

**Psychosocial Factors and Return to Sport Outcomes in
Football: a Mixed Methods Approach**

Dale Martin Forsdyke

**Submitted in accordance with the requirements for the degree of
Doctor of Philosophy**

The University of Leeds

York St John University

School of Science, Technology and Health

Submitted - July 2020

Intellectual Property and Publication Statement

The candidate confirms that the work submitted is their own, except where work which has formed part of jointly authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

This copy has been supplied on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement

The work in study one of the thesis has appeared in publication as follows:

Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: a mixed studies systematic review, British Journal of Sports Medicine, May 2016, Dale Forsdyke, Professor Andy Smith, Dr Michelle Jones and Dr Adam Gledhill.

I was responsible for proposing and implementing the search strategy, leading the research team on study selection and analysis, and preparing the systematic review manuscript as the lead author. The contribution of the other authors was Professor Andy Smith and Dr Adam Gledhill formed the research team with me and provided critical discourse on the study selection and analytical processes. Additionally, all three co-authors provided feedback on the prepared manuscript prior to submission to improve its overall quality. The author contributions are also stated in the published article.

“The right of Dale Forsdyke to be identified as Author of this work has been asserted by himself in accordance with the Copyright, Designs and Patents Act 1988.”

©2020 Dale Forsdyke

The following work was published over the course of doctoral study:

Publications:

Gledhill, A., & **Forsdyke, D.** (2018). An ounce of prevention is better than a pound of cure: shouldn't we be doing EVERYTHING to reduce sports injury incidence and burden? *British Journal of Sports Medicine*, 52, 1292-1293.

Gledhill, A., & **Forsdyke, D.**, & Murray, E. (2018). Psychological interventions used to reduce sports injuries: a systematic review of real-world effectiveness *British Journal of Sports Medicine*, 52, 967-971.

Jowett, G.E., Hill, A., **Forsdyke, D.**, & Gledhill, A. (2018). Perfectionism and coping with injury in marathon runners: A test of the 2x2 model of perfectionism. *Psychology of Sport and Exercise*, 37, 26-32.

Madigan, D.J., Stoeber, J., **Forsdyke, D.**, Dayson, M., & Passfield, L. (2017). Perfectionism predicts injury in junior athletes: Preliminary evidence from a prospective study, *Journal of Sports Sciences*, 36 (5), 545-550.

Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2017). Infographic: Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes. *British Journal of Sports Medicine*, 51,561.

Forsdyke, D., Gledhill, A., & Ardern, C.L. (2017). Psychological readiness to return to sport: three elements to help the practitioners decide whether the athlete is REALLY ready? *British Journal of Sports Medicine*, 51(7), 555–556.

Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2016). Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: a mixed studies systematic review. *British Journal of Sports Medicine*, 50 (9), 537-544.

Presentations and webinars:

Invited keynote at Sporting Shoulder Conference (2019): **Forsdyke D.** *Is my athlete REALLY ready to return to sport following injury? The role of psychological readiness.* Liverpool, UK.

Invited keynote at British Association of Sport and Exercise Medicine (BASEM) Conference (2019): **Forsdyke D.** *Is my athlete REALLY ready to return to sport following injury? The role of psychological readiness.* Glasgow, UK.

Presented at the British Association of Sport and Exercise Sciences (BASES) Annual Conference (2018): **Forsdyke D,** Smith A, Gledhill A, Madigan D. *Social support and psychological readiness to return to sport after injury in football players: the mediating role of re-injury anxiety.* Harrogate, UK.

Presented at the Future of Football Medicine Conference (2017): **Forsdyke D,** Gledhill A, Smith A. *Psychosocial factors related to sports injury outcomes in elite female football players.* Barcelona, Spain.

Invited keynote at Running 2017 (2017): **Forsdyke D.** *Rehabilitating the athlete not just the injury: Psychological aspects of running injury rehabilitation.* Kettering, UK.

Human Kinetics/BASES Webinar June 16th (2015): Gledhill A, **Forsdyke D.** *Rehabilitating the athlete not just the injury.* <https://t.co/IeqMi3Jv9A>

Preface: Placing the research into the context of the research-practitioner

“I’ve got no hamstring in the middle. I’m basically running on two hamstrings on my right leg and three on the other. That injury has probably changed my whole career.

I’ve been compromised from the age of 19”

(televised interview quote from Michael Owen, ex-international football player,

https://www.youtube.com/watch?v=2YFEwTa_DjU)

The completion of this doctoral thesis has been accomplished and influenced by my two interrelated personas – the inquisitive academic researcher and the sports therapy practitioner. Both are equally important to appreciate when reading the content of this thesis, the lenses it is intended to be viewed through, and the context it is derived from.

Despite having common aims (e.g., reducing injury incidence, optimising return to sport outcomes) there is frequently tension between research and practitioner facing environments regarding the alignment of their respective priorities (Jones et al., 2019). Often what works in practice isn’t entirely supported by research, and inferences from empirical research are often not sensitive to the contextual demands of practitioner environments. For example, research informs us that psychological, social and contextual factors are associated with the outcome of sports injury (Truong et al., 2020). However, at the same time sports injury practitioners often feel under-trained and over-challenged at recognising, monitoring, and modulating these factors (e.g., Alexanders, Anderson & Henderson, 2015; Heaney, Walker, Green & Rostron, 2015). Therefore, often what works in theory does not work in practice. As such, the research questions that form the main purpose of this thesis are derived from “real world” observations and experiences in applied settings, together with addressing some limitations that arise from the literature.

Considering this, the present thesis is shaped by an applied research-practitioner framework (Jones et al., 2019). According to Jones et al., (2017) the research-practitioner is familiar with both practitioner and research environments and doing so benefits from access to participants (and subsequently data) with “real life” questions driving research. This framework has its origins in Pasteur’s Quadrant where research is classified as: (i) pure-basic; (ii) use-inspired; or (iii) pure-applied contingent on its quest for understanding and considerations of use (Stokes, 1997; Tushman & O’Reilly, 2007). The latter two classifications of research are important elements in the practitioner-researcher framework and are well aligned with my own philosophical and axiological beliefs about the value of research (i.e., pragmatism, value laden). This is the belief that the central aim of research is to enhance practice through providing clinically relevant and practically meaningful findings. To me this PhD intends to give a “voice” to past, present and future injured players and challenges my peer sport injury practitioners of all professional backgrounds to reflect on and develop their working practices. After all, it is becoming increasingly recognised that it is not necessarily what you do, but the manner in which you do it that seems to be important in sport and exercise medicine (e.g., King, Roberts, Hard & Ardern, 2019).

Being a sports therapy practitioner immersed in the context that this thesis is grounded in has influenced the research approach of the thesis. For over ten years I have worked as a sports therapy practitioner in football. This “lived” experience has developed me into being a pragmatist as a practitioner and researcher. It is expected that a sports injury practitioner works across methodologies and methods when assessing, monitoring, and making clinical decision on injured athletes (see Brukner et al., 2017; Petty & Ryder, 2018). For example, it is common that subjective data (i.e., descriptive, experiential and player-reported) and objective data (i.e., numerical, measurable and testable) are used in combination to form clinical judgements. Both quantitative and

qualitative research findings can be generalisable and serve to develop understanding and challenge practice (Smith, 2018). In this sense the methodologies and methods adopted in this thesis have been specifically selected based on the thesis aims and research questions underpinning each study.

Despite working with many football players, one applied example stands out as developing my curiosity into this research area and stimulating reflection on my own practice. This example was an experienced international football player who had sustained anterior cruciate ligament (ACL) injury requiring surgical reconstruction. This particular player had returned to sport for over 18-months was performing well and was physically robust. The team had an important away fixture at the same football ground that the injury was sustained at. Approaching the fixture, the player indicated her anxiety at returning to the “scene of the crime” and that she had lost confidence in performing. This stimulated many questions such as: (i) could it be that the player was physically but not necessarily psychologically recovered; (ii) if so, what factors (beyond the physical) are important when returning to sport following injury? and (iii) how are these important factors developed or diminished? It is hoped that this doctoral journey has led to my development both as a researcher and sport injury practitioner and enables, in part, these important questions to be addressed so that return to sport following injury can be better understood.

Acknowledgments

This part time doctoral journey began over 6 years ago and as such this thesis is the product of hard work and resilience. In many ways completing this thesis shares similar characteristics with returning to sport following injury! There were many occasions that I doubted my ability to get to this point and it has taken the support of key individuals to keep motivated and grounded during the completion of this doctoral journey. Therefore, this acknowledgment section allows me to give recognition to the people who have supported me through this period.

First, and most importantly, I would like to acknowledge the role of my family. Sophie (my wife) has been my driving force ever since we met at York St John University in 1997. She has always seen the potential in me that I could not, and for that I will always be grateful. As for my children, Isla and Leo, I am pretty sure they know very little about my research, and even if they did, they aren't particularly interested in listening to me talking about it. However, rather than being a frustration this has been enormously helpful and, in some ways, therapeutic. They have prevented the completion of this thesis becoming overwhelming or all-consuming. Instead, they have enabled me to place everything into perspective and keep me focussed on my most important job in life – being a dad. My family are beautiful, funny, talented, and infuriating in equal measure, and have been central to me completing this thesis – thank you.

Secondly, I would like to thank my PhD supervisors and colleagues. I was introduced to my supervisor Professor Andy Smith way back in 1996 during my undergraduate degree and so it is nice 24 years later to have completed this thesis under his guidance. My main supervisor, Dr Daniel Madigan is one of the best academics I have worked alongside, and I thank him for sharing his expertise, encouragement, and for his patience in order to get this thesis over the line. To my external supervisor,

fellow researcher in this field and close friend, Dr Adam Gledhill, your input for many years has been supportive and challenging in equal parts – thank you. Thanks to Dr Sarah Mallinson-Howard for offering critical feedback on the work. I am very lucky to have colleagues (past and present) that are my best friends in the world, and I thank them for listening, providing alternative perspectives, and being a distraction. Good colleagues and good friends are hard to find so I am really fortunate – and as a starting point I definitely owe you a few beers.

Lastly, I would like to recognise the intellectual generosity of the participants that have contributed to the thesis, and my peers in the world of football and sports and exercise medicine. Throughout this doctoral journey I have had the opportunity to disseminate my research locally (e.g., BASEM regional CPD evening), nationally (e.g., Liverpool Hope Shoulder 2019 Conference, BASEM annual conference) and internationally (e.g., Football Medical Strategies conference, lab visit to University of Alberta). It is for these opportunities and people being receptive to my research that I am thankful for. For the practitioners that have embraced my research and have applied this into their own practice, thank you. I hope you this has enabled you to better manage your injured athletes.

Thesis Abstract

Injuries are common in amateur and professional football. As such, much work has focused on understanding the return to sport process following injury. However, in this regard, research and practice have tended to focus on biological and physical factors. This is despite the belief that psychosocial factors may have a comparable prognostic influence on return to sport outcomes. Therefore, the main purpose of this thesis was to examine the psychosocial factors associated with return to sport outcomes following injury in football. To do so, four studies were conducted. Study one evaluated the current research on psychosocial factors and return to sport outcomes by systematically reviewing the empirical evidence ($N = 25$). Study two qualitatively explored how psychosocial factors are associated with return to sport outcomes by conducting photo-elicitation interviews with previously injured international female players ($N = 8$). Study three examined the relationship between psychosocial factors and return to sport outcomes by collecting cross-sectional quantitative data from previously injured players ($N = 150$). Study four examined the same relationship but did so using a longitudinal design and previously injured male academy players ($N = 68$). Overall, the findings of this thesis: (1) suggest that perceived social support and re-injury anxiety are potentially important psychosocial factors that are related to return to sport outcomes; (2) enable further conceptual and contextual understanding regarding the role of perceived social support during the return to sport process; (3) provide further conceptual understanding of psychological readiness to return to sport and how this can be developed or diminished over time via its relationship with social support and re-injury anxiety; and (4) provide both amended and new frameworks that can be used for future research and practice in order to optimise return to sport outcomes following injury in football.

Table of Contents

Preface	i
Acknowledgements	iv
Thesis Abstract	vi
Table of Contents	
Lists of Tables	
List of Figures and Illustrative Material	
Glossary of Abbreviations	
1.0 Chapter One. Thesis Context and Conceptual Background	1
1.1 Aim of the chapter one	2
1.2 Introduction	3
1.3 Defining sports injury	4
1.4 The burden of injury in football	8
1.5 Return to sport following injury	11
1.6 Return to sport outcomes	17
1.7 Psychological or psychosocial factors?	21
1.8 The importance of psychosocial factors	22
1.9 What the current evidence suggests about psychosocial factors and return to sport outcomes	24
1.9.1 Systematic review evidence	25
1.9.2 Quantitative study evidence	27
1.9.3 Qualitative study evidence	31
1.10 Theoretical underpinnings of psychosocial factors and return to sport	33

1.10.1 Stage-based approaches and return to sport	34
1.10.2 Cognitive appraisal-based approaches and return to sport	37
1.10.3 Biopsychosocial-based approaches and return to sport	42
1.10.4 Motivation-based approaches and return to sport	47
1.10.5 Perspectives on the theoretical landscape of psychosocial factors and return to sport	51
1.11 The problem stated	52
1.12 Overall purpose and aims of the thesis	54
1.13 Chapter summary	58
2.0 Chapter Two (study one). Psychosocial Factors Associated with Sports Injury Outcomes in Competitive Athletes: A Mixed Studies Systematic Review	60
2.1 Aim of Chapter two	61
2.2 Study abstract	63
2.3 Introduction	64
2.3.1 Psychosocial factors	64
2.3.2 Previous systematic reviews	66
2.3.3 Mixed studies systematic reviews	67
2.3.4 The present study	68
2.4 Methods	69
2.4.1 Ontological and epistemological assumptions	69
2.4.2 Ethical considerations	69
2.4.3 Search strategy	70
2.4.4 Eligibility criteria	71

2.4.5 Assessment of risk of bias	72
2.4.6 Data Synthesis	72
2.4.7 Establishing rigour	73
2.5 Results	74
2.5.1 Literature identifications	74
2.5.2 Assessment of risk of bias	74
2.5.3 Demographic characteristics	75
2.5.4 Study characteristics	76
2.5.5 Psychosocial factors	95
2.5.6 Injury-related emotions associated with sport injury rehabilitation outcomes	96
2.5.7 Injury-related cognitions associated with sport injury rehabilitation outcomes	97
2.5.8 Injury-related behaviours associated with sport injury rehabilitation outcomes	99
2.6 Discussion	100
2.6.1 Review findings	100
2.6.2 Current empirical limitations and future directions	103
2.6.3 Strengths and limitations of the review	104
2.7 Conclusion	106
3.0 Chapter Three (study two). ‘Together we are Limitless’: A Qualitative Study of Perceptions of Social Support and Return to Sport Outcomes in International Women Football Players	107
3.1 Aim of Chapter Three	108

3.2 Study abstract	109
3.3 Introduction	111
3.3.1 Psychosocial factors	111
3.3.2 Social support	112
3.3.3 Social support and the experience of injury	114
3.3.4 Social support and return to sport outcomes	116
3.4.5 The benefits of a qualitative approach	118
3.4.6 The present study	118
3.4 Methods	120
3.4.1 Ontological and epistemological assumptions	120
3.4.2 Ethical considerations	121
3.4.3 Participants and sampling	121
3.4.4 Procedure	123
3.4.5 Analysis and establishing rigour	125
3.5 Results	127
3.5.1 Factors influencing the social support process	127
3.5.2 Perceptions of high and low-level social support	129
3.5.3 Social support and the experience of the injury process	131
3.5.4 Social support, experience of the injury process and return to sport outcomes	135
3.6 Discussion	138
3.6.1 Influencing factors of the social support process	139
3.6.2 Perceptions of high and low-level social support	140

3.6.3 Perceptions of social support and the experience of the injury process	140
3.6.4 Perceptions of social support, the experience of the injury process and return to sport outcomes	142
3.6.5 Study limitations and future considerations	144
3.6.6 Applied implications	146
3.7 Conclusion	148
4.0 Chapter Four (study three). Social Support and Psychological Readiness to Return to Sport After Injury in Football Players: The mediating Role of Re-injury Anxiety	149
4.1 Aim of Chapter Four	150
4.2 Study abstract	151
4.3 Introduction	152
4.3.1 Psychological readiness to return to sport	152
4.3.2 Perceived social support	153
4.3.3 The mediating role of re-injury anxiety	155
4.3.4 The present study	157
4.4 Methods	158
4.4.1 Ontological and epistemological assumptions	158
4.4.2 Ethical considerations	159
4.4.3 Participants	159
4.4.4 Procedure	160
4.4.5 Measures	161
4.4.6 Data screening	162

4.4.7 Analytical strategy	163
4.5 Results	164
4.5.1 Descriptive statistics and bivariate correlations	164
4.5.2 Regression and mediation analysis	168
4.6 Discussion	169
4.6.1 The mediating role of re-injury anxiety	169
4.6.2 Other possible mediating pathways	171
4.6.3 Limitations and future directions	172
4.6.4 Applied implications	172
4.7 Conclusion	174
5.0 Chapter Five (study four). Perceived Social Support and Changes in Re-injury Anxiety and Psychological Readiness to Return to Sport Over Time in Football Players	175
5.1 Aim of Chapter Five	176
5.2 Study abstract	177
5.3 Introduction	178
5.3.1 Psychological readiness to return to sport	178
5.3.2 Perceived social support	180
5.3.3 Re-injury anxiety	182
5.3.4 Longitudinal designs	184
5.3.5 The present study	186
5.4 Methods	187
5.4.1 Ontological and epistemological assumptions	187
5.4.2 Ethical considerations	187

5.4.3 Participants	188
5.4.4 Procedure	189
5.4.5 Measures	190
5.4.6 Data screening	192
5.4.7 Analytical strategy	193
5.5 Results	193
5.5.1 Descriptive statistics and bivariate correlations	193
5.5.2 Growth curve modelling	195
5.6 Discussion	196
5.6.1 Perceived social support and changes in psychological readiness to return to sport and re-injury anxiety	199
5.6.2 Change in psychological readiness to return to sport and re-injury anxiety	200
5.6.3 Applied implications	203
5.6.4 Study limitations and future directions	204
5.7 Conclusion	205
6.0 Chapter Six. General Discussion and Conclusions	206
6.1 Aim of the Chapter Six	207
6.2 Drawing the thesis together	208
6.3 Discussion of the Research Aims of the Thesis	209
6.3.1 Discussion of research aim one	209
6.3.2 Discussion of research aim two	211
6.3.3 Discussion of research aim three	213

6.3.4 Meta inference of findings	217
6.4 Theoretical implications of the research	221
6.5 Applied implications of the research	227
6.6 Research strengths and limitations	235
6.7 Future research directions	242
6.8 Concluding remarks	247
Chapter Seven. Thesis references	249
Chapter Eight. Appendices	
Appendix A: Ethical approval letters and references numbers	
Appendix B: Published study one infographic, <i>Infographic: Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes</i>	
Appendix C: PRISMA checklist used for study one	
Appendix D: Examples of photographs and images forming the photo-elicitation interviews (PEI)	
Appendix E: Perceived Available Social Support Questionnaire (PASS-Q)	
Appendix G: Re-Injury Anxiety Inventory (RIAI)	
Appendix G: Injury – Psychological Readiness to Return to Sport Scale (I-PRRS)	
Appendix H: Published editorial, <i>Psychological readiness to return to sport: three key elements to help the practitioner decide whether the athlete is REALLY ready?</i>	

Lists of Tables

Table 2.1 <i>Search terms used for the systematic review</i>	70
Table 2.2 <i>Eligibility criteria applied to studies</i>	71
Table 2.3 <i>Study quality appraisal</i>	78
Table 2.4 <i>Demographic information from included studies</i>	80
Table 2.5 <i>Study research findings</i>	84
Table 2.6 <i>Thematic evaluation of the included studies</i>	95
Table 4.1 <i>Sample demographics and descriptive statistics</i>	165
Table 4.2 <i>Bivariate correlations and Cronbach's alpha</i>	166
Table 4.3 <i>Summary of multiple regression analyses predicting psychological readiness to return to sport.</i>	167
Table 5.1 <i>Descriptive statistics, bivariate correlations and Cronbach's alpha.</i>	197

List of Figures and Illustrated Materials

Figure 1.1 <i>Representation of the rehabilitation and return to sport process following injury (modified from Ardern et al., 2016).</i>	12
Figure 1.2 <i>Quadrants of optimal readiness to return to sport following injury.</i>	15
Figure 1.3 <i>Conceptual hierarchical diagram of return to sport outcomes.</i>	20
Figure 1.4 <i>The grief response model (adapted from Kübler-Ross, 1969).</i>	35

Figure 1.5 Integrated model of psychological response to the sport injury and rehabilitation process (adapted from Wiese-Bjornstal et al., 1998).	39
Figure 1.6 Explanatory relationships between cognitive appraisals, emotional response, behavioural response and outcomes existing in the dynamic core of the integrated model (adapted from Walker, Thatcher & Lavallee, 2007).	42
Figure 1.7 The biopsychosocial model of sports injury rehabilitation (adapted from Brewer, Andersen & Van Raalte, 2002).	44
Figure 1.8 Potential pathways between psychological factors and sport injury rehabilitation outcomes (adapted from Brewer, 2010).	47
Figure 1.9 Representation of basic psychological needs theory relationship with motivation and rehabilitation adherence (modified from Ryan & Deci, 2007).	49
Figure 1.10 Representation of the relationship between the studies included in this thesis. Qual = qualitative approach to data collection and /or analysis; Quan = quantitative approach to data collection or analysis.	58
Figure 2.1 Process overview of study identification, screening, eligibility, and inclusion (adapted from Moher et al., 2009).	75
Figure 3.1 Explanatory thematic map of perceived social support processes and return to sport outcomes grounded in an international women's football context.	138
Figure 4.1 Hypothesised model of the relationship between perceived social support, re-injury anxiety, and psychological readiness to return to sport.	158

<p>Figure 4.2 Mediation model of total perceived social support and re-injury anxiety predicting return to sport confidence.</p>	169
<p>Figure 5.1 Fixed interval re-injury anxiety and psychological readiness to return to sport growth curve changes over time from measurement means.</p>	195
<p>Figure 5.2 Conditional PP-LGCM of total perceived social support during rehabilitation on the intercept and linear slope of re-injury anxiety and psychological readiness to return to sport over time.</p>	198
<p>Figure 6.1 Modified biopsychosocial model of sports injury rehabilitation (Brewer, Andersen & Van Raalte, 2002) based on the thesis findings together with recent empirical evidence.</p>	227

List of Abbreviations

ACL – Anterior Cruciate Ligament

COSMIN - Consensus-Based Standards for the Selection of Health Status

Measurement Instruments

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROSPERO – International Prospective Register of Systematic Reviews

MeSH – Medical Subject Headings

1.0 Chapter One

Thesis context and conceptual background

1.1 Aim of Chapter One

The main purpose of this thesis is to examine the psychosocial factors associated with return to sport outcomes following injury in the context of football. Chapter one is a narrative review which introduce the reader to the concepts that are central to this thesis, and to the context in which this thesis is grounded in. In particular, this chapter reviews the current evidence base on sports injury, return to sport outcomes, and psychosocial factors within a football context. By doing so, this chapter develops the rationale for the aims of the thesis and for the four studies intending to address these aims. First, an overview of sports injury in a football context is provided. Second, the literature on return to sport following injury and return to sport outcomes is presented. Third, the theoretical underpinnings of how psychosocial factors influence return into sport outcomes are evaluated. Finally, having scoped and rationalised the central concepts, the aims of the thesis are presented along with how each study intends to address the aims. Additionally, how the four studies included in this thesis expand on one another to create an aligned and coherent body of work is also elucidated. Consequently, this background chapter provides a useful orientation for navigating the overall thesis (Oliver, 2014).

1.2 Introduction

Association football (referred to as football from this point onwards) is a sex, age and ability inclusive sport. Globally, there are a reported 270 million people actively participating in football (Fédération Internationale de Football Association, 2006). In England, this corresponds to over eight million people who participate in football activities of some form (English Football Association, 2015). Regularly participating in sport and exercise is beneficial to many aspects of physical, psychological, and social health (e.g., Blair & Morris, 2009; Donaldson & Finch, 2012). Taking part in football is no different, and regular participation in football has been associated with improved cardiorespiratory (e.g., VO_2 max), musculoskeletal (e.g., muscle strength, bone mass) and metabolic health (e.g., glucose tolerance) and as such may reduce the risk of chronic adult disease and illness (e.g., hypertension, diabetes; Krstrup & Krstrup, 2018). The strength of the evidence is such that regularly taking part in football activities is seen as “medicine” that prevents ill health and serves to enhance the health of those already ill (Krstrup et al., 2017). Paradoxically, routine participation in football can also pose a threat to health. This detrimental effect is commonly demonstrated in the form of sport injuries (e.g., Boyce & Quigley, 2004; Dijkstra et al., 2014; Ekstrand et al., 2020). Given the relatively high risk of injury in football, there are thought to be two types of football player, those that have sustained a significant injury, and those that have not yet sustained a significant injury (Brown, 2005). It is thought that sustaining a sports injury is an almost inevitable consequence of participation in football (Ardern et al., 2016). Sustaining a sports injury presents an arduous challenge for any football player and therefore a greater understanding of sport injuries in football and return to sport following injury is important to inform both research and practice.

1.3 Defining Sports Injury

At face value, the question of “what is a sports injury?” appears to be a simple one. However, it is much more complex than is initially expected. In fact, sports injury can be defined in several different ways. This includes the use of all complaints, medical attention, time-loss, and time-loss from competition definitions (Clarsen & Bahr, 2014; Fuller et al., 2006). The all-complaints definition refers to all injuries or physical complaints, including those that may not necessarily need medical attention as they are sub-clinical (e.g., experiencing delayed onset of muscle soreness following high intensity training). The medical attention definition differs in that to be classified as a sports injury there is a requirement for assessment, diagnosis, and treatment from a qualified practitioner, and is irrespective of any time-loss. Meanwhile, the time-loss definitions focus on sports injuries that result in players being unable to train and/or compete for a period of time. Key considerations are the nature of the time-loss within the time-loss definitions (i.e., the player being unable to compete in matches is a component of the competition time-loss definition). These various sports injury definitions can be placed in a broad to narrow hierarchical order based on the number of injuries each is likely to capture. For example, the all-complaints definitions would be expected to capture the most sports injuries, whereas time-loss from competition definitions would capture the fewest (Clarsen & Bahr, 2014).

Having numerous ways to conceptualise sports injury presents a challenge to sports injury practitioners and researchers. For example, epidemiological studies within sports and between sports have defined sports injury inconsistently (i.e., what is included as a recordable event). This means that comparing the rates of sports injury between different sports or comparing the findings from various studies is problematic. As such, a recommended minimum requirement when studying any sports injury topic is that they should explicitly state their operationalised definition of sport injury should

be explicitly stated (Clarsen & Bahr, 2014). This will enable readers of such sports injury studies the ability to better appreciate the context from which the data is generated.

Within the context of football, time-loss definitions are by far the most frequently used (e.g., Ekstrand et al., 2020; Hägglund, Waldén, Bahr & Ekstrand, 2005). Specifically, it is the time-loss from all football activities that is most commonplace. All football activities include all scheduled training and competitions. As such, in most football research, injury tends to be broadly defined as any physical complaint sustained by a player that causes interruption or absence from the next training session or competitive fixture (Hägglund et al., 2005). From a pragmatic perspective this definition means that what constitutes a sports injury and what does not can be easily delineated. Thus, the advantage to practitioners is that determining what constitutes a recordable event is straightforward (i.e., did the injury lead to interruption or absence?). An additional benefit for researchers is this definition allows similar players to be recruited and sampled more easily, compared with adopting other definitions (e.g., all complaints, medical attention) when making player comparisons.

To give a balanced perspective, the reliance on the time-loss definition in football has several limitations that researchers and practitioners should be aware of. First, while this definition is sensitive enough to report traumatic injuries (i.e., a sudden onset of symptoms), it may not accurately reflect overuse injuries (i.e., a gradual onset of symptoms). This is because many players with overuse injuries may feel able to continue to train and compete despite the existence of an overuse pathology (e.g., initial pain that frequently subsides with movement). Additionally, it is also thought that football players may not incur any time-loss from certain sports injuries if they use pain management strategies such as oral analgesics or by modifying load (Clarsen & Bahr, 2014; Tscholl, Vaso, Weber & Dviorak, 2014). Second, the time-loss definition is

dependent on the frequency of training and competition. For instance, for the same injury, an injured professional football player will miss more training and competitions when compared to a recreational player with an identical injury, simply because the professional football player will miss many more opportunities to engage in football activities than a recreational player. Third, time-loss definitions often differ based on the perceived importance of the player, and importance of the phase of the season (Fuller et al., 2006). For example, a player who is regarded as integral to the team will miss less time with injury during important stages of the season. This may be due to such players being “rushed” back into sport or such players being given preferential treatment modalities which may enhance tissue recovery (e.g., biological regenerative therapies). Finally, this type of definition excludes other potentially important forms of time-loss from football activities such as psychological complaints (e.g., depression) and illnesses (e.g., virus). Both psychological complaints and illness may have similar prevalence and represent similar burdens to sports injuries (Gouttebauge et al., 2019).

Considering the above, there are several reasons which both support and limit the use of time-loss definition of sports injury. Thus, for these reasons, any definition of sports injury adopted within a study should be clearly stated, and be context and research design specific, as one definition does not appear to fit all situations (Clarsen & Bahr, 2014). Given this background, sports injury is operationalised using the time-loss definition in this thesis in order to provide readers with clarity in terms of the nature of the players recruited and sampled, and the extent to which findings in can be reliably inferred.

One important issue related to time-loss definitions that is frequently manipulated based on research design, is what constitutes enough time-loss (i.e., the sufficient number of days away from football activities to be included in the study sample). The amount of time-loss due to sustaining a sports injury is frequently referred

to as the injury severity. The severity of injury is often expressed as the total number of elapsed days from the date the injury was sustained until the player returns to full participation in football activities (Fuller et al., 2006). As such, the severity of sports injury can be described as slight (1-3 days of time-loss), minor (4-7 days of time-loss), moderate (8-28 days of time-loss), major (>28 days of time-loss), or career ending (no return to the pre-injury sport; Fuller et al., 2006; Hägglund et al., 2005). Injury severity as an inclusion criterion is frequently manipulated in the research for pragmatic reasons (e.g., to ensure an adequate sample size) and to keep the study sample relatively homogenous (e.g., to ensure a comparable starting point to permit more exact theoretical predictions). In the context of this thesis, the effect that psychosocial factors may have on return to sport outcomes may be very different: sustaining a slight injury (e.g., a low-grade muscle strain or contusion) that may lead to a few days to a week of time-loss from football activities, compared to sustaining a major injury leading to several months of time-loss (e.g., a ruptured tendon or fracture). While it is logical in this research area to strive for homogeneity in the form of injury type, doing so has, in part, contributed to a clear injury bias in the literature. For example, a proliferation of studies have focused on severe knee injuries (e.g., ACL rupture; Ardern, Taylor, Feller, Whitehead & Webster, 2015). This is understandable given that such injuries are potentially career-threatening, frequently require surgical intervention, and have relatively poor short- and long-term prognoses. However, this has hampered the overall understanding of return to sport outcomes for other sports injuries that may also be highly prevalent (e.g., a hamstring strain) or that may lead to similar time-loss from football activities (e.g., a high-grade ankle sprain). In other words, while the understanding of return to sport outcomes for ACL injury is developing, the understanding of return to sport outcomes for other sports injuries that are common in football is limited.

Against this background, this thesis accommodates the aforementioned issues in two ways. First, each study uses a clear operational time-loss definition of sports injury in order to provide clarity on the sampling and nature of the participants. Following the recommendations of Clarsen and Bahr (2014), this definition is context and research design specific. Second, while utilising homogenous samples in an attempt to examine comparable injury and return to sport experiences, no specific focus is given to any single type of sports injury. There are merits to focussing on one injury, although in light of the evidence base this thesis does not intend to further add to the injury bias in the literature. Additionally, football players may sustain many types of injury and re-injury (Ekstrand et al., 2020). As such, the findings from the studies in this thesis may have greater utility for practitioners working with players who have sustained various sports injuries.

1.4 The Burden of Sports Injury in Football

Given its central positioning in this thesis, it is prudent to contextualise the specific burden of sports injury in football. Injury burden is a relatively contemporary term and is a function of injury incidence (i.e., the number of sports injuries per number of athletic exposure hours, frequently normalised to every 1000 hours) and injury severity (i.e., the time-loss from football activities; Bahr, Clarsen, & Ekstrand, 2018). Exposure hours typically include the accumulated time from regular training and competition. Combining measures of incidence and severity allows a more accurate representation over the impact of a sports injury. On the one hand, hamstring strains may have relatively low severity, but within football the incidence of hamstring injuries is high (Ekstrand et al., 2020). On the other hand, ACL injury may have high severity, but fortunately the incidence in football is relatively low (Ekstrand et al., 2020). As such, both injuries may have a similar burden, and therefore may have the same overall negative impact on players and the team. Research into sports injuries in football has

tended to either focus on injuries with high incidence rates (e.g., hamstring strain) or most frequently those with major severity (e.g., ACL rupture). This has led to further injury bias in the literature, which has hindered understanding of the impact of sports injuries with moderate severity and incidence. Moderate injuries are particularly important as cumulatively they represent the greatest cause of player absence in football (Ekstrand et al., 2020).

In football, the burden of injury is high across all nations, levels of performance, sex, and age. For example, at the elite level of men's football, epidemiological studies have reported that 130 days are lost to injury per 1000 hours of exposure (e.g., Hägglund, Waldén, Magnusson, Kristenson, Bengtsson & Ekstrand, 2013). At the sub-elite level of men's football, a reported 228 days are lost to injury per 1000 hours of exposure (e.g., Whalan, Lovell, McGunn & Sampson, 2019). In women's football, injury rates are reported to be between 1.4 and 23.6 injuries per 1000 hours of exposure (e.g., Gaulrapp, Becker, Walther, Hess, 2010; Tegnander et al., 2008). Finally, in boy's youth football, injury rates can range from 0.69 to 80 injuries per 1000 hours of exposure, accounting for the consequences of aspects of biological and psychosocial maturation (e.g., Renshaw & Goodwin, 2016). In addition, many players tend to sustain a re-injury (i.e., an injury of the same type and location as the initial injury) as a possible consequence of premature return to sport (Ekstrand et al., 2020). This then incurs an extended absence from football activities which is often longer than the absence caused by initial injury (Ekstrand et al., 2020). Collectively, these findings suggest that the burden of sports injury in football represents a significant challenge to players, practitioners and researchers. This is particularly important as sustaining a sports injury often incurs a range of negative consequences.

Although it has been argued that sports injury can have positive consequences via personal adversity-related growth, this is by no means guaranteed (e.g., Roy-Davis,

Wadey & Evans, 2017). It is much more likely that sports injury will have negative consequences (e.g., Drew, Raysmith & Charlton, 2017). The negative consequences of sports injury can span several operational levels. This includes the player, team, and organisational levels. On a player-level, each football player can expect to sustain around two sports injuries per season that will lead to an absence from football activities (Ekstrand, Hägglund & Waldén, 2009). When a player does sustain a sports injury, the prognosis is frequently poor in terms of the decision about whether or not to return to competitive football (Arden et al., 2015; Lai, Arden, Feller & Webster, 2017), the inability to attain pre-injury levels of performance (e.g., Ishøi, Thorborg, Kraemer & Hölmich, 2018), re-injury (e.g., Ekstrand, Hägglund & Waldén, 2009; Hägglund, Waldén, Bengtsson & Ekstrand, 2018), and long-term health issues (e.g., osteoarthritis; Webster & Feller, 2019). Consequently, sustaining a sports injury is likely to have an adverse effect on a player's career trajectory (Ivarsson, Stabulova & Johnson, 2018). This is potentially significant given the dynamic nature and culture of the football industry (e.g., short-term contracts of employment, pressure for optimal performance levels versus time to develop).

On a team-level, a typical squad of 25 players can expect around 50 sports injuries per season (Ekstrand, Hägglund & Waldén, 2009). This is important, since having a lower injury burden, matched with a subsequently higher player availability in training and competition, is associated with greater team success (e.g., Drew et al., 2017; Hägglund et al., 2013). In other words, the most successful teams will have more of their best players available for selection, and consequently have a greater opportunity to develop as a cohesive unit. For example, an 11-season prospective study of 24 teams found that a lower injury burden and higher match availability was associated with higher league positioning, number of points per game, and success in major international club competitions (Hägglund et al., 2013). Recent additional evidence in

English football found that for every 136 days lost to injury equated to the loss of one league point, while every 271 days lost equates to finishing one place lower in the league (Eliakim, Morgulev, Lidor & Meckel, 2020). As such the burden of injury could be a deciding factor between team success (e.g., winning a league title, promotion) and failure (e.g., relegation).

Finally, at an organisation level, the economic cost of sports injury in football is substantial. In elite European football, each sports injury that leads to four-weeks' worth of time-loss from training and competition is thought to cost a football club €500,000 (Ekstrand, 2013). Additionally, in English football it is indicated that £45 million is lost each season due to injury-related decrements in performance (Eliakim et al., 2020). In lower levels of performance (e.g., sub elite, recreational), the economic cost is likely to include loss of earnings, reduced productivity, and the on-going cost of sports injury screening and treatment (e.g., to the National Health Service; Cump, Verhagen, Annemans & Meeusen, 2008). While the specific economic cost of sports injury in the United Kingdom (UK) is yet to be established, it is likely to account for billions of pounds (Kellezi et al., 2016). In light of the significant negative consequences of sports injury, the optimal strategy for returning football players back to sport following injury is an important consideration for all football stakeholders.

1.5 Return to Sport Following Injury

Against the background of negative consequences of sports injury, over the last decade, research on how to optimally return players to sport following injury has proliferated (e.g., McCall, Lewin, O'Driscoll, Witvrouw & Ardern, 2016). This research suggests a number of stages of returning to sport. For most players, prior to beginning the return to sport process, there is a period of injury assessment, diagnosis and treatment. After this it is typical for players to engage in focussed rehabilitation activities with the aim of restoring physical function in order to competently complete

activities of daily living (e.g., sitting to standing, climbing stairs, unaided walking). It is thought that the return to sport process that follows is complex (i.e., it differs according to the sport and performance level of the player) and should be viewed as a continuum which is paralleled with rehabilitation and tissue healing processes (see Figure 1.1; Ardern et al., 2016).

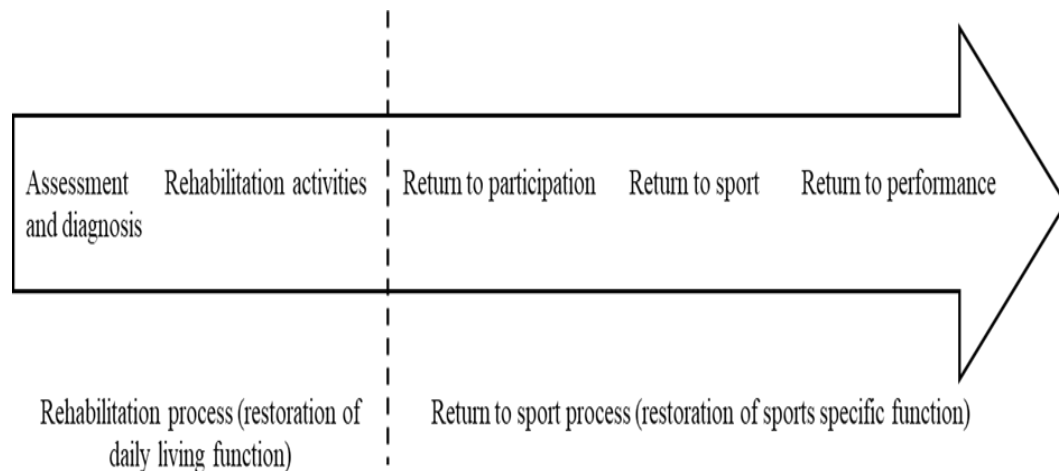


Figure 1.1. Representation of the rehabilitation and return to sport process following injury (modified from Ardern et al., 2016).

The return to sport continuum (see Figure 1.1) has three progressive elements: (i) return to participation; (ii) return to sport; and (iii) return to performance (Ardern et al., 2016). Return to participation refers to participating in football training activities or in some modified competition. However, the player is not yet fully “ready”. In other words, the player does not have sufficient physical and/or psychological readiness to return to sport. Next, return to sport refers to the point where the player has returned to their defined sport but is unable to compete at their desired or expected performance level. Finally, a return to performance refers to the player having returned to their defined sport and been able to perform at a level comparable to or exceeding their pre-injury levels. Additionally, this means that the player’s pre-injury status has been restored. For many players, returning to performance represents a significant challenge,

which many cannot overcome (Drew et al., 2017). The overall aim of the three elements of the return to sport continuum is to restore sports specific function and playing status to a level comparable to or greater than pre-injury level (Webster & Feller, 2019). However, there is no guarantee that players will successfully return to their pre-injury sport and be able to perform at their pre-injury standard of performance. As such, some players may cease to take part in their pre-injury sport altogether (Ristolainen, Kettunen, Kujala, & Heinonen, 2012).

Return to sport frameworks and consensus statements on return to sport following injury suggest that a player should only return to sport when they are evaluated as being physically and psychologically “ready” (e.g., strategic assessment of risk and risk tolerance framework; Shrier, 2015; Arden et al., 2016). This concept has been proposed in order to prevent players from returning to sport when they are physically but not psychologically ready to do so (and vice versa). Doing so may have several negative implications which include a reduced capacity to perform to a satisfactory standard and an increased risk of re-injury (e.g., Zarzycki, Failla, Capin & Snyder-Mackler, 2018). However, despite featuring in theoretical frameworks as a specific desired outcome (e.g., in the biopsychosocial model of sport injury rehabilitation; Brewer, Andersen & Van Raalte, 2002) the meaning of the term “readiness” and how this may be developed or diminished is relatively understudied (Webster, Nagelli, Hewett & Feller, 2018).

A player’s “readiness” to return to sport following injury can be subdivided into physical and psychological elements. Physical readiness to return to sport following injury is seldom defined but can be inferred from the sports medicine literature as the capability of the biological tissues to respond to the acute (i.e., single stimulus) or chronic (i.e., multiple stimulus) physical demands of the sport, and is usually assessed via a battery of closed and open skills with outcome thresholds (Taberner, Allen &

Cohen, 2019). For example, this may involve establishing an adequate limb symmetry index from muscle strength and power testing (i.e., comparing the injured to the uninjured body part). Recently, it has been noted that a player's physical readiness is seldom comprehensively evaluated, with only 23% of players meeting full physical discharge criteria prior to return to sport (Webster & Hewitt, 2019). This is potentially clinically important given that being unable to meet such criteria is related to a four-fold increase in the risk of re-injury upon return to sport (Kyritsis, Landreau, Miladi & Witvrouw, 2016). While criteria to evaluate physical "readiness" is more established in research and practice, far less is known about the methods to ascertain a player's psychological "readiness" (Burgi et al., 2019). Psychological readiness to return to sport following injury is even more challenging to define. Provisional definitions allude to psychological readiness being a composite of positive emotions, sport confidence, realistic expectations, risk appraisal, and motivation (Podlog, Banham, Wadey & Hannon, 2015; Webster, Feller & Lambros, 2008). The characteristics of a player who is psychologically ready to return to sport are therefore multifaceted. By drawing on the literature, one possible starting position for a working definition is that psychological readiness is the relationship between sport confidence and anxiety, in the context of re-injury and performance (e.g., Conti, di Franso, Robazza & Bertollo, 2019; Forsdyke, Gledhill & Ardern, 2017).

Applied practice indicates that rarely will a player be held back from returning to sport because they are not psychologically ready to return (Forsdyke, Gledhill & Ardern, 2017). There are three main possible reasons for this. First, psychological readiness to return to sport appears to be a complex construct (i.e., involving several interacting variables) and as such is currently challenging to characterise (e.g., Webster & Feller, 2018). Second, based on its complexity and being historically less frequently studied, the measurement instruments used to evaluate the psychological readiness of

players are limited (Slagers, van den Akker-Scheek, Geertzen, Zwerver, & Reininga, 2019). For example, only three measurement tools are used to evaluate a player's psychological readiness, and of these, two are injury-specific (e.g., used to evaluate psychological readiness from an ACL injury or shoulder injury). Currently these have not been validated for use across other sport pathologies. Finally, making judgements on psychological readiness to return to sport is an area in which practitioners tend to feel under-prepared and over-challenged about (Heaney, 2006). For example, a scoping review of an injury practitioner's education and training found that the psychological aspects of sports injury were marginalised (Heaney et al., 2015). This is potentially important given that greater exposure to education regarding the psychology of sports injury leads to greater efficacy in making "readiness" decisions from this standpoint (Heaney, Rostron, Walker & Green, 2017).

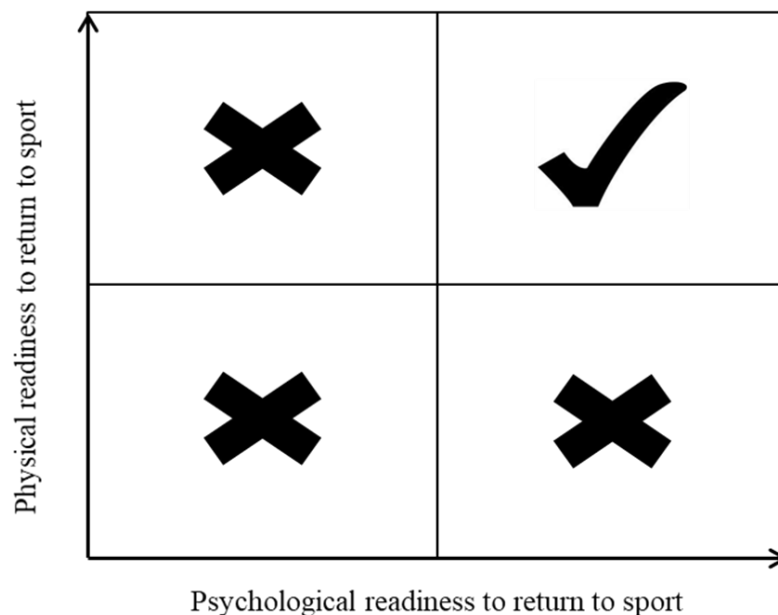


Figure 1.2. Quadrants of optimal readiness to return to sport following injury

By integrating the findings from theory, practitioner frameworks, and empirical evidence, the combined physical and psychological readiness of a player can be referred to as overall “readiness” to return to sport following injury (e.g., Brewer et al., 2002, Lentz et al., 2015; Shrier, 2015). Figure 1.2 further illustrates this informed perspective and places optimal “readiness” to return to sport into quadrants situated on high-to-low continuum axes (i.e., versus dichotomous classifications).

From this figure it can be inferred that a player returning to sport following injury when they display anything other than high in physical readiness and high in psychological readiness is not desirable. For example, a player who is high in physical readiness and low in psychological readiness will be physically robust but may present with anxiety over performance and re-injury. Meanwhile, a player that is low in physical readiness and high in psychological readiness may feel “ready”, but they would be unable to withstand the loading demands of the sport (e.g., repeated bouts of high-speed running, single leg landing). There is some evidence to support this perspective, because players who do not meet physical and psychological readiness discharge criteria are less likely to return to competitive sport (Ardern et al., 2014a; Christino, Fleming, Machan & Shalvoy, 2016), are more likely to sustain a re-injury (Paterno et al. 2017; Webster & Hewitt, 2019), and are more likely to underperform (Zarzycki et al., 2018). The development of physical and psychological readiness is the key aim of the return to sport process for all players (Ardern et al., 2016). Consequently, underdeveloped “readiness” may additionally impact on the player once they return to sport (i.e., in the form of re-injury, underperformance). Unfortunately, according to research, many players return to sport when they are physically or psychologically underprepared (e.g., Phelan, King, Richter, Webster & Falvey, 2019; Schmitt, Paterno, Ford, Myer & Hewett, 2015). As such, ensuring players possess both sufficient physical

and psychological readiness appears to represent important return to sport outcomes (Brewer et al., 2002; Grindem, Engebretsen, Axe, Snyder-Mackler & Risberg, 2020).

1.6 Return to Sport Outcomes

Return to sport outcomes describe the consequences or end results of the return to sport process. These outcomes may extend to states of being regarding short and long-term physical and psychological functioning, body structures, and activities related to sport participation (Brewer, 2010). The literature outlines two approaches to understanding return to sport outcomes: a simplistic single-faceted approach, and a complex multifaceted-approach. In the former approach, the return to sport outcome is single-faceted and binary in nature. For example, a football player will either return to their pre-injury sport, or conversely not return to pre-injury sport following injury. This has been regularly used as the outcome by which to evaluate the relative “success” of the return to sport process, and many studies have assessed this as the primary return to sport outcome (e.g., Ardern, Webster, Taylor & Feller, 2011; Webster & Feller, 2019). In other words, these studies have examined the various discriminatory factors between those players who have returned to sport following injury and those that have not. From a practitioner and research perspective, having a single return to sport outcome makes sense, because it provides a single measurement point that signifies the end of the return to sport process for reporting, and also enables players’ returns to be delineated as “successful” versus “unsuccessful” for research purposes. Clearly, a sustained return to pre-injury sport is one important outcome of the return to sport process; however, using only this outcome fails to consider several other possible outcomes that may influence the manner in which a player re-engages with sport. For example, a return to pre-injury sport following injury does not necessarily mean a return to pre-injury levels of performance, or that the player has remained injury-free.

A more current perspective is the complex and ultimately more person-centred approach. This suggests that return to sport outcomes are multifaceted and heavily context dependent (Ardern et al., 2016). Subsequently, evaluating the overall “success” of the return to sport process is necessarily complex. Drawing on the theoretical underpinnings in this area, return to sport outcomes may additionally pertain to levels of functional performance, quality of life, treatment satisfaction, or readiness to return to sport, while others broadly refer to physical and psychosocial health outcomes (Brewer et al., 2002; Wiese-Bjornstal, Smith, Shaffer & Morrey, 1998). These examples from theoretical underpinnings are important as they suggest that: (i) there is no singular return to sport outcome; (ii) there are physical and psychosocial outcomes of return to sport; and (iii) that some return to sport outcomes can be placed outside the sport domain (e.g., quality of life). Depending on the context, there may be a specific onus on one specific return to sport outcome, whilst others may not necessarily apply (Ardern et al., 2016). Several contextual considerations that are thought to influence return to sport outcomes such as the nature of the injury (e.g., severity, re-injury), the nature and demands of the pre-injury sport (e.g., team or individual, high risk movements), level of performance (e.g., recreational, professional), significance of upcoming participation opportunities (e.g., World Cup, preseason training), and the career stage of the player (senior professional, academy player; Ardern et al., 2016). This means that evaluating which return to sport outcomes are successfully met, when they are met, and to what extent, may differ from player to player. For example, the return of a 19-year-old international football player may be different to that of a 36-year-old recreational football player.

Despite some understanding that physical and psychological readiness outcomes are associated with a successful return to sport, the theoretical underpinnings and empirical evidence largely fail to address the relationship between multifaceted return to

sport outcomes, and whether there is any logical hierarchy to these outcomes (e.g., Ardern et al., 2014a; Kyrstis, Bahr, Landreau, Miladi & Witrouw, 2016), for example, which outcomes may be of greater or lesser importance, and the convergent or discriminant nature of the outcomes. Once again, by integrating theory, practitioner frameworks and the findings of empirical evidence, Figure 1.3 attempts to provide further clarity on return to sport outcomes by placing these in a hierarchical diagram (Ardern et al., 2016; Brewer et al., 2002). Overwhelmingly, a return to pre-injury levels of performance and status or greater is the optimal outcome of the return to sport process (Webster & Feller, 2019). As such, a return to pre-injury performance and status is the uppermost sport injury outcome in Figure 1.3.

Realistically, before a player can attain this outcome, they must have actively returned to their pre-injury sport for an injury-free period of time (i.e., football training and matches). The ability and decision to return to sport following injury may be influenced by the players overall readiness, which is formed from physical and psychological readiness outcomes (e.g., Ardern et al., 2016). One inference from this notion is that for any two players of similar physical status (i.e., physical readiness) the player with greater psychological readiness is more likely to achieve a more successful return to sport. As physical and psychological readiness outcomes are multifaceted, several other lower order outcomes may well determine this. For example, lower order outcomes of muscle strength, muscle power, tissue resilience and aerobic capacity may determine overall physical readiness (Webster & Hewitt, 2019). In contrast, psychological readiness may be determined by outcomes of confidence, anxieties over re-injury and underperformance, motivation and expectations (Podlog et al., 2015; Webster & Feller, 2018).

Return to pre-injury performance and status							
Return to pre-injury sport							
Overall readiness to return to sport							
Physical readiness				Psychological readiness			
e.g., muscle strength	e.g., muscle power	e.g., aerobic capacity	e.g., tissue resilience	e.g., motivation	e.g., expectations	e.g., confidence	e.g., re-injury anxiety

Figure 1.3. Conceptual hierarchical diagram of return to sport outcomes (modified from Ardern et al., 2016; Brewer et al., 2002).

There is evidence that physical and psychological readiness outcomes are related and are not independent of one another. For example, psychological readiness has been found to predict the rate of re-injury (McPherson, Feller, Hewitt & Webster, 2019a) and quality of functional performance upon return to sport (Christino et al., 2016; Zarzycki et al., 2018). The implication is that a player who meets all the lower order physical and psychological readiness outcomes will possess greater “readiness” and consequently be able to return to their pre-injury sport with a better chance of returning to pre-injury levels of performance and status. Taking a hamstring injury as an example, the inference is that establishing high levels of confidence and low levels of anxiety (in the context of re-injury and performance) is just as important as establishing adequate muscle strength and rate of force development. In the inaugural Bern consensus

statement on return to sport following injury, a holistic approach which considers physical and psychological factors is advocated in order to optimise return to sport outcomes (Ardern et al., 2016).

1.7 Psychological or Psychosocial Factors?

The focus of this thesis is to examine psychological and psychosocial factors and their relationship with return to sport outcomes. The terms psychological and psychosocial are frequently used interchangeably in the sports medicine literature. The term psychosocial was deliberately chosen (from this point onwards) as opposed to psychological because of its appropriateness with the return to sport context and it therefore offers greater utility. Psychological factors refer to a player's individual-level emotional and cognitive processes and behaviours in response to the experience of injury, rehabilitation and return to sport (Brewer & Redmond, 2017; Truong et al., 2020). The term psychosocial factors acknowledge and extends this perspective further to include how social conditions interact with the aforementioned psychological factors (e.g., social support, return to sport environment). Subsequently, psychosocial factors can be defined as pertaining to the influence of social factors on a player's mind or behaviour, and to the interrelation of behavioural and social factors (Martikainen, Bartley & Lahelma, 2002). As the return to sport process takes place in a social environment involving many different people (e.g., injury practitioners, technical coaches, family, friends, team-mates), the term psychosocial appears to be more appropriate. Conceptually, it is thought that these factors may be further divided into extrinsic (i.e., social support, social environment) and intrinsic psychosocial factors (i.e., emotion, cognition, behavioural characteristics, Nilsson & Kristenson, 2010). It is therefore the net effect of these intrinsic and extrinsic psychosocial factors in response to the experience of injury, rehabilitation and return to sport that may be prognostic

factors of return to sport outcomes (e.g., return to pre-injury sport, overall readiness, psychological readiness).

1.8 The Importance of Psychosocial Factors

Current scientific approaches to sports injury treatment, rehabilitation, and return to sport have never been more advanced (e.g., diagnostic screening technologies, enhanced surgical procedures, use of player monitoring systems, Brukner et al., 2017). Consequently, it would be logical to assume that return to sport outcomes for injured players should be consistently successful. However, contrary to this notion, poor return to sport outcomes are often reported in the form of players not returning to their pre-injury sport or their pre-injury levels of performance (e.g., Drew et al., 2017; Lai et al., 2017). Reported return to competitive sport rates may be as low as 55-60%, whereas return to performance rates may be as low as 17-22% following sports injuries that are common to football (Ardern Taylor, Feller & Webster, 2014b; Harris et al., 2013; Ishøi et al., 2018). While an optimal return to sport is probably determined by many physical and non-physical factors, a high proportion of players do not return to their pre-injury sport despite having good levels of physical functioning (Webster, McPherson, Hewett & Feller, 2019). As such, non-physical factors (i.e., psychosocial factors) have been advocated in research and practice in order to potentially explaining the variance in return to sport outcomes across a range of sports injuries (e.g., Chester, Jerosh-Herold, Lewis & Shepstone, 2018; Mallows, Debenham, Walker & Littlewood, 2017, Sonesson, Kvist, Ardern, Österberg & Grävare Silbernagel, 2015). For example, a recent systematic review of 28 studies found that 65% of athletes who did not return to their pre-injury sport following ACL injury cited psychosocial factors for not doing so (Nwachukwu et al., 2019). Such findings indicate that other factors, beyond and

additional to physical factors may be important prognostic factors of return to sport outcomes (Kitaguchi et al., 2019; Truong et al., 2020).

Although good physical functioning is a prerequisite to return to sport, there is a growing amount of empirical research recognises that psychosocial factors may have equal value to physical factors in explaining return to sport outcomes (e.g., Ardern, Taylor, Feller & Webster, 2014a; Chester et al., 2018). In fact, when directly compared to physical factors (e.g., limb function, strength, joint laxity), psychosocial factors (e.g., fear of re-injury, self-efficacy) appear to be equally or more important (Ardern, Taylor, Feller & Webster, 2012b; Kitaguchi et al., 2019; Kvist, Ek, Sporrstedt & Good, 2005). In one cohort study of players with ACL injury requiring reconstruction, psychosocial factors were associated more significantly than functional outcomes (i.e., limb symmetry from hop tests) with a return to pre-injury sport (Baez, Hoch & Hoch, 2020). This study also found that psychosocial factors in the form of elevated levels of fear of movement were associated with a 17% reduction in return to pre-injury sport. Similarly, a cohort study investigating the factors that contribute to a player returning to pre-injury levels of performance following ACL injury, found that psychosocial factors were the sole significant predictor of this outcome (Webster et al., 2019c).

Many psychosocial factors have been empirically examined in the literature including re-injury anxiety, motivation, kinesiophobia, self-efficacy, social support, and adherence (Lin et al., 2020; te Wierike, van der Sluis, van den Akker-Scheek, Elferink-Gemser & Visscher, 2013; Truong et al., 2020). For example, in a systematic review of 11 studies, 15 different psychosocial factors were noted as being potentially associated with a return to pre-injury sport (Ardern, Taylor, Feller, Whitehead & Webster, 2013b). As such, there is currently only a broad and superficial understanding of these factors and their potential relationship with return to sport outcomes (Brewer, 2010; Williams et al., 2020). Empirical evidence has not yet demonstrated which psychosocial factors

are most salient, how these factors may interact, and by which process any effect may be underpinned (e.g., the process by which social support may be related to return to sport outcomes). There is also some discrepancy in terminology within the literature which further diminishes clarity (Walker, Thatcher & Lavalley, 2010). For example, fear, anxiety and kinesiophobia are suggested as being salient psychosocial factors but are rarely delineated from one another (i.e., semantically how they differ). This then impacts on the fit and appropriateness when measuring or screening for these factors in research and practice (see Lin et al., 2020). While psychosocial factors appear to be an important consideration in order to optimise return to sport, the current empirical landscape is a daunting one for researchers and practitioners to navigate.

1.9 What the Current Evidence Suggests about Psychosocial Factors and Return to Sport Outcomes

Despite being historically underrepresented in the literature when compared to physical factors, there is now a developing and diverse body of research suggesting that several psychosocial factors may influence return to sport outcomes. The research on this topic has been growing theoretically and empirically over the last 20 years.

Research indicating the prognostic importance of psychosocial factors spans all of the levels or hierarchy of evidence (Murad, Asi, Alsawas & Alahbad, 2016). For example, the evidence to support the importance of psychosocial factors is indicated in several systematic reviews, quantitative method studies and qualitative method studies.

Understanding where the collective field the research sits is important as this often drives the strength of recommendation and translation into practice in evidence-based medicine, while also highlighting opportunities for future projects (Murad et al., 2016).

1.9.1 Systematic review evidence

There have been several systematic reviews in this area of research. This is important as these studies are thought to be the top of the evidence pyramid, and as such may provide stronger recommendations for those working with injured football players. One of the first systematic reviews on this topic was conducted by Mendoza, Patel and Bassett (2007). The review included ten quantitative, prospective studies on a pooled total of 800 athletes with ACL injury. The findings of the review were that an athlete's motivation, self-efficacy, and perceptions of control were related to the outcome of ACL injury following surgical reconstruction. Of note, no formal appraisal of quality was undertaken, and as such there is limited understanding about the quality of the evidence that the recommendations of the review are based on. Subsequently, Ardern et al. (2012) carried out a review of eleven quantitative studies on a pooled total of 983 athletes. Through qualitatively analysing studies the review highlighted 15 different psychosocial factors to be associated with returning to pre-injury sport, which were then reduced into central themes of competence, relatedness and autonomy. From the included studies, it was interpreted that an athlete with more motivation, high confidence and low fear of re-injury had a greater likelihood of returning to their pre-injury sport. In similar fashion, te Wiereke and colleagues (2013) conducted a systematic review including 24 studies (of different methodologies and methods) on a pooled total of 1428 athletes with ACL injury. Through qualitative analysis, the findings from the included studies were reduced into central themes of cognition, behaviour, emotion, and outcomes. Specifically, the review inferred that fear of re-injury, perceived control and self-efficacy appear to be factors related to recovery outcomes from ACL injury.

Recently, there have been two further systematic reviews that have added to the literature beyond that of the aforementioned studies. First, Nwachukwu et al. (2019)

centred their research question on attempting to quantify how much psychosocial factors effect a lack of return to sport following ACL injury requiring surgical intervention. In total, 28 studies (of different methodology and methods) on a pooled total of 2918 athletes were included. From the analysis, of the athletes that did not return to sport following injury, 64% cited psychosocial factors. The prominent factors included fear of re-injury (76.7%), low confidence (14.8%), depression (5.6%) and lack of motivation (2.5%). Lastly, Truong et al. (2020) carried out a scoping review (using systematic methods) on psychological, social and contextual factors across the recovery stages following severe knee injury. Seventy-seven mixed studies on a pooled total of 5540 athletes were included. The findings of this particular review are important because in addition to highlighting the importance of psychological (i.e., barriers to progress, active coping, independence, recovery expectations) social (i.e., social support, engagement in care) and contextual factors (i.e., environmental influences and sport culture), it was found that while all studies focused on psychological factors, less is known about social (39% of included studies) and contextual factors (21% of included studies). Thus, this highlights a potential gap in the extant evidence.

Collectively, the systematically reviewed evidence has provided a sense that psychosocial factors are associated with return to sport outcomes, and several key factors have been identified as being particularly important. However, taken together these reviews have some general limitations. First, the aforementioned reviews have a clear bias towards athletes returning to sport from severe knee injury (e.g., ACL injury). Therefore, the extent to which the recommendations from the reviews can be extended to other injuries that are seen by practitioners on a routine basis is restricted. Second, how these reviews deal with studies from different methodologies and methods is sometimes awkward. For example, reviews have excluded qualitative studies with little justification before then conducting a qualitative analysis of quantitative studies (e.g.,

Arden et al., 2012), or qualitative or mixed methods studies have been included in the review but misinterpreted (e.g., te Wierke et al., 2013). Being able to effectively include diverse studies in order to form accurate and coherent findings is an area for development for future reviews. Lastly, when interpreting systematic review evidence, readers should be aware of possible publication bias. In other words, none of the reviews in this area include “grey” unpublished literature or highlight studies in which psychosocial factors were not associated with return to sport outcomes. Therefore, these reviews indicate which factors might be important but not those that might be unimportant to further help guide practice.

1.9.2 Quantitative studies

There are several important quantitative studies in this area. Many of these studies are cross sectional or adopt prospective case control designs utilising self-report measures (e.g., Arden, Taylor, Feller, Whitehead & Webster, 2015; Brewer 2010; Wadey, Podlog, Hall, Hamson-Utley, Hicks-Little & Hammer, 2014) and together support the notion that psychosocial factors may influence return to sport outcomes. Notably, much of this research is grounded in examining severe sports injuries (e.g., ACL injury requiring surgical reconstruction) and not the mild to moderate injuries that make up most of the routine workload of injury practitioners. While these studies have focused on a broad spectrum of psychosocial factors, by drawing on this evidence re-injury anxiety, coping behaviours, fear of movement, psychological readiness, locus of control, motivation and social support may be particularly important at influencing return to sport outcomes.

In terms of the potential importance of re-injury anxiety, a cross sectional study of 335 severely injured athletes (defined as >4 weeks’ time loss) found a significant positive relationship between re-injury anxiety and heightened return to sport concerns

(Wadey, Podlog, Hall, Hamson-Utley, Hicks-Little & Hammer, 2014). In other words, greater re-injury anxiety led to less favourable return to sport outcomes. In this study there were significant indirect (i.e., mediating) effects of specific coping behaviours (measured using the MCOPE, Crocker & Graham, 1995). For example, wishful thinking, venting of emotions, denial, and behavioural disengagement. This study indicates the importance of re-injury anxiety but also the athlete's ability to employ the correct coping strategy to deal with re-injury anxiety.

In regard to evidence for fear of movement as being potentially important, one cross sectional study of 62 athletes who had previously undergone ACL reconstruction surgery, 47% had not returned to their pre-injury sport following injury reporting greater fear of movement and lower knee-related quality of life (Kvist, Ek, Sporrstedt & Good, 2005). Fear of movement also appears important when it has been studied alongside other potentially important psychosocial factors. In a case control study of 187 athletes (Ardern, Taylor, Feller, Whitehead & Webster, 2013) focusing on whether psychological factors predict return to pre-injury sport following surgical intervention, reported fear of movement, locus of control, expectations of recovery measured before and soon after surgery predicted return to pre-injury sport at 12 months. A similar study of 164 athletes at 1-7 years post-surgery found that those that had not returned to their pre-injury sport reported not trusting the knee (28%), fear of re-injury (24%), and poor self-report knee function (22%, Ardern, Osterberg, Tagesson, Gauffin, Webster & Kvist, 2014). In this study psychological readiness was most strongly associated with a return to pre-injury sport, whereas more contextual factors of age, sex and level of performance were not.

In the literature there is a growing appreciation that psychological readiness may be a clinically relevant consideration. For example, a prospective and longitudinal study of 87 athletes, 49% had not returned to sport by 12 months post-surgery (Langford,

Webster & Feller, 2009). Whereas there was no difference in measures of emotional response or physical recovery between those that had returned to pre-injury sport and those that did not, the non-returned group reported significantly lower psychological readiness at six and 12 months. Similarly, in a cross-sectional study of 118 athletes one-year post knee surgery, psychological readiness was associated with significant higher odds of returning to pivoting sport (Hart, Culvenor, Guermazi & Crossley, 2020). Psychological readiness also seems an important contributor to other return to sport outcomes beyond the return to pre-injury sport. For example, a cohort study of 222 athletes who had ACL surgery found that at 12 months 61% had returned to pre-injury levels of performance (Webster, McPherson & Hewett, 2019). Through multivariate modelling, psychological readiness was the only significant predictor variable to explain return to performance, whereas more physical factors, self-reported function and pre-injury level of performance were found to be not predictive.

There are few studies that have only sampled injured footballers. One such study of 182 female footballers provides some supportive evidence about the potentially important role of motivation on a player's return to football after ACL surgery (Fältström, Hägglund & Kvist, 2016). This cross-sectional study found that having high motivation along with a shorter time between the injury and surgery was predictive of a return to pre-injury football activities following surgery. An additional prospective cohort study using mixed sport athletes provides further evidence that motivation may be important (Sonesson, Kvist, Arden, Österberg & Silbernagel, 2017). Of the 65 athletes requiring ACL surgery that were sampled, a large majority expected to return to their pre-injury sport within 12 months (86%) although only 26% actually managed this. The athletes who had returned to their pre-injury sport at 12 months reported significantly higher motivation to return compared to the non-returned.

One final psychosocial factor that appears important from the quantitative research is social support. Studies have associated social support with lower injury related stress and less negative emotional response to being injured (Rees, Mitchell, Evans & Hardy, 2010). However, such studies tend to examine psychological responses and can only indirectly infer their findings to how social support may impact upon specific return to sport outcomes. For example, a study of 319 injured athletes revealed found significant interactive effects for perceptions of social support and injury stress on negative emotional response to injury (Mitchell, Evans, Rees & Hardy, 2014). In other words, when social support is perceived as low, injury stress was positively associated with higher levels of negative emotional response. One exception that extended social support to return to sport outcomes literature is provided by Yang et al. (2014). In this study of 387 injured collegiate athletes perceiving high-level social support was negatively associated with anxiety and depression at return to sport (i.e., more positive outcomes). If social support is to be considered important further studies examining its relationship with specific outcomes is needed.

The quantitative research highlights a number of prominent psychosocial factors. However, the bias towards including participants with severe knee injuries does diminish how reliably the findings can be inferred to other severe injuries or injuries with mild to moderate severity. Additionally, there are few studies that have looked examining some of the prominent psychosocial factors together to gain an understanding of how these may interact to effect return to sport outcomes. For example, looking at the perceived social support, re-injury anxiety and psychological readiness relationship may provide further understanding of potentially important psychological processes.

1.9.3 Qualitative studies

There are two types of qualitative studies on psychosocial factors and return to sport outcomes, (i) more exploratory studies, and (ii) more focused studies. Of these it is the more exploratory studies that are more common. The more exploratory studies tend to investigate psychosocial responses through the injury process, either retrospectively or prospectively, and as such suggest many psychosocial factors may be important for a wide range of sports injuries. A study of eight previously injured collegiate athletes, using retrospective semi-structured interviews and context analysis, interpreted that an athlete's cognitions of injury severity, injury diagnosis, the rehabilitation process, and "lessons learned" influenced their emotions and behaviours and were related to return to sport outcomes (Clement, Arvinen-Barrow & Fetty, 2015). The important emotions of note were frustration, excitement and re-injury anxiety, and important behaviours were seeking out social support and being cautious with risk. Additionally, Podlog and Eklund (2006) conducted a longitudinal qualitative study on 12 competitive amateur and semi-professional athletes focussing on returning to sport following severe injury. It was interpreted from the semi-structured interviews that dealing with adversity during rehabilitation and overcoming return to sport fears and concerns were important aspects of a successful return to sport.

In contrast the more focused qualitative studies provide a depth of understanding centred on a specific psychosocial factor. In an attempt to provide greater depth on psychological readiness to return to sport, Podlog and colleagues (2015) conducted a qualitative study on seven athletes from a mix of sports who had returned to sport following a severe sports injury (i.e., > 2months time loss). The results from focus groups and follow-up individual interviews interpreted several attributes and precursors of psychological readiness to return to sport. The attributes of psychological readiness were having confidence, realistic expectations, and motivation to regain performance

standard, whereas the precursors of these attributes included trust in the rehabilitation provider, social support, effective goal setting, patience, accepting their postinjury limitations, and feeling “wanted”. An additional important finding was that developing psychological readiness should be seen as a dynamic psychological process and not as a stationary construct which the extant quantitative cross-sectional evidence infers. In another more focused qualitative study, Hildingsson, Tranaeus-Fitzgerald and Alricsson (2018) examined perceived motivational factors during injury rehabilitation. Six female football players who had sustained a severe sports injury were recruited and took part in semi-structured interviews. The players were at different stages of the return to sport process. Following content analysis of the data, several perceived factors that increase motivation were described including social support, having clear goals, and responding to internal and external stressors/pressures. It was interpreted that such factors would help players comply with the rehabilitation process and as such enhance return to sport outcomes. In both the examples of more focused qualitative studies social support was interpreted as one potentially important factor that may contribute to psychological readiness and rehabilitation motivation. However, to date no qualitative study has focused on social support processes in the sports injury domain. Such a study would be important to provide further conceptual depth, greater context, and extend the findings of previous qualitative and quantitative studies.

Taken together, the diverse evidence base in this field of research indicates that psychosocial factors are associated with return to sport outcomes. As such, further study of psychosocial factors has clinical relevance. It is also apparent that while several factors are thought to be important, the current evidence base can be described broad and superficial. In other words, through the approach and focus of much of the research, numerous factors have been identified, but there is an overall lack of depth, attention to context, and limited understanding of process of effect. Therefore, there is a need for

studies to provide greater depth and explore the relationship between psychosocial factors to better understand the psychological processes of how psychosocial factors may relate to specific return to sport outcomes (Williams et al., 2020). In order to garner further insight, an awareness of the developing theoretical underpinnings of psychosocial factors and return to sport is important.

1.10 Theoretical Underpinning of Psychosocial Factors and Return to Sport

The study of psychosocial factors and sports injury dates back for over three decades (e.g., Weiss & Troxal, 1986). Notwithstanding, a longstanding viewpoint is the psychosocial processes that injured players undergo, until ideally, they return to their pre-injury sport is unclear (Brewer, 2010; Walker, Thatcher & Lavallee, 2007). Possible explanations for how psychosocial factors may influence return to sport outcomes may derive from theories and models. Although theories and models are distinctive, they are both of equivocal importance in providing explanatory relationships between concepts in order to better understand human phenomena (Grüne-Yanoff, 2013). In other words, theories and models may enhance understanding of which processes may be involved in optimising return to sport outcomes following injury. In this context, several theoretical perspectives have been developed in an attempt to explain the processes and pathways by which psychosocial factors impact upon return to sport outcomes. These theoretical perspectives primarily fall into four approaches: (i) stage-based approaches; (ii) cognitive appraisal-based approaches; (iii) biopsychosocial-based approaches; and (iv) motivation-based approaches (e.g., Brewer, 1994; Santi & Pietrantoni, 2013). Collectively, these approaches provide the theoretical basis for the study of psychosocial factors and return to sport outcomes.

1.10.1 Stage-based Approaches and Return to Sport

Early theoretical thinking (e.g., 1980-1998) on psychosocial aspects of sports injury and return to sport centred around stage-based approaches (Walker et al., 2007). Broadly, these approaches suggest that sustaining sports injury incurs a sense of “loss” (e.g., loss of function or a player’s loss of identity), and that recovery from sports injury occurs in predictable progressive stages (Brewer, 1994).

Of the stage-based approaches, the grief response model is the most frequently applied to sports injury contexts (Kübler-Ross, 1969). The concept of grief was initially applied to sports injury as it was thought to be representational of the intense emotional distress preceded by a situation which involved a period of “loss” (Evans & Hardy, 2005). The grief response model itself is non-domain specific and was originally designed to explain the psychological adjustment to terminal illness. The model has been adopted by sports injury researchers who view adjusting to sports injury as having comparable psychological processes to adjusting with terminal illness (e.g., Evans & Hardy, 1995, Pederson, 1986). In other words, the assumptions of this model are that a player perceives sustaining injury as a significantly traumatic event, and a grieving process ensues in a similar way to how an individual would perceive being diagnosed with terminal illness, or the death of a loved one (Walker & Heaney, 2013). However, whether the same grieving process takes place in response to injury compared to the response to terminal illness, where there is a more likely capacity to be restored to full function, is unclear.

The grief-response model (Kübler-Ross, 1969) proposes five stages. It is suggested that players would progress through five predictable and linear stages: denial, anger, bargaining, depression, and finally acceptance and “normal” psychological adjustment to being injured. First, the initial disbelief of the player causes them to deny the significance of the injury and reject injury guidance and diagnosis. Second, the

initial denial is replaced with anger towards themselves or someone else perceived to have contributed to the injury (e.g., coach, teammates). Third, players will likely bargain with stakeholder practitioners in order to return to sport in a reduced time. Fourth, as the realisation of injury occurs the player will become depressed and exhibit low mood due to the situation they are in and may become disillusioned with their progress. Finally, the player accepts their situation and as such can focus on progressing through the return to sport process (Walker & Heaney, 2013). A key premise of the model when applied to sports injury is that progressing to the adaptive acceptance stage in a less complicated and more timely manner would lead to enhanced return to sport outcomes. (see Figure 1.4)

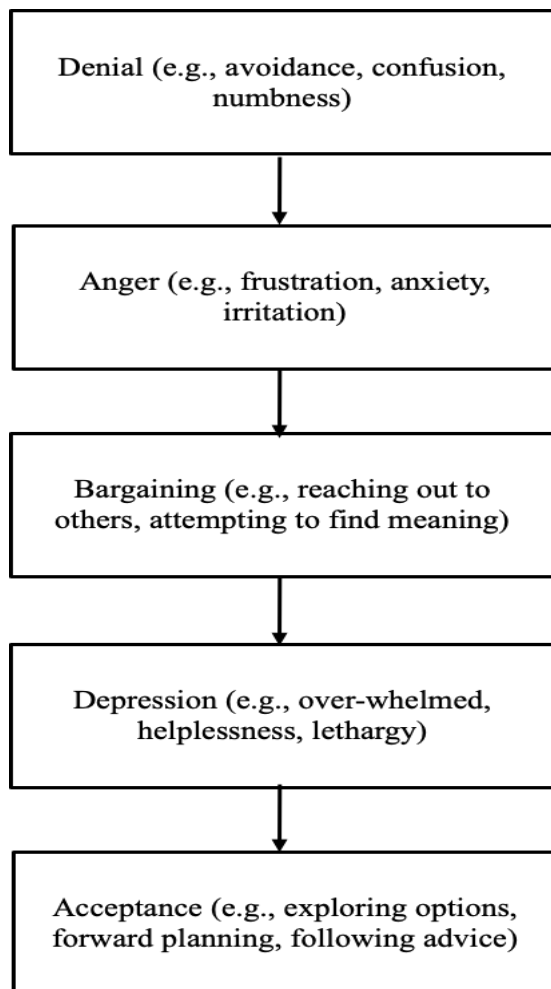


Figure 1.4. The grief response model (adapted from Kübler-Ross, 1969)

Although there is some empirical support for a grief-like approach to sport injury (Evan & Hardy, 1995; Gordon, Milios, & Grove, 1991), this specific approach has several commonly identified limitations. First, there appears to be a general lack of empirical support over the denial and bargaining stages of the model (Udry, Gould, Bridges & Beck, 1997). The denial stage especially is often identified by authors as not being theoretically sound when applied to a sports injury context (e.g., Walker et al., 2007). Whereas in the original context patients would deny the existence of terminal illness, football players do not deny they have an injury. Instead, players are thought to simply not comply with advice and continue participating when advised not to (Walker & Heaney, 2013). Therefore, the use of terminology such as non-compliance would appear to be more appropriate with injured players within the return to sport process (Santi, 2013). Second, the linear, sequential, and predictable nature of stage-based approaches has received substantial criticism as it fails to acknowledge a more intra and inter-individual dynamic process that changes in magnitude and direction, and which is typical of injured players (Grindstaff, Wrisberg & Ross, 2010; Walker et al., 2007). Third, the model fails to explain how players may perceive the occurrence of injury as a positive event (e.g., used as a feasible excuse during periods of poor personal or team form), or how players may derive positive consequences from the experience of injury (e.g., increased self-awareness, resilience; see Wadey, Podlog, Galli & Mellalieu, 2016). Finally, extension of the model to explaining returning to sport outcomes is unclear. The final stage of acceptance is the point of departure from the model. Progress from acceptance of the injury situation to then influencing the outcome is likely to be mediated by many emotional, cognitive and behavioural factors that the model does not incorporate (Grindstaff et al., 2010). As such, in the sports injury domain the model may have limited explanatory value. To this end, stage-based approaches such as the grief response model are regarded as overly rigid and not representational of the return

to sport process, creating a need for more dynamic and individualised theoretical thinking (Walker & Heaney, 2013).

1.10.2 Cognitive Appraisal-based Approaches and Return to Sport

In an attempt to further understand “how and why” psychosocial factors may influence a player’s return to sport outcomes beyond that offered by stage-based approaches, cognitive appraisal approaches were adopted and developed (e.g., Brewer, 1994; Wiese-Bjornstal et al., 1998). In other words, why do players experience different return to sport processes and return to sport outcomes? Generally, cognitive appraisal approaches are heavily influenced by Lazarus and Folkman’s (1984) model of stress, appraisal and coping. Cognitive appraisals are individual determined processes (i.e., idiopathic) in which a potentially stressful situation is perceived, and the extent of the given stress is evaluated by the individual (Walker et al., 2007). Cognitive appraisals take two forms, primary appraisal and secondary appraisal (Lazarus & Folkman, 1984). Primary appraisal relates to the player’s assessment of what is at stake by evaluating the challenge, benefit, risk, and value. Subsequently, secondary appraisal refers to the player’s assessment of their coping options in terms of being able to address the demands of the situation. Together, a player’s appraisal of a potentially stressful situation and the resources they possess to cope with the situation predicts their emotional and subsequently behavioural responses. In this regard, the cognitive appraisal approach addresses some key limitations of the stage-based approaches (i.e., not fully accounting for individual differences). For example, two players with the same injury and severity of injury (e.g., moderate grade lateral ankle sprain) could have different responses to being injured based on their individual initial appraisal of the situation, and the coping resources they possess.

In the sports injury domain, the most widely accepted cognitive appraisal-based approach is the integrated model of response to sport injury and rehabilitation process, as depicted in Figure 1.5 (Wiese-Bjornstal et al., 1998). From a rehabilitation perspective, the model identifies three broad propositions: (i) that idiopathic pre-injury and post injury factors influence the psychological response of the player to sustaining injury (i.e., accounts for individual differences); (ii) this response can and will change over time in a dynamic way; and (iii) that physical and psychosocial recovery is the outcome of this process (Santi & Pietrantonio, 2013). During the return to sport process personal and situational factors continually affect cognitive appraisal of injury stressors. Examples of personal factors include the nature of the injury (i.e., injury type and severity), and the individual make-up of each player (psychological, demographic and physical). Examples of situational factors include the nature of the sporting environment (i.e., level of competition and time in season), and the availability and quality of the player's social support network (i.e., sport injury practitioner influence and coach influence).

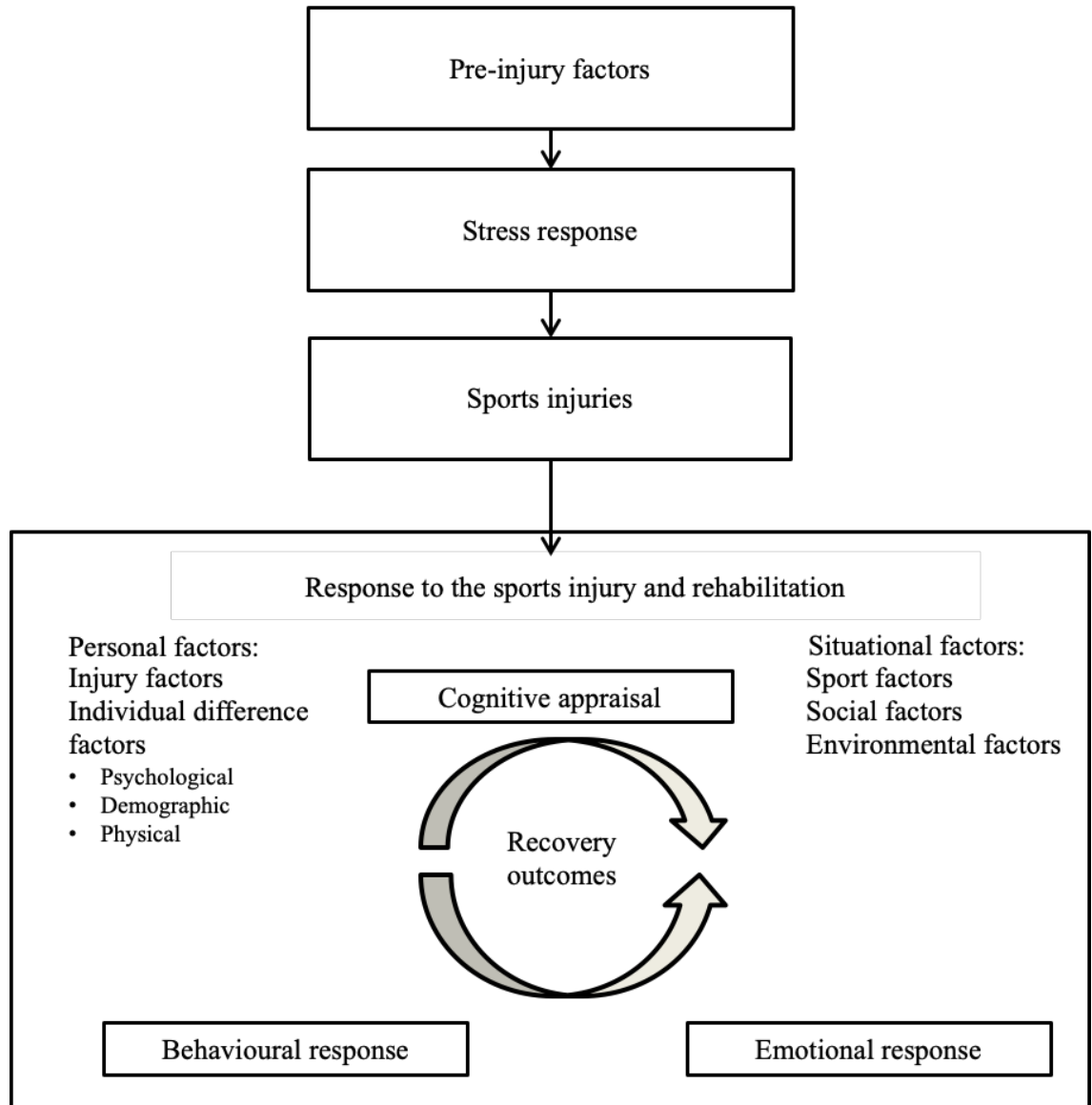


Figure 1.5. Integrated model of psychological response to the sport injury and rehabilitation process (adapted from Wiese-Bjornstal et al., 1998).

According to the integrated model these cognitions will influence several emotional (e.g., anxiety, anger and guilt) and behavioural responses (e.g., adherence to set exercises, help-seeking and malingering) of the player to injury, and consequently lead to further cognitions (e.g., over self-confidence, self-worth and goal adjustment). This cyclical process of cognitive appraisals, and emotional and behavioural responses, is often referred to as the dynamic core, which should be viewed as a three-dimensional

(3D) spiral (Walker et al., 2007). Whereas the 3D spiral may head upwards towards the reader for optimal return to sport outcomes (i.e., physical and psychosocial readiness) it can also shift downwards and away from the reader to signify non-optimal return to sport outcomes (i.e., not returning to pre-injury sport).

The cognitive appraisal-based approach has received empirical support from research which used different methodologies and methods (e.g., Albinson & Petrie, 2003; Grindstaff et al., 2010) and is generally accepted by many as the more rigorous framework compared to stage-based approaches (e.g., Walker & Heaney, 2013). For example, several studies have confirmed that emotional responses to injury mediate behavioural responses in injured athletes, and that positive rehabilitation outcomes are influenced by an athlete's behaviour (e.g., Kolt, 2003). However, most research has only examined individual parts of the integrated model of psychological response to the sports injury and rehabilitation process, and therefore its overall currency in research and practice is still under scrutiny (Walker et al., 2007; Santi, 2013).

The integrated model has several limitations. First, the major criticism of the model is assumption by researchers and practitioners that the exemplar sub-headings are an exhaustive, prescriptive list rather than specific related examples, and uncover additional and potentially salient psychosocial factors that are not indicated in the model (e.g., Grindstaff et al., 2010; Walker et al., 2007). Second, the integrated model endeavours to be so comprehensive in its coverage to the point it is untestable in its complete form (Santi, 2013). The model attempts to explain both pre-injury factors as causes of injury, and how psychosocial factors can influence recovery outcomes. In regard to latter, there are numerous direct and indirect explanatory pathways. For example, the original model proposes at least seven behavioural responses, six emotional responses, and six cognitive appraisals. While this provides some awareness of many psychosocial factors, it is a daunting challenge to directly apply the whole

model into research and into practice. Last, several authors have criticised the dynamic core as being overly simplistic and suggested different directional relationships in terms of how cognitive appraisal, emotional and behavioural response interlink and mediate return to sport outcomes (Brewer, 2010). For example, the process by which the dynamic core influences both physical and psychosocial recovery is unclear, while the explanation as to how physical and psychosocial recovery may not occur simultaneously is not provided.

To provide further clarity on processes in the dynamic core of the integrated model, several additional processes have been suggested (see Figure 1.6; Walker et al., 2007). First, the dynamic core in which cognitive appraisals, emotional responses, and behavioural responses influence each other in a cyclical manner may have some bidirectional pathways, for example, the pathway between cognitive appraisal, and emotional and behavioural responses. Second, behavioural responses may mediate the relationship of emotional responses to physical and psychosocial outcomes. Finally, recovery outcomes lead to further cognitive appraisals, and in the case of psychosocial outcomes this process is bidirectional. While this provides additional explanatory pathways beyond those originally proposed, the propositions are yet to be fully examined.

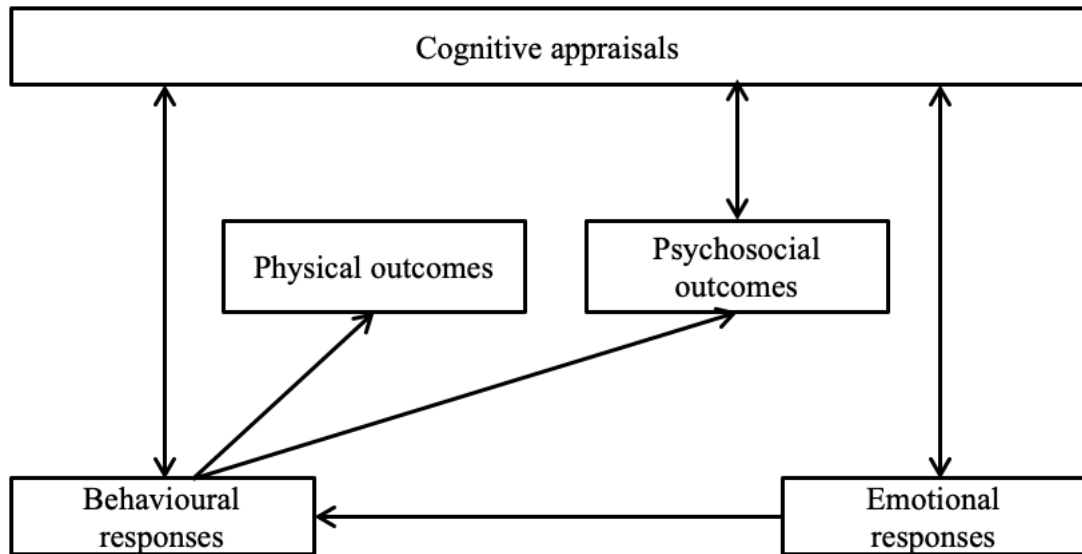


Figure 1.6. Explanatory relationships between cognitive appraisals, emotional response, behavioural response and outcomes existing in the dynamic core of the integrated model (adapted from Walker et al., 2007).

1.10.3 Biopsychosocial-based Approaches and Return to Sport

Although often thought to be relatively contemporary, biopsychosocial approaches can be dated back to the early work of Engel (1977). These approaches suggest additional biological, psychological and social pathways to the cognitive appraisal approaches, through which psychosocial factors may contribute to return to sport outcomes (Brewer, 2010). This is an important feature of this approach, given that stage-based and cognitive appraisal-based approaches do not acknowledge biological or physical factors, and fail to articulate the mechanism behind the interaction of psychosocial factors and physical factors (Brewer, 2002). The same critique is often directed at traditional medical models which commonly place exclusive focus on biological or physical factors (e.g., Virchow's biomedical model; Dijkstra, Pollock, Chakraverty & Alonso, 2014). Therefore, biopsychosocial approaches acknowledge the multifaceted nature of the return to sport process. As such, biopsychosocial approaches

may have greater utility in practice, compared with other largely psychological or physical approaches.

Within the specific context of sports injury, Brewer and colleagues (2002) developed the biopsychosocial model of sport injury rehabilitation (see Figure 1.7). Broadly, the model aims to provide a comprehensive overview of the numerous factors and pathways involved in sports injury rehabilitation from the occurrence of injury to the subsequent outcomes. As such, it draws on approaches that are frequently adopted as best practice in other healthcare settings. The model contains several key components: characteristics of the injury; sociodemographic factors; biological factors; psychological factors; social/contextual factors; intermediate biopsychosocial outcomes; and sport injury rehabilitation outcomes.

According to the model, characteristics of the player's injury (e.g., cause, severity, location, and injury history) and the sociodemographic background of the player (e.g., age, sex, race/ ethnicity, and socio-economic status) influence biological, psychological and social/ contextual factors. Each player will have a different profile of injury characteristics and socio-demographic backgrounds. Therefore, this model partly accounts for some of the variability seen in return to sport outcomes between players. Psychological factors (e.g., personality, cognition, affect, and behaviour) are placed centrally in the model, and share reciprocal relationships with biological (e.g., tissue repair, sleep, neurochemistry, and metabolism) and social / contextual (e.g., social network, life stress, rehabilitation environment, and situational characteristics) factors (Brewer et al., 2002). The various interactions between these biopsychosocial factors that will influence outcomes directly or through mediated pathways.

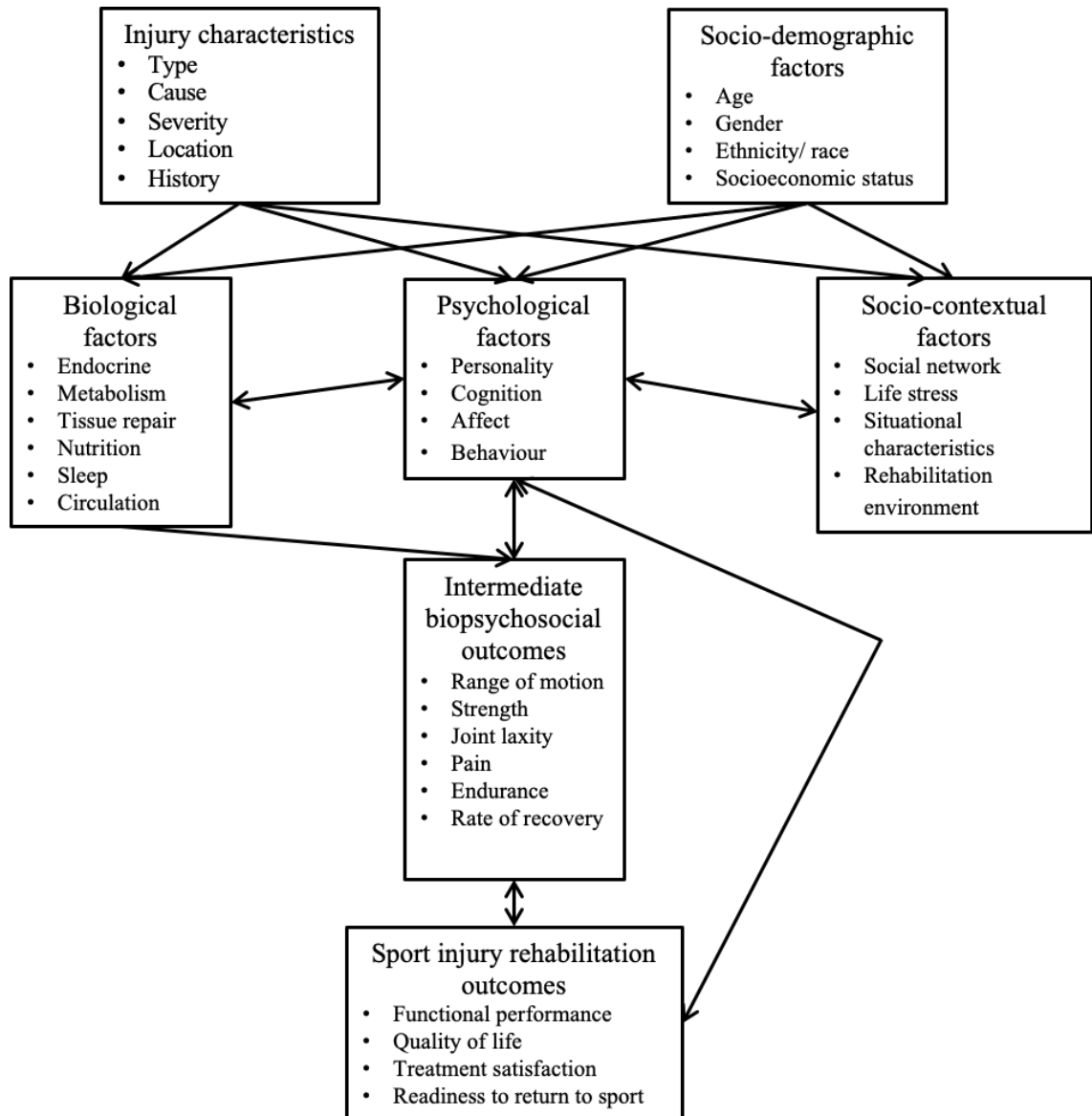


Figure 1.7. The biopsychosocial model of sports injury rehabilitation (adapted from Brewer et al., 2002).

Relating to specific outcomes, the model proposes that intermediate biopsychosocial rehabilitation outcomes (e.g., rate of recovery, pain, strength, and range of motion) determine subsequent sport injury rehabilitation outcomes (functional performance, quality of life, treatment satisfaction, and readiness to return to sport). It is proposed that psychological factors will influence outcomes (i.e., intermediate biopsychosocial and sports injury rehabilitation) directly and in a mediated fashion

through their relationship with biological and social/contextual factors. For example, psychological distress (psychological) may negatively influence rate of recovery (intermediate biopsychosocial outcome) mediated by its effect on sleep quality (a biological factor). It is important to note that only psychological factors are believed to directly influence both intermediate and sport injury rehabilitation outcomes, and that this relationship is bidirectional. Using the aforementioned example, the slow rate of recovery may then lead to increased psychological distress. In addition, social/contextual factors will only influence outcomes mediated by psychological factors. For example, social support may influence readiness to return to sport, and this relationship may be mediated by anxiety.

By acknowledging that return sport is a multicomponent process, the biopsychosocial model may have greater utility when compared with other approaches (i.e., outcomes are formed by physical and psychosocial processes; Santi & Pietrantonio, 2013). There is some support for the biopsychosocial model within the literature, with several correlational and experimental intervention studies validating certain pathways (see Brewer, 2010). Cross-sectional studies have found biopsychosocial factors to be significant predictors of function and disability (e.g., Igwese-Chidobe et al., 2017; Thomee et al., 2007). In one such study of ACL injuries, psychological factors (e.g., self-esteem, perceived control) significantly predicted return to sport and functional performance (e.g., single hop test, knee arthometry; Christino et al., 2016). Likewise, experimental studies have found that by modulating psychological and social factors through interventions, physical and functional outcomes can be optimised (e.g., Maddison, Prapavessis & Clatworthy, 2006; Christalou & Zervas, 2007). Additionally, by examining the interactions between physical and psychological factors, other studies have advocated this approach without necessarily referring to the biopsychosocial framework (e.g., Zarzycki et al., 2018; McPherson et al., 2019a). For example, in one

study it was speculated that the neural impairments of the injured limb interact with psychological factors to negatively influence functional performance by creating an avoidance response or increased feeling of distress that certain tasks can no longer be completed, and consequently a successful return to sport is never achieved (Burland et al., 2019).

Despite this empirical support, several limitations of the biopsychosocial model have been raised (Walker & Heaney, 2013). First, while there is empirical support for elements of the model, because of the model's complexity its overall propositions have not been tested. For example, is the relationship between socio-contextual factors (e.g., social support) and sports injury rehabilitation outcomes (e.g., readiness to return to sport) mediated by psychological factors, and if so which specific factors? Second, the model fails to explain the relationship between the identified psychological factors. For example, how do cognitions, affect and behaviour interact with one another, and are they considered separate factors? Finally, the model does not explain how differential outcomes are developed, not does it delineate which of the physical, social or biological (physical) factors are the most significant in determining differential outcomes (Walker & Heaney, 2013).

To add further clarity to the propositions of the biopsychosocial model, Brewer (2010) suggested several alternative explanatory pathways of how psychological and biological factors influence multifaceted sports injury outcomes (see Figure 1.8). First, it is indicated that psychological factors can directly influence cognitive/affective outcomes (i.e., psychological readiness). Second, psychological factors can indirectly influence cognitive/affective outcomes via rehabilitation behaviour and /or biological factors. Finally, psychological factors influence functional/physical outcomes (i.e., physical readiness) and this is indirectly mediated by rehabilitation behaviour and/or biological factors. In its present form, however, the biopsychosocial model remains as a

theoretical underpinning that is frequently referred to in research and applied practice, but infrequently tested (Heaney, Green, Rostron & Walker, 2012).

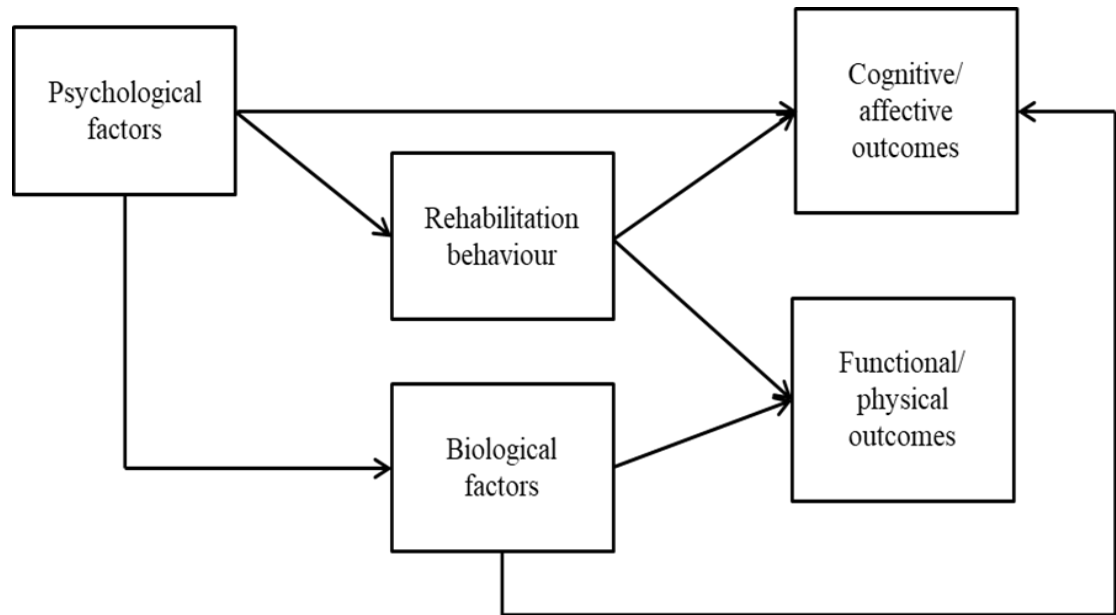


Figure 1.8. Potential pathways between psychological factors and sport injury rehabilitation outcomes (adapted from Brewer, 2010).

1.10.4 Motivation-based approaches and return to sport

Motivation-based approaches are centred upon what motivates a player to engage in adaptive rehabilitation behaviours, and which conditions may determine these behaviours. The assumption is that higher levels of self-motivated behaviour augment positive health outcomes. Podlog and Eklund (2007) suggest that motivation is likely to be the principle psychological factor impacting on return to sport after injury. For example, adhering to prescribed sports injury practitioner advice and instructions (i.e., being more motivated) would enhance a player's physical readiness to return to sport. The principle motivation-based approach in the sports injury domain is self-determination theory (SDT, Deci & Ryan, 1985).

SDT is a meta-theory comprised of several mini-theories describing the socio-environmental conditions influencing a player's tendency towards self-motivated behaviour, psychological health, and task performance (Podlog, Dimmock & Miller, 2011). These mini theories are cognitive evaluation theory, organismic integration theory, causality orientations theory, basic psychological needs theory, goal content theory, and relationship motivation theory (Deci & Ryan, 1985). As a meta-theory, SDT propositions are thought to span multiple contexts (e.g., education, health, parenting), contending that an individual's actions and behaviours are not only instigated by intrinsic motivation (i.e., engagement for personal reasons), but also that there is a continuum from amotivation (i.e., absence of any intention) to intrinsic motivation, inclusive of forms of external motivation (Santi, 2013). However, whether an injured player can be truly intrinsically motivated (i.e., engaging for inherent interest and enjoyment) to engage in rehabilitation activities is questionable. This is because players typically engage in such activities to achieve a discernible external goal (e.g., to return to sport), and these activities are frequently prescribed by a qualified sports injury practitioner. Therefore, in a sports injury context referring to autonomous motivation, controlled motivation and amotivation may have better conceptual fit. Specific forms of controlled motivation include introjected regulation (i.e., acting to avoid feelings of guilt and shame) and external regulation (i.e., acting to obtain incentives or avoid punishment), whereas, in addition to intrinsic motivation, specific forms of autonomous motivation include integrated (i.e., acting because of value congruence) and identified regulated reasons (i.e., acting to achieve an important personal goal or valued outcome; Deci & Ryan, 1985). In comparison to controlled motivation, autonomous motivation promotes greater behavioural adherence and commitment because behaviours are self-regulated and self-reinforcing (Chan, Lee, Hagger, Mok & Yung, 2017). Of the several mini theories of SDT it is particularly basic psychological needs theory (BPNT, Deci &

Ryan, 2000) that has been most frequently applied to the return to sport context (see Figure 1.9; e.g., Podlog & Eklund, 2007).

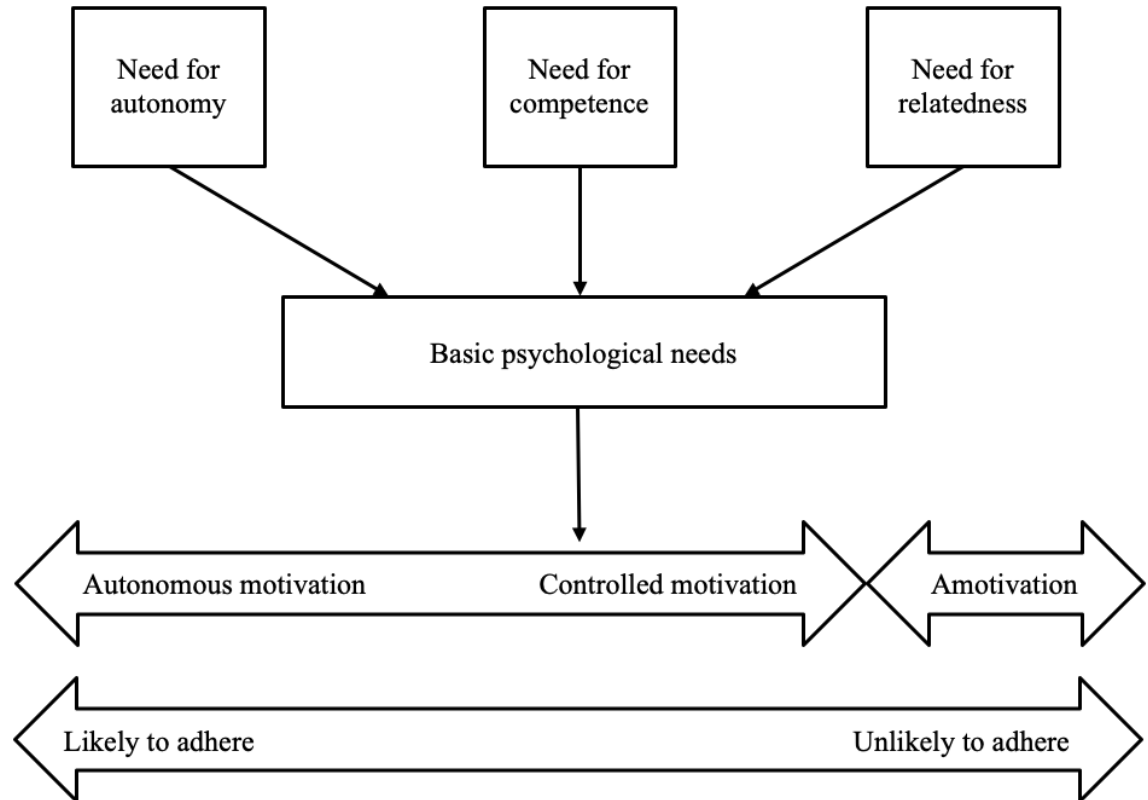


Figure 1.9. Representation of basic psychological needs theory relationship with motivation and rehabilitation adherence (modified from Ryan & Deci, 2007).

According to BPNT, self-motivated behaviour will be enhanced if the correct conditions are perceived. The social environment a player finds themselves in serves to either satisfy (i.e., support) or frustrate (i.e., diminish) a player's basic psychological needs. Deci and Ryan (2000) refer to three basic psychological needs: autonomy, competence and relatedness. Autonomy explains a player's need to feel that their behaviour is their choice, and contingent upon themselves (Chan et al., 2010). It is frequently cited as the most important of the psychological needs across several health domains (Ryan, Patrick, Deci, and Williams, 2008). Competence relates to the player's

feelings (e.g., anxiety and confidence) that an effective outcome can be achieved, or a particular criterion goal completed based on their own ability and/or strategies. Finally, relatedness is the player's need to feel supported, trusted, respected, understood, and cared for. Evidence suggests that there is a greater chance of a successful return to sport when all of the basic needs are satisfied (Arden, Taylor, Feller & Webster, 2013a).

Deci and Ryan (2005) propose that a player's experience of competence and autonomy are necessary to facilitate motivated behaviour (e.g., adhering to reconditioning exercises) and that this can only develop in environments where the need for relatedness is supported. In other words, the extent to which the environment is supportive of a player's autonomy and competence is important to enhance return to sport outcomes. There is some empirical support for these propositions in the context of clinical-based rehabilitation adherence (e.g., cancer, lower back pain; Chan & Hagger, 2012; Levy, Polman & Borkoles, 2008), psychological well-being during rehabilitation (Carson & Polman, 2017; Podlog, Lochbaum & Stevens, 2010) and return to sport rates following injury (Arden et al., 2013b).

While BPNT may provide a useful framework to identify and organise psychological processes that may influence a player's motivation to return to sport following injury, it is not without limitations (Chan et al., 2017). First, as a relatively simple and generic theory it can be argued that it takes a reductionist approach to the complexity of both the player and the return to sport experience. In this regard, some of the complexity of the return to sport process can become lost. For example, in a systematic review of psychological factors associated with returning to sport following injury, 15 different psychological factors were identified from the literature and were subsequently reduced to the three basic psychosocial needs (see Arden et al., 2013a). Within this review, potentially salient factors that did not align to basic psychological needs (e.g., coping, beliefs, and personality) were labelled additional factors and as such

their potential importance is diminished. Second, BPNT infers that during rehabilitation from sports injury, motivation and consequently adherence is purely adaptive. This is frequently the case when compared with non-adherence to sports injury practitioner advice and instructions. However, it is noted that being over-motivated and hence being over-adherent (i.e., exceeding practitioner-recommended guidance) might be commonplace in players who are willing to risk a premature return to sport (e.g., Murphy & Waddington, 2007; Podlog et al., 2013a). Consequently, in a sport injury context there may be occasions where motivation may be maladaptive. Finally, when applied to a sports injury context it is unclear which of the basic psychological needs are the most important, whether all psychological needs carry the same weighting, and how the basic psychological needs may interact with other cognition and emotions to predict return to sport outcomes. For example, BPNT may not effectively account for the proximal decision-making processes (e.g., a player's belief, planning, commitment; Chan et al., 2017).

1.10.5 Perspectives on the Theoretical Landscape of Psychosocial Factors and Return to Sport

This is clearly a research area that is relatively rich with theoretical underpinnings (i.e., multiple approaches, theories and models). Regardless of these rich theoretical underpinnings, a common perspective is that this is a theoretically underdeveloped topic when compared to other areas of psychology or sports medicine (Brewer, 2010). The underpinnings frequently referred to in this area include stage-based approaches, cognitive appraisal-based approaches, biopsychosocial-based approaches, and motivation-based approaches. The extensions to these approaches (e.g., Brewer, 2010; Walker et al., 2007) have provided some additional explanatory processes underpinning how psychosocial factors may influence return to sport

outcomes. However, each approach has its own inherent strengths and limitations. A common limitation is that when approaches have been individually applied, they have resulted in a substantial amount of unexplained variance in outcomes (Chan et al., 2017). This then raises the questions: (i) do we need to create more theory? and (ii) do we need to test and develop existing theory? One growing perspective that has been suggested when trying to understand determinants of health outcomes more comprehensively is the use of a multi-theory approach (Hagger, 2009). In other words, combining approaches or models to provide a fuller explanation of how psychosocial factors influence return to sport outcomes.

Within this research area, several additional mainstream psychological underpinnings have also been applied. This has occurred when the study is largely focused on one specific psychosocial factor (e.g., rehabilitation motivation and theory of planned behaviour; Ajzen, 1991). For example, when researchers have specifically examined social support, they have nested this within traditional social support theory (i.e., the stress buffering and direct effects hypotheses; e.g., Mitchell, Evans, Rees & Hardy, 2014), despite the fact that social support appears in the domain specific approaches (e.g., the integrated model and the biopsychosocial model). As such, within the field of research this has given rise to a proliferation of empirical studies identifying potentially important psychosocial factors, but which are grounded in completely different theoretical underpinnings. In light of this, navigating the current theoretical landscape is a daunting task for researchers and sports injury practitioners alike.

1.11 The Problem Stated

In summary, the previous sections provide a contextual and conceptual background to the study of psychosocial factors and return to sport outcomes following injury in football. More specifically, an outline has been provided of the main

independent (i.e., psychosocial factors) and dependent variables (i.e., return to sport outcomes) that are further examined in this thesis. Against this contextual and conceptual background, several important problems are highlighted. Collectively, these problems provide the overarching rationale for this thesis. In other words, they support the contention that the study of psychosocial factors and return to sport outcomes in football is an important and clinically relevant topic.

First, the burden of sports injury in football is high (Ekstrand et al., 2020). As such the management of sports injury presents a significant challenge to football players and practitioners. Second, when a player is injured, returning them back to their pre-injury sport and pre-injury levels of performance and status is challenging. As such, the prognosis from sports injury in football is a pressing concern (e.g., Ardern et al., 2014b; Drew et al., 2017). Third, theory, research and practitioner frameworks point to physical and psychosocial factors as being central to an optimal return to sport (e.g., the need for players to be physically and psychologically ready; Ardern et al., 2016). Based on the available evidence base, the current understanding of physical and psychosocial factors requires further development in order to facilitate better return to sport outcomes (e.g., Webster & Hewett, 2019). However, there appears to be a greater need to develop further understanding of psychosocial factors (Brewer, 2010). This may be because psychosocial factors that may influence return to sport outcomes have been largely marginalised in research and education/training when compared to physical factors (e.g., Heaney et al., 2015). Finally, the theory and research focusing on psychosocial factors and return to sport outcomes requires development from its present state. The current body of literature supports the importance of psychosocial factors (e.g., Truong et al., 2020). However, the present understanding of psychosocial factors can be characterised as being broad and superficial (i.e., many factors are identified, understanding of association as opposed to processes; e.g., Brewer, 2010). A focused

and in-depth understanding is required to advance this area of research (i.e., delineating which factors are most important, understanding the process of effect). Overall, for the aforementioned reasons, this thesis is grounded in a real-world challenge and is focused on a worthwhile topic. It may therefore provide some extension to the current literature and applied practice.

1.12 Overall Purpose and Aims of the Thesis

In alignment with the rationale that sports injuries are common and return to sport outcomes frequently poor, the main purpose of the thesis is to study the psychosocial factors associated with return to sport outcomes following injury in football. By doing so, the research contained in this thesis may provide an incremental contribution to the psychology of sport injury and sports medicine literature with the view to informing return to sport practices for injured football players.

To systematically address the main purpose of the thesis, there are three main research aims that are grounded in a football context: (1) to evaluate the theoretical underpinnings and empirical research on psychosocial factors and return to sport outcomes; (2) to explore how psychosocial factors are associated with return to sport outcomes from the player's own perspective; and (3) to examine the relationship between psychosocial factors and return to sport outcomes. To meet these aims there are four studies that adopt a range of methods which are best suited to the research aim to which each study is aligned (see chapters two – five). Each research aim and each study has been designed to incrementally and iteratively build on the previous one. Therefore, this is a mixed methods thesis. Mixed methods research is the use of both quantitative and qualitative methods of inquiry in a single study or series of connected studies (Tariq & Woodman, 2010). It is thought that the type of research areas that may profit most from a mixed methods approach tend to be broad and complex (i.e., involve many facets; Scott & Briggs, 2009). Theory and research indicate that understanding

psychosocial factors and return to sport outcomes represents one such topic. Mixed methods programmes of work are aligned with the philosophical standpoint of pragmatism (Morgan, 2007). This approach is evident in the daily working routine of sports injury practitioners that this thesis is intended to impact on, as it aligns with empowerment, diversity, and attention to context (Buchheit, Eirale, Simpson & Lacome, 2018; May, Hunter & Jason, 2017). For example, complex clinical judgements (e.g., decisions over return to sport following injury) are frequently developed using qualitative (e.g., subjective working knowledge) and quantitative methods (e.g., objective measurement tools yielding numerical metrics) to give a more complete understanding, and are not made based upon certain ontological or epistemological stances (Forsdyke et al., 2017; Scott & Briggs, 2009). As such, this thesis may have some inferential and statistical-probabilistic generalisability to other injured football players (Smith, 2017). The studies contained in this thesis adopt an approach that has high fidelity with practice and may provide a more complete understanding of psychosocial factors and return to sport outcomes in football.

Aim one of this thesis is to evaluate the theoretical underpinning and empirical research on psychosocial factors and return to sport outcomes in football. This research aim is addressed by the present chapter that provides a contextual and theoretical background to the thesis, and by study one. Study one is a mixed studies systematic review of the literature relating to psychosocial factors and sports injury outcomes entitled: “*Psychosocial Factors Associated with Sports Injury Outcomes in Competitive Athletes: A Mixed Studies Systematic Review*”. In light of the research context and theoretical background, a systematic review is a natural starting point for the thesis in order to evaluate the status of the current empirical evidence, and to scope and synthesis findings and suggestions within this evidence. The findings from study one will then be used to rationalise and inform the foci of the following empirical studies.

Aim two of this thesis is to explore how psychosocial factors are associated with return to sport outcomes in football from the athlete's own perspective and is addressed in study two. Building on the findings from the systematic review in study one, study two is a qualitative study of perceived support and return to sport outcomes entitled: *"Together we are Limitless: A Qualitative Study of Perceptions of Social Support and Return to Sport Outcomes in International Women Football Players"*. This study is intended to build on study one by being more exploratory in nature and in adopting an interpretivist approach. This may provide a deeper and context specific understanding of how psychological factors are associated with return to sport outcomes.

Aim three of this thesis is to examine the relationship between psychosocial factors and return to sport outcomes. This aim is jointly addressed by studies three and four. These studies build on the findings and research limitations of study two by quantitatively examining whether interpretive propositions can be generalised to wider football populations. As such, study three and four adopt a positivist approach. Study three is a quantitative cross-sectional study of perceived social support during rehabilitation and the psychological readiness to return to sport relationship entitled: *"Social Support and Psychological Readiness to Return to Sport After Injury in Football Players: the mediating role of re-injury anxiety"*. Study four is a quantitative longitudinal diary study of the perceived social support during the rehabilitation and return to sport process, re-injury anxiety, and psychological readiness to return to sport relationship titled: *"Perceived Social Support and Changes in Re-injury Anxiety and Psychological Readiness to Return to Sport Over Time in Football Players"*. Together, these studies permit the relationship between psychosocial factors and return to sport outcomes to be examined at a given time-point, and then allow any change in this relationship to be examined over time.

Finally, chapter six is a narrative general discussion of the study findings in light of the three stated research aims. One distinctive feature of mixed methods research is the interface between quantitatively and qualitatively obtained data (Creswell, 2007). As such, the general discussion provides a collective meta-inference of the thesis findings (Guest, 2012). Additionally, the theoretical implications, applied implications relative strengths and limitations, and possible avenues for future research to further extend the research area will be discussed. In other words, this section is based on the findings of the present thesis: what is now known; what is not known; what still needs further development; and what utility the findings have (Oliver, 2014).

As a programme of study, this thesis uses an exploratory sequential mixed method design to iteratively examine the relationship between psychosocial factors and return to sport outcomes following injury in football (see Creswell & Plano Clark, 2011). This means that the inductively driven and qualitative focused studies precede the deductively driven and quantitatively focussed studies (Morse, 2003). The subsequent studies and chapters together provide evidence of how a mixed methods approach to studying psychosocial factors and return to sport outcome has been embedded in this thesis (see Figure 1.10).

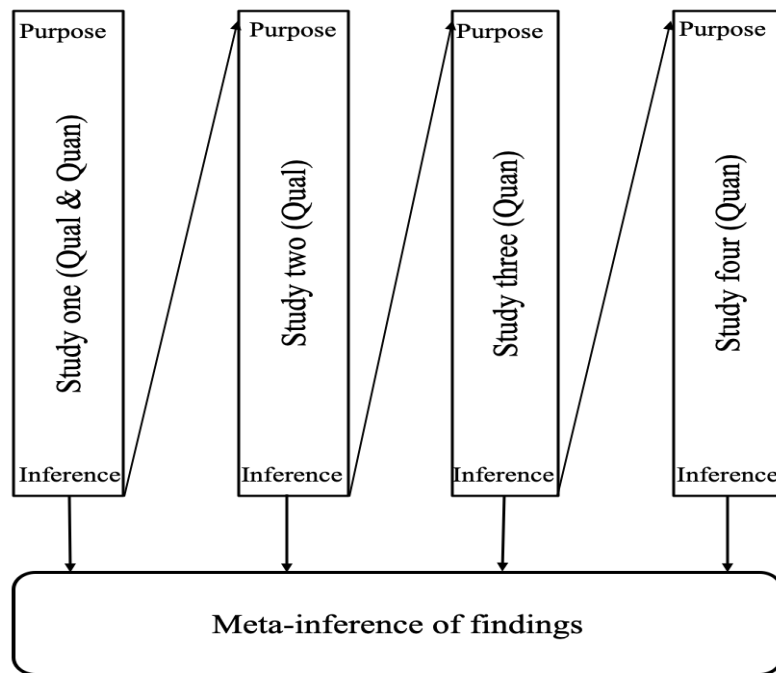


Figure 1.10. Representation of the relationship between the studies included in this thesis. Qual = qualitative approach to data collection and /or analysis; Quan = quantitative approach to data collection or analysis.

1.13 Chapter Summary

The intention of this narrative chapter was to act as an introduction the reader to the central concepts of this thesis, and to the football injury context in which this thesis is grounded. By doing so the reader should have garnered some general understanding of the independent (i.e., psychosocial factors) and dependent variables (i.e., return to sport outcomes) examined throughout this thesis. Detailing the background to the research topic reveals several problems related to current sports injury and return to sport research and practice. These problems provide the core rationale for this thesis. Collectively, the background and rationale form the main purpose and research aims of the thesis. Using a mixed methods approach, the four studies in this thesis collectively address the main purpose and research aims. The studies that immediately follow this chapter are intended to inform and build upon each other to form a logical and coherent

line of enquiry (i.e., to scope, to explore, to examine). In combination with the mixed methods approach this thesis adopts, the cumulative findings from the studies provide the basis for the meta-inference of findings in the general discussion. In light of the theoretical and empirical background to this research area, a logical starting point would be to conduct a systematic review of the evidence base to capture indications from existing empirical evidence tells us.

2.0 Chapter Two

Psychosocial Factors Associated with Sports Injury Outcomes in Competitive Athletes: A Mixed Studies Systematic Review

Note to reader.

This study was published in the *British Journal of Sports Medicine*:

Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2016). Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: A mixed studies systematic review. *British Journal of Sports Medicine*, 50, 537-544.

2.1 Aim of Chapter Two

The previous chapter presents some background evidence about the current theoretical and empirical state-of-play that underpins this research area. Chapter one also highlights some of the current challenges and key areas for development that confront researchers and practitioners. Drawing upon the previous chapter it is apparent that returning players to sport following injury is challenging and that psychosocial factors may be a prognostic influence on return to sport outcomes. Against this background, the theoretical and empirical research is considered under-developed (Brewer, 2010). Consequently, our understanding of psychosocial factors and return to sport outcomes is potentially fragmented and superficial. For research areas such as this, one useful type of research design is a systematic review. Systematic reviews are considered the highest level of evidence and aim to synthesis evidence from multiple empirical studies to address a specific research question (Munn et al., 2018). Within health setting systematic reviews are linked to the rise of evidence-informed practice and policy (Dixon Woods et al., 2006). There have been other systematic reviews in this research area, but these have tended to have restrictive inclusion criteria and as such only systematically review a reduced amount of the empirical evidence (e.g., Arden et al., 2013a; te Wierke et al., 2013). This is a potential issue given some of the diversity of the empirical evidence (e.g., different injury types, research designs, methods). Therefore, the purpose of this study was to address the research question: are psychosocial factors associated with sports injury rehabilitation outcomes in competitive athletes? This study begins with an empirical and theoretical rationale for the study of psychosocial factors and return to sport outcomes, and for conducting a further systematic review on this topic. Next, the methods used in the systematic review following best practice guidelines are explained (i.e., PRISMA). The results from the

methods that were employed are then presented before finally discussing the key findings of the review in light of the strengths and limitations of the work.

2.2 Study Abstract

The prime focus of research on sports injury has been on physical factors. This is despite an understanding that when an athlete sustains an injury it has psychosocial as well as physical impacts. Psychosocial factors have been suggested as prognostic influences on the outcomes of rehabilitation. The aim of this work was to address the question: *are psychosocial factors associated with sports injury rehabilitation outcomes in competitive athletes?* This mixed studies systematic review was registered prior to commencement (PROSPERO reg. CRD42014008667). Electronic database and bibliographic searching were undertaken from the earliest entry until 1st Sept 2016. Studies that included injured competitive athletes, psychosocial factors, and at least one discernible sports injury rehabilitation outcome were reviewed by the authors. A quality appraisal of the studies was undertaken to establish the risk of reporting bias. Twenty-five studies including a pooled total of 942 injured competitive athletes were appraised and synthesised. Twenty studies had not been included in previous reviews. The mean methodological quality of the studies was 59% (moderate risk of reporting bias). Convergent thematic analysis uncovered three core themes across the studies: i) emotion associated with rehabilitation outcomes; ii) cognitions associated with rehabilitation outcomes; and iii) behaviours associated with rehabilitation outcomes. Injury and performance related fears, anxiety, and confidence were associated with rehabilitation outcomes. There is gender-related, age-related, and injury-related bias in the reviewed literature. Psychosocial factors were associated with a range of sports injury rehabilitation outcomes. Practitioners need to recognise that an injured athlete's thoughts, feelings, and actions may influence the outcome of sports injury.

2.3 Introduction

In competitive sport there is a high burden of injury (Ekstrand et al., 2020). To date, the prime focus of research on sports injuries has been on physical factors (Truong et al., 2020). This is despite our understanding that when an athlete sustains a sports injury it has psychosocial impacts (Brewer et al., 2002; Engel, 1980). A common assumption in research and practice has been that physical and psychosocial recovery occurs at the same time. Recently, it has been recognised that physical and psychological readiness to return to sport after injury does not always coincide meaning that athletes may return to training and competition when they are physically but not psychologically ready (Podlog & Eklund, 2007). This is potentially important given that returning to sport psychologically underprepared may be associated with several negative prognostic performance-related and injury-related connotations (McPherson et al., 2019a).

2.3.1 Psychosocial Factors

Following injury, many athletes do not return to their pre-injury level of activity, and even less return to competition (Ardern et al., 2012b; Colvin et al., 2009). Based on the increased physical and psychological demands and relative risk of participation, competitive athletes may be less likely to return to a pre-injury level of performance than recreational athletes (Colvin et al., 2009). For example, return to performance rates following injury in certain high-risk sports are reported to be as low as 17 - 22% (Harris et al., 2013; Ishøi et al., 2018). As the return to sport process takes place within social contexts often involving many people, a key to an effective return to sport may lie with psychosocial factors (Shrier, Charland, Mohtadi, Meeuwisse & Matheson, 2010). Psychosocial factors can be described as “pertaining to the influence of social factors on an individual’s mind or behaviour, and to the interrelation of behaviour and social

factors” (Martikainen, Bartley & Lahelma, 2002, p. 1091). In other words, return to sport outcomes may be associated with the cumulative relationship between an athlete’s emotions, cognitions and behaviours, and the social context of the return to sport process. These factors have been identified as being important prognostic influences in a range of traumatic and non-traumatic sports injuries (e.g., Del Buono, Smith, Coco, Woolley, Denaro & Maffulli, 2013; Refshauge & Maher, 2006; Tol et al., 2014).

Psychosocial factors are also an importance presence within a number of theoretical underpinnings that have been developed and applied within this area (e.g., Brewer et al., 2002; Kubler-Ross, 1969; Wiese-Bjornstal et al., 1998). These draw on stage-based, cognitive appraisal or biopsychosocial approaches and give a conceptual framework to work from, although no single approach predominates the evidence base (Podlog & Eklund, 2007). See Chapter One for an overview and critique of these approaches. The two main frameworks that appear in the literature most frequently are the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) and the biopsychosocial model of sports injury rehabilitation (Brewer et al., 2002). The integrated model primarily focusses on the product of a cyclical relationship between cognitions, emotional responses and behavioural responses to explain return to sport outcomes. Whereas the biopsychosocial model proposes that psychosocial factors may influence return to sport outcomes directly or indirectly through mediating biopsychological outcomes (e.g., rate of recovery, pain, range of motion). While there is support for some of the specific pathways within these frameworks, owing to their complexity the current research has so far been unable to validate all collective propositions. As such, this is a research topic requiring further theoretical development (Brewer, 2010).

2.3.2 Previous Systematic Reviews

Three major systematic reviews have been published within this area (Ardern et al., 2013a; Mendoza, Patel & Bassett, 2007; te Wierike et al., 2013). Collectively, these have addressed the need for transparency, methodological rigour and non-biased perspectives in reporting the empirical evidence (Moher, Liberati, Tetzlaff & Altman, 2009). Out of the three reviews, two are exclusively focused on psychosocial factors influencing anterior cruciate ligament (ACL) rehabilitation (e.g., Mendoza, Patel & Bassett, 2007; te Wierike et al., 2013). While ACL injury has high personal impact and burden (Núñez et al., 2012) this represents a narrow perspective and precludes reliable generalisation of the findings. For example, the unique nature of ACL injury frequently means that surgical intervention is required and usually leads to 9-12 months of time loss from competitive sport. To reduce injury-related bias there is a need to include other injuries which may have the similar prevalence, severity and chronicity (e.g., high-grade lateral ankle sprain, rotator cuff tendinopathy). Such an approach would have high real-world relevance as practitioners are required to manage competitive athletes that have sustained a range of sports injuries. Together, all of these previous reviews agree that psychosocial factors may influence return to sport outcomes. However, differences in constructs were apparent across the reviews. For instance, prominent psychosocial factors highlighted in these reviews include motivation, self-efficacy, perceived control ($N=10$ included studies, Mendoza, Patel & Bassett, 2007); autonomy, relatedness, competence ($N=11$ included studies, Ardern et al., 2013a); and affect, cognition, and behaviours ($N=24$ included studies, te Wierike et al., 2013).

A limitation of these previous reviews is that they have only reported the collective findings from quantitative research designs (e.g., non-experimental cross-sectional designs) without clear rationale. This is despite the existence of peer-reviewed qualitative empirical evidence. As such, by excluding qualitative research previous

reviews have reduced the evidence on which they base their findings (e.g., Ardern et al., 2013a).

2.3.3 Mixed Studies Systematic Reviews

Put simply, mixed studies reviews evaluate and synthesise from both quantitative and qualitative methods of inquiry (Tariq & Woodman, 2010). There is clearly value in both qualitative and quantitative approaches (i.e., mono-method research). While quantitative approaches provide scientific objectivity and statistical-probabilistic generalisability, qualitative approaches provide a subjective exploration and understanding of complex contextual phenomenon with local inferential generalisability (Everest, 2014; Smith, 2017). The broad underlying assumption is that mixed studies reviews may address some research questions more comprehensively than a mono-method approaches alone. There are several advantages of adopting a mixed studies approach such as: i) inferential quality; ii) completeness; iii) initiation, development and expansion; and iv) utility and context (e.g., Bryman, 2006, Dellinger & Leech, 2007, Tashikkori & Teddlie, 2012). It is thought that the type of research areas that may profit most from a mixed methods approach tend to be broad and complex (Scott & Briggs, 2009). One such example of a broad and complex research area is return to sport following injury.

There is growing recognition over the need for systematic methodologies to rigorously deal with diverse forms of evidence to address the disparity between academic research and practitioner experience (Dixon-Woods et al., 2006). In other words, sports injury research is typically characterised by pure rationality and objectivity, whereas the day to day demands of practitioners may, in comparison, be more local and experiential. Integrating statistical generalisation with the in-depth description of complex phenomena gleaned from qualitative research has the potential

to provide a more detailed, rich, and highly practical understanding of the return to sport process. Therefore, evaluating the overall contribution of a body of literature with contrasting paradigms and designs can be more relevant to effective clinical decision making (Pace et al., 2012).

2.3.4 The Present Study

The present study draws on the information and rationale provided in the preceding narrative chapter. Specifically, the previous chapter gave a narrative overview of the context of returning to sport from injury and the theoretical underpinnings explaining the importance of psychosocial factors. Together, unexplained real-world practitioner challenges (i.e., optimally return athletes back to sport following injury), under-developed theoretical explanations, and limitations in previous systematic reviews are indications for a new systematic review of the evidence (Dixon-Woods et al., 2006). Therefore, systematically reviewing and appraising all relevant empirical findings on psychosocial factors and return to sport outcomes is warranted. According to Moher et al. (2009) the purpose of a systematic review is to review a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant extant literature in order to collate and analyse data from the studies included in the review. Specifically, this will allow for a robust evidence-based assessment of what the current body of research suggests, highlight areas for development in this research topic, and serve as a protagonist for further empirical studies. As such, the aim of this systematic review was to evaluate the association between psychosocial factors and sports injury rehabilitation outcomes. This aim was underpinned by the research question: are psychosocial factors associated with sports injury rehabilitation outcomes in competitive athletes?

2.4 Methods

The methodology of the systematic review was informed by the PRISMA guidelines (Moher, et al., 2009) and recommendations by Lloyd-Jones (2004). The review was prospectively registered with PROSPERO in February 2014 (registration number: CRD42014008667).

2.4.1 Ontological and Epistemological Assumptions

The mixed studies systematic review assumed a pragmatic standpoint (see Teddlie & Tashakkori, 2012). This standpoint is less influenced by traditional dogma over research philosophy (i.e., nature of truth and reality) and more driven by utility and practical consequences (Shaw, Connelly & Zecevic, 2010). This approach may have greater real-world relevance to sport injury practice where multiple forms of data are frequently collected and are freely available to inform overall clinical decision-making (Buchanan & Bryman, 2007). The pragmatic standpoint aligns with the decision to include, review and appraise qualitative and quantitative studies in order to form highly relevant findings.

2.4.2 Ethical Considerations

Before implementing the review search strategy, institutional ethical approval was obtained (see Appendix A). The specific ethical considerations relating this study were: (i) inclusion of studies with ethical insufficiencies; (ii) inclusion of studies because of a conflict of interest; and (iii) misrepresentation of findings due to author bias (Vergnes, Marchal-Sixou, Nabet, Maret & Hamel, 2010). These considerations were mitigated by referring any study that was deemed below ethical standards to the institutional ethics committee for further guidance and adopting a research team approach to data identification, screening, applying the eligibility criteria and analysis

aligned to PRISMA guidelines (Moher et al., 2009). Additionally, the research team had no conflicts of interest with any potential study.

2.4.3 Search Strategy

Eight databases were searched on June 1, 2015 (i.e., *SPORTDiscus*, *CINAHL*, *AMED*, *MEDLINE*, *PsychINFO*, *SocIndex*, PEDro, ScienceDirect) using multiple keywords and Boolean phrases (see Table 2.1). The search terms were agreed *a priori* and informed by breaking down the research question, relevant MeSH terms, and by the biopsychosocial approaches used in the area (Brewer et al., 2002; Wiese-Bjornstal, 2010). The combination of search terms was piloted to ensure adequate sensitivity to detect relevant studies. As such the search terms underwent several iterations. The extracted studies were included or excluded in a three-step screening process based on the study title, abstract and full text (Lloyd-Jones, 2004). Bibliographic searching was employed by reviewing the reference lists of included studies using the same process.

Table 2.1 *Search terms used for the systematic review*

Electronic database	Search terms (including truncations)
EBSCO Host (including SPORTDiscus, CINAHL, AMED, SocIndex, PsychINFO, MEDLINE)	‘Sport* inj*’ OR ‘athlet* inj*’ (ab) AND Psychosocial OR psycholog* OR emotion* (ab) AND Rehabilitat* OR recover* OR outcome* OR return (ab) AND athlet* OR player* OR individual*OR patient*(ab)
ScienceDirect	‘Sport* injur*’ OR ‘athlet* injur*’ (title/abstract/key words) AND Psychosocial OR psycholog* (title/abstract/key words)

PEDro	‘Sport* inj**’OR ‘athlet* inj’ (title/abstract) AND Psycholog* OR psychosocial (title/abstract)
-------	---

2.4.4 Eligibility Criteria

The eligibility criteria are presented in Table 2.2. There was no restriction on date of publication, gender, age, or level of performance. Each study had to conform to best practice definitions of *sports injury* (Clarsen & Bahr, 2014; Hägglund, Waldén, Bahr & Ekstrand, 2005) and *competitive athlete*, containing at least one discernible *psychosocial factors* (Brewer et al., 2002; Wiese-Bjornstal, 2010) influencing at least one discernible *sports injury rehabilitation outcomes* (Brewer, 2010; World Health Organisation, 2001). Studies of non-musculoskeletal (MSK) injury, such as concussion, were excluded based on specific psychopathology directly effecting neurocognitive function. As such it may be difficult to separate out the psychological consequences associated with the injury pathology from the more interpretive psychosocial responses of athletes (Putukian & Echemendia, 2007).

Table 2.2 *Eligibility criteria applied to studies*

Inclusion criteria	Exclusion criteria
Date unrestricted	Non MSK pathology (e.g. traumatic brain injury, cardiac pathology, visceral damage, spinal cord injury)
Sports injury – <i>any MSK pathology requiring the athlete to miss at least one training session or competition</i>	Non-English language
Competitive athletes – <i>competes in sport at least once per week</i>	Non-peer reviewed
Contain at least one discernible sports injury outcome	Reviews (all), commentaries, Editorials position statements, unpublished abstracts
Contain at least one discernible psychosocial factor	Intervention studies
No gender, age or performance level restriction	Inventory development studies

No research design restriction	Studies on prevention or risk Data gathered from coach or physiotherapist or athletic trainer
Original empirical evidence	
Data gathered from the athlete	

2.4.5 Assessment of Risk of Bias

To assess the methodological quality of the literature the Mixed Methods Appraisal Tool (MMAT) was used (Pace et al., 2012). Additional to generic criteria the MMAT has five sets of quality criteria relating to: (1) qualitative; (2) quantitative – randomised controlled studies; (3) quantitative – non-randomised controlled studies; (4) quantitative – observational descriptive studies and (5) mixed-methods studies. The overall quality score for each study was based on the methodological domain-specific criteria using a percentage-based calculation. Mixed methods studies were quality assessed within its own domain plus the domain/s used by its quantitative and qualitative components. According to the MMAT, for mixed methods studies the overall research quality cannot exceed the quality of its weakest component. The MMAT in this review was used to provide an informative description of overall quality and to assess the potential for bias in the findings. Literature using the MMAT has found that the consistency of the global “quality score” between reviewers (ICC) was between 0.72 and 0.94 (Pace et al., 2012).

2.4.6 Data Synthesis

The first step of data synthesis was indwelling (Swann, Keegan, Piggott & Crust, 2012) where the reviewers read the full text of each study and became immersed in the findings and inferences. Studies were then placed into three tables for the review: (1) demographic characteristics; (2) study summary; and (3) study quality appraisal.

Data-based convergent thematic analysis was used to synthesise data from different empirical findings and the assessment of methodological quality (Centre for Reviews and Dissemination, 2009). A meta-aggregative approach was adopted where data transformation was used to “qualitise” findings from a diverse range of literature (Tariq & Woodman, 2010; Teddlie & Tashikkori, 2012). A meta-analysis of results was not conducted due to the heterogeneity within the included studies research designs and methods.

2.5.7 Establishing Rigour

To ensure rigour, a peer review team was formed. The team comprised of the lead researcher (DF), a professor from the same institution (AS), and an academic from another university (AG). This team was created to minimise bias and human error. Established methods of peer debrief and use of “devil’s advocate” were used to inform the reviews search strategy, records screening, and generation of final themes from the included studies (Swann et al., 2012). The full text assessment of eligibility and quality appraisal was undertaken collaboratively in working meetings. These were chaired by the lead researcher with borderline cases or contentious issues resolved through review team discussion until a consensus was reached. Eligibility of final studies was carried out using a voting system to determine the basis for study inclusion or exclusion. Shared decisions to include or exclude studies were based on majority voting (i.e., two from three votes). Where further clarification was deemed necessary, additional information was sought from study author(s) or referred to an appropriate university ethics committee. The review process adhered to the PRISMA checklist for quality (see Appendix C).

2.5 Results

2.5.1 Literature Identification

The electronic database search yielded 368 records. An additional 92 records were identified through systematic bibliographic searching (see Figure 2.1). Titles and abstracts of 432 records were screened following removal of duplicate records ($N=28$), and 368 records were excluded. Sixty-four full texts of studies were obtained and screened at the point, and 39 were excluded. One study (Gordon & Lindgren, 1990) was referred by the team to the Chair of the Faculties Ethics Committee for advice and later included. Finally, 25 studies were included for systematic review and synthesis. Table 2.3 identifies the rating for each of the final studies as a marker of agreement for inclusion by the research team (e.g. for full agreement three stars were awarded).

2.5.2 Assessment of Risk of Bias

The methodological quality of included studies was assessed using the MMAT and decisions agreed by the team. Fourteen studies were assessed against qualitative criteria, five studies against quantitative (non-randomised) criteria, four studies against quantitative (descriptive) criteria, and two against mixed methods criteria (see Table 2.3). The methodological quality of the 25 studies varied between 25 and 75% (mean 59%). Qualitative studies scored highest for quality (mean 64%, range 25-75%), compared to quantitative studies (mean 55.5%, range 25-75%) and mixed methods (mean 37.5%, range 25-50%). Although the MMAT does not state specific thresholds for quality level, it was agreed by the team in line with previous systematic reviews that there was a moderate to high risk of reporting bias (e.g., Ardern et al. 2013a; Swann et al., 2012; te Wierike et al., 2013).

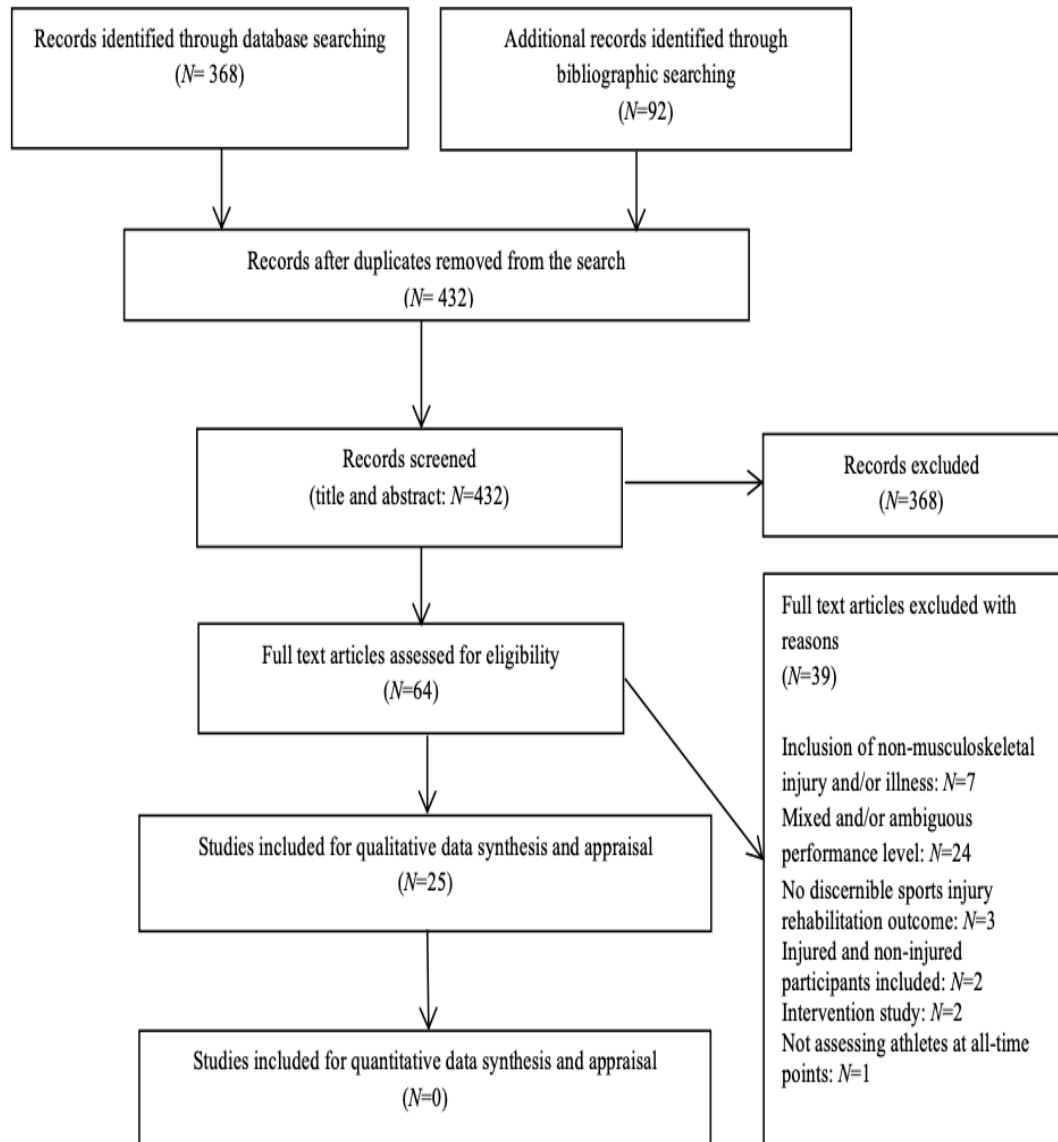


Figure 2.1 Process overview of study identification, screening, eligibility, and inclusion (adapted from Moher et al., 2009).

2.5.3 Demographic Characteristics

The 25 included studies reported on 942 injured athletes, aged 15 to 37 years (mean 23.7 years). Twenty-four studies reported the number of male and female participants. In total there were 552 (64%) men and 309 (36%) women. The athletes included in this review played team and individual sports, ranging from international levels of performance to regularly competing amateurs. The national affiliation of the

study's lead author highlights the clinical relevance and global interest in this topic (e.g. Australia 44%, United Kingdom 24%, North America 20%, and Scandinavia 12%).

2.5.4 Study Characteristics

There were 14 qualitative, nine quantitative, and two mixed methods studies included in the review (see Table 2.4). All 25 studies were used in qualitative data synthesis and appraisal. Sports injury rehabilitation outcomes across the final studies focused on perceived and actual markers of physical and psychological rehabilitation (see Table 2.5). For example, return to sport (Johnson, 1996; Johnson, 1997; Mainwaring, 1999), perceived success and effectiveness (Quinn & Fallon, 1999; Ford, Eklund & Gordon, 2000; Tracey, 2003), and time loss from competition (Kvist et al., 2005). Quantitative studies were largely cross sectional and correlation-based utilising a wide range ($N=22$) of previously established inventories to measure psychosocial response, often with multiple inventories used simultaneously (e.g., Quinn & Fallon, 1999; Podlog & Eklund, 2006). Only seven (32%) of the inventory measures used were specific to the sports injury domain.

There were a broad range of operational definitions of sports injury included across the included studies. Seventeen (68%) studies used a time loss-based definition, ranging from one day (Ford, Eklund & Gordon, 2000) to two months (Podlog & Eklund, 2009). Where mean time loss was explicitly stated, this ranged from 18.5 days to 9.4 months highlighting a tendency to examine moderate and severe injuries (Hägglund et al., 2005). Return to competitive sport rates ranged from 51% (Johnson, 1996) to 78% (Mainwaring, 1999) Injury characteristics revealed a bias towards serious knee injuries with 8 studies of ACL injury (32%), and 8 where serious knee sprains dominated the range of pathologies. Ten studies (40%) focused on injuries requiring

surgical intervention; the remaining 15 studies (60%) included a mixture of injuries or information about whether surgical intervention was required, or it wasn't stated.

13 Gallagher & Gardner ***	✓✓							X	X	✓	X			25	
14 Thatcher et al. **	✓✓	✓	✓	✓	X									75	
15 Carson & Polman ***	✓✓	✓	✓	✓	X			X	X	X	✓	✓	✓	X	25
16 Langford et al. ***	✓✓					✓	✓	X	X					50	
17 Mankad et al. ***	✓✓	✓	✓	✓	X									75	
18 Podlog & Eklund ***	✓✓	✓	✓	✓	X									75	
19 Carson & Polman ***	✓✓	✓	✓	✓	X			X	X	✓	✓	✓	✓	X	50
20 Wadey et al. ***	✓✓	✓	✓	✓	X									75	
21 Arderm et al. ***	✓✓					✓	✓	✓	X					75	
22 Carson & Polman ***	✓✓	✓	✓	✓	X									75	
23 Podlog et al. ***	✓✓	✓	✓	X	X									50	
24 Clement et al. ***	✓✓	✓	✓	✓	X									75	
25 Podlog et al. ***	✓✓	✓	✓	✓	X									75	

✓ = denotes criteria met, X= denotes criteria not met, shaded=not applicable criteria

Table 2.4. *Demographic information from included studies*

Study (date) inclusion rating	Operational definition of injury	Population studied	Injury type (s)	Sample number (n=)	Gender (M:F)	Age (mean years, SD, range)
1. Gordon & Lindgren	Not explicitly stated	Elite cricket	Bilateral pars interarticularis defect requiring surgical intervention	1	1 male	Not stated
2. McDonald & Hardy	Severe injury leading to time loss from sport of three weeks or more	NCAA Division 1 athletes from softball, basketball, track and field, tennis	Musculoskeletal injury including thigh strain, thigh contusion, metatarsal fracture, sprained ankle	5	3:2	Not stated
3. Johnson	Injury occurring in training or competition and minimum time loss of 5 weeks	Highly competitive or elite athletes from team (80%) and individual (20%) sports	Musculoskeletal injury with most common knee, foot/ankle, and shoulder	81	64:17	22.9-25.2
4. Johnson	Injury occurring in training or competition and minimum time loss of five weeks	Highly competitive or elite athletes from team (80%) and individual (20%) sports	Musculoskeletal injury with most common knee, foot/ankle, and shoulder	81	5:7	24.4
5. Mainwaring	Sport related sprain or torsion injury to the knee severe enough to require at least diagnostic surgery	Competitive elite or club athletes from a variety of sports	Sport related ACL injuries	10	6:4	20-29 years
6. Quinn & Fallon	Physical damage sustained as a result of sport participation with time loss of four week or more	Elite athletes from 25 different sports (73.5% team sports, 26.5% individual sports)	Musculoskeletal injury – predominantly ligamentous injury knee, injury to shoulder joint, stress fractures	136	118:18	24.6 ± 4.5
7. Ford et al.	Medical problem sustained during practice or competition that prevented participation (training or	Regularly competitive athletes from Australian football (41), basketball (20), cricket (14),	Not explicitly stated	121	65:56	22 ± 3.6

	playing) for at least one day beyond the date of occurrence.	field hockey (9), netball (26) and volleyball (11)				
8.Tracey	Injury that was moderate to severe and which kept them out of practice and/or competition for at least 7 consecutive days	NCAA Division 3 athletes competing in a variety of team and individual sports	Musculoskeletal injury including ACL sprain, sprained ankle, metatarsal fracture, meniscal tear, back strain, shoulder separation, foot contusion	10	Mixed	21.1 ± 0.9
9.Kvist et al.	ACL injury, and undergone reconstruction performed at same hospital	Regularly competitive patient-athletes e.g., participating in football, handball. Ice hockey, floor ball, American football	ACL requiring surgical reconstruction (various grafts)	62	34:28	18-37
10.Podlog & Eklund	Time loss of one month or more was the criteria used to denote injuries as serious	Competitive amateur and semi-professional athletes from a variety of individual and team sports	Serious musculoskeletal injury affecting knee, ankle, hip, shoulder, spine, hand	12	7:5	18-28
11.Thing	Not explicitly stated	Elite and non-elite competitive female handball athletes	ACL injury	17	17 females	19-33 years
12.Vergeer	Injury sustained during sport leading to time loss	Competitive rugby league athlete	Shoulder dislocation	1	1 male	28
13.Gallagher & Gardner	Medically diagnosed and severity led to time loss of one week or longer	NCAA Division 1 athletes from nine different sports	Not explicitly stated	40	30:10	Not stated
14.Thatcher et al.	Severe injury is classified as an injury that prevents an athlete from participating in practice/competition for more than 21 days	Competitive university athletes (karate, judo, field hockey)	Severe musculoskeletal injury including shoulder dislocation, knee ligament sprain, fracture of fibula	3	1:2	Not stated

15. Carson & Polman	Injury occurred during match play leading to time loss	Professional rugby union athlete	ACL injury required surgical intervention	1	1 male	Not stated
16. Langford et al.	Uncomplicated primary ACL reconstruction	Regularly competitive patient-athletes participating at least weekly prior to injury with intent to return to sport	ACL requiring surgical reconstruction (various grafts)	87	55:32	27.48±5.72
17. Mankad et al.	Injury was absence from sport participation for a minimum of three months	State or national level athletes from variety of sports i.e., basketball, rugby league, gridiron, water polo, and BMX racing	Severe musculoskeletal injuries including knee sprain, shoulder dislocation	8	5:3	22.67 ± 3.74
18. Podlog & Eklund	Athletes needed to have sustained an injury requiring a two months absence from sport-specific training and competition	High level amateur and semi-professional athletes returning to play post injury	Not explicitly stated	12	7:5	18-28
19. Carson & Polman	Not stated	Professional rugby union athletes	ACL injury required surgical intervention	4	4 males	18-27
20. Wadey et al.	Injury sustained during training or competition leading to time loss	Club to national level athletes from rugby union, football, basketball	All lower extremity musculoskeletal including sprain, fracture, dislocation, tendinopathy, strain	10	10 males	21.7 ± 1.8
21. Ardern et al.	ACL injury, and undergone reconstruction performed by the same surgeon	Regular competitive patient-athletes including Australian football (29%), netball (19%), basketball (15%) and football (11%)	ACL requiring surgical reconstruction with hamstring graft	209	121:88	31.7 ± 9.7
22. Carson & Polman	Not stated	Professional rugby union athletes	ACL injury required surgical intervention	5	5 males	Not stated

23.Podlog et al.	Current musculoskeletal injury requiring a minimum one-month absence from sport participation	Elite level adolescent athletes from a variety of sport i.e., Basketball, netball, football rowing, track and field	Musculoskeletal injury including sprain (ACL), dislocation (knee and shoulder), fractures (fibula, arm, lumbar spine), Achilles tendinopathy, bulging disc, Scheuermann's disease	11	3:8	15.3 ± 1.55
24 Clement et al.	Injury that had restricted their sport participation for a minimum of six weeks over the past year	NCAA Division II University athletes from mix of sports including acrobatics/ tumbling (n=4), football (n=3), baseball (n=1)	Musculoskeletal injury including ACL injury (n=3), fractures (n=3), rotator cuff repair (n=1), chondrocyte removal from elbow (n=1)	8	4:4	18-22
25 Podlog et al.	Injury was absence from sport participation for a minimum of two months	Mixed level (club-professional) athletes from rugby union (n=3), football (n=2), gymnastics (n=1), martial arts (n=1)	All lower extremity musculoskeletal injury including fractures metatarsal/ankle (n=3), posterior cruciate ligament rupture (n=1), bruised bone (n=1), hamstring strain (n=1), Achilles tendon damage (n=1)	7	4:3	21.9 ±3.8

M:F, male:female; ACL, anterior cruciate ligament

Table 2.5 *Study research findings*

Study	Study design	Psychosocial factor(s)	Sports Injury Rehabilitation Outcome	Findings
1.Gordon & Lindgren	Qualitative: retrospective case study design	Interview data on experience of response, rehabilitation, and return to sport	Return to first class cricket post-surgery	<p>Psychological adjustment on the part of the athlete (attributed to himself and own efforts) significant in recovery process.</p> <p>Reported growth through rehabilitation increased ability to meaningfully interact with seriously injured and handicapped people in the future.</p> <p>Rationale thoughts and a self-responsible attitude led to more adaptive behaviours.</p> <p>Return to sport experience mediated by confidence related to the injury, withstanding sporting demands, and performance.</p>
2.McDonald & Hardy	Quantitative: prospective cohort design	Affect – POMS questionnaire	Athlete perceived rehabilitation progress and effectiveness	<p>Significant negative correlation between total mood disturbance and perceived rehabilitation.</p> <p>Significant negative correlation between affective measures of tension, depression, anger, fatigue, confusion and perceived rehabilitation.</p>

3.Johnson	Quantitative: prospective cohort design	Psychological profile of multiply vs first time injured athletes (MACL, GCQ, KSP)	Perceptions of rehabilitation success (SIQ)	Significant difference between first time injured and multiply injured for perceptions of physical recovery, and awareness of rehabilitation guidelines. Multiply injured athletes rated themselves significantly higher for mood variables of social orientation and activity than first time injured
4.Johnson	Quantitative: longitudinal prospective cohort design (3-36months)	Psychosocial profile of injured athletes (MACL, GCQ, KSP)	Return to sport	Results suggested that being younger, female, isolation from the team and athletic friends, and having had no previous experience with injury characterized the non- returning athlete.
5.Mainwaring	Qualitative: longitudinal and cross- sectional design (over 12 months)	Domains of sports (physical, psychological, social)	Return to sport	Restoration of self comes from the motivation to overcome the disability (injury). This has a reciprocal mediating relationship with sport injury domains (psychological, social, and physical). Each domain is influenced by person and situation factors.
6.Quinn & Fallon	Quantitative: repeated measures cohort design	Self-reporting of confidence (SSCI), injury appraisals, emotional response (POMS), self-efficacy, coping (COPE), motivation – self and rehabilitation focussed	Injury process to return to sport	Confidence in recovering on time and being successful upon return to sport followed inverted U shape through rehabilitation. Rehabilitation motivation (adherence and intensity) increased in a linear fashion through the phases.

7.Ford et al.	Quantitative: prospective correlational cohort design	Life stress (ALES) and moderating psychosocial variables SCAT-competitive trait anxiety, LOT-hardiness, SE-S-self-esteem, SSS-social support)	Time loss from sport	Use of active coping resources increased through the rehabilitation phases.
				Hardiness and quality of social support were significantly related to decreased injury time-loss in athletes when positive life change increased
				Global self-esteem was significantly associated with decreased injury time-loss when both negative life change and total life change increased.
				Dispositional optimism significantly associated with decreased time loss when positive life changes increased.
8.Tracey	Qualitative: exploratory cohort design	Data on injury related affect, emotions, and cognitions	Perceived psychological adjustment and recovery	Cognitive appraisal of injury affected emotional and behavioural responses.
				Return to practice associated with a reduction in negative emotions although feelings of alienation/isolation remained and comparison to non-injured peers served to increase emotional response.
				Successful recovery associated with a sense of accomplishment and having gone through a learning experience.
				Fear not a predominant theme on return to sport although feelings of hesitation and apprehension were apparent.

9.Kvist et al.	Quantitative: prospective cohort design	Fear of re-injury/ movement (TSK)	Self-report function (KOOS) Sport participation (general questions)	Reluctance to openly discuss injury related feeling with sport peers e.g. coaches. 3-4 years post-surgery only 53% athletes had returned to pre-injury activity level. Negative significant correlation between TSK and knee related quality of life.
10.Podlog & Eklund	Qualitative: longitudinal cohort design	Psychosocial 'issues and processes' arising from interview data	Return to sport (pre- competition and competition)	Athletes not returning to pre-injury activity level reported significantly higher fear of movement. Pre-competition phase: Theme 1 Motives to return to sport e.g. restore identity. Theme 2 Return to competition appraisal and emotions (positive and negative). Theme 3 Decision making process (ambiguity & pressure to return). Competition phase: Theme 1 Dealing with competition fears. Theme 2 Encounters with adversity. Theme 3 Enjoyable aspects of return/ reflecting on positives of injury.

11.Thing	Qualitative: longitudinal ethnographic cohort design (over one and a half years)	Athlete perceptions of risk and health	Return to sport	Suggested returning athletes experienced a number of autonomy, competence, and relatedness issues.
				Injury challenges social identity, bodily attitudes, and time management.
				Return to sport characterised by ambivalence between desire vs. reason, and pleasure vs. safety.
				All athletes seriously considered their sporting future.
				Athletes often alone with problems of injury and chose not to discuss with sports peer.
12.Vergeer	Qualitative: prospective longitudinal case study design (over 20 weeks including three year follow up)	Mental representations of being an injured athlete	Restoration of function and return to sport	Dynamic flux in themes through recovery process.
				At three years post injury athlete no longer competing despite functional restoration.
				Theme 1: role of different types of injury awareness.
				Theme 2: effective use of a mental itinerary.
				Theme 3: complexity of mental model (state of injury and consequences associated).

13. Gallagher & Gardner	Quantitative: prospective correlational cohort design	Emotional response (POMS), coping (CRI-AF), cognitive schemas (YSQ-SF)	Phases of return to sport; phase one (within 72 hours onset), phase two (projected rehabilitation mid- point), phase three (discharge to return to sport activity)	Theme 4: motivational role of reflecting of ideal or desired physical self.
				Theme 5: involuntary and voluntary use of mental imagery.
				TNM reduced throughout rehabilitation.
				Avoidance focussed coping strategies positively related to TNM.
				Approach focussed strategies negatively related to TNM.
				Maladaptive schemas positively related to TNM.
				Schema of <i>impaired autonomy</i> predicted more severe TNM.
14. Thatcher et al.	Qualitative: longitudinal exploratory case studies design	Motivational style (MSP) according to Reversal Theory, emotional response through rehabilitation (unstructured interview)	Return to training/competition	All athletes' motivational style shifted throughout rehabilitation process.
				Times during rehabilitation when motivational needs not being met leading to adverse emotional response.
				Motivational flexibility important for successful rehabilitation

15. Carson & Polman	Mixed method: longitudinal case study design	Interview, self-report diary, and questionnaire data on emotions and coping strategies (to give holistic view of cognitive appraisal processes through rehabilitation; ERAIQ, SIP, C-HIP, MOS-SSS, SCQ, ICQ)	Successful participation in rehabilitation and return to sport	<p>Late limited participation and return to sport determined by influential emotional and coping strategies.</p> <p>Late limited stage salient emotions (apprehension, encouragement, depression/frustration) and beneficial coping (goal setting, social support, use of both avoidance and problem focussed coping types).</p> <p>Return to sport stage salient emotions (confidence building, apprehension, relief) and beneficial coping (goal setting, social support, and use of problem focussed coping type).</p>
16. Langford et al.	Quantitative: prospective longitudinal cohort design (3,6, and 12 months)	Emotional response to injury (ERAIQ), psychological impact of returning to sport (ACL-RSI), physical recovery outcome measures	Return to sport	<p>At 12 months only 51% athletes had returned to competitive sport.</p> <p>No differences in physical recovery or ERAIQ between groups, however significant reduction across groups over rehabilitation period.</p> <p>Athletes that returned to competitive sport scored significantly higher on ACL-RSI (emotions, confidence in performance, risk appraisals).</p>
17. Mankad et al.	Qualitative: exploratory inductive design	Perceptions of emotional climate	Psychological rehabilitation from long term injury	<p>Theme 1: emotional trauma – athletes displayed fear of re-injury and identity concerns upon return to sport.</p> <p>Themes 2: emotional climate – athletes felt the need to suppress/ inhibit genuine emotions in the team environment.</p>

				Theme 3: emotional acting – athletes learnt to disengage from genuine emotions through emotional control techniques within team environment.
				Authors suggest these were emotionally destructive behaviours that could delay an athlete’s long-term psychological rehabilitation.
18.Podlog & Eklund	Qualitative: longitudinal cohort design (6-8-month period)	Athletes perceptions of return to play arising from interview data	Perceived successful injury return	<p>Successful rehabilitation influenced by perceptions of:</p> <ul style="list-style-type: none"> Return to preinjury sport status Ability to stay on ‘right path’ Having realistic post injury expectations Feeling self-satisfied Absence of injury related concerns Effectively overcoming adversity <p>Suggested successful injury return influenced by competence, relatedness, and autonomy aspects.</p>
19.Carson & Polman	Mixed method: exploratory case studies design	Interview data, self–report diary, and C-HIP questionnaire data on coping strategies	Perceptions of psychological adjustment and recovery	<p>Avoidance coping (behavioural and cognitive) may facilitate greater perceptions of control and help manage stressful situations.</p> <p>High level of distraction coping strategies (physical and cognitive).</p> <p>Avoidance coping may facilitate personal develop through rehabilitation and contribute towards fulfilment of basic needs.</p>

20. Wadey et al.	Qualitative: retrospective exploratory cohort design	Psychological antecedent and mechanisms	Return to competitive sport	Possible for athletes to perceive benefits through injury rehabilitation which facilitates holistic recovery.
				Reflecting on the recovery of the injury athletes were able to get clearer sport related perspective and improve ability to deal with adversity.
				By having contact with other distressed individuals, athletes believed they were less selfish, and had increased empathy for others.
21. Ardern et al.	Quantitative: cross sectional case series with follow up (2-7 years)	Fear of re-injury (self-report questionnaire)	Return to pre-injury sport level	Significantly less fear of re-injury found in athletes who returned to sport at pre-injury level. Fear associated with personal and situational factors.
				Significantly greater concern over sport environment conditions by females.
				Significantly greater fear of re-injury and risk cognitions in athletes with delay to surgical intervention (>3months).
22. Carson & Polman	Qualitative: longitudinal exploratory design (throughout transition into return to play)	Interview and self-report diary data on injury cognitions, emotions, and coping strategies	Return to competition	Return to play determined by influential emotions and the athletes coping strategies.
				Pre competition salient themes included: influential emotions (confidence building, anticipation, anxiety) and coping (physical and mental preparation, social support).

23.Podlog et al.	Qualitative: longitudinal cohort design (11-month period)	Data on the athlete's psychosocial experience	Process of return to sport	<p>Post competition salient themes included: influential emotions (confidence building, positive performance emotions, performance anxieties) coping (problem focussed coping, social support, dealing with fear).</p> <p>Successful return to play influenced by gaining confidence in the injured tissue with this perceived to be improved through testing</p> <p>Experience of process of return to sport influenced by:</p> <p>Theme 1-heightened injury stress (pain, falling behind others, missing out, fear of re-injury, underperforming).</p> <p>Theme 2 – coping (lack of directed strategies, use of avoidance coping, and problem focussed coping).</p> <p>Theme 3 – importance of social support.</p> <p>Theme 4 – recovery outcomes (positive influenced by satisfaction in performance and success in achieving goals, negative influenced by underperformance relative to pre-injury), reflecting on personal growth through being injury.</p>
24. Clement et al.	Qualitative: retrospective cohort design	Interview data on psychosocial responses to rehabilitation	Return to sport	Rehabilitation from sports injury influenced by cycles of cognitive appraisals, emotional responses, and behavioural response.

25. Podlog et al.	Qualitative: retrospective cohort design	Focus group and interview data based on psychological experience and precursors of returning to sport	Psychological readiness to return to sport	<p>When returning to sport athletes reflected on lessons learnt, with these appraisals serving as precursors to emotional response (feelings of excitement and anxiety) and behavioural response (being cautious when returning to play).</p> <p>Psychological readiness determined by three components:</p> <p>Component 1 – confidence in returning to sport (precursor: trust in rehabilitation provider, social support, achievement of standards/ outcomes).</p> <p>Component 2 – realistic expectations of one’s sporting capabilities (precursor: patience, acceptance, effective goal setting).</p> <p>Component 3 – motivation to regain previous performance standards (precursor: effective goal setting, boredom of injury, feeling wanted, social support).</p>
-------------------	--	--	--	--

ALES (Athlete Life Experiences Survey), **SCAT** (Sport Competition Anxiety Test), **LOT** (Life Orientation Test), **SE-S** (Self-esteem Scale), **SSS** (Social Support Scale), **POMS** (Profile of Mood States), **CRI-AF** (Coping Response Inventory – Adult Form), **YSQ-SF** (Young Schema Questionnaire – Short Form), **ERAIQ** (Emotional Response of Athletes to Injury Questionnaire), **SIQ** (Sports Injury Questionnaire), **MACL** (Mood Adjective Checklist), **GCQ** (General Coping Questionnaire), **KSP** (Karolinska Scales of Personality), **TSK** (Tampa Scale of Kinesiophobia), **KOOS** (Knee Injury and Osteoarthritis Outcome Score), **ACL-RSI** (ACL - Return to Sport After Injury Scale), **C-HIP** (Coping with Health, Injuries, and Problems Inventory), **SSCI** (State Sport Confidence Inventory), **TNM** (Total Negative Mood), **MOS-SSS** (MOS-Social Support Survey), **SCQ** (Sports Climate Questionnaire), **ICQ** (Injury Climate Questionnaire), **SIP** (Sports Inventory for Pain)

2.5.5 Psychosocial Factors

There were three core themes across the studies: i) injury-related *emotion* associated with rehabilitation outcomes; ii) injury-related *cognitions* associated with rehabilitation outcomes; and iii) injury-related *behaviours* associated with rehabilitation outcomes (see Table 2.6). The mean methodological quality of the themes ranged from 56.3 to 58.8%.

Table 2.6 *thematic evaluation of the included studies (N=25)*

Core Theme	Sub-sets	Studies*	MMAT Quality Rating (%)
Injury related emotion	Mood (TMD, TNM) Injury anxieties & fears Emotional integrity	2,3,4, 5, 6, 7, 8,9, 10, 11, 13,15,16, 17, 18, 21,22,23,24,25	58.8
Injury related cognition	Restoring the self Basic needs fulfilment Personal growth and development	1,3,4,5, 6, 7, 8, 10,11, 13, 14, 18, 19, 20, 22, 23,24,25	58.3
Injury related behaviour	Coping Social support	3,4, 6, 12,13,15,17,19,22,23,24,25	56.3

* where studies have multiple findings spanning a number of constructs these have been replicated across the core themes (e.g., qualitative papers that infer both emotion and cognition factors as having an effect on sports injury rehabilitation outcomes)

2.5.6 Injury-related Emotion Associated with Sport Injury Rehabilitation

Outcomes

Twenty studies had significant emotion-related (emotion, mood and affect factors) content. Specifically, the role of mood, anxiety and fear (re-injury and performance), and emotional integrity emerged. Several studies found that as rehabilitation progressed toward a return to sport, total mood disruption (TMD) and total negative mood (TNM) decreased and more positive mood states developed (e.g., Gallagher & Gardner, 2007; Quinn & Fallon, 1999; Tracey, 2003). For example, McDonald & Hardy (1990) in a study of five Division 1 athletes found a significant negative relationship between TMD and the outcome of athlete perceived rehabilitation ($r=0.69, p=<0.0001$).

Despite return to sport often being seen as a positive rehabilitation outcome, a number of studies reported heightened levels of anxiety and/or fear during the transition (e.g., Clement, Arvinen-Barrow & Fetty, 2015; Podlog & Eklund, 2006). A frequently reported cause of anxieties and fear is that of re-injury (e.g., Ardern et al., 2012b; Kvist et al., 2005). Performance related anxiety and fear was prominent during the return to sport (e.g., Carson & Polman, 2012; Clement et al., 2015). Podlog and Eklund (2006) in a qualitative study of twelve athletes, all with severe injuries, found that a successful rehabilitation was associated with effectively dealing with competition fears. Later work by the same author, on eleven injured elite adolescent athletes highlighted the dual fears of pain and re-injury, together with the fear of falling behind others, missing out, and underperforming (Podlog et al., 2013b). This suggests that injury-related fear is experienced by both adult and younger athletes.

Three studies highlighted findings related to poor emotional integrity, or in other words, athletes being reluctant to discuss their emotions about being injured with their

sporting peers and coaches (Mankad, Gordon & Wallman, 2009; Thing, 2006., Tracey, 2003). Tracey (2003) found that when some athletes returned to sport their feelings of isolation/alienation remained. Mankad and colleagues (2009) suggested that the inability to “emotionally disclose” within the team environment was related to an impeded long-term psychological recovery from sports injury.

2.5.7 Injury-related Cognitions Associated with Sport Injury Rehabilitation

Outcomes

There were 18 studies that reached conclusions related to restoration of the self (*self-confidence, self-esteem, self-identity*), injury-related outlook, perceptions of basic psychological needs fulfilment, and perceptions of growth and development were included. Injury-related cognitions appear to serve as “precursors” to the resulting emotional responses (i.e., nervousness, anxiety, excitement) and are associated with personal and situational factors (e.g., Clement et al., 2015). Personal factors such as gender, age, limited injury experience, lowered confidence, and perceptions of isolation were all significantly related cognitions about not returning to sport (e.g., Kvist et al., 2005; Langford, Webster & Feller, 2009). Delayed surgical intervention was a noteworthy situational factor that was associated with negative risk appraisal and non-return to sport at 2-7 years post ACL surgery (Arderm et al., 2012a).

Ten studies identified restoring the self as being important in the successful return to sport following injury (e.g., Kemp et al., 2012; Langford et al., 2009; Podlog et al., 2015). According to the reviewed studies restoring the self appears to be: i) an important motivating factor; ii) a common concern when returning to sport following injury; and iii) a predictor of time loss from sport due to injury (e.g., Clement et al., 2015; Ford, Eklund & Gordon, 2000; Podlog & Eklund, 2006).

Six studies identified that a successful return to sport was associated with feelings of sport-related self-confidence (e.g., Carson & Polman, 2008; Langford et al., 2009; Podlog et al., 2015). Within this context sport related confidence was relative to both injury and performance. Two studies by Carson and Polman (2008; 2012) found confidence-building was important in the return to sport with this developed from injury specific and performance specific inputs (e.g., from fitness testing, performing well during activity, and the injury site feeling “*strong*”). Podlog et al., (2015) found confidence was a major attribute of psychological readiness to return to sport. Overall confidence in returning to sport was associated with the rehabilitation programme, the injured body part, and performance capability beliefs. “Precursors” to developing confidence in returning to sport were noted as having trust in the rehabilitation provider, satisfaction of social support needs, and achievement of physical standards / clinical outcomes. Langford et al., (2009) used the ACL-RSI with injured athletes and found a significant difference between the group of returners to sport and those that had not returned at 6 months ($p=0.005$) and 12 months ($p=0.001$).

Six studies (24%) inferred that fulfilling basic psychological needs was an important predictor of successful return to sport. Of these, 3 studies were grounded in Basic Psychological Needs Theory (Ryan & Deci, 2000) and were published by the same author (i.e., Podlog). The studies within this subset highlight the importance of addressing relatedness, competence, and autonomy during reintegration into sporting activities in order to reduce TNM and to experience a successful rehabilitation (Gallagher & Gardner, 2007; Podlog & Eklund, 2009). Notably, fulfilment of competence, relatedness, and autonomy seems important in both elite adult and adolescent populations (e.g., Podlog & Eklund, 2006; Podlog & Eklund, 2009; Podlog et al., 2013).

Importantly, seven of the final studies (28%) suggested that perceiving injury as an opportunity for growth, and as a positive developmental experience was related to a successful rehabilitation (e.g., Clement et al., 2015; Podlog & Eklund, 2006; Tracey, 2003).

2.5.8 Injury-Related Behaviours Associated with Sport Injury Rehabilitation

Outcomes

Twelve studies (48%) contributed to this core theme relating to the effect of coping strategies, and social interactions on the athlete's rehabilitation outcomes. There was ambiguity in findings regarding which type of coping mechanism was related to positive rehabilitation outcomes. Avoidance focussed coping strategies were suggested as being both facilitative (Carson & Polman, 2010) and debilitating (Gallagher & Gardner, 2007; Mankad, Gordon and Wallman, 2009). A mixed-method study of elite professional rugby players found that behavioural and cognitive avoidance coping strategies enhanced perceptions of recovery (Carson & Polman, 2010). In contrast two studies credited using avoidance coping with less successful rehabilitation outcomes such as a delay in psychological rehabilitation (Mankad, Gordon and Wallman, 2009), and associated increase in TNM (Gallagher & Gardner, 2007).

There was stronger agreement within the final studies about the positive association problem-focused coping strategies have with rehabilitation outcomes, such as reintegration back into training/competition (e.g., Carson & Polman, 2008; Quinn & Fallon, 1999; Vergeer, 2006). Gallagher & Gardner (2007) found that in the return to sport phase of rehabilitation there was a significant negative relationship between approach focussed coping and TNM ($r = -0.354, p = <0.05$). Two studies by Carson and Polman (2008; 2012) identified that problem-focused coping strategies enhanced the experience of returning to sport after an ACL injury.

Seven studies highlighted the importance of social support to perceived and actual sports injury outcomes. Perceptions of social support network provided by multiple agents (e.g., teammates, medical staff, coach, family, crowd) were particularly salient on returning to sport (Carson & Polman, 2008; Carson & Polman, 2012). Trust in the rehabilitation provider, feeling wanted by others, and satisfaction of social support needs were associated with developing psychological readiness to return to sport (Podlog et al., 2015). Insufficient social support appears to be associated with unsuccessful rehabilitation (Johnson, 1997), and remains a common concern for athletes upon returning to sport (Podlog et al., 2013b; Tracey, 2003).

2.6 Discussion

2.6.1 Review findings

The aim of this review was to evaluate the association between psychosocial factors and sports injury rehabilitation outcomes. This aim was underpinned by the research question: *are psychosocial factors associated with sports injury rehabilitation outcomes in competitive athletes?* Of the 25 studies included in our review, 20 had not been included in previous reviews which indicates novel findings. The findings suggest that psychosocial factors (emotion-related, cognition-related, and behavior-related) are associated with a variety of perceived and actual sports injury rehabilitation outcomes. Previous research suggests that this process is cyclical in nature (Clement et al., 2015). For example, cognitions impact upon injury related emotions and behaviours, and vice versa. Our findings are consistent with previous reviews and theoretical perspectives (e.g., Brewer et al., 2002; te Wierike et al., 2013). However, what is not known from this review is to what extent these psychosocial factors are related to sports injury

rehabilitation outcomes; singularly or cumulatively, compared with biological factors (e.g., rate of metabolism, quality of sleep, tissue repair status).

Other domain-related systematic reviews (e.g., Ardern et al., 2013a; Mendoza, Patel & Bassett, 2007) highlight fear of re-injury as one of the most common emotional factors associated with rehabilitation outcomes after severe injury. Fear is seen as a unitary construct within quantitative research designs that dominate previous reviews. In contrast, the evidence from this review highlights the fact that injured athletes experience many anxieties and fears during rehabilitation. These findings suggest that the anxieties and fears athletes experience come in two forms: i) re-injury related (Ardern et al., 2012b; Kvist et al., 2005; Mankad, Gordon & Wallman, 2009); and ii) performance related (Carson & Polman, 2012; Tracey, 2003). This knowledge may help inform psychological intervention during the rehabilitation of injured athletes.

Evidence from our review and the broader literature suggests an association between rehabilitation outcomes and anxiety/ fear of being re-injured (e.g., Chmielewski et al., 2008; Heijne, Axelsson, Werner & Biguet, 2008; Kvist et al. 2005). The athlete who can effectively manage anxiety and fear will experience more positive outcomes from rehabilitation (Podlog & Eklund, 2006). Ardern et al., (2014a) highlighted the concept of “*psychological readiness*” as important in determining return to sport decisions following ACL injury. The construct of “*psychological readiness*” in terms of sports injury can be interpreted as being a combination of the athlete experiencing low levels of fear regarding re-injury and underperforming (Glazer, 2009).

Restoring self-confidence was a key sub-set emerging from the included studies (e.g., Carson & Polman, 2012; Langford et al., 2009). Self-confidence is derived from two elements: (i) confidence in the injury site; and (ii) confidence in performance. Confidence may have a moderating effect on the emotion of fear as both seem

determined by injury and performance related inputs. This review indicates that successful return to sport is underpinned by developing self-confidence cognitions, even though the mechanism of effect is not yet fully established (e.g., Gordon & Lindgren, 1999; Carson & Polman, 2012). Confidence in returning to sport after injury appears to be a multidimensional factor (Podlog et al., 2015). Developing confidence in both the injured body part and in the ability to perform to a satisfactory standard may act as a “*buffer*” from injury-related anxiety and fear. The implication of this is athletes would acquire the suitable “*psychological readiness*” to return.

Experiencing adversity has the potential to yield positive outcomes.

Nonetheless, it is important to note that stress-related growth isn't inevitable (Popa & Padea, 2013). An ability to perceive sport injury rehabilitation as an opportunity for development and growth was associated with more positive rehabilitation outcomes (Kvist et al., 2005; Podlog et al., 2015). A perspective from Wadey et al., (2013, p. 126) is that growth through adversity may even lead to “*positive changes that propel them to a real or perceived higher level of functioning than that which existed prior to the negative circumstance*”. It seems that perceiving the experience related to injury as positive may facilitate returning to sport (Podlog & Eklund, 2006), enable a more holistic recovery (Wadey et al., 2013). Different forms of growth that can occur through injury include: personal, psychological, social, and physical (Wadey et al., 2013). Practitioners may consider encouraging athletes to reflect on the injury experience as an opportunity for growth to facilitate positive rehabilitation outcomes.

Emotional integrity relates to the athlete's conscious decision to either withhold or disclose false injury related emotions and emerged as an important sub-set (Mankad, Gordon & Wallman, 2009). This may compound perceptions of isolation and impede psychological rehabilitation outcomes (e.g., Mankad et al., 2009; Thing, 2003; Tracey, 2003). The review findings support the theoretical propositions of Wiese-Bjornstal

(2010) whereby emotional integrity (or emotional inhibition as phrased in the model) is identified as an emotion-related factor associated with rehabilitation outcomes. The emotional integrity (or lack of) could have a profound effect on the ability to collect accurate data. A lack of emotional integrity may challenge the validity of some studies already published and challenges researchers to develop methodologies to overcome this problem. Both researchers and practitioners should give injured athletes the opportunity to use non-traditional forms of communication (e.g. blogs and diaries).

2.6.2 Current Empirical Limitations and Future Directions

The empirical literature relating to adult male athletes with severe knee injury (e.g., ACL) is well established. This finding is indicative of gender-related, age-related, and injury-related biases in the literature, limiting generalisability of findings across populations. Male and females have different physical and psychological responses to injury. This may lead to very different injury experiences and outcomes (Costello, Bieuzen & Bleakley, 2014; Ristolainen, Kettunen, Kujala & Heinonen, 2012). Age-related differences are a neglected area in sport injury psychology (Weiss, 2003). The fact that only one study included adolescent participants highlights this problem. Researchers and practitioners should be aware of the gender, age and injury differences across athletic populations to better facilitate positive sports injury rehabilitation outcomes.

Most studies reviewed adopted the perspective that return to sport is the major rehabilitation outcome and cease their data collection at this point (e.g., Gallagher & Gardner, 2007; Vergeer, 2006). Return to pre-injury sport is often seen as the defining feature of recovery and has been criticised for skewing the evidence base (Hammond, Lilley & Ribbans, 2013). It is naïve to assume that just because an athlete returns to sport post injury that they are fully recovered both physically and psychologically. It is

plausible that the interpretation of a successful rehabilitation is associated with many complex biopsychosocial, technical, and tactical factors. Therefore, using return to pre-injury activity levels as the sole indicator may be too simplistic. An alternative approach that addresses the various expectations of different members of the multidisciplinary team may provide a more rounded understanding of success outcomes (Ardern et al., 2016).

In general, the included studies lacked detail regarding co-morbidity, multiple pathologies, iatrogenic issues, or mis-diagnosis issues, despite these being potentially striking features of the injured athlete's experience (Brewer et al., 2002; Wiese-Bjornstal, 2010). There appears to be little empirical literature on complicated, multi-pathological or unsuccessful rehabilitation. Studies using negative case analytical approaches could profoundly change our understanding of the area. For example, studying athletes that have had a complicated or unsuccessful rehabilitation as negative case studies.

The bias towards non-experimental, correlational designs within the literature restricts the ability to establish causal relationships between psychosocial factors and injury rehabilitation outcomes. Due to the nature of evidence reviewed a causal link between psychosocial factors and sports injury outcomes can't be reliably inferred. In addition to further exploring experiences of injured athletes for greater contextual awareness, future research could also explore causal patterns using longitudinal designs (i.e., the temporal change in relationships over time).

2.6.3 Strengths and Limitations of the Review

There are methodological challenges in conducting a mixed studies systematic review (Dixon-Woods et al., 2006). The tendency for systematic reviews to exclude non-experimental research has received criticism, particularly because it doesn't

account very well for the local and experiential nature of a clinician's work (Ferlie, Wood & Fitzgerald, 1999; May & Pope, 2000). There is a growing call for mixed study reviews within the healthcare sector to address the perceived divergence between research and practice (Dixon-Woods et al., 2006; Ferlie, Wood & Fitzgerald, 1999). This review is a positive response to this call and therefore offers an important contribution to the literature. The reviewed quantitative evidence provides statistically informed associations between psychosocial factors and rehabilitation outcomes. Additionally, the qualitative and mixed methods evidence elucidates some mechanisms behind these associations, and how psychosocial factors are modified throughout the return to sport process. As such this systematic review may provide a more comprehensive account of psychosocial factors and sport injury outcomes than previous reviews that have included only mono-method research (e.g., Ardern et al., 2013a).

This review was focused on examining the literature pertaining to competitive athletes. Therefore, this precludes any robust generalisability to other populations such as recreational and intramural athletes or non-athletic patient groups. All levels of competitive athlete were included. It is plausible that athletes with more time investment in sport or those who gain financial benefit for participation may exhibit different types and/or intensity of psychosocial factors (Ardern et al., 2013b). As all published literature was considered, there is a chance the results of older studies may not be generalisable to modern sports medicine practice and by not including "grey literature" there is some publication bias. This review included all sports injury types to develop an understanding beyond simply ACL injury. It must be noted however, that the findings of this review are based on a sizeable percentage of post-operative ACL participants. Injury severity and type may be a confounding factor when examining sports injury rehabilitation outcomes (Ardern et al., 2013b). An athlete with more severe injuries may exhibit more prolonged and severe negative psychosocial responses

proliferating into the return to sport phase. Including studies with mixed time loss is ecologically valid, however, by aggregating studies the ability to differentiate injury experiences across specific populations is diminished. For example, whether analogous psychosocial factors are associated with injuries requiring surgical versus. non-surgical intervention could be debated.

If injury outcomes are associated with psychosocial factors as this and other reviews suggest, practitioners need to be suitably empowered to recognise and address these factors, or appropriately refer on using the correct referral pathway (Alexanders et al., 2015; Heaney et al., 2015).

2.7 Conclusion

This systematic review found that the athlete's injury-related cognitions, emotions and behaviours were associated with sports injury rehabilitation outcomes. Restoring self-confidence, whilst at the same time inoculating against emotions of anxiety/fear appears to increase the likelihood of a successful rehabilitation. Meeting social support needs and employing appropriate coping strategies appears important in facilitating this. It seems common for athletes not to fully disclose their injury-related emotions. Practitioners should consider approaches to improve an athlete's emotional integrity and regularly monitor psychosocial factors throughout rehabilitation. The injury experience can be an opportunity for growth and development. Practitioners should enable their athletes to perceive the injury experience as positive, as this is related to positive outcomes.

3.0 Chapter Three

‘Together we are Limitless’: A Qualitative Study of Social Support and Sports Injury Outcomes in International Female Football Players

Note to reader.

This study was presented at an international football medicine conference:

Presented at the Future of Football Medicine Conference (2017): Forsdyke, D., Gledhill, A., & Smith A. *Psychosocial factors related to sports injury outcomes in elite female football players*. Barcelona, Spain.

3.1 Aim of Chapter Three

The findings from study one provided some initial evidence that psychosocial factors are associated the return to sport outcomes. In particular, from reviewing the available empirical evidence, an athlete's injury-related emotions (e.g., re-injury anxiety/ fears), cognitions (e.g., self-confidence) and behaviours (e.g., engaging with social support) were associated with return to sport outcomes (e.g., psychological readiness). However, because of the diversity of studies (e.g., research designs, samples, measurement instruments) included in the systematic review it is difficult to identify which of the psychosocial factors are most important in specific contexts, such as football. Additionally, because various study designs were included in the systematic review (i.e., quantitative, qualitative and mixed methods), only the direct effects of psychosocial factors on return to sport outcomes were alluded to as opposed to indirect effects or potential explanatory mechanisms. One advantage of using qualitative research designs is to gain context-specific granularity about the process and interactions by which psychosocial factors may influence return to sport outcomes (Eklund, Jeffery, Dobersek & Cho, 2011). Therefore, the purpose of study two is to use a qualitative approach to explore how psychosocial factors relate to return to sport outcomes in international women football players following injury. This study begins with the empirical and theoretical perspectives on the major psychosocial factor interpreted from this study, in particular social support, and provides a rationale for further qualitative investigation. Next, the qualitative research design and methods used are outlined. Finally, the interpretive results from the adopted methods are presented prior to discussing these findings and how these are positioned in the current theoretical and empirical research.

3.2. Study Abstract

Injury rates in international women's football are high, and the prognosis from injury is often poor in the form not returning to pre-injury levels of performance and re-injury. It is thought that several psychosocial factors may be important. As recovery from sports injury take places in a social context involving many stakeholders, one important psychosocial factor might be social support. Consequently, the aim of this study was to explore whether perceptions of social support during injury are viewed as important and how these perceptions may relate to return to sport outcomes in international female football players following injury. In doing so, this study intended to extend previous research by exploring social support processes and return to sport outcomes in an underrepresented context. Eight previously injured international female football players were purposively sampled (mean age = 29.63 years, mean playing experience = 14.5, mean international caps = 34). Players engaged in auto driven photo elicitation interviews focussing on important aspects of their experience of injury and return to sport. Data collection, and data analysis was an iterative cycle, and as such an additional four participants were theoretically sampled. Study integrity, credibility, and resonance were established by employing a range of quality-focussed approaches. From the reflexive thematic analysis interpretive findings indicate that: (i) the social support process is influenced by several contextual factors; (ii) that a players' perceptions of high or low-level social support during the injury process are formed from the interface of availability and quality of support; and (iii) that perceptions of social support influence return to sport outcomes by modulating the players experience of the injury process. Together these findings were placed in an explanatory thematic map of social support processes and return to sport outcomes in international female football players. In this context, these findings suggest that social support is a potentially important and clinically relevant consideration in the return to sport process following injury.

Practitioners should monitor and evaluate a player's perceptions of social support throughout the injury process in an attempt to augment optimal return to sport outcomes.

3.3 Introduction

There are a growing number of women playing football at professional and international levels (Martinez-Lagunas, Niessen & Hartmann, 2014). With the development of the women's game, there has been greater physical and psychological demands placed on players culminating in a greater risk of injury (Ivarsson et al., 2018; Pensgaard, Ivarsson, Erlene-Solstad & Steffen, 2018). It is not surprising that rate of injury in elite women's football is high (Gaulrapp, Becker, Walther & Hess, 2010; Junge & Dvorak, 2015). When injured, female players often have a negative injury experience, and poor return to sport outcomes (e.g., Ageberg et al., 2010; Prinz, Dvorák & Junge, 2016; Ristolainen et al., 2012). Even if female players do return to their pre-injury sport, they do so with an increased likelihood of re-injury and reduced ability to attain pre-injury performance levels (Allen et al., 2016; Webster et al., 2019).

Theoretical and empirical evidence suggests that psychosocial factors are prognostically important at influencing return to sport outcomes (e.g., Brewer et al., 2002; Nwachukwu et al., 2019). Despite this, physical factors have gained primacy to psychosocial factors in research and practice (Walker et al., 2007). Consequently, a deeper understanding key psychosocial factors may be important in facilitating more optimal return to sport outcomes for female football players (e.g., Forsdyke, Smith, Jones & Gledhill, 2016).

3.3.1 Psychosocial Factors

The term "psychosocial factor" is concerned with the interaction between social factors (e.g., social support, social environment) and a player's emotions, cognitions, and behaviour (Forsdyke et al., 2016). There is some theoretical and empirical evidence suggesting that psychosocial factors are associated with return to sport outcomes in women's football (e.g., Fältström, Hägglund & Kvist, 2016; Hildingsson, Tranaeus-Fitzgerald & Alricsson, 2018). Even with a growing amount of research, understanding of psychosocial factors and how these relate to return to sport outcomes is still an under-

developed topic (Brewer, 2010). In part, this viewpoint reflects the proliferation of research that has uncovered many psychosocial factors may be related to return to sport outcomes (see Ardern et al., 2013a; Nwachukwu et al., 2019). While this has provided a broad platform for the research area to develop, it has been at the expense of a depth of understanding. In particular, little is known from a player's perspective of their lived experience about which psychosocial factors are viewed as being more important than others, or the psychological processes underpinning any effect on the player. As recovering from sports injury and returning to sport is a social process involving many stakeholders (e.g., coaches, medical staff, family, team-mates), one potentially important and clinically relevant psychosocial factor may be social support.

3.3.2 Social Support

Social support can be viewed as the activities that individuals engage in with the intention of helping each other, and the perceived messages arising from these activities (Bianco & Eklund, 2001). The social support process is interactive and heavily contextual (Yang, Peek-Asa, Lowe, Heiden & Foster, 2010). For example, the moderators of the social support injured players may experience are noted to include the relationship characteristics between provider and recipient, personal characteristics of the provider and recipient, and the sociocultural context of the sport (Bianco & Eklund, 2001). This infers that the relationship between social support and return to sport outcomes may well differ between sports, gender, and level of performance. For example, when compared to men, women tend to report different pre- and post-injury social support patterns, be more willing to access different sources of social support when they are injured and may have different notions over the quality of the support they receive (Yang et al., 2010). Therefore, a better understanding of social support processes during injury in elite female football players may start to provide a context specific evidence-base with a view to improving the experience of sports injury and

return to sport outcomes within this population (Bianco & Eklund, 2001; Yang et al., 2010).

Conceptually, social support is a complex and multidimensional construct comprising of structural (i.e., the players support network available to them), functional (i.e., the exchange of support between the player and the support provider), and perceptual features (i.e., the players appraisals over the quality of support; Bianco & Eklund, 2001). It is the more perceptual features of social support that are more reliably related to health outcomes (Freeman & Rees, 2010; Goodwin, Costa, & Adonu, 2004). In other words, within a football context, it may be the players' perceptions of high or low-level social support that they experience that influences return to sport outcomes to a greater extent when compared to the actual support they may receive (Corbillon, Crossman & Jamieson, 2008).

Even though perceptions of social support have the potential to influence return to sport outcomes, little is known about the indicators that constitute perceptions of high or low-level social support (Ardito & Rabellino, 2011). Several different instruments provide a proxy measure of this by measuring the extent to which a player is satisfied with social support (e.g., social support survey, Sherbourne & Stewart, 1991; perceived available support in sport questionnaire, Freeman, Coffee & Rees, 2011). However, precisely what indicators prompt a player to be more or less satisfied is unclear. Grounded in general healthcare, Maciak and colleagues (2018) provide a framework for high-level social support including several professional (e.g., being present, receptive, genuine, committed) and personal indicators (e.g., trust, caring, rapport, respect). While this framework provides a working heuristic in health settings such as physiotherapy and occupational therapy, how well these indicators transfer to a sports setting is unknown. In particular, in a sport setting the sports injury process tends to include additional and different stakeholders and outcome goals. As such, the indicators of high

and low-level social support may be different in a sport setting. A greater insight of potentially complimentary or additional indicators may assist stakeholders in providing higher level support. In turn, this may improve the injury experience and return to sport outcomes for players.

3.3.3 Social Support and the Experience of Sport Injury

One way social support is thought to benefit injured players is influencing the experience of sports injury. From a theoretical standpoint, the construct of social support is underpinned by three differing perspectives: (i) the stress and coping perspective; (ii) the social constructionist perspective; and (iii) the relationship perspective (Lakey & Cohen, 2000). Of these perspectives it is the stress and coping perspective (e.g., Lazarus & Folkman, 1984) that dominates the social support and injury literature. This perspective suggests that social support may be related to health-related outcomes by influencing a player's ability to cope through its relationship with injury-related stress (Carson & Polman, 2012; Podlog & Eklund, 2006). Social support may therefore be an important consideration given that the experience of sports injury and consequently returning to sport following injury is highly stressful for many players (Evans, Wadey, Hanton & Mitchell, 2012).

Within the broader social support literature, two main hypotheses are proposed to explain the conditions and mechanisms under which social support has its effect. These are the stress-buffering hypothesis and the main-effect or direct hypothesis (see Bianco & Eklund, 2001 for a conceptual review). First, the stress-buffering hypothesis suggests a palliative and indirect coping mechanism during periods of high injury-related stress (Rees et al., 2010). For example, once injury-related stress is experienced, high levels of social support may moderate the responses to the stressor, enable more adaptive perspectives of the stressors, and enhance coping by providing a distraction or solution to the stressor (Carson & Polman, 2010). More specifically, at low levels of

social support there is a negative association between further injury-related stress and psychological illbeing. Equally, with high levels of social support this association is weakened or non-existent (Cohen & Wills, 1985). Second, the main-effects or direct hypothesis proposes a preventative coping mechanism whereby social support inoculates the injured player from experiencing high injury-related stress (Rees et al, 2010). For example, the mere presence of high levels of sustained social support, irrespective of the intensity and frequency of stress, may be sufficient to enhance return to sport outcomes by facilitating greater psychological and physical wellbeing (Clement & Shannon, 2011). These two hypotheses are considered as complimentary, simultaneously occurring, and not opposing one another (Bianco & Eklund, 2001). When tested, there is support for both hypotheses in the literature and taken together it can be inferred that a player with high levels of social support should have augmented return to sport outcomes via an increased ability to manage injury-related stress (Mitchell et al., 2014).

In this regard, several studies have examined the social support and psychological response relationship (e.g., Mitchell et al., 2014; Rees et al., 2010). This evidence suggests that perceptions of high-level social support results in less negative responses to injury (e.g., Brown et al., 2003; Rees et al., 2010; Mitchell, 2014), enhanced ability to cope with injury stress (Carson & Polman, 2012), psychological wellbeing (Clement & Shannon, 2011), and improved rehabilitation adherence (e.g., Bianco, 2001; Covassin et al., 2014; Everhart, Best & Flanigan, 2015). One qualitative study of six elite female football players found that perceived social support was important in developing autonomous motivation. Whereas perceptions of high-level of social support was associated with greater adherence and overcoming adversity, low-level social support generated unrealistic expectations and diminished autonomous motivation (Hildingsson, Traneus-Fitzgerald & Alricsson, 2018). Additionally, in

another qualitative study of eight elite female football players with a first-time ACL injury, perceptions of high-level social support (i.e., constructive communication, rich interaction) was associated with developing resilient behaviours (Johnson et al., 2016). Collectively, this evidence suggests that social support may be related to several potentially important injury process variables (e.g., anxiety, isolation, reassurance, motivation) that shapes a player's overall experience of the injury process. To date, much less is known about if or how the effect of social support may extend to return to sport outcome variables (e.g., readiness to return to sport; return to pre-injury performance levels). In other words, because high-level social support appears to reduce the experience of negative emotional reactions during the injury process, whether this relationship extends to influencing a player's return to sport outcomes has not been well researched.

3.3.4 Social Support and Return to Sport Outcomes

Return to sport outcomes are context and outcome dependent, describing a player's status (i.e., physical and psychosocial) with regards to their sports participation (Arden et al., 2016; Brewer, 2010). There is some tentative evidence indicating that social support may be associated with return to sport outcomes (e.g., Levy, Polman & Clough, 2008; Norlin, Tranaeus-Fitzgerald & Aricsson, 2016; Truong et al., 2020). For example, one qualitative study of eight football players who had sustained a severe sports injury found that the perceived support from the team coach was an important factor of returning to sport following injury (Norlin, et al., 2016). Similarly, a scoping review of 77 studies found social factors (including social support) to be related with outcomes across the stages of return to sport (Truong et al., 2020).

From a theoretical perspective, social support is noted within existing psychology of return to sport frameworks such as in the integrated model of psychological response to sport injury and the rehabilitation process (Wiese-Bjornstal et

al., 1998) and the biopsychosocial model of sport injury rehabilitation (Brewer et al., 2002). In the integrated model, social support is framed as a situational factor that influences a recursive cycle of cognitive appraisal, emotional response and behavioural response, and is also identified as a specific behavioural response to being injured (e.g., seeking out, use or disuse). Whereas, in the biopsychosocial model social support is a sociocontextual factor that influences intermediate biopsychological and return sport outcomes through its relationship with psychological factors (i.e., personality, cognition, affect, behaviour). However, in both of these models' social support is identified as one of several exemplar factors and because of this its overall importance and underlying processes explaining the effect remain relatively unclear (see Chapter One for a full review of theoretical underpinnings, Brewer, 2010).

Currently, there is little empirical evidence specifically exploring how perceived social support may be related to return to sport outcomes. Instead, social support tends to appear as one of many factors suggested to influence return to sport outcomes (e.g., Carson & Polman, 2012; Truong et al., 2020). Drawing on the limited evidence, social support has been previously positively associated with the ability to return to a pre-injury playing status and re-injury (Corbillon et al., 2008, Sonesson et al., 2017), perceptions of recovery and physical capability (Poget, Blackburn, Descloux & Fiddler, 2019) and in the development of psychological readiness (Podlog et al., 2015). Together, the current domain-specific frameworks and empirical evidence do not adequately explain the psychological process of how social support may influence return to sport outcomes. If social support is to be viewed as a clinically relevant consideration in optimal return to sport practices, more in-depth and context specific research is required.

3.3.5 The Benefits of a Qualitative Approach

Most of the social support and sports injury research uses quantitative, cross-sectional and correlational designs (e.g., Clement & Shannon, 2011; Yang et al., 2010). The findings from such studies are important because they have so far identified provisional and potentially important relationships between social support and return to sport variables. However, the over-reliance on this approach has been of some detriment to causal and temporal depth of understanding in this research area (Brewer, 2010). Against this background, by gaining data on those players that have had “lived experience”, using a qualitative approach may address some of the limitations of the current literature in several ways. First, a more in-depth and holistic understanding of social support processes may be developed. Second, the contextual complexities and nuances that may influence social support processes can be captured more effectively. Finally, the sequential events and causal explanations behind how social support may influence return to sport outcomes can be explored (Morse, 2020). As such, the use of a qualitative approach in this study should enable greater granularity and utility that may compliment and extend the current body of literature.

3.3.6 The Present Study

Study one was a systematic review of psychosocial factors and return to sport outcomes. All relevant and available findings from the current literature on psychosocial factors associated with return to sport outcomes were reviewed and appraised. However, owing to the diverse body of evidence the inference of the findings from study one is limited. In other words, due to nature of the empirical evidence included in the review, only association-based findings could reliably be made (see study one for specific findings). One potentially important psychosocial factor identified in study one as relating to return to sport outcomes was social support. Additionally, one further research recommendation from study one was to further explore the experiences of

injured athletes from under-represented populations in the literature to provide contextual awareness (Forsdyke et al., 2016). As such, this current study builds on study one by attempting to provide greater depth about the potentially important social support - return to sport outcome relationship.

In addition, the present study attempts to extend the previous literature in several ways. First, this study moves away from the trend of positivist and cross-sectional research designs to a more qualitative and interpretivist line of inquiry (Brewer, 2010). This may elucidate a deeper understanding behind social support processes during injury, how these processes may relate to the experience of injury, and subsequent return to sport outcomes (Forsdyke et al., 2016). Second, female football players have minority representation when compared to their male counterparts across relevant key disciplines (Costello et al., 2014). Female football players, and in particular those of an elite and international standard remain under-represented in comparison to male players in the psychology of sport injury literature and football psychology literature (Forsdyke et al., 2016; Gledhill, Harwood & Forsdyke, 2017; Ivarsson et al., 2018). This is important because men and women may demonstrate different social support patterns and responses to injury, potentially leading to different injury experiences (Costello et al., 2014; Yang et al., 2010). Finally, in response to the call for more sport and performance specific understanding of social support processes this study is grounded in a homogenous sample (e.g., Bianco & Eklund, 2001; Rees et al., 2010). In other words, the players sex, sport, and performance level are comparable. By doing so the intention is to provide a rich, context-specific understanding of social support processes. Previous research has noted the importance of recognising such factors when exploring the social support and the return to sport outcome relationship (e.g., Bianco & Eklund, 2001; Podlog & Eklund, 2007; Rees et al., 2010). Regardless of this, many studies have used mixed-sports and performance levels with a limited attention to context (e.g., Clement

& Shannon, 2011). Elite-level players may differ from recreational or novice players in a range of perceptual, cognitive, and strategic aspects of their behaviour (Swann, Moran & Piggott, 2014). Consequently, the injury experience and social processes impacting on return to sport outcomes are likely to differ between international and recreational players (Forsdyke et al., 2016; Rees et al., 2010).

Against this background, the aim of this study was to explore whether perceptions of social support during injury are viewed as important and how these perceptions may relate to return to sport outcomes in international female football players following injury. This aim was underpinned by two research questions: (i) are players perceptions of social support related to their return to sport outcomes? and (ii) how do players perceptions of social support relate to their return to sport outcomes?

3.4 Methods

3.4.1 Ontological and Epistemological Assumptions

This study adopted a critical realist standpoint (see Bhaskar, 1989). This standpoint is positioned between positivism and constructivism and is ontologically realist and epistemologically interpretivist (Fletcher, 2017). A critical realist approach aims to understand and explain the mechanisms behind actual events and is interested in providing causal explanations (Fletcher, 2017). As such this allows us to gain a rich insight from those with first-hand knowledge of the “lived experience”, while also locating these perspectives within the broader context of international women’s football. Critical realism is congruent with the aims, research questions, methods and analytical strategy adopted in this study as it permits and encourages impact by focussing on understanding the social relations that relate to real-world problems (Wiltshire, 2018).

3.4.2 Ethical considerations

Institutional ethical approval was obtained in accordance to Declaration of Helsinki for human studies (1964) and the Data Protection Act (2018) for personal data use, storage, and removal (see Appendix A). The specific ethical considerations relating to this study refer to the researcher/participant relationship, informed consent, confidentiality, anonymity, and beneficence (Goodwin, Mays & Pope, 2019). Several steps were taken to mitigate potential ethical issues. First, the role of interviewer and purpose of the research was disclosed. This was important as the interviewer was also a sports injury practitioner to avoid any deception. Second, participants gave full informed consent to how the data would be used, expunged and the processes to withdraw their data. Third, each study participant self-selected a pseudonym which they were referred to by and any individuals, organisations, or events were anonymised so data could not be traced back to the original source. Finally, due to the potentially sensitive nature of the topic under investigation, participants were made aware of referral options should they experience any emotional disruption (e.g., MIND helpline).

3.4.3 Participants and Sampling

Homogenous purposive sampling was initially used to select participants (Patton, 2002). Participants were recruited on the basis that they were able and willing to provide insights into the factors that were important in their experience of injury and return to sport. Eight United Kingdom (UK) based international female football players were sampled (mean age = 29.63 ± 7.26 years, mean playing experience = 14.5 ± 4.74 years, mean international caps 34 ± 30.67). All participants were of white European ethnicity and represented five different Women's Super League (WSL) teams and three different countries.

Participants had experienced the following injuries: anterior cruciate ligament (ACL) injury requiring surgical reconstruction ($n=4$); hamstring strain; lateral ankle

sprain; Achilles tendinopathy; and a mid-radial fracture. Injuries had led to mean 7.13 ± 4.51 months of time-loss (range 2-15 months). Four players reported this was a new injury, characterised as one that they had not experienced before in their careers. For the remaining players ($n = 4$) this was a re-injury, defined as an injury of the same type and location as a previous injury (Hägglund et al., 2005). At the time of data collection, all players had returned to football in some capacity but none of the players perceived they had yet returned to their pre-injury level of performance defined by returning to a standing and status at or greater than prior to injury (Ardern et al., 2016).

Initial access to the participants came from the lead author's contacts in international women's football which was developed as a sports injury practitioner, and from referrals from coaches and other international players. Following the initial interviews and as a result of this being a "hard to reach" research population, a snowball strategy was then used wherein initial participants were asked if they knew of other players who might act as suitable participants for the study (Biernacki & Waldorf, 1981; Porter, Morrow & Reel, 2013). For example, according to published data there are approximately 230 registered players in the top tier of WSL and of those there are only 127 internationals (English Football Association, 2017). This highlights a limited pool of players for potential sampling, Overall, 13 international players were approached to take part in the study because of fitting the inclusion criteria giving a sampling rate of 62%. There were several reasons provided for not taking part in the study including not returning communication, a busy competitive schedule, change of team, and moving overseas. The term "sports injury" was operationally defined as an injury that occurred during a scheduled training session or match resulting in absence from the next training session or match (Hägglund, Waldén, Bahr & Ekstrand, 2005). Only severe musculoskeletal injuries were included leading to a minimum time loss from football

activities (i.e., training and competition) of two months within the last 24 months (e.g., Podlog et al., 2015).

In addition, four providers of social support were later recruited. These included a 54-year-old experienced male WSL technical coach and coach educator, a 35-year-old male WSL team sports therapist and Head of Medicine, a 54-year-old father of a previously injured international female footballer, and a 32-year-old WSL team-mate and club captain. All four participants were recruited voluntarily via email or text message through the authors existing contacts based on their direct experience of supporting injured international female football players.

3.4.4 Procedure

Individual auto-driven photo-elicitation interviews (PEI) were conducted (Clark, 1999). PEI refers to the use of photographs or images as the stimulus for discourse during a research interview (Meo, 2010). A critique of traditional semi structured interviews is that they allow the researcher to control the conversation and follow a predictable path, which can result in shallow and manufactured responses (Morse, 2020). In comparison, with auto-driven PEI research, participants are empowered to become part of the research process, with the interview content driven by the participant who has taken the images or photographs (Clark, 1999). When compared to traditional semi structured interviews, it is thought PEI's challenge research participants, trigger salient memories, encourage reflection, lead to new perspectives, and assist with establishing trust and rapport (Epstein, Stephens, McKeever & Baruchel, 2006). Before data collection took place, the PEI approach was piloted on football players ($N = 2$) who had recovered from injury and since returned to sport but did not meet the study inclusion criteria. This was done to familiarise the interviewer with the PEI process,

evaluate the flow of questions and language use, and practice developing follow-up questions.

In preparation for their interview, participants were encouraged to reflect on their injury experience and were given guidance to produce between eight to ten images or photographs of the factors that were particularly important to them during this experience. The images and photographs provided by the participants formed the semi-structured dialogue of the PEIs. This ensured that the interviewee had familiarity with the interview topic, and as such provided a richer insight into the injury experience (Clark-Ibáñez, 2004).

Interviews were conducted face to face at various venues and times convenient for the participants. The interview approach was conversational and was influenced by the framework of Rubin and Rubin (2012) consisting of: (i) a discussion of football career to date (e.g., Tell me how you originally got into football?); (ii) a discussion of the nature of the specific injury (e.g., Tell me about what injury we are focussing on today and how it happened?); and (iii) a discussion of each image and photograph, using probe and follow-up questions (i.e., Explain why you chose to include this image or photograph? How do you think that influenced your rehabilitation and return to sport? see Appendix D for examples of images and photographs). The players chose a mixture of personal photographs, media photographs, and poignant images to inform their PEI. In addition, probing questions and clarification statements were used to build on the participants responses (e.g., How did that make you feel? It sounds like your team coach was important to you when you were injured?). Interviews were digitally recorded and transcribed verbatim. The mean length of time between returning to sport and the PEI's was 7.83 months (range 2-18 months). PEI's were conducted by the same interviewer and took place over a seven-month period with a mean PEI duration of 57.5

± 7.16 minutes (range, 47-68 minutes) which yielded a total of 202 pages of single-spaced text.

3.4.5 Analysis and Establishing Rigour

A systematic and inductive “data driven” approach to reflexive thematic analysis was adopted (Braun, Clarke & Weate, 2016). Only data arising from PEI dialogue was included in the analysis and not the images/ photographs. First, to become familiar with the data, the content of each transcript was reviewed line by line, followed by provisional “pen and paper” coding of the data aligned to the research questions. Second, to reduce the data further, lower-order and higher-order latent themes were identified and developed. As these themes were interpreted from the data, it was at this point the four individuals with experience of providing social support to injured international female players were sampled and interviewed. Semi-structured interviews at this stage did not use images or photos, and the interview began by using broad questions before becoming more focused (e.g., Tell me about your experiences in football? Describe how you have provided social support to injured players?). Rather than to verify the players’ data, the purpose was to facilitate a richer understanding of how interactions with different providers of support may have impacted on the player’s injury experience and return to sport outcomes, and to refine the naming, delineation, and interrelationship of themes (Jones, Brown & Holloway, 2013). In other words, this complimented the player data by providing more rounded and contextual explanations. At this stage, all of the data that the players provided was anonymous in line with institutional ethical approval. Lastly, the final refined themes were deductively analysed in order to develop an explanatory thematic map demonstrating the interaction of themes and to provide a more complete inquiry (Morse, 2020). The thematic map was developed iteratively from initial diagramming from reflections on the data and through

critical discourse with the research team in light of the data and previous research in this area.

To ensure integrity, rich rigor, and credibility of the data, several quality-focussed strategies were adopted (see Levitt et al., 2017; Tracy, 2010). The specific strategies adopted were congruent with a critical realist approach. Interview notes were made after each interview to summarise researcher's immediate impressions of the interview interaction, the interview setting and how the research may have influenced the interview (e.g., Miciak et al., 2018). Regular peer debriefs using a "critical friend" approach took place to enhance plausibility of data (Smith & McGannon, 2017). This commenced at the coding stage to challenge the inductive interpretation of the data and concluded with the final version of the deductive thematic map. This was done to challenge interpretation and reinterpretation, as well as to deepen understanding (Tracy, 2010).

Member reflections (and not member checking) were used as an opportunity for further collaborative participation and reflexive elaboration (Smith & McGannon 2017). Each participant was encouraged to reflect on their transcribed data and the final refined themes to ensure that their data was not being misinterpreted and to discuss gaps in interpretation. This took place within six-weeks of the participants being interviewed via email correspondence. For example, some of the original technical sport and exercise medicine terminology relating to different stages of return to sport wasn't clearly understood and was amended (e.g., reconditioning and return to participation stages). Further member reflections took place on the developed thematic map via email to ensure this was both comprehensible and meaningful. The final explanatory thematic map was a consensus of the experience of the players and perspectives of the social support providers.

To further enhance the resonance and coherence of the findings a multivocality approach was used (Tracy, 2010). The explanatory thematic map was presented to six individuals currently involved in international women's football to critique the presentation of the thematic map and resonance in their practical context (e.g., international team coaches, international team doctors). Comments were collected via email or phone and led to amendments being made to the layout of the thematic map. As such, the final thematic map went through several iterations to enhance its practical utility.

3.5 Results

The interpretive findings from the methods described above led to the development of an explanatory thematic map of perceived social support processes and return to sport outcomes grounded in an international women's football context (see Figure 3.1). The final themes reflect the combined contribution of the eight purposively sampled international female football players and the four theoretically sampled providers of social support to injured international female football players. The following results section is structured according to how the thematic map was sequentially constructed. First, the findings suggest that the social support process is influenced by several contextual factors. Second, that a player's perceptions of high or low-level social support during the injury process are formed from the interface of availability and quality of support. Finally, it is theorised that perceptions of social support influenced return to sport outcomes by modulating the players experience of the injury process.

3.5.1 Factors Influencing the Social Support Process

This theme was developed to reflect the contextual factors influencing the social support process. In particular, these factors included: (i) the pre-injury and injury relationship between provider and player; (ii) sociocultural factors within the context of

elite women's football; and (iii) the personal characteristics of the provider and player. Injury enforced change to each player's regular social support patterns. Players were exposed to altered relationships with existing pre-injury providers of support (e.g., team coach, team-mates) whilst also developing "new" injury relationships with additional providers of support (e.g., team medical staff, consultant surgeons). A positive pre-injury relationship with support providers appeared to positively influence their perceptions of social support during the injury process. Costa (player) spoke positively about the pre-injury relationship with her team coach:

" He [team coach] has been brilliant, I think he sort of sees me like a second daughter. I've known him a long time and played with him at [WSL team] and what have you ... he'll say to me he'll just be as proud when I get back on that pitch as my dad would"

The nature of international women's football meant that distinctive stressors influenced the provision of social support. Constraints on team-level resourcing (e.g., financial, contact time) resulted in players commenting on infrequent or restricted social support. For example, use of part-time medical staff or only one medical practitioner with large case work. Harvey (team medical staff) mentioned, *"In WSL there is not enough staff or time for medical staff to be implementing specific assessment for psychosocial factors"*. The pressure to get results at this level of performance led to long-term injured players not being considered a priority compared to "fully fit" players or those nearing return to sport that may imminently be able to contribute to the team performance.

The personal characteristics of the provider to offer help, and the willingness of players to identify, seek out and accept help, related to the social support process. This followed a high-to-low pattern. For example, at the start of the injury process players

perceived this was high (i.e., lots of availability) but as time-loss from football activities progressed this reduced (i.e., diminished availability). Costa (player) commented:

“at the start of your injury a lot of girls are interested you know to see how you’re getting on...but as that injury keeps going on like a lot the less interested your team-mates become because you’re still out injured”.

As such, this adversely impacted the potential availability of social support at the point of return to sport where the players all reported high levels of stress. Libby (team-mate) noted some of the challenges of supporting injured team-mates, *“it can be hard to continually reiterate on a regular basis the same message... to try and encourage...some [non-injured] players can be frustrated by the slowing in pace of integrating a non-contact player back into sessions.”*

3.5.2 Perceptions of High and Low-Level Social Support

Perceptions of social support were interpreted to be the interface of social support availability and social support quality. These sub-themes were delineated by taking availability as the completeness of the provision relative to the player’s needs, whereas quality pertained to whether the activities and messages of this provision matched, exceeded or fell below the player’s expectations. Players reported having access to many available providers of social support. Providers were both internal to the WSL team they were contracted to (e.g., team medical staff, team coaches, team-mates) and from external sources (e.g., international team staff, specialist consultants, family, team supporters). Of the providers highlighted it was the social support activities and messages afforded by team medical staff and team coaches that were considered to be the most important during the injury process.

While all players had access to an extensive availability of social support providers, this didn’t necessarily relate to perceptions about the quality of social

support. Social support that was considered player-centred (i.e. players involved in shared decision making), coherent (i.e. informed and clear), and cohesive (i.e. consistent accurate message from all providers) was perceived as high-quality. In one example, Sandy (player) commented,

“I had em, a physio [external to WSL team] who worked with me pretty much every day...I had regular contact with [international team doctor] and the physio [international team] at the time... she was getting regular feedback from the physio here...the support was great”.

In comparison, social support viewed as controlling and fragmented was perceived as low-quality. Players frequently mentioned not being “trusted” by providers of social support. Costa (player) shared an example of this:

“there’s been a lot of me trying to tell them it’s not right and for them to trust me... a lot of them say like ‘no, it should be right by now’ but I’m like I’ve never injured my knee before but I’m sure it should not feel like that... they’d [medical consultants] be telling me they wanna inject it with steroids injections... I’ve had too many injections to know that it’s not helping ...he’s like I think this is best so who am I to tell a specialist that I didn’t think that’s okay”.

In another example, Peacock (player) spoke about how not being “trusted” and feeling pressure to return to sport prematurely:

“...it’s only been a month, I don’t even know, cause they [WSL team] had that many injuries going on they’d even thought properly about how long it’d been since I’d done it and whether it had healed... so at that game I said, ‘I’m not ready to play, it’s not’, you know, ‘I don’t feel ready to play’ ... I knew it wasn’t right and I know, I’m not medically trained but I know that it wouldn’t have been right for my arm as well, you know”.

It was interpreted that low-quality social support could, in part, be attributed to the providers lack of awareness and poor internal and external communication. In one example, Jeremy (parent) commented, *“I wasn’t quite sure whether she wanted me...support over the telephone or by her side... but I didn’t know what to do, how to do it...I think as in everything I needed advice on what I can do”*. In another example, Trevor (WSL team coach) noted, *“they [players] will tell the medics a lot of stuff that doesn’t normally get out, they need to be better experts at transferring that over to the right people”*.

Co-ordinating a team aimed at supporting injured players appeared to be challenging. Where there were many medical practitioners from different organisations (e.g., private clinics, NHS) involved in the management of injured players this was often not well co-ordinated and lacked leadership. In one example, Peacock (player) highlighted that because of this no one at her WSL team took a lead role on her recovery:

“She [WSL sports injury practitioner] never even looked at it... I went to her at training and said, ‘I’ve seen the specialist’ and she was just like, ‘oh yeah, good, he sent a letter’, she didn’t look at anything on me, I don’t think she even looked at it again to be honest.”

3.5.3 Social support and the Experience of the Injury Process

The injury process was conceptualised as commencing with the first reaction, diagnosis, and treatment of the injury until the player returned to participation in their pre-injury sport (i.e., effectively discharged). The experience of the injury process was made up of many stressors (e.g., sport, medical, lifestyle) and responses to these stressors (e.g., re-injury anxiety, motivation). High-level social support served to attenuate injury stress and negative responses and promote a more positive experience.

For example, high-level social support: (i) offered a distraction from injury-related stressors; (ii) enhanced motivation and adherence; (iii) contributed to less feelings of isolation; and iv) fostered feelings of being professionally valued and cared about. For example, when recalling how social support developed her motivation, Cherry (player) mentioned:

“I told my [team] coach how I was feeling and the depression thing...he called me every morning for like a week...that was probably the best thing that could have happened... I thought well then I will do my absolute best to try and push.”

Conversely, perceptions of low-level social support served to amplify the injury stress and negative responses and therefore contribute to a negative experience of the injury process. Players spoke about isolation, depression, frustration, anger, helplessness, embarrassment, and fear of being adversely judged when low-level support was perceived. Peacock (player) on her perceived low-level medical support remarked,

“That’s not really good enough... from like a medical point of view, but from a club’s point of view as well... I felt a little bit isolated injury wise... just to know somebody’s thinking about it or cares about it”.

Likewise, speaking about the psychological impact of experiencing low-level medical from her WSL team, Zoe (player) highlighted:

“...when you are like feeling like a bit negative about the situation and maybe doubting yourself a little bit, then you do need someone kind of there working with you like showing you that you are progressing a little bit...it’s just very frustrating, it would just so you know, I don’t cry easy and things like that but just the anger sometimes that I would feel, like how frustrated I’d feel”.

A lack of clear and accurate information from the providers of social support was a major cause of additional injury stress to players and diminished motivation to engage in rehabilitation activities. For example, Costa (player) commented, *“the worse*

thing anyone could have told me was the fact that it would be six to nine months rehab...I 'm fifteen months down the line, I've done absolutely everything they've told me...I'm still out injured". Highlighting the impact of misinformation, Zoe (player) stated, *"I just couldn't really see positive situation coming out of it and didn't have the motivation to do it"*.

The several providers of social support affected the experience of injury in different ways. For example, family and friends were mainly viewed as a distraction from injury related stressors. Costa (player) stated, *"I think it just helped massively, like to have that support round me ... reassure me that I will get back... it takes me away from just thinking that I'm injured"*. In a similar manner, Geraldine (player) highlighted the important role of her father in helping her cope with injury related stress:

"like he was the main person, like every day he'd ask me if I was alright... he knew deep down that I wasn't alright, so he'd always be like 'oh let's go do something' like let's go watch football or we'll go out like to just kind of keep my mind off things so to try and distract me from just thinking about being injured really".

Furthermore, Kat (player) spoke about the importance of the tangible support offered by her partner:

"with me being an international being away from my family that was I guess looking back kind of difficult as well because I had to take care of myself thankfully, I had a girlfriend at the time who like went shopping for my food that was kind of great of her because I couldn't take care of me, and I felt really bad."

Whereas being able to engage in rehabilitation activities around other injured players (e.g., injured club team-mates, during residential rehabilitation care) served as an additional stimulus in further developing motivation. Reflecting back in the

importance of residential rehabilitation care, Zoe (player) explained, *“I felt a little bit more integrated into it and that someone was actually really taking a genuine interest...whereas [back with WSL team] I did feel like a lot of the time I was just on my own”*. Frequently, players sought out other players that had been through similar injury experiences as an additional source of information and reassurance. Martha (player) stated, *“I was just picking her brain about how she dealt with everything cause I think she struggled a lot with coming back to play and being OK with her knee ...it was actually reassuring to hear”*.

All of the players that were interviewed feared for their international careers (e.g., not being offered a new central contract) and their perceptions of low-level support from international team support staff compounded this. The players perceived a high-level supportive international environment when they were injury free, where they felt included and professionally appreciated. However, when they were injured and not fit for international duty, they felt excluded with limited concern shown about how they were and how they were progressing. For example, Costa (player) noted:

“It’s taken more than the squad that’s gone to the [major international competition] to get to that [major international competition] so players shouldn’t be just left aside when they’re injured... it would be nice to know [international coach] still believes in me... not to get a phone call...to not have any communication that was like, that was like a kick up the arse.”

In another example, Geraldine (player) mentioned:

“I think it’s always nice to know that people want to help you and especially with England like England are like a huge thing I think it’s nice to know that you’re not just one of those players you know they pick and choose whenever they want, or they think you’re having a good game or like they actually do care about you”.

3.5.4 Social Support, Experience of the Injury Process and Return to Sport

Outcomes

Return to sport outcomes were multifaceted (i.e., several aspects were identified). The key facets interpreted from the data related to: (i) psychological readiness; (ii) relational changes; (iii) career trajectory; and (iv) quality of life. As identified in the thematic map (see Figure 3.1) it was interpreted that the players' perceptions of high or low-level social support were associated with return to sport outcomes indirectly through mitigating the injury process experience and, albeit less frequent, more directly through the players enhanced psychological wellbeing. For example, high-level pre-injury perceptions of social support enabled players to avoid injury anxieties, limit feelings of helplessness, maintain feeling professionally valued, place setbacks into perspective, and effectively manage return to sport expectations. It was interpreted that both process pathways were occurring simultaneously based on the typical (e.g., feeling low on motivation) and more atypical (e.g., unexpected setbacks), dynamic nature of injury stress.

The theme of psychological readiness included the player's level of confidence and anxieties over performance and re-injury upon return to sport. Players reported lacking confidence in their ability to perform at their pre-injury level and remain free from re-injury. This was in part due to some providers of social support failing to manage player expectations. On the impact of not addressing her expectations, Geraldine (player) explained:

"I was quite nervous at first cos obviously I expected it to be a lot longer and they were like after two weeks they were like 'no you're ready you can do it' ...I didn't want to go into it scared that every time I went into a tackle or jumped; I wasn't gonna do it [the injury] again so I was obviously a bit nervous".

Likewise, Sally (player) had little input over what to expect on returning to sport and because of this explained, *“I’m not the player I was before the injury ...I just used to play a lot better ...I’ll always look for the safe option...I don’t feel 100% fit...I don’t think it’s ever gonna be like what it used to”*. Furthermore, despite returning to sport for nine months, Sandy (player) mentioned, *“it’s weird how it affects you sort of mentally even now... before every game I always sort of pray that you know nothing happens and that I stay sort of injury-free”*. The high demands of the performance level and consequent expectations of the team coach were often viewed as compounding these concerns. Martha (player) commented, *“We’re in a very pressurised situation as a team so he’s [team coach] expecting performance levels to be 100% and that’s had a knock-on effect on me”*.

Players revealed that the experience of the injury process iteratively changed their relationship with providers of social support. In other words, the player’s perceptions of high or low-level social support during injury shaped their future perceptions of social support providers when they had eventually returned to sport. For example, players were concerned that they were being perceived as “unreliable” or “weaker” after injury by the team coaching staff. There were examples of players experiencing distress at the point of return to sport and choosing not to disclose this because of the opinion it would be used against them (e.g., in team selection, contract renewal). Martha (player) noted, *“I wouldn’t want to say certain things to the manager because I wouldn’t not want him to pick me...maybe he’d be less likely to give me a contract at the end of the year”*. While speaking about how she shared her return to sport concerns, Cherry (player) commented:

“I was concerned but I was too scared to say anything ... I have told my national coach about my feelings and he’s used it against me...I just feel like then they start

reading into things...they thought I was weaker than I was...I just keep my feeling to myself it works better that way."

Sustaining a severe injury leading to significant time loss from football activities had negatively impacted on each player's career trajectory. None of the players perceived that they had returned to a comparable pre-injury level of performance (i.e., WSL team status, international team status). However, several players reported additional career opportunities becoming available due to being injured. For example, opportunities in the media as an expert panellist or co-commentary on live matches. As a result of their injury experience players found that they were able to become a social model for other injured players, and as such a prospective provider of social support.

Despite returning to sport, players reported that injury had negatively impacted upon their quality of life. For example, long term pain and chronic functional deficits reduced the quality of their life away from football. These findings were interpreted as indicating that not all return to sport outcomes may be sport specific. Costa (player) commented,

"I assumed that having a big operation like that it was never ever gonna hurt after...since I woke up in that bed [15 months earlier] my knee has never not hurt... I'd say my knee controls me more than I control it".

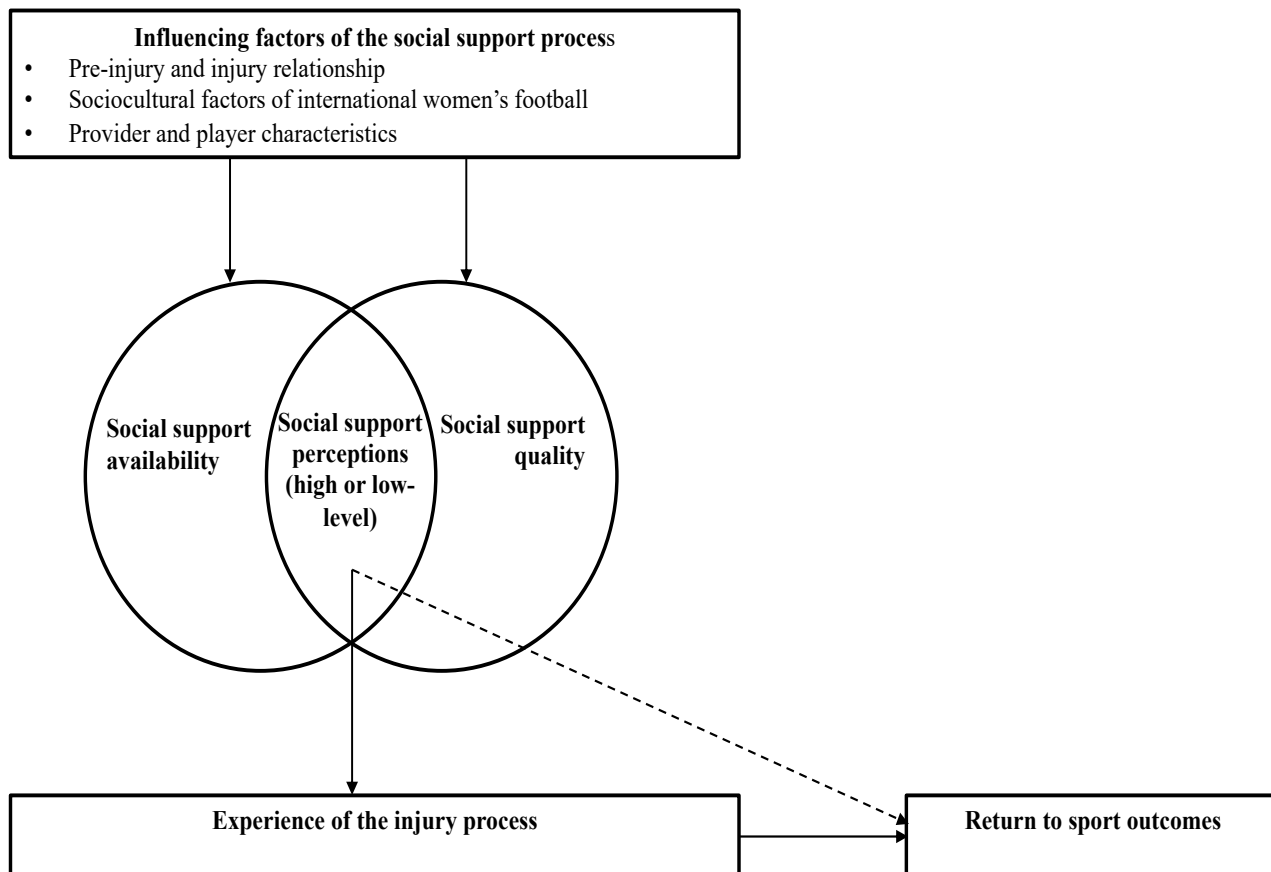


Figure 3.1 Explanatory thematic map of perceived social support processes and return to sport outcomes grounded in an international women's football context. The broken line indicates only tentative evidence was found.

3.6 Discussion

The aim of this study was to explore whether perceptions of social support during injury are viewed as important and how these perceptions may relate to return to sport outcomes in international female football players following injury. In light of previous research and by addressing the research aim, this study offers an incremental contribution to the social support and injury literature by presenting a provisional context-specific explanatory thematic map. The most important interpretive findings were that: (i) the social support process is influenced by several contextual factors; (ii) that a player's perceptions of high or low-level social support during the injury process are formed from the interface of availability and quality of support; and (iii) that

perceptions of social support influence return to sport outcomes by modulating the players experience of the injury process. As such, the interpretive findings of this study provide some endorsement to the content and propositions of domain specific theoretical frameworks by suggesting social support as an important factor worth consideration in the return to sport process (e.g., the integrated model, Wiese-Bjornstal et al., 1998; the biopsychosocial model, Brewer et al., 2002).

3.6.1 Influencing Factors of the Social Support Process

Conceptually, it has been highlighted that relationship characteristics, provider and recipient characteristics, and sociocultural context are related to social support processes (Bianco & Eklund, 2001). However, previously this has neither been empirically supported or contextualised like it has been done in the present study. The influencing factors interpreted from the data included: the pre-injury and injury relationship between provider and player (e.g., quality of pre-injury relationship prior to an enforced relationship change with new and existing providers); sociocultural factors of international-level women's football (e.g., pressurised environment, modest financial resourcing); and provider and player characteristics (e.g., willingness to afford, seek out, and accept help). Some novel findings of this study extend the sports injury and social support research findings by further indicating that the pre-injury relationship between support provider and player appears important at influencing perceptions of social support when injured (Bianco & Eklund, 2001; Maurice, Kuklick & Anderson, 2017), and that social support appears to follow a high-to-low pattern during injury (i.e. high availability and quality at the start of the injury process but this diminishes as time-loss continues). The latter point is potentially important as it infers that players may be integrated back into sport without feeling adequately supported. In turn this may impact on a player readiness to return to sport and potentially increase the risk of injury of re-

injury and restrict the ability to perform at a pre-injury level (Ivarsson et al., 2018; Podlog et al., 2015).

3.6.2 Perceptions of High and Low-Level Social Support

Previous research has found that the perceptual features of social support predict health outcomes (e.g., Freeman & Rees, 2010; Goodwin, Costa & Adonu, 2004). However, what constitutes perceptions of high or low-level social support in a sport setting is an area requiring development (Burns, Weissensteiner & Cohen; Maciak, Mayan, Brown, Joyce & Gross, 2018). The finding of this study suggests that overall perceptions of social support appears to be the interface of availability and quality of support. From the thematic map it can be theorised that the greater overlap between availability and quality, the player will have perceptions of higher-level social support. In contrast, if the overlap is trivial or the availability and quality are separate the player will perceive social support to be low-level. High-level social support was perceived when players had sufficient availability to quality support that was proportionate to their needs and expectations. This is potentially important as research has found perceptions of high-level support (in the form of satisfaction) negatively predicts anxiety and positively predicts motivation and ability to handle high stress (Covassin et al., 2014). According to the findings of this study, having access to a wide range of providers of support does not necessarily mean high-level support is afforded. Indicators of high-level support were interpreted when the support was player-centred, coherent and cohesive. In contrast, indicators of low-level support were that it was controlling and fragmented. Previous frameworks from other healthcare domains have indicated other predominantly micro-level indicators of high-level social support (i.e., ongoing session-by-session patient to therapist interactions; Maciak et al., 2018). In elite sport, supporting players through the injury process until return sport tends to be a more multidisciplinary team-based responsibility (e.g., Ardern et al., 2016). As such, the

indicators of high or low-level support in this study operate at this level. Therefore, in combination with current micro-level frameworks, this study offers some new and additional conceptual and applied considerations for stakeholders aiming to provide high-level social support to injured players.

3.6.3 Perceived Social Support and the Experience of the Injury Process

Sustaining and recovering from sports injury is a stressful event for any player (e.g., Evans, Wadey, Hanton & Mitchell, 2012; Ivarsson et al., 2018). The more stressful this event is, the worse the experience is for players. Importantly, the presented thematic map indicates that perceptions of high-level social support may attenuate injury-related stress and consequent negative psychological responses (e.g., experiencing less anxiety). In other words, players who perceive high-level social support had a less negative injury process experience characterised by less anxiety and greater motivation. Conversely, the players that perceived low-level social support had a more stressful and complex injury experience characterised by frustration, helplessness, and isolation. This finding is supported within sports injury and social support theory and research. From a theoretical perspective, the biopsychosocial model and social support theory propose that social support shares a relationship with affective states (Bianco & Eklund, 2001; Brewer et al., 2002). In particular, the stress and coping perspective of social support theory suggests that social support inoculates and buffers or alternatively amplifies a player's injury-related stress. There is empirical evidence indicating a similar sentiment. Previous research has suggested that social support has an enabling or disabling relationship with stress-related experience (e.g., Covassin et al., 2014; DeFreese & Smith, 2014; Rees et al., 2010). In one example, a qualitative study by Carson and Polman (2008) found that social support was an important coping mechanism used to alleviate injury stress throughout the process of returning to sport following ACL injury.

An additional and potentially important benefit of a player perceiving a high-level social support centres on mental health. The career-time prevalence of mental health problems in women's football is significant and experiencing injury is a major contributor to mental health problems (Prinz, Dvorák & Junge, 2016). In this study there was evidence of injury impacting on a player's mental health (e.g., "felt isolated", "the depression thing"). With regards to a potentially important role of perceived social support, meta-analytical findings from general healthcare indicates a moderate to high effect size between high-level social support and improvements in mental health (Harandi, Taghinasab & Nayeri, 2017). The sentiment is echoed in the sports injury domain where perceptions of high-level social support from sports injury practitioners predicted less anxiety and depressive symptoms (Yang et al., 2012). Taken together, this finding provides some further empirical evidence that perceived social support should be an important consideration for those involved in the management of the injury process.

3.6.4 Perceived Social Support, Experience the Injury Process, and Return to Sport Outcomes

According to the explanatory thematic map it can be theorised that perceptions of high or low-level social support during the injury process influences return to sport outcomes. This is a potentially important finding as there is a paucity of empirical evidence that has uncovered how perceptions of social support may extend to influencing return to sport outcomes (Brewer, 2010). The predominant process that this occurred by was by modulating the experience of the injury process (i.e., a palliative process attenuating injury-related stress and limiting anxiety), albeit there was some evidence of a direct process when players perceived high-level social support prior to injury (i.e., a preventative process shielding players from injury-related stress through enhanced wellbeing). In regard to an indirect process, if players perceived high-level

social support alleviated injury stress, less anxiety and enhanced motivation, leading a less negative and more positive experience of the injury process, and therefore better return to sport outcomes. Regarding the direct process, the study findings indicate that sustained pre-injury and injury access to high-level social support was related to less negative experiences, maintained feelings of being professionally valued, placed setbacks into perspective, and managed injury expectations. Owing to the complexity of the stressors that international female players encountered during the injury experience, together with a wide range of providers of support, it is theorised that both process pathways may be concurrent and complimentary (Bianco & Eklund, 2001; Madrigal & Gill, 2014). Additionally, the findings of this study offer some contextual empirical support to processes identified in the biopsychosocial model where social support influences return to sport outcomes mediated by psychological factors (Brewer et al., 2002).

The return to sport outcomes that perceived social support was interpreted to influence were multifaceted. The outcomes identified from the data related to psychological readiness, relational changes, career trajectory, and quality of life. The concept of psychological readiness as an injury outcome has recently gained attention in the literature (e.g., Forsdyke et al., 2017; Webster & Feller, 2018). This study suggests players that perceive high-level social support during the injury process will exhibit greater psychological readiness to return to sport. As such, this would result in players returning to sport confident in their ability to perform and remaining injury-free (Glazer, 2009). With regards to this particular return to sport outcome, previous research has reported unequivocal findings. For example, social support is either indicated as an important precursor to psychological readiness, or as a coping strategy that has limited significance (e.g., Podlog, et al., 2015; Wadey et al., 2014). As psychological readiness appears to be important for an optimum return to sport exploring the factors that may

contribute to a player being psychologically ready is clinically relevant (e.g., McPherson et al., 2019a). This study provides some further evidence that perceived social support may be one such factor.

Very little research has included finding on relational changes between social support provider and player following injury (Bianco & Eklund, 2001). This study found that the experience of the injury process iteratively changed existing social support relationships. In particular, these relational changes related to the team or international coach. Following injury, players became suspicious of the coach's intentions, feared for their careers, and thus this changed their pre-injury interactions. This suggests that perceptions of high or low-level social support when injured can either diminish or enrich the coach – athlete relationship. In an attempt to understand and enhance return to sport outcomes, further research into the social support – psychological readiness relationship, and coach – player relationship is recommended (e.g., Maurice, Kuklick & Anderson, 2017; Norlin, Tranaeus-Fitzgerald & Alricsson, 2016).

3.6.5 Study Limitations and Future Considerations

Possible limitations and future considerations of this study may include the nature of the sample used in the study, the use of retrospective recall of data and self-reflexivity over biasing the findings. A contentious point in qualitative research is whether enough sampling has taken place to base the interpretative findings on (Bowen, 2008). In all twelve individuals were sampled including eight players and four different providers of social support to injured players. An additional six participants then contributed the construction of the explanatory thematic map. The overall sample size exceeds the minimum suggested guidelines for the chosen analysis method (see Braun & Clarke, 2016) and is consistent with studies in this field of research employing similar research designs (e.g., Johnson et al., 2016; Norlin, Tranaeus-Fitzgerald &

Alricsson, 2016; Podlog et al., 2015). Even so, the sampling of additional players may have enabled the strength of some themes to be increased, while always having the potential to uncover additional relevant data.

In sampling only international female football players, this study attempted to increase the diversity of the research population in this area (Costello et al., 2014; Forsdyke et al., 2016). In doing so, the extent that the findings can be inferred for other injury types, sex, ages, or levels of performances is restricted. It is likely however that the findings of this study may have some inferential generalisability to other similarly injured players and to stakeholders supporting injured football players at an elite level (Smith, 2018). Future research may wish to ascertain the extent of which the findings of this study can be applied to a broader football population (e.g., males, different performance levels).

This study relied on retrospective recall of the injury experience and as such could have been limited by some memory decay and reinterpretation of the injury experience over time in light of subsequent events. That is the players interpretation of social support during the injury may be reinterpreted due to more recent events. Additionally, the findings from this study are quite broad and some of the detail and temporal change may have been lost. The threat of recall bias on the data was partially mitigated by including a two-year criterion for inclusion, and the systematic use of PEI in that salient factors could be reflected upon prior to the interview (Althubaiti, 2016). The use of member reflections also provided players with additional opportunities to clarify, develop or amend their thoughts as required following their initial interviews. In future the use of concurrent data collection approaches across the injury timeline would negate the main limitations of retrospectively recalled data.

Self-reflexivity is an important consideration in the design and evaluation of experiential qualitative research (Shaw, 2010). The lead author's subjective values,

biases, and inclinations as a white male researcher and experienced sports injury practitioner in this context may have influenced the study findings (Tracy, 2010). For example, several players and support providers that contributed to the study were recruited using the lead authors contacts and as such there might have been some unconscious sampling bias. In other words, the players who chose not to take part or were not contacted to take part in the study may have provided additional data. In part the use of auto-driven PEI limited the extent the lead author could misdirect the focus of the interviews owing to their biases. Additionally, to address this several methods also were employed to enhance the rigor of this research in order to challenge and adequately minimise any misinterpretations (e.g., peer debrief, member reflections).

3.6.6 Applied Implications

Based on the study findings there are several applied implications of this research which may have some transferability to practitioners working in similar contexts. First, against the background of the factors influencing the social support process creating a pre-injury social support action plan is advocated. A pro-active plan would clarify what social support can look like, how to provide it, and each individuals roles and responsibilities. This plan would then be openly shared with players and stakeholders. For example, prior to injury, each player and stakeholder develop an awareness of what to do, how to do it, and how often to do it. For the players in this study, the plan should also involve co-ordinating with international team staff. This may be an important consideration in fostering positive pre-injury relationships between provider and player and to safeguard that players perceive a high-level support.

Second, best practice in sport and exercise medicine suggests the regular use of meetings where player-centred shared decision making can take place (see Ardern et al., 2016). There were examples in this study where injured players felt controlled by fragmented social support. Therefore, it is recommended that in these routine meetings

that one item for consideration is all stakeholders engage in open communication and evaluation of a player's perceptions of social support. For example, is the support player-centred, coherent and cohesive? This approach may help in establishing the current and future social support needs of each player, manage the player and stakeholders' expectations, and ensure that consistent support activities and messages are afforded (Forsdyke et al., 2016).

Finally, the findings from this study could also give rise to well-designed social support interventions. Currently, this is something that is largely absent from the sports injury literature (Brewer, 2010; Gledhill, Forsdyke & Murray, 2018). According to the study findings, interventions could be directed at the player and at the stakeholders that are there to support them. For injured players, interventions should be focused on enhancing perceptions of social support, reducing injury stress and promoting psychological wellbeing. This in turn should augment return to sport outcomes. Some evidence to support this notion can be found in a systematic review of 100 studies where patient-focused social support interventions were found to enhance health outcomes (Hogan, Linden & Najarian, 2002). For stakeholders, an intervention would be chiefly educational and focus on social support skills training to empower those who may provide support. In one example, Maurice and colleagues (2017) provide a coach-focused heuristic modified from a coaching excellence framework looking at the interpersonal, professional intrapersonal knowledge coaches should possess to produce positive player outcomes. Whether the sentiments from this heuristic have sound utility to other key stakeholders or to a sport and exercise medicine team is yet unknown. However, the findings of this study together with more micro-level and provider specific evidence may provide a useful framework for providing support to injured players and stimulate a new and clinically relevant line of enquiry in sport and exercise

medicine (e.g., Burns, Weissensteiner & Cohen, 2019; Maciak et al., 2018; Maurice, Kuklick & Anderson, 2017).

3.7 Conclusion

This study explored whether perceptions of social support during injury are viewed as important, and how these perceptions may relate to return to sport outcomes in international female football players following injury. The most important interpretive findings were that: (i) the social support process is influenced by several influencing factors; (ii) that a players' perceptions of high or low-level social support during the injury process are formed from the interface of availability and quality of support; and (iii) that perceptions of social support influence return to sport outcomes by modulating the players experience of the injury process. Together these contextual and novel findings provide an incremental contribution to the psychological of sport injury literature. current literature relating social support to injury outcomes.

Additionally, the study findings may have some inferential generalisability to similarly injured football players and to stakeholders working in a football environment. Future research should aim to examine and apply the contextual social support processes indicated in this study. Such extended finding may eventually provide an empirical platform for developing enhanced social support practices for injured players in an attempt to better manage the injury experience and optimise return to sport outcomes.

4.0 Chapter Four

Social Support and Psychological Readiness to Return to Sport After Injury in Football Players: The Mediating Role of Re-injury Anxiety

Note to reader:

This study was presented at the British Association of Sport and Exercise Science (BASES) conference and appeared in the Journal of Sport Sciences abstract edition of the conference, pages 13-14:

Accepted for oral at British Association of Sport and Exercise Sciences (BASES) Annual Conference (2018): Forsdyke D, Smith A, Gledhill A, Madigan D. *Social support and psychological readiness to return to sport after injury in football players: the mediating role of re-injury anxiety*. Harrogate, UK

4.1 Aim of Chapter Four

Study two explored whether perceptions of social support during injury are viewed as important, and how these perceptions may relate to return to sport outcomes following injury. The findings from study two provided some evidence that a player's perception of social support is one potentially important psychosocial factor that may influence return to sport outcomes. Specifically, it was interpreted that perceived availability and quality of social support was related to several return to sport outcomes through a relationship with the experience of the injury process (i.e., ability to cope with injury-related stressors from first reaction, diagnosis and treatment to return to pre-injury sport). One important injury-related response highlighted by the players was re-injury anxiety and one important return to sport outcome was psychosocial readiness to return to sport. A common criticism of qualitative studies is that the findings are restricted to the context in which they are derived, and as such this reduces the extent the results can be reliably inferred to the broader population (Eklund et al., 2011). Therefore, to examine the applicability of the key propositions of study two to the broader football population of injured football players, study three uses an observational quantitative design. The purpose of study three is to further examine the role of perceived social support in psychological readiness to return to sport, and whether re-injury anxiety during rehabilitation may be a mediating factor in this relationship. This study commences with empirical and theoretical perspectives underpinning psychological readiness, social support, and re-injury anxiety and how these potentially important factors may be associated. Next, the cross-sectional research design and methods used in this study are outlined. The cross-sectional results arising from the methods the study employed are then presented. Finally, the key findings of the study are discussed and where these findings are positioned within the current body of evidence in light of the strengths and limitations of the study.

4.2 Study Abstract

Return to sport outcomes following injury are often poor. This is compounded by a current lack of understanding surrounding the factors that optimise psychological readiness to return to sport. Consequently, in the present study, the aim was to further our understanding of these issues by examining the role of perceived social support in psychological readiness to return to sport. In doing so, this study intended to extend previous research by examining whether re-injury anxiety during rehabilitation is a mediating factor in this relationship. A sample of 150 previously injured football players (mean age = 25.32 years) completed measures of perceived social support, re-injury anxiety during rehabilitation, and psychological readiness to return to sport. Mediation analyses showed that re-injury anxiety (e.g., apprehension, worry, tension) accounted for the relationship between perceived social support and psychological readiness to return to sport. These findings suggest that injured players with greater perceived social support will experience less re-injury anxiety during rehabilitation and, consequently, will be more confident in performing well and remaining injury-free upon their return to sport.

4.3 Introduction

Within football, the burden of sports injury is high (Bahr et al., 2018). At the same time, return to sport outcomes following injury are often poor (Drew et al., 2017). Ideally players should only return to sport when they are both physically and psychologically ready to do so (Ardern et al., 2016). In comparison to the physical factors predicting optimal return to sport, psychological factors are poorly understood (Walker et al., 2007). In this regard, however, both theory and research suggest a prominent role for social support (Forsdyke et al., 2016). Therefore, the aim of the present study was to further examine the role of social support in psychological readiness to return to sport following injury in football players. In doing so, this study extends previous research by examining whether re-injury anxiety is a mediating (i.e., explanatory) factor in this relationship.

4.3.1 Psychological Readiness to Return to Sport

There is a recent growing body of literature examining psychological readiness to return to sport following injury (e.g., Webster et al., 2018). In the context of football, psychological readiness to return to sport is generally considered to be a player's confidence in his/her ability to perform football activities well and to remain injury-free (Glazer, 2009; Webster et al., 2008). It can be viewed as an adaptive return to sport outcome that has several behavioural, emotional, and performance related consequences for players prior to, upon, and after returning to sport (Forsdyke et al., 2016; Phelan et al., 2019). Psychological readiness may predict which players return to competitive sport following injury (Fältström, Hägglund & Kvist, 2016), the likelihood of re-injury (McPherson et al., 2019b), and greater functional performance upon return to sport (Zarzycki et al., 2018). Psychological readiness is therefore an important determinant of optimal return to sport (Ardern et al., 2016). As such understanding the determining

factors that may promote psychological readiness to return to sport may help practitioners better support injured players (Webster et al., 2018).

Currently, there is a limited theoretical and empirical understanding of how psychological readiness to return to sport following injury is developed or diminished (Podlog et al., 2015). One possible theoretical explanation lies with the biopsychosocial model of sport injury rehabilitation (Brewer et al., 2002). Broadly, this heuristic model suggests that biological (e.g., hormonal and circulatory), psychological (e.g., affect and cognition), and socio-contextual factors (e.g., rehabilitation environment and social support) predict psychological readiness to return to sport. Furthermore, the model posits that this occurs via mediating biopsychological processes (e.g., pain, emotion, function). There is some evidence to support the biopsychosocial model in the context of psychological readiness to return to sport. For example, research has found that biological factors (e.g., limb symmetry; Zarzycki et al., 2018), psychological factors (e.g., motivation; Podlog et al., 2015) and socio-contextual factors (e.g., injury to surgery interval; Webster et al., 2018) are associated with psychological readiness to return to sport. As returning to sport following injury is a social process involving many people (e.g., coaches, medical staff, teammates), one important factor contained within the biopsychosocial model is social support (Truong et al., 2020).

4.3.2 Perceived Social Support

Social support is defined as an exchange of resources (activities and the messages arising from these activities) between individuals that are intended to help one another (Bianco & Eklund, 2001). Social support is a complex construct comprising of actual (size of the social support network and the exchanges received) and perceived features (appraisals of the quality of the available social support relative to a player's needs and expectations). Although these features show a moderate overlap, research suggests that they have differential predictive ability (e.g., Freeman & Rees, 2008).

Regarding the present study, it is perceived social support that is likely most relevant (Freeman, Coffee, & Rees, 2011). This is because perceived support is more consistently associated with health-related outcomes (e.g., return to sport outcomes) than actual social support (e.g., Goodwin, Costa, & Adonu, 2004; Stevens, Cruwys & Murray, 2020). For example, a meta-analysis of 37 empirical studies found the effect size for perceived social support to be significantly higher than actual social support on mental health outcomes (Prati & Pietrantonio, 2010). The operational definition of perceived social support in the present study was the player's overall impression that the available social network during injury was sufficiently supportive enough or not relative to their needs (Kang, Park & Wallace, 2018).

Typically, four main social support dimensions feature in the literature; (i) emotional support; (ii) esteem support; (iii) tangible support; and (iv) informational support. Emotional support refers to expressions of empathy, trust, and caring to an injured player (Bianco & Eklund, 2001). Esteem support refers to praise and encouragement that is given to an injured player on their abilities or accomplishments (Fernandes et al., 2014). Tangible support refers to assistance with finance, transport or equipment provided to an injured player (Clement & Shannon, 2011). Whereas informational support refers to feedback, instruction or advice provided to an injured player (Bianco & Eklund, 2001). While often studied separately it is plausible that each dimension of social support serves multiple functions (Freeman & Rees, 2008). For example, medical staff attempting to provide guidance on return to sport criteria (i.e., informational support) may also be interpreted as a sign of caring (i.e., emotional support). Therefore, examining the individual dimensions of social support, and the composite social support is recommended (Viswesvaran, Sanchez, & Fisher, 1999). Both differentiated and aggregate approaches to testing social support have strengths and weaknesses. On one hand taking a fragmented approach to examining social

support using different dimensions has the potential to uncover unique relationships with context specific variables. On the other taking an aggregated approach may help reduce type one errors in reporting findings and gives greater overall clarity to findings (Freeman & Rees, 2008). Based on the preliminary nature of the present study, both approaches to examining the effects of perceived social support were adopted.

In the context of return to sport following injury in football, perceived social support may improve a player's psychological readiness to return to sport. There is some evidence for this notion. For example, a qualitative study of previously injured mixed sport players (Podlog et al., 2015) showed that perceptions of social support were related to perceptions of psychological readiness to return to sport. Similarly, a quantitative study of sport players with severe knee injuries found that social support, in the form of completing group-based rehabilitation exercise, significantly improved psychological readiness to return to sport following injury (Meierbachtol, Yungtum, Paur, Bottoms, & Chmielewski, 2018). Taken together, preliminary research suggests that perceptions of social support may be an important antecedent of psychological readiness to return to sport.

In the present study, we wished to understand why this is the case. According to the biopsychosocial model of injury (Brewer et al., 2002), social support will have its effect on psychological readiness to return to sport via indirect mechanisms. In other words, social support affects psychological readiness to return to sport via mediating psychological factors such as emotions (e.g., Lentz et al., 2015). One particularly relevant emotion in the context of injury rehabilitation is anxiety.

4.3.3 The Mediating Role of Re-Injury Anxiety

Anxiety is a commonly experienced emotion during injury rehabilitation (e.g., Forsdyke et al., 2016; Rice et al., 2019). At its broadest, anxiety is described as the

subjective feeling of apprehension, worry, and tension caused by the perception of a situation as threatening (Spielberger, 1972). Given the potentially personally meaningful context of injury rehabilitation, anxiety is likely to manifest in relation to the possibility of re-injury (Walker et al., 2010). That is, players will experience apprehension, worry, and tension regarding the possibility of re-injuring themselves (Wadey et al., 2014). Consequently, re-injury anxiety may be one psychological factor that affects return to sport outcomes.

Re-injury anxiety may be important in relation to return to sport as well as perceived social support. In support of this proposition, research has found it to be related to numerous actual and perceived injury outcomes which include failing to return to sport at pre-injury levels (e.g., Ardern et al., 2012a), greater time-loss from injury (e.g., Ivarsson, Tranaeus, Johnson & Stenling, 2017), and heightened concerns upon return to sport (e.g., Meierbachtol et al., 2020; Wadey et al., 2014). In addition, upon return to sport, players with re-injury anxiety are less likely to perform well (i.e., avoid contact situations and give less than required effort levels; Wadey et al., 2014). Thereby, in context of the present study, then, re-injury anxiety is likely to decrease the likelihood of optimal psychological readiness to return to sport.

There are several factors that are thought to explain the development of re-injury anxiety during rehabilitation (e.g., injury severity, time to surgery, player age; Wadey, et al., 2014). One potentially important factor is a player's perceptions of social support. This is because social support is thought to have a preventative (i.e., inoculating) and palliative (i.e., buffering) relationship with injury-related stress (Bianco & Eklund, 2001). That is, with perceptions of low-level social support injury-related stress may be amplified, whereas with perceptions of high-level social support, injury-related related stress may be diminished. As such, social support activities and messages may help players better cope with the apprehensions, worries, and tensions of re-injuring

themselves (Walker & Thatcher, 2011). In line with this idea, several studies have found that perceptions of high-level social support negatively predict symptoms of anxiety (e.g., Carson & Polman, 2012; Yang et al., 2014). It can thus be inferred that an injured player with perceptions of low-level social support (i.e., dissatisfaction) is more likely to suffer from the effects of re-injury anxiety than a player with perceptions of high-level social support.

In regard to an explanatory mechanism that accounts for the relationship between perceived social support and psychological readiness to return to sport, there is evidence that re-injury anxiety is potentially important. Research has related social support to negative affective states such as re-injury anxiety (e.g., Mitchell et al., 2014) and re-injury anxiety to psychological readiness to return to sport (e.g., Wadey et al., 2014). Moreover, according to the biopsychosocial model of sport injury and rehabilitation (Brewer et al., 2002), re-injury anxiety may mediate this relationship. However, to date, no study has examined these factors in the same study, despite a theoretical and empirical rationale to do so.

4.3.4 The Present Study

Study three intends to extend the findings of study one and two. In study one, potentially important psychosocial factors that were identified in the reviewed evidence were social support, re-injury anxiety and psychological readiness to return to sport. So far, these specific factors have not been collectively empirically examined (see study one). Study two found that a player's perceptions of social support during rehabilitation influenced return to sport outcomes (e.g., psychological readiness to return to sport), and that this was proposed as being explained by impacting on the players experience of the injury process (e.g., re-injury anxiety). However, as study two used a qualitative approach this restricts the inference of the findings to other populations (see study two). In light of this, study three empirically tests the proposition from study two with one

explanatory process in biopsychosocial model (Brewer et al., 2002) by examining the relationships between social support, re-injury anxiety, and psychological readiness to return to sport.

Against this background, the aim of the present study was to further examine the role of perceived social support on psychological readiness to return to sport following injury in football players. In doing so, this study extended previous research by examining whether re-injury anxiety is a mediating factor in this relationship. Based on the preceding discussion, it was expected that perceived social support would positively predict psychological readiness to return to sport following injury via re-injury anxiety (see Figure 4.1)

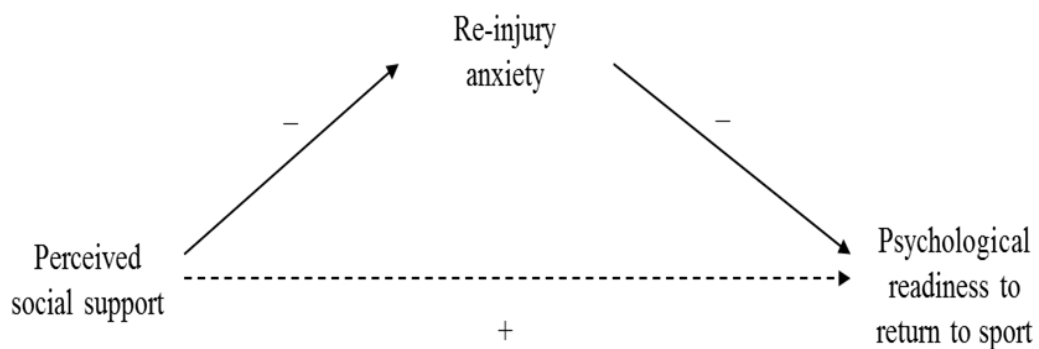


Figure 4.1. Hypothesised model of the relationship between perceived social support, re-injury anxiety, and psychological readiness to return to sport.

4.4 Methods

4.4.1 Ontological and Epistemological Assumptions

This study adopted a positivist and objective standpoint (see Bunniss & Kelly, 2010). This philosophical standpoint seeks to examine observable variables with the aim of generating findings with statistical probabilistic inference (Park, Konge & Artino, 2019). This standpoint is commensurable with the aims of this study which were to

examine the relationship between psychosocial factors so that return to sport outcomes might be predicted.

4.4.2 Ethical considerations

Institutional ethical approval was obtained in accordance with the Declaration of Helsinki for human studies (1964) and the Data Protection Act (2018) for personal data use, storage, and removal. Specific ethical considerations for this study were informed consent, maintaining anonymity, and protection from harm (Evans et al., 2002; Fox, Murray & Warm, 2003). Several ethical steps were to address these considerations. First, for both the on-line and hard copy of the questionnaire, participants gave written informed consent. For the on-line version of the questionnaire, participants gave active consent via a forced response setting before being able to complete the items. In other words, participants could not proceed to the items before giving active consent. From this point, to ensure participants answered the items volitionally, the forced response setting was removed. Second, participants created their own unique traceable code in order to maintain their anonymity and to be used for removing data should this be requested. Last, if reflecting back on the injury experience and answering items relating to this caused psychological distress, the participants were signposted to sources of support (e.g., MIND helpline).

4.4.3 Participants

Participants were 150 adult football players (83 males, 67 females; M age = 25.32 years, $SD = 4.28$) who had sustained at least one injury within the last 24 months leading to a minimum time-loss from football training or matches of eight weeks or more and had returned to football following injury (e.g., Podlog & Eklund, 2009). The participants were recruited via social media advertisement and by drawing on the authors existing contacts within football using a three-staged sampling approach. This

was done to increase the reach of the study. First, was a social media launch using Twitter and Facebook displaying a study infographic and link to access the on-line questionnaire. Next, there was a more targeted stage whereby practitioners and teams were contacted asked to share the study details amongst their football network. Last, the lead author physically visited football teams and recruited eligible participants following a short presentation. The mean time loss caused by sport injury was 17.17 weeks ($SD = 12.22$). Participants were drawn from a range of levels of performance (international, $n = 11$; professional, $n = 11$; semi-professional, $n = 30$; amateur, $n = 98$). Most of the injuries reported were traumatic (i.e., sudden onset of symptoms; $n = 119$) vs. overuse (i.e., insidious onset of symptoms; $n = 31$) and were considered a new injury ($n = 126$) to the participants vs. a re-injury (i.e., same injury type and location after returning to sport; $n = 24$).

4.4.4 Procedure

This study employed a cross-sectional design. This type of study is thought beneficial for establishing associations between multiple variables as a basis for understanding relationships (Sedgewick, 2014). Prior to distribution, the questionnaire was piloted on two separate individuals focussing upon the quality of the content, presentation, ease of completion, and then consequently revised. Participants voluntarily completed either an online version of the questionnaire (82%; Qualtrics, Provo, UT, USA) or an identical paper copy (18%). Previous research has found item responses do not tend to differ between questionnaire formats (Lonsdale, Hodge, & Rose, 2006). All Likert scales were fully labelled with verbal anchors utilising the work of Wade (2006) as these scales are considered more robust than partially labelled scales (e.g., Weston 2018; Krosniak & Presser, 2010). Participants responded to the questionnaire by retrospectively reflecting on their experience of rehabilitation (i.e., process) and their return to sport following injury (i.e., outcome).

4.4.5 Measures

Perceived social support. To measure perceptions of social support, the Perceived Available Support in Sport Questionnaire was used (PASS-Q, Freeman, Coffee and Rees, 2011). The PASS-Q contains 16 equally distributed items which assess dimensions of emotional (e.g., “*show concern for you*”), esteem (e.g., “*boost your sense of competence*”), informational (e.g., “*give you constructive criticism*”), and tangible support (e.g., “*help with travel to appointments, training and matches*”). To contextualise to the recalled injury experience, the items were preceded by the stem: “*Think about your experience of being injured. If needed, to what extent did someone ...*,” with responses scored on a 5-point Likert scale ranging from 0 (not at all) to 5 (extremely so). The separate dimension level perceived social support was calculated by taking the mean score for the available corresponding items. In addition, based on conceptual suggestions (Burlinson & MacGeorge, 2002) together with previous empirical work (e.g., Freeman & Rees, 2008), a total score of perceived social support was created by averaging across subscales. This item was then referred to as total perceived social support. The PASS-Q has demonstrated reliability and validity in previous studies (e.g., Freeman, Coffee, & Rees, 2011; Freeman & Rees, 2008).

Re-injury anxiety. To measure the intensity of re-injury anxiety, we used the Re-Injury Anxiety Inventory (RIAI, Walker, Thatcher, & Lavalley, 2010). The following generic stem sentence preceded the items: “*Think about your experience of being injured. To what extent do the statements reflect how you felt at the time?*” The RIAI is focussed upon anxiety over re-injury during rehabilitation (RIA-R) and re-entry back to training/competition (RIA-RE). Only the 13-item RIA-R subscale (e.g., “*I am worried about becoming re-injured during rehabilitation*”) was used in this study to examine the intensity of anxiety during rehabilitation. This was done to develop a temporal understanding between the variables. Participants responded on a 4-point Likert scale

ranging from 0 (not at all) to 3 (very much so). The subscale score was calculated by summing items. The RIAI has demonstrated reliability and validity in previous studies employing this research design (e.g., Wadey et al., 2014).

Psychological readiness to return to sport following injury. To measure psychological readiness to readiness to return to sport following injury, we used the Injury–Psychological Readiness to Return to Sport Scale (I-PRRS, Glazer, 2009). This generic measure was selected on the basis that it is currently the only direct measure of psychological readiness and because other measures are injury specific (e.g., focus on anterior cruciate ligament or shoulder injury; Podlog et al., 2015).). The scale was preceded by the generic stem phrase “*Based on your experience of returning to football following injury, to what extent do you agree with the following statements*”. The I-PRRS contains 6 items primarily measuring self-confidence relating to performance (e.g., “*confidence in my skill level/ability*”) and injury (e.g., “*confidence in the injured body part to handle the demands of the situation*”). Each item response was recorded using a scale from 0 (no confidence) to 100 (utmost confidence). A total score for psychological readiness was derived summing the six items and dividing by 10. The I-PRRS has demonstrated reliability and validity in previous studies adopting this research design (e.g., De la Vega, Barguín, Aguayo, & Márquez, 2017; Slagers et al., 2019a).

4.4.6 Data Screening

Initially, the data was examined for missing values. Due to relatively few missing items ($i = 15$), missing responses were replaced with mean imputation of the item responses from the corresponding scale (Graham, Cumsille, & Elek-Fisk, 2003). Secondly, Cronbach’s alpha was calculated for each study variable. All of which were acceptable (e.g., $> .70$) as recommended by Nunnally & Bernstein (1994; see Table 1).

Finally, following procedures described by Tabachnick and Fidell (2007), data were screened for univariate and multivariate outliers; none were found.

4.4.7 Analytic Strategy

First, means, standard deviations, and bivariate correlations for all variables were computed (see Table 4.1). This included all the social support dimensions, re-injury anxiety, and psychological readiness to return to sport. Cohen's (1992) effect size thresholds were used to interpret the correlation coefficients. Next, following Baron and Kenny (1986) a hierarchical regression analysis was conducted to examine whether the combination of social support and re-injury anxiety predicted psychological readiness. This approach highlights three conditions in order to support potential mediating effects: (i) the independent variable predicting the dependent variable; (ii) the independent variable predicting the mediating variable; and (iii) the independent variable and mediator variable predicting the dependent variable. In Step 1, social support was entered as the independent variable, and in Step 2 re-injury anxiety was entered as a mediating variable. Finally, to further test whether re-injury anxiety mediated the relationship between social support and psychological readiness, the size and significance of the indirect effect were examined using the PROCESS macro for SPSS (Hayes, 2013). The mediation model was run with bias-corrected bootstrapping (5000 resamples) using 95% confidence intervals (CI; see Rucker, Preacher, Tormala, & Petty, 2011). This non-parametric procedure creates an empirical approximation of the sample distribution allowing the indirect effects of the mediation model to be tested. If the 95% CI does not contain zero this indicates that the variable is a significant mediator ($p < .05$) in the proposed model (Rucker et al., 2011). For statistical modelling the sequence of the variables was informed by study two of the thesis and from processes described in the biopsychosocial model (Brewer et al., 2002).

4.5 Results

4.5.1 Descriptive Statistics and Bivariate Correlations

First, the means and standard deviations were reviewed for each variable (see Table 4.1). According to published cut-offs, on average, participants reported that they had experienced moderate levels of re-injury anxiety during rehabilitation with low-moderate levels of psychological readiness upon return to sport following injury (Glazer, 2009; Walker et al., 2010). There were only marginal differences between male and female participants across all variables other than females, on average, reported lower psychological readiness (-5.44). However, this difference was not clinically meaningful as the mean scores remained within the same threshold (Glazer, 2009). Second, the bivariate correlations between the variables and the effect size of these were inspected (see Table 4.2). All of the social support dimensions, other than tangible support, showed a significant small-to-medium negative correlation with re-injury anxiety during rehabilitation (i.e., players with higher social support will have lower re-injury anxiety). All social support dimensions demonstrated significant medium-to-large positive relationship with psychological readiness to return to sport (i.e., players with higher social support will have higher psychological readiness). Re-injury anxiety during rehabilitation showed a significant medium-to-large negative correlation with psychological readiness to return to sport (i.e., players with high re-injury anxiety will have lower psychological readiness).

Table 4.1. *Sample demographics and descriptive statistics*

Variable		Overall (<i>n</i> =150)	Male (<i>n</i> =83)	Female (<i>n</i> =67)
Age	<i>M</i> (SD)	25.32 (4.28)	24.53 (4.94)	26.12 (3.22)
Time loss (weeks)	<i>M</i> (SD)	17.17 (12.22)	15.2 (11.18)	19.14 (15.54)
Performance level	<i>n</i> (%)			
International		11 (7.3)	2 (18.2)	9 (81.8)
Professional		11 (7.3)	6 (54.5)	5 (45.5)
Semi-professional		30 (20)	19 (63.3)	11 (36.7)
Amateur		98 (65.3)	65 (66.3)	33 (33.7)
Injury type	<i>n</i> (%)			
Traumatic		119 (79.3)	55 (46.2)	64 (53.8)
Overuse		31 (20.7)	20 (64.5)	11 (35.5)
First time injury		126 (84)	71 (56.3)	55 (43.7)
Re-injury		24 (16)	6 (25)	18 (75)
Perceived social support	<i>M</i> (SD)			
Esteem support		3.53 (0.88)	3.32 (1.11)	3.70 (3.69)
Emotional support		3.93 (0.97)	3.71 (1.09)	4.13 (0.79)
Information support		3.51 (0.97)	3.40 (1.01)	3.65 (0.92)
Tangible support		3.40 (1.11)	3.11 (1.12)	3.62 (1.02)
Total support		3.58 (0.88)	3.39 (0.93)	3.75 (0.82)
Re-injury anxiety	<i>M</i> (SD)	29.57 (9.96)	30.10 (8.99)	28.93 (11.08)
Psychological readiness	<i>M</i> (SD)	37.02 (12.15)	39.44 (11.72)	33.99 (11.56)

Table 4.2. *Bivariate correlations and Cronbach's alpha*

Variable	1	2	3	4	5	6	7
1. Esteem support							
2. Emotional support	.77**						
3. Information support	.74**	.45**					
4. Tangible support	.69**	.65**	.57**				
5. Total support	.93**	.83**	.81**	.86**			
6. Re-injury anxiety	-.26**	-.26**	-.20*	-.13	-.24**		
7. Psychological readiness	.44**	.29**	.41**	.34**	.43**	-.46**	
<i>M</i>	3.53	3.93	3.51	3.4	3.58	29.57	37.02
<i>SD</i>	0.88	0.97	0.97	1.11	0.88	9.96	12.15
Cronbach's α	.93	.91	.79	.86	.95	.94	.88

Note. $N = 150$. * $p < .05$. ** $p < .001$.

Table 4.3. Summary of multiple regression analyses predicting psychological readiness to return to sport

	Total support		Emotional support		Esteem support		Tangible support		Information support	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1										
Perceived social support on psychological readiness										
	.19**	.43**	.09**	.29**	.20**	.44**	.12**	.34**	.17**	.41**
Step 2										
Perceived social support on psychological readiness										
	.13**	.33**	.16**	.18*	.13**	.34**	.17**	.27**	.15**	.33**
Re-injury anxiety on psychological readiness										
		-.37**		-.41**		-.37**		-.42**		-.39**

Note. $N = 150$. β = standardised regression weight. * $p < .05$. ** $p < .001$.

4.5.2 Regression and Mediation Analyses

Results from the regression analyses indicated that perceived social support and re-injury anxiety predicted psychological readiness to return to sport (see Table 4.2). Perceived social support was a significant positive predictor of psychological readiness to return to sport (.43, $p < .001$). For example, on average, a player with higher perceived social support will be more psychologically readiness. Whereas re-injury anxiety was a significant predictor of psychological readiness to return to sport ($-.37$, $p < .001$). For example, on average, a player with higher re-injury anxiety will be less psychologically ready. Moreover, in Step 2 when re-injury anxiety was added to the perceived social support – psychological readiness to return to sport model, the effect of perceived support on psychological readiness was reduced in size which is indicative of mediation (see Baron & Kenny, 1986). Whether re-injury anxiety mediated the relationship between different dimensions of perceived social support and total perceived social support, and psychological readiness was then further tested, as suggested by the regression analyses. Results showed that the mediation effect was significant for total perceived social support (indirect effect = 0.11 [95% CI = 0.19, 0.38]), emotional support (indirect effect = 0.12 [95% CI = 0.05, 0.20]), esteem support (indirect effect = 0.10 [95% CI = 0.04, 0.18]), informational support (indirect effect = 0.08 [95% CI = 0.02, 0.17]). However, for tangible support the mediating pathway was nonsignificant (indirect effect = 0.07 [95% CI = 0.00, 0.15]). The findings from total perceived social support are summarised in Figure 4.2. The R^2 value was .32 indicating that this model accounted for 32% of the variance of the response data around the mean.

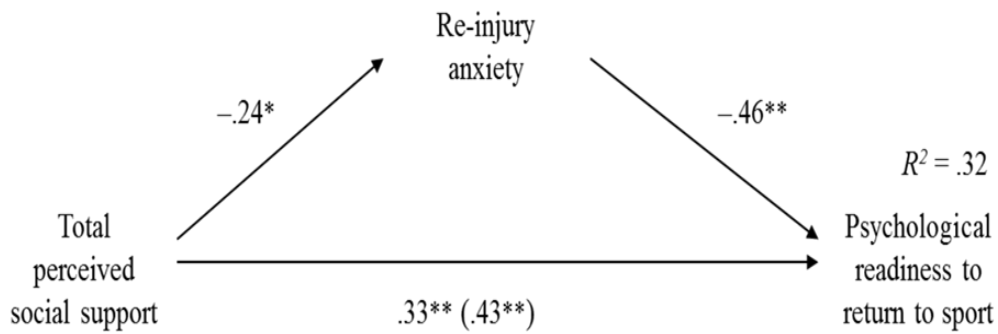


Figure 4.2. Mediation model of total perceived social support and re-injury anxiety predicting return to sport confidence ($N = 150$). The bracketed figures are direct correlations before accounting for mediating effects. All coefficients are correlations. $*p < .01$, $**p < .001$.

4.6 Discussion

The aim of the present study was to further examine the role of perceived social support in psychological readiness to return to sport following injury in football players. This study extended previous research by examining whether re-injury anxiety is a mediating factor in this relationship. As hypothesised, this study found that perceived social support was a significant positive predictor of psychological readiness to return to sport. Furthermore, the findings provide support for the mediating role of re-injury anxiety during rehabilitation (e.g., apprehension, worry, and tension).

4.6.1 The Mediating Role of Re-Injury Anxiety

To date, this is the first study to examine one psychological process underpinning the relationship between perceived social support during rehabilitation and psychological readiness to return to sport. In congruence with theoretical propositions (see Brewer et al., 2002) and those made in study two, it was found that re-

injury anxiety was a significant mediator of this relationship, other than for tangible support. In other words, an injured player with greater perceived social support will experience less re-injury anxiety during rehabilitation, and consequently they will be more confident in performing well and remaining injury-free upon return to sport (i.e., more psychologically ready). This finding is potentially important given the relatively poor rates of returning to competitive sport (Ardern et al., 2014b), the negative impact of injury on performance level (Drew et al., 2017), and such factors being related to a subsequent increased risk of re-injury (Olmedilla, Rubio, Fuster-Parr, Pujals, & García-Mas, 2018).

Perceived tangible support during rehabilitation showed both a non-significant relationship with re-injury anxiety and consequently led to an insignificant mediation effect. However, the direction of the relationship was conceptually as expected. This means greater availability of material and personal assistance was in part related to less re-injury anxiety during rehabilitation. There could be two possible explanations for this. First, we suggest that the magnitude of the relationship would be greater with a larger sample size. Second, is that the 13-item re-injury anxiety during rehabilitation subscale may fail to sufficiently detect anxieties over more tangible factors during rehabilitation. For example, anxieties over financial implications of injury or transport to training during rehabilitation. This is of course beyond the scope of the RIAI but is worthy of future consideration in measurement instruments. In other words, injured football players may have anxieties over many more issues beyond solely re-injury.

4.6.2 Other Possible Mediating Pathways

After accounting for the mediating role of re-injury anxiety, a significant positive direct relationship between perceived social support and psychological readiness to return to sport following injury was found. In other words, the relationship was not fully explained by re-injury anxiety. This finding is suggestive of the potential for other factors to explain this relationship. Revisiting the biopsychosocial model of injury (Brewer et al., 2002), there are several other factors that may be relevant in this regard. For example, other psychological (e.g., rehabilitation behaviour) and biological (e.g., rate of injury healing) factors may mediate this relationship (Brewer, 2010). These alternative factors are certainly worth considering for future research in this area.

Previous research may also provide some direction for further explanatory factors. These factors include motivation (Chan et al., 2017; Podlog et al., 2015), expectancy beliefs (Carriere et al., 2015), self-esteem and perceived control (Christiano et al., 2016), optimism (Williams et al., 2020), pain perceptions (Stevens, Cruwys & Murray, 2020), and adherence to rehabilitation activities (Covassin et al., 2014; Ivarsson et al., 2017). For example, a player with perceptions of high-level social support may be more motivated to return to sport, have clear expectations of rehabilitation and return to sport, and adhere to their prescribed rehabilitation programme. Previous research has rarely accounted for the complex interplay between psychosocial factors and return to sport outcomes (Williams et al., 2020). Therefore, examining these multiple variables together with re-injury anxiety or as alternative factors to re-injury anxiety may provide further understanding of the relationship between perceived social support and psychological readiness to return to sport. Future research should aim to test these assertions too.

4.6.3 Limitations and Future Directions

The present study has several limitations. First, a cross-sectional design was employed to collecting retrospectively recalled data (i.e., reflecting back on the injury experience). This approach precludes establishing causality, temporality (e.g., change over time), and can be open to recall bias. The maximum time for players to recall their injury experience was limited to 24 months which for reporting on significant life events is not uncommon (e.g., Howard, 2011; Wadey, Evans, Evans & Mitchell, 2011). However, future research should seek to use longitudinal designs to better address causal and temporal precedence. Second, this study only measured perceived social support. It is currently unclear whether received social support is important for psychological readiness to return to sport. However, including measures of both perceived and received social support may provide a more comprehensive understanding of the role of social support in psychological readiness to return to sport. A third limitation relates to how representative the study sample is of the available population (i.e., football players who had previously sustained a severe sports injury and had returned to football). Specifically, this study relied on participants to actively volunteer to complete the questionnaire. As such, the individuals who met the inclusion criteria but chose not to take part may have contributed different data. Future research should consider adjunctive and alternative methods of recruitment and sampling to garner data from individuals that do not engage in questionnaire research and/or had not been able to return to football following injury. Finally, this study was based exclusively on football players. It is uncertain if the present findings will generalise to other sports and contexts. Future research should aim to examine these relationships in other populations to determine their generalisability and utility.

4.6.4 Applied Implications

The present findings lend themselves to applied recommendations. In this regard, the study findings indicate two suggestions. First, to optimise psychological readiness to return to sport, practitioners should routinely monitor (i.e., screen) player's perceptions of social support and re-injury anxiety throughout injury rehabilitation (e.g., with the RIAI; Walker et al., 2010). Optimising psychological readiness in preparation to return to sport is important as only a modest number of players will experience meaningful improvements once they have returned to training and competition (Zarzycki, Failla, Arundale, Capin & Snyder-Mackler, 2017). Second, practitioners could implement social support interventions with injured players tailored to their support needs in an attempt to diminish re-injury anxiety (Burns, Weissensteiner & Cohen, 2019; Rice et al., 2019). In turn, this should enhance their psychological readiness. Research is needed to determine what such interventions should consist of and how effective they can be (see Hogan, Linden & Najarian, 2002 for a review). One sport-based example is provided by Freeman, Rees and Hardy (2009) who found that a one-to-one tailored intervention significantly improved dimensions of social support and performance outcomes in the form number of shots per round in golf. The intervention aimed to enhance emotional, esteem, informational and tangible support based on each players' needs prior to, during, and following competition. Interventions may also be effective direct towards practitioners providing social support. For example, a self-determination theory informed communication skills intervention directed at sports injury practitioners led to greater support provided for patient needs (Murray et al., 2015). Such interventions are an excellent starting point for future research. It is hoped that together these suggestions may enable practitioners to better

support injured players. Last, while interventions may be appropriate for the injured player, organisations and stakeholders may wish to consider the broader environmental and cultural factors that may foster re-injury anxiety (Rice et al., 2019). For example, the train or play through pain mentality and risk-taking culture (Truong et al., 2020). This indicates that that a multidisciplinary team-based approach to reducing re-injury anxiety may be required.

4.7 Conclusion

The present study contributes to the understanding of the relationship between perceived social support and psychological readiness to return to sport following injury in football players. The study suggests that perceived social support is important in relation to developing psychological readiness to return to sport. Moreover, it appears that re-injury anxiety, at least partly, mediates this relationship.

5.0 Chapter Five

Perceived Social Support and Changes in Re-injury

Anxiety and Psychological Readiness to Return to

Sport Over Time in Male Academy Football Players

5.1 Aim of Chapter Five

Study three provided some preliminary cross-sectional findings that perceived social support during rehabilitation significantly predicts psychological readiness to return sport. Furthermore, this psychological process is, in part, mediated by re-injury anxiety experienced during rehabilitation. As a result, study three examined the applicability of key propositions arising from study two to the broader football population. However, since study three used a cross-sectional design these findings are nuanced as any causality between the independent and dependent variables is impeded, and mediation potentially biased as mediation consists of processes that unfold over time (Maxwell & Cole, 2007). In order to further examine causal processes and take a more developmental perspective reflective of the return to sport process, longitudinal data is required (Cornelius, Brewer & Van Raalte, 2007). Consequently, the purpose of study four is to further our understanding of the psychosocial factors from previous studies (perceived social support, re-injury anxiety, psychological readiness to return to sport) by examining whether perceived social support predicts changes in re-injury anxiety and psychological readiness to return to sport over time. This study begins with empirical and theoretical underpinnings to the social support, re-injury anxiety and psychological readiness relationship, and provides a rationale for the need to examine these factors longitudinally. Next, the longitudinal research design and methods used in this study are outlined. The results arising from the methods that were employed and then presented. Finally, the key findings of the study are discussed and where these findings are positioned within the current body of evidence in light of the strengths and limitations of the study.

Study Abstract

In football, return to sport outcomes following injury are often poor. It is thought that this, in part, may be attributable to psychosocial factors. However, research and practice tend to focus on physical factors, and, as such, our understanding of psychosocial factors requires further development. In addition, most findings originate from cross-sectional studies which impedes casual inferences. Consequently, in the present study, the aim was to further our understanding of these factors by examining whether perceived social support predicts changes in re-injury anxiety and psychological readiness to return to sport over time. A sample of 68 previously injured male international football academy players (mean age = 18.98 years) completed baseline measures of perceived available social support, and repeated measures of re-injury anxiety and psychological readiness to return to sport over five days. Growth curve modelling showed that perceived available social support did not predict initial levels (intercept) or changes in (slope) re-injury anxiety or psychological readiness to return to sport. However, increases in re-injury anxiety predicted decreases in psychological readiness to return to sport. Overall, the findings suggest reducing re-injury anxiety may be particularly important for ensuring athletes are psychologically ready to return to sport.

5.3 Introduction

The burden of sports injury in football is high and accounts for a significant amount of time loss from training and competition (Whalan et al., 2019). Given the negative personal and team-based implications associated with injury, how to return players back to their pre-injury sport in an optimal way is of particular importance to practitioners (Ekstrand et al., 2019). For an optimal return to sport a player should be physically and psychologically ready (Ardern et al., 2016). However, compared to physical readiness, our understanding of psychological readiness is far less developed (Podlog et al., 2015; Walker et al., 2007). More specifically, the factors that might contribute to psychological readiness to return to sport is an area for development (Webster & Feller, 2018). Theory and research would suggest that social support and re-injury anxiety may be two such contributing factors (e.g., Brewer et al., 2002; Forsdyke et al., 2016). Study three found that perceived social support significantly predicted psychological readiness to return to sport, and that this relationship was, in part, explained by re-injury anxiety. However, how these factors interact over time has yet to be established. This is potentially important given the negative impact of returning to regular training and competition without adequate levels of psychological readiness (McPherson, Feller, Hewett & Webster, 2019b). Therefore, the aim of the present study was to longitudinally examine the role of social support on re-injury anxiety and psychological readiness to return to sport following injury.

5.3.1 Psychological Readiness to Return to Sport

Owing to the need to optimise return to sport outcomes, there has been a recent growth of research into psychological readiness to return to sport following injury (e.g.,

Lentz, Paterno & Riboh, 2018; McPherson et al., 2019a). Despite the research area developing, operational definitions of psychological readiness to return to sport are rare. Some studies suggest that psychological readiness is multifaceted (i.e., comprised of many variables), albeit one variable commonly thought of as indicative of psychological readiness is confidence (e.g., Forsdyke et al., 2016; Podlog et al., 2015). This context-specific confidence is thought to be multidimensional and derive from two elements: (i) confidence in performance; and (ii) confidence over injury recovery (Webster & Feller, 2018). Therefore, in the context of return to sport in football, psychological readiness can be considered as a player's confidence in their ability to perform football activities well and to remain injury-free (Glazer, 2009; Webster et al., 2008).

Psychological readiness appears to be an important modifiable determinant of optimal return to sport as it is positively associated with the decision to return to competitive football following injury (Ardern et al., 2014a), a greater level of functional performance upon return to sport (Zarzycki et al., 2018), and a reduced risk of re-injury (McPherson et al., 2019b). Furthermore, cross-sectional data suggests that players may be deficient in psychological readiness several months after returning to sport following injury (Phelan et al., 2019). Therefore, understanding the process of how psychological readiness to return to sport is developed or diminished over time is imperative to help practitioners to better support injured players (Webster et al., 2018).

Presently, the understanding of the factors that may modify the development of psychological readiness to return to sport is unclear (Podlog et al., 2015). According to theory and research, several factors are thought to contribute to the development of psychological readiness. A possible theoretical explanation can be found in the biopsychosocial model of sport injury rehabilitation (Brewer et al., 2002). This

heuristic model proposes that biological (e.g., rate of tissue repair, circulation), psychological (e.g., emotional state, cognitions), and socio-contextual factors (e.g., social support, rehabilitation and return to sport environment) interact to predict psychological readiness to return to sport. Moreover, it is thought that this occurs via intermediate biopsychosocial pathways (e.g., pain, function), albeit psychological factors may also have a direct effect on psychological readiness. There is some growing evidence to support the application of the biopsychosocial model in the context of psychological readiness to return to sport. For example, research indicates that biological factors (e.g., greater limb symmetry; Zarzycki et al., 2018), psychological factors (e.g., having realistic expectations, Podlog et al., 2015), and socio-contextual factors (e.g., shorter time to surgical intervention, Webster et al., 2018) may positively contribute to the development of psychological readiness to return to sport. As returning to sport following injury is a social process (i.e., involving multiple stakeholders) one such factor that may be important in the development of psychological readiness is perceived social support (e.g., Podlog et al., 2015; Truong et al., 2020).

5.3.2 Perceived Social support

In the context of returning to sport following injury, social support can be viewed as activities that players and stakeholders engage in with the intention to help one another (Bianco & Eklund, 2001). Social support is a complex construct encompassing several actual (e.g., the size of the players social support network) and perceived features (e.g., the players appraisals about the quality of the social support). Even though these features moderately overlap, research suggests that each has different predictive ability (i.e., propositions of effect; Freeman & Rees, 2010). Against the background of the present study, it is perceived social support that is most likely to be

relevant (Freeman, Coffee & Rees, 2011). This is because research has suggested that it is the players perceptions of the availability and quality of social support (whether accurate or not), rather than actual social support, that is more reliably associated with injury-related outcomes (Bianco & Eklund, 2001).

There is empirical and theoretical evidence suggesting that social support during rehabilitation may be associated with the development of psychological readiness to return to sport following injury. A qualitative study by Podlog et al., (2015) interpreted that perceived social support and feeling wanted by stakeholders (i.e., coaches, sports injury practitioners) and team-mates was associated with the development of psychological readiness. Additionally, an experimental pre-post intervention study found that a five-week group-based training intervention (i.e., greater social support) corresponded with a significant improvement in psychological readiness to return to sport measured using the ACL-RSI (Meierbachtol et al., 2018). From a theoretical perspective, the biopsychosocial model (Brewer et al., 2002) perceived social support will develop or diminish psychological readiness to return to sport via indirect processes. In other words, social support is related to psychological readiness via its relationship with psychological factors such as emotional states (e.g., Lentz et al., 2015; Stevens, Cruwys & Murray, 2020). One emotional state that is commonly experienced by players during the return to sport process, and that may impact upon return to sport outcomes (e.g., psychological readiness) is re-injury anxiety (Walker & Thatcher, 2011; Webster & Feller, 2018).

5.3.3 Re-injury Anxiety

Anxiety is commonly experienced by players during the return to sport process (e.g., Forsdyke et al., 2016). Broadly, anxiety can be described as a modifiable emotional state comprised of different somatic (i.e., tension, pain) and cognitive (i.e., apprehension, worry) elements in anticipation of a potentially threatening situation (Spielburger, 1972). Given the meaningful context of returning to sport following injury, anxiety is likely to manifest itself in the form of re-injury anxiety (Walker et al., 2010). Specifically, players with re-injury anxiety will experience apprehension, worry and tension in response to the possibility of re-injuring themselves when returning to sport (Wadey et al., 2014). Subsequently, re-injury anxiety is thought to be one clinically relevant factor that has implications on players when returning to sport (e.g., influencing psychological readiness, Walker et al., 2010).

Re-injury anxiety may be an important factor in the development of psychological readiness to return to sport following injury. That is because there are several negative implications of re-injury anxiety on injury recovery and performance, including: (i) ceasing participation in competitive-level sport (e.g., Ardern et al., 2012b); (ii) slower recovery time, and as such increased time-loss from injury (e.g., Ivarsson, Tranaeus, Johnson & Stenling, 2017); (iii) high-levels of concern when returning to sport (Wadey et al., 2014); and (iv) have reduced return to sport confidence (Tripp, Stanish, Ebel-Lam, Brewer & Birchard, 2011). In addition, upon returning to sport players experiencing re-injury anxiety are likely to have inferior post-injury levels of performance together (e.g., hesitation, inefficient skills execution, not giving 100%, Wadey et al., 2014) and an increased injury risk (Ivarsson et al., 2017). Thus, in the context of the present study re-injury anxiety maybe considered to diminish

psychological readiness to return to sport. As such, understanding the factors that may lead to a player developing re-injury anxiety is important.

Numerous factors have been suggested to explain the development of re-injury anxiety (e.g., sex, time to surgical intervention, previous rehabilitation experience, pain, nature and level of post-injury sport, Ardern et al., 2012a; Ross, Clifford & Louw, 2017). One potentially important factor is a player's perceptions of social support during rehabilitation. This is because the social support activities players engage in during rehabilitation may enable them to better manage the symptoms of apprehension, worry and tension about re-injuring themselves upon return to sport (Walker & Thatcher, 2011). Coherent with this idea, several studies have found that a player's perceptions of social support may predict re-injury anxiety (e.g., Kleinart, 2002; Podlog, Lochbaum & Stevens, 2010; Yang et al., 2014). Therefore, it can be inferred that a player with perceived low-level availability and quality of social support during rehabilitation may return to sport with higher re-injury anxiety. However, this has yet to be longitudinally investigated within samples of competitive players (see study one).

There is some theoretical and empirical evidence to suggest a relationship between social support, re-injury anxiety, and psychological readiness. According to the biopsychosocial model (Brewer et al., 2002) the process involves socio-contextual factors (e.g., perceived social support) impacting upon return to sport outcomes (e.g., psychological readiness) via psychological factors (e.g., re-injury anxiety). Empirical evidence has negatively associated high-level perceived social support during rehabilitation with the development of re-anxiety upon return to sport (e.g., Yang et al., 2014), and negatively associated re-injury anxiety with psychological readiness to return to sport (e.g., Kvist et al., 2005; Wadey et al., 2014). Study three was the first

study to directly examine these factors together and provided some provisional data indicating that perceived social support predicted psychological readiness to return to sport in previously injured football players, and that this relationship could be explained, in part, by the experience of re-injury anxiety during rehabilitation. However, due to the cross-sectional and retrospective nature of study three how these factors change over time is not currently known (see study three).

5.3.4 Longitudinal Designs

Despite positive calls to do so, the relationship between social support, re-injury anxiety and psychological readiness to return to sport may change over time, has not been previously studied (e.g., Brewer et al., 2002; Webster et al., 2018). Typically, research has tended to examine the direct relationships between psychosocial factors and psychological response or return to sport outcomes (Williams et al., 2020), Effective examination of change over time requires the use of longitudinal research designs (Stenling, Ivarsson & Lindwall, 2017). This is relevant in this research area for several potentially important reasons. First, the growing theory and research in this context suggests prominent and inter-related roles for psychological readiness and re-injury anxiety in the optimal return to sport following injury (e.g., Webster & Feller, 2018). Second, returning to sport following injury is a dynamic process (e.g., Ardern et al., 2016), and as such psychological readiness and re-injury anxiety are likely to change over time (e.g., day to day fluctuations). The over-reliance on cross-sectional and correlational studies (e.g., Phelan et al., 2019; Webster et al., 2018) means these factors have typically been studied as being unchanging. Therefore, our understanding of potentially important within-player changes during the return to sport process is limited. There is some evidence that changes in player status are important. In one study by

McPherson and colleagues (2019a) it was not necessarily the psychological readiness score that was important, but the extent to which the score changed across time that predicted re-injury upon return to sport. In another study, players that experienced a meaningful change in psychological readiness (termed as responders) reported greater return to pre-injury sport rates and function compared with non-responders (Zarzycki et al., 2017). As such, a better understanding of these temporal changes may allow more effective player management during the return to regular training and competition regimen (Cornelius et al., 2007). Lastly, process-driven theory in the context (e.g., the biopsychosocial model; Brewer et al., 2002) propose causal processes that are impacted upon by many explanatory, mediating and outcome factors (Stenling et al., 2017). As such these causal processes would inevitably take time to unfold. In other words, the causal processes included in the biopsychosocial model suggests that psychological readiness may develop over time. However, owing to the cross-sectional and correlational nature of many studies in this research area it is assumed these processes occur instantaneously. Adopting a longitudinal growth-based approach (e.g., latent growth curve modelling) may therefore enhance our understanding of how psychological readiness may develop or diminish over time, and more appropriately test the causal propositions of theory (Stenling et al., 2017).

One research method that facilitates the collection and examination of longitudinal data is a diary method. Diary methods allow for the systematic and intensive collection of self-reported data (Iida, Shrout, Laurenceau & Bolger, 2012). Although diary methods are seldom used in this research area (see Forsdyke et al. 2016; Truong et al., 2020) they may provide several benefits when compared to traditional cross-sectional inventory designs such as: (i) improved ecological validity of examining

psychological processes that are prone to change over time within a context; (ii) avoids retrospectively aggregated data and as such limits retrospection bias; and (iii) further understand what processes may underlie change over time and how players may differ in this process (Bolger, Davis & Rafaeli, 2003; Iida et al., 2012). Taken together, longitudinal research designs using diary methods may provide further insight about the psychological processes behind the perceived social support, re-injury anxiety and psychological readiness to return to sport relationship.

5.3.5 The Present Study

Study four builds on all previous studies. Study one identified potentially important psychosocial factors that are associated with return to sport outcomes. One of the recommendations from this study was the need for longitudinal studies to examine developmental and temporal change in psychosocial factors associated with return to sport outcomes. From the qualitative data in study two it was proposed that a player's perception of social support during rehabilitation was connected with their return to sport outcomes (e.g., psychological readiness to return to sport) and this occurred via the player's experience of the injury process (e.g., re-injury anxiety). In study three this was quantitatively examined with findings indicating that perceived social support predicted psychological readiness to return to sport, and that this relationship was, in part, was mediated by re-injury anxiety. While study three was able to empirically test the proposition from study two, we were unable to examine the causal and developmental nature of the key proposition generated in study two. In recognition of this, study four adopts a longitudinal approach in order to further understand the developmental and temporal nature of the perceived social support, re-injury anxiety and psychological readiness to return to sport relationship.

Against this background, this study aims to build on previous research by: (i) examining the role of perceived social support during rehabilitation on re-injury anxiety and psychological readiness during return to sport following injury; and (ii) longitudinally examining the temporal nature of re-injury anxiety and psychological readiness to return to sport over time. From the preceding discussion it was expected that perceived social support during rehabilitation would be significantly associated with initial and change measurements of re-injury anxiety and psychological readiness during return to sport. Additionally, re-injury anxiety and psychology readiness to return to sport would be significantly related initially and over time.

5.4 Methods

5.4.1 Ontological and Epistemological Assumptions

This study assumed a positivist and objective standpoint (see Bunnis & Kelly, 2010). This standpoint aims to yield reproducible findings with statistical probabilistic generalisability by assessing clearly observable and measurable variables (Park, Konge & Artino, 2019). As this study aimed to ascertain the nature of the relationship between psychosocial factors over time, this standpoint was considered the most appropriate.

5.4.2 Ethical Considerations

Institutional ethical approval was obtained in accordance with the Declaration of Helsinki for human studies (1964) and the Data Protection Act (2018) for personal data use, storage, and removal (see Appendix A). The ethical considerations for this study included: (i) informed consent; (ii) coercion; (iii) anonymity and confidentiality; (iv) the

researcher/participant relationship; and (v) protection from harm (Helgesson, Ludvigsson, Gustafsson & Stolt, 2005). In order to mitigate potential ethical issues, several steps were taken. To access participants, consent from a gatekeeper was required (i.e., Technical Director). Participants were recruited voluntarily with no coercion should they decide not to engage in the study. The participants gave active informed consent in writing before data collection and were made aware that if this changed with further data collection points, their data would be removed from the study. To ensure anonymity and confidentiality participants created a unique research code. This code was then used if a participant wanted their data to be removed. As the researcher was an injury practitioner known to academy coaches and participants, the role of researcher and purpose of the research was disclosed to avoid deception (e.g., data was not to be shared with academy staff). Finally, as returning to sport following injury has the potential to cause psychological distress, participants were signposted to sources of support should they perceive the need (e.g., MIND helpline).

5.4.2 Participants

The participants were recruited from one football academy, with access to potential participants coming from the authors existing contacts in football. Initial access to potential participants was via a gatekeeper (i.e., technical director) whereby the study was orally presented to all the academy players ($N = 152$). This involved explaining the purpose of the study, the inclusion criteria in order to take part, the requirements of the study, and their rights as potential participants. Of the participants deciding not to take part in the study, this was because they did not meet the inclusion criteria (e.g., had never sustained a sports injury). The participants who volunteered to take part in the study were 68 male international football academy players (mean age=

18.98 years, $SD \pm 2.44$, range 18-22 years) who had sustained at least one sports injury within the last twelve months leading to a minimum of 14 days' time loss and had returned to their pre-injury sport at the time of data collection. The sample size was based on the requirements of the statistical analysis and research design (i.e., latent growth curve modelling, number of observations per participant, Curran, Obeidat & Losardo, 2010; Duncan & Duncan, 2004). Sports injury was operationally defined as an injury sustained as a result of participation in sport or exercise leading to time-loss from regular football activities (i.e., scheduled training or competition, Häggglund et al., 2005). Most injuries reported were considered new ($n = 54$) vs. re-injury ($n = 14$), traumatic (i.e., rapid onset of symptoms, $n = 41$) vs overuse ($n = 27$) and occurred due to contact ($n = 47$) vs. non-contact ($n = 21$) leading to a mean football activity time-loss of 28.48 ± 61.03 days. When injury-free, players typically participated in football activity five-times per week (Monday-Friday), totalling on average 13.5 hours of scheduled loading. Access to the participants came from the researcher's contacts.

5.4.3 Procedure

Initially, participants completed a baseline hard copy questionnaire including background information, measurement of perceived social support during the return to sport process, and measurement of re-injury anxiety and psychological readiness to return to sport. Participants then completed a hard copy fixed interval schedule time-based diary reflecting on how they currently felt about their injury (Iida, et al., 2012). As returning to sport is empirically and theoretically thought a dynamic process (e.g., Truong et al., 2020; Wiese-Bjornstal, 2010), the variables were examined over a consecutive five-day period during the competitive season. Measures of re-injury anxiety and psychological readiness to return to sport were taken on these five

occasions. The decision to use 5 consecutive time-points was informed by the day-to-day nature of working with and monitoring of academy football players and for pragmatic reasons (e.g., reduce attrition associated with longer intervals between time-points). Given these variables are state based (i.e., potential to fluctuate) a repeated measures design allows for a more accurate examination of players perceptions over time than a single measurement point would have afforded (Ivarsson, Johnson, Lindwall, Gustafsson & Altermyr, 2014). It is thought that the diary method allows change and transitions of behaviour and processes to be recorded and observed (Snowden, 2015). As such, findings may have greater validity and relevance and are more accurate to the context they are derived (Iida et al., 2012). Data collection involved the lead author attending academy training and matches with the hard-copy diaries so that players could input their data on arrival. This approach to data collection was decided on following discussion with the academy multidisciplinary team as the best method to maximise completion rates in their context.

5.4.4 Measures

Baseline measures

Social Support

To measure perceptions of social support, the Perceived Available Support in Sport Questionnaire was used (PASS-Q, Freeman, Coffee and Rees, 2011). The PASS-Q contains 16 equally distributed items which assess dimensions of emotional (e.g., “*show concern for you*”), esteem (e.g., “*boost your sense of competence*”), informational (e.g., “*give you constructive criticism*”), and tangible support (e.g., “*help with travel to appointments and training*”). To contextualise to injury experience, the

items were preceded by the stem: “*When returning to sport following injury, if needed, to what extent would someone ...*,” with responses scored on a 5-point Likert scale ranging from 0 (not at all) to 5 (extremely so). Based on conceptual critique of viewing social support dimension as separate entities due to likely overlap (Cohen & Wills, 1985; Burleson & MacGeorge, 2002) together with the influence of previous empirical work (e.g., Freeman & Rees, 2008) a mean average score of all items was taken referring to this as total perceived social support. The scoring of the PASS-Q has demonstrated reliability and validity in previous studies (e.g., Freeman & Rees, 2008).

Diary Measures

Re-injury Anxiety.

To measure re-injury anxiety, the Re-Injury Anxiety Inventory was used (RIAI, Walker et al., 2010). The scale was preceded by the generic stem sentence “*What were your thoughts and feelings about re-injury today?*” The RIAI is focussed upon multidimensional anxiety over re-injury during rehabilitation (RIA-R) and re-entry back to training/competition (RIA-RE). Only the 15-item RIA-RE subscale (e.g., “*My body feels tense about re-entering competition because of re-injury worries*”) was used in this study to examine the intensity (i.e., amount) of re-injury anxiety during re-entry back into training/competition. Participants responded on a 4-point Likert scale ranging from 0 (not at all) to 3 (very much so). The subscale score was calculated by totalling corresponding items. A total subscale score of zero would suggest the absence of RIA-RE, whilst a total score of 45 would suggest extreme RIA-RE. The RIAI has demonstrated reliability and validity in previous studies (e.g., Wadey et al., 2014).

Psychological Readiness to Return to Sport Following Injury.

To measure psychological readiness to readiness to return to sport following injury, the Injury – Psychological Readiness to Return to Sport Scale was used (I-PRRS, Glazer, 2009). Other measures of psychological readiness were discounted based on being injury specific and being indirect measures (e.g., ACL-RSI, SIRSI; Podlog et al., 2015). The scale was preceded by the generic stem phrase “*How would you rate your psychological readiness today?*”. The I-PRRS contains 6 items measuring self-confidence relating to performance (e.g., “*confidence in my skill level/ability*”) and injury recovery (e.g., “*confidence in the injured body part to handle the demands of the situation*”). Each item response was recorded using a scale from 0 (no confidence) to 100 (utmost confidence). A total score for psychological readiness was derived by summing item responses and dividing by ten. The I-PRRS has demonstrated reliability and validity in previous studies (e.g., Conte, De la Vega, Barguín, Aguayo, & Márquez, 2017; Slagers et al., 2019a).

5.4.5 Data Screening

Initially the data was examined for missing values. Due to moderately few missing items at random (<5%, Jakobsen, Gluud, Wettersely & Winkel, 2017), missing responses were replaced with mean imputation of the item responses from the corresponding scale items (Graham, Cumsille, & Elek-Fisk, 2003). Secondly, Cronbach’s alpha was calculated for each study variable (see Table 4.1). All of which were acceptable (> .70; Nunnally & Bernstein, 1994). Finally, following processes outlined by Tabachnick and Fidell (2007), data were screened for univariate and multivariate outliers. No univariate or multivariate outliers were found.

5.5.6 Analytical Strategy

First, means, standard deviations, and bivariate correlations were computed for all manifest variables. Cohen's (1992) effect size thresholds were used to interpret the correlation coefficients. Based on the perspective that research in this area has failed to adequately capture the dynamic nature of return to sport (e.g., Cornelius et al., 2007) conditional parallel process latent growth curve modelling (PP-LGCM) was employed to analyse the data with Mplus' robust maximum likelihood estimator. PP-LGCM allows for two univariate growth curves to be estimated in the same model and the relationship between the variables over time to be examined (Stenling et al., 2014). Perceived social support during the return to sport process was conceived as a baseline covariate within the PP-LGCM. Latent factors were then modelled to examine the intercept (initial levels) and the linear slope (change) of re-injury anxiety and psychological readiness. Model fit indices of Chi-square statistics (χ^2 , $\geq .05$), Comparative Fit Index (CFI, $\geq .90$), Root Mean Square Error of Approximation (RMSEA, $\leq .08$), Tucker Lewis Index (TLI, $\geq .90$), and Standardised Root Mean Square Residual (SRMR, $\leq .05$) were used with 90% confidence intervals. Analyses were conducted with the statistical package Mplus 7.11 (Muthen & Muthen, 1998-2012).

5.5 Results

5.5.1 Descriptive Statistics and Bivariate Correlations

Table 5.1 displays the descriptive statistics and bivariate correlations between the study variables. First, on reviewing the means and standard deviations, players initially reported low-to-moderate re-injury anxiety and moderate psychological

readiness levels on return to sport (Glazer, 2009; Walker et al., 2010). The general trend over time was for a marginal decrease in re-injury anxiety (-1.94 over 5 waves) combined with a marginal increase in psychological readiness ($+1.68$ over 5 waves). The re-injury anxiety and psychological readiness trajectories over time appear in Figure 5.1. The slope means for re-injury anxiety and psychological readiness to return to sport were -0.39 and 0.40 respectively. Secondly, from inspecting bivariate correlations, total perceived social support during rehabilitation showed a non-significant small negative correlation with re-injury anxiety, and a non-significant small positive correlation with psychological readiness to return to sport. There were significant large positive correlations with re-injury anxiety measurements over time and with psychological readiness measurements over time. In general, re-injury anxiety and psychological readiness to return to sport showed a significant medium-to-large negative relationship over time (i.e., the greater the re-injury anxiety, the less psychologically ready the player is).

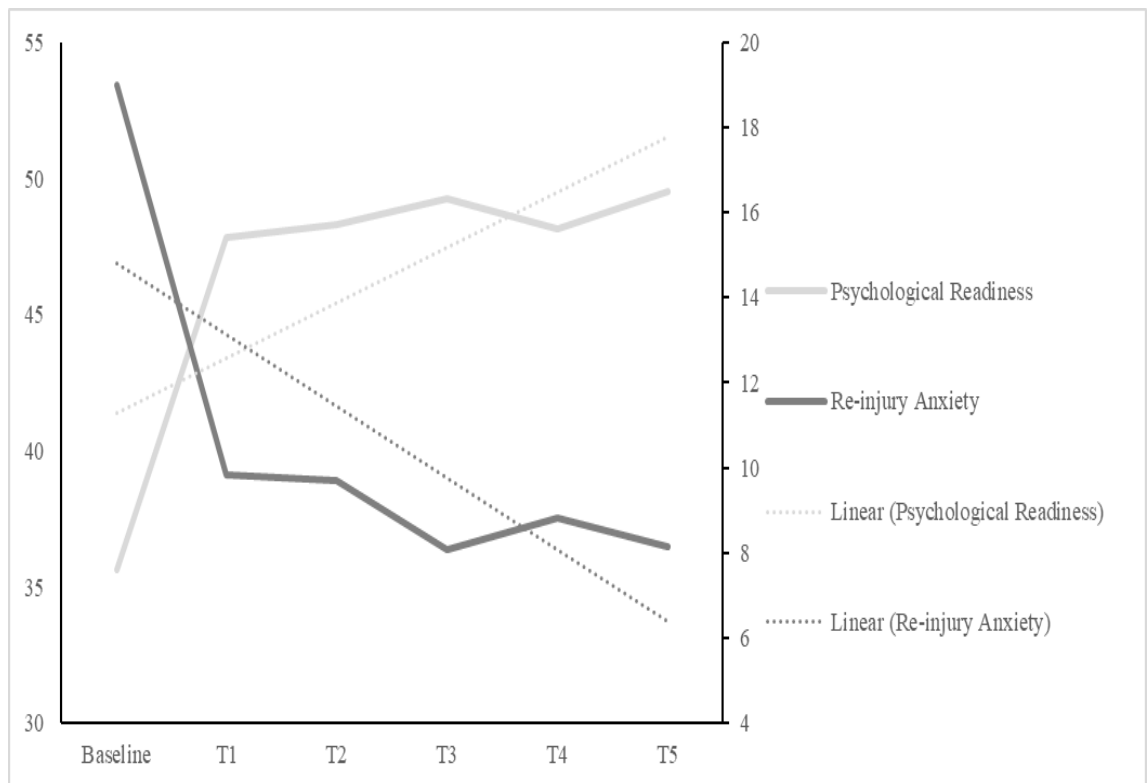


Figure 5.1. Fixed interval re-injury anxiety and psychological readiness to return to sport growth curve changes over time from measurement means. The broken lines indicate average trend data.

5.5.2 Growth Curve Modelling

The PP-LGCM including total perceived social support, re-injury anxiety, and psychological readiness to return to sport showed acceptable model fit: χ^2 ($df = 47$, $N = 68$, $SB = 1.04$) = 80.66, $p < 0.05$; RMSEA = 0.105 (90% CI = 0.06 - 0.14); CFI = 0.94; TFI = 0.93; SRMR = 0.07 (see Figure 5.2.). First, baseline total perceived social support was not significantly associated with the intercept (i.e., initial measurement) or slope (i.e., trajectory of change) of re-injury anxiety or psychological readiness to return to sport. Second, there was a significant negative, and large relationship between the intercepts of re-injury anxiety and psychological readiness to return to sport ($\beta = -.71$, p

= < .001). Third, from examining the intercept-slope relationship, there was a significant negative and medium association between the intercept of re-injury anxiety and the slope of re-injury anxiety ($\beta = -.41, p = < .05$), and a significant, positive and medium association between the intercept of psychological readiness to return to sport and the slope of re-injury anxiety ($\beta = .40, p = < .001$). This indicates, on average, a player with high re-injury anxiety will continue to experience anxiety, and a player with high psychological readiness will, over time, experience less re-injury anxiety. All other intercept-slope relationships were non-significant. Last, there was a significant, negative and medium relationship between the slope of re-injury anxiety and the slope of psychological readiness to return to sport ($\beta = .37, p = < .05$). This indicates a relationship between the two variables over time as a change in one, on average, changed the other.

5.6 Discussion

The main aims of this study were to: (i) examine the role of perceived social support during rehabilitation on re-injury anxiety and psychological readiness during return to sport following injury; and (ii) longitudinally examine the temporal nature of re-injury anxiety and psychological readiness to return to sport over time. In doing so this study extended previous research by examining the intercept-slope and slope-slope relationships between these variables over several timepoints using a PP-LGCM approach. Against our expectations, this study found that perceptions of social support during rehabilitation was not related to the intercept or slope of re-injury anxiety and psychological readiness during the return to sport.

Table 5.1. *Descriptive statistics, bivariate correlations and Cronbach's alpha*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Perceived social support											
2. T1 Re-injury anxiety	-.014										
3. T2 Re-injury anxiety	-.04	.93**									
4. T3 Re-injury anxiety	-.10	.79**	.86**								
5. T4 Re-injury anxiety	-.05	.83**	.88**	.90**							
6. T5 Re-injury anxiety	-.13	.75**	.80**	.87**	.89**						
7. T1 Psychological Readiness	.16	-.61**	-.54**	-.48**	-.45**	-.43**					
8. T2 Psychological Readiness	.15	-.73**	-.72**	-.66**	-.63**	-.60**	.84**				
9. T3 Psychological Readiness	.15	-.59**	-.60**	-.55**	-.54**	-.48**	.79**	.81**			
10. T4 Psychological Readiness	.09	-.63**	-.60**	-.58**	-.53**	-.50**	.69**	.75**	.76**		
11. T5 Psychological Readiness	.20	-.60**	-.60**	-.58**	-.57**	-.55**	.76**	.81**	.91**	.80**	
<i>M</i>	2.11	10.07	9.71	8.06	8.83	8.13	47.84	48.31	49.27	48.15	49.52
<i>SD</i>	0.91	7.91	8.74	7.81	8.18	7.29	9.78	11.26	9.98	11.24	10.39
Cronbach's alpha	.96	.90	.93	.92	.92	.92	.87	.93	.93	.94	.94

Note, $N = 68$. ** $p < .001$.

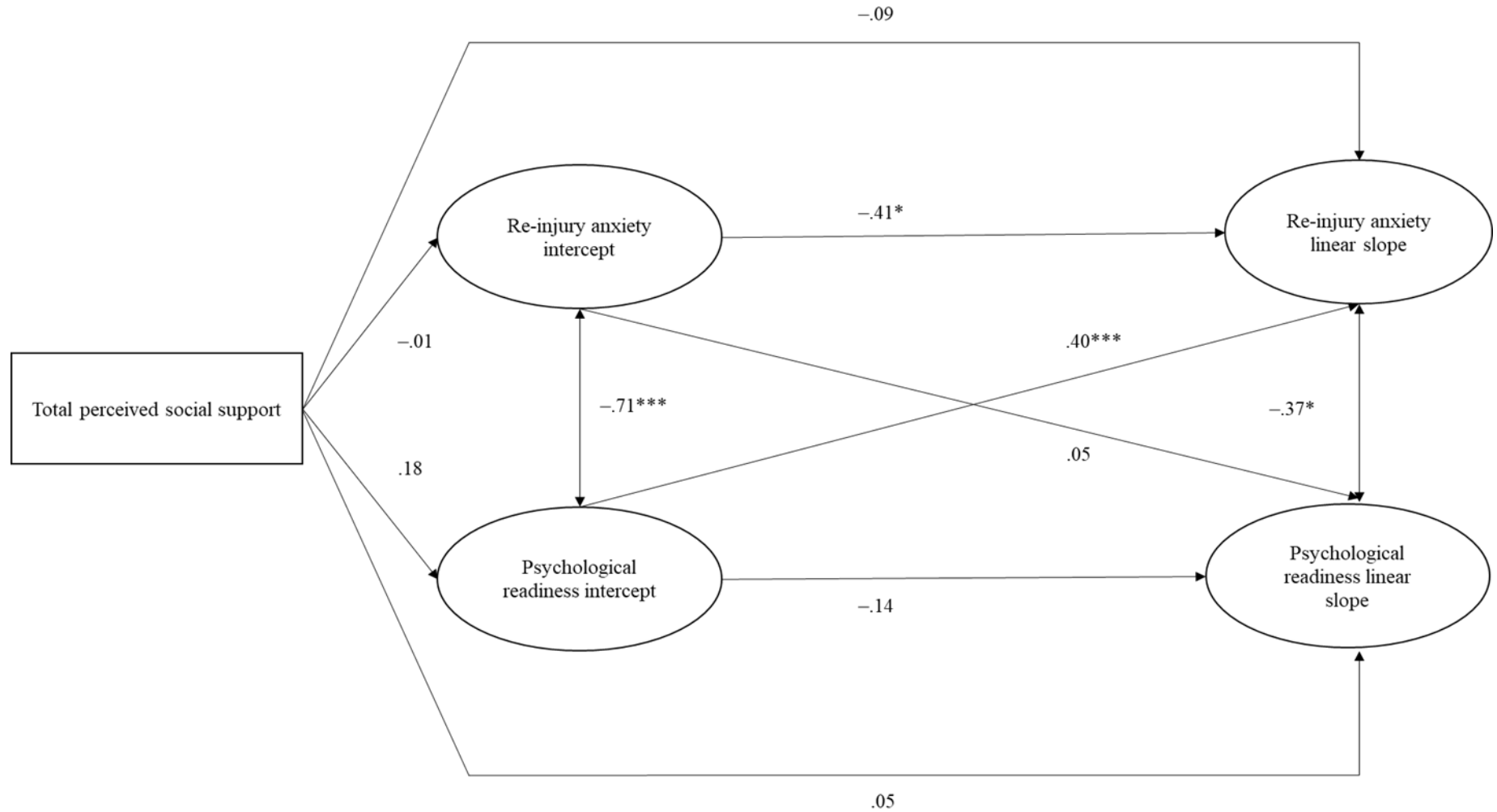


Figure 5.2. Conditional PP-LGCM of total perceived social support during rehabilitation on the intercept and linear slope of re-injury anxiety and psychological readiness to return to sport over time ($N = 68$). All coefficients are standardised correlations. $*p < .05$, $*** p < .001$.

5.6.1 Perceived Social Support and Changes in Psychological Readiness to Return to Sport and Re-Injury Anxiety

To date this is the first study to examine the psychological processes underpinning the perceived social support, re-injury anxiety and psychological readiness to return to sport relationship over time. According to process-based theoretical propositions (e.g., Brewer et al., 2002) a player's perception of social support during rehabilitation will influence the development of both re-injury anxiety and psychological readiness during return to sport. Study three found some provisional cross-sectional data to support this proposition. However, in this particular study a player's perceptions of social support during rehabilitation was not significantly associated with the initial or change measures of re-injury anxiety or psychological readiness to return to sport.

There may be two possible empirical explanations for this. First, the nature of the sample was different in this study. In study three the performance level was heterogenous, whereas in this study it was homogenous. Research indicates that sex and performance level may be one mediator in the effect of social support on outcomes (Rees, Mitchell, Evans & Hardy, 2010; Yang et al., 2010). It could be that the players in this study perceived and used social support differently to that of study three. Evidence for this can be seen in the groups mean for perceived social support between study three (3.58 ± 0.88) and the present study (2.11 ± 0.91). Second, although this study attempted to standardise the return to sport timeframe (i.e., returned to sport within the last 12 months) the reality was that players would have returned to sport more recently than others. Social support patterns may change throughout the return to sport process and also between injured and fully fit players (Carson & Polman, 2012; Yang et al., 2010). In other words, when returning to sport, social support seems important but becomes less so as the player becomes fully re-integrated back into sport (Yang et al, 2010). That

is, the recalled findings must not be taken as an exact representation of what transpired during rehabilitation but as the players recollections of social support activities and message that were important to them (Bianco, 2001). Therefore, the players who had recently returned to sport may have different and more current perspectives on the social support they experienced compared to those that had returned to sport for a prolonged period of time.

Non-significant findings such as these also indicate that other biological, psychological and socio-contextual factors may be important (Truong et al., 2020). For example, previous research has suggested other antecedents of re-injury anxiety (e.g., undergoing recovery again, nature of risk in pre-injury sport, personality, and the impact on social priorities, Ross, Clifford & Louw, 2017) and psychological readiness to return to sport (e.g., player perception of symptoms and function, pre-injury investment in sport, realistic expectations, and motivation, Podlog et al., 2015; Webster et al., 2018). Re-injury anxiety and psychological readiness are two variables thought to be important in the optimal return to sport therefore further understanding of how each variable may be developed or diminished may assist practitioners in supporting injured players more effectively (e.g., Ardern et al., 2016; Wadey et al., 2014).

5.6.2 Changes in Re-Injury Anxiety and Psychological Readiness to Return to Sport

This study provides several potentially important findings relating to the re-injury anxiety and psychological readiness relationship during the return to sport following injury. To encourage an optimal return to sport, players should be evaluated as being sufficiently psychologically ready with negligible anxiety over re-injury (see Ardern et al. 2016). Initially, the players in this study reported only moderate levels of psychological readiness to return to sport and moderate-low anxiety over re-injury (see Slagers et al., 2019b). According to research it is common for players to return to sport

without being psychologically reconditioned (e.g., in the form of restoring confidence) for extended periods of time after returning to sport (Phelan et al., 2019). As being psychologically underprepared is related to a number of negative consequences this is concerning (e.g., re-injury, underperformance, McPherson et al., 2019b; Webster et al., 2019). Therefore, practitioners working with injured players should use robust measures of psychological readiness and re-injury anxiety to inform return to sport decisions, and subsequently to monitor players response upon reintegration back into regular training and competition.

For a change in psychological readiness to be considered as clinically meaningful it should be greater than both the smallest detectable change (SDC) and minimal important difference (MIC; van Kampen et al., 2013). Using an anchor-based approach to calculate meaningful effects, Slagers and colleagues (2019b) found the MIC and SDC of the I-PRRS at a group level to be 0.9 and 1.1 respectively. The participants in this study, on average, increased their psychological readiness scores by 1.68 across the measurement time-points. As this figure is greater than the published SDC and MICV for the measurement instrument, this change even over a short time frame can be interpreted as being both important and significant (Slagers et al., 2019b). The extent of such changes in psychological readiness are important as a small change in psychological readiness has been found to predict long-term engagement in the pre-injury sport, re-injury, and function (McPherson et al., 2019b Zarzycki et al., 2017).

As expected, re-injury anxiety and psychological readiness to return to sport demonstrated a significant negative intercept-to-intercept and slope-to-slope relationships. This inverted relationship means that a player with reduced levels of re-injury anxiety will have greater psychological readiness to return to sport levels and vice versa. Both variables have been negatively associated in previous cross-sectional studies (e.g., Tripp et al., 2011). This study extends such findings by demonstrating that

linear changes in the re-injury anxiety and psychological readiness to return to sport relationship are related over time (i.e., both variables travel over time together, Stenling et al., 2017). This significant and negative relationship was interpreted as indicating that players, on average, with a greater reduction in re-injury anxiety over time, will have less of a change in psychological readiness to return to sport. As maintaining or improving psychological readiness to return to sport appears important (e.g., McPherson et al., 2019b; Zarzycki et al., 2018) understanding the influencing role of re-injury anxiety is potentially important. As such, practitioners should seek to target players with high levels of re-injury anxiety and provide specific evidence-based interventions (e.g., imagery training, Rodriguez, Marroquin & Crosby, 2018) in order to optimise psychological readiness in preparation for, and upon, return to sport.

Other findings were found from examining the intercept-to-slope relationships in the PP-LGCM. Such potentially important findings and inference derived from are only made possible due the longitudinal design this study adopted (Stenling et al., 2017). Specifically, this related to the significant negative intercept-to-slope relationship of re-injury anxiety, and the significant positive intercept-to-slope relationship between psychological readiness and re-injury anxiety. In the case of the intercept-to-slope relationship of re-injury anxiety, this was taken to mean that when the initial levels of re-injury anxiety were high there was a low level of change (i.e., less decline) over the measurement timepoints. In other words, players who return to sport with high levels of re-injury anxiety, on average, remain anxious over the prospect of re-injury. According to research, these players would be at greater risk of negative performance and injury outcomes (e.g., Ardern et al., 2012a; Ivarsson et al., 2017). Relating to the relationship between the intercept of psychological readiness and the slope of re-injury anxiety, this was taken to mean that when initials levels of psychological readiness were high there was a high level of change (i.e., greater decline) in re-injury anxiety over the

measurement timepoints. In other words, players that return to sport with high levels of psychological readiness, on average, will become less anxious over the prospect of re-injury. This finding compliments the growing evidence base suggesting the importance of optimising psychological readiness to enhance return to sport outcomes (e.g., McPherson et al., 2019a; Zarzycki et al., 2017). Together these would infer the importance of optimising a player's psychological status (i.e., low re-injury anxiety, high psychological readiness) prior to the point of returning to sport in order to have an optimal return to sport.

5.6.3 Applied implications

In light of the aforementioned findings of the study there are two practical implications to be considered. First, injured players' re-injury anxiety and psychological readiness to return to sport should be routinely screened and monitored by a competent practitioner (see Forsdyke et al., 2017). The information from this should then be used in shared decision making throughout the return to sport process (Ardern et al., 2016). This appears particularly important at the point of return to sport as this seems indicative of what to expect over time (i.e., a player returning to sport psychologically underprepared, on average, will remain so). Given the modest amount of research aiming to establish the psychometric properties of relevant measures this is challenging (e.g., ACL-RSI, SIRSI, I-PRRS, RIAI; Forsdyke et al., 2017). For example, despite some measures stating clinical thresholds to inform decisions, what represents a "meaningful" change is an area requiring development in research informed practice (i.e., to distinguish real change from measurement error). While Slagers and colleagues (2019b) have provided some provisional data relating to the I-PRRS and ACL-RSI to inform decision making, further research focussing on indicators of MIC, SDC and standard error of measurement (SEM) for all other relevant measures is required. Secondly, when players with low level of psychological readiness and/ or high level of

re-injury anxiety are identified evidence-informed interventions should be adopted. This would be done to facilitate important change in psychological status. Sports injury practitioners are thought well placed to offer such psychological support or refer to a sports psychologist (Heaney, 2006). Specific interventions may include imagery, goal setting, counselling, and written disclosure (Brewer, 2010; Schwab Reese, Pittsinger & Yang, 2012). By implementing well-designed interventions aimed at increasing psychosocial readiness and attenuating re-injury anxiety may enable players to optimally return to sport (Cupal, 1998; Gledhill et al., 2018).

5.6.4 Study limitations and future research

The present study has several limitations. One potential limitation of this study is the proximity of the measurement timepoints. This allowed us to examine the realistic day-to-day fluctuations in re-injury anxiety and psychological readiness that challenge players and practitioners. This study found only marginal change in these latent variables over the fixed time intervals. This may have been because these variables demonstrate limited change over time or the responsiveness of the measures to detect change. Future research may consider collecting such data across return to sport using weeks as opposed to day intervals, which may provide more responsive data and highlight further interesting results. Another limitation is that the sample this study used only consisted of adult male academy football players. Whereas pragmatically this allowed us to maintain an adequate sample size across the measurement time-points, this precludes how the results can then be directly generalised to other previously injured populations (e.g., women, youth performers, individual sports). An additional limitation refers to the extent that the study sample represents the population under examination (i.e., previously injured male academy football players that had returned to football). Restricting recruit and sampling to a single cohort means that there was an unequal chance of being sampled. As such, individuals that could have taken part but

chose not to or from other cohorts may have contributed different data. Future research may want to adopt a multiple cohort design in order to address this bias. Finally, this study did not account for other confounding variables which may have affected the direction and strength of the relationship between the observed variables (e.g., injury type, injury severity). Further research with homogeneity of rehabilitation length, injury nature, and time lost from return to sport to measurement may elucidate additional findings.

5.7 Conclusion

This study longitudinally examined perceived social support during rehabilitation, re-injury anxiety and psychological readiness over time. It was found that re-injury anxiety and psychological readiness to return to sport are significantly related and that this relationship travels over time. Additionally, initial levels of re-injury anxiety were found to negatively predict growth of re-injury over time and initial level of psychological readiness positively predicted growth of re-injury anxiety over time. Taken together, these findings infer practitioners should ensure players have low levels of re-injury anxiety and high psychological readiness levels (i.e., in the form of injury-related confidence) at the point of return to sport in order to optimise return to sport outcomes.

6.0 Chapter Six

General Discussion and Conclusions

6.1 Aim of Chapter Six

The aims of the general discussion section in a thesis are to: (i) draw together findings of the studies; (ii) examine whether the aims of the thesis have been achieved; (iii) emphasise the contribution to human knowledge; (iv) develop applied practical recommendations; (v) explain potential limitations of the thesis; and (vi) suggest possible avenues for future research in order to further extend the field of research (Oliver, 2014). Additionally, as a mixed methods thesis the discussion serves as the interface between the qualitatively and quantitatively derived findings from the programme of study in order to provide a meta-inference of overall findings (Creswell, 2007). Considering this, chapter six is structured using several sub-headings: (1) drawing the thesis together; (2) discussion of research aim one; (3) discussion of research aim two; (4) discussion of research aim three; (5) meta-inference of findings; (6) theoretical implications of research; (7) applied implications of the research; (8) research strengths and limitations; (9) future research directions; and (10) concluding remarks. By doing it is hoped the reader can gain an informed and aggregated perspective over the potential contribution of this programme of study to research and practice.

6.2 Drawing the Thesis Together

The overall purpose of this body of work was to study the relationship between psychosocial factors and return to sport outcomes in the context of football. By doing so, this thesis has the potential to better inform return to sport practices and augment the return to sport outcomes for injured football players. The purpose of the thesis was underpinned by three main research aims. The first was to evaluate the theoretical underpinnings and empirical research on psychosocial factors and return to sport outcomes in football. The second was to explore how psychosocial factors are associated with return to sport outcomes in football from the player's own perspective. The last aim was to examine the relationship between psychosocial factors and return to sport outcomes in football. Four studies were conducted in the thesis in order to systematically address these research aims. This thesis began relatively broadly by examining psychosocial factors and return to sport outcomes (i.e., in studies one and two) becoming more focused on specific factors (i.e., in studies three and four). In particular, towards the latter part of the thesis the studies are centred on the perceived social support, re-injury anxiety and psychological readiness to return to sport relationship. This combination of variables has not been investigated previously, and as such this thesis contains a number of original and potentially important findings that may incrementally extend the literature on psychology of sports injury.

Overall, the novel findings provided by this thesis offer a contribution to the literature and applied practice by: (1) suggesting that perceived social support and re-injury anxiety are potentially important psychosocial factors that are related to return to sport outcomes; (2) enabling further conceptual and contextual understanding regarding the role of perceived social support during the return to sport process; (3) providing further conceptual understanding of psychological readiness to return to sport and how this can be developed or diminished over time via its relationship with social support

and re-injury anxiety; and (4) providing both amended and new frameworks that can be used for future research and practice in order to optimise return to sport outcomes following injury in football. Commensurate with the mixed methods approach to the thesis, the general discussion represents a meta-inference of the aggregated results from studies adopting different methods in order to provide convergent overall findings (Creswell, 2007).

6.3 Discussion of the Research Aims of the Thesis

6.3.1 Discussion of Research Aim One

The first research aim was to evaluate the theoretical underpinnings and empirical research on psychosocial factors and return to sport outcomes in football. This aim was jointly addressed by chapter one and study one. Whereas chapter one evaluated the current theoretical underpinning, study one evaluated the current empirical research. Chapter one provided a narrative review aiming to explain and critique the various theoretical underpinnings which outlined how psychosocial factors may impact upon return to sport outcomes. The findings of this narrative chapter highlighted several important points. First, there are several predominant domain and non-domain specific theoretical approaches to explain how psychosocial factors may impact upon return to sport outcomes. The most prominent of these in the literature are cognitive appraisal-based approaches (e.g., the integrated model of response to sport injury and rehabilitation process, Wiese-Bjornstal et al., 1998) and biopsychosocial-based approaches (e.g., the biopsychosocial model of sport injury rehabilitation, Brewer et al., 2002). Second, while theoretical underpinning exists in this area, there is limited empirical evidence to validate the processes identified in these studies (Brewer, 2010; Williams et al., 2020). For example, both the integrated model and biopsychosocial models contain many complex processes and exemplar psychosocial factors, so it is not feasible to investigate them as a whole. As a result, one perspective is that these

underpinnings provide little more than macro-level frameworks to be used as starting points for theoretical thinking (Podlog & Eklund, 2007). Finally, in light of the previous points, the study of psychosocial factors and return to sport outcomes can be viewed as a growing but theoretically under-developed research area (Brewer, 2010; Santi, 2013). Once the theoretical underpinning to the topic was evaluated, the logical next step was to evaluate the indications of the current empirical evidence.

In order to evaluate the empirical evidence, as indicated in the first research aim, study one was conducted. Study one was a systematic review entitled: '*Psychosocial Factors Associated with Sports Injury Outcomes in Competitive Athletes: A Mixed Studies Systematic Review*'. The specific aim of study one was to examine the association between psychosocial factors and sports injury outcomes in competitive athletes. Study one extended previous systematically reviewed evidence (e.g., Ardern et al., 2013a; te Wierke et al., 2013) by including all sports injuries (i.e., not just one injury such as ACL injury) and all relevant studies regardless of methodology and methods (i.e., qualitative, quantitative, mixed methods). As such, study one was able to provide a more comprehensive account of the empirical research with greater utility of transferring findings to practice compared to previous reviews that only include mono-method studies (e.g., Ardern et al., 2013a; Teddlie & Tashikkori, 2012). The important finding of study one was that psychosocial factors (emotion-related, cognition-related, and behaviour-related) were associated with a variety of perceived and actual sports injury outcomes. In other words, how a player feels, thinks, and behaves during the return to sport process appear to be prognostic factors of sports injury outcomes.

Of several additional findings of the systematic review, two findings appeared to have potential importance for research and practice. First, this study extended the conceptual understanding of psychological readiness to return to sport in relation to: (i) its inherent features; (ii) its potential importance in affecting other sports injury

outcomes; and (iii) the factors that may develop psychological readiness. Using the corresponding evidence, psychological readiness to return to sport was interpreted as being a product of fear/anxiety and confidence in remaining injury-free and performing well (i.e., it appears to be multidimensional and multifaceted). Prior to conducting this systematic review, a working empirical understanding of the concept was unclear despite previous studies inferring its importance in optimising return to sport outcome (e.g., Ardern et al., 2014a; Udry, Shelbourne & Gray, 2003).

A second pertinent finding was that an athlete's perceptions of social support afforded by key stakeholders was one behaviour-related factor that may, in part, contribute to the development of sports injury outcomes, and in particular psychological readiness to return to sport. This interpretation was made on the basis of perceived social support being consistently associated with anxiety and confidence in the included studies. This finding has support in theory (e.g., Brewer et al., 2002; Wiese-Bjornstal et al., 1998) and current research (e.g., Ardern et al., 2013b; Truong et al., 2020). Together the findings of chapter one and study one indicated that certain psychosocial factors might be important, but the underlying processes are unclear, and these reasons collectively formed the foundations for the exploratory nature of second research aim of the thesis.

6.3.2 Discussion of Research Aim Two

Building on research aim one, the second research aim was to explore how psychosocial factors are associated with return to sport outcomes in football from the player's own perspective. In other words, the focus was on further understanding the psychological processes underpinning the relationship between psychosocial factors and return to sport outcomes by exploring player-level experiences of injury and return to sport (Slade, Patel, Underwood & Keating, 2018). The second research aim was addressed by study two. Despite *a priori* knowledge about the potential importance of

psychosocial factors, this study intended to explore whether this could be interpreted from qualitatively derived data while also exploring potential causal mechanisms. Although the initial intention was an exploration of psychosocial factors, social support was interpreted as the predominant psychosocial factor that players spoke about, and as such the study iteratively became focussed on social support. Consequently, the specific aim of study two was to explore whether perceptions of social support during injury are viewed as important and how these perceptions may relate to return to sport outcomes in international female football players following injury.

Several potentially important findings were interpreted from the qualitative data and constructed into an explanatory thematic map (see Figure 3.1). The important findings of the study were that: (i) the social support process is influenced by several contextual factors; (ii) that a player's perceptions of high or low-level social support during the injury process are formed from the interface of availability and quality of support; and (iii) that perceptions of social support influence return to sport outcomes by modulating the player's experience of the injury process. Collectively, the findings of this study provided some further empirical support to theoretical frameworks and the current body of research, while also providing new findings (Brewer et al., 2002; Corbillon et al., 2008; Rees et al., 2010). For example, from a theoretical perspective, the explanatory thematic map constructed in this study supports one previously unexamined proposition from the biopsychosocial model by indicating that socio-contextual factors, such as social support, may influence return to sport outcomes (e.g., psychological readiness) mediated via psychological factors (e.g., injury anxiety; Brewer et al., 2002). Generally, previous research has only related perceived social support to emotional responses (e.g., Covassin et al., 2014; Rees et al., 2010). Therefore, relating perceived social support to return to sport outcomes and proposing a potential mechanism of effect was an important finding of the study.

Some additional findings of the study may also have some conceptual and applied importance. This study provided some further conceptual understanding of social support in a football injury context. Whereas previous research has found that many providers of social support may be available to players (e.g., Yang et al., 2010) there is a paucity of research in this area attempting to characterise the indicators of high-quality social support. The findings from the study suggest perceived social support is the interface between availability and quality, and the larger the interface the higher the level of support. Moreover, indicators of high-level support were indicated to be player-centred, cohesive and coherent. One contextual factor influencing social support was the pre-injury relationship between support provider and player. This is a potentially important finding as it implies that sports teams can adopt a proactive approach to supporting injured players by fostering positive pre-injury relationships. According to the thematic map, such an approach would mean that injured players have a greater chance of experiencing high-level support.

In all, study two built on study one, and hence served to provide some deeper contextual understanding and exploratory pathways behind how perceived social support may influence sports injury outcomes such as psychological readiness. The natural next step was to quantitatively examine these interpreted propositions and determine whether these could be transferred to a wider football population.

6.3.3 Discussion of Research Aim Three

The third research aim was to examine the relationship between psychosocial factors and return to sport outcomes in football. This research aim was jointly addressed by studies three and four. Study three specifically aimed to further examine the role of perceived social support in psychological readiness to return to sport following injury in football players, and whether this relationship was mediated by re-injury anxiety. The specific aim of study four was to longitudinally examine the role of perceived social

support on re-injury anxiety and psychological readiness during return to sport following injury. By doing so these studies examined the main causal proposition in the explanatory thematic map constructed in study two in a broader football context, and previously untested propositions from the biopsychosocial model of sport injury rehabilitation (Brewer et al., 2002). Taken together, both of these studies allowed a cross-sectional and longitudinal examination of the relationship between perceived social support and psychological readiness to return to sport. For example, at a specific time point, it was useful to determine the process underpinning the social support and psychological readiness relationship (i.e., association) and subsequently how this relationship changes over several time points (i.e., temporality). By taking this approach, the last research aim aligns with published recommendations for any future research attempting to progress this field of research (e.g., Brewer, 2010; Cornelius et al., 2007; Williams et al., 2020).

The findings from study three were that perceived social support was a significant positive predictor of psychological readiness to return to sport, and that this relationship can be partly explained by the mediating role of re-injury anxiety. In other words, an injured player with perceptions of high-level available social support during the injury process will experience less re-injury anxiety, and consequently will be more psychologically ready to return to sport following injury. However, even after accounting for the mediating role of re-injury anxiety, the variance in the relationship was not fully explained. Therefore, other possible mediating factors may also need to be considered (e.g., adherence, motivation, kinesiphobia; Truong et al., 2020). The findings of study three provided some provisional empirical support to the explanatory thematic map constructed in study two and previously untested propositions within theoretical frameworks. For example, in the biopsychosocial model (Brewer et al., 2002) a path exists between socio-contextual factors and return to sport outcomes

mediated by psychological factors. Although this particular framework contains a range of suggested exemplar factors, perceptions of social support, re-injury anxiety and psychological readiness are not specifically referred to. From an empirical perspective this process makes sense as previous research indicates that social support is associated with re-injury anxiety (e.g., Lentz et al., 2015) and that re-injury anxiety is associated with return to sport outcomes such as psychological readiness (e.g., Meierbachtol et al., 2018). However, until study three was conducted, no other study has previously examined this pathway in full.

In light of the findings and limitations of study three, study four adopted a more longitudinal approach. Therefore, this study was able to examine the process interpreted in study two and then examined cross-sectionally in study three from a longitudinal perspective, to better understand the developmental nature and temporality of relationships (Cornelius et al., 2007). As such, studying perceived social support with the experience of re-injury anxiety during re-entry into sport and psychological readiness to return to sport over time uncovered several important findings. First, against expectations the overall perceptions of social support (i.e., total perceived available support) experienced during rehabilitation was not significantly related to the intercept or slope of re-injury anxiety or psychological readiness to return to sport, albeit the direction of the relationship was as expected. In studies two and three, perceived social support was either interpreted or confirmed as sharing a significant relationship with both re-injury and psychological readiness. Therefore, at face value this suggests other psychosocial or biological factors may also be important in affecting psychological readiness beyond or additional to perceived social support. Second, the intercepts and slopes of re-injury anxiety and psychological readiness to return to sport were significantly related. This finding indicates that, on average, players with high psychological readiness will experience less re-injury when returning to sport, and that

this relationship travels across time together. Third, the intercept of psychological readiness and the slope of re-injury anxiety were significantly related. This indicates that, on average, when players return to sport with high psychological readiness they become less anxious about re-injury over time. Finally, the intercept of re-injury anxiety and the slope of re-injury anxiety was significantly related. This means that when re-injury anxiety levels are high at the point of returning to sport there is a limited change in re-injury anxiety over time. In other words, players who return to sport experiencing high levels of re-injury can expect to keep on experiencing re-injury anxiety over time.

One further and potentially important finding, which was first found in study two but subsequently also in studies three and four, was that players had returned to sport when they were psychologically underprepared. In study two, even though players had since returned to competitive sport, they spoke of a lack of post-injury confidence and anxiety over re-injury, thus indicating that they still weren't psychologically ready. Additionally, in studies three and four players reported possessing only moderate levels of psychological readiness despite having returned to sport following their injury (37.02 and 47.84 respectively; Slagers et al., 2019a). The psychological "under preparedness" of players to return to sport is thought to be common and players may not be psychologically ready even after months of returning to training and competition. For example, in a study of 499 athletes with ACL injuries psychological readiness to return to sport scores were depressed even after nine months of returning to sport (Phelan et al., 2019). The potentially important point is that players may then be predisposed to several negative consequences such as re-injury and below standard performance for a prolonged period following return to pre-injury sport (e.g., Kitaguchi et al., 2019; McPherson et al., 2019b). Therefore, these findings provide a positive call for practitioners to make return to sport decisions considering the psychological readiness of players.

6.3.4 Meta-inference of Findings

Coherent with the mixed methods approach adopted by this thesis, after discussing how each research aim was systematically met, it is also important to provide a meta-inference of the overall findings produced after conducting studies with different methodologies and methods (Creswell, 2007; Tashakkori & Teddlie, 2008). In addressing the main purpose of the thesis and as a collective programme of study, this thesis uncovers several novel and potentially important findings. As such the findings of the thesis have the potential to offer an incremental contribution to the research area by (1) suggesting that perceived social support and re-injury anxiety are potentially important psychosocial factors that are related to return to sport outcomes; (2) enabling further conceptual and contextual understanding regarding the role of perceived social support during the return to sport process; (3) providing further conceptual understanding of psychological readiness to return to sport and how this can be developed or diminished over time via its relationship with social support and re-injury anxiety; and (4) providing both amended and new frameworks that can be used for future research and practice in order to optimise return to sport outcomes following injury in football.

First, after conducting a systematic review of the empirical evidence and three empirical studies, perceived social support appears to be one potentially important psychosocial factor associated with return to sport outcomes. Further to this, the perceived social support – return to sport outcome relationship can, in part, be explained by re-injury anxiety. This particular finding is noteworthy from a theoretical and empirical perspective. This finding lends some provisional empirical support to previously unexamined pathways in domain specific theoretical frameworks, while also providing new exemplar content for consideration (e.g., the biopsychosocial model; Brewer et al., 2002) and further empirical support that perceived social support will

influence health outcomes through its relationship with stress (Bianco & Eklund, 2001). From an empirical perspective, there is limited research extending the impact of perceived social support to discernible sports injury outcomes. Alternatively, most research tends to examine the relationship between social support and stress-based responses (e.g., Mitchell et al., 2014; Rees et al., 2010). Therefore, this thesis provides some provisional evidence to the potential prognostic importance of perceived social support in attenuating the experience of re-injury anxiety and as such enhance psychological readiness to return to sport.

Second, the collective findings of the thesis provide a greater conceptual and contextual understanding of perceived social support. The findings indicate that several contextual factors may influence perceived social support: (i) pre-injury and injury provider and player relationship; (ii) sociocultural demands of the environment; and (iii) provider and player characteristics. Previous conceptual commentaries have noted a similar sentiment, but these factors have never been empirically examined in a specific context (Bianco & Eklund, 2001). The nature of perceived social support and the indicators of high or low-level perceptions are not well understood in a sport injury context. The findings of this thesis provide some conceptual development. In particular, perception of social support seems to be formed by the interface of availability and quality. The larger the interface or cross-over between the two, the more positive the perceptions would be. Additionally, high-level social support was perceived when social support was viewed as player-centred, cohesive and coherent. Although micro-level indicators of high-level support are noted in other domains (Maciak et al., 2018), empirically grounded indicators in a contemporary sports injury context have not been previously identified.

This thesis provides further conceptual understanding of psychological readiness to return to sport. Throughout the studies included in the thesis, psychological readiness

appears to be an important return to sport outcome. For example, in studies one and two this was interpreted from the data and consequently in studies three and four the factors that may develop psychological readiness were examined. Previous research has centred on the importance of these factors in predicting other higher-level return to sport outcomes such as re-injury and return to pre-injury levels of performance without necessarily developing further conceptual understanding (e.g., Ishøi et al., 2018; McPherson et al., 2019b). The findings of the thesis build on current conceptual understandings by suggesting that psychological readiness to return to sport is multidimensional (i.e., performance and re-injury) and multifaceted (i.e., a function of confidence and anxiety). Furthermore, based on the data from studies three and four, re-injury anxiety and psychological readiness are two inextricably linked variables that are related at any given timepoint and travel with each other over time. This thesis also provides some further understanding about how psychological readiness maybe developed or diminished. Although research exists on the factors that may develop psychological readiness (e.g., Podlog et al., 2015; Webster et al., 2018), no other study has directly found perceptions of social support to be one such factor. Although most findings from the thesis point to a player's perceptions of social support being an antecedent of psychological readiness, owing to the non-significant results from study four, it should be viewed as one of several possible antecedents. Examples of other antecedents to psychosocial readiness may be found in theory and research. For example, in a recent scoping review of 77 studies, several other psychological (e.g., autonomy, expectations), social (e.g., engagement in care), and contextual factors (e.g., rehabilitation environment, sport culture) were highlighted as being important during the recovery stages from injury that may influence sport injury outcomes (Truong et al., 2020). If psychological readiness is to be considered a clinically relevant return to sport outcome, further conceptual understanding such as provided in this thesis is important.

Finally, this thesis provides both amended and new frameworks that can be used for future research and practice. The variables that this thesis focuses on have not been investigated together and hence the collective findings provide further empirical support to the wider body of literature while highlighting new and potentially clinically relevant lines of enquiry. When addressing research aims one and two, novel frameworks have been constructed from evidence found in the four studies and the broader literature (e.g., see Figure 1.2 quadrants of optimal readiness to return to sport, hierarchical diagram of return to sport outcomes, see Figure 3.1 explanatory thematic map of perceived social support processes and return to sport outcomes). These novel frameworks provide a useful starting point for further research. Additionally, the principle sentiments of the thematic map constructed in study two and further examined in studies three and four provide some support for previously untested processes found in existing frameworks (e.g., biopsychosocial model). The predominant frameworks in this topic were originally created based on a now outdated evidence base. Therefore, finding a relationship between perceived social support and psychological readiness, mediated by re-injury anxiety has the potential to revise and refresh some of theoretical thinking in this area. For example, in the current biopsychosocial model, perceived social support, re-injury anxiety and psychological readiness are not specifically referred to.

In regard to sport injury practice, recognising and examining the psychosocial element of return to sport is not commonplace (Burgi et al., 2019). Therefore, the findings of this thesis offer a contribution by providing several empirically grounded practice-focussed strategies aimed at optimising return to sport outcomes. Together, these strategies may provide a heuristic focusing on: (i) routinely monitoring and improving perceptions of social support; (ii) routinely monitoring and reducing re-injury anxiety; and (iii) the routine monitoring of psychological readiness to inform decisions before and for a period of time following, return to sport. A logical next step

for future research would be to examine the “real world” effectiveness of such strategies.

In summary, from the four studies included in this thesis it can be theorised that: (i) a player’s perception of social support is one factor that is related to psychological readiness to return to sport (but may not be the only antecedent); (ii) this relationship can be partly explained by a player’s experience of re-injury anxiety during rehabilitation (but other mediating factors may also be important); and (iii) re-injury anxiety and psychological readiness to return to sport appear to be two related variables both cross-sectionally and more longitudinally. Together these should form part of the interdisciplinary return to sport decision making process and may require ongoing screening and monitoring upon discharge to a full return to sport.

6.4 Theoretical Implications of the Research

Compared with other areas of sports medicine or sports psychology the theoretical underpinning of how psychosocial factors may determine return to sport outcomes is in its infancy (Brewer, 2010; Truong et al. 2020). Often, theoretical frameworks within this context are extremely complex and as such are therefore impossible to fully examine (e.g., the integrated model, the biopsychosocial model). In particular, these prominent frameworks tend to suggest large amounts of exemplar factors which frequently lack sufficient detail and include many empirically untested pathways. From existing theory, it is difficult to ascertain which psychosocial factors are most important and also the underpinning processes of effect are. The predominant theoretical frameworks in this area are around 20 years old, and as such the evidence and context originally informing them has changed. Sport and exercise medical approaches to the diagnosis, treatment, and rehabilitation have progressed rapidly (e.g.,

diagnostic scanning capabilities, use of biological regenerative therapies, use global positioning systems). Therefore, the findings of this thesis may offer some refreshed theoretical thinking, grounded in a modern sports injury context.

This thesis predominantly adopts the biopsychosocial model of sports injury rehabilitation (Brewer et al., 2002) as the chief framework because of its credibility in modern sport and exercise medicine practice and because it provides a more complete return to sport framework by considering psychosocial and physical factors (Brewer et al., 2002; Santi, 2013). There are several theoretical implications of the thesis findings, and as such this thesis offers some potential expansion to the current theoretical underpinning of this topic.

Collectively, the studies included in this thesis provide some supporting evidence to the notion that perceived social support may be one important factor related to return to sport outcomes. In the biopsychosocial model of sports injury rehabilitation (Brewer et al., 2002) social support is identified as one of several social and contextual factors that may influence a range of sport injury rehabilitation outcomes via a mediated relationship with several psychological factors. The collective findings from this thesis provide some tentative support for this proposition and consequently indicate that perceived social support is a worthy consideration in augmenting an optimal return to sport in a football context. This thesis offers an incremental theoretical contribution to the literature is by providing an increased depth and clarity concerning the potential role of perceived social support.

Currently, in the biopsychosocial model, social support is identified using the term “social network”. According to the thesis findings and the broader research on this topic, this term is generally poorly defined and under-represents the complexity of social support during the return to sport process in several ways (e.g., Bianco & Eklund, 2001; Brewer, 2010). First, the term social network implies that there is a linkage of

social interactions and personal relationships around a player that may or may not provide social support, and which may in fact serve functions other than supporting the player (Ferlander, 2007). Second, the term social network implies that the larger the actual network (i.e., more available support providers), the greater the prospect of the player having enhanced return to sport outcomes. This thesis provides some evidence that while having a large availability of social support is desirable, it does not necessarily mean players will perceive that the support meets their needs, and as such may not lead to more successful return to sport outcomes. Third, social network may adequately capture the more structural and actual features of social support but fails to address the more perceptual features (Bianco & Eklund, 2001). This is important as the perceptual elements of social support are more consistently related with health outcomes (Goodwin, Costa, & Adonu, 2004; Stevens, Cruwys & Murray, 2020). Finally, the findings of this thesis contend that it is the interface between perceptions of availability and quality of social support relative to a player's needs that is important, and not purely the size of the social network. In a conceptual commentary, Bianco and Eklund (2001) also argue this might be the case, referring to it as "sense of support", although the empirical evidence in this area appears to have largely ignored this phrasing. Accordingly, in line with the thesis findings, a more appropriate term to might be "perceptions of social support".

Drawing on the biopsychosocial model, the psychological factors that may influence sports injury rehabilitation outcomes are central to influencing intermediate and sport injury outcomes (Brewer et al., 2002). However, there is little indication as to which psychological factors might be particularly important in mediating the "social network" – sports injury rehabilitation outcome relationship. For example, the framework refers to reductionist groupings of psychological factors such as personality, affect, cognitions, and behaviours. This thesis found that re-injury anxiety (i.e.,

apprehension, concerns and tension over re-injury) is one psychological factor that may be important in influencing return to sport outcomes. The thesis findings together, with other contemporary empirical work, highlights a need for these potentially salient psychological factors, such as re-injury anxiety, to have a presence in theoretical frameworks (e.g., Wadey et al., 2014). The alternative is that these potentially important factors requiring further research or consideration in applied practice (e.g., monitoring of the players re-injury anxiety status) are forgotten and underdeveloped. As such, this is a positive call for exemplar content in the theoretical frameworks to be refreshed in light of contemporary findings.

Throughout the thesis, psychological readiness was the predominant return to sport outcome firstly interpreted in studies one and two, and then examined as a dependent variable in studies three and four. In view of this, the findings provide two provisional theoretical advancements. First, despite the recent growth (from 2014 onwards) in popularity of the study of psychological readiness to return to sport (e.g., Ardern et al., 2014a) and several measures of psychological readiness being available (e.g., ACL-RSI, SIRSI, I-PRRS), this term is not adequately accounted for in prominent domain specific underpinnings. For example, the biopsychosocial model simply refers to “readiness to return to sport”. It is not clearly delineated whether this refers to being physically ready, psychologically ready or both. Not clarifying this term effectively in the model has the potential to restrict understanding of how psychological readiness may be developed and understating it as a potentially important return to sport outcome requiring further research and practical consideration. Second, in the prominent frameworks in this area such as the biopsychological model of sports injury rehabilitation (Brewer et al., 2002) and the integrated model of response to sport injury and rehabilitation process (Wiese-Bjornstal et al., 1998), the position of psychological readiness as an outcome is unclear. Given the findings from this thesis and the growing

empirical evidence relating to psychological readiness, it should be seen as an important cognitive/affective sports injury rehabilitation outcome providing a platform for returning to sport at a comparable performance level and remaining injury free (e.g., McPherson et al., 2019b; Webster & Feller, 2018). In order to progress theoretical thinking, the position of psychological readiness in relation to other return to sport outcomes should be clarified. To this extent, theoretical frameworks in this area should be refreshed to specifically refer to psychological readiness in addition to physical readiness.

In summary, this theoretical implication section highlights a broader need for theoretical frameworks in this area to be revisited or combined with others in a multi-theory approach (Hagger, 2009). Most of these frameworks are now round 20 years old (e.g., the biopsychosocial model of sports injury rehabilitation, the integrated model of response to sport injury and rehabilitation process) and need refinement in order to better reflect the growing evidence base within this area (i.e., new concepts, contemporary context). Adopting a multi-theory approach could unify the strengths from concepts and processes from multiple theories and frameworks in order to address the limitations of the individual frameworks and provide a more complete explanation of psychosocial factors and return to sport outcomes (Chan et al., 2012). In one example Chan and colleagues (2017) propose integrating self-determination theory and the theory of planned behaviour to more comprehensively explain motivational processes that relate to health-related behaviours and outcomes. In regard to the foci of this thesis, by integrating social support theory (i.e., palliative and preventative stress processes) with the biopsychosocial model (Brewer et al., 2002) may provide a more comprehensive explanation of how perceived social support may predict psychological readiness to return to sport. Throughout the process of writing this thesis, domain general social support theory frequently failed to be adequately sensitive to the sports

injury context, while domain specific theoretical frameworks such as the biopsychosocial model lacked specific detail on particular variables and processes. As such, a multi-theory approach may help to better understand psychosocial factors and return to sport outcomes in the future.

Against the background of the empirical findings from the thesis, contemporary evidence and expert perspectives in this field, “new” additional content is proposed to the biopsychosocial model of sport injury rehabilitation in Figure 6.1 (e.g., Ardern et al., 2016; Ishøi et al., 2018; Webster et al., 2019). The new additional content reflects the concepts that: (i) perceptions of social support may be an important socio-contextual factor; (ii) re-injury anxiety appears to be one important affective psychological factor associated with sports injury rehabilitation outcomes (i.e., psychological readiness to return to sport); (iii) readiness to return to sport should be separated out to recognise the psychological and physical elements; and (iv) that intermediate sports injury rehabilitation outcomes such as psychological and physical readiness to return to sport are associated with return to sport outcomes. Conceptually, using different terms together with new potentially important psychosocial factors and return to sport outcomes informed by empirical data may allow the theoretical underpinning to move in a more mature direction (Brewer, 2010). As presented, these revisions may better reflect modern sport and exercise medicine perspectives (e.g., the Bern Consensus Statement on Return to Sport, Ardern et al., 2016). In turn, this may provide exciting new lines of research inquiry and strategies to better manage return to sport outcomes in football players.

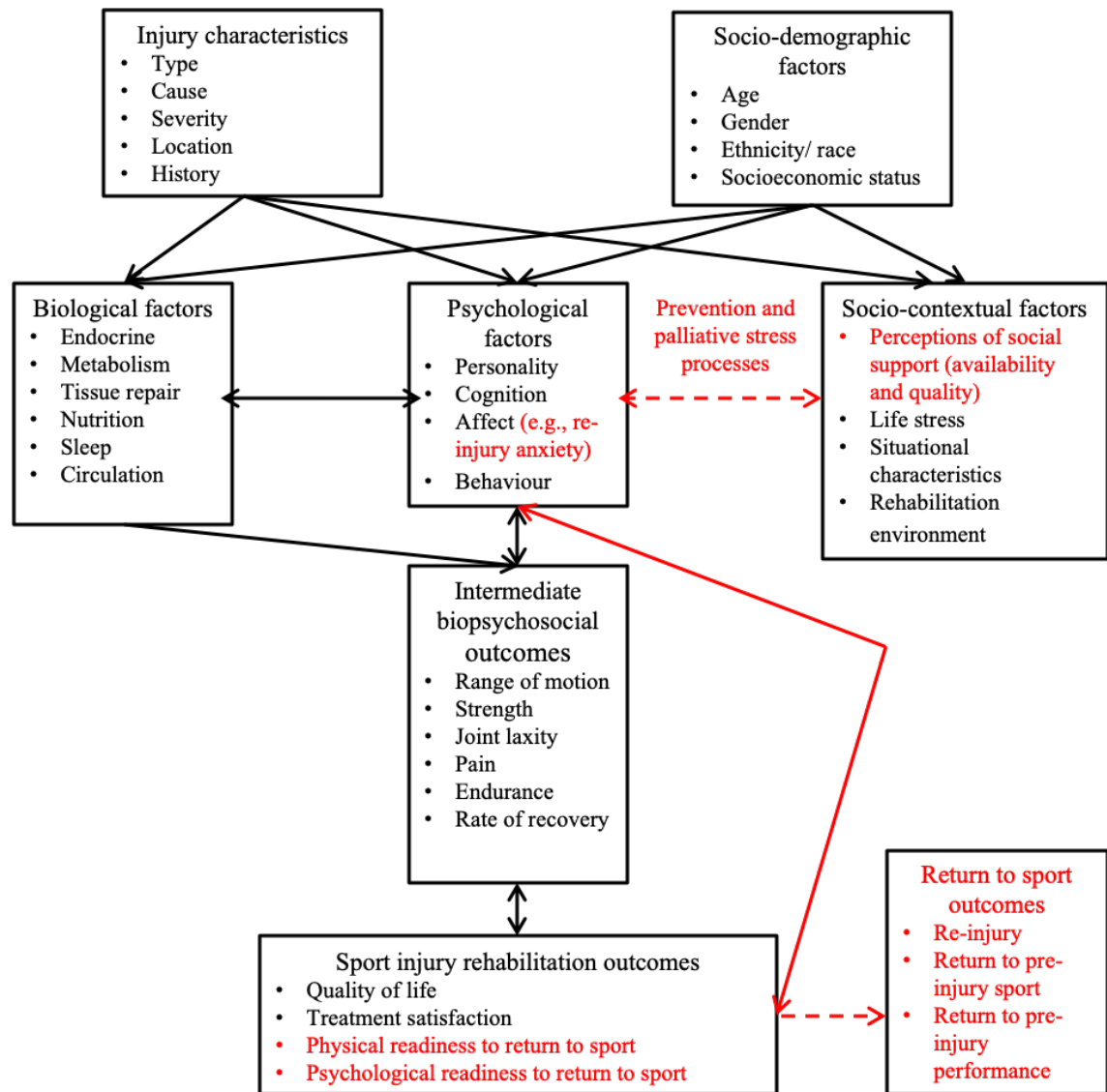


Figure 6.1 Modified biopsychosocial model of sports injury rehabilitation (Brewer et al., 2002) based on the thesis findings together with recent empirical evidence. The broken line denotes weaker support for this path in the thesis.

6.5 Applied Implications of the Research

In the preface, it was indicated that this thesis was influenced by the research-practitioner model (Jones et al., 2019). In other words, this means addressing research questions and providing findings that have some fidelity in applied practice. Throughout this thesis it has been highlighted that returning players back to sport in a safe and effective manner is a major challenge (e.g., Drew et al., 2017; Ishøi et al., 2018). In an

attempt to address this “real world” challenge, the empirical findings from this thesis may have several applied implications for practice. These implications focus on: (i) screening and monitoring; (ii) intervention; and (iii) return to sport decision-making. Together these may provide a broad working heuristic for practitioners working with injured football players.

Prior to explaining each of the applied implications in turn, it is important to highlight that in this context practitioners commonly feel overchallenged and underequipped to effectively manage the psychosocial aspects of the return to sport process (Alexanders et al., 2014; Heaney, 2006). Therefore, the most important applied implication may well be around changing the focus of training providers (e.g., physiotherapy, sports therapy, sport coaching, sports science degree programmes) to include greater coverage of psychosocial aspects of the return to sport process (Alexanders et al., 2014). For example, as screening for psychosocial factors is thought to be an aspect of best-practice care for optimal return to sport, training providers should ensure psychosocial factors are covered in as much depth as physical factors to reflect their growing importance at influencing return to sport outcomes (Ardern et al., 2016, Lin et al., 2020). Consequently, practitioners may be more empowered to recognise, screen and intervene when psychosocial factors may be diminishing the chance of an optimal return to sport or refer to an appropriate professional (Heaney et al., 2017; Yang et al., 2014).

First, the findings of this thesis indicate that perceptions of social support during rehabilitation and experiencing re-injury anxiety are two factors that may develop or diminish psychological readiness to return to sport. This is potentially important given that psychological readiness has been associated with a range of negative return to sport consequences (e.g., McPherson et al., 2019b; Webster et al., 2019). Therefore, it is suggested that practitioners should monitor injured players perceptions of the social

support they are experiencing throughout the return to sport process (e.g., adequate availability and quality) to ensure it is meeting their needs, and routinely screen for re-injury anxiety. According to the findings of the thesis, however, it must be noted that other factors additional to, or independent of, perceptions of social support and re-injury anxiety may also be associated with psychological readiness and therefore might be worthy of screening and monitoring (e.g., motivation, pain, adherence, expectations; Brewer et al., 2002). Through regular monitoring and screening players can be effectively tracked to enable more informed decisions over progression or to provide some explanation when progress is not straightforward (i.e., slow progress, setbacks; Lin et al., 2020).

However, the regular monitoring of players using measurement instruments across time may be challenging (Forsdyke et al., 2017). This is because while several instruments state potentially important thresholds, there is only a modest amount of research establishing the veracity of these in practice (e.g., RIAI, I-PRRS, SIRSI, ACL-RSI). Before robust decisions can be made there should be confidence in clinical thresholds and an informed understanding of what represents a clinically important change for players. For example, at face value a player may have increased their psychological readiness; however, this change in score would need to be greater than the smallest detectable change and error of the measurement instrument to be considered clinically meaningful (Davidson & Keating, 2014). One study examining the properties of commonly used measures of psychological readiness found that it was impossible to distinguish minimally clinically important change from the smallest detectable change and standard measurement error in individual players (i.e., the minimal clinically important change was lower than the smallest detectable change; Slagters et al. (2019b). Accordingly, at an individual player level, changes in psychological readiness using common measurement instruments may be important but

not significant because they cannot be separated from measurement error. In light of this, a more robust approach may be to use a combination of measures to inform impressions of psychological readiness (e.g., using several instruments together with subjective clinical judgements; Forsdyke et al., 2017).

According to the findings in this thesis, the screening and monitoring of players for psychosocial factors should not cease at the point of the decision to return to sport, as there was evidence of players experiencing moderate levels of re-injury anxiety and psychological readiness after returning to their pre-injury sport. In light of the findings developed from the longitudinal nature of study four, players should be adjudged psychologically ready upon the point of return to sport; otherwise they can expect to remain psychologically vulnerable over time (i.e., experience apprehension, worry and tension over re-injury and underperformance). As few players tend to change their psychological status over time on return to sport, establishing sufficient levels of psychological readiness and re-injury anxiety prior to return to training and competition is important (Zarzycki et al., 2017). Unfortunately, according to research this is a common and clinically important occurrence (Phelan et al., 2019; McPherson et al., 2019b). One further reason for being able to screen and monitor players would be to provide a basis for intervention (Lin et al., 2020; Slagers et al., 2019b).

The second group of applied implications focuses on intervention. If perceptions of social support and re-injury anxiety are potentially important, providing interventions to ensure injured players experience high-level social support and less injury anxiety during the return to sport process is clearly desirable. In regard to perceived social support, study two found that pre-injury relationships between the provider and player may be one important determinant of player perceptions of social support. These findings, together with other research (e.g., Yang et al., 2014), suggest that coaches and sports injury practitioners are two important providers of social support for injured

players. As such, fostering positive pre-injury player-coach and player-sports injury practitioner relationships should be considered in order to enhance perceptions of social support during injury. In practice, the player-sports injury practitioner relationship is frequently under-developed because fully fit players will seldom have meaningful interactions with sports injury practitioners. One example of an intervention aimed at fostering the pre-injury player-sports injury practitioner relationship is to have an open-door policy for non-injured players to access guidance and support (e.g., Maurice, Kuklick & Anderson, 2017; Rees, Mitchell, Evans & Hardy, 2010). This may establish a familiar working relationship prior to injury and foster a sense of trust in the provider of support

One other intervention that may merit some consideration is to develop and implement a social support focused standard operating plan for injured players. This would operationalise roles which support injured players and go some way to ensuring high-level social support is perceived (see Arden et al., 2016; Burns, Weissensteiner & Cohen, 2019). In other words, creating of a premeditated strategic plan should be created that addresses the key questions relating to injured players' expected needs. For example, who players should turn to for injury-related information, who accompanies players to hospital appointments and de-briefs to the multi-disciplinary team; or what the coach's role is in providing support to injured players. A proactive approach to supporting injured players may be important to ensure that any support is player-centred, coherent and cohesive. One possible micro-level framework for strengthening high-level social support is suggested by Burns and colleagues (2019). According to this framework, the characteristics for effectual support are building empathetic relationships (i.e., spending time together, regularly checking in), having a well-structured support network (i.e., clear roles, partnership), and being present (i.e., engage, laugh). It is thought these characteristics can be achieved through efficacious

communication, consultation, counselling, collaboration, and coaching. Together, the indicators of high-level support found in this thesis and similar frameworks such as this are important. This is because practitioners often do not clearly understand what social support is or how it can be delivered (Maurice. Kucklick & Anderson, 2017). By fostering a proactive plan, high-level social support can be built around injured players which may attenuate negative responses to injury, develop autonomous forms of motivation, and develop psychological readiness (e.g., Podlog et al., 2015; Yang et al., 2014).

Re-injury anxiety is a psychological factor that players commonly experience during the return to sport process (Rice et al., 2019; Wadey et al., 2014). As such practitioners should be prepared to provide evidence-informed interventions aimed at reducing injury anxiety or follow referral pathways to other appropriate professionals (Heaney, 2006; Hu et al., 2017). According to the findings of this thesis, interventions aimed at reducing re-injury anxiety should be delivered during the injury process and after players return to sport when the need presents itself. In particular, these interventions may include guided imagery, progressive muscle relaxation, goal setting, micro-counselling, written emotional disclosure and acceptance and commitment therapy (Rodriguez, Marroquin & Crosby, 2019; Schwab-Reese, Pittsinger & Yang, 2012). While some of these interventions may be delivered by sports injury practitioners, others would require the services provided by a qualified sports psychologist. From a pragmatic perspective, it is thought that interventions may have the greatest impact when delivered by the sports injury practitioner and integrated into the rehabilitation programme (Alexanders et al., 2014). In other words, the player would receive exercises to physically load them with the aim of developing physical readiness, and also receive some psychological skills training within the same treatment plan to develop psychological readiness. There is some evidence to suggest that this approach

may be more effective than providing physical loading alone in influencing return to sport outcomes (Rodriguez et al., 2019; Tripp et al., 2007; Wilson & Cramp, 2018). For example, a systematic review of the effect of imagery training on ACL injury outcomes found that imagery is an effective intervention reducing re-injury anxiety, building confidence and promoting physical healing (Rodriguez et al., 2019). As such, well-informed interventions, delivered by the sports injury practitioner may be important for augmenting return to sport outcomes. Nonetheless, it is thought that more well-constructed research is required to determine the specific nature of such interventions, and their efficacy, efficiency and compliance (Hogan, Linden & Najarian, 2002; Schwab Reese, Pittsinger & Yang, 2012).

In addition to player-level interventions aimed at reducing re-injury anxiety, a broader approach that systemically challenges cultures and attitudes that promote re-injury anxiety may also be important (Rice et al., 2019). In other words, adopting a team-wide approach that addresses the environmental, organisational and cultural norms may provide additional positive effects. Such an approach may have a preventative effect on the re-injury anxiety for injured players, for example, by having proactive operating plans in place to reduce the pressure on injured players to return to sport prematurely, and challenging the culture in certain sport contexts of promoting training and playing through pain or injury (Truong et al., 2020; Wiese-Bjornstal, 2010). As such, effective interventions to reduce re-injury anxiety in football players may require many stakeholders and target the injured player and the sporting environment (Truong et al., 2020).

The final group of applied implications focus on decision-making concerning injured players. The collective findings of the thesis are a positive call for psychosocial factors to be considered when making clinical decisions. Specifically, this refers to the need to consider whether the player is psychologically ready to be progressed from the

earlier stages of treatment and rehabilitation until discharge and return to their pre-injury sport. Currently, research suggests that in applied practice this tends not to happen (Grindem, Snyder-Mackler, Moksnes, Engebretsen & Risberg, 2016; Kyritsis et al., 2016). For example, in a scoping review of 209 studies focusing on the conditions of players are returning to sport, only one study reported using a robust measure of psychological readiness (Burgi et al., 2019). Evidence such as this implies that many players return to their injury sport with their psychological readiness status unknown. This is an important consideration since a growing body of evidence indicates potential negative consequences for the player if psychological readiness is underdeveloped (e.g., McPherson et al., 2019b; Webster et al., 2019). The strategic assessment of risk and risk tolerance framework (StARRT, Shrier, 2015) is one prominent return to sport decision making framework that highlights psychological readiness as one of several factors requiring evaluation in the assessment of activity risk. However, specific guidance on how effective decisions over psychological readiness to return to sport can be made in this framework is currently lacking.

One such novel framework aimed at empowering sports injury practitioners to make effective decisions over psychological readiness to return to sport is proposed by Forsdyke and colleagues (2017, see Appendix H). This framework suggests three elements should be considered when making decisions concerning psychological readiness to return to sport. These elements are: (i) that the practitioner uses reliable, valid and responsive psychological measurement instruments to screen and monitor injured players; (ii) that the practitioner combines information derived from psychological measurement instruments with their working knowledge of the player. This is particularly important as these impressions are usually gleaned from many hours of meaningful interactions; and (iii) that all clinical decisions are made from a player-centred and interdisciplinary perspective (i.e., not only using time based or biological/

physical criteria). Of particular importance is that practitioners are recommended to use all three elements concurrently to inform their decisions on psychological readiness as opposed to relying on one element of the framework (i.e., the elements are mutually complimentary). This more comprehensive information can then be considered in the overall interdisciplinary decision-making framework (e.g., StARRT; Ardern et al., 2016; Shier, 2015). In this regard injured players would be returned to their pre-injury sport when they are physically and psychologically ready to do so in an attempt to optimise return to sport outcomes (see Figure 1.2).

6.6 Research Strengths and Limitations

As with any academic work there are several research strengths and limitations to be aware of within the presented thesis. On one hand, identifying the strengths of the work enables greater understanding of the incremental contribution of the thesis in extending research and practice in this topic. Conversely, the limitations of the thesis signpost the boundaries of the inferences from the collective findings. The strength of the thesis includes the adoption of a mixed methods approach and the diversity of methods used. Meanwhile, the limitations of the thesis include issues relating to sampling (nature and size), the reliance on self-reported and retrospective recalled data, and challenges around accurate measurement of variables.

Overall strengths of the thesis relate to the mixed method approach that this thesis adopted. Based on the diversity of the theoretical frameworks and empirical evidence in this research area, prior to starting the thesis there were limited assumptions of how the thesis would conclude as evidenced by the thesis title. Consequently, an iterative and pragmatic stance was adopted by using the findings of one study to then inform the methodology, methods, and focus of the next. It is through this organic approach that the thesis results in providing several novel findings relating to perceived social support, re-injury anxiety, and psychological readiness to return to sport (i.e., this

was not forced *a priori*). By adopting this approach, this thesis adheres to Brewer's (2010) recommendation that future research should explore and then examine the relationships between psychosocial factors and specific return to sport outcomes. The process of first exploring and then examining is aligned with a mixed methods approach.

This thesis contains a systematic review of mixed studies, a qualitative study using PEI, a quantitative retrospective recall-based cross-sectional study, and a quantitative longitudinal study. The employment of mixed methods in a programme of study is thought to have numerous specific advantages over using a mono-method approach (Creswell, 2007). There are four significant advantages in adopting a mixed methods approach: (i) inferential quality; (ii) completeness; (iii) initiation, development and expansion; and (iv) utility and context (e.g., Bryman, 2006, Dellinger & Leech, 2007, Tashikkori & Teddlie, 2012). First, inferential quality refers to the quality of the process of interpretation and the outcome of interpretation when providing conclusions (Tashikkori & Teddlie, 2012). Each research method has its own merits and limitations, and mixed methods research benefits from combining the relative merits of each method, whilst also offsetting the limitations. Second, completeness refers to the combination of qualitative and quantitative methods, which provides a more comprehensive account of the phenomenon than mono-method research (Creswell, 2007). By doing so, one method can be used to enhance explanations, clarify, or illustrate the findings of the other, leading to the development of an augmented understanding (Teddlie & Tashikkori, 2012). Third, a mixed methods approach may promote greater initiation, expansion and development of our understanding of phenomena (Tariq & Woodman, 2010). Finally, mixed methods research may yield findings with more utility and which are more contextually sensitive than mono-method approaches (Tashikkori & Teddlie, 2012). Frequently, practitioners need to make

informed decisions by reasoning from diverse forms of evidence (i.e., using both qualitative and quantitative data). Simply basing return to sport decisions on quantitative or qualitative data alone is neither optimal nor practical (Dixon-Woods et al., 2006). Therefore, the collective findings from the mixed methods research in this thesis may possess enhanced resonance and meaningfulness for practitioners (Bryman, 2006). Against this background, this may enhance practice and decision-making concerning return to sport following injury (Buchheit et al., 2018). If a mixed methods approach has greater transferability to the everyday work of practitioners supporting injured players, these points are potentially important.

There are certain limitations of this thesis which together may impact the extent of the inferences made from the thesis findings. The first group of limitations refers to sampling. This thesis is grounded in football and it only sampled adult football players. While this has provided contextually relevant findings, it does preclude generalisability to other team or individual sports. One inclusion criterion used in each study was that players must have been recently severely injured using the time-loss definition of sports injury. While this contributed to gaining a homogenous sample, the definition adopted in this thesis has a bias towards garnering data from players with traumatic, musculoskeletal, lower limb injuries (e.g., ACL rupture, lateral ankle sprain). In other words, this restricts the extent to which the thesis findings can be transferred to other injury types such as overuse injuries, upper-limb injuries, concussions, and injuries leading to only mild to moderate time-loss is restricted. This is potentially important as practitioners often work with players with different sports injuries. and some of which also have poor return to sport outcomes which may be explained by psychological readiness to return to sport (Ishøi et al., 2018). For empirical and pragmatic reasons, the samples used in the studies varied in nature (e.g., sex and performance level). For example, study two used international female football players, study three used a mixed

sex and performance level football players, and study four used male academy football players. On one hand, it could be argued that collectively in the meta-inference of the study findings this has provided a balanced perspective in a research area with clear sex-related biases (Forsdyke et al., 2016). On the other, this could be viewed as unfocussed and may limit the inference of findings because sex and performance level may be confounding factors affecting the return to sport process (e.g., Fältström, Kvist, Gaufin & Hägglund, 2019; Ivarsson et al., 2018). Nonetheless, findings from this thesis indicate a number of biases in the current literature, thus suggesting that future research carefully considers the samples they use in order to avoid adding to these biases.

While all the studies in this thesis were adequately powered based on the complexity of the study and intended analytical strategy (e.g., thematic analysis, mediation analysis, PP-LGCM), repeating the studies with a larger sample size may have led to some additional and potentially important findings. As such there is a possibility that individually and collectively, studies may have failed to detect some clinically relevant and meaningful effects through greater variability and response bias (e.g., uncoverage bias, voluntary response bias). It is contended that if the empirical studies were replicated with a larger sample size, there would be some stability in the current significant relationships while at the same time other potentially meaningful effects may become significant. One such example can be found in study four, where total perceived social support was not a significant predictor of the intercept of re-injury anxiety or psychological readiness, despite this relationship being established previously in the thesis and making sound theoretical sense.

The second limitation refers to the reliance on retrospectively recalled and self-reported data. Much of data gathered in the thesis was retrospective recall and self-reported in nature requiring players to recall their lived experiences. Retrospective recall is a commonly used method of collecting data within this field of research, as it

facilitates reflection on processes and to help crystallise particularly important details (Althubaiti, 2016; Wadey et al., 2014). However, relying solely on retrospectively recalled data has a number of limitations such as memory decay (i.e., time-based reduction in accuracy) and reinterpretation of experiences (i.e., change in perceptions with time) which may have contributed to the possibility of some recall bias (Gabbe et al., 2003). This may have been problematic as the factors examined in this thesis are prone to temporal change (i.e., not static), and the requirement for players to effectively differentiate how they felt during the injury process from how they currently feel may have been challenging (Stenling et al., 2017).

The over-reliance on self-reported data can also be considered a limitation of the thesis. For example, in study three and study four the independent and dependent manifest variables were assessed using solely self-report measures (e.g., I-PRRS, PASS-Q, RIAI). Although the selected self-report measures possessed adequate psychometric proprieties (i.e., validity, reliability), the over-reliance on self-report measures may have some systematic biases which may have impacted the findings (Gallagher et al., 2017). Limitations of self-report measures include common-method variance (i.e., variance attributed to measurement method rather than to the variables) and response distortion (e.g., social desirability, negative affectivity, acquiescence response styles). The limitations of self-report measures may impact a singular measure of a variable but also the subsequent correlated relationships between variables at a single time point as in study three, or across multiple timepoints as in study four (i.e., regression dilution bias, Brewer, 2010). Despite these limitations, within sports medicine settings the use of self-reported measures (i.e., patient reported outcome measures) is commonly considered an efficient method of gaining valuable direct data with players with a wide range of variables (Saw, Main & Gastin, 2015). Similar research which adopts self-report measures should consider the use of additional

measures to validate players responses (e.g., behavioural markers, clinical ratings) in order to gain added objectivity and potentially yield more robust findings (Brewer, 2010; Wadey et al., 2014).

The final limitation of the thesis involves challenges concerning accurate measurement of variables. In particular, this limitation refers to the measures for perceived social support (e.g., PASS-Q) and psychological readiness to return to sport. (I-PRRS) adopted in studies three and four. The PASS-Q was selected as a sport-specific measure of a player's perceptions of their potential to access social support had they required it when they were injured (Freeman, Coffee & Rees, 2011). Other research in this area has tended to use a diverse range of non-domain specific measures (e.g., Social Support Scale, Social Support Questionnaire). As this is the first study to have examined perceived available social support in the sports injury domain, the findings may therefore be affected by some method variance (i.e., variance attributable to measurement tool as opposed to the variable). Using the PASS-Q also precludes making any reliable inference to the social support the players actually received during the injury process, and more importantly perceptions over the quality of social support. Study two indicated that perceptions of social support was the interface between perceived social support availability and perceived social support quality.

To date there are no established measure exists of a player's perceptions of the quality of social support in the sports injury literature. Alternatively, studies measure the extent of satisfaction with social support using a single item (e.g., Clement & Shannon, 2011). At best this only provides a crude proxy measure of perceived quality. Therefore, being able to reliably measure social support quality would have further enhanced the findings of the thesis. One further consideration is that in studies three and four a unidimensional (vs multidimensional) approach was taken to examining perceived availability of social support. As such a latent variable of total perceived

available support was created for sound empirical reasons arising from data collected for this thesis and from that of others (e.g., Burleson & MacGeorge, 2002; Freeman & Rees, 2008). However, in doing so may have obscured the impact of specific support functions (Freeman, Coffee & Rees, 2011). For example, this may have further uncovered which function of social support (emotional, esteem, tangible and/or informational support) is most strongly associated with return to sport outcomes. Additionally, the PASS-Q does not delineate to different providers of social support (e.g., coach, sport injury practitioner, team-mate) and as such inference about the significance of individual social support providers cannot be made. Considering each social support function and provider separately, and subsequently modelling these nuances, may lead to additional conceptual and practical understanding concerning the possible importance of perceived social support in the return to sport process.

The I-PRRS was selected as a measure of psychological readiness to return to sport. This decision was based on the I-PRRS being the only direct and injury-generic validated measure of psychological readiness to return to sport and for its contemporary use in the literature (Glazer, 2009; Podlog et al., 2015; Slagers et al., 2019a). Other measurement scales are popular in the literature, but these tend to be injury specific and their utility when applied to other injuries is currently unknown (e.g., SIRSI, ACL-RSI). While the other scales seemingly have some predictive ability, they assess factors relating to, but are distinct from, psychological readiness (e.g., risk appraisal, emotions, performance confidence; Podlog et al., 2015; Webster et al., 2008). A limitation of using the I-PRRS is that it views psychological readiness to return to sport as a measure of confidence in remaining injury-free and being able to perform well. Therefore, the I-PRRS takes a single faceted (albeit multidimensional) and reduced perspective of the construct of psychological readiness (Podlog et al., 2015). This findings from this thesis indicate that psychological readiness may be more multifaceted. As such these findings

may have been affected by measurement variance, as data from this thesis suggests that psychological readiness to return to sport is multifaceted. In other words, in studies three and four was psychological readiness to return to sport measured or injury-related confidence?

One additional point for consideration is the responsiveness of the I-PRRS to change in players over time. A recent study by Slagers and colleagues (2019b) reported that the standard measurement error and smallest worthwhile change was larger than the minimal clinically important difference of the I-PRRS. This broadly implies its utility in cross-sectional research (i.e., study three); however, in more longitudinal studies and applied practice requiring multiple measurement points findings may need to be interpreted with caution (i.e., study four). To further develop research in this field, either the utility of injury-specific measures of psychological readiness should be examined when applied to other injuries (i.e., ACL-RSI, SIRSI) or an injury-generic and multifaceted measure of psychological readiness with robust psychometric properties should be developed and validated. Currently, this does not exist in the literature despite having the potential to enhance both research and applied practice. Together, these three general limitations of the thesis may serve as a catalyst for further research on this topic and suggest the foci for future research directions.

6.7 Future Research Directions

As has been previously mentioned, a common perspective is that this research topic is still in its infancy, which creates many opportunities and challenges for future empirical research and theoretical development (Brewer, 2010; Williams et al., 2020). Aligned to the collective study findings, three broad research priorities are identified that may extend this field of research. These refer to: (i) further research of key

psychosocial factors; (ii) the development and validation of measurement instruments; and (iii) further examining the impact of psychological readiness to return to sport.

The collective findings from this thesis suggest that perceived social support, re-injury anxiety, and psychological readiness to return to sport are important factors that may enable players to optimally return to sport. This novel finding, together with the broader evidence on psychological readiness and return to sport, led to revisions to the biopsychosocial model of sports injury rehabilitation as a potentially important theoretical and conceptual contribution to the literature (see Figure 6.1, Brewer et al., 2002). For example, in the modification the perceived social support - re-injury anxiety - psychological readiness relationship can be extrapolated such that it influences return to sport outcomes (e.g., re-injury status, performance status). It is therefore logical that future research should empirically examine this amended theoretical process.

The overall findings of the thesis and theoretical frameworks indicate that other psychosocial factors may also be important antecedents and mediators of psychological readiness to return sport. Suggested additional factors which researchers may choose to examine includes rehabilitation adherence, motivation, and expectations (e.g., Chester et al., 2018; Hildingsson, Tranaeus Fitzgerald & Alricsson, 2018; Podlog et al., 2015). Therefore, future research may consider other psychosocial factors that may be associated with psychological readiness together with or independent of perceived social support and re-injury anxiety. Initially, this may be undertaken cross-sectionally to establish provisional associations; however, the more optimal approach would be to use more concurrent and longitudinal research designs. Such designs would enable greater understanding of the development of these factors as opposed to assuming processes occur instantaneously (Stenling et al., 2017).

Future research examining these factors should also seek to become less reliant on self-reported outcome measures, but additionally use measures to validate and

endorse self-reported responses to reduce potential bias in the study findings. These additional measures may include biological markers (e.g., muscle strength, neural control, cortisol levels), clinical ratings (e.g., practitioner ratings of change and compliance), and behavioural markers (e.g., attendance and adherence, Brewer, 2010; Burland et al., 2019; Wadey et al., 2014). The added benefit of using such markers is that the interrelationship between biological/physical and psychological recovery could be better understood and may provide a more comprehensive understanding of causal processes. For example, there are believed to be several neural correlates of effective player – social support provider interactions which may modulate injury-related emotions and injury-related behaviours (e.g., release of endogenous dynorphins, reduced brain cortex and striatum activation; Coan, 2006; Jensen et al., 2014; Stevens, Cruwys & Murray, 2020). However, most current literature tends to examine biological/physical and psychological recovery separately which may have previously thwarted and indeed continues to thwart, the understanding of optimal return to sport practices.

Current literature refers to a substantial range of measurement instruments (see study one). Only a few of these measurement instruments are domain specific and therefore their direct utility in the sports injury domain may be questionable. For example, in study one only 32% of outcome measures used were domain specific. Future research should focus on developing psychometrically sound and domain specific measures using COSMIN guidelines (Prinsen et al., 2018). Of particular importance here is the ability to reliably measure psychological readiness to return to sport. In this thesis the I-PRRS was used to measure psychological readiness because it is the only scale that directly measures this concept (Podlog et al., 2015). Researchers and practitioners should be aware that the current available instruments either: (i) remain injury specific (e.g., ACL-RSI, SIRSI); (ii) reduce psychological readiness down

to a single faceted construct even though it is thought to be more complex (e.g., I-PRRS); or (iii) have low responsivity to accurately detect meaningful change. For example, Slagers and colleagues (2019b) found that the responsivity of commonly used measurement instruments for psychological readiness was sufficient to reliably detect change at a group-level but not at an individual-level. In other words, at an individual level the denoted smallest worthwhile difference (95% CI) was greater than the minimal important change. For current researchers and applied users of these instruments this is potentially important, as this indicates it may not be possible to distinguish meaningful and clinically relevant effects from the measurement error of the instrument (Davidson & Keating, 2014).

Therefore, within this research area there is a need to revise current instruments, and develop new valid, reliable and responsive measures of psychological readiness to return to sport, which have sound predictive value and can be used generically across different sports injuries (e.g., sprains, strains, fractures, tendinopathies). According to COSMIN guidelines, the most critical property of an instrument to measure psychological readiness is content validity. To enhance the content validity, an interdisciplinary approach using patients' perspective and experiences is advocated (Prinsen et al., 2018). Such a measure could then be used reliably in further cross-sectional, longitudinal and experimental research to predict return to sport outcomes, and in applied practice to better inform return to sport decisions.

Empirically, psychological readiness to return to sport appears to be a clinically relevant factor in the optimal return to sport following injury (e.g., Webster et al., 2019). This thesis offers an incremental contribution to how psychological readiness can be developed and the findings further suggest that return to sport decisions should consider the players psychological readiness. Such decisions should additionally consider whether the player is also physically ready to return to sport (Ardern et al.,

2016). However, little is known about the impact of decisions based on a collective “readiness to sport”, for example, the direct impact of players returning to sport when they are physically but not psychologically ready to return to sport and vice versa. Research also implies that physical readiness often takes precedence in return to sport decision-making (Forsdyke et al., 2017). For psychological readiness to be of further clinical importance in applied practice, longitudinal studies are required to examine the impact of the return to sport status of players. In Figure 1.2 a “quadrants of return to sport” are presented which could be used as a tentative framework to guide such research. These quadrants were influenced by the work of Timmins et al., (2016) on hamstring characteristics and injury risk. Their work in that field it revolutionised approaches to preventing and return to sport practices for hamstring injuries. Similarly, the return to sport quadrants could be used as a “new” research framework to empirically examine the impact of physical and psychological readiness on return to sport outcomes (e.g., re-injury, ability to return to pre-injury performance). This suggestion is also aligned to the modified biopsychosocial model (see Figure 6.2) and may provide a platform for potentially important future research and enhanced applied practice.

In summary, the general discussion, should provide further understanding about how the thesis has addressed each research aim, and how the findings of the thesis offer an incremental contribution to human knowledge in this research area from a theoretical and empirical perspective (Oliver, 2014). Additionally, the general discussion sections provide some informed suggestions about a future research agenda and highlight some applied considerations to support practitioners working with injured football players in order to optimise their return to sport outcomes.

6.8 Concluding Remarks

The main purpose of this thesis was to examine psychosocial factors and return to sport outcomes following injury in football using a mixed methods approach. The purpose of the thesis was underpinned by three main research aims. The first was to evaluate the theoretical underpinnings and empirical research on psychosocial factors and return to sport outcomes in football. The second was to explore how psychosocial factors are associated with return to sport outcomes in football. The last aim was to examine the relationship between psychosocial factors and return to sport outcomes in football. Four studies were conducted in the thesis in order to logically address these research aims, which used different methodologies and methods best suited to the respective research aim. Study one was a systematic review entitled: *“Psychosocial Factors Associated with Sports Injury Outcomes in Competitive Athletes: A Mixed Studies Systematic Review”*. Study two was a qualitative study entitled: *“Together we are Limitless: A Qualitative Study of Perceptions of Social Support and Return to Sport Outcomes in International Female Football Players”*. Study three was a quantitative cross-sectional study entitled: *“Social Support and Psychological Readiness to Return to Sport After Injury in Football Players: The Mediating Role of Re-injury Anxiety”*. Finally, study four was a qualitative longitudinal study titled: *“Perceived Social Support and Changes in Re-injury Anxiety and Psychological Readiness to Return to Sport Over Time in Football Players”*.

Overall, the novel findings provided through this thesis offer a contribution to the literature and applied practice by: (1) suggesting that perceived social support and re-injury anxiety are potentially important psychosocial factors that are related to return to sport outcomes; (2) enabling further conceptual and contextual understanding regarding the role of perceived social support during the return to sport process; (3) providing further conceptual understanding of psychological readiness to return to sport

and how this can be developed or diminished over time via its relationship with social support and re-injury anxiety; and (4) providing both amended and new frameworks that can be used for future research and practice in order to optimise return to sport outcomes following injury in football. As such, the thesis extends the current literature and provides some clinically relevant findings. It is hoped that the findings of this thesis can serve as a catalyst for more well-constructed research examining the potentially important role of social support and psychological readiness and, in part, be used to improve applied practice in order to optimise return to sport outcomes.

7.0 Chapter Seven

Thesis References

- Ageberg, E. (2010). Sex differences in patient-reported outcomes after anterior cruciate ligament reconstruction: data from the Swedish knee ligament register. *American Journal of Sports Medicine*, 38(7), 1334-1342.
- Ajzen, I. (1991). The theory of planned behaviour. *Organisation Behaviour and Human Decision Processes*, 50(2), 179-211.
- Albinson, C. B., & Petrie, T. A. (2003). Cognitive appraisals, stress, and coping: preinjury and postinjury factors influencing psychological adjustment to sport injury. *Journal of Sport Rehabilitation*, 12(4), 306–322.
- Alexanders, J., Anderson, A., & Henderson, S. (2015). Musculoskeletal physiotherapists' use of psychological interventions: A systematic review of therapists' perceptions and practice. *Physiotherapy*, 101(2), 95-102.
- Allen, M. M., Pareek, A., Krych, A. J., Hewett, T. E., Levy, B. A., Stuart, M. J., ... Dahm, D. (2016). Are female soccer players at an increased risk of second anterior cruciate ligament injury compared with their athletic peers? *American Journal of Sports Medicine*, 44(10), 2492-2498.
- Althubaiti A. (2016). Information bias in health research: definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, 9, 211–217.
- Ardern, C. L., Glasgow, P., Schneiders, A., Wirvrouw, E, Clarsen, B., Cools, A., ... Bizzini, M. (2016). 2016 Consensus statement on return to sport from the first world congress in sports physical therapy, Bern. *British Journal of Sports Medicine*, 50(14), 853-864.
- Ardern, C. L., Taylor, N. F., Feller, J. A., Whitehead, T. S., & Webster, K. E. (2015). Sports Participation 2 Years After Anterior Cruciate Ligament Reconstruction in Athletes Who Had Not Returned to Sport at 1 Year: A Prospective Follow-up of

Physical Function and Psychological Factors in 122 Athletes. *The American Journal of Sports Medicine*, 43(4), 848–856.

Ardern, C.L., Österberg, A., Tagesson, S., Gauffin, H., Webster, K.E., & Kvist, J. (2014a). The impact of psychological readiness to return to sport and recreational activities after anterior cruciate ligament reconstruction. *British Journal of Sports Medicine*, 48(22), 1613-9.

Ardern, C.L., Taylor, N.F., Feller, J.A., & Webster, K.E. (2014b). Fifty-five per cent return to competitive sport following anterior cruciate ligament reconstruction surgery: an updated systematic review and meta-analysis including aspects of physical functioning and contextual factors. *British Journal of Sports Medicine*, 48, 1543-1552.

Ardern, C. L., Taylor, N. F., Feller, J. A., & Webster, K. E. (2013a). A systematic review of the psychological factors associated with returning to sport following injury. *British Journal of Sports Medicine*, 47(17), 1120-1126.

Ardern, C.L, Taylor, N., Feller, J.A, Whitehead, T., & Webster, K.E (2013b). Psychological responses matter in returning to pre-injury level of sport after anterior cruciate ligament construction. *American Journal of Sports Medicine*, 41(7), 1549-1558.

Ardern, C.L., Taylor, N.F., Feller, J.A., & Webster, K.E. (2012a). Return to sport outcomes at 2 to 7 years after anterior cruciate ligament reconstruction surgery. *American Journal of Sports Medicine*, 40(1), 41-8.

Ardern, C.L., Taylor, N.F., Feller, J.A., & Webster, K.E. (2012b) Fear of re-injury in people who have returned to sport following anterior cruciate ligament reconstruction surgery. *Journal of Science and Medicine in Sport*, 15(6), 488-495.

- Ardern, C.L., Webster, K.E., Taylor, N.F., & Feller, J.A. (2011). Return to sport following anterior cruciate ligament reconstruction surgery: a systematic review and meta-analysis of the state of play. *British Journal of Sports Medicine*, 45, 596-606.
- Ardito, R. B., & Rabellino, D. (2011). Therapeutic alliance and outcome of psychotherapy: historical excursus, measurements, and prospects for research. *Frontiers in Psychology*, 2, 270.
- Averill, J. R. (1968). Grief: Its nature and significance. *Psychological Bulletin*, 70(6), 721–748.
- Bahr, R., Clarsen, B., & Ekstrand, J. (2018). Why we should focus on the burden of injuries and illnesses, not just their incidence. *British Journal of Sports Medicine*, 52, 1018-1021.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Bianco, T. (2001) Social support and recovery from sport injury: elite skiers share their experiences. *Research Quarterly for Exercise and Sport*, 72(4), 376-388.
- Bianco, T., & Eklund, R.C. (2001). Conceptual considerations for the social support research in sport and exercise settings: the case of sport injury. *Journal of Sport and Exercise Psychology*, 23, 85-107.
- Biernacki, P., & Waldorf, D. (1981). Snowball Sampling: Problems and Techniques of Chain Referral Sampling. *Sociological Methods and Research*, 10, 141–163.

- Blair, S.N., & Morris, J.N. (2009). Healthy Hearts and the universal Benefits of being Physically Active: Physical Activity and Health. *Annals of Epidemiology*, 19(4), 253-256.
- Bliss, L. B. (2008). Mixed Methods in Social Inquiry. *Journal of Mixed Methods Research*, 2(2), 190–192.
- Bolger, N., David, A., & Rafaeli, E. (2003). Diary methods: capturing life as it is lived. *Annual Review of Psychology*, 54, 579-616.
- Bowen, G. (2008) Naturalistic inquiry and the saturation concept. *Qualitative Research*, 8 (1), 137-152.
- Boyce, S.H., & Quigley, M.A. (2004). Review of sports injuries presenting to an accident and emergency department. *Emergency Medicine Journal*, 21, 704-706.
- Brewer, B.W., & Redmond, C. (2016). *Psychology of Sport Injury*. Champaign, IL: Human Kinetics.
- Brewer, B.W. (2010). The role of psychological factors in sport injury rehabilitation outcomes. *International Review of Sport and Exercise Psychology*, 3(1), 40-61.
- Brewer, B.W., Andersen, M.B., & Van Raalte, J.L. (2002). Psychological aspects of sport injury rehabilitation: toward a biopsychological approach. In D. Mostofsky & L. Zaichkowsky (eds). *Medical Aspects of Sport and Exercise* (pp. 41-54). Morgantown, WV: Fitness Information Technology.
- Brewer, B.W. (1994). Review and critique of models of psychological adjustment to athletic injury. *Journal of Applied Sport Psychology*, 6, 87-100.
- Brown, C. (2005). Injuries: The Psychology of Recovery and Rehab. In S. Murphy (ed), *The Sport Psychology Handbook* (pp. 2015-2235). Champaign, IL: Human Kinetics.

- Brukner, P., Clarsen, B., Cook, J., Cools, A., Crossley, K., Hutchinson, H., McCrory, P., ... Khan, K. (2017). *Brukner & Khan's Clinical Sports Medicine 5th Edition*. Sydney: McGraw-Hill.
- Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6(1), 97–113.
- Buchanan, D. A., & Bryman, A. (2007). Contextualizing Methods Choice in Organizational Research. *Organizational Research Methods*, 10(3), 483–501.
- Buchheit, M., Eirale, C., Simpson, B.M., & Lacombe, M. (2019). Injury rate and prevention in elite football: let us first search within our own hearts. *British Journal of Sports Medicine*, 53, 1327-1328.
- Buchheit, M. (2017). Outside the box. *International Journal of Sports Physiology & Performance*, 12, 1001–1002.
- Bunniss, S., & Kelly, D.R. (2010). Research paradigms in medical education research. *Medical Education*, 44, 358-366.
- Burgi, C.R., Peters, S., Ardern, C.L., Magill, J.R., Gomez, C.D., Sylvian, J., ... Reiman, M.P. (2019). Which criteria are used to clear patients to return to sport after primary ACL reconstruction? A scoping review. *British Journal of Sports Medicine*, 53, 1154-1161.
- Burland, J., Lepley, A., Cormier, M., DiStefano, L., Arciero, R., & Lepley, L. (2019). Learned Helplessness After Anterior Cruciate Ligament Reconstruction: An Altered Neurocognitive State? *Sports Medicine*, 49(5), 647-657.
- Burleson, B. R., & MacGeorge, E. L. (2002). *Supportive communication*. In M. L. Knapp, & J. A. Daly (Eds.), *Handbook of interpersonal communication* (pp. 374-424). Thousand Oaks, CA: Sage Publications.

- Burns, L., Weissensteiner, J., & Cohen, M. (2019). Supportive interpersonal relationships: a key component to high-performance sport. *British Journal of Sports Medicine*, 53, 1386-1389.
- Cameron, R. (2009). A Sequential Mixed Model Research Design: Design, Analytical and Display Issues. *International Journal of Multiple Research Approaches*, 3(2), 140-152.
- Carriere, J.S., Thibault, P., Adams, H., Milioto, M., Ditto, B., & Sullivan, M.J. (2017). Expectancies mediate the relationship between perceived injustice and return to work following whiplash injury: A 1-year prospective study. *European Journal of Pain*, 21(7), 1234-1242.
- Carson, F., & Polman, R. (2008). ACL injury rehabilitation: a psychological case study of a professional rugby union player. *Journal of Clinical Sports Psychology*, 2, 71-90.
- Carson, F., & Polman, R. (2010). The facilitative nature of avoidance coping within sports injury rehabilitation. *Scandinavian Journal of Medicine and Science in Sports*, 20(2), 235-40.
- Carson, F., & Polman, R. (2012). Experiences of professional rugby union players returning to competition following anterior cruciate ligament reconstruction. *Physical Therapy in Sport*, 13(1), 35-40.
- Carson, F., & Polman, R. (2017). Self-determined motivation in rehabilitating professional rugby union players. *BMC Sports Science, Medicine and Rehabilitation*, 9, 2.
- Centre for Reviews and Dissemination. *Systematic reviews: CRD's guidance for undertaking reviews in health care*. (2009). York: University of York.

- Chan, D., & Hagger, M. (2012). Theoretical integration and the psychology of sport injury prevention. *Sports Medicine*, 42(9), 725-732.
- Chan, D., & Hagger, M. (2012). Self-determined forms of motivation predict sport injury prevention and rehabilitation intentions. *Journal of Science and Medicine in Sport*, 15(5), 398-406.
- Chan, D., Lee, A., Hagger, M., Mok, K., & Yung, P. (2017). Social psychological aspects of ACL injury prevention and rehabilitation: an integrated model for behavioural adherence. *Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology*, 10, 17-20.
- Chester, R., Jerosch-Herold, C., Lewis, J., & Shepstone, L. (2018). Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: a multicentre longitudinal cohort study. *British Journal of Sports Medicine*, 52, 269-275.
- Chmielewski, T., Jones, D., Day, T., Tillman, S., & Lentz, T., & George, S. (2008). The association of pain and fear of movement/reinjury with function during anterior cruciate ligament reconstruction. *Journal of Orthopaedic Sports Physical Therapy*, 38(12), 746-53.
- Christakou, A., & Zervas, Y. (2007). The effectiveness of imagery on pain, oedema, and range of motion in athletes with a grade II ankle sprain. *Physical Therapy in Sport*, 8, 130-140.
- Christino, M., Fleming, B., Machan, J., & Shalvoy, R. (2016). Psychological factors associated with anterior cruciate ligament reconstruction recovery. *Orthopaedic Journal of Sports Medicine*, 4(3), 2325967116638341.

- Clark, C.D. (1999). The autodriven interview: A photographic viewfinder into children's experiences. *Visual Sociology*, 14, 39-50.
- Clark-Ibanez, M. (2004). Framing the social world with photo elicitation interviews. *American Behaviour Science*, 47(12), 1507-1527.
- Clarsen, B., & Bahr, R. (2014). Matching the choice of injury/illness definition to study setting, purpose and design: one size does not fit all! *British Journal of Sports Medicine*. 48, 510-512.
- Clement, D., & Shannon, V.R. (2011). Injured athletes' perceptions about social support. *Journal of Sport Rehabilitation*, 20(4), 457-470.
- Clement, D., Arvinen-Barrow, M., & Fetty, T. (2015). Psychosocial responses during different phases of sport-injury rehabilitation: A qualitative study. *Journal of Athletic Training*, 50(1), 95-104.
- Coan, J., Schaefer, H., & Davidson, R. (2006). Lending a hand: social regulation of the neural response to threat. *Psychological Science*, 17, 1032–1039.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159.
- Cohen, S., & Wills, T.A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310-357.
- Colvin, A.C., Walsh, M., Koval, K.J., McLaurin, T., Tejwani, N., & Egol, K. (2009). Return to sports following operatively treated ankle fractures. *Foot & Ankle International*, 30(4), 292-6.
- Conti, C., di Fronso, S., Robazzi, C., & Bertollo, M. (2019). The injury-psychological readiness to return to sport (I-PRRS) scale and the sport confidence inventory (SCI): a cross-cultural validation. *Physical Therapy in Sport*, 40, 218-224.

- Corbillon, F., Crossman, J., Jamieson, J. (2008). Injured athletes' perceptions of the social support provided by their coaches and teammates during rehabilitation. *Journal of Sport Behaviour*, 31(2), 93-107.
- Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research 4th Edition*. Thousand Oaks, CA: Sage.
- Cornelius, A., Brewer, B.W, Van Raalte, J.L. (2007). Applications of multilevel modeling in sport injury rehabilitation research. *International Journal of Sport and Exercise Psychology*, 5(4), 387-405.
- Costello, J.T., Bieuzen, F., & Bleakley, B.M. (2014). Where are all the female participants in Sports and Exercise Medicine research? *European Journal of Sport Science*, 14(8), 847-851.
- Covassin, T., Crutcher, B., Bleecker, A., Heiden, E. O., Dailey, A., & Yang, J. (2014). Postinjury anxiety and social support among collegiate athletes: a comparison between orthopaedic injuries and concussions. *Journal of Athletic Training*, 49(4), 462–468.
- Creswell, J.W., & Plano Clark, V.L. (2011). *Designing and Conducting Mixed Methods Research* (2nd ed), Los Angeles: Sage Publications.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches 2nd Edition*. Los Angeles: Sage Publications.
- Cryer, P. (2006). *The Research Students Guide to Success 3rd Edition*. Buckinghamshire: Open University Press.
- Cumps, E., Verhagen, E., Annemans, L., & Meeusen, R. (2008). Injury rate and socioeconomic costs resulting from sports injuries in Flanders: data derived from sports insurance statistics 2003. *British Journal of Sports Medicine*, 42:767-772.
- Cupal, D. (1998). Psychological interventions in sport injury prevention and rehabilitation, *Journal of Applied Sport Psychology*, 10(1), 103-123.

- Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modelling. *Journal of Cognition and Development*, 11(2), 121–136.
- Data Protection Act. (2018). c. 12 Available at <http://www.legislation.gov.uk/ukpga/2018/12/contents/enacted> (Accessed: 6 Oct 2019).
- Davidson, M., & Keating, J. (2014). Patient-reported outcome measures (PROMs): how should I interpret reports of measurement properties? A practical guide for clinicians and researchers who are not biostatisticians. *British Journal of Sports Medicine*, 48, 792-796.
- De la Vega, R., Barquín, R., Aguayo, E., & Márquez, S. (2017). Restoration of confidence and perception of coaches following sport injury. *Cogent Psychology*, 4, 1312047.
- Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.
- DeFreese, J.D., & Smith, A.L. (2014). Athlete social support, negative social interactions, and psychological health across a competitive sport season. *Journal of Sport and Exercise Psychology*, 36, 619-630.
- Del Buono, A., Smith, R., Coco, M., Woolley, L., Denaro, V., & Maffulli, N. (2013). Return to sports after ankle fractures: a systematic review. *British Medical Bulletin*, 106, 179-91.

- Dellinger, A. B., & Leech, N. L. (2007). Toward a Unified Validation Framework in Mixed Methods Research. *Journal of Mixed Methods Research*, 1(4), 309–332.
- Dijkstra, H.P., Pollock, N., Chakraverty, R., & Arden, C.L., (2017). Return to play in elite sport: a shared decision-making process. *British Journal of Sports Medicine*, 51, 419-420.
- Dijkstra, H.P., Pollock, N., Chakraverty, R., & Alonso, J.M. (2014). Managing the health of the elite athlete: a new integrated performance health management and coaching model. *British Journal of Sports Medicine*, 48, 523-531.
- Dixon-Woods, M., Bonas, S., Booth, A., Jones, D.R., Miller, T., Sutton, A.J., et al. (2006). How can systematic reviews incorporate qualitative research? A critical perspective. *Qualitative Research*, 6(1), 27-44.
- Drew, M.K., Raysmith, B.P., & Charlton, P.C. (2017). Injuries impair the chance of successful performance by sportspeople: a systematic review. *British Journal of Sports Medicine*, 51, 1209-1214.
- Duncan, T.E., & Duncan, S.C. (2004). An introduction to latent growth curve modelling. *Behaviour Therapy*, 35, 333-363.
- Eklund, R., Jeffery, K., Dobersek, U., & Cho, S. (2011). Reflections in qualitative research in sport psychology. *Qualitative Research in Sport, Exercise and Health*, 3(3), 285-290.
- Ekstrand, J., Krutsch, W., Spreco, A., van Zoest, W., Roberts, C., Meyer, T., ... Bengtsson, H. (2019). Time before return to play for the most common injuries in professional football: a 16-year follow-up of the UEFA Elite Club Injury Study. *British Journal of Sports Medicine*, Published Online First: 10 June 2019. doi: 10.1136/bjsports-2019-100666

- Ekstrand, J. (2013). Keeping your top players on the pitch: the key to football medicine at a professional level. *British Journal of Sports Medicine*, 47(12), 723-724.
- Ekstrand, J., Häggglund, M., & Waldén, M. (2011). Injury incidence and injury patterns in professional football: the UEFA injury study. *British Journal of Sports Medicine*, 45, 553-558.
- Eliakim, E., Morgulev, E., Lidor, R., & Meckel, Y. (2020). Estimation of injury costs: financial damage of English Premier League teams' underachievement due to injuries. *BMJ Open Sport & Exercise Medicine*, 6, e000675.
- Engel, G.L. (1977). The need for a new medical model: a challenge for biomedicine. *Science*, 196, 129-136.
- Engel, G.L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry*, 137, 535-44.
- Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo elicitation interview (PEI): using photos to elicit children's perspectives. *International Journal of Qualitative Methods*, 5(3), 1-11.
- Evans, M., Robling, M., Maggs Rapport, F., Houston, H., Kinnersley, P., & Wilkinson, C. (2002). It doesn't cost anything just to ask, does it? The ethics of questionnaire-based research. *Journal of Medical Ethics*, 28(1), 41-44.
- Evans, L., & Hardy, L. (1995). Sport injury and grief responses: A review. *Journal of Sport & Exercise Psychology*, 17(3), 227-245.
- Everest, T. (2014). Resolving the Qualitative-Quantitative Debate in Healthcare Research. *Medical Practice and Review*, 5(1), 6-15.
- English Football Association. (2017). FA to restructure women's football pyramid at elite level. Retrieved from <https://www.thefa.com/news/2017/sep/26/fa->

[restructure-womens-football-pyramid-wsl-wpl-270917](#) (accessed 14th October, 2020)

- Fältström, A., Kvist, J., Gauffin, H., & Hägglund, M. (2019). Female soccer players with anterior cruciate ligament reconstruction have a higher risk of new knee injuries and quit soccer to a higher degree than knee-healthy controls. *The American Journal of Sports Medicine*, 47(1), 31–40
- Fältström, A., Hägglund, M., & Kvist, J. (2016). Factors associated with playing football after anterior cruciate ligament reconstruction in female football players. *Scandinavian Journal of Medicine & Science in Sports*, 26(11), 1343-1352.
- Ferlander, S. (2007). The importance of different forms of social capital for health. *Acta Sociologica*, 50(2), 115–128.
- Ferlie, E., Wood, M., & Fitzgerald, L. (1999). Some limits to evidence-based medicine: a case study from elective orthopaedics. *Quality in Health Care*, 8(2), 99-107.
- Fernandes, H. M., Reis, V. M., Vilaça-Alves, J., Saavedra, F., Aidar, F. J., & Brustad, R. (2014). Social support and sport injury recovery: An overview of empirical findings and practical implications. *Revista de Psicologia del Deporte*, 23(2), 445–449.
- FIFA.com. (2006). Big Count 2006: Statistical Summary Report. Retrieved from http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.summaryreport_7022.pdf. (accessed 17th June, 2019).
- Ford, I., Eklund, R.C., & Gordon, S. (2000). An examination of psychosocial variables moderating the relationship between life stress and injury time-loss among athletes of a high standard. *Journal of Sports Science*, 18(5), 301-12.

- Forsdyke, D., Gledhill, A., & Arden, C.L. (2017). Psychological readiness to return to sport: Three key elements to help the practitioner decide whether the athlete is REALLY ready? *British Journal of Sports Medicine*, 51(7), 555-556.
- Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2016). Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: A mixed studies systematic review. *British Journal of Sports Medicine*, 50, 537-544.
- Fox, J., Murray, C., & Warm, A. (2003). Conducting research using web-based questionnaires: Practical, methodological, and ethical considerations, *International Journal of Social Research Methodology*, 6(2), 167-180.
- Freeman, P., Coffee, P., & Rees, T. (2011). The PASS-Q: The perceived available support in sport questionnaire. *Journal of Sport & Exercise Psychology*, 33, 54-74.
- Freeman, P., Rees, T., & Hardy, L. (2009). An intervention to increase social support and improve performance. *Journal of Applied Sport Psychology*, 21(2), 186-200.
- Freeman, P., & Rees, T. (2008). The effects of perceived and received support upon objective performance outcome. *European Journal of Sport Science*, 8, 359-368.
- Fuller, C. W., Ekstrand, J., Junge, A., Andersen, T. E., Bahr, R., Dvorak, J., & Meeuwisse, W. H. (2006). Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. *British Journal of Sports Medicine*, 40(3), 193-201.
- Gabbe, B.J., Finch, C.F., Bennell, K.L., & Wajswelner, H. (2003). How valid is a self-reported 12-month sports injury history? *British Journal of Sports Medicine*, 37, 545-547.

- Gallagher, B.V., & Gardner, F.L. (2007). An examination of the relationship between early maladaptive schemas, coping, and emotional response to athletic injury. *Journal of Clinical Sport Psychology*, 1(1), 47-67.
- Gallagher, J., Needleman, I., Ashley, P., Garcia Sanchez, R., & Lumsden, R. (2017). Self-reported outcome measures of the impact of injury and illness on athlete performance: a systematic review. *Sports Medicine*, 47, 1335–1348.
- Gaulrapp, H., Hartmut, G., Becker, A., Walther, M., & Hess, H. (2010). Injuries in women's soccer: A 1-year all players prospective field study of the women's Bundesliga (German premier league). *Clinical Journal of Sport Medicine*, 20(4), 264-271.
- Giza, E., Mithöfer, K., Farrell, L., Zarins, B., & Gill, T. (2005). Injuries in women's professional soccer. *British Journal of Sports Medicine*, 39, 212-216.
- Glazer, D.D. (2009). Development and preliminary validation of the injury-psychological readiness to return to sport (I-PRRS) scale. *Journal of Athletic Training*, 44(2), 185-189.
- Gledhill, A., Forsdyke, D., & Murray, E. (2018). Psychological interventions used to reduce sports injuries: a systematic review of real-world effectiveness. *British Journal of Sports Medicine*, 52, 967-971.
- Gledhill, A., Harwood, C., & Forsdyke, D. (2017). Psychosocial factors associated with talent development in football: a systematic review. *Psychology of Sport and Exercise*. 31, 93-112.
- Goodwin, D., Mays, N. and Pope, C. (2020). Ethical Issues in Qualitative Research. In *Qualitative Research in Health Care* (eds C. Pope and N. Mays).
doi:10.1002/9781119410867.ch3

- Goodwin, R., Costa, P., & Adonu, J. (2004). Social support and its consequences: “Positive” and “deficiency” values and their implications for support and self-esteem. *British Journal of Social Psychology*, 43, 465-474.
- Gordon, S., Milios, D., & Grove, R.J. (1992). Psychological adjustment to sport injuries: Implications for therapists and trainers. *Sport Health*, 10(2), 13-15.
- Gordon, S., & Lindgren, S. (1990). Psycho-physical rehabilitation from a serious sport injury: a case study of an elite fast bowler. *Australian Journal of Science and Medicine in Sport*, 22, 71-6.
- Gouttebauge, V., Castaldelli-Maia, J., Gorczynski, P., et al. (2019). Occurrence of mental health symptoms and disorders in current and former elite athletes: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 53, 700-706.
- Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. In J.A. Schinka & W. F. Velicer (Eds.), *Handbook of Psychology: Research Methods in Psychology* (Vol. 2, pp. 87–114). New York, NY: Wiley.
- Grassi, A., Zaffagnini, S., Muccioli, G.M., Neri, M.P., Villa, S.D., & Marcacci, M. (2015). After revision anterior cruciate ligament reconstruction, who returns to sport? A systematic review and meta-analysis. *British Journal of Sports Medicine*, 49, 1295 - 1304.
- Grindem, H., Engebretsen L, Axe, M., Snyder-Mackler, L., & Risberg, M. (2020). Activity and functional readiness, not age, are the critical factors for second anterior cruciate ligament injury — the Delaware-Oslo ACL cohort study. *British Journal of Sports Medicine*, Published Online First: 11 February 2020. doi: 10.1136/bjsports-2019-100623.

- Grindstaff, J. S., Wrisberg, C. A., & Ross, J. R. (2010). Collegiate athletes' experience of the meaning of sport injury: A phenomenological investigation. *Perspectives in Public Health*, 130(3), 127–135.
- Grüne-Yanoff, T. (2013). Relations between theory and models in psychology and ergonomic. *Perspectives on Science*, 21(2), 196-201.
- Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic Controversies, Contradictions, and Emerging Confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 191–215). Thousand Oaks, CA: Sage Publications.
- Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. Thousand Oaks, CA: Sage Publications.
- Harvi, F., Culvenor, A., Guermazi, A., & Crossley, K. (2020). Worse knee confidence, fear of movement, psychological readiness to return-to-sport and pain are associated with worse function after ACL reconstruction. *Physical Therapy in Sport*, 41, 1-8.
- Hagger, M., (2009). Theoretical integration in health psychology: unifying ideas and complimentary explanations. *British Journal of Health Psychology*, 14(2), 189-194.
- Hägglund, M., Waldén, M., Bahr, R., & Ekstrand, J. (2005). Methods for epidemiological study of injuries to professional football players: developing the UEFA model. *British Journal of Sports Medicine*, 39, 340-346.
- Hägglund, M., Waldén, M., Bengtsson, H., & Ekstrand, J. (2018). Re-injuries in Professional Football: The UEFA Elite Club Injury Study. doi:10.1007/978-3-662-55713-6_74.

- Hägglund, M., Waldén, M., Magnusson, H., Kristenson, K., Bengtsson, H., & Ekstrand, J. (2013). Injuries affect team performance negatively in professional football: an 11-year follow-up of the UEFA Champions League injury study. *British Journal of Sports Medicine*, 47, 738-742.
- Hammond, L., Lilley, J., & Ribbans, W. (2013). Defining recovery: an overlooked criterion in sports injury surveillance. *Clinical Journal of Sports Medicine*, 23(3), 157-9.
- Harandi, T. F., Taghinasab, M. M., & Nayeri, T. D. (2017). The correlation of social support with mental health: A meta-analysis. *Electronic physician*, 9(9), 5212–5222.
- Harris, J., Frank, J., Jordan, M., et al. (2013). Return to sport following shoulder surgery in the elite pitcher: a systematic review. *Sports Health*, 5(4), 367-376.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. London: Guilford.
- Heaney, C.A., Rostron, C.L., Walker, N., & Green A. (2017) The impact of a sport psychology education intervention on physiotherapists. *European Journal of Physiotherapy*, 19:2, 97-103.
- Heaney, C.A, Walker, N., Green, A., & Rostron, C. (2015). Sport psychology education for sport injury rehabilitation professionals: a systematic review. *Physical Therapy in Sport*, 16:72-79.
- Heaney, C.A, Green, A., Rostron, C., & Walker, N. (2012). A qualitative and quantitative investigation of the psychology content of uk physiotherapy education programs. *Journal of Physical Therapy Education*, 26(3), 48–56.

- Heaney, C.A. (2006) Physiotherapists' perceptions of sport psychology intervention in professional soccer. *International Journal of Sport and Exercise Psychology*, 4:1, 73-86.
- Heijne, A., Axelsson, K., Werner, S., & Biguet, G. (2008). Rehabilitation and recovery after anterior cruciate ligament reconstruction: patients experiences. *Scandinavian Journal of Medicine and Science in Sports*, 18, 325-35.
- Helgesson, G., Ludvigsson, J., Gustafsson Stolt U. (2005). How to handle informed consent in longitudinal studies when participants have a limited understanding of the study. *Journal of Medical Ethics*, 31, 670-673.
- Hildingsson, M., Fitzgerald, U. T., & Alricsson, M. (2018). Perceived motivational factors for female football players during rehabilitation after sports injury - a qualitative interview study. *Journal of Exercise Rehabilitation*, 14(2), 199–206.
- Hogan, B.E., Linden, W., & Najarian, B. (2002). Social support interventions: Do they work? *Clinical Psychology Reviews*, 22(3), 381-440.
- Howard, R.W. (2011). Testing the accuracy of the retrospective recall method used in expertise research. *Behavioural Research*, 43, 931-941.
- Howe, K. R. (1988). Against the Quantitative-Qualitative Incompatibility Thesis or Dogmas Die Hard. *Educational Researcher*, 17(8), 10–16.
- Hsu, C. J., Meierbachtol, A., George, S. Z., & Chmielewski, T. L. (2017). Fear of Reinjury in Athletes. *Sports Health*, 9(2), 162–167.
- Igwesi-Chidobe, C. N., Coker, B., Onwasigwe, C. N., Sorinola, I. O., & Godfrey, E. L. (2017). Biopsychosocial factors associated with chronic low back pain disability in rural Nigeria: a population-based cross-sectional study. *BMJ Global Health*, 2(3), e000284. <https://doi.org/10.1136/bmjgh-2017-000284>.

- Iida, M., Shrout, P., Laurenceau, J., & Bolger, N. (2012). Using diary methods in psychological research. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 1. Foundations, planning, measures, and psychometrics* (pp. 277-305). Washington, DC: American Psychological Association.
- Ishøi, L., Thorborg, K., Kraemer, O., & Hölmich, P. (2018). Return to Sport and Performance After Hip Arthroscopy for Femoroacetabular Impingement in 18- to 30-Year-Old Athletes: A Cross-sectional Cohort Study of 189 Athletes. *The American Journal of Sports Medicine*, 46(11), 2578–2587.
- Ivarsson, A., Johnson, U., Karlsson, J., Börjesson, M., Hägglund, M., Andersen, M., & Waldén, M. (2019). Elite female footballers' stories of sociocultural factors, emotions, and behaviours prior to anterior cruciate ligament injury. *International Journal of Sport and Exercise Psychology*, 17(6), 630-646.
- Ivarsson, A., Johnson, U., Lindwall, M., Gustafsson, H., & Altemyr, M. (2014). Psychosocial stress as a predictor of injury in elite junior soccer: a latent growth curve analysis. *Journal of Science and Medicine in Sport*, 17, 366-370.
- Ivarsson, A., Stambulova, N., & Johnson, U. (2018). Injury as a career transition: Experiences of a Swedish elite handball player. *International Journal of Sport and Exercise Psychology*, 16(4), 365-381,
- Ivarsson, A., Tranaeus, U., Johnson, U., & Stenling, A. (2017). Negative psychological responses of injury and rehabilitation adherence effects on return to play in competitive athletes: a systematic review and meta-analysis. *Open Access Journal of Sports Medicine*, 8, 27-32.
- Jakobsen, J.C., Gluud, C., Wetterslev, J., & Winkel, P. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials

– a practical guide with flowcharts. *BMC Medical Research Methodology*, 17, 162.

- Jensen, K., Petrovic, P., Kerr, C., Kirsch, I., Raicek, J., Cheetham, A., ... Kaptchuk, T. (2014). Sharing pain and relief: neural correlates of physicians during treatment of patients. *Molecular Psychiatry*, 19(3), 392-398.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33(7), 14–26.
- Johnson, U., Ivarsson, A., Karlsson, J., Hägglund, M., Waldén, M., & Börjesson, M. (2016). Rehabilitation after first-time anterior cruciate ligament injury and reconstruction in female football players: A study of resilience factors. *BMC Sports Science, Medicine and Rehabilitation*, 8(1), 20.
- Johnson, U. (1997). A three-year follow-up of long-term injured competitive athletes: influence of psychological risk factors on rehabilitation. *Journal of Sports Rehabilitation*, 6(3), 256-71.
- Johnson, U. (1996). The multiply injured versus the first-time-injured athlete during rehabilitation: a comparison of nonphysical characteristics. *Journal of Sports Rehabilitation*, 5(4), 293-304.
- Jones, B., Till, K., Emmonds, S., Hendricks, S., Mackreth, P., Darall-Jones, J., ... Rock, A. (2019). Accessing off-field brains in sport; an applied research model to develop practice. *British Journal of Sports Medicine*, 53, 791-793.
- Jones, I., Brown, L., & Holloway, I. (2013). *Qualitative Research in Sport and Physical Activity*. London: Sage Publications.
- Junge, A., & Dvořák, J. (2015). Football injuries during the 2014 FIFA World Cup. *British Journal of Sports Medicine*, 49(9), 599-602.

- Kang, H., Park, M., & Wallace, J. (2018). The impact of perceived social support, loneliness, and physical activity on quality of life in South Korean older adults. *Journal of Sport and Health Science*, 7(2), 237-244.
- Kellezi, B., Baines, D., Coupland, C., Beckett, K., Barnes, J., Sleney, J., ... Kendrick, D. (2016). The impact of injuries on health service resource use and cost to primary and secondary care in the English NHS. *Journal of Public Health*, 38(4), 464-471.
- Kemp, J., Collins, N., Makdissi, M., Schache, A., Machotka, Z., & Crossley, K. (2012). Hip arthroscopy for intra-articular pathology: a systematic review of outcomes with and without femoral osteoplasty. *British Journal of Sports Medicine*, 46, 632-43.
- King, J., Roberts, C., Hard S., & Arden, C.L. (2019). Want to improve return to sport outcomes following injury? Empower, engage, provide feedback and be transparent: 4 habits! *British Journal of Sports Medicine*, 53, 526-527.
- Kitaguchi, T., Tanaka, Y., Takeshita, S., Tsujimoto, N., Kita, K., Amano, H., ... Horibe, S. (2019). Importance of functional performance and psychological readiness for return to pre-injury level of sports 1 year after ACL reconstruction in competitive athletes. *Knee Surgery, Sports Traumatology, Arthroscopy*, 28(7), 2203-2212.
- Kleinert, J. (2002) An approach to sport injury trait anxiety: Scale construction and structure analysis. *European Journal of Sport Science*, 2(3), 1-12
- Kolt, G.S., & McEvoy, J.F. (2003) Adherence to rehabilitation in patients with low back pain. *Manual Therapy*, 8, 110-116.
- Krosnick, J.A., & Presser, S. (2010). Question and questionnaire design. *Handbook of Survey Research*. 2(3), 263-314.

- Krustrup, P., & Krustrup, B.R. (2018). Football is medicine: it is time for patients to play! *British Journal of Sports Medicine*, 52, 1412-1414.
- Krustrup P, Skoradal MB, Randers MB, Weihe, P., Uth, J., Mortensen, J., ... Mohr, M. (2017). Broad-spectrum health improvements with one year of soccer training in inactive mildly hypertensive middle-aged women. *Scandinavian Journal of Medicine and Science in Sports*, 27, 1893- 1901.
- Kübler-Ross, E. (1969). *On Death and Dying*. New York: The McMillan Company.
- Kuhn, T. S. (1996). *The structure of scientific revolutions 2nd Edition*. Chicago, IL: University of Chicago Press.
- Kvist, J., Ek, A., Sporrstedt, K., & Good, L. (2005). Fear of re-injury: a hindrance for returning to sports after anterior cruciate ligament reconstruction. *Knee Surgery, Sports Traumatology, Arthroscopy*, 13, 393–397.
- Kyritsis, P., Bahr, R., Landreau, P., Miladi, R., & Witvrouw, E. (2016). Likelihood of ACL graft rupture: not meeting six clinical discharge criteria before return to sport is associated with a four times greater risk of rupture. *British Journal of Sports Medicine*, 50, 946-951.
- Lai, C.C., Ardern, C.L., Feller, J.A., & Webster, K. (2018). Eighty-three per cent of elite athletes return to preinjury sport after anterior cruciate ligament reconstruction: a systematic review with meta-analysis of return to sport rates, graft rupture rates and performance outcomes. *British Journal of Sports Medicine*, 52, 128-138.
- Langford, J.L., Webster, K., & Feller, J.A. (2009). A prospective longitudinal study to assess psychological changes following anterior cruciate ligament reconstruction surgery. *British Journal of Sports Medicine*, 43(5), 377-8.

- Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lentz, T.A., Paterno, M.V., & Riboh, J.C. (2018). So, you think you can return to sport? *British Journal of Sports Medicine*, Published Online First: 26 February 2018.
doi: 10.1136/bjsports-2017-099006
- Lentz, T.A., Zeppieri, G., Tillman, S.M., Moser, M.W., Farmer, K.W., & Chmielewski, T.L. (2015). Comparison of physical impairment, functional, and psychosocial measures based on fear of reinjury/lack of confidence and return-to-sport status after ACL reconstruction. *American Journal of Sports Medicine*, 43(2), 345-353.
- Levitt, H. M., Motulsky, S. L., Wertz, F. J., Morrow, S. L., & Ponterotto, J. G. (2017). Recommendations for designing and reviewing qualitative research in psychology: Promoting methodological integrity. *Qualitative Psychology*, 4(1), 2-22.
- Levy, A. R., Polman, R. C. J., & Borkoles, E. (2008). Examining the relationship between perceived autonomy support and age in the context of rehabilitation adherence in sport. *Rehabilitation Psychology*, 53(2), 224–230.
- Levy, A., Polman, R. C. J., & Clough, P. J. (2008). Adherence to sport injury rehabilitation programmes: An integrated psycho-social approach. *Scandinavian Journal of Medicine & Science in Sports*, 18(6), 798-809.
- Lin, I., Wiles, L., Waller, R., Goucke, R., Nagree, Y., Gibberd, M., ... O'Sullivan, P. (2020). What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review. *British Journal of Sports Medicine*, 54, 79-86.

- Lloyd-Jones, M. (2004). Application of systematic review methods to qualitative research: Practical issues. *Journal of Advanced Nursing*, 48, 271-8.
- Lonsdale, C., Hodge, K., & Rose, E.A. (2006). Pixels vs. paper: comparing online and traditional survey methods in sport psychology. *Journal of Sport and Exercise Psychology*, 28(1), 100-108.
- Maddison, R., Prapavessis, H., & Clatworthy, M. (2006). Modeling and rehabilitation following anterior cruciate ligament reconstruction. *Annals of Behaviour Medicine*, 31, 89-98.
- Mainwaring, L. (1999). Restoration of the self: A model for the psychological response of athletes to severe knee injuries. *Canadian Journal of Rehabilitation*, 12, 145-56.
- Mallett, R., Hagen-Zanker, J., Slater, R., & Duvendack, M. (2012). The benefits and challenges of using systematic reviews in international development research. *Journal of Development Effectiveness*, 4(3), 445-455,
- Mallows, A., Debenham, J., Walker, T., & Littlewood, C. (2017). Association of psychological variables and outcome in tendinopathy: a systematic review. *British Journal of Sports Medicine*, 51, 743-748.
- Mankad, A., Gordon, S., & Wallman, K. (2009). Perceptions of emotional climate among injured athletes. *Journal of Clinical Sports Psychology*, 3(1), 1-14.
- Martikainen, P., Bartley, M., & Lahelma, E. (2002). Psychosocial determinants of health in social epidemiology. *International Journal of Epidemiology*, 31,1091-3.
- Maurice, S., Kuklick, C., & Anderson, M. (2017). Providing social support to injured athletes: Applications of the international sport coaching framework. *International Journal of Physical Education, Sports and Health*, 4(5), 166-175.

- Maxwell, S.E., & Cole, D.A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, 12(1), 23-24.
- May, E.M., Hunter, B.A. & Jason, L.A. (2017). Methodological Pluralism and Mixed Methodology to Strengthen Community Psychology Research: An Example from Oxford House. *Journal of Community Psychology*, 45: 100-116.
- May, N., & Pope, C. (2000). Assessing quality in qualitative research. *British Medical Journal*, 320, 50-2.
- Mayan, M. J. (2009). *Essentials of Qualitative Inquiry*. New York: Routledge.
- McCall, A., Lewin, C., O'Driscoll, G., Witvrouw, E., & Arden, C.L. (2017). Return to play: the challenge of balancing research and practice. *British Journal of Sports Medicine*, 51, 702-703.
- McDonald, S., & Hardy, C. (1990). Affective response patterns of the injured athlete: an exploratory analysis. *The Sport Psychologist*, 4, 261-74.
- McPherson, A. L., Feller, J. A., Hewett, T. E., & Webster, K. E. (2019a). Smaller change in psychological readiness to return to sport is associated with second anterior cruciate ligament injury among younger patients. *The American Journal of Sports Medicine*, 47(5), 1209–1215.
- McPherson, A. L., Feller, J. A., Hewett, T. E., & Webster, K. E. (2019b). Psychological readiness to return to sport is associated with second anterior cruciate ligament injuries. *The American Journal of Sports Medicine*, 47(4), 857–862.
- Meierbachtol, A., Yungtum, W., Paur, E., Bottoms, J., & Chmielewski, T.L. (2018). Psychological and functional readiness for sport following advanced group training in patients with anterior cruciate ligament reconstruction. *Journal of Orthopaedic & Sports Physical Therapy*, 48(11), 864-872.

- Meo, A.I. (2010). Picturing students' habitus; the advantages and limitations of photo-elicitation interviewing in a qualitative study in the city of Buenos Aires. *International Journal of Qualitative Methods*, 9(2), 149-171.
- Mendonza, M., Patel, H., & Bassett, S. (2007). Influences of psychological factors and rehabilitation adherence on the outcome post anterior cruciate ligament injury/surgical reconstruction. *New Zealand Journal of Physiotherapy*, 35(2), 62-71.
- Miciak, M., Mayan, M., Brown, C., Joyce, A. S., & Gross, D. P. (2018). The necessary conditions of engagement for the therapeutic relationship in physiotherapy: an interpretive description study. *Archives of Physiotherapy*, 8, 3.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage Publications.
- Mitchell, I., Evans, L., Rees, T., & Hardy, L. (2014). Stressors, social support, and tests of the buffering hypothesis: Effects on psychological responses of injured athletes. *British Journal of Health Psychology*, 19, 486-508.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *British Medical Journal*, 339, 332-6.
- Morgan, D.L. (2007). Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, 1(1), 48-76.
- Murad, M., Asi, N., Alsawas, M., & Aladab, F. (2016). New evidence pyramid. *BMJ Evidence-Based Medicine*, 21, 125-127.

- Murphy, P., & Waddington, I. (2007). Are elite athletes exploited? *Sport in Society*, 10 (2), 239–255.
- Murray, A., Hall, A., Williams, G., McDonough, S., Ntoumanis, N., Taylor, I., ... Lonsdale, C. (2015). Effect of a self-determination theory based communication skills training program on physiotherapists' psychological support for their patients with chronic low back pain: A randomized controlled trial. *Archives of Physical Medicine and Rehabilitation*, 96, 809-816.
- Munn, Z., Peters, M.D.J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18, 143.
- Morse, J. (2020). The changing face of qualitative research. *International Journal of Qualitative Methods*, 19, 1-7.
- Morse, J. (2003). Principles of mixed methods and multi-method research design. In C. Teddlie, & A. Tashakkori (Eds.), *Handbook of Mixed Methods in Social and Behavioral Research* (pp. 189-208). Thousand Oaks, CA: Sage Publication.
- Muthén, L. K., & Muthén, B. O. (1998 –2012). *Mplus user's guide (7th ed.)*. Los Angeles, CA: Muthén & Muthén.
- Nilsson, E., & Kristenson, M. (2010). Psychological factors related to physical, social, and mental dimensions of the SF-36: a population-based study of middle-aged women and men. *Patient Related Outcomes Measures*, 1, 153-162.
- Norlin, T., Tranaeus Fitzgerald, U., & Alricsson, M. (2016). Barriers to and possibilities of returning to play after a severe soccer injury: a qualitative study. *European Journal of Physiotherapy*, 18(3), 179-184.

- Núñez, M., Sastre, S., Núñez, E., Lozano, L., Nicodemo, C., & Segur, J. (2012). Health-related quality of life and direct costs in patients with anterior cruciate ligament injury: single-bundle versus double-bundle reconstruction in a low-demand cohort--a randomized trial with 2 years of follow-up. *Arthroscopy*, 28(7), 929-35.
- Nunnally, J. C., & Bernstein, I. H. (1994) *Psychometric theory (3rd ed.)*. New York, NY: McGraw-Hill, Inc.
- Nwachukwu, B., Adjei, J., Rauk, R., Chala, J., Okoroha, K., Verma, N., ... Williams III, R. (2019). How much do psychological factors affect lack of return to sport after anterior cruciate ligament reconstruction? A systematic review. *Orthopaedic Journal of Sports Medicine*, 7(5), 2325967119845313.
<https://dio.org/10.1177/23252967119845313>.
- Oliver, P. (2014). *Writing Your Thesis 3rd Edition*. London: Sage Publications.
- Olmedilla, A., Rubio, V.J, Fuster-Parra, P., Pujals, C., & Garcia-Mas, A. (2018). A Bayesian approach to sport injuries likelihood: does players self-efficacy and environmental factors play the main role? *Frontiers in Psychology*, 9, 1174.
- Owen, M. (25th August, 2018). From Honest and emotional Michael Owen on how he went from ballon d'Or winner to Stoke's bench [YouTube video]
https://www.youtube.com/watch?v=2YFEwTa_DjU [Accessed 16th December, 2019].
- Pace, R., Pluye, P., Bartlett, G., Macauley, A., Salsberg, J., Jagosh, J., ... Seller, R. (2012). Testing the reliability and efficiency of the pilot Mixed Methods Appraisal Tool (MMAT) for Systematic Mixed Studies Reviews. *International Journal of Nursing Studies*, 49(1), 47-53.

- Park, Y., Konge, L., & Artino, A. (2019). The positivism paradigm of research. *Academic Medicine*, doi:10.1097/ACM.0000000000003093.
- Paterno, M. V., Flynn, K., Thomas, S., & Schmitt, L. C. (2018). Self-Reported fear predicts functional performance and second acl injury after acl reconstruction and return to sport: a pilot study. *Sports Health*, 10(3), 228–233.
- Patton, M.Q. (2002). *Qualitative evaluation and research methods (3rd ed.)*. Newbury Park, CA: Sage Publications.
- Pederson, P. (1986). The grief response and injury: A special challenge for athletes and athletic trainers. *Athletic Training*, 21, 312-314.
- Petty, N.J., & Ryder, D. (2018). *Musculoskeletal Examination and Assessment 5th Edition*. Edinburgh: Elsevier.
- Phelan, B., King, E., Richter, C., Webster, K., & Falvey, E. (2019). A comparison of anterior cruciate ligament - Return to sports after injury (ACL-RSI) scores of male athletes nine-months Post-ACL reconstruction with matched uninjured controls. *Physical Therapy in Sport*, 38, 179-183.
- Podlog, L., Banham, S. M., Wadey, R., & Hannon, J. C. (2015). Psychological readiness to return to competitive sport following injury: A qualitative study. *The Sport Psychologist*, 29(1), 1–14.
- Podlog, L., Gao, Z., Kenow, L., Kleinart, J., Granquist, M., Newton, M., & Hannon, J. (2013a). Injury rehabilitation over adherence: preliminary scale validation and relationships with athletic identity and self-presentation concerns. *Journal of Athletic Training*, 48(3), 372-382.
- Podlog, L., Wadey, R., Stark, A., Lochbaum, M., Hannon, J., & Newton, M. (2013b). An adolescent perspective on injury recovery and the return to sport. *Psychology of Sport & Exercise*, 14(4), 437-446.

- Podlog, L., Dimmock, J., & Miller, J. (2011). A review of return to sport concerns following injury rehabilitation: Practitioner strategies for enhancing recovery outcomes. *Physical Therapy in Sport*, 12(1), 36-42.
- Podlog, L., Lochbaum, M., & Stevens, T. (2010). Need Satisfaction, well-being, and perceived return-to-sport outcomes among injured athletes. *Journal of Applied Sport Psychology*, 22(2), 167-182.
- Podlog, L., & Eklund, B.C. (2009). High-level athletes' perceptions of success in returning to sport following injury. *Psychology of Sport and Exercise*, 10, 535-544.
- Podlog, L., & Eklund, R. C. (2007). The psychosocial aspects of a return to sport following serious injury: A review of the literature from a self-determination perspective. *Psychology of Sport and Exercise*, 8(4), 535–566.
- Podlog, L., & Eklund, R.C. (2006). A longitudinal investigation of competitive athletes' return to sport following serious injury. *Journal of Applied Sport Psychology*, 18(1), 44-68.
- Poget, F., Blackburn, T., Descloux, F., & Fiddler, H. (2019). Participating in an exercise group after anterior cruciate ligament reconstruction (ACLR) is perceived to influence psychosocial factors and successful recovery: a focus group qualitative study. *Physiotherapy*, 105(4), 492-500.
- Popa, G., & Padea, D. (2013). Stress-related growth, self-esteem and perceived self-efficacy among professional rescuers. *Procedia - Social and Behavioral Sciences*, 89, 720-724.

- Porter, R., Morrow, S., & Reel, J. (2013). Winning looks: body image among adolescent female competitive swimmers. *Qualitative Research in Sport, Exercise and Health*, 5(2), 179-195.
- Prati, G., & Pietrantonio, L. (2010). The relation of perceived and received social support to mental health among first responders: a meta-analytic review. *Journal of Community Psychology*, 38(3), 403-417.
- Prinsen, C.A., Mokkink L.B., Boute, L.M., Alonso, J., Patrick, D.L., de Vet, H.C., & Terwee, C.B. (2018). COSMIN guideline for systematic reviews of patient-reported outcome measures. *Quality of Life Research*, 27(5), 1147–1157.
- Prinz, B., Dvořák, J., & Junge, A. (2016). Symptoms and risk factors of depression during and after the football career of elite female players. *BMJ Open Sport & Exercise Medicine*, 2, e000124.
- Putukian, M., & Echemendia, R. (2007). Psychological aspects of serious head injury in the competitive athlete. *Clinical Sports Medicine*, 22(3), 617-630.
- Quinn, A.M., & Fallon, B.J. (1999). The changes in psychological characteristics and reactions of elite athletes from injury onset until full recovery. *Journal of Applied Sport Psychology*, 11(2), 210-229.
- Rees, T., Mitchell, I., Evans, L., & Hardy, L. (2010). Stressors, social support and psychological responses to sport injury in high- and low-performance standard participants. *Psychology of Sport & Exercise*, 11(6), 505-512.
- Refshauge, K.M, & Maher, C.G. (2006). Low back pain investigations and prognosis: a review. *British Journal of Sports Medicine*, 40, 494-498.

- Renshaw, A., & Goodwin, P.C. (2016). Injury incidence in a Premier League youth soccer academy using the consensus statement: a prospective cohort study. *BMJ Open Sport & Exercise Medicine*, 2:e000132.
- Rice, S.M., Gwyther, K., Santesteban-Echarri, O., Baron, D., Gorczynski, P., Gouttebauge, V., ... Purcell, R. (2019). Determinants of anxiety in elite athletes: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 53:722-730.
- Ristolainen, L., Kettunen, J. A., Kujala, U. M., & Heinonen, A. (2012). Sport injuries as the main cause of sport career termination among Finnish top-level athletes. *European Journal of Sport Science*, 12(3), 274-282.
- Rodriguez, R.M., Marroquin, A., & Cosby, N. (2019). Reducing fear of reinjury and pain perception in athletes with first-time anterior cruciate ligament reconstructions by implementing imagery training. *Journal of Sport Rehabilitation*, 28, 385-389.
- Ross, C.A., Clifford, A., & Louw, A.Q. (2017) Factors informing fear of reinjury after anterior cruciate ligament reconstruction. *Physiotherapy Theory and Practice*, 33:2, 103-114,
- Roy-Davis, K., Wadey, R., & Evans, L. (2017). A grounded theory of sport injury-related growth. *Sport, Exercise, and Performance Psychology*, 6(1), 35–52.
- Rubin, H.J., & Rubin, I.S. (2012). *Qualitative interviewing: the art of hearing data (3rd ed)*. Thousand Oaks, CA: Sage Publications.
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, 5, 359–371.

- Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behaviour change and its maintenance: Interventions based on self-determination theory. *European Health Psychologist*, 10, 2–5.
- Ryan, R. M., & Deci, E. L. (2007). Active human nature: Self-determination theory and the promotion and maintenance of sport, exercise, and health. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 1-19). Champaign, IL: Human Kinetics.
- Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Sale, J.E.M., Lohfeld, L.H. & Brazil, K. (2002). Revisiting the Quantitative-Qualitative Debate: Implications for Mixed-Methods Research. *Quality & Quantity*, 36, 43–53.
- Sandon, A., Werner, S., & Forssblad, M. (2015). Factors associated with returning to football after anterior cruciate ligament reconstruction. *Knee Surgery, Sports Traumatology, Arthroscopy*, 23(9):2514-2521.
- Santi, G. & Pietrantonio, L. (2013) Psychology of sport injury rehabilitation: a review of models and interventions. *Journal of Human Sport & Exercise*, 8(4), 1029-1044.
- Saw, A.E., Main, L.C., & Gastin, P.B. (2016). Monitoring the athlete training response: subjective self-reported measures trump commonly used objective measures: a systematic review. *British Journal of Sports Medicine*, 50, 281-291.
- Schmitt, L. C., Paterno, M. V., Ford, K. R., Myer, G. D., & Hewett, T. E. (2015). Strength asymmetry and landing mechanics at return to sport after anterior

- cruciate ligament reconstruction. *Medicine and Science in Sports and Exercise*, 47(7), 1426–1434.
- Schwab-Reese, L.M., Pittsinger, R., & Yang, J. (2012). Effectiveness of psychological intervention following sport injury. *Journal of Sport and Health Science*, 1(2), 71-79.
- Scott, P. J., & Briggs, J. S. (2009). A pragmatist argument for mixed methodology in medical informatics. *Journal of Mixed Methods Research*, 3(3), 223–241.
- Sedgewick, P., (2014). Cross-sectional studies: advantages and disadvantages. *British Medical Journal*, 348, g2276.
- Shaw, J.A., Connelly, D., & Zecevic, A. (2010). Pragmatism in practice: mixed methods research for physiotherapy. *Physiotherapy Theory and Practice*, 26(8), 510-518.
- Shaw, R.L. (2010). Embedding reflexivity within experiential qualitative psychology. *Qualitative Research in Psychology*, 7(3), 233-243.
- Sherbourne, C., & Stewart, A. (1991). The MOS Social Support Survey. *Social Science & Medicine*, 32(6), 705-714.
- Shrier, I. (2015). Strategic Assessment of Risk and Risk Tolerance (StARRT) framework for return-to-play decision-making. *British Journal of Sports Medicine*, 49, 1311-1315.
- Shrier, I., Charland, L., Mohtadi, N.G.H., Meeuwisse, W.H., & Matheson, G.O. (2010). The sociology of return-to-play decision making: a clinical perspective. *Clinical Journal of Sports Medicine*, 20(5), 333-5.

- Slade, S.C., Patel, S., Underwood, M., & Keating, J.L. (2018). Rigorous qualitative research in sports, exercise and musculoskeletal medicine journals is important and relevant. *British Journal of Sports Medicine*, 52, 1409-1410.
- Slagers, A.J., Reininga, I., Geertzen, J., Zwerver, J., & van den Akker-Scheek, I. (2019a) Translation, cross-cultural adaptation, validity, reliability and stability of the Dutch Injury - Psychological Readiness to Return to Sport (I-PRRS-NL) scale. *Journal of Sports Sciences*, 37(9), 1038-1045.
- Slagers, A.J., van den Akker-Scheek, I., Geertzen, J., Zwerver, J., & Reininga, I. (2019b). Responsiveness of the anterior cruciate ligament – Return to Sports after Injury (ACL-RSI) and Injury – Psychological Readiness to Return to Sport (I-PRRS) scales. *Journal of Sports Sciences*, 37(21), 2499-2505.
- Smith, B. (2018). Generalizability in qualitative research: misunderstandings, opportunities and recommendations for the sport and exercise sciences, *Qualitative Research in Sport, Exercise and Health*, 10(1), 137-149.
- Smith, B., & McGannon, KR. (2017). Developing rigor in qualitative research: problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology*, 11(1), 101-121.
- Snowden, M. (2015). Use of diaries in research. *Nursing Standard*, 29 (44), 36-41.
- Sonesson, S., Kvist, J., Ardern, C.L., Österberg, A., & Grävare Silbernagel, K. (2017). Psychological factors are important to return to pre-injury sport activity after anterior cruciate ligament reconstruction: Expect and motivate to satisfy. *Knee Surgery, Sports Traumatology, Arthroscopy*, 25(5), 1375.
- Spielberger, C.D. (1972). *Anxiety as an emotional state*. In C.D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (Vol. 1, pp. 24–49). New York:Academic Press.

Sport England, 'Active Peoples Survey Report',

https://www.sportengland.org/media/11746/1x30_sport_16plus-factsheet_aps10.pdf. (accessed 17th June, 2019).

Steffen, K., Pensgaard, A. M. & Bahr, R. (2009), Self-reported psychological characteristics as risk factors for injuries in female youth football. *Scandinavian Journal of Medicine & Science in Sports*, 19: 442–451.

Stenling, A., Ivarsson, A., & Lindwall, M. (2017). The only constant is change: analysing and understanding change in sport and exercise psychology research. *International Review of Sport and Exercise Psychology*, 10(1), 230-251.

Stevens, M., Cruwys, T. & Murray, K. (2020), Social support facilitates physical activity by reducing pain. *British Journal of Health Psychology*.
doi:[10.1111/bjhp.12424](https://doi.org/10.1111/bjhp.12424)

Stokes, D.E. (1997). *Pasteur's Quadrant: Basic Science and Technological Innovation*. Washington: Brooking Institution Press.

Swann, C., Keegan, R., Piggott, D., & Crust, L. (2012). A systematic review of the experience, occurrence, and controllability of flow states in elite sport. *Psychology of Sport and Exercise*, 13, 807-19.

Swann, C., Moran, A., & Piggott, D. (2015). Defining elite athletes: Issues in the study of expert performance in sport psychology. *Psychology of Sport and Exercise*, 16, 3-14.

Tabachnick, B.G., & Fidell, L. S. (2007). *Using multivariate statistics (5th ed.)*. Boston, MA: Pearson.

- Taberner, M., Allen, T., & Cohen, D.D. (2019). Progressing rehabilitation after injury: consider the ‘control-chaos continuum’. *British Journal of Sports Medicine*, 53, 1132-1136.
- Tariq, S., & Woodman, J. (2013). Using mixed methods in health research. *Journal of the Royal Society of Medicine Short Reports*, 4(6), 2042533313479197.
- te Wierike, S., van der Sluis, A., van den Akker-Scheek, M., Elferink-Gemser, M., & Visscher, C. (2013). Psychosocial factors influencing the recovery of athletes with anterior cruciate ligament injury: a systematic review. *Scandinavian Journal of Medicine and Science in Sports*, 23, 527-40.
- Teddlie, C., & Tashakkori, A. (2010). Overview of Contemporary Issues in Mixed Methods Research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of Mixed Methods in Social and Behavioral Research* (2nd ed., pp. 1–42). Thousand Oaks, CA: Sage Publications.
- Teddlie, C., & Tashakkori, A. (2012). Common “core” characteristics of mixed methods research: a review of critical issues and call for greater convergence. *American Behavioral Scientist*, 56(6), 774–788.
- Tegnander, A., Olsen, O. E., Moholdt, T. T., Engebretsen, L., & Bahr, R. (2008). Injuries in Norwegian female elite soccer: A prospective one-season cohort study. *Knee Surgery, Sports Traumatology, Arthroscopy*, 16(2), 194-198.
- Thatcher, J., Kerr, J., Amies, K., & Day, M. (2007). A reversal theory analysis of psychological responses during sports injury rehabilitation. *Journal of Sports Rehabilitation*, 16(4), 343-62.
- Thing, L. (2006). “Voices of the broken body”. The resumption of nonprofessional female players’ careers after anterior cruciate ligament injury. The female players’

dilemma: is she willing to run the risk? *Scandinavian Journal of Medicine and Science in Sports*, 16, 486-92.

Thomee, P., Wahrborg, M., Borjesson, R., Thomee, R., Eriksson, B.I., & Karlsson, J. (2007). Self-efficacy, symptoms and physical activity in patients with an anterior cruciate ligament injury: A prospective study. *Scandinavian Journal of Medicine & Science in Sports*, 17, 238-245.

Timmins, R.G., Bourne, M.N., Shield, A.J., Williams, M.D., Lorenzen, C., & Opar, D.A. (2016). Short biceps femoris fascicles and eccentric knee flexor weakness increase the risk of hamstring injury in elite football (soccer): a prospective cohort study. *British Journal of Sports Medicine*, 50, 1524-1535.

Tol, J.L, Hamilton, B., Eirale, C., Muxart, P., Jacobsen, P., & Whiteley, R. (2014). At return to play following hamstring injury the majority of professional football players have residual isokinetic deficits. *British Journal of Sports Medicine*, 48(18),1364-9.

Tracey, J. (2003). The emotional response to the injury and rehabilitation process. *Journal of Applied Sport Psychology*, 15(4), 279-93.

Tracy, S.J. (2010). Qualitative quality: eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10):837-851.

Tripp, D. A., Stanish, W., Ebel-Lam, A., Brewer, B. W., & Birchard, J. (2011). Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes with anterior cruciate ligament injuries at 1-year post-surgery. *Sport, Exercise, and Performance Psychology*, 1(S), 38-48.

Truong, L.K., Mosewich, A., Holt, C., Le, C., Miciak, M & Whittaker, J. (2020). Psychological, social and contextual factors across recovery stages following a

sport-related knee injury: a scoping review. *British Journal of Sports Medicine*, doi: 10.1136/bjsports-2019-101206.

Tscholl, P., Vaso, M., Weber, A.S., & Dvorak, J. (2014). High prevalence of medication uses in professional football tournaments including the World Cup between 2002 and 2014; a narrative review with a focus on NSAIDs. *British Journal of Sports Medicine*, 49(9), 580-582.

Tushman, M.L., & O'Reilly, C. (2007). Research and relevance: Implications of Pasteur's quadrant for doctoral programs and faculty development. *Academy of Management Journal*, 50, 769-74.

Udry, E., Shelbourne, D.K., & Gray, T. (2003). Psychological readiness for anterior cruciate ligament surgery: describing and comparing the adolescent and adult experiences. *Journal of Athletic Training*, 38(2), 167-171.

Udry, E., Gould, D., Bridges, D., & Beck, L. (1997). Down but not out: Athlete responses to season-ending injuries. *Journal of Sport & Exercise Psychology*, 19(3), 229-248.

van Kampen, D.A., Willems, W.J., van Beers, L., Castelein, R., Scholtes, V., Terwee, C. (2013). Determination and comparison of the smallest detectable change (SDC) and the minimal important change (MIC) of four-shoulder patient-reported outcome measures (PROMs). *Journal of Orthopaedic Surgery and Research*, 8, 40.

van Manen, M. (2007). Phenomenology of practice. *Phenomenology & Practice*, 1(1), 11-30.

Vergeer, I. (2006). Exploring the mental representation of athletic injury: A longitudinal case study. *Psychology of Sport Exercise*, 7(1):99-114.

- Vergnes, J., Marchal-Sixou, C., Nabet, C., Maret, D., & Hamel, O. (2010). Ethics in systematic reviews. *Journal of Medical Ethics*, 36(12), 771-774.
- Wade, M.V. (2006). *Likert-type scale response anchors*. Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management, Clemson University.
- Wadey, R., Podlog, L., Galli, N., & Mellalieu, S. (2016). Stress-related growth following sport injury: examining the applicability of the organismic valuing theory. *Scandinavian Journal of Medicine and Science in Sport*, 26(10), 1132-1139.
- Wadey, R., Podlog, L., Hall, M., Hamson-Utley, J., Hicks-Little, C., & Hammer, C. (2014). Reinjury Anxiety, Coping, and Return-to-Sport Outcomes: A Multiple Mediation Analysis. *Rehabilitation Psychology*, 59(3), 256-266.
- Wadey, R., Clark, S., Podlog, L., & McCullough, D. (2013). Coaches' perceptions of athletes' stress-related growth following sport injury. *Psychology of Sport and Exercise*, 14, 125-35.
- Wadey, R., Evans, L., Evans, K., & Mitchell, I. (2011). Perceived benefits following sport injury: a qualitative examination of their antecedents and underlying mechanisms. *Journal of Applied Sport Psychology*, 23:2, 142-158.
- Walker, N., & Heaney, C. (2013). Psychological responses to injury: a review and critique of existing models. In M. Arvinen-Barrow, Monna & N. Walker (Eds). *The Psychology of Sport Injury and Rehabilitation* (pp.23-38). Abingdon: Routledge.
- Walker, N., & Thatcher, J. (2011). The emotional response to athletic injury: Re-injury anxiety. In J. Thatcher, M. Jones, & D. Lavalley (Eds.), *Coping and emotion in sport* (2nd ed., pp. 236–260). New York, NY: Routledge.

- Walker, N., Thatcher, J., & Lavalley, D.E. (2010). A preliminary development of the re-injury anxiety inventory (RIAI). *Physical Therapy in Sport*, 11(1), 23-29.
- Walker, N., Thatcher, J., & Lavalley, D. (2007). Review: Psychological responses to injury in competitive sport: a critical review. *Journal of the Royal Society for the Promotion of Health*, 127(4), 174–180.
- Wankel, L.M., & Berger, B.G. (1990) The Psychological and Social Benefits of Sport and Physical Activity, *Journal of Leisure Research*, 22:2, 167-182.
- Webster, K. E., & Feller, J. A. (2019). Expectations for return to preinjury sport before and after anterior cruciate ligament reconstruction. *The American Journal of Sports Medicine*, 47(3), 578–583.
- Webster, K.E., Hewett, T.E. (2019). What is the evidence for and validity of return-to-sport testing after anterior cruciate ligament reconstruction surgery? a systematic review and meta-analysis. *Sports Medicine*, **49**, 917–929.
- Webster, K. E., McPherson, A. L., Hewett, T. E., & Feller, J. A. (2019). Factors associated with a return to preinjury level of sport performance after anterior cruciate ligament reconstruction surgery. *The American Journal of Sports Medicine*, 47(11), 2557–2562.
- Webster, K. E., & Feller, J. A. (2018). Development and validation of a short version of the Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) Scale. *Orthopaedic Journal of Sports Medicine*, 6(4), 1-7.
- Webster, K.E, Nagelli, C.V., Hewett, T.E., & Feller, J. (2018). Factors associated with psychological readiness to return to sport after anterior cruciate ligament reconstruction surgery. *The American Journal of Sports Medicine*, 46, 1545-1550.
- Webster, K.E, Feller, J., & Lambros, C. (2008). Development and preliminary validation of a scale to measure the psychological impact of returning to sport

- following anterior cruciate ligament reconstruction surgery. *Physical Therapy in Sport*, 9(1): 9-15.
- Weiss, M. (2003). Psychological aspects of sport-injury rehabilitation: a developmental perspective. *Journal of Athletic Training*, 38(2), 172-5.
- Weiss, M., & Troxel, R. K. (1986). Psychology of the injured athlete. *Athletic Training*, 21, 104-109.
- Weston, M. (2018). Training load monitoring in elite English soccer: a comparison of practices and perceptions between coaches and practitioners. *Science and Medicine in Football*, 2(3), 216-224.
- Whalan, M., Lovell, R., McCunn, R., & Sampson, J.A. (2019). The incidence and burden of time loss injury in Australian men's sub-elite football (soccer): A single season prospective cohort study. *Journal of Science and Medicine in Sport*, 22(91), 42-47.
- Wiese-Bjornstal, D.M. (2010). Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: a consensus statement. *Scandinavian Journal of Medicine & Science in Sports*, 20: 103-111.
- Wiese-Bjornstal, D.M., Smith, A.M., Shaffer, S.M., & Morrey, M.A. (1998). An integrated model of response to sport injury: Psychological and sociological dimensions. *Journal of Applied Sport Psychology*, 10, 46-69.
- Williams, T., Evans, L., Robertson, A., Hardy, L., Roy, S., Lewis, D., & Glendinning, F. (2020). The role of optimism and psychosocial factors in athletes' recovery from ACL injury: A longitudinal study. *Frontiers in Sports and Active Living*, 2, 116.
- Wilson, S., & Cramp, F. (2018) Combining a psychological intervention with physiotherapy: A systematic review to determine the effect on physical function

and quality of life for adults with chronic pain. *Physical Therapy Reviews*, 23:3, 214-226

World Health Organisation. (2001). *International Classification of Functioning, Disability and Health*. Geneva: World Health Organisation.

Yanchar, S. C., & Williams, D. D. (2006). Reconsidering the compatibility thesis and eclecticism: five proposed guidelines for method ese. *Educational Researcher*, 35(9), 3–12.

Yang, J., Peek-Asa, C., Lowe, J. B., Heiden, E., & Foster, D. T. (2010). Social support patterns of collegiate athletes before and after injury. *Journal of Athletic Training*, 45(4), 372–379.

Yang, J., Schaefer, J. T., Zhang, N., Covassin, T., Ding, K., & Heiden, E. (2014). Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *Journal of Athletic Training*, 49(6), 773–779.

Zarzycki, R., Failla, M., Capin, J., & Snyder-Mackler, L. (2018). Psychological readiness to return to sport is associated with knee kinematic asymmetry during gait following ACL reconstruction. *Journal of Orthopaedic & Sports Physical Therapy*, 27, 1-21.

Zarzycki, R., Failla, M., Arundale, A. J. H., Capin, J. J., & Snyder-Mackler, L. (2017). Athletes with a positive psychological response to return to sport training have better outcomes one and two years after ACL reconstruction. *Orthopaedic Journal of Sports Medicine*, <https://doi.org/10.1177/2325967117S00324>.

Chapter Eight

Appendices

**Appendix A – ethical approval letters and reference
numbers**

Dale Forsdyke
Lecturer
Faculty of Health & Life Sciences

1st October, 2014

Nathalie Noret
Chair of Faculty of Health & Life
Sciences Research Ethics
Committee
Direct Line 876311
E-mail: n.noret@yorksj.ac.uk


Dear Dale,

**RE: Systematic Review on Psychosocial Factors Influencing
Rehabilitation**

REF: DF/08/09/2014/01

The research ethics committee has approved, without reservation, the above research ethics submission of 8th September 2014.

Yours sincerely



Dale Forsdyke
Lecturer
Faculty of Health & Life Sciences

Nathalie Noret
Chair of Faculty of Health & Life
Sciences Research Ethics
Committee
Direct Line 876311
E-mail: n.noret@yorksj.ac.uk

3rd July, 2015

Dear Dale,

RE: Experiences of sport injury rehabilitation

REF: DF/09/12/2014/03

The research ethics committee has approved, without reservation, the above research ethics submission of 21st May, 2015.

Yours sincerely



18th July, 2017

Nathalie Noret
Chair of the Cross School
Research Ethics Committee
Direct Line 876311
E-mail: n.noret@yorks.j.ac.uk

Dear Dale,

RE: The relationship between perceived social support provision and
injury outcomes in footballers

REF: 180717_Forsdyke2

The research ethics committee has approved, without reservation, the above
research ethics submission of 18th June, 2017.

Yours sincerely





York St John University,
Lord Mayors Walk,
York,
YO31 7EX

14/02/2018

York St John University Cross School Research Ethics Committee
(Health Sciences, Sport, Psychological and Social Sciences and Business)

Dear Dale,

Title of study: Temporal and Longitudinal Changes in Psychological Readiness to Return to Sport After Injury - a diary study
Ethics reference: Forsdyke_14022018
Date of submission: 08/02/2017

I am pleased to inform you that the above application for ethical review has been reviewed by the Cross School Research Ethics Committee and I can confirm a favourable ethical opinion on the basis of the information provided in the following documents:

Document	Date
Ethics proposal form	08/02/2018
Diary Template	08/02/2018
Gatekeeper Letter	08/02/2018
Inventory Baseline	08/02/2018
Participant information sheet & consent form	08/02/2018
Responses to feedback form	13/02/2018

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology or accompanying documentation. All changes must receive ethical approval prior to commencing your study.

Yours sincerely,

Nathalie Noret

Appendix B – Published study one infographic

Note to reader.

This editorial was published in the *British Journal of Sports Medicine*:

Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2017). Infographic: Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes.


British Journal of Sports Medicine, 51, 561.

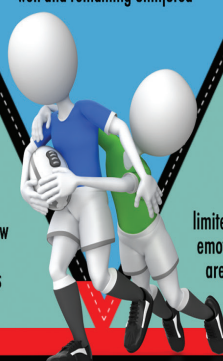
Infographic: Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes

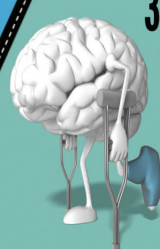
Dale Forsdyke,¹ Andy Smith,² Michelle Jones,³ Adam Gledhill⁴


Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes


The aim of this review was to address the question: are psychosocial factors associated with sports injury rehabilitation outcomes in competitive athletes?


- 


Psychosocial factors including how an athlete thinks, feels and acts are associated with the outcomes of rehabilitation
- 

An athlete's psychological readiness to return to play appears to be a product of fear, anxiety, confidence in performing well and remaining uninjured
- 

Being female, young, having a limited experience of injury, negative emotion and perceptions of isolation are factors related to less successful outcomes of rehabilitation
- 

Our current interpretation of a successful rehabilitation is overly simplistic and associated with many biopsychosocial, technical and tactical factors
- 

Practitioners need to be aware that injured athletes are emotionally vulnerable, and that their emotional integrity may be questionable during rehabilitation
- 

Practitioners should encourage athletes to perceive the injury experience as an opportunity for growth and development
- 

Practitioners need to ensure injured athletes are physically, psychologically, socially, tactically and technically ready to return to sport
- Practitioners should not assume that physical and psychosocial recovery from injury occurs within the same timeframe

Reference: by Forsdyke, Smith, Jones & Gledhill, BJSM 2016

Designed by eYLM Sport Science

¹Applied Human Sciences, York St John University, York, UK

²York St John University, York, UK

³School of Sport, Health and Social Sciences, Southampton Solent University, Southampton, UK

⁴Health and Social Sciences, Leeds Beckett University, Leeds, UK

Correspondence to Dale Forsdyke; d.forsdyke@yorksj.ac.uk

© Article author(s) (or their employer(s) unless otherwise stated in the text of the article) [2017]. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

To cite Forsdyke D, Smith A, Jones M, et al Published Online First: [please include Day Month Year]. doi:10.1136/bjsports-2016-097467

Br J Sports Med 2017;0:1
doi:10.1136/bjsports-2016-097467

Appendix C – PRISMA checklist for study one

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4,5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5,6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5,6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5,6, Fig.2.1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5, Fig.2.1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5,7,8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5,6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6,7
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7

Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	7
----------------------	----	---	---

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6,7
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7,8, Fig.2.1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	9-12 Table 2.4
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	8,9
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Table 2.5
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	13
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	8,9 Table 2.3
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	7-16
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	16-20
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	19
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	20,21
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	21

Appendix D – Examples of photographs forming the photo-elicitation interviews (PEI) in study two







Appendix E – Perceived Available Social Support Questionnaire (PASS-Q)

	Not at all			Extremely so	
1. Provide you with comfort and security	0	1	2	3	4
2. Always be there for you	0	1	2	3	4
3. Care for you	0	1	2	3	4
4. Show concern for you	0	1	2	3	4
5. Reinforce the positives	0	1	2	3	4
6. Enhance your self-esteem	0	1	2	3	4
7. Instil you with the confidence to deal with pressure	0	1	2	3	4
8. Boost your sense of competence	0	1	2	3	4
9. Give you constructive criticism	0	1	2	3	4
10. Give you tactical advice	0	1	2	3	4
11. Give you advice about performing in competitive situations	0	1	2	3	4
12. Give you advice when you're performing poorly	0	1	2	3	4
13. Help with travel to training and matches	0	1	2	3	4
14. Help with tasks to leave you free to concentrate	0	1	2	3	4
15. Do things for you at competitions/matches	0	1	2	3	4
16. Help you organize and plan your competitions/matches	0	1	2	3	4

Appendix F: Re-Injury Anxiety Inventory (RIAI)

	Not at all	Somewhat	Moderately so	Very much so
1. I am worried about becoming re-injured during rehabilitation	0	1	2	3
2. I am worried about becoming re-injured during re-entry into competition	0	1	2	3
3. I feel nervous about becoming re-injured during rehabilitation				
4. I feel nervous about becoming re-injured during re-entry into competition	0	1	2	3
5. I have doubts that I will remain injury free during rehabilitation	0	1	2	3
6. I have doubts that I will remain injury free during re-entry into competition	0	1	2	3
7. I feel on edge about becoming re-injured during rehabilitation	0	1	2	3
8. I feel on edge about becoming re-injured during re-entry into competition	0	1	2	3
9. I am worried that I may not do as well I could in rehabilitation due to re-injury worries	0	1	2	3
10. I am worried that I may not do as well as I could on returning to competition due to re-injury worries	0	1	2	3
11. My body feel tense about rehabilitation because of re-injury worries	0	1	2	3
12. My body feels tense about re-entering competition because of re-injury worries	0	1	2	3
13. I feel confident that I will not become re-injured during re-entry into competition	0	1	2	3
14. I am worried about failing during rehabilitation due to my re-injury worries	0	1	2	3
15. I am worried about failing when re-entering into competition due to my re-injury worries	0	1	2	3
16. Re-injury worries about rehabilitation make my body feel tense	0	1	2	3

17. Re-injury worries about re-entry into competition make my body feel tense	0	1	2	3
18. I am worried about performing poorly during rehabilitation due to re-injury worries	0	1	2	3
19. I am worried about performing poorly during re-entry into competition due to re-injury worries	0	1	2	3
20. I am worried about failing to achieve full re-entry into competition due to re-injury worries	0	1	2	3
21. I feel my stomach sinking due to re-injury worries during rehabilitation	0	1	2	3
22. I am worried that others will be disappointed if I become re-injured during re-entry into competition	0	1	2	3
23. The thought of re-injury during re-entry into competition makes my palms sweaty	0	1	2	3
24. I am confident about not becoming re-injured during rehabilitation because I mentally picture myself staying injury free	0	1	2	3
25. I am worried about concentrating during rehabilitation because of re-injury worries	0	1	2	3
26. I am worried about concentrating during re-entry into competition because of re-injury worries	0	1	2	3
27. My body feels tight due to re-injury worries during rehabilitation	0	1	2	3
28. My body feels tight due to re-injury worries during re-entry into competition	0	1	2	3

Appendix G: Injury – Psychological Readiness to Return to Sport Scale (I-PRRS)

	None			Moderate				Complete				
1. My overall confidence to play was...	0	10	20	30	40	50	60	70	80	90	100	
2. My confidence to play without pain was...	0	10	20	30	40	50	60	70	80	90	100	
3. My confidence to give 100% effort was...	0	10	20	30	40	50	60	70	80	90	100	
4. My confidence to not concentrate on the injury was...	0	10	20	30	40	50	60	70	80	90	100	
5. My confidence in the injured body part to handle the demands of the situation was...	0	10	20	30	40	50	60	70	80	90	100	
6. My confidence in my skill level/ability was...	0	10	20	30	40	50	60	70	80	90	100	

Appendix H: Published editorial, Psychological readiness to return to sport: three key elements to help the practitioner decide whether the athlete is REALLY ready?

Note to reader.

This editorial was published in the *British Journal of Sports Medicine*:

Forsdyke, D., Gledhill, A., & Ardern, C.L. (2017). Psychological readiness to return to sport: three key elements to help the practitioner decide whether the athlete is REALLY ready?. *British Journal of Sports Medicine*, 51, 555-556.

Psychological readiness to return to sport: three key elements to help the practitioner decide whether the athlete is REALLY ready?

Dale Forsdyke,¹ Adam Gledhill,² Clare Ardern^{3,4,5}

Return to sport (RTS) outcomes after severe injury are consistently poor.^{1 2} Psychological factors are important influences on returning to sport³ yet what it means to be psychologically ready to RTS is unclear.⁴ Rarely will an athlete be held back from RTS because he/she is not psychologically ready to return. Psychological factors correlate with injury occurrence,⁵ therefore these factors should be offered greater weighting in RTS decision-making.

Characteristics of an athlete who is psychologically ready to RTS are multifaceted and include, among others: realistic expectations, high levels of self-efficacy and low levels of anxiety.^{1 4 6} Psychological readiness to RTS is likely influenced by multiple social agents, personal and contextual factors (eg, coaches, sports medicine practitioners, personality traits, performance level).⁴ Consequently, RTS decisions should be made from an interdisciplinary perspective, with multidimensional monitoring of psychological factors (eg, concurrently monitoring self-efficacy and re-injury anxiety levels).⁶

Psychological readiness to RTS is not commonly monitored in practice, despite specific instruments being available.⁷ Many practitioners feel underprepared to work within this area⁸ or might view evaluating psychological readiness to RTS as being outside their scope of their practice. On the other hand, sports medicine practitioners are ideally positioned to monitor athletes, because of the strong working relationship developed throughout injury rehabilitation.

¹Applied Human Sciences Department, Faculty of Health and Life Sciences, York St John University, York, UK; ²Faculty of Health and Social Sciences, Carnegie School of Sport, Leeds Beckett University, Leeds, UK; ³Aspetar Orthopaedic & Sports Medicine Hospital, Doha, Qatar; ⁴Division of Physiotherapy, Linköping University, Linköping, Sweden; ⁵School of Allied Health, La Trobe University, Melbourne, Australia

Correspondence to Dale Forsdyke, Applied Human Sciences Department, Faculty of Health and Life Sciences, York St John University, Lord Mayors Walk, York YO31 7EX UK; d.forsdyke@yorks.ac.uk

In this editorial, we describe three key elements that practitioners can consider when monitoring psychological readiness to RTS in preparation for RTS decision-making.

THREE KEY ELEMENTS IN PSYCHOLOGICAL READINESS TO RTS DECISION-MAKING

To facilitate effective RTS monitoring, practitioners should be empowered to confidently consider the psychological aspects of RTS. An empowered practitioner is better able to appreciate the role of psychology within severe injury and use this knowledge to inform referrals to appropriate professionals (eg, accredited sport psychologist, mental health practitioner) when the limits of their professional competency have been reached (box 1).

Key element 1: how can the practitioner best monitor athletes?

Box 2 identifies tools that practitioners might use to get to know the athlete and for monitoring psychological readiness to RTS. These tools suggest thresholds to

Box 2 Examples of tools (questionnaires and inventories) that may be used by practitioners to monitor psychological readiness to RTS (formatted versions of the tools are available as on-line resources)

- ▶ Re-injury Anxiety Inventory (RIAI): <http://www.sciencedirect.com/science/article/pii/S1466853X09000996>;
- ▶ Injury-Psychological Readiness to Return to Sport Questionnaire (i-PRRS): <http://natajournals.org/doi/pdf/10.4085/1062-6050-44.2.185>;
- ▶ Knee Self-Efficacy Scale (KSES): <http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0838.2005.00472.x/abstract>;
- ▶ Tampa Scale of Kinesiophobia (TSK): <http://www.ncbi.nlm.nih.gov/pubmed/16962238>;
- ▶ ACL-Return to Sport after Injury Inventory (ACL-RSI): <http://www.sciencedirect.com/science/article/pii/S1466853X07000971>.

guide RTS decisions, although their use as clinical measures requires further evaluation and validation. We are mindful that no tool is perfect and might have completion issues associated with social desirability to RTS at a time when athlete's emotional integrity is poor,⁵ for example, athlete's inaccurately completing tools when under pressure for premature RTS. One limitation of these tools is their unidimensional nature⁶ (eg, focus on a specific injury, joint or construct), therefore it is advantageous to use multiple tools to compare and contrast findings.

Key element 2: use working knowledge of the athlete

We embrace the notion of 'knowing your athlete'. Practitioners and athletes share significant interactions prior to injury and during phased return to participation. Knowledge, understanding and rapport develop through these interactions. For example, the practitioner might observe an athlete is preoccupied with RTS concerns, is becoming withdrawn or adapting performance of specific movement patterns leading to subjective evaluations of RTS status. Clarifying the athlete's perceptions of support from coaches and teammates may provide information on RTS stressors and the collective RTS expectations. While tools may infer an athlete is psychologically ready to RTS, working knowledge of the athlete might suggest

Box 1 Examples of professional sports psychology associations

- ▶ British Psychological Society (BPS): <http://www.bps.org.uk/>;
- ▶ British Association of Sport and Exercise Sciences (BASES): <http://www.bases.org.uk/>;
- ▶ Australian Psychological Society (APS): <http://www.psychology.org.au/>;
- ▶ American Psychological Association (APA): <http://www.apa.org/>;
- ▶ North American Society for the Psychology of Sport and Physical Activity (NASPPA): <https://nasppa.com/>;
- ▶ Association for Applied Sport Psychology (AASP): <http://www.appliedsportpsych.org/>.

Editorial

otherwise and vice versa. Monitoring athletes with tools is useful, however, the practitioner should avoid being overly reliant on these as collectively both forms of information (tools and subjective evaluations) require consideration when making informed RTS decisions.

Key element 3: adopt an interdisciplinary, shared decision-making approach

Shared decision-making, involving the key stakeholders, is central to quality RTS decisions.³ Historically, the sport medicine practitioner was the gate keeper of the RTS decision, relying primarily on physical assessments. Now the consensus is that RTS decisions should be collaborative and involve practitioners (sports medicine, sports psychology and sports science team), coach(es), parents or carers (in the case of children or vulnerable adults) and the athlete.³ Considering the collective perspectives of all stakeholders provides a more robust picture of an athlete's psychological readiness to RTS. For example, coaches can provide information regarding the athlete's intent and engagement during technical practice (eg, is there hesitance when anticipating contact?); family members can provide valuable information about behaviours away from sport. Both perspectives help

build a picture of the athlete's psychological readiness to RTS.

SUMMARY

When can the practitioner be sure that the athlete is psychologically ready to RTS? Perhaps this is difficult to predict? Or at least more difficult than physical readiness, which is, at least in part, dictated by tissue healing. As practitioners, we recognise and accept that biological scarring can have a long-term effect on function and performance. Severe injury could imprint (metaphorically) psychological scar tissue (eg, athletes report that their injury will 'never leave them'), and we should consider this aspect of RTS equally alongside the physical aspect.

Twitter Follow Dale Forsdyke @forsdyke_dale, Adam Gledhill @gleds13 and Clare Ardern @clare_ardern

Contributors DF, AG and CA are justifiably credited with authorship, according to authorship criteria. DF and AG were jointly responsible for the original content and structure of the manuscript. CA offered collaborative critical support in appraising the content and structure and offered additional expert perspective. DF and AG completed critical revisions of the manuscript. All authors gave final approval of the manuscript.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/bjmsports-2016-096770>).

To cite Forsdyke D, Gledhill A, Ardern C. *Br J Sports Med* Published Online First: [please include Day Month Year] doi:10.1136/bjmsports-2016-096770

Accepted 16 November 2016

Br J Sports Med 2016;0:1–2.

doi:10.1136/bjmsports-2016-096770

REFERENCES

- 1 Ardern CL, Österberg A, Tagesson S, et al. The impact of psychological readiness to return to sport and recreational activities after anterior cruciate ligament reconstruction. *Br J Sports Med* 2014;48:1613–9.
- 2 Fältström A, Häggglund M, Kvist J. Factors associated with playing football after anterior cruciate ligament reconstruction in female football players. *Scand J Med Sci Sports* 2016;26:1343–52.
- 3 Ardern CL, Glasgow P, Schneiders A, et al. 2016 Consensus statement on return to sport from the First World Congress in Sports Physical Therapy, Bern. *Br J Sports Med* 2016;50:853–64.
- 4 Forsdyke D, Smith A, Jones M, et al. Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: a mixed studies systematic review. *Br J Sports Med* 2016;50:537–44.
- 5 Ivarsson A, Johnson U, Podlog L. Psychological predictors of injury occurrence: a prospective investigation of professional Swedish soccer players. *J Sport Rehabil* 2013;22:19–26.
- 6 Podlog L, Banham SM, Wadey R, et al. Psychological readiness to return to competitive sport following injury: a qualitative study. *Sport Psychol* 2015;29(1):1–14.
- 7 Walker N, Thatcher J, Lavallee D. A preliminary development of the Re-Injury Anxiety Inventory (RIAI). *Phys Ther Sport* 2010;11:23–9.
- 8 Heaney C, Green A, Rostron C, et al. A qualitative and quantitative investigation of the psychology content of UK physiotherapy education. *J Phys Ther Educ* 2012;26:48–56.