

Understanding referral behaviours in Oral Surgery in England – a mixed methods study.

Thesis by Alternative Format

Richard Jonathan Moore

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

The School of Dentistry
Faculty of Medicine and Health
The University of Leeds

January 2026

Intellectual property and publications

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

The thesis is constructed of two chapters which compromise of the following publications, both of which I am the main author.

For both publications I developed the concept, contributed to the data analysis, interpretation and drafted the manuscript.

Professor Gail Douglas, Professor Iain Pretty and Professor Alan Mighell (supervising and advisory author for the group) critically reviewed and revised each manuscript.

Moore RJ, Pretty I, Douglas G, Mighell A. An evaluation of referrer factors for 98,671 referrals made to the West Yorkshire oral surgery managed clinical network over a three-year period. Br Dent J (2022). <https://doi.org/10.1038/s41415-022-4034-z>

Moore RJ, Pretty I, Douglas G, Mighell A. Review of 1.75 million referrals over 34 months identifies the disruptive impact of the SARS-CoV-2 pandemic on oral surgery care in England: a service evaluation. Br Dent J (2023). <https://doi.org/10.1038/s41415-023-5526-1>

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.

Acknowledgements

I would like to express my sincere gratitude to my supervisory team for their guidance, support and encouragement throughout the course of this PhD. I am deeply thankful to Professor Alan Mighell, who has supported me from the very start of my career at The University of Leeds and consistently encouraged me to pursue doctoral research. His mentorship, insight and belief in my academic development have been instrumental to the completion of this work. I am also extremely grateful to Professor Gail Douglas and Dr Karen-Vinall Collier for their continuous support, constructive feedback and thoughtful guidance throughout the research process, and to Jenny Owen for her advice and contribution to the research.

I would like to acknowledge Professor Iain Pretty for his valuable contribution to the quantitative phase of this research and for his role, alongside Professor Mighell in the inception and early development of the research idea.

I would like to thank Dr Vishal Aggarwal for his continued support as both a colleague and a mentor. His advice, encouragement and generosity with his time have been greatly appreciated throughout this journey.

I am particularly grateful to Dr Alasdair McKechnie for being an extremely supportive colleague and for providing me with the opportunity and flexibility to integrate this PhD into my academic and clinical roles. His understanding and encouragement have been crucial in enabling me to balance clinical, academic and research commitments.

Finally, I would like to express my heartfelt thanks to Richard, and my parents for their unwavering support throughout this process.

I am especially grateful to my father, Dr David Moore who has been a constant inspiration throughout my life.

Abstract

Aim

This thesis investigates the referral behaviours of General Dental Practitioners (GDPs) in England for patients requiring oral surgery, addressing a critical gap in understanding the behavioural, systematic and contextual drivers underpinning referral decision making.

Existing Literature

Existing literature demonstrates limited UK-specific evidence and a lack of qualitative insight into psychosocial influences such as clinician confidence, training, access to services, perceived risk, and medico-legal concerns. Current initiatives, such as managed clinical networks (MCNs) and categorisation of levels of care focus on triage and care closer to home but fail to address why GDPs are increasing their referrals in Oral Surgery.

Method & Results

An explanatory sequential mixed-methods approach was employed. The quantitative phase analyses of 98,671 referrals from the West Yorkshire Managed Clinical Network (2016-2019), alongside a national dataset of 1.75 million referrals during the COVID-19 period (2019 to 2021). Exodontia accounted for over 60% of referrals. Referral activity was highly concentrated, with 10% of GDPs responsible for 60% of total referrals. Following an initial pandemic related decline, referral rates surged reaching at 8.5 times pre-pandemic levels.

The qualitative phase, informed by the COM-B model (Capability, Opportunity, Motivation – Behaviour) utilised semi-structured interviews with GDPs and focus groups with Foundation Trainers to explore determinants underlying these patterns. Confidence emerged as the central mediator of referral behaviour, influenced by variability in undergraduate oral surgery training, the transition from supervised to independent practice and access to ongoing support.

Structural factors, including the financial constraints of the NHS UDA contract limited the feasibility of providing complex oral surgery in primary care. Additionally,

perceived risk especially from fear of complications and litigation acted as a significant driver of referral decisions.

Integration of these findings provides an insight in the behavioural understanding of GDP referral behaviours.

Conclusion

This thesis proposes a multi-level intervention framework targeting education, system design and policy reform, including standardisation of surgical training, enhanced feedback mechanisms between primary and secondary care and reconsideration of contractual incentives.

These findings offer important implications for optimising referral pathways, supporting the primary care workforce and improving patient access and outcomes in oral surgery services.

Table of Contents

<i>List of abbreviations</i>	8
<i>Thesis by alternative publication</i>	10
Chapter 1 – Introduction	11
1.1 Historical and Professional Context of Oral Surgery	11
1.2 Rising Demand and Pressure on Oral Surgery Services	13
1.3 Commissioning Structures and Levels of Care	14
1.4 Managed Clinical Networks & Referral Management Systems	16
1.5 System-Level Challenges	19
1.6 Education and Training	19
1.7 Regulation and measurement of competence	20
1.8 Workforce diversity, risk and professional identity	20
1.9 Contractual influences and financial incentives	21
1.10 Discussion	22
1.1 References	25
Chapter 2 – Aims of the research project	28
Objectives	29
Chapter 3 – Methodology	31
Introduction	31
3.1 Research Design - considerations	32
3.2 Alternative Methodologies	33
3.3 Defining Mixed Methods Research	37
3.4 Philosophical and Methodological Rationale	39
3.5 Study Design	41
3.6 Typologies of Mixed Methods Research	42
3.7 Integration in Mixed Methods Research	43
3.8 Rationale for Explanatory Sequential Design	44
3.10 Limitations of Mixed-Methods Research	45
3.11 Phase 1 – Quantitative Study (Chapter 4.2)	47
3.12 Phase 2 – Qualitative Study (Chapter 8)	49
3.13 Integration of findings	52
3.14 References	53
Chapter 4 – Scoping Review	55
4.1 Introduction	55
4.2 Aims & Objectives	56
4.3 Methods	57
4.4 Results	60
4.5 Discussion	69
Chapter 5 – An overview of Oral Surgery delivery in England	78
Introduction	78
5.1 Delivery of oral surgery in England	79
5.2 Payments and contracts	82
5.3 Workforce and education	83
5.3 Routes into service	84
5.4 Referral demand and management	86
5.5 Governance of service providers	88

5.6	Conclusions	91
5.7	References	93
Chapter 6 – An evaluation of referrer factors for 98,671 referrals made to the West Yorkshire Oral Surgery Managed Clinical Network over a 3-year period.		96
	Abstract	97
	Introduction	98
	Materials & Methods	100
	Results.....	102
	Discussion	108
	Conclusions	111
	References	112
Chapter 7 – Review of 1.75 million referrals over 34-months identifies the disruptive impact of the SARS-CoV2 pandemic on oral surgery care in England – a service evaluation.....		113
	Abstract	114
	Introduction	116
	Aims.....	117
	Materials and Method	117
	Results.....	118
	Discussion	125
	References	131
Chapter 8 - Understanding referral behaviours of General Dental Practitioners towards patients requiring Oral Surgery Treatment in England. A framework analysis informed by the COM-B model.....		132
	Abstract	132
	Introduction	133
	Background	134
	Aims.....	136
	Materials & Methods	136
	Results.....	139
	Discussion	153
	Future developments / recommendations.....	157
	References	159
Chapter 9 – Exploring Foundation Trainers’ Perceptions of Foundation Dentists’ Experiences, Attitudes, Confidence and Behaviours towards Oral Surgery		160
	Introduction	160
	Aims.....	162
	Methods.....	162
	Results.....	166
	Discussion	175
	References	181
Chapter 10 – Discussion & Conclusion		183
	References	210
Appendix 1.....		213
Appendix 2.....		215

List of abbreviations

NHS	National Health Service
OS	Oral Surgery
OMFS	Oral & Maxillofacial Surgery
GMC	General Medical Council
GDC	General Dental Council
GDP	General Dental Practitioner
DWsl	Dentist with special interest
PCT	Primary Care Trust
MEE	Medical Education England
GIRFT	Getting it right first time
UDA	Unit of Dental Activity
MCN	Managed Clinical Network
RMS	Referral Management System
e-RMS	electronic referral management system
MMR	Mixed Methods Research
AAA	Advice, analgesia, antibiotics
ABAOMS	Association of British Academic Oral & Maxillofacial Surgeons
BAOS	British Association of Oral Surgeons
CDO	Chief Dental officer
COVID-19	Coronavirus disease of 2019
CINAHL	Cumulative Index to Nursing and Allied Health Literature database
CMO	Chief Medical Officer
CPD	Continuing Professional Development
DFT	Dental Foundation Training
EEA	European Economic Area
FD	Foundation Dentist
GA	General Anaesthesia
GIS	Geographic Information System
HRG	Health Resource Group
ICO	Information Commissioners Office
IMD	Index of Multiple Deprivation
JB	Joanna Briggs Institute
MEDLINE	Medical Literature Analysis and Retrieval System online
MOS	Minor Oral Surgery
PCC	Population Concept Context
PDS	Primary Dental Service
PREMs	Patient Reported Experience Measures
PRISMA	Patient Reporting Items for Systematic reviews and Meta-Analyses
PROMs	Patient Reported Outcome Measures

SARS- COV2	Severe Acute Respiratory Syndrome Coronavirus 2
SAS	Specialty, associate specialists and specialists
SLA	Service Level Agreement
UDC	Urgent Dental Care
UK	United Kingdom
VT	Vocational Training

Thesis by alternative publication

This thesis is submitted in the alternative format in accordance with the University of Leeds protocol for the format and presentation of an Alternative Style of Doctoral Thesis including published material, and the University's overarching regulations for the submission and examination of postgraduate research thesis. The submission route was discussed and agreed with my supervisory team at an early stage of the research, and this format has been approved as appropriate for the discipline and research conducted in the School of Dentistry, Faculty of Medicine and Health.

In accordance with the University requirements for submission by publication, a minimum of three publishable manuscripts is included within this thesis.

Two manuscripts have been published in peer-reviewed journals and are presented in Chapters 6 and 7.

The third manuscript, presented in Chapter 8 is formatted for submission to a peer-reviewed journal and represents work that is complete and of a publishable standard.

The inclusion of these manuscripts reflects their contribution to the overall research aims and their alignment with the publication standards and requirements set out in the University protocol.

Chapter 1 – Introduction

Patients can reasonably expect their National Health System (NHS) care to be delivered by the right person, at the right time and in the right place. To achieve this, it frequently requires healthcare professionals to seek the input of others through the process of referral. Effective referral is underpinned by clinicians recognising the limits of their competence, working within multi-disciplinary teams, acting in the patient's best interests and maintaining professional standards.

Across the NHS, demand for care continues to outstrip the resources available, reinforcing the need to make best use of the available resources efficiently (Fund 2016). Patient referral, typically from generalists to specialists, is a pillar of the approach to the NHS care and has huge implications for patient outcomes and how State finances are spent. However, despite this surprisingly little is understood about what drives referral behaviours of general dental practitioners (GDPs) in dentistry, particularly towards Oral Surgery.

1.1 Historical and Professional Context of Oral Surgery

The profession of Dentistry developed from barber surgeons and extraction of teeth (Bishop 2012). Over time the care of patients requiring surgical treatments has evolved with increasing sophistication and professional reorganisation including establishment of the specialties of Oral Surgery (OS) and Oral and Maxillofacial Surgery (OMFS) (MEEDP 2010). In the UK, OS and OMFS are distinct, but closely related specialties, differentiated by training pathways, regulatory frameworks and professional oversight. OS is a dental specialty regulated by the General Dental Council (GDC), with practitioners holding a primary dental qualification and having met the standards required for specialty listing via a formal training programme or demonstration of equivalence. The specialty of Oral Surgery has a focus on dento-alveolar surgery, management of complex extractions, oral pathology and treatment of patients who have medical co-morbidities and anxiety. Patients are treated in both primary and secondary care under local anaesthesia, conscious sedation and general anaesthesia.

In contrast, OMFS is a General Medical Council (GMC) registered specialty and requires dual qualification in medicine and dentistry, followed by higher surgical training. OMFS has a broader scope that extends beyond the oral cavity to include facial trauma, head and neck oncology, orthognathic surgery and reconstructive procedures. Whilst a registerable degree in Dentistry is required to be added to the GMC OMFS Specialty Register, it is not a requirement to maintain GDC registration to work in OMFS, reflecting that it is a medical specialty regulated by the GMC.

There is substantial overlap in the remit of OS and OMFS particularly in relation to dento-alveolar surgery. This overlap has important implications for the organisation and delivery of care. Ambiguity regarding professional boundaries can contribute to inconsistent patient pathways including referral pathways, variation in thresholds for referral, and uncertainty among General Dental Practitioners (GDPs) about the most appropriate destination for patients. At a system level, the coexistence of services delivered by individual healthcare professionals regulated by the GDC and/or the GMC regulated undertaking similar procedures has challenges. This impacts widely including on coding, commissioning and activity reporting with some procedures sometimes attracting different tariffs or being captured inconsistently across providers. These structural issues have downstream effects on workload distribution, workforce planning and service development. Regulatory issues for individual healthcare practitioners can be complex. Additionally, this reinforces inefficiencies and inequalities in access to care for patients, which may be critical to understanding how and why referral decisions are made within the current NHS oral surgery landscape.

OS has a focus on surgical procedures to the teeth and supporting jaws and remains central to Dentistry. The specialty is a core component of the undergraduate (UG) dental surgery curriculum with demonstration of learning outcomes required to meet the GDC 'Safe Practitioner' standards (GDC 2023) and first professional registration. This reflects the need for primary care 'high street' GDPs to undertake OS procedures, such as routine dental extractions as well as recognise when care is more complex and referral is appropriate.

Dental extractions are one of the main reasons for referral from GDPs to OS specialists based in secondary care hospital settings (Coulthard 2000b). As such, OS provides a useful lens through which to examine the interaction between undergraduate education, workforce capability, system design and referral behaviour.

1.2 Rising Demand and Pressure on Oral Surgery Services

The referral process from general dental practitioners to specialist OS services is a critical component of primary and secondary care integration in England. It plays a central role in ensuring patients receive the appropriate treatment by the appropriately trained clinician. Over the past decade there has been a marked increase in the volume of referrals to OS, driven by a combination of rising patient expectations, changing workforce demographics, evolving professional standards, and shifting healthcare policies (Hill 2021). There is an increase in the number of patients with co-morbidities due to the changing health of the general population, advances in medicine with medications which have a direct impact, some significant, with regards to outcomes of OS procedures. The additional complexity of such patients often impacts the referral of a patient for a straightforward procedure. This growing demand has placed considerable pressure on OS services across England and raises important questions about the nature, appropriateness and drivers of referral behaviours

In response to increasing referral numbers, in 2006 The Department of Health, in collaboration with the Faculty of General Dental Practitioners published 'Guidelines for the appointment of Dentists with Special Interest (DwSIs) in Minor Oral Surgery' (Drake 2008). This was designed as a framework for the Primary Care Trust (PCT) at time to develop local DwSI services with inclusion of the scope of care for DwSIs. However, this initiative was ultimately unsuccessful for several reasons. A key limitation was the absence of nationally defined standards for training, accreditation, scope of practice and clinical governance. This led to significant regional variation and inconsistency in quality.

This led to the embryonic development of primary care OS contracts which were tendered for on a regional basis by practitioners with additional experience in OS. However, due to the limited awareness, variability in commissioning and challenges in integration of such contract's success was limited.

In 2010, the Medical Education England (MEE) 'Review of Oral Surgery Services and Training' recommended that *"primary care OS services should be developed to meet the needs of patients for appropriate, accessible care and to make more efficient use of NHS resources"*. (MEEDP 2010). This review recognised that there were high levels of referrals to secondary care OS and OMFS units, and steps should be taken to identify which patients could be treated in a primary care setting. This has been further emphasised by the 'Getting it Right First Time (GIRFT) in Oral and Maxillofacial Surgery Report (Morton 2018).

Following on from the 2010 MEE review, the development and implementation of primary care OS contracts is an example of an initiative to increase OS primary care delivery by dentists with the appropriate skills over and above those of a GDP.

1.3 Commissioning Structures and Levels of Care

The NHS England Five Year Forward View (NHS 2014) marked a significant policy shift. It led to NHS England publishing the 2015 Commissioning Guide for Oral Surgery and Oral Medicine which has been reformatted and hosted on the NHS website (NHS Oral Surgery Standard 2023) aimed at supporting commissioners to offer a "consistent and coherent approach" to commissioning across three levels of care (table 1).

Table 1 - Levels of care defined in the NHS England Five Year Forward View (2014).

Level 1	Level 2	Level 3a
Procedures/conditions to be performed or managed by a clinician commensurate with a level of competence as defined by the Curriculum for Foundation Training or equivalent. This is the minimum that a commissioner would expect to be delivered in a primary care NHS Mandatory contract.	Procedural and/or patient complexity requiring a clinician with enhanced skills and experience who may or may not be on a specialist register. This care may require additional equipment or environment standards but can usually be provided in primary care.	Procedures / conditions to be performed or managed by a clinician recognised as a specialist at the GDC defined criteria and on a specialist list, or by a consultant.
		Level 3b
		Procedures / conditions to be performed or managed by a clinician recognised as a consultant in the relevant specialty, who has received additional training which enables them to deliver more complex care, lead MDTs, MCNs and deliver specialist training.

The three levels of care do not describe or define contracts, practitioners or setting. Level 1 care encompasses treatment that can be and should be delivered and provided by GPs in primary care. Level 2 services (also known as intermediate care) involves more complex procedures managed by dentists with enhanced skills or additional training. These dentists are usually working under a referral

mechanism and are commissioned in a primary care setting or via managed clinical networks (MCNs), and care is provided in a variety of settings, commonly in the community/primary care setting. There is a move to provide such provision close to patients. Level 3 refers to hospital based secondary care led by consultant oral surgeons or oral and maxillofacial surgeons and delivered by themselves or members of their teams, typically within NHS trusts. This stratified approach was designed to improve patient access, manage demand on hospital services, and ensure the most efficient use of specialist resources (NHS Commissioning Guide 2015).

Despite these structures which are intended to streamline care and improve access, referrals to level 3 services remain high, and a significant proportion of referrals are redirected, rejected or deemed inappropriate for the level of care requested emphasising the lack of meaningful controls (Gradwell 2024).

This suggests variability in general dental practices and system inefficiencies, highlighting the need to understand the underlying behaviours and influences that guide such decisions (Halai 2019). Referral management systems and triage strategies have shown promise in improving pathway efficiency in some areas (Ghiu 2018). Similarly, cost-effectiveness and assessments of e-referrals and triage systems have demonstrated reduced demand on secondary care with potential financial savings for the NHS (Hill 2021).

1.4 Managed Clinical Networks & Referral Management Systems

The Commissioning Guide recommended development of Referral Management Systems (RMS) and MCNs to underpin change. Introduction of electronic RMS (eRMS) (Goldthorpe 2018) helped inform understanding of referral demand and manage referrals within MCNs.

MCNs are an established healthcare model and have been described as *“self-supporting groups of professionals working together to ensure cross-speciality*

sharing of patients and expertise. They are a strong mechanism for ensuring that patients receive the care they need in a timely fashion from the most suitable professional in the network area” (Skipper 2010).

Goodwin et al (2003) in their review of networks suggested that clinical networks allow for continuous working relationships between clinicians and their organisations, improving the care for patients required across a range of institutions.

MCN’s come with many advantages for patients such as primary care rather than hospital providers, nearest or soonest provider choice and reduced times to treatment (Goldthorpe 2018). There are also advantages linked to the use of NHS resources and standards of care, e.g. those not requiring secondary care (Coulthard 2014).

A recurrent feature seen in OS MCN data is that level 2 accounts for most of the referrals made (Coulthard 2000a, Skipper 2010, Coulthard 2000b, Halai 2014). This was triangulated in the OMFS Getting It Right First Time (GIRFT) report (Morton 2018) that described how many OMFS units are carrying out high volumes of dentoalveolar surgery, with suboptimal resource use and commented that a significant amount of dentoalveolar surgery should be carried out in a more appropriate setting. Opportunities were identified for NHS England to define a dentoalveolar pathway which meets the needs of the patients, service requirements and future planning and contract needs; and it was recommended that steps should be taken to ensure that dentoalveolar surgery takes place in the appropriate setting. The GIRFT Hospital Dentistry report (Jones 2021) noted that within the specialty of OS there is substantial unwarranted variation in outcomes, such as complication rates, unplanned admissions, repeated procedures and escalation to higher levels of care. Due to the inconsistency in coding the report highlighted that it was difficult determine whether poorer or better outcomes reflected true differences in quality, or simply differences in case mix and reporting.

It described the variation in practice in how OS services were being delivered and the level of care at which patients were treatment. GIRFT noted that in some centres there was evidence of activity that would ordinarily be classified as Level 2 care

being undertaken within a hospital setting which was configured for Level 3 care. Conversely, some hospital services were managing high volumes of lower complexity cases that could have been delivered in primary care. As a result of this, some centres appeared to be undertaking more Level 2 work than would be expected given their specialist remit. This contributed to inefficiencies, longer waiting times and distortion of outcome data when comparing providers. However, it should be recognised that within secondary care are junior staff and staff in training programmes, therefore there will need to be an element of Level 2 cases to fulfil their training requirements.

Therefore, accurate understanding of activity, outcomes and workforce needs was impeded. The report concluded that variability in the application of main specialty and treatment codes, often influenced by administrative practices that attribute activity to the responsible consultant rather than the clinician providing the care meant that work undertaken by OS was frequently captured under other specialty codes, such as OMFS. This inconsistent coding practice limited the ability to measure workloads and clinical outcomes accurately.

It is important to note that Level 2 activity plays a critical role in the financial sustainability of Level 3 OMFS services, as income generated through Level 2 care underpins the affordability of the consultant-led workforce in secondary care. Most Level 2 activity can be safely and effectively delivered by an appropriately trained and experienced GDC registrant (e.g. an Oral Surgeon or Dentist with additional experience) working within a multidisciplinary team structure which may be led by an OMFS consultant (GMC registered). The OMFS secondary care service modules which focus exclusively on high acuity Level 3 care are unlikely to be sustainable in the long term, given the associated work intensity and the negative implications for workforce wellbeing and retention.

It emphasised that many OS cases may not require level 3 care and could be managed in a level 2 or primary care setting. Thereby freeing secondary care capacity and reducing waiting times. The report recommends that clearer referral and treatment pathways, standardised coding of procedures and improved data

capture could allow commissioners and providers to identify variation, optimised resource use and improve patient outcomes.

The literature (Coulthard 2000b, Savla 2019, Patel 2023), has identified several key influences on referral decision making in general dental practice and many of these intersect with perceived complexity of the procedure, confidence and competence in oral surgery skills and time pressures with general dental practice.

1.5 System-Level Challenges

Despite repeated policy initiatives, the full potential of eRMS and MCNs have yet to be met. One explanation lies in broader system-level issues within the NHS. Health policy in England is frequently shaped by short-term political cycles which can prioritise rapid solutions over long-term workforce and service planning. Initiatives such as MCNs have been introduced without consistent national mandates, clear operational detail or robust mechanisms for implementation, governance and evaluation.

This lack of national coherence contributes to variability in standards of care, limited quality assurance and weak accountability structures. In OS, although MCNs have made efforts to promote a more structured and standardised approach, the referral processes have been variable in practice across the country. Questions remain around the intrinsic and extrinsic factors that influence how and why GPs refer patients for OS care.

1.6 Education and Training

Workforce capability is potentially a central determinant of referral behaviour. OS is a core element of the undergraduate curriculum; the current OS curriculum was developed by the Association of British Academic Oral and Maxillofacial Surgeons (ABAOMS) and there is little evidence that this has been uniformly adopted across

UK dental schools (Macluskey 2008). As a result, there is variation in learning outcomes, assessment methods and clinical exposure.

Reductions in clinical contact time and hands-on surgical experience have raised concerns about graduate preparedness for primary care oral surgery (Macluskey 2009). This variability in training may translate into differences in confidence, competence and risk tolerance among new graduates thereby influencing referral behaviours (Brown 2020).

1.7 Regulation and measurement of competence

The GDC as the statutory regulator defines the outcomes required of a newly qualified dentist at the point of registration. These standards describe what a 'safe practitioner' (GDC 2023) should be able to do but offer limited guidance on how competence should be measured longitudinally as dentists transition into independent practice. The progression from undergraduate education into dental foundation training (DFT) represents a critical period, yet there is limited evidence on how competence in OS is assessed, supported or remediated during this transition.

NHS England plays a central role in DFT, setting national standards and curricula for Foundation Dentists (FDs). While such frameworks provide structure in the first year after graduation, accountability for ongoing competence development beyond DFT is less clearly defined.

1.8 Workforce diversity, risk and professional identity

The increasing proportion of overseas-trained dentists within the UK workforce introduces additional variability in prior training, scope of practice and surgical experience. In 2024 68.9% of Dentists on the GDC register were UK qualified, 18.4% were EEA qualified, 3.4% qualified in other parts of the world and 9.3% came through the Overseas Registration Examination route. There has been a steady rise

in overseas registrants from 28.4% in 2020 to 31.7% in 2024 (GDC 2025). Combined with differences in UG exposure, this contributes to a heterogeneous workforce with wide-ranging confidence and competence in OS.

1.9 Contractual influences and financial incentives

The structure of the NHS dental contract has long been implicated in shaping clinical behaviour. The units of dental activity (UDA) system have been criticised for disincentivising time-intensive procedures such as OS in primary care (D'Cruz 2018). In this context, referral may represent a rational response to systemic inefficiencies rather than a deficit in clinical competence.

However, more recently the December 2025 NHS dental contract: quality and payment reforms (UK Government 2025) may influence dentists' referral behaviour by reshaping financial and workload incentives associated with complex and urgent care. Improved remuneration for such work has the potential to reduce financially driven referrals, which may encourage some practitioners to manage a broader range of cases within primary care. However, where contractual expectations increase workload without the appropriate support, time or skill mix, then dentists may remain more likely to refer patients, especially those requiring complex oral surgery treatment to manage risk, maintain efficiency and protect professional wellbeing.

1.10 Discussion

This chapter has outlined the complex issues which surrounding OS referrals in England. Further discussion regarding the complex historical issues around OS will be discussed in Chapter 5.

Referral is a fundamental mechanism through which patients are expected to access care by the appropriate clinician, at the right time and in the right setting. However, in the context of OS, this process is shaped by a confluence of factors including overlapping professional boundaries between OS and OMFS, rising demand on services, evolving commissioning structures and persistent variation in education, training and workforce capability. While national policy initiatives such as the development of levels of care, primary care contracts, implementation of referral management systems and MCNs have sought to rationalise pathways and improve efficiency, evidence suggests that these mechanisms have not consistently delivered the intended outcomes.

Despite the introduction of structured commissioning guidance and stratified care pathways, referral volumes continue to increase coupled with inappropriate referrals. Given these findings it would suggest that referral behaviour cannot be fully explained by formal policy structures alone. Referral decisions appear to be influenced by a broader set of interacting determinants, including clinician confidence and competence, risk perception, professional identity, contractual incentives, systems pressure and service configuration. Many of these influences operate at an individual level of practices and clinicians and therefore cannot be captured through the collection of routine data.

This chapter has highlighted significant gaps in the literature, while there is growing evidence describing patterns of referral activity and service utilisation, there remains limited understanding of why GPs make the referral decisions they do in OS. Of particular interest, there is a lack of research examining how individual, organisational and system-level factors interact to shape referral behaviours, and

how these behaviours may contribute to unwarranted variation, inefficiencies and inequalities in access to care. This lack of insight is especially notable given the role of OS in the curriculum and clinical demand and need for OS in primary care and NHS resource utilisation.

These observations provide a clear justification for the focus of this thesis and for the adoption of a mixed methods approach to investigate the referral behaviours of general dental practitioners towards oral surgery.

Quantitative analysis allows for the examination of referral data across regions and timeframes, identifying patterns in volume, referral destination, practitioner variation and patient demographics. These insights will provide an overview of referral activity and offer a foundation for understanding the broader context of access to care. However, this data will not allow an explanation for the drivers behind clinical decision making. To gain further insight in the referral behaviours, it is necessary to explore the beliefs, experiences and contextual factors that influence practitioners' choices.

Qualitative methods are well suited for this latter part of the research. Rooted in constructivist epistemology, qualitative research acknowledges that knowledge and behaviour are socially and individually constructed, shaped by professional identity, clinical environment, experience and wider policy frameworks. Using an inductive thematic approach this thesis explores GDPs referral behaviours towards OS.

In addition, qualitative research allows for the exploration of professional identity and the perception of risk. GDPs may refer due to fear of complications, medico-legal concerns or lack of mentorship or supervision in their working environment. Others may have developed habitual patterns of referral reinforced by local culture or prior feedback from referral centres. These subtleties cannot be accurately captured through quantitative data sets but are crucial in the understanding of referral behaviours.

By integrating qualitative and quantitative methods, this thesis provides a comprehensive analysis of OS referral behaviours in England. It is designed to

generate a deeper understanding of the drivers behind referral decisions, assess the alignment between referral activity and service design, and offer some insight into potential interventions for improvement of workforce education, referral pathways and policy. Ultimately this work contributes to the broader goal of improving access to appropriate oral surgery care, the development of the workforce and ensuring high quality patient centred outcomes.

1.1 References

- Bishop M. The ethics of dental practice in London in the 16th century. *Brit Dent J*. 2012;213:77-80.
- Brown J, Baker R, Moore RJ. 2020. An investigation into the oral surgery curriculum and undergraduate experience in a sample of DFT's in the UK. *Eur J Dent Ed* 25(3):421-434
- Coulthard P, Bailey E, Bridgman CM. 2014. Introducing clinical triage for oral surgery management in England. *Oral Surg* 7;143-151
- Coulthard P, Kazakou I, Koron R, Worthing HV. 2000a. Referral patterns and the referral system for oral surgery care. Part 1: General dental practitioner referral pathways. *Br Dent J* 188;142-145
- Coulthard P, Koron R, Kazakou I, Macfarlane TV. 2000b Patterns and appropriateness of referral from general dental practice to specialist oral and maxillofacial surgical services. *Br J Oral Maxillofac Surg*. 38(4):320-5.
- D'Cruz L. 2018 Tier 2 NHS services in primary dental care – where are the risks? *Brit Dent J* 224(12); 927-929
- Drake S. 2008. Dentists with special interests – towards a flexible workforce to meet oral health needs of the future. *Br Dent J* 205;9-11
- Fund TK. Demand and activity in the NHS: still rising [Available from: <https://www.kingsfund.org.uk/blog/2016/12/demand-and-activity-nhs-still-rising>].
- General Dental Council 2023. The Safe Practitioner: Dentist. https://www.gdc-uk.org/docs/default-source/education-and-cpd/safe-practitioner/spf-dentist.pdf?sfvrsn=c198211d_5
- General Dental Council 2025. Registration Statistical Report. https://www.gdc-uk.org/docs/default-source/reports-and-publications/gdc-registration-statistics-report-2024.pdf?sfvrsn=17fb911_8
- Ghiu G, Catleugh M. 2018. The efficiency and quality of the care pathway for adult patients being referred to the East Lancashire and Blackburn with Darwen Oral Surgery Service. *Brit Dent J* 226(3);197-202
- Goldthorpe J, Sanders C, Macey R, Gough L, Rogers J, Tickle, Pretty I. 2018. Exploring implementation of an electronic referral management system and enhanced primary care service for oral surgery: perspectives of patients, providers and practitioners. *BMC Health Ser Res* 18;646 <https://doi.org/10.1186/s12913-018-3424-z>

- Gradwell N, Fleming C, Bell C, Gormely M. 2024. An evaluation of oral surgery referrals to aid development of an integrated service in Southwest England. *Brit Dent J* <https://doi.org/10.1038/s41415-024-7949-8>
- Goodwin N, Perri Peck E, Posaner R. 2003. Managing across diverse networks: lessons from other sectors. Final Report. <https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/HSMC/research/diverse-networks-2004.pdf>
- Halai T, Pizzo E, Schwab J, Patel, Eyeson J. 2019. A cost analysis of non-surgical extractions in primary versus secondary care. *Faculty Dent J* 10:14-19
- Hill H, Birch S, Tickle M, Pretty I, Goldthorpe J. 2021. An eReferral Management & Triage System for minor Oral surgery referrals from primary care dentists: a cost-effectiveness evaluation. *BMC Health Serv Res* 21:781
- Jones E. 2021. Hospital Dentistry – GIRFT Programme National Specialty Report. https://gettingitrightfirsttime.co.uk/medical_specialties/hospital-dentistry/
- Macluskey M, Durham J. 2009. Oral surgery undergraduate teaching and experience in the United Kingdom: a national survey. *Eur J Dent Ed* 13;52-57
- Macluskey M, Durham J, Gowan G et al. 2008. UK national curriculum for undergraduate oral surgery subgroup for teaching of the Association of British Academic Oral and Maxillofacial Surgeons. *Eur J Dent Educ* 12(1);48-58
- MEEDP Board. 2010. Review of Oral Surgery Services and Training. <https://www.baos.org.uk/resources/MEEOSreview.pdf>
- Morton M. 2018. Oral and Maxillofacial Surgery – GIRFT Programme National Specialty Report. https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/11/OMFS-Report-Nov18-F_Layout-1-FINAL.pdf
- NHS 2018. Five Year Forward View <https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf>
- NHS 2023. Oral Surgery Clinical Standard. <https://www.england.nhs.uk/long-read/oral-surgery-clinical-standard/>
- Patel R, Gerrard G. 2023. Assessing secondary care oral surgery referral complexities and casemix. *Faculty Dent J* 14(1)6-10
- Savla A, Sanalla A, Tanna N. 2019. How do minor oral surgery courses impact the confidence levels of general dental practitioners? *Brit Dent J* 226;512-517
- Skipper M. 2010. Managed clinical networks. *Br Dent J* 209(5):241-2

UK Government 2025. 2025. NHS dentistry contract: quality and payment reforms.
<https://www.gov.uk/government/consultations/nhs-dentistry-contract-quality-and-payment-reforms/nhs-dentistry-contract-quality-and-payment-reforms-consultation-document>.

Chapter 2 – Aims of the research project

This research project seeks to investigate the referral behaviours of GPs in England with respect to patients who require oral surgery treatment. It adopts a mixed-methods approach, grounded in behavioural theory, to generate a holistic understanding of how and why referral decisions are made.

A scoping review was conducted to explore the existing literature on referral behaviours of GPs towards oral surgery services within England. The aim of the review was to map the available evidence regarding how, why and under what circumstances GPs refer patients for oral surgery. This type of review was considered appropriate due to the exploratory nature of the research question and the heterogeneity anticipated in study designs and the methods available.

Findings from the review revealed that while several papers discuss oral surgery referrals in the broader context of NHS services, very few address the direct issue of the behavioural aspects of GPs with regards to referring. This is limited evidence of qualitative exploration of GP perspectives, experiences or motivations. Additionally, there is a lack of UK-specific empirical research focused on the psychosocial and contextual determinants that drive referral decisions, such as confidence, training, access to services, perceived risk and medico-legal concerns. This lack of in-depth research is concerning given the increasing demand for oral surgery services. However, there is evidence in the medical literature which demonstrates referral behaviours are a complex decision-making process which is influenced by clinical, personal and systemic factors.

The main initiatives discussed are those aimed at triaging referral and promoting care closer to home and not addressing one of the core issues which is an appreciation of why GPs are increasing referrals for oral surgery services. This scoping review highlights a significant gap in the literature regarding the behavioural dimensions within referral decisions for oral surgery services by GPs in England. Existing studies are of small volume numbers of referrals, and none adopt a

theoretically informed or mixed-methods approach to appreciate the complexity of GDPs referral behaviours.

A distinguishing feature of this project is its use of explanatory sequential design, in which quantitative methods are used first to describe the landscape and patterns of referral behaviour, followed by qualitative methods to explore and explain those findings in depth. This design facilitates a robust exploration of the multifaceted factors that influence referral behaviours.

During the third year of my PhD, the COVID-19 pandemic significantly disrupted the progress of the study, leading to unavoidable delays in data collection and analysis. As the situation evolved, particularly towards the later stages of the pandemic, it became evident that additional datasets had emerged that were unique to this period and offered valuable insights into referral behaviours under unprecedented conditions. Following discussions with my supervisory team, it was agreed that incorporating this pandemic-specific data would strengthen the study and enhance its relevance by capturing the impact of the pandemic on clinical practice and decision making.

Primary aim / research questions

To explore GDPs referral behaviours in relation to oral surgery within primary care, and to identify key factors which shape their referral behaviours.

Objectives

To conduct a scoping review of the literature related to dental referral behaviours for those patients requiring oral surgery care.

To apply quantitative approaches to investigate the referral data for patients requiring oral surgery procedures in England.

To apply qualitative approaches in a stepwise way to investigate key factors which influence referral behaviour within a structured approach using the COM-B model.

To integrate the above findings from both the quantitative and qualitative aspects using a mixed methods approach to discuss key areas of focus for intervention design.

Chapter 3 – Methodology

Introduction

This chapter outlines and justifies the methodological approach used in this study, which explores the referral behaviours of General Dental Practitioners (GDPs) to specialist OS services in England. The complexity of referral decision making, involving clinical judgement, experience, consideration of the contextual constraints, and professional attitudes require methods which can address both the measurable patterns of activity and the underlying reasoning which has shaped the reason for referral.

Training

During the course of this PhD, I undertook structured training in both quantitative and qualitative research methodologies to support the design and delivery of a mixed-methods study. Quantitative research skills were developed through collaborative engagement with experienced researchers at The University of Manchester, which facilitated practical understanding of data handling, statistical analysis and interpretation.

In parallel, I pursued formal training in qualitative research through two dedicated courses: one focused on questionnaire design and interview techniques, enhancing skills in data collection and participant engagement; and a second centred on thematic analysis which provided a rigorous framework for coding, analysing and interpreting qualitative data.

Collectively, this training enabled the integration of robust quantitative and qualitative approaches within the study, ensuring methodological coherence and depth of analysis.

3.1 Research Design - considerations

Selecting an appropriate research design is critical to the success and outcomes of the research. The design will dictate how data are collected and analysed and how the aims of the research can be meaningfully answered with associated credible and valid findings which will be accessible to a variety of audiences (Creswell 2018, Maxwell 2012, DeVaus 2001).

The study focuses on the overarching question of what are the referral behaviours of GPs in England towards patients requiring oral surgery, and what factors influence these behaviours? This is likely to be complex and multifactorial in aetiology. It will involve an understanding and appreciation why they behave in such ways, which will include the psychological, social and contextual influences.

Several methodological approaches were considered during the design phase, but ultimately a mixed methods design was chosen for the reasons discussed later. Alternative methods which were considered are outlined below with justification for rejection.

3.2 Alternative Methodologies

Alternative methodological approaches were considered during the design phase but ultimately rejected in favour of mixed methods. These included purely quantitative, purely qualitative and realist approaches.

3.2.1 *Quantitative-Only Design*

A purely quantitative only design, such as a cross-sectional survey or regression-based analysis could have identified statistical associations between GDP characteristics and referral behaviours. However, as standard methodological text and research reviews note, such designs are limited in their ability to explain they why and how behind the decision-making processes, because they focus on numerical measurement rather than the meaning and context (Pyo 2023). Quantitative methods identify ‘snapshots’ of associations at a point in time but do not capture the subjective reasoning or rationale that underpins clinical decision making. Therefore, the complex phenomena, such as how GDPs assess case complexity, risk, or manage patient expectations remain unexplored by this approach (Cresswell et al 2018, Green et al 2018, Harrison 2013). Without such qualitative insight, quantitative analysis alone may oversimplify the investigation of referral behaviours by reducing complex, context-dependent processes to numerical variables, therefore missing the explanatory depth for essential understanding variations in referral practice (Richie et al 2013, Pope 2006)).

These limitations are widely acknowledged in methodological comparison of research paradigms; both qualitative and mixed approaches are recommended when research aims to uncover participants’ perspectives or decision-making processes rather than measuring ‘what’ is happening (Lim 2024).

3.2.2 *Qualitative-Only Design*

Conversely, a purely qualitative approach (such as grounded theory, phenomenology, or case study) would have yielded rich insights into the lived

experiences and perceptions of GPs regarding their referral behaviours, capturing the complexity, context and reasoning behind decision making (Creswell 2018, Pope 2006). However, a qualitative only study would lack the capacity for broad generalisation which is necessary to identify wider trends across the population. Established methodological guidance emphasises that research design should be aligned to the nature of the research questions: exploratory questions about experiences, motivations and decisions main processes are best addressed through qualitative methods, while questions about prevalence or association require quantitative approaches (Bryman 2016, O’Cathain et al 2014).

The aim of this research is to gain insight into both the individual level experiences but also the broader patterns of referrals and therefore a qualitative only design would not be sufficient. In addition, the literature although sparse on this subject of referral behaviours, demonstrates demographic variation in referrals which therefore supports a mixed methods approach (Ritchie et al 2013). This approach is consistent with expert advice in health services research, which recommends combining qualitative and quantitative methods to achieve both depth and breadth of understanding, particularly when addressing complex clinical behaviours (Creswell 2014, Greenhalgh 2016, O’Cathain 2014).

3.2.3 *Realist Approaches*

Realist approaches, including realist evaluation are grounded in scientific realism and seek to explain how outcomes are generated through underlying mechanism operating within contexts (Pawson et al 1997). Rather than focusing solely on participants’ accounts, realist research aims to identify causal explanations articulated through ‘Context-Mechanism-Outcome’ (CMO) configurations. Such approaches are of benefit in the evaluation of complex interventions, where there is a need to understand variations in outcomes and determines “what works for who under which circumstances” approach (Howe et al 2025, Wong et al 2013). Data collection typically involves qualitative methods such as interviews and document analysis. However, this process of analysis is explicitly theory driven and has a primary objective being development, testing or refinement of programme theories.

Despite the strengths of a realist approach, this type of methodology is most effective when applied to clearly defined interventions or programmes. GDP referral behaviours don't constitute a discrete intervention but represent complex, embedded professional practice which is influenced by multiple interacting factors which include clinical experience, education, organisational constraints, perception of risk and contractual arrangements. The realist approach also emphasises causal explanation and programme theory development which wasn't aligned with the aims of the research. Finally, the application of the CMO configuration risked constraining the analysis by imposing a causal structure of GDPs professional judgements which are often fluid and shaped by subjective aspects and would limit the inductive insight.

Realist evaluation was developed for use in research where there is involvement of complex social programmes in aspects where interventions may work differently depending upon the conditions and the agent responses. It focuses in identifying mechanisms as opposed to whether an intervention works overall.

3.2.4 Case Study

A case study approach was also considered which would involve the in-depth exploration of a system, service or process within the real-life context (Yin 2018). Case studies are particularly useful for examining complex organisation phenomena and are characterised using multiple data sources to provide rich, contextualised understanding.

In healthcare research a case study approach has been widely employed to investigate service delivery, implementation processes and institutional practices. However, within the remit of this research the limitation would be the need to define clear boundaries within a 'case' such as a specific geographical area of organisation. Implementation of this would have restricted the scope of the study and limited the inclusion of diverse findings across the GDP population. The aim of this research was not to examine referral processes within a single or small number setting, but to gain insight into the common and divergent factors which drive referral behaviour across the broader population of GDPs.

In addition, whilst case studies offer depth their findings are often transferable from an analytical perspective, but do not have the ability to generate theories which would be useful from the perspective of mapping behavioural findings onto a framework to allow intervention development and future planning.

3.3 Defining Mixed Methods Research

Mixed methods research (MMR) refers to an approach in which both quantitative and qualitative methods are deliberately combined with a single study to provide a more comprehensive understanding of a complex phenomenon than either method could achieve alone (Creswell 2018). It represents more than a simple use of two data types and involves the purposeful integration of qualitative and quantitative strands at one or more stages of the research process (O’Cathain et al 2014). The integration of these strands allows researchers to draw on the complementary strengths of each method, combining the precision, breadth and generalisability of quantitative research with depth and contextual richness and explanatory power of qualitative inquiry (Creswell 2010).

This approach was chosen for the present research because understanding referral behaviours among GPs is inherently complex, involving not only measurable patterns such as demographic or clinical characteristics but also nuanced reasoning, contextual factors and perceptions that influence decision making.

It is increasingly recognised as a robust and sophisticated methodology in health sciences, particularly suited to research questions that require both statistical breadth and narrative depth, and allows generation of new insights through complementarity, triangulation or expansion (Johnson et al 2007).

Quantitative methods alone could identify statistical associations between GP characteristics and referral practices but would not shed any light on the rationale behind these behaviours, or indeed capture any variations in clinical judgement, risk assessment or patient management (Bryman 2007). Qualitative methods, conversely, excel at exploring meanings, experiences and behaviours and would generate rich narratives of individual experiences but could not provide insights into population-level trends or the broader patterns necessary to inform policy or service design (Pope 2006, Ritchie 2013).

By combining these approaches, MMR allows for a more holistic understanding of referral behaviours, enabling the exploration of both what is happening at a

population level and why it occurs at the individual level (Fetters 2013, Doyle 2016). This methodological choice aligns with established guidance in health research, which recommends MMR when the research questions span multiple dimensions such as clinical behaviours and organisations (Johnson 2007, O’Cathain 2008). In health research, where the focus of the subject covers clinical, behavioural and organisational dimensions, MMR has gained recognition as a particularly suitable and rigorous methodology (Fetters et al 2013, Doyle 2016).

3.4 Philosophical and Methodological Rationale

The philosophical underpinnings of research are central to determine how knowledge is conceptualised, generated and interpreted. Such foundations guide the methodological research choices and shape how researchers approach the answer to their questions (Asalahi 2015). An MMR approach demands explicit consideration of the philosophical assumptions that allow for the integration of differing epistemological and ontological positions (Creswell 2018, Tashakkori 2010). The foundations can be incorporated into the term 'research paradigm'.

MMR allows the integration of paradigms which have in the past been valued as incompatible, especially positivism and interpretivism (Morgan 2007). Pragmatism is a paradigm which allows the incorporation of both interpretivism and positivism, allowing practical outcomes and real-world applications of research (Pretorius 2024)

In this study I adopted an MMR design to address the complexity of the research question, by exploring the meanings, perceptions and contextual influences surrounding practitioners' experiences but also the examination of patterns and relationships across a broader sample. As discussed above, a mixed methods approach offers the opportunity to combine the depth of rich, contextualised data with the breadth of generalisable findings which enables a more comprehensive understanding of referral behaviours and influences as opposed to qualitative or quantitative data. Pragmatism focuses on 'what works to address this problem' as opposed to a single epistemology or ontological method (Creswell and Plano Clark 2017). Pragmatism provides an ideal philosophical foundation to allow both qualitative and quantitative approaches to be complementary, rather than viewing them as being philosophically incompatible. It allows the researcher to draw flexibly on the combination of methods most appropriate to answering the initial research question. Less focus is therefore given to the nature of the reality (ontology) or the nature of knowledge (epistemology), rather a focus on the consequence of the research question and the effectiveness of the methods chosen (Creswell 2017).

In the qualitative phase of this research, thematic analysis was used to generate rich, interpretive insights into the referral behaviours of practitioners. The pragmatist

paradigm supports the use of thematic analysis as a legitimate method for uncovering patterns of meaning and linking these to the quantitative research to allow relationships to be examined.

As this research aims to explore referral behaviours with discussion around potential interventions, the pragmatic approach allows mixing of the two core components. Mixing methods enables both thematic analysis (qualitative) and quantitative follow-up; thematic analysis provides the interpretive depth required and quantitative methods provide the breadth needed. The combined design maximises the potential for meaningful, actionable insights.

3.5 Study Design

Building upon the pragmatic philosophical foundation, the design of the study is an explanatory sequential mixed methods approach which has been selected to address the research question in a structured and comprehensive manner.

This design begins with a quantitative phase which seeks to identify patterns and trends in GDP's referral behaviours towards oral surgery services through analysis of accessible referral databases, allowing an insight into the current landscape of referral volumes.

The findings from this phase directly inform the subsequent qualitative phase in which semi-structured interviews explore the underlying reasons, contextual influences and cognitive processes which shape these referral behaviours. This sequencing reflects the pragmatic emphasis on using the most appropriate methods to answer the research question effectively, allowing quantitative results to be enriched and explained through qualitative insight. The integration of both strands ultimately facilitates a more holistic understanding of referral decision making/behaviours, therefore aligning with the study's aim to generate both an explanatory depth and practical relevance for clinical education, service delivery, workforce development and policy development in oral surgery.

3.6 Typologies of Mixed Methods Research

Foundational typologies in MMR (Creswell 2018, Johnson 2007) identify several core design models through which integration occurs; convergent (concurrent), exploratory sequential and explanatory sequential designs.

3.6.1 Convergent (concurrent) design

Within this design, quantitative and qualitative data are collected in parallel, analysed independently and merged during interpretation. The purpose is to triangulate findings to determine whether results from both aspects converge, diverge or complement one another (Fetters 2013). This design allows for direct comparison of numerical outcomes and qualitative insights which enhances validity through corroboration (Bryman 2007). However, convergence designs require significant resources and research expertise to conduct both strands simultaneously and may be less suitable where sequential logic or explanatory linkage between datasets is required (Plano Clark 2016).

3.6.2 Exploratory Sequential Design

This begins with a qualitative phase, where themes or constructs are identified following by a quantitative phase which tests these findings (Ivankova 2006). This design is advantageous when existing theoretical frameworks or instruments are inadequate to capture the phenomenon, allowing the qualitative results to inform instrument development. It is often used in early-stage research to develop conceptual models. However, its inductive design makes it less suitable for studies which use quantitative databases as their foundation or initiation for the research or where the aim is to seek explain rather than generate patterns.

3.7 Integration in Mixed Methods Research

Integration is the defining feature of MMR and the mechanism through which its added value is realised (Fetters 2013). It may occur at multiple stages during the research, and three principal integration stages have been identified:

1. Connecting – linking the results of one phase to inform the next
2. Embedding – nesting one dataset with another
3. Merging – combining both datasets for comparison and joint interpretation

In the present study, integration occurred primarily through connection; results in the quantitative study were used to focus the qualitative phase. The qualitative analysis sought to interpret the quantitative findings allowing exploration of the referral behaviours and patterns, initially by the development of a topic guide followed by recruitment of participants and qualitative interviews with an independent interviewer.

Integration occurred at the interpretation stage, where both datasets were synthesised to develop a conceptual understanding of referral behaviour within the context of the COM-B (Michie 2011).

3.8 Rationale for Explanatory Sequential Design

The rationale for adopting an explanatory sequential design was both theoretical and practical. From a theoretical perspective, this design aligns with the pragmatic orientation of the study and its objective to understand not only the referral behaviours which exist, but why such behaviours exist. The quantitative phase established the volume of referrals from GPs to oral surgery providers and included regional variations and the effect of the pandemic. However, quantitative numerical data alone would not capture the reasoning processes, attitudes or contextual barriers which underly such patterns. The subsequent qualitative phase which involved semi-structured interviews allowed exploration of such issues in depth, providing richness to the data and complementing the quantitative set. Overall, this approach provided both breadth and depth of understanding, thereby enhancing the overall explanatory power of the study.

3.10 Limitations of Mixed-Methods Research

While MMR offers the advantage of combining qualitative and quantitative data to provide a more comprehensive understanding of phenomena it is not without challenges. MMR requires careful planning to ensure that both strands align with the research questions and that they are integrated meaningfully (Cresswell 2018). In the context of this thesis, careful justification was required to demonstrate why both approaches were necessary. Quantitative data allows identification of patterns and associations in referral behaviours, whereas the qualitative interviews were essential to explore the underlying reasoning and behaviour drivers. Failure to integrate these two aspects effectively would risk presenting a discount of data sets which would in turn reduce the power and impact of the research.

Integration of data is often methodologically challenging. The successful synthesis of both aspects requires thoughtful strategies to ensure that insights from one method inform and enrich the others (Fetters 2013). In this study, integration involved linking quantitative survey results with the qualitative themes mapped to COM-B (Johnson 2024). Careful planning is essential as during the process of integrating data inherently involves interpretive judgement which therefore introduces potential subjectivity and influence the conclusions. Reporting this process transparently is therefore critical to maintain credibility.

MMR is resource intensive, by combining two methods demands greater time, effort and skill as opposed to a single-methods study. This includes being proficient in survey design, interview techniques and multi-level data analysis (Johnson 2007). In this thesis, the combined approach required both large-scale data collection from the e-RMS dataset and detailed qualitative analysis of interview transcripts placing practical constraints on the sample size and depth of data analysis. The quantitative data set was large, and although the qualitative interviews were small numbers there was evidence of saturation within the analysis (Saunders 2017).

Integration across paradigms requires significant methodological expertise and maintaining coherence between quantitative and qualitative components can be demanding. Quantitative research is typically grounded in a positivist paradigm, whereas qualitative research often adopts an interpretivist stance (Tashakkori

2010). Combining these paradigms can be challenging and there is a risk that one method might dominate over the other thereby influencing the research outcome.

Whilst MMR can provide rich and nuanced understandings, there are inherent limitations in generalisability and reporting (O’Cathain 2010). The qualitative component is context specific and cannot be assumed to represent all GDPs experiences across England. Similarly, the constraints of this thesis may limit the depth with which data integration processes and contradictory findings can be presented (Simard 2025).

In summary, although MMR offers unique insights into complex phenomena such as GDP referral behaviours, it is associated with challenges in design, integration, resource demands, epistemological consistency and generalisability. Appreciating such limitations does not diminish the value of the approach but provides essential context for interpreting the findings and understanding the study’s contributions to this area of research.

3.11 Phase 1 – Quantitative Study (Chapter 4.2)

This phase of the research consists of a broad analysis followed by a focused detailed overview of referral volumes via a centralised electronic referral system to the West Yorkshire Managed Clinical Network (WYMCN).

Referral data for the three specialities Oral Medicine, Oral Surgery and Oral & Maxillofacial Surgery was acquired from the eRMS provider for the dates outlined below. Agreement was sought from the Commissioners and WYMCN. Ethical approval was not required as this was a service evaluation with secondary use of data as stated by the Information Commissioners Office (ICO).

A retrospective analysis of referral data was collected between October 2016 and September 2019 inclusive. The MCN in West Yorkshire is unique in its tri-specialty remit (oral surgery, oral medicine, oral and maxillofacial surgery) and in its operation of a centralised electronic referral system.

In addition to the data analysis of referral categories, the volume of referrals per referrer, referrers time since first registration with the GDC and referrers country of degree origin were included.

3.11.2 Analytical Approach

Descriptive statistics were used to examine trends in referral volumes and categories. Cross-tabulations explored potential associations between practitioner characteristics and referral activity. This analysis provided a system-level overview of referral behaviours, identifying patterns that warranted further exploration in the qualitative phase.

3.11.3 Impact of COVID-19 on oral surgery referrals

The COVID-19 pandemic presented unprecedented challenges to dental services across the UK, including suspension of routine care, changes to referral pathways, and altered patterns of patient presentation. As such, the pandemic represented a major external disruption that had the potential to significantly influence referral behaviours from general dental practitioners to specialist oral surgery services.

The inclusion of COVID-19 referral data within my thesis allowed for a unique opportunity to assess the resilience, adaptability and responsiveness of the referral system during a time of crisis. Analysis referral volumes during, and in the period immediately following the pandemic helped identify key shifts in demand for oral surgery services.

Furthermore, the pandemic also impacted my ability to conduct qualitative data collection affecting timing and scope of the original research design. In my response to these limitations, integrating a retrospective analysis of referral data during the pandemic adding further value to the thesis, offering a pragmatic and relevant extension to the project.

Given the nature of the research question and supporting the first part of quantitative data particularly concerning trends over time, volumes of activity and service pressures; a quantitative approach was both appropriate and essential to this component. A structured analysis of referral data was undertaken to quantify and describe the variations in referral numbers, waiting times and case categorisation.

This data set has assisted in giving insight into how external pressures may act as a catalyst for changing referral behaviours, whether that be through necessity, policy or altered professional judgement. It also supports the hypothesis that referral behaviours and practices are complex, dependent upon the context and are often influenced by factors beyond clinical presentation alone.

3.12 Phase 2 – Qualitative Study (Chapter 8)

3.12.1 Research Design

To explore the underlying behaviours, motivations and contextual factors which influence GDPs decision to refer patients for oral surgery services it was appropriate to adopt a qualitative methodology. Whilst quantitative data provided valuable information on patterns and trends in referral numbers it cannot adequately capture the complexity of human behaviour, professional judgement or the influence of wide psycho-social factors. Therefore, qualitative interviews with GDPs were conducted to gain a richer, more nuanced understanding of their decision making. The development of the topic guide for the interviews was an iterative and theory informed process. The guide was designed to elicit in depth insights into the decision-making processes of GDPs when referring patients for OS care, including the behavioural, cognitive and systemic factors influencing their decisions. The guide was mapped to the COM-B model (Capability, Opportunity, Motivation – Behaviour) to provide a structured approach to explore the determinants of behaviour (Michie 2011).

The draft topic guide underwent pilot testing with a focus group comprised of experienced GDPs, OS providers and academics who were not included in the study sample. The focus group was recorded and reviewed to assess clarity, relevance and flow of questions. Feedback from this phase led to modifications, such as rephrasing complex questions and adding prompts in to explore subtle aspects of decision-making. This iterative development ensured that the topic guide was both theoretically informed and practically relevant, capable of eliciting rich, meaningful qualitative data. The initial draft of the topic guide was informed by findings from the quantitative survey and scoping review on referral behaviours in primary dental care. Questions were designed to be open ended and flexible, allowing participants to describe their experiences, reasoning and perceived barriers in their own words. For example, prompts explored how GDPs assess case complexity and consider referral pathways and reasons for referring. The use of COM-B also facilitated the mapping of results for coding and thematic analysis.

3.12.2 Sampling and Recruitment

Recruitment of participants followed a purposive sampling strategy (Palinkas 2015). This method was employed to capture diversity and breadth in referrers' experience, practice setting, levels of experience and training background (Palinkas 2015). Recruitment occurred via professional networks and stakeholder contacts, with participants provided with detailed study information and consent forms. Semi-structured interviews were carried out with an experienced independent researcher based within The University of Leeds Dental School. A topic guide (appendix 1) was used having been produced from pilot groups of referring practitioners to ensure questions were refined.

Thematic analysis of the data was undertaken collaboratively to ensure analytical rigour. Initial coding was conducted by the primary researcher with a proportion of transcripts reviewed and coded by supervisory team members. Regular cross checking and comparison of coding decisions ensured consistency and reduced the potential for individual bias.

The analysis followed a deductive approach with themes developed using the COM-B model of behaviour. The use of COM-B provided a valuable structure for organising and interpreting the emerging themes. COM-B is a widely adopted framework in behaviour science that explains behaviours as the result of an interaction between an individual's capability (both physical and psychological), the opportunities available to them (social and physical) and their motivation (both automatic and reflective). Application of this model deductively during the research allows mapping of the themes onto the COM-B to support a deeper insight into the influences on referral behaviour.

This study primarily employed a deductive approach, with COM-B as an organising framework to guide analysis and interpretation of referral behaviours. However, inductive elements were also incorporated, ensuring that themes emerging directly from participants' accounts were not overlooked or forced into pre-existing categories. This balance enabled the research to remain theoretically informed

whilst still sensitive to novel insights grounded in the data set. In doing so, the study preserves the richness of the participants' narratives focusing them into an established behaviour change theory, thereby enhancing both the rigour and the relevance of the conclusions.

This use of qualitative thematic analysis, guided by a robust and iterative methodology provides a critical insight into the complex web of factors that underpins the referral behaviours. The integration of COM-B as an analytical framework adds an explanatory power to the findings and therefore facilitates the identification of potential interventions to improve the appropriateness of referrals and reduction of referrals.

The results of this aspect of the research highlighted conclusions strongly linked to undergraduate teaching and clinical experiences. It became clear that the period in foundation training and associated trainers play a pivotal role in bridging this transition from education into clinical practice. Therefore, further qualitative research was carried out which explored the perspectives of foundation trainers. I aimed within this research to capture the insights of how confidence, capability and decision making are nurtured during the early career stages of postgraduate training, thereby complementing and contextualising the findings from the referrers group.

3.13 Integration of findings

Integration occurred during the interpretation and discussion stages. The sequential design meant that qualitative findings could directly explain, extend, or challenge the quantitative results.

For example:

- Statistical patterns in referral volumes were contextualised by practitioners' reflections on training and confidence.
- Increases or decreases in referrals were explained by insights into how GPs perceived service pressures or external influence.

This integration provided a panoramic view of referral behaviours, combining descriptive trends with explanatory insight.

3.14 References

- Asalahi E. 2015. The Philosophical Foundations of Educational Research: a Beginners Guide. *Am J of Ed Res* 3(3):213-317
- Bryman A. 2007 Barriers to Integrating Quantitative and Qualitative Research. *J of Mix Methods Res*;1:8-22
- Bryman A. 2016. *Social Research Methods*. Sage
- Burke Johnson R, Onwuegbuzie AJ, Turner LA. Towards a definition of mixed methods research. *J of Mix Meth Res* 2007;2:112-133
- Cresswell JW & Plano-Clark VL. 2018. *Designing and Conducting Mixed Methods Research*. Sage
- De Vaus 2001. *Research design in social research*. Sage
- Doyle L, Brady AM, Byrne G (2016). An overview of mixed methods research. *Journal of Research in Nursing* 21(8):623-635
- Fetters MD, Curry LA, Creswell JW. 2013. Achieving integration in mixed methods design – principles and practices. *Health Services Res* 2013;48:2134-2156
- Green J & Thorogood N. 2018. *Qualitative Methods for Health Research* (4th ed) Sage.
- Hammond SP, Seeley C, Blackett R, Markovich G, Wong G. 2025. A mixed methods realist evaluation of Digital Life Story Work platform: What works, for whom, under what circumstances and how? *The Brit J of Social Work* 55(5):2421-2440
- Harrison S, Dowswell G, Wright J, Russel I. 2003 General practitioners' uptake of clinical practice guidelines: a qualitative study. *J Health Serv Res Policy* 8(3):149-53
- Howe J, Harrison M, Fitzgerald I, Clibbens N. Realist research in nursing: an introduction to seeing beyond 'what works'. *Evid Based Nursing*. 2025; 28:134-136
- Johnson J, Blefari C, Marotti S. 2024. Application of the COM-B model to explore barriers and facilitators to participation in research by hospital pharmacists and pharmacy technicians: A cross-sectional mixed-methods survey. *Res in Soc Admin Pharmacy* 20(1):43-53
- Lim WM 2025. Australasian Market J <https://doi.org/10.1177/14413582241264619>
- Maxwell JA. 2012. *A realist approach for qualitative research*. Sage
- Michie S, M van Stralen M, West R. 2011. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science* 6(42); <https://doi.org/10.1186/1748-5908-6-42>
- O'Cathain A, Murphy E, Nicholl J. 2008. The quality of mixed methods studies in health services research. *J Health Serv Res Policy*. 13(2):92-8

- O'Cathain A, Murphy E, Nicholl J. 2010. Three techniques for integrating data in mixed methods studies. *BMJ*. 17:341:c4587 doi:10.1136/bmj.c.4587
- Palinkas LA, Horwitz SH, Green CA, Wisdom JP, Duan N, Hoagwood K. 2015. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health*. 42(5):533-544
- Pawson R & Tilley N. 1997. *Realist Evaluation*. Sage
- Plano Clark, V.L. & Ivankova, N.V. (2016). *Mixed Methods Research: A Guide to the Field*. Thousand Oaks, CA: Sage.
- Pope C & Mays N. 2006. *Qualitative Research in Health Care*. BMJ Books
- Pretorius L. 2024. Demystifying Research Paradigms: Navigating Ontology, Epistemology and Axiology in Research. *The Qual Report* 29(10);2698-2715
- Pyo J, Lee W, Choi EY, Jang SG, Ock M. 2023. Qualitative Research in Healthcare: Necessity and Characteristics. *J Prev Med Public Health* 15;56(1):12-20
- Ritchie, J., Lewis, J., Nicholls, C.M. & Ormston, R. 2013. *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: Sage
- Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, Burroughs H, Jinks C. 2017. Saturation in qualitative research: exploring its conceptualisation and operationalisation. *Qual Quant*. 52(4):1893-1907
- Simard A, F-Dufour I, MacLachlosse-Fournier R, Perreault J, Hudon C. 2025. Compatibility, integration, and epistemology: Contemporary issues from a mixed methods research experience. *Methods in Psychology* 12;100187
- Tashakkoroi A, Teddlie C. 2010. *SAGE Handbook of Mixed Methods in Social & Behavioural Research*. SAGE
- Wong G, Greenhalgh T, Westhorp G, Pawson R. 2014. Development of methodological guidance, publication standards and training materials for realist and meta-narrative reviews: the RAMESES (Realist And Meta-narrative Evidence Syntheses – Evolving Standards) project. *Health Soc Care Deliv Res* 2(30): <https://doi.org/10.3310/hsdr02300>
- Yin RK 2018. *Case Study Research and Applications: Design and Methods* (6th ed). Thousand Oaks, CA:Sage

Chapter 4 – Scoping Review

4.1 Introduction

This chapter describes the methodological approach used to conduct a scoping review of the literature examining the referral behaviours of GPs towards oral surgery services and provision of oral surgery care in the United Kingdom.

A scoping review methodology was selected as it is particularly suited to exploring the breadth, depth and characteristics of an emerging heterogeneous body of literature, where study designs vary and where the evidence has not previously been comprehensively synthesised. This approach enables mapping of key concepts, identification of knowledge gaps and clarification of how research has been conducted in this area.

The review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews, following the updated guidance by Peters et al 2020. The review will also be reported in line with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) checklist.

4.2 Aims & Objectives

4.2.1 Aim

The aim of this review is to explore and synthesise the existing literature on the referral behaviours of GDPs towards oral surgery and provision of oral surgery care.

4.2.2 Objectives

The specific objectives of this review are to:

- To identify common factors influencing referral decision.
- To explore the impact of practitioner demographics and training
- Examine the role of systemic and service level constraints
- Review the outcomes and appropriateness of referrals to oral surgery services

4.3.3 Review question

The primary review question guiding this scoping review is:

What is known from the existing literature about the referral behaviours of General Dental Practitioners towards oral surgery services, including the frequency, appropriateness and variability of referrals, and what factors influence these decisions?

4.3 Methods

The scoping review followed the updated methodological guidance by the Joanna Briggs Institute (JBI) (Peters 2020). Eligibility criteria for this review were developed using the Population Concept Context (PCC) framework as advocated by JBI.

Population – General Dental Practitioners

Concept – Referrals relating to oral surgery

Context – Primary to secondary care

4.3.1 *Inclusion criteria*

Studies were eligible for inclusion if they met the following criteria:

The population of interest comprised of GDPs. The concept under investigation was referrals to oral surgery services. Comparators were not required given the exploratory nature of the review. Eligible studies were required to report outcome related to influencing factors on referral decisions, referral pathways, the impact of training and experience, systemic and service-level constraints and the appropriateness or outcomes of referrals.

A broad range of study designs were considered eligible, including quantitative, qualitative and mixed-methods research. The time frame for inclusion was from 2000 to 2024 reflecting contemporary changes in dental education, commissioning structures and referral pathways. Only studies published in English language were included.

4.4.2 *Exclusion criteria*

Studies were excluded if they focused exclusively on secondary or tertiary care providers with no direct relevance to GDP referral decision making. Non-English language publications were excluded due to feasibility constraints. Studies published prior to 2005 were also excluded.

4.4.3 *Search strategy*

The search strategy followed the three-step approach recommended by JBI. An initial limited search was undertaken in key electronic databases to identify relevant keywords and index terms. This preliminary search focused on combinations of terms relating to general dental practice, referral behaviour, oral surgery and

decision making. The purpose of this stage was to refine the final search strategy and ensure sensitivity to the breadth of terminology used in the literature.

A comprehensive systematic search was subsequently conducted across multiple electronic databases. These included:

- MEDLINE
- Embase
- Scopus
- Web of Science
- CINAHL
- The Cochrane Library

Search terms were adapted for each database and included combinations of keywords and subject headings relating to “General Dental Practitioners”, “referrals”, “oral surgery”, “dental referrals”. Boolean operators, truncation and phrase searching were used to optimise search sensitivity and specificity.

All retrieved citations were imported into Excel™ and duplicates were removed. Study selection occurred in two stages, firstly titles and abstracts were screened against the predefined inclusion and exclusion criteria. Second, full texts of potentially relevant studies were retrieved and assessed for eligibility.

The study selection process was documented using a PRISMA-ScR flow diagram which details the number of records identified, screened, excluded and included at each stage.

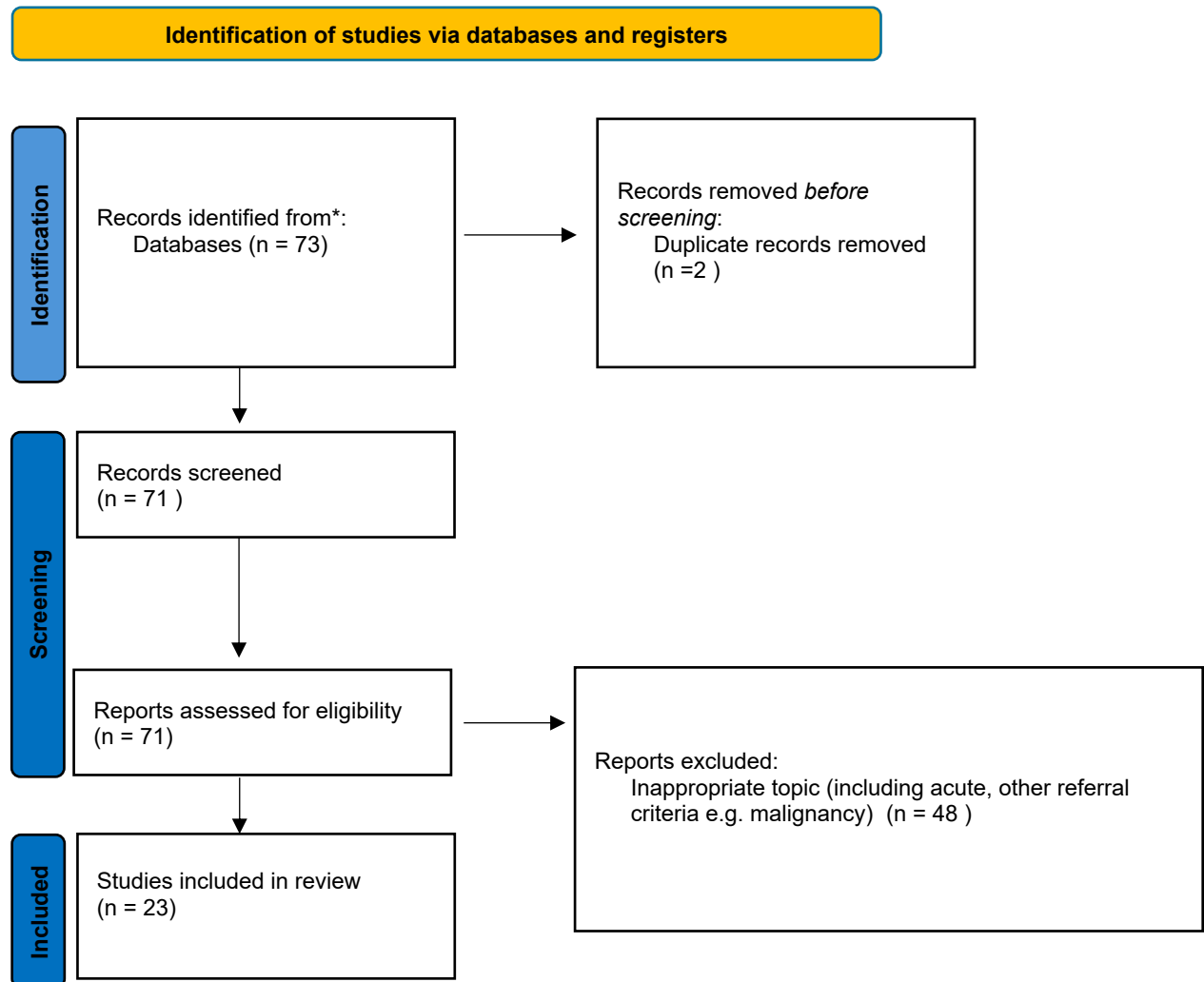
Data were extracted using a standardised data chart in the spreadsheet developed specifically for this review. The following key data items were extracted from each included study:

- Author(s), year of publication and country of origin
- Study design and methodological approach
- Clinical setting and referral context
- Key findings relating to referral behaviours

Data analysis proceeded using a combination of descriptive numerical analysis and qualitative thematic synthesis. Quantitative data were summarised to describe the distribution of study designs and clinical settings. Qualitative and mixed-methods findings were synthesis thematically to identify recurring patterns relating to referral behaviour.

4.4 Results

Below – PRISMA Flow diagram of study inclusion (Page et al 2021)



4.4.1 *Characteristics of literature*

The primary review question guiding this scoping review sought to explore what is known from the existing literature about the referral behaviours of General Dental Practitioners (GDPs) towards oral surgery services. However, despite a comprehensive and systematic search of the available evidence the review identified a notable absence of literature directly addressing this question. While some studies alluded to aspects of referral practice, there was insufficient depth to draw meaningful conclusions in relation to behavioural drivers and influencing factors.

With respect to training, the available literature, although limited, suggests a relationship between additional postgraduate education and referral behaviour. A small number of studies indicated that GDPs who had undertaken further postgraduate training in OS reported higher levels of confidence in managing surgical cases within primary care (Coulthard 2000a, Davies 2013). However, these findings were not consistently or robustly explored across the literature and the evidence base remains insufficient to draw definitive conclusions regarding the extent to which training directly influences referral decision making.

The studies reviewed were over the last 25 years with the research focus heavily clustered around specific urban regions, most notably Manchester (Coulthard 2000a, Coulthard 2014, Coulthard 2000b, Halai 2014, Jadun 2019), London (Kendall 2011, Onwudiwe 2025, Pau 2010, Shaffie 2012), and the West Midlands (Ahmed 2019). More recent work has expanded to evaluate national frameworks in Wales (Lewis 2023, Sivarajasingam 2020) and the Southwest of England (Gradwell 2024, Patel 2023). The range of studies included in this review captures the systemic shift from traditional hospital-based models towards the implementation of the Level 2 / Intermediate Minor Oral Surgery (IMOS) services and MCNs.

The literature is dominated by retrospective audits and analyses of referral records, ranging from modest samples of 100 letters to extensive datasets encompassing just under 50,000 referrals over a ten-year period (Gradwell 2024, Halai 2014, O'Neil 2012, Patel 2019, Patel 2023, Webster 2020). To move beyond simple quantitative descriptions, several studies used a mixed-methods approach, supplementing audit data with semi-structured interviews and thematic analysis to explore the

motivations behind clinician behaviour (Goldthorpe 2018, Lewis 2023, Sivarajasingam 2020). Innovation in study design is further evidenced by the application of Geographic Information Systems (GIS), to map patient 'hotspots' against socioeconomic deprivation scores (Ahmed 2019), and the use of health economic evaluations to quantify the fiscal impact of consultant-led triage (Hill 2021).

The clinical settings are split between secondary care and primary care, with early studies primarily seeking to evaluate the appropriateness of GDP referrals sent into hospitals, with more recent or later research shifting towards evaluating the safety, efficacy and patient satisfaction of services delivered within the primary care environment (Kendall 2011, Bell 2007, Dyer 2009, Dyer 2018, Pau 2010). A subset of the studies focus specifically on referral quality and communication, utilising audit and re-audit cycles to measure the impact of standardised proformas and e-RMS on the provision of essential clinical data such as medical histories and radiographs (Shaffie 2012, Patel 2019).

Table 4.4.2 Study Characteristics

Author	Year	Study Design	Referral volume if relevant	Geographical Area if appropriate	Clinical setting, referral behaviours	Key findings
Coulthard P, Kazakou I, Koron R, Worthington HV	2000 (A)	Postal questionnaire. 336 respondents.	N/A	N/A	To investigate the referral patterns of GDPs to specialist OS services in Greater Manchester	Reasons for referral were anticipated difficulty of surgery and patient compromise. Wide variation in referral behaviours between practitioners. PG training identified as factor contributing to variation.
Coulthard P, Koron R, Kazakou I, Macfarlane TV	2000 (B)	Postal questionnaire 74 respondents	N/A	N/A	To investigate the patterns of referral and appropriateness of referrals to specialist oral and maxillofacial surgery services.	Reasons for referral were expected difficulty of the operation, medical condition of the patient and lack of facilities for general anaesthesia. Very few were inappropriate.
Bell G	2007	Retrospective analysis (audit) of 600 consecutive referrals	600	North Cumbria / Dumfries	Review of patients treated in a primary care setting.	Despite a small sample the study demonstrated that it was safe and effective to diagnose and manage a broad spectrum of patients in the primary care setting.
Dyer TA, Dhamija AC	2009	Service evaluation of 705 appointments	705	South Yorkshire	Evaluation of a primary care based oral surgery service.	Demonstrated that a minor oral surgery service can be successfully provided in dental practice.

		including patient satisfaction			Reviewed 705 appointments.	
Ahmed B, Al-Mossallami A, Bornstein MM	2019	Mapping of referrals	3512	Birmingham	Review of 3,512 referrals	Mapping of referral provides important information on patient's location and referrers. This has uses in commissioning of healthcare services.
Pau A, Nanjappa S, Diu S	2010	Audit a primary care oral surgery service (referrals, cost and patient outcomes)	83	Romford	Service evaluation of primary care OS with patient views.	Demonstrated that the provision of oral surgery in primary care by those with a special interest provides good patient services and better access and reduced costs.
Kendall N	2011	Audit	N/A	N/A	Primary care oral surgery services	The increase in demand for oral surgery care has been met by the provision of primary care-based oral surgery services.
Shaffie N, Cheng L.	2012	Retrospective audit of referral letters in secondary care.	N/A	N/A	Referrals to secondary care OMFS	Improved referral forms showed notable improvements in referrals from primary to secondary care therefore improving patient service and provision.
O'Neill E, Gallagher JE, Kendall N	2012	Audit of referrals to primary care oral surgery service	501	Croydon	Primary care oral surgery	Most referrals were appropriate and the use of a clinician-led triage process reduced referrals to secondary care.

Davies B, Ramsey R, Bryant D, MacKenzie N	2013	Retrospective audit of patient records and referral data	795	North Yorks / Wiltshire (MOD)	Primary care oral surgery	Demonstrated that the primary care service was efficient, effective and economically viable with complication rates comparable to alternatives.
Coulthard P, Bailey E, Bridgman CM	2014	Review referrals for secondary care and reasons for, and to develop a minimum data set for triagers	1885	Manchester	Secondary care oral surgery	Demonstrated that a significant number of referrals were suitable for primary care but a review of teaching and training systems for the future would allow further improvement.
Halai T, Yates JM	2014	Retrospective analysis of oral surgery referrals	300	Manchester	Secondary care	A relatively high volume of inappropriate referrals to secondary care were noted. Demonstrated that there needs to be an increased understanding by GPs of case complexity and surgical and medical aspects of patient care to allow treatment in primary care.
Dyer TA, Lau JGL	2018	Service evaluation and review of patient and practitioner satisfaction	623	South Yorkshire	Primary OS care	Range of oral surgery procedures can be carried out in primary care with low complication rates, acceptable waiting times and high satisfaction results from both patients and practitioners.

Goldthorpe J, Sanders C, Macey R, Gough L, Rogers J, Tickle M, Pretty I	2018	Review of implementation of eRMS in primary care OS	N/A	N/A	Primary care OS	Shown that eRMS was successfully implemented in areas of the UK. The model that was evaluated has potential for expansion across a wider area of the UK to allow demand to be managed in other specialist services.
Patel A, Stagnell S, Eaton K	2019	Audit of referrals to IMOS in East Kent	441	East Kent	Primary care OS	Shown that a wide variation between the referral and the treatment provided.
Jadu S, Syed N, Drabu T, Yates J	2020	Review of referrals to primary care	500	Manchester	Primary care OS	Shown that waiting times were low and some patients had a lack of understanding about what they had been referred for. A significant number of inappropriate radiographs were included but appropriate referrals were included.
Sivarajasingam V, Leiws K, Athwal J, Mort J, Emanuel C, Morgan MZ	2020	Review of secondary care referrals	298	Wales	Secondary care OS	Demonstrated that 37% of referrals were level 1, 33% level 2 and 30% level 3. Therefore, introduction of an OS MCN and primary care service is welcomed to reduce the number of inappropriate referrals to secondary care.
Webster J, Landes D	2021	Review of primary care referrals	48,286	North East England	Primary care OS	A range of primary car referrals were noted in the 10-year period.

						There was no correlation between the distance to the provider, the contract size and deprivation levels and the referral rate.
Hill H, Birch S, Tickel M, Pretty I, Goldthorpe J	2021	Evaluation of eRMS in primary care	1427	North West England	Primary care OS	Shown that almost 50% of referrals were appropriately diverted to primary care with the use of an eRMS system.
Lewis K, Sivarajasingam V, Morgan M	2023	Referral	N/A	N/A	Secondary care OS	Key themes were identified relating to the reason for the referrals to secondary care. This has resulted in the development of some local interventions to attempt to address the themes.
Patel R, Gerrard G	2023	Assessment of OS case mix in secondary care	225	Wiltshire	Secondary care OS	Audit demonstrated that an appropriate casemix was seen in this unit with adjustments to the triage
Gradwell N, Flemin C, Bell C, Gormley M	2024	Evaluation of secondary care OS referrals	100	N/A	Secondary care OS	Demonstrated that 17% of referrals were Level 1 and 35% were level 2 and 48% level 3. Concluding that the development of a primary care service would address waiting times and improve patient experience.
Onwudiwe F, Bqain M, Bean T, Koshal S,	2025	Evaluation of primary care OS service	300	London	Primary care OS	Shown that 37.7% of referrals to primary care were inappropriate.

Mathur M, Movahedi M						Discussion around the development of strategies to improve the appropriateness of referrals including addressing the confidence of GDPs in OS was discussed.
Total referrals in scoping review:			60,581			

4.5 Discussion

Across the included studies, the cumulative number of referrals identified within this scoping review totalled 60,581, providing a dataset for comparison with the two primary datasets generated within this thesis. Geographically, the evidence base demonstrates a relatively narrow and uneven distribution, with studies predominantly situated in specific regions including North Cumbria and Dumfries, South Yorkshire and major urban centres such as Birmingham, London and Manchester, alongside more localised areas including Romford and Croydon. This concentration highlights a limited representation of wider national referral patterns. It is also important to acknowledge that one included cohort was derived exclusively from the Ministry of Defence, reflecting referral behaviours within a military dental care context, which may not be directly generalisable to civilian General Dental Practice settings.

The provision of oral surgery (OS) services within the UK National Health Service (NHS) is undergoing significant transformation, largely in response to sustained increases in referral volumes from primary care to secondary care (Kendall 2011). These rising referral rates have contributed to escalating waiting times and growing concerns regarding the efficiency and sustainability of current service models (Gradwell 2024, Hill 2021). Historically, a greater proportion of OS activity in the UK has been delivered within hospital settings when compared with many other healthcare systems internationally (Coulthard 2014). However, evidence suggesting that a substantial proportion of the workload within Oral and Maxillofacial Surgery (OMFS) departments estimated to be as high as 80% consists of routine OS procedures, combined with the recognition that hospital-based care is often less cost-effective than comparable treatment delivered in primary care, has driven a major policy reorientation (Coulthard 2000a, Halai 2014).

This system-level reconfiguration, informed by NHS strategic documents and the Medical Education England (MEE) Review of Oral Surgery Services and Training (Davies 2013, Gradwell 2024), has prioritised the expansion of specialist OS provision within primary care. In particular, the development of Intermediate Minor

Oral Surgery (IMOS) or Level 2 services, delivered within MCNs, has been promoted as a mechanism to align patient need, clinical competence, and care setting (Gradwell 2024, Kendall 2011). The introduction of tiered complexity frameworks (Levels 1, 2, and 3) by NHS England reflects an explicit attempt to standardise referral decision-making and ensure that patients are managed by clinicians with appropriate skills in the most suitable environment (Gradwell 2024, Patel 2023). Within this evolving context, the referral behaviour of GDPs represents a critical determinant of how effectively these policy intentions are realised in practice.

4.5.1 Analysis of referral patterns and appropriateness

The decision to refer a patient for specialist OS care represents a key behavioural and gatekeeping function undertaken by GDPs (Coulthard 2000a). Across the literature, the most frequently cited driver for referral is the anticipated technical difficulty of the surgical procedure (Coulthard 2014, Coulthard 2000a, Halai 2014, Coulthard 2000b). Additional commonly reported influences include the perceived complexity of the patient's general medical history (Coulthard 2014, Coulthard 2000b) and limitations within the primary care setting, particularly the absence of facilities or staff to provide general anaesthesia or conscious sedation (Coulthard 2000a, Coulthard 2000b). These findings highlight that referral decisions are shaped not solely by clinical diagnosis, but by GDPs' assessments of risk, capability, and system constraints.

Despite these rational drivers, retrospective audits conducted across multiple regions in England and Wales consistently report high proportions of referrals deemed inappropriate, typically defined as cases suitable for management by a generalist or a GDP with enhanced skills (Level 1 or Level 2 complexity) being referred to secondary care (Halai 2014, Gradwell 2024, Sivarajasingam 2020). Such findings point towards a disconnect between policy-defined complexity thresholds and real-world referral behaviour. Evidence within this scoping review illustrates the scale of this mismatch. In Manchester, 34% of OS referrals were classified as inappropriate (Halai 2014). A mixed-methods study in Wales found that approximately 69% of referrals to secondary care fell within Level 1 or 2 complexity (Sivarajasingam 2020). Similarly, in the southwest of England, 52% of referrals to

Bristol Dental Hospital were assessed as Level 1 or 2 (Gradwell 2024), while an evaluation of a London IMOS service identified that 37.7% of accepted referrals were inappropriate at Level 1 (Onwudiwe 2025).

Collectively, these data demonstrate considerable potential for reducing secondary care burden through more effective referral decision-making and triage. Spatial analyses further suggest that referral behaviour may vary geographically. The application of Geographic Information Systems (GIS) in Birmingham identified referral “hot spots” that correlated with areas of socio-economic deprivation (Ahmed 2019), implying that population factors may influence referral demand. However, contrasting findings from a large-scale analysis in the Northeast of England of over 48,000 referrals that found no association between referral frequency and deprivation or proximity to providers, instead suggesting that professional and behavioural factors exert a stronger influence on referral patterns (Webster 2020).

4.5.2 Evaluation of primary care specialist services

The shift towards delivering minor oral surgery (MOS) in primary care (IMOS) by specialists or dentists with enhanced skills (formerly DwSIs) has been shown to be safe, effective, and acceptable to patients (Bell 2007, Patel 2019). From a behavioural perspective, the availability of such services alters the referral landscape by expanding the range of credible alternatives to secondary care. Evaluations of IMOS and DwSI schemes report several consistent outcomes:

Reduced waiting times – Primary care specialist services significantly reduce delays compared with hospital-based pathways, with treatment often completed within 3–6 weeks (Kendall 2011) and substantially outperforming the 18-week referral-to-treatment standard (Jandu 2019).

High patient satisfaction – Patients report high satisfaction, frequently attributing this to shorter waits, convenience, and the familiarity of the dental practice environment (Dyer 2009, Patel 2019, Dyer 2018, Coulthard 2000, Halai 2014).

Safety and outcomes – Audits demonstrate that a wide range of OS procedures can be safely delivered in primary care with low complication rates (Bell 2007, Dyer 2009, Patel 2019). For example, a dry socket rate of 4.4% has been reported (Bell

2007), comparing favourably with hospital-based outcomes (Dyer 2009). Importantly, the disparity between the complexity level perceived by GPs at referral and the lower complexity of procedures ultimately performed by Level 2 providers highlights a behavioural gap in confidence and competence assessment (Patel 2019, O'Neil 2012).

Cost effectiveness – Level 2 primary care services offer substantial cost savings compared with equivalent secondary care treatment (Halai 2014, Ahmed 2019, Pau 2010). The combination of electronic referral management and triage has been shown to generate statistically significant savings per diverted referral (Hill 2021).

4.5.3 Referral management systems and quality improvement

The implementation of an electronic referral management system (e-RMS) has been identified as a critical mechanism for ensuring patients are directed to the most appropriate care tier while improving referral pathways (Goldthorpe 2018, Hill 2021). Clinical triage, often led by consultants or specialists act as a primary quality improvement tool by filtering referrals based on clinical need or surgical complexity (Coulthard 2014, Patel 2019). Such systems facilitate quality improvement by utilising mandatory data fields that ensure essential information such as medical histories and enclosed radiographs are provided before a referral can be submitted (Goldthorpe 2018, Patel 2019). An example of this is in East Kent where the introduction of an e-RMS results in 99.7% of referrals including an appropriate radiograph (Patel 2019). This is a significant improvement over historical paper-based systems where diagnostic data were frequently omitted. In addition, e-RMS reduces administrative burdens, shortens waiting times to triage and provides commissioners and clinicians with the data necessary for intelligent service transformation (Coulthard 2014, Goldthorpe 2018). Overall, the effectiveness of OS service reconfiguration depends heavily on referral management systems (RMS) that influence and support GP referral behaviour (Kendall 2011, Hill 2021).

4.5.4 Clinical triage and redirection

Consultant-led triage has been shown to redirect a substantial proportion of referrals up to 45% in some studies towards appropriate primary care Level 2 services (Hill

2021, Kendall 2011). Such systems act as a corrective mechanism for inappropriate referrals and provide an opportunity to realign clinical decision-making with established complexity frameworks.

4.5.5 Data quality and electronic systems

Poor-quality referral information is reported as an issue in many papers, with several referrals lacking essential clinical details such as medical histories or diagnostic radiographs, undermining effective triage and delaying care (Gradwell 2024, Jadun 2019, Shaffie 2012). In one study, 77% of referrals were submitted without radiographic support (Sivarajasingam 2020). The implementation of electronic RMS (e-RMS), particularly those incorporating mandatory data fields, has significantly improved referral quality (Gradwell 2024, Patel 2019). For example, the introduction of a Dental Electronic Referral System (DERS) in East Kent resulted in 99.7% of referrals including a radiograph, demonstrating how system-level interventions can positively shape referral behaviour (Patel 2019). Additionally, e-RMS generate high-quality data to support commissioning decisions and service planning (Hill 2021, Coulthard 2014).

4.5.6 Barriers, challenges and future directions

Despite strong evidence supporting primary care specialist OS services, several barriers continue to influence GDP referral behaviour. Several structural and psychological barriers hinder effective referral practice. A primary barrier has been shown surprisingly to be 'technophobia' or lack of IT skills among older practitioners. This has led to resistance against e-RMS and a preference for traditional, albeit less efficient paper letters (Goldthorpe 2018). Practitioners often perceive a loss of clinical autonomy when their decisions are scrutinised by remote triagers, leading to non-compliance or the bypass of official pathways (Goldthorpe 2018). Additionally, practice-level constraints such as lack of specialised surgical equipment or the absence of facilities for conscious sedation act as physical barriers, forcing GDPs to refer cases where they might be otherwise competent to manage (Ahmed 2019, Coulthard 2000, Lewis 2023, Sivarajasingham 2020).

4.5.7 Financial incentives and contract limitations

The current NHS primary dental contract (UDA system) often inadequately remunerates complex OS procedures in primary care, inadvertently discouraging GDPs from undertaking them and promoting referral instead (Lewis 2023, Sivarajasingam 2020). This is cited as a major disincentive for GDPs to perform oral surgery (Lewis 2023). Under this framework, a GDP receives the same remuneration for a complex surgical extraction as they would for referring the patient to secondary care, creating a perverse incentive to avoid such work. This saves time and reduces practice costs (Ahmed 2019, Coulthard 2000, Onwudiwe 2025, Sivarajasingham 2020). This system fails to account for the increased time, skill and risk associated with Level 1 and 2 procedures therefore leading GDPs to concluded that undertaking such surgery is “not worth their time” (Lewis 2023, Sivarajasingham 2020). Furthermore, the economic anomaly where secondary care is free at the point of delivery, while primary care attracts a patient charge can lead to patients pressurising GDPs for hospital referrals to avoid treatment costs (Ahmed 2019, Coulthard 2014, Coulthard 2000, Halai 2014).

4.5.8 Clinical competence and confidence

A significant gap exists between perceived and actual surgical difficulty, often influences by the clinician’s experience and confidence levels (Halai 2014, Patel 2019, Patel 2023). There is widespread professional perception that recent dental graduates lack the practical skills required for anything beyond simple forceps extractions, a deficit potentially exacerbated by reduced clinical exposure during the COVID-19 pandemic (Lewis 2023, Onwudiwe 2025, Patel 2023). Paradoxically, while postgraduate training increases confidence, it also increases a practitioner’s awareness of complications, sometimes leading them to refer more frequently by more appropriately (Coulthard 2000, Coulthard 2000). Concerns persist regarding reduced exposure to OS during undergraduate training, contributing to diminished confidence among some GDPs when managing potentially complex cases (Lewis 2023, Sivarajasingam 2020). This lack of confidence often independent of clinical experience can foster risk-averse behaviour and increased referral, amplified by fear of litigation, and 89% of dentists in one paper expressed a fear of being sued

causing them to be risk averse and refer borderline cases to specialists to avoid potential complications (Lewis 2023).

4.5.9 Training and secondary care destabilisation

Diverting simpler cases away from hospitals risks reducing access to Level 1 and 2 cases essential for undergraduate and postgraduate training (Coulthard 2014, Halai 2014, Sivarajasingam 2020). University Hospitals rely on a steady flow of Level 1 and 2 complexity cases to provide essential experience for undergraduate students and junior staff (dental core trainees and residents) (Coulthard 2014, Halai 2014). If such training cases are removed entirely from the hospital service to improve efficiency and reduce cost, this could result in a deskilled future workforce (Goldthorpe 2018, Hali 2014, Kendall 2011). To mitigate this, some models suggest a strategic integration of students and trainees to the primary care specialist sites where patients are now being treated (Coulthard 2014, Kendall 2011). Ultimately, central triage must be carefully balanced to ensure that while the secondary care burden is reduced, the viability of the hospital-based teaching environment is not compromised (Coulthard 2014, Goldthorpe 2018).

4.5.10 Information gaps and governance

There remains a need for targeted education, particularly for early-career clinicians, to improve understanding of OS complexity levels and referral criteria (Onwudiwe 2025). Governance concerns also persist regarding clinical supervision and quality assurance in primary care settings compared with hospital-based multidisciplinary teams (Goldthorpe 2018, Halai 2014).

Addressing these challenges requires effective utilisation of MCNs to standardise referral pathways, enhance communication between care sectors (including feedback on inappropriate referrals), and address gaps in training and remuneration (Webster 2020, Lewis 2023, Sivarajasingam 2020). Ultimately, future commissioning decisions should prioritise population need over raw referral demand, ensuring that referral behaviour aligns with equitable, efficient, and high-quality OS service delivery (Webster 2020).

4.6 References

- Ahmed B, Al-Mosaallami, Bornstein M. 2019. Geographic information system mapping of oral surgery referrals to the Birmingham Dental Hospital. *Brit Dent J* 227(6):477-481
- Bell G. 2007. An audit of 600 referrals to a primary care based oral surgery service. *Br Dent J* 203:E6
- Clark S. 1995. Minor oral surgery 'specialisation' in general dental practice. *Br Dent J* 8;179(1):22-5
- Coulthard P, Kazakou I, Koron R, Worthington H. 2000. Referral patterns and the referral system for oral surgery. Part 1: General dental practitioner referral patterns. *Br Dent J* 2000;188:142-145
- Coulthard P, Koron R, Kazakou I, Macfarlane TV. 2000. Patterns and appropriateness of referral from general dental practice to specialist oral and maxillofacial surgical services. *Br J Oral Maxillofac Surg* 38;320-325
- Coulthard P, Bailey E, Bridgman CM. 2014 Introducing clinical triage for oral surgery referral management in England. *Oral Surg* 7:143-151
- Davies B, Ramsey R, Bryant D, MacKenzie N. 2013 A service review of a novel primary care specialist oral surgery referral service operating in a managed clinical network 6:61-66
- Dyer TA, Dhamija AC. 2009 Evaluation of an NHS practice-based minor oral surgery service. *Br Dent J* 207:577-582
- Dyer TA, Ga Lai Lau J. 2018 Evaluation of a practice-based minor oral surgery service. *Prim Dent J* 7(3):30-37
- Goldthorpe J, Sanders C, Macey R, Gough L, Rogers J, Tickle M, Pretty I. 2018 Exploring implementation of an electronic referral management system and enhanced primary care service for oral surgery: perspectives of patients, providers and practitioners. *BMC Health Serv Res* 18:646
- Gradwell N, Fleming C, Bell C, Gormley. 2024. An evaluation of oral surgery referrals to aid development of an integrated service in South West England. *Br Dent J* <https://doi.org/10.1038/s41415-024-7949-8>
- Halai T, Yates JM. 2014. Assessment of oral surgery referrals from primary care to a regional dental hospital. *Oral Surg* 7:168-176
- Hill H, Birch S, Tickle M, Pretty I, Goldthorpe J. 2021. An eReferral Management & Triage System for minor oral surgery referrals from primary care dentists: a cost-effectiveness evaluation *BMC Health Serv Res* 21:781
- Jadun S, Syed N, Drabu T, Yates J. 2019. Patient awareness and quality of oral

- surgery referrals to specialist practice. *Oral Surg* 13;99-107
- Kendall N. 2011. Development of oral surgery services in primary care. *Oral Surg* 4:57-64
- Lewis K, Sivarajasingam V, Morgan M. 2023 An investigation into oral surgery referrals in Wales. *Br Dent J* <https://doi.org/10.1038/s41415-023-5505-6>
- O'Neill E, Gallagher JE, Kendall N. 2012. A baseline audit of referral and treatment delivered to patients in the Intermediate Minor Oral Surgery Service in Croydon PCT *Prim Dent Car* 9(1):23-28
- Onwudiwe F, Bqain M, Bean T, Koshal S, Mathur M, Movahedi 2025 Evaluating the referral appropriateness and quality in oral surgery: a quality improvement study in all London IMOS services. *Oral Surg* 18:486-493
- Patel N, Stagnell S, Eaton K. 2019 The appropriateness of oral surgery referrals and treatment in contracted intermediate minor oral surgery practices in East Kent *Brit Dent J* 227(3):211-216
- Patel R, Gerrard G. 2023 Assessing secondary care oral surgery referral complexities and casemix. *Fac Dent J* 14(1):6-10
- Peters MDJ, Marnie C, Tricco AC, Pollock D, Munn Z, Alexander L, McInerney P, Godfrey CM, Khalil H. 2020. Updated methodological guidance for the conduct of scoping reviews. *JBIM Evidence synthesis* 18:2119-2126
- Pau A, Nanjappa S, Diu S. 2010 Evaluation of dental practitioners with special interest in minor oral surgery *Br Dent J* 208(3):103-107
- Shaffie N, Cheng L. 2012 Improving the quality of oral surgery referrals. *Br Dent J* 213(8):411-413
- Sivarajasingam V, Lews K, Athwal J, Mort J, Emanuel C, Morgan MZ. 2020 Oral surgery referrals at a UK dental hospital in the context of a managed clinical network: a mixed methods study. *Oral Surg* 13:212-220
- Webster J, Landes D. 2021 Retrospective analysis of referrals to the North East of England intermediate oral surgery service *Oral Surg* 14:321-327

Chapter 5 – An overview of Oral Surgery delivery in England

Introduction

This chapter provides an overview of the evolving oral surgery landscape in England, examining the historical, organisational and policy factors that shape how services are delivered across primary and secondary care.

It explores the drivers behind changing patterns of demand, the development of commissioning frameworks and managed clinical networks, and the implications of shifting workforce structures and educational pathways.

By outlining the key components that influence service provision (including referral systems, governance mechanisms and the interface between primary and specialist care), the chapter aims to highlight the opportunities and challenges in planning oral surgery services that are responsive to patient needs, clinically effective and aligned with the broader NHS priorities.

Oral Surgery (OS) has its origins from barber surgeons, who for centuries extracted teeth prior to development of effective, safe anaesthetics and the establishment of dentistry as a clear branch of healthcare. From these OS has kept a distinct identity that is reflected in the educational outcomes to be achieved as a dental undergraduate in the UK prior to first registration as a dentist (Macluskely 2008, GDC 2005). Further skill development through training and experience, including for some to specialist level, remains popular amongst General Dental Council (GDC) registrants. Changing patterns of healthcare need and consideration as to how these needs are most effectively met within healthcare policy has placed OS at a crossroads. Whilst the structures and policies described are relevant to England, the underlying trends and challenges have a shared identity between the 4 nations of the United Kingdom. Here factors that are key to informing the planning for OS development to meet future public and patient needs are explored.

5.1 Delivery of oral surgery in England

Historically most OS procedures have been undertaken by GDPs working in primary care dental practices. The shift over time of general anaesthetics out of primary dental care into hospital settings contributed to expansion of hospital-based OS services that became established after the 2nd World War and establishment of the NHS, within emergence (OMFS). Extractions under general anaesthesia (GA) without intubation in primary care dental practices were the norm with dentists trained to give GA's for many years. There were over a million GA episodes a year in the late-1960s before a reduction over time, with under 370,000 GA episodes a year by the late 1980s (Poswillo 1990). Dental surgery GA's ended in January 2002 on safety grounds coupled with changing standards of care and patient expectations.

The changing context of oral healthcare needs is also influenced by adults retaining their teeth longer within a background of a greater comorbid disease complexity which reflects the advances in medical care in recent decades.

Within the evolving landscape it is important to recognise that dental extractions are one of the main reasons for hospital admissions. Between 2014 and 2015, 42,000 children (under 16) were admitted with a diagnosis of dental caries and in the same period, 33,871 children (under 10) required a GA for dental extractions (HSCIC 2014). Accordingly, multiple factors have contributed to an increasing demand for OS care under LA and GA to be delivered in a hospital setting rather than in primary care. Common reasons for referral are that the extraction is felt that it is beyond the competence of the referring GDP (O'Neil 2012) and since 2006 contractual changes were introduced.

The 2010 Medical Education England (MEE 2010) Review of Oral Surgery Services and Training recommended that *“primary care oral surgery services should be developed to meet the needs of patients for appropriate, accessible care and to make more efficient use of NHS resources”*. It recognised that there were high levels of referrals to secondary care OMFS departments, and in areas where this was reported as high, then steps should be taken to identify which patients could be treated in a primary care setting.

Leading on from the 2010 MEE review, the development and implementation of primary care oral surgery contracts are an example of initiatives to increase OS care delivery by dentists with the appropriate skills over and above those of a GDP. The Department of Health, in collaboration with the Faculty of General Dental Practitioners in 2006 published 'Guidelines for the appointment of Dentists with Special Interests (DwSIs) in Minor Oral Surgery' as a framework for Primary Care Trust (PCT) development of local DwSI services with inclusion of the scope of care for DwSIs (DoH 2004).

The NHS England Five Year Forward View (2014) led to NHS England publishing the 2015 Commissioning Guide for Oral Medicine and Oral Surgery to support commissioners to offer a "consistent and coherent approach" to commissioning services across 3 levels of care (Table 1). The guide lays out the framework for the concept of clinical engagement and leadership through Managed Clinical Networks (MCNs) which will work closely with NHS commissioners and Dental Local Professional Networks (LPNs).

Table 1: Definitions of levels of clinical care as set out by NHS England
From: Commissioning Guide for Oral Medicine & Oral Surgery⁷

Level 1	Level 2	Level 3a
Procedures/conditions to be performed or managed by a clinician commensurate with a level of competence as defined by the Curriculum for Foundation Training or equivalent. This is the minimum that a commissioner would expect to be delivered in a primary care NHS Mandatory contract.	Procedural and/or patient complexity requiring a clinician with enhanced skills and experience who may or may not be on a specialist register. This care may require additional equipment or environment standards but can usually be provided in primary care.	Procedures / conditions to be performed or managed by a clinician recognised as a specialist at the GDC defined criteria and on a specialist list; or by a consultant.
		Level 3b
		Procedures / conditions to be performed or managed by a clinician recognised as a consultant in the relevant specialty, who has received additional training which enables them to deliver more complex care, lead MDTs, MCNs and deliver specialist training.

Level 1 and 2 procedures are usually performed in primary care settings, however some Level 1, 2 and 3 procedures may be performed in a secondary care setting if modifying factors or local circumstances dictate.

There are challenges with level 1 standards, which for new graduates are linked to the GDC outcomes to be achieved by first registration and the interface between the undergraduate and new graduate is of increasing interest by the GDC and higher education establishments.

Establishment of level 2 care is variable across the country, although standards have been defined in the commissioning guide. This is an area with iterative development as experience is gained from different Intermediate Minor Oral Surgery

(IMOS) contracts. Level 3 standards link to specialist care, and the GDC Specialty Listing is under review and ongoing currency of specialist skills is a focus in the 2019 GDC Specialist List Consultation (GDC 2019).

5.2 Payments and contracts

The funding of dentistry has been restructured over time reflecting broader healthcare policy. A GDP undertaking a level 1 Oral Surgery procedure, such as uncomplicated exodontia, is remunerated in England through 3 Units of Dental Activity (UDAs) as set out in the 2006 NHS Dental Primary Care Contract. By contrast, level 2 or 3 Oral Surgery care is typically remunerated via a tariff/activity-based approach involving Payments by Results (PbR) linked to Health Resource Groups (HRG). Considerable variations exist as to how this system is applied, in part reflecting interpretation, data coding and local context. Under- or over-trading against planning is a particular tactic of this approach. Other areas of healthcare are increasingly moving to Aligned Incentive Contracts, which involve an agreed contract value for a given period between the commissioners and the provider without any link to tariff or activity. The provider knows exactly what income they will receive, therefore giving more freedom to reconfigure whilst knowing what is required to be delivered.

The British Association of Oral Surgeons (BAOS) published a review of primary care oral surgery contracts in 2020 in response to significant variation in the interpretation and implementation of the 2015 NHS England commissioning guidance across the UK. This document sets out best practice standards applicable to all UK nations and highlights how the COVID-19 pandemic has exposed and exacerbated weaknesses in commissioning, particularly long secondary care waiting lists. BAOS emphasises the need to reduce pressure on secondary care by strengthening appropriately commissioned primary care OS services supported by well-functioning MCNs. MCNs should be chaired by an OS specialist and include relevant service providers and dental network representatives.

BAOS further stresses adequate and equitable remuneration is essential, with concerns raised about low and inconsistent tariffs. These risk limiting access to sedation and cause an increase in hospital referrals. Hierons (2017) illustrates the variability in both contract type ranging from Personal Dental Services (PDS) agreements to service level agreements (SLA's) and the significant variability in remuneration which was shown in PDS cases to have a mean value of £60, and SLA contracts having a mean value of £199. Tariffs should reflect clinical complexity, resources, enhanced PPE costs, and where necessary, sessional funding models. BAOS discourages the 'see and treat' or 'one-stop' model for complex procedures such as third molar surgery due to concerns around consent and patient choice.

5.3 Workforce and education

There is increasing interest in the development and transition of skills and knowledge from Dental Student to Dental Foundation or Vocational Training (DFT), and subsequent early careers working. There is an evolving structure to the outcomes to be achieved in OS at the point of transition from new dental graduate to GDC registrant, at the end of DFT and on completion of Dental Core Training (DCT) (DFT 2019). Each year a small number of GDC registrants go on to achieve GDC specialist listing in OS via formal training posts or GDC Specialist List Assessed Applications. In 2024 the OS specialist list increased by 4 members from 743 in 2023 to 747. Access to the Tri-Collegiate Membership in OS, which forms an important component of progression to GDC Specialist Listing in OS, is currently only accessible to those on a formal specialty training pathway or an equivalent parallel training that may include a relevant University postgraduate degree. However, there are plans from 2026 for this examination to be 'open access' and in the format of a Fellowship (DFSE 2025).

In 2016 it was reported that 17% of the OS specialists listed were also on the GMC OMFS specialist register, and 68% of the OS specialist list were admitted at the time of establishment of the GDC Specialist List in Oral Surgery (Magennis 2016). Being a specialist in OS does not infer employment status. Some OS specialists hold consultant contracts with the majority being OMFS consultants. By comparison

there are a small number of consultants in OS, who are largely based in academic institutions. Most OS specialists hold other employment contracts.

The development over time of educational outcomes in OS for specific clinical grades is a welcome development, but these have a limited direct impact on one part of the OS workforce who are hospital based and typically work under the direction of OMFS consultants. The Specialty and Associate Specialist (SAS) grade doctor/dentist group deliver key service and professional development roles without clear routes for professional development and career advancement as recently highlighted by Wilmott and Mannion (2018). The SAS group typically account for 20% of the hospital workforce, whereas in hospital-based OMFS and OS this group accounts for almost 45% (MEE 2010). Some OS SAS grade individuals are included in the Specialist List for OS.

Health Education England's Advancing Dental Care is a major programme to transform dental education and how the future dental workforce is planned and developed (NHS England 2019) to meet future patient needs, address oral health inequalities and ensure a sustainable skilled dental workforce. It is important to recognise that at present OS procedures are not exclusive to dentists. Extraction of erupted deciduous teeth under local anaesthetic is within the scope of practice of Dental Therapists as set out by the GDC.

5.3 Routes into service

Patients registered with a GDP or general medical practitioner (GMP) can be referred for elective or urgent OS care to either a level 2 or 3 provider. Urgent care may also be accessed through patients contacting the NHS 111 service, who after telephone triage in the context of local arrangements, will advise on either local dental practitioners, urgent dental care centres or the nearest emergency department (with an emergency ambulance arranged in selected cases). As around half of the adult population are not registered with a dentist for ongoing oral

healthcare, opportunities for early intervention are lost with an associated burden on acute services including admission to hospital (Burnham 2011).

5.4 Referral demand and management

The need for OS care alters with time and impacts on the nature and number of referrals. The drivers for the decision to refer are inevitably complex and insufficiently understood. There is an ongoing upwards trend in OS referrals from primary dental care to secondary care (O'Neil 2012, Ehsan 2022). The commonest reasons for referral (Halai 2014) have been described as surgical extraction, multiple extractions, perceived difficulty of extraction and anxiety or anticipated need for sedation. The NHS England Oral Surgery & Oral Medicine Commissioning Guide 2015 highlights the relevance of co-morbid states and recognises that variations in care need and delivery vary with geography. The Guide concludes that a referral management system and Managed Clinical Network (MCN) that engages clinicians should underpin change.

The introduction of electronic referral management systems (e-RMS) in some areas has helped inform understanding of referral demand. Different models for OS MCNs have been established including at least one that involves other specialties (Montgomery-Cranny 2017). MCNs come with many advantages for patients such as primary care rather than hospital providers, nearest or soonest provider choice and reduced times to treatment.

A recurrent feature seen in OS MCN data is that level 2 accounts for most of the referrals made. This was triangulated in the OMFS 'Getting It Right First Time' (GIRFT) 2018 report that described how many OMFS units are carrying out high volumes of dentoalveolar surgery, with suboptimal resource use and comment that a significant amount of dentoalveolar surgery should be carried out in a more appropriate setting (GIRFT 2019). Opportunities were identified for NHS England to define a dentoalveolar pathway which meets the needs of the patients, service requirements and future planning and contract needs; and it was recommended that steps should be taken to ensure that dentoalveolar surgery takes place in the appropriate setting.

There are insufficient detailed reports to date to understand the effectiveness of MCNs in meeting the policies that underpin the Oral Surgery and Oral Medicine Commissioning Guide.

5.5 Governance of service providers

Governance limitations sit at the core of many of the persistent shortcomings within the organisation and delivery of OS care in England. While the NHS is founded on principles of public benefit and equity, in practice governance mechanisms have tended to prioritise financial control and the achievement of easily measurable performance targets, often at the expense of nuanced assessments of care quality, appropriateness and patient experience. Targets such as waiting times or activity volumes, although politically and administratively attractive, offer only partial insight into whether care is being delivered by the most appropriate clinician, within the optimal setting, or aligned with the individual patient need. As a result, the system lacks robust mechanisms to ensure that patients can reasonably expect their care to be delivered by the right person, at the right time and in the appropriate setting. There is an ongoing evolution of systems reflecting changing priorities and understanding. For example, the Oral Surgery & Oral Medicine Commissioning Guide places an emphasis on Patient Reported Experience Measures (PREMs) and use of Patient Reported Outcome measures (PROMs). This allows collection of data which is representative nationally and validated. However, data provided from these outcomes are subject to several biases and should be used for local quality improvement and longitudinal analysis of outcome data rather than comparison between providers (Gerrard 2017).

In the absences of transparent accountability structures which define who is responsible for clinical decision-making across referral boundaries, this expectation remains aspirational rather than enforceable. Consequently, variation in referral thresholds, provider capability and treatment locations/settings persist with limited visibility for commissioners, clinicians or patients as to whether alternative, potentially more appropriate pathways are considered.

The introduction of a stratified level 1-3 OS framework and the development of MCNs represented an important attempt to address such governance issues by aligning patient complexity with provider competence and fostering collaboration between primary and secondary care. However, the implementation of such

initiatives has been inconsistency and, in several areas, insufficiently developed to function as an effective governance mechanism.

Patient pathways in some regions are poorly defined with limited clarity regarding escalation routes, shared responsibility or consequences when referrals bypass levels of care. Formal mechanisms to support clinicians who lack confidence or competence to manage cases (e.g. structured mentorship, feedback loops or network wide learning) are under-developed and in many areas non-existent. Without embedded controls, incentives and consequences, MCNs risk functioning as nominal structures rather than the active system of clinical governance, education and support which they could be. There are therefore unanswered questions about how accountability is shared, how quality is assured across organisational borders and how patients are protected from both under or over referral with a fragmented OS MCN.

GIRFT is only now starting to impact on Dentistry. It aims to improve medical care within the NHS and to identify approaches from across the NHS that improve outcomes and patients experience, without the need for radical change or additional investment (Montgomery-Cranny 2017). There is currently limited published evidence demonstrating the consistent enforcement or regulatory oversight of formal clinical governance frameworks within primary care dentistry. While governance principles are well established within secondary care and hospital based dental services, their translation into routine primary care practice appears variable and is often inferred rather than explicitly documented in the literature. In contrast, elements of governance such as risk management, structured risk assessment, and the adoption of strategies aimed at reducing complications and so-called 'never-events' are increasingly reported within both dental and wider healthcare literature. These include the use of checklists, standardised referral pathways, clinical audit, and reflective practice to mitigate procedural and systems-based risk (Moore 2019, Bailey 2025). Although these approaches are not uniformly mandated or enforced in primary care dentistry there is growing recognition of their importance in improving patient safety, clinical quality and professional accountability (Enseldo-Carrasco 2018). It is anticipated that as expectations

around safety culture, transparency and quality assurance continue to evolve, the routine incorporation of formalised governance and risk-reduction strategies within primary dental care will become both more widespread and an expected standard of practice.

5.6 Conclusions

OS is a core component of the practise of dentistry, yet current regulatory and professional governance arrangements provide limited assurance that the evolving clinical needs of the population are being met by a workforce with demonstrable and maintained competence. There must be an acceptance that legacy arrangements are not an optimum fit for the future. Healthcare is complex but this should not stand in the way of carefully managed transitioning to different models of care. Education and professional development of the workforce need to align with the changes. For OS practise there are challenges throughout the workforce pipeline from undergraduate education to demonstration of ongoing currency of specialist skills, irrespective of the setting where care is delivered. In England, inclusion on the GDC specialist OS list represents a recognition of specialist status at a single point in time and does not require evidence of any specialty-specific continuing professional development (CPD) thereafter. While the GDC mandates minimum CPD hours, these requirements are generic and do not ensure ongoing currency or depth of competence within a defined specialty area.

Specialist listing alone therefore provides limited transparency for commissioners, referrers or indeed patients regarding a clinician's current scope of practice or procedural capability.

These limitations are compounded by the relative absence of robust, specialty-specific clinical appraisal and outcome review within primary dental care. Unlike secondary care, where appraisal is embedded within organisational clinical governance frameworks, appraisal in primary dental care is often informal, variable in quality and poorly linked to demonstrable clinical outcomes (Patel 2021, D'Cruz 2002). There is little systematic scrutiny of case complexity, complication rates, or appropriateness of care delivery across settings, despite increasing volumes of complex oral surgery work being undertaken in primary care. This creates a governance gap between regulation, education, and service delivery in which neither specialist listing nor contractual mechanisms adequately ensure alignment between clinician capability and patient need.

There is scope to further develop patient pathways that benefit individuals and deliver best use of State resources. Informed changes need to be underpinned by reliable and appropriately interpreted data from multiple sources, including e-referral systems and MCNs. It is only through understanding of these key factors, and others, that OS care that meets the needs of the population can be planned and delivered.

5.7 References

- Advancing Dental Care: Education and Training Review. Final Report (2019). NHS Health Education England Accessed online February 2019
https://www.hee.nhs.uk/sites/default/files/documents/advancing_dental_care_final.pdf
- Bailey E, Dungarwalla M. 2025. Patient safety in dentistry – a decade in the making. *Brit Dent J*. 238(10):814-821
- Burnham R, Bhandari R, Bridle C. 2011. Changes in admission rates for spreading odontogenic infection resulting from changes in government policy about the dental schedule and remunerations. *Br J Oral Maxillofac Surg* 49: 26-28
- Consultation of the principles of specialist listing 2019. The General Dental Council Accessed online February 2019 <https://www.gdc-uk.org/docs/default-source/consultations-and-responses/principles-of-specialist-listing---consultation-outcome-report.pdf>
- Dental Foundation Training Curriculum 2019
<https://www.copdend.org/wp-content/uploads/2018/08/Curriculum-2016-Printable-reverse-colourway.pdf> accessed online February 2019
- Department of Health/Faculty of General Dental Practitioners (UK) 2004
Implementing a Scheme for Dentists With Special Interests (DwSIs)
 London: DH/FGDP(UK); <https://www.gdc-uk.org/about/what-we-do/consultations>
- D'Cruz L. 2002. Clinical Governance: Something New for General Dental Practice. *Dent Update* 29:34-37
- Ehsan O. 2022 Oral surgery wait times in NHS secondary dental care in England: a five-year review. *Br Dent J* 4:1-4
- Enseldo-Carrasco E, Carson-Stevens A, Cresswell K, Bedi R, Sheikh A. 2018. Developing agreement on never events in primary care dentistry: an international eDelphi study. *Brit Dent J* 224:733-740
- GDC Preparing for practice (2015 revised edition)
[https://www.gdc-uk.org/api/files/Preparing%20for%20Practice%20\(revised%202015\).pdf](https://www.gdc-uk.org/api/files/Preparing%20for%20Practice%20(revised%202015).pdf)
 Accessed February 2019
- Guide for Commissioning Oral Surgery and Oral Medicine 2015
<https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2015/09/guid-comms-oral.pdf>
 Accessed online February 2019

- Gerrard G, Jones R, Hierons R 2017 How did we do? An investigation into the suitability of patient questionnaires (PREMs and PROMs) in three primary care oral surgery practices. *Br Dent J*; 233;1 27-32
- Halai T, Yates JM 2014. Assessment of oral surgery referrals from primary care to a regional dental hospital *Oral Surg*; 7(3) 168-176
- Hierons RJ, Gerrard G, Jones R 2017 An investigation into the variability of primary care oral surgery contracts and tariffs in England and Wales (2014/2015) *Br Dent J*; 222(11): 870-877
- HSCIC. Hospital Episode Statistics, Admitted Patient Care – NHS England, 2014; 2014: 308439
<https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity/hospital-episode-statistics-admitted-patient-care-england-2014-15>
- Macluskey M, Durham J, Cowan G et al 2008. UK national curriculum for undergraduate oral surgery subgroup for teaching of the Association of British Academic Oral and Maxillofacial Surgeons *Eur J Dent Educ* 12; 48-58
- Magennis P, Begley A 2016 Oral Surgery (OS) Specialist List 2016 – What will happen when the grandfathers move on? *Faculty Dent J* 10(2) e153
- Medical Education England 2010 Review of Oral Surgery Services and Training
<https://www.baos.org.uk/resources/MEEOSreview.pdf>
- Montgomery-Cranny J, Edmondson M, Reid J, Eapen-Simon S, Hegarty A, Mighell AJ 2017 Development of a managed clinical network in oral medicine *Brit Dent J* 223(9); 719-725
- Moore RJ, Miller R, Henderson S. 2019. Risk management in oral surgery. *Brit Dent J*. 227(12):1035-1040
- O'Neill E, Gallagher JE, Kendall N 2012. A Baseline Audit of Referral and Treatment Delivered to Patients in the Intermediate Minor Oral Surgery Service in Croydon PCT *Prim Dent Care*;19(1):23-28
- Oral and Maxillofacial Surgery, GIRFT Programme National Specialty Report, November 2018 Accessed February 2019
<https://gettingitrightfirsttime.co.uk/wp-content/uploads/2019/01/OMFS-Report-Jan19-G.pdf>
- Patel; K, Jenkyn I. 2021. An introduction to clinical governance. *Brit Dent J*. 230(8):539-543
- Poswillo DE. 1990 General Anaesthesia, Sedation and Resuscitation in Dentistry – Report of an expert working party. *Standing Dental Advisory Committee* Standard General Dental Services Contract July 2018 NHS England

Access January 2019 <https://www.england.nhs.uk/wp-content/uploads/2018/08/general-dental-services-contract-2018.pdf>

Wilmott S, Mannion CJ 2018 The SAS grade: underused and under recognised?
Brit Dent J; 19: 1-2 DOI: 10.1038/sj.bdj.2018.870

Chapter 6 – An evaluation of referrer factors for 98,671 referrals made to the West Yorkshire Oral Surgery Managed Clinical Network over a 3-year period.

Published in **British Dental Journal. 2022**

<https://doi.org/10.1038/s41415-022-4034-z>

Authors

Richard J Moore¹, Iain Pretty², Gail Douglas¹, Alan J Mighell¹

¹School of Dentistry, University of Leeds UK

²School of Dentistry, Manchester University UK

Abstract

Introduction: Patients referred from primary dental care to hospital-based specialists in high volumes can contribute to significant NHS service pressures. Surprisingly little is understood about what contributes to referral factors.

Aims: To gain new insight into the referral factors from primary dental care by interrogating the tri-specialty West Yorkshire Managed Clinical Network referral pathway data for a 36-month period (2016-2019).

Methods: Anonymised referrals from the electronic referral management system were collated for analyses.

Results: There were 98,671 referrals within the 36-month period, 13% of which were rejected. Of those accepted for triage 76% were directed at oral surgery, with >60% accounted for by exodontia. Ten percent of referrers accounted for 60% of all referrals. Peak referral occurred 5-years after GDC registration

Discussion: This is the first report of referral data from a tri-specialty Managed Clinical Network with exodontia referrals predominating. The data set demonstrates variation in referrer behaviours despite referral guidance. Referrals should be based upon patient need, but patterns observed in this study suggested possible associations with high and low referral patterns which warrant further research.

Conclusions: Interrogation of the referral database suggests that there are interesting patterns of referral which may be associated with characteristics of the referrer as well as their patients' needs. Further investigation could inform improved processes and service design, as well as education delivery and workforce development.

Introduction

The referral of patients from primary dental care to hospital-based specialists is a long-established model in the UK. Over time referral numbers grew exposing the limitations of a demand-driven approach within increasing pressure on NHS resources. To help meet this challenge, the NHS England 'Five Year Forward View' (2014) set the policy for introduction of Managed Clinical Networks (MCNs). MCNs are an established healthcare model that aim to provide care in a timely fashion at an appropriate location that is delivered by the most suitable professional in the networked area (Skipper 2010). In brief, there is greater flexibility in how care is provided compared to the established model of primary care dental team referral directly to hospital specialists, with attendant advantages for patients and NHS services.

NHS England went on to publish the 2015 Commissioning Guide for Oral Medicine (OM) and Oral Surgery (OS) to support NHS commissioners to offer a “*consistent and coherent approach*” to commissioning services, for example in OS, across 3 levels of care within an MCN approach. Levels 1 and 3 reflect care delivered by general practitioners and specialist/consultant led services (3a and 3b), respectively. Level 2 care is delivered by dentists with skills over-and-above those expected of a general dental practitioner who are working within a networked approach that includes patient pathways. The levels of care are not tied to the setting of the provider and may include primary care or hospital settings.

The introduction in England in 2004 of NHS Choose and Book System (Walford 2006), an electronic referral management system (eRMS) for General Medical Practitioners to refer to specialist medical services, ended the traditional paper letter referral in that area of healthcare. It empowered patient choice over service location and gave the referrer more autonomy eRMS has been associated with a reduction in inappropriate referrals, waiting times and duplicate referrals (Goldthorpe 2018). In addition, patient satisfaction increased. This represented a step change with

subsequent eRMS referral development, in part informed by the data that digitalisation generated.

By contrast, dentistry largely continued with a paper-based referral process. However, there has been an increasing switch to eRMS in Dentistry over recent years, but the pace, prioritisation and system choice has been in response to local or regional drivers that contrasts with the NHS e-Referral system used universally across England by General Medical Practitioners. This difference is due to the central funding of GP IT systems, whereas other primary care providers, including dentists, were not included in this NHS funding.

Provision of care that falls within the scope of OS, Oral & Maxillofacial Surgery (OMFS) or OM varies across the UK, reflecting how local services have developed over time. These areas of clinical practice collectively account for the majority of all referrals made by the dental team, yet surprisingly little is understood about referrer factors. New insight has the potential to inform improved processes and service design, as well as education delivery and workforce development.

The West Yorkshire oral surgery MCN (WYOS-MCN) established in October 2016 has a geographical footprint that is home to 1.3 million people. Given the overlap in clinical practice between OS, OMFS and OM, the WYOS-MCN established a referral form for each one, but manages these through a single e-RMS. The aim of this study is to gain insight in to the referral factors which are contributory to the pathway, by interrogation of the WYOS-MCN referral pathway data for a 36-month period (2016-2019).

Potential referrers are required to make decisions that are informed by referral guides and related documentation to promote best use of the processes. Clear direction is given that suspected cancer referrals should be referred via the 2 week wait pathway and not via this eRMS. Within the WYOS pathway referrers are required to choose one of 3 referral forms; OS, OMFS or OS (appendix 1-3). Each referral form includes a structured approach for the clinical focus of the referral and designed to acquire a minimum data set through the use of mandatory questions. Each referral form includes an 'other' category for conditions that do not fit one of the named categories. As part of the referral process, the referrer in liaison with the

patient is asked to select a preferred provider with choice informed by 'nearest' or 'soonest' options.

After receipt, each referral is checked for completeness of essential administrative details with referrals returned to the referrer if these are incomplete. Referrals that meet the required administrative standards are triaged either centrally (OS) or by the referrer selected local provider (OMFS and OM). Triage takes account of the sufficiency of clinical information to make an informed decision and appropriateness for the service in question. After central triage, allocation of accepted OS referrals to providers is determined by referrer/patient choice and capacity within the overall MCN. It is important to note that the choice of referral form does not determine the provider. For example, care that follows a referral made on an OS form is often provided by OMFS.

Referral Data

Referral data for the three specialties OM, OMFS and OS was acquired from the eRMS provider for the dates October 2016 to September 2019 inclusive. Agreement was sought from the Commissioners and WYOS MCN. Ethical approval was not required as this is a service evaluation with secondary use of data as stated by the Information Commissioners Office (ICO). There were no patient identifiable data within the spreadsheet. These data were exported from the eRMS into a Microsoft Excel™ (Microsoft Corporation 2018) spreadsheet and cleansed into the specialty specific categories as detailed in the results section.

In addition to this, the numbers of new registrants each year was acquired from the General Dental Council (GDC) and plotted against the years since first registration of the local referrers; and referral numbers for each referrer were formatted into deciles.

Results

Total number of referrals received for clinical triage over 36 consecutive months.

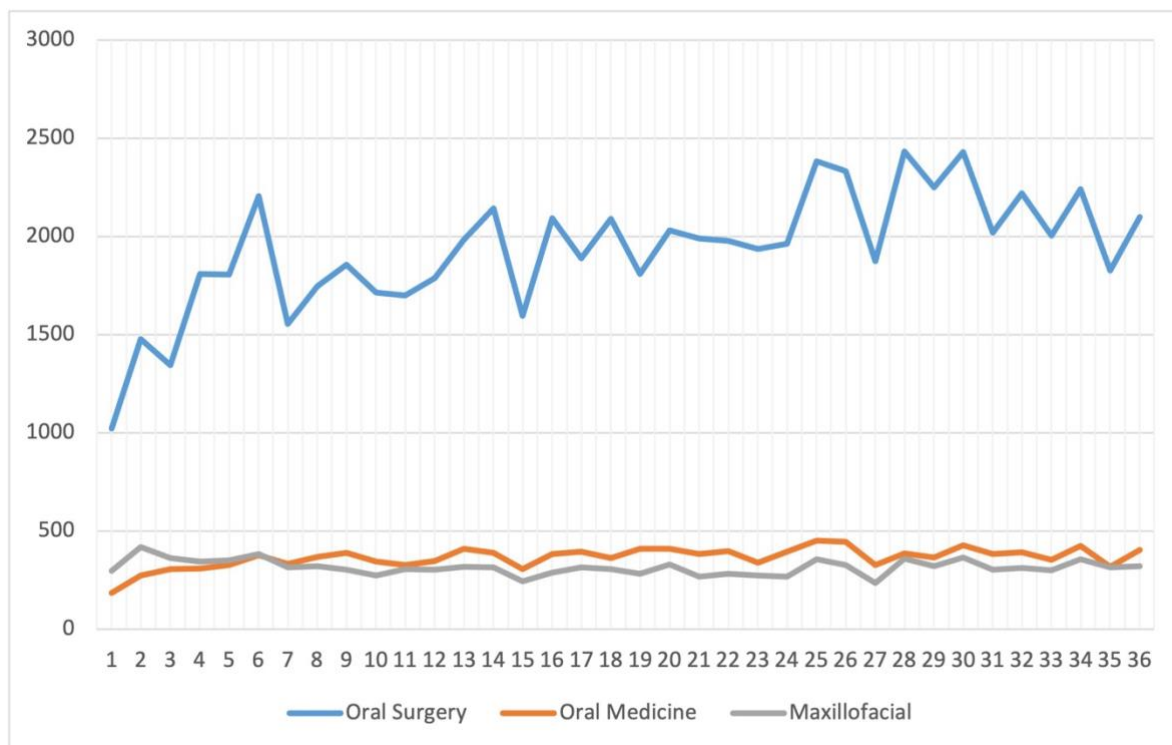
A total of 98,671 referrals were made through the eRMS over the 36-month study period starting 1st October 2016. (Table 1).

Time Period	Oral Surgery		Oral Medicine		Oral & Maxillofacial Surgery		All Referrals	
	Total received	Total (%) rejected	Total received	Total (%) rejected	Total received	Total (%) rejected	Total received	Total (%) rejected
2016-2017	21550	3171 (14.7%)	3872	336 (8.6)	3936	589 (14.9%)	26358	4096 (15.5)
2017-2018	23383	3351 (14.3)	4564	290 (6.3)	3509	261 (7.4)	31456	3902 (12.4)
2018-2019	29918	3807 (12.7%)	4668	207 (4.4)	3271	186 (5.6)	37857	4200 (11)
Totals	74851	10329 (13.7)	13104	833 (6.7)	10716	1039 (9.6)	98671	12198 (12.3)

Above - Table 1 – Summary of referrals received for clinical triage over the 36-month period summarised by 12 month periods and the 3 referral forms used. The time periods are October to September inclusive. The 'Total (%) rejected' reflects the referrals rejected at clinical triage expressed as a number and (percentage).

Of these 12.3% (n = 12,198) were rejected at clinical triage due to reasons such as no radiographs, inappropriateness of referral and insufficient clinical details. Fluctuations in the number of referrals received per month across the 36-month study period were evident as shown in figure 2 that started in October 2016 (month

1) with the introduction of the WYOS MCN. Transient reductions are evident in August (months 11, 23 and 35) and December (months 3, 15 and 27).



Above - Figure 2 – Referrals received for clinical triage by month over the 36-month period.

Each referral form requires information about the reason for referral within several broad categories. There was a wide distribution in the numbers of referrals made within each referral category (Table 2).

Form	Referral Category	2016-17	2017-18	2018-19	Totals (%)
OS	Difficult extraction	6252	6001	4490	16743 (16.9)
	Third Molars	4101	4929	3573	12603 (12.7)
	Removal of roots	3850	4923	7649	16422 (16.6)
	Routine extraction	3516	3518	2689	9723 (9.8)
	Impacted teeth	1962	2029	1395	5386 (5.4)
	Surgical exposure	309	447	277	1033 (1.0)
	Surgical endodontics	243	165	71	479 (0.4)
	Other (OS)	1317	1371	9774	12462 (12.6)
OM	Soft tissue (OM)	2829	3506	2271	8606 (8.7)
	Orofacial pain	316	382	293	991 (1.0)
	Salivary Gland (OM)	126	134	99	359 (0.3)
	Oral presentation of wider problem	56	72	51	179 (0.1)
	Other (OM)	545	470	1954	2969 (3.0)
OMFS	Soft Tissue (OMFS)	829	890	578	2297 (2.3)
	TMJ	738	870	16	1624 (1.6)
	Hard tissue	545	487	399	1431 (1.4)

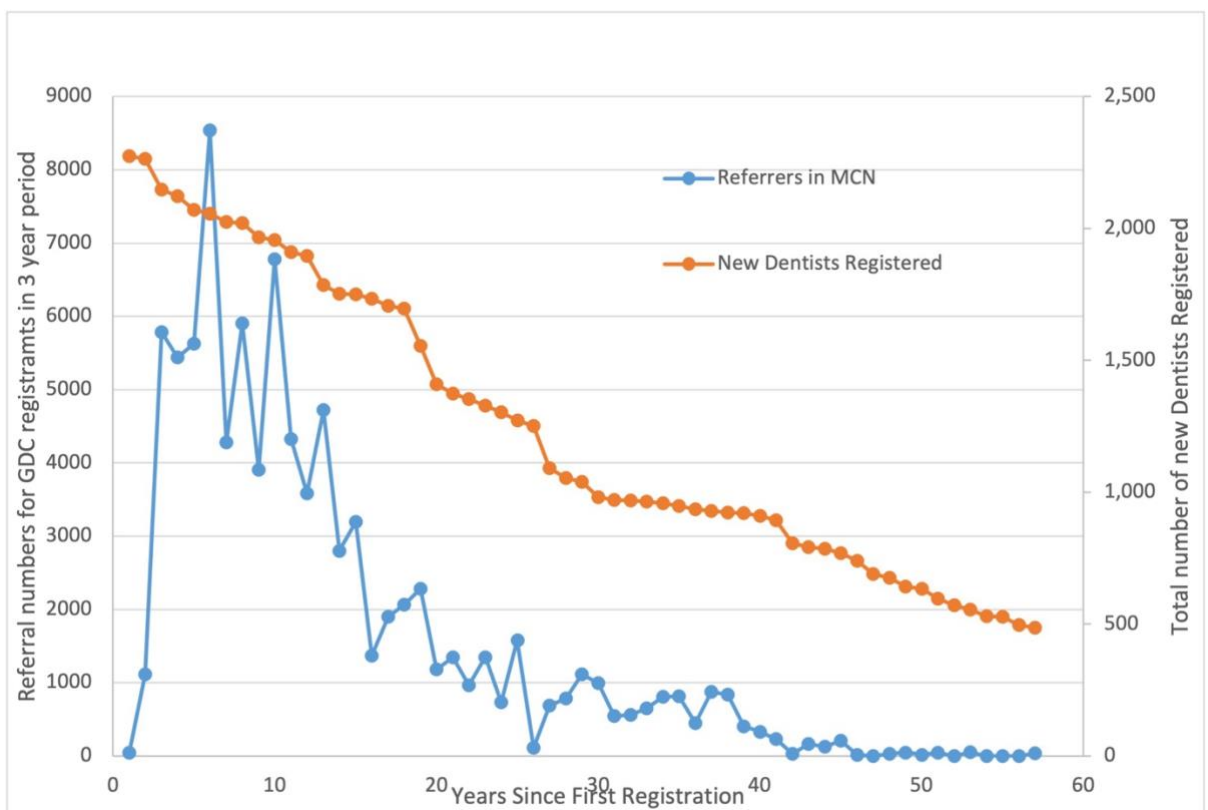
	Trauma	78	76	55	209 (0.2)
	Salivary Gland (OMFS)	78	66	51	195 (0.1)
	Facial Deformity	32	22	19	73 (0.07)
	Severe swelling	9	51	10	70 (0.07)
	Other (OMFS)	1614	1035	2142	4791 (4.8)
Total		27,558	31,480	34,047	98,671 (100.0)

Above - Table 2 - Cause for referral, as selected by the referrer, by 12-month period.

For each form the referral categories are presented in order of descending selection apart from than the 'other' choice, which is presented last.

Distribution of Referrers by year since GDC Registration and Primary Registrable Qualification.

A total of 1800 individual referrers made a referral that was accepted for clinical triage. Of these, 3.5% (n = 63) had an invalid GDC number and accounted for 64 referrals. Consideration of the number of referrals made by years since GDC registration identified that the peak for referrals was 5 years after GDC registration and thereafter fell (Figure 3). UK graduates made 75% of all referrals with the remainder by overseas graduates.



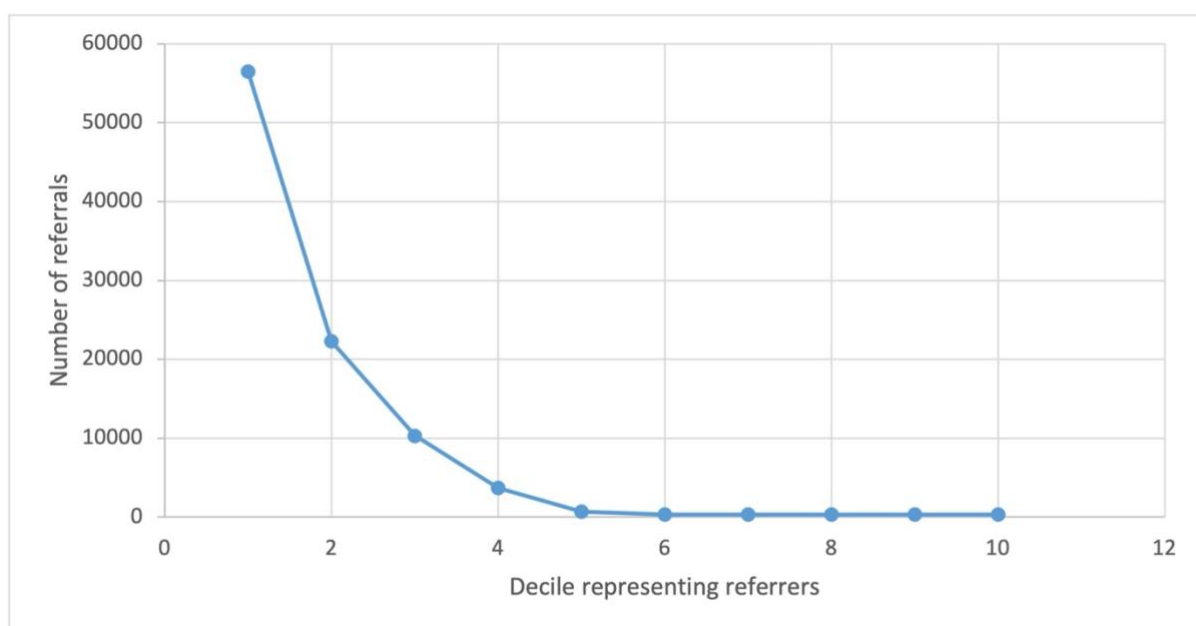
Above - Figure 3 – The distribution of referrers by year since GDC registration

A regression analysis was carried out on the distribution of referrers, years since first registration and referral numbers which showed no significant F-test and no significant coefficients, therefore the numbers of years since graduation is not significant in the referral numbers. Figure 3 shows that the numbers of WYOS MCN

referrers mirrors that of the UK picture of the numbers of new dentists registered (data acquired from the GDC).

Numbers of Referrals made by Individual GDC registrants

There was wide variation in the number of referrals made by each GDC registrant with 10% of all referrers referring 60% of the total number of referrals in the 3-year period (Figure 4). The most frequent referrers (top 10% of referrers (n=180)) followed a similar distribution to the overall cohort with UK graduate registrants accounting for 77%.



Above - Figure 4 – Numbers of referrals made by individual GDC registrants in deciles.

Discussion

Better patient access and better resource use are at the heart of the NHS England Five Year Forward View and the SARS-CoV-2 virus (COVID-19) pandemic from 2020 is sharpening the focus. There are challenges associated with how routine NHS care is most effectively recovered. This aligns with the need to reduce patient visiting hospitals for care which could be delivered in other settings closer to patients' homes. The pandemic has also highlighted the importance of preparing the workforce to meet the changing oral health needs of patients and services (England HEE 2019).

This is the first report of an MCN with an e-RMS that collectively includes referrals made to OS, OMFS and OM specialties by the dental team. The establishment of this MCN coincided with introduction of the first eRMS in the region and provides powerful opportunities to inform planned changes to service design and educational development of the workforce with the goal of improving patient care. The eRMS is used by primary care dental referrers and referrals from others, such as General Medical Practice teams and hospital-based specialists, come via other routes. Accordingly, the data presented is representative of the vast majority of all referrals received, but not all.

Referral categories in the 3 referral forms used, bring insight into service demand. This is of benefit for referral categories with high and low referral numbers. Numbers are small for some categories such as facial deformity and facial pain; the care pathways are multi-disciplinary. Duplication of complex services needs to be avoided, and it is important that patients are able to access these services in a timely manner. By contrast, care for referral categories with high numbers is delivered by multiple providers who should be delivering care to agreed, minimum standards and shared quality assurance processes. Exodontia in one form or another accounted for over 60% of all referrals and is likely to be an underestimation given the greater than expected use of the 'other' category. This is consistent with past reports that

have highlighted the high referral numbers for level 2 or 3 OS including the GIRFT report for OMFS (Fullarton 2019).

The findings of this study indicate a need to review the referral guidelines and referral categories, as well as how these are used by referrers to ensure there is clarity over which referral form and referral category should be selected. The number of referrals rejected at clinical triage was high at 12.3% and creates additional work and patient care delays. A further driver for change is evident from the choice of 'other' for all specialties and the rise in its use over the 3-year period. Without further qualitative analyses the appropriateness of such referrals cannot be assessed. It would suggest that either referrals do not fulfil the criteria for the specified categories or there is scope for more proactive feedback to referrers to limit the use of 'other'. 'Other' category referrals dilute the value of a referral category approach and are a regression to the past paper letter referral approach. The use of 'open text' boxes on referrals provides an opportunity for additional information, but only once a specific referral criteria has been chosen.

The variation in referral numbers by year since GDC registration is striking and 60% of all referrals are accounted for by 10% of referrers. Within the top 10% there appears to be no immediate correlation in the years since GDC registration and number of referrals, with 77% (n=138) of the top 10% of referrers (n=180) being UK graduates. Overall, the percentage of referrers with a UK primary dental qualification was similar (75%) to the 2019 GDC data for all registered dentists (72%). A small number of referrals could not be linked to a GDC number but were otherwise valid. These did not have a meaningful impact on data interpretation. Therefore, in this study referral numbers do not correlate with an 'early years' referrer or overseas graduates. It is important to note that it is not years since graduation and the data must be interpreted accordingly, particularly for overseas registrants who may have worked for many years before registering to work in the UK.

This study includes the largest number of referrals reported for dentistry with recognition that not all referrers would have been working for the whole 3-year period and some findings may represent chance. The medical literature reveals a mathematical model which calculates the amount of variation in the rates of referral is likely to be caused by chance alone (Moore 1989). Although this model is applicable to General Medical Practitioners, the larger size of their referral base compared to that investigated here limits its utility here. The heterogeneity of the data presented contrasts with that of Coulthard (2000) who reported that 96% of a sample of 400 GDCs in one city referred up to 10 patients per month for OS care. In this study there is a subgroup of referrers who make high numbers of referrals. This group is of particular interest for further investigation to understand the reasons why. The reasons for this diversity of referral behaviour are likely to be multifactorial reflecting factors linked to the individual registrant, the running of the practice, location of practice and patient-related factors. However, it is important not to draw unfounded conclusions that their referral patterns are inappropriate. By contrast, some GDC registrants make very few referrals, and it is reasonable to question the reasons for this also.

The reasons for the high service demand for exodontia in this referral series need to be better understood. There is a body of published work that explores the self-reported confidence of registrants and included reports that new foundation trainees have low confidence levels with regards to oral surgery (Patel 2006, Brown 2020). There has been a related focus on the undergraduate and dental foundation training in OS and whether this is sufficient. It might be expected that referral numbers would peak in the years immediately following completion of Foundation Training one year after first GDC registration for UK graduates. This is not the case in this large series and the peak at 5-years post GDC registration and the subsequent gradual reduction cannot be currently clearly explained. It is probable that the underlying reasons are multi-factorial and care has to be taken not assume that this can be attributed to variations in undergraduate and early career experiences over time. It has been reported that postgraduate training in OS, either as a short course or recognised post-graduate training programme is a factor contributing to referral behaviours in OS (Coulthard 2000).

The data presented illustrate the value of collectively managing referrals made on OS, OMFS and OM electronic referral forms and how these link to the care provider. Furthermore, it highlights the potential for this to be strengthened by further developing resources and processes to support choice about selection of referral categories, alongside additional patient pathway development.

Conclusions

In conclusion, this study highlights the potential for 3-specialty e-RMS data to inform future provision of patient care through improved processes, service design and workforce development. However, further qualitative and quantitative investigation of this data is required. In particular, there is a need to better understand the referral factors which contribute to such high OS referrals of which the majority are exodontia.

References

- Brown J, Baker R, Moore RJ. 2020. An investigation into the oral surgery curriculum and undergraduate experience in a sample of DFT's in the UK. *Eur J Dent Ed* 25(3):421-434
- Coulthard P, Kazakou I, Koron R, Worthington HV. 2000. Referral patterns and the referral system for oral surgery care. Part 1 – General Dental Practitioner referral patterns. *Br Dent J* 188(3):142-5
- England HE. 2019. Advancing Dental Care Review. Available from <https://www.hee.nhs.uk/our-work/advancing-dental-care> (accessed December 2025)
- General Dental Council 2019. Annual report and accounts. Available from https://www.gdc-uk.org/docs/default-source/reports-and-publications/annual-reports/gdc-annual-report-and-accounts-2019.pdf?sfvrsn=4cd4c002_4 (accessed December 2025)
- Goldthorpe J, Walsh T, Tickel M, Birch S, Hill H, Sanders C, Coulthard P, Pretty IA. 2018. An evaluation of a referral management and triage system for oral surgery referrals from primary care dentists: a mixed-methods study. Southampton (UK): *NIHR Journals Library*. PMID: 29481032
- Montgomery-Cranny J, Edmondson M, Reid J, Eapen-Simon S, Hegarty AM, Mighell AJ. 2017. Development of a managed clinical network in oral medicine. *Brit Dent J* 223(9):719-25
- Moore AT, Roland MO. 1989. How much variation in referral rates among General Practitioners is due to chance? *Brit Med J* 298(6672):500-2
- Patel J, Fox K, Grieveson B, Youngson CC. 2006. Undergraduate training as preparation for vocational training in England: a survey of vocational dental practitioners' and their trainers' views. *Br Dent J Suppl* 9-15
- Skipper M. 2010. Managed clinical networks. *Brit Dent J* 209(5):241-2
- Walford S. 2006. Choose and book. *Clin Med* 6(5):473-6

Chapter 7 – Review of 1.75 million referrals over 34-months identifies the disruptive impact of the SARS-CoV2 pandemic on oral surgery care in England – a service evaluation

Published in **British Dental Journal**, 203

<https://doi.org/10.1038/s41415-023-5526-1>

Authors

Richard J Moore¹, Iain Pretty², Gail Douglas¹, Alan J Mighell¹

¹School of Dentistry, University of Leeds UK

²School of Dentistry, Manchester University UK

Abstract

Aims:

This study aimed to use the electronic Referral Management System (eRMS) oral surgery data across multiple sites in England to evaluate the service over a 34-month period in relation to:

1. Pre and post pandemic referral rates in oral surgery
2. Examining the data for signs of inequality in obtaining a referral for oral surgery.
3. Consider the impact on service provision for oral surgery in England.

Methods:

Oral surgery referral data was available from an eRMS for areas of England covered by this service for the 34-month period March 2019 to December 2021 (inclusive), which included 12 months of pre-pandemic data and the first 22-months of the pandemic. The data were from the following regions in England; Central Midlands, Cheshire & Merseyside, East Anglia and Essex, Greater Manchester, Lancashire, Thames Valley and Yorkshire and the Humber.

Results:

The total number of referrals received was 1,766,895 during this 34-month period, with pre-pandemic referral levels averaging at 25,498 per month with a reduction to 698 per month in April 2020. Referrals have risen to a peak of 217,646 for the month of November 2021. An average of 1.5% of referrals were rejected pre-pandemic, compared with 2.7% per month post pandemic.

Discussion:

Pre-pandemic referral numbers were predictably stable within a narrow range which have then increased dramatically post-pandemic. The variations in oral surgery referral patterns place significant strain on oral surgery services across England. This not only has consequences on patient experience but also the

workforce and workforce development, to ensure that there is not a long-term destabilising impact.

Conclusion:

Analysis of 1.75 million referrals to oral surgery services in England have highlighted the ongoing impact of the pandemic and the need to actively minimise adverse impacts on patients, NHS services and the workforce.

Key words

Aerosol-generating procedures

COVID-19

Referral volume

SARS-CoV2

Oral Surgery

Introduction

The COVID-19 pandemic was declared by the World Health Organisation (WHO) on 11th March 2020, after the first report of a case of pneumonia on 31st December 2019 in Wuhan, China. Following a rapid spread of the disease throughout the world, lockdown measures in England legally came into force on 26th March 2020. Fears that the SARS-CoV2 virus could be spread in dental aerosol-generating procedures drove cessation of face-to-face routine and non-urgent dental care in England on the 25th March 2020. Patient telephone triage was carried out with advice, analgesia and/or antibiotics (AAA) as first line treatment unless patients were acutely unwell in which case, they were referred to urgent dental care clinics (UDC's). Guidance was issued by the British Association of Oral Surgeons (BAOS) and the British Association of Oral and Maxillofacial Surgeons (BAOMS) on the management of patients requiring oral surgery treatment (BAOMS). Oral surgery services in secondary care were suspended in many units with staff deployed to support colleagues in medical specialties, particularly critical care (Moore 2022) and therefore patients' access to oral surgery care was markedly and rapidly reduced. This was a similar situation with paediatric general anaesthetic operating lists for exodontia (Elsherif 2021).

A standard operating procedure was released by the Chief Dental Officer (CDO) for England in preparation for dental practices returning to face-to-face care from early June 2020. Thereafter the capacity of dental practices to deliver care has increased but without a return to pre-pandemic levels. Secondary care Oral Surgery service capacity has also increased over time, but ongoing operational pressures are having a detrimental impact on service provision. For patients who need oral surgery care the pandemic disruption translates to a reduction in access to primary care and where needed to secondary care also. As secondary care services plan their recovery to make best use of the resources available to them, there is a need to understand the impact of pandemic disruption on oral surgery referrals to secondary care.

Aims

This study aimed to use the electronic Referral Management System (eRMS) oral surgery data across multiple sites in England to evaluate the service over a 34-month period in relation to:

1. Pre and post pandemic referral rates in oral surgery
2. Examining the data for signs of inequality in obtaining a referral for oral surgery.
3. The impact on service provision for oral surgery in England.

Materials and Method

Oral surgery referral data was available from an eRMS for areas of England covered by this service for the 34-month period March 2019 to December 2021 (inclusive), which included 12 months of pre-pandemic data and the first 22-months of the pandemic. The data were from the following regions in England; Central Midlands, Cheshire & Merseyside, East Anglia and Essex, Greater Manchester, Lancashire, Thames Valley and Yorkshire and the Humber.

Ethical approval was not required as this was a service evaluation, and no patient identifiable data were included within data export, complying with the ICO guidelines on secondary use data. Data were exported from the eRMS into Microsoft Excel [™] (Microsoft Corporation 2018) and the accompanying index of multiple deprivation (IMD) decile for each referral was included at the time of data receipt.

Results

The total number of referrals received to both intermediate minor oral surgery (IMOS) and secondary care in the period March 2019 to December 2021 was 1,766,895 with large changes evident (Figure 1 and Table 1). Pre-pandemic referrals averaged at 25,498 per month over a 11-month period (March 2019 – February 2020). Referrals reduced in March 2020 to 19,019, with a further reduction to 698 and 747 per month in April and May 2020, respectively. There was a slow but steady increase in referrals from June 2020 (4,692) to October 2020 (16,734) which coincided with dental practices in England resuming face-to-face care. Whilst referral numbers in this period increased, they did not return to pre-pandemic levels. Referrals subsequently increased from 18,089 in February 2021 to 57,573 in March 2021 and continued to rise steeply to a peak in November 2021 of 217,646. Referrals averaged 84,953 per month in the period including August 2020 and December 2021.

Not all referrals received are accepted at the point of clinical triage. The number of rejected referrals were recorded as a percentage compared to the number of referrals received (Figure 2). Prior to the pandemic an average of 1.5% of referrals were rejected each month; however post- pandemic these increased to an average of 2.7% per month. There is a peak of rejected referrals in May 2020 which reached 98%, but then dropping to 18% in June 2020.

Since the easing of restrictions there has a reduction in the number of referrers referring patients for oral surgery. Between March 2019 and December 2019 there were an average of 23,539 referrers per month, which has reduced to an average of 14,029 per month since June 2020.

Figure 1 – Graphical representations of referral numbers through the eRMS per month from March 2019 to December 2021. The data demonstrates the total number of referrals, mean number of referrals pre-pandemic (March 2019 – February 2020) and during the pandemic (July 2020 – December 2021), plus the number of referrers per month with annotations to include key points in the pandemic timeline such as national lockdowns and easing of restrictions during the study period.

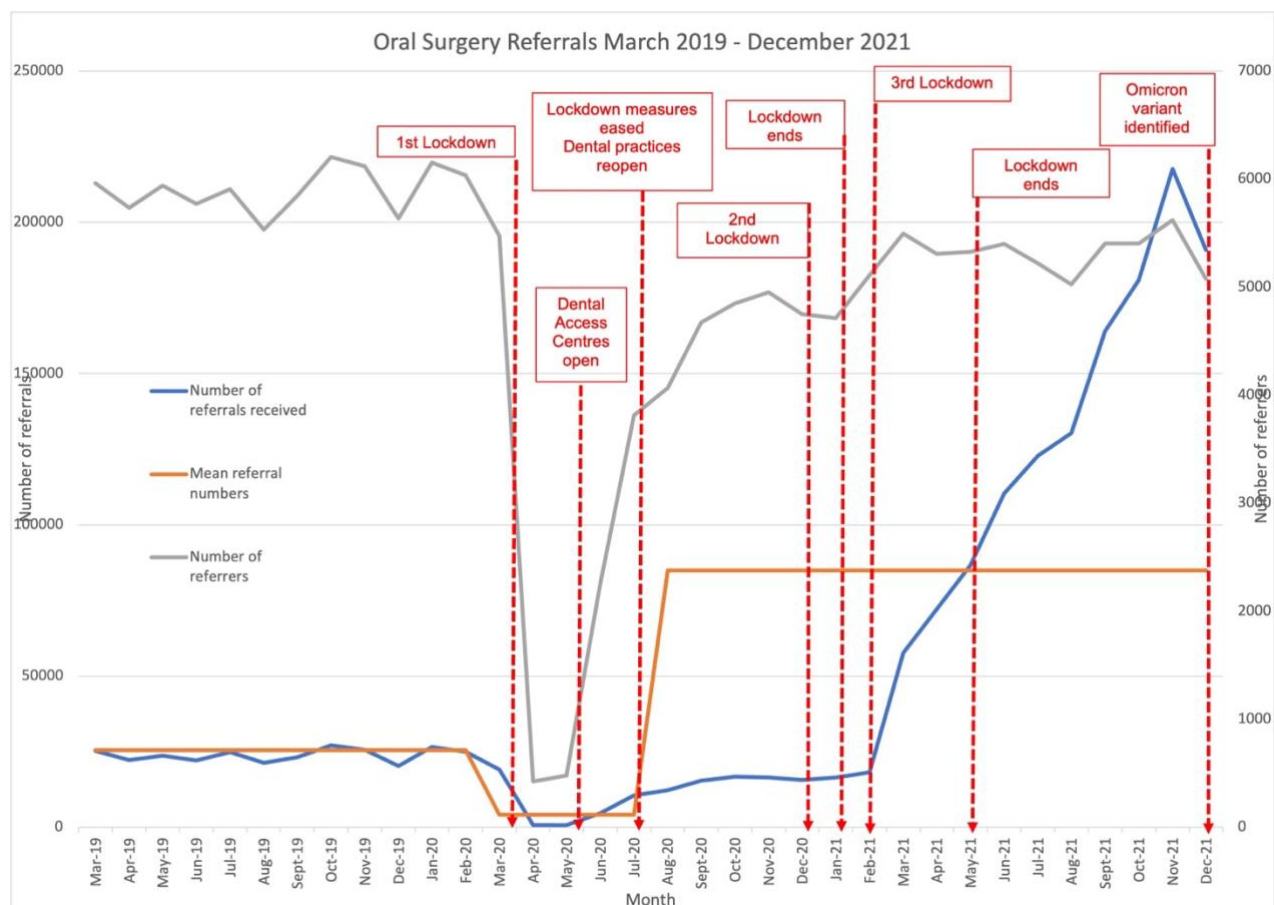


Figure 2 - Geographical representation of referrals. Map demonstrating the volume of referrals from practice postcodes in England. Blue represents low numbers, through the colour spectrum to red being high numbers of referrals.

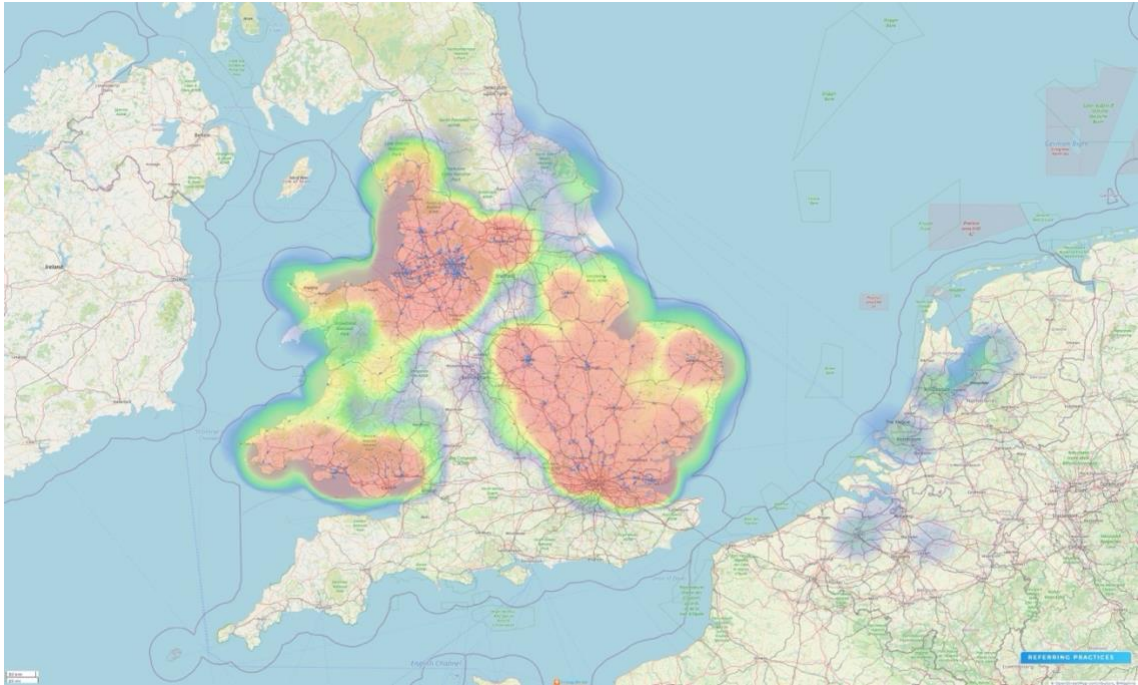


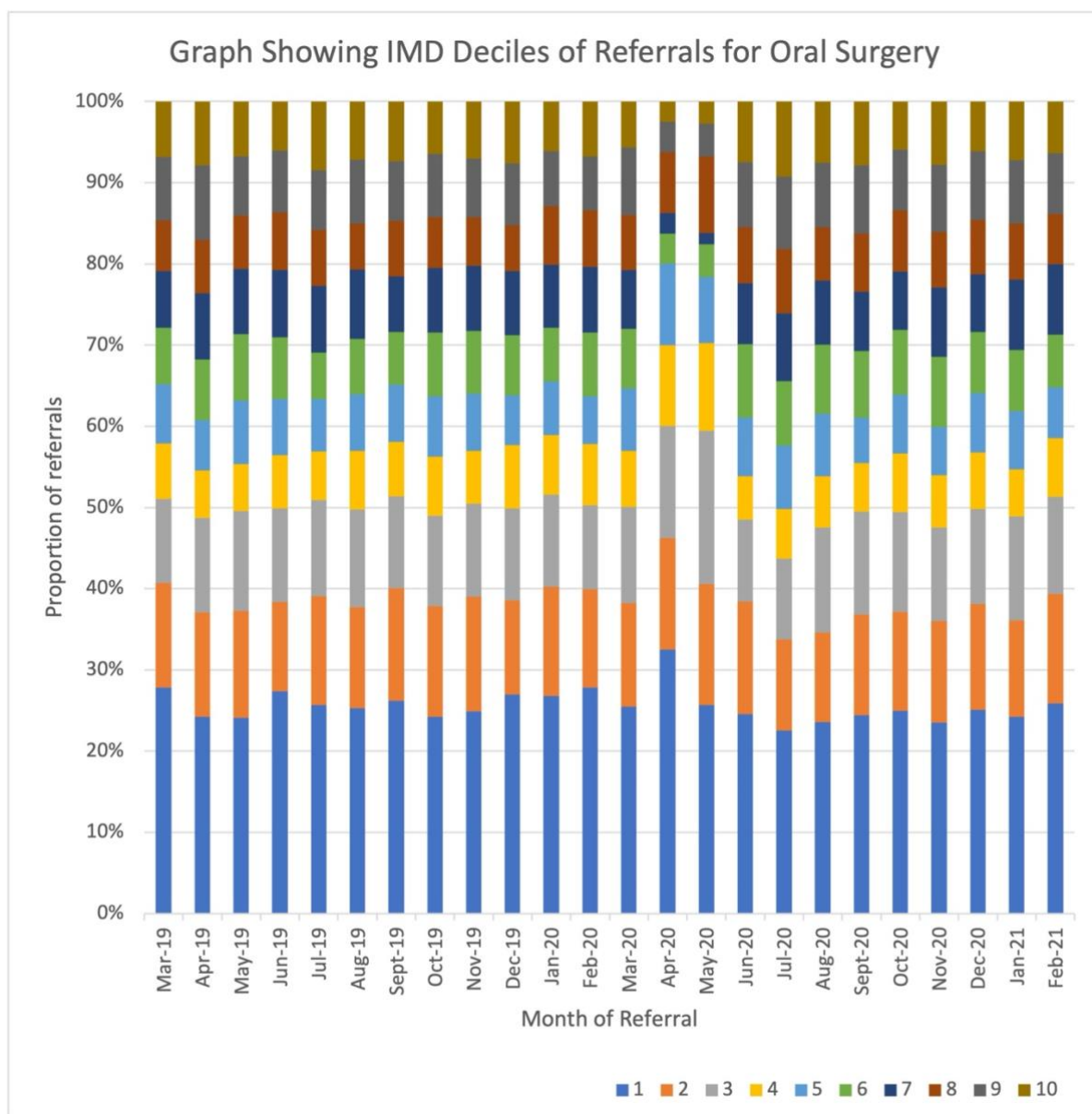
Table 1 – Representation of the number of referrals per month between March 2019 – December 2021.

	Number of referrals received per month
Mar-19	25224
Apr-19	22179
May-19	23710
Jun-19	22080
Jul-19	24851
Aug-19	21293
Sep-19	23109
Oct-19	27024
Nov-19	25663
Dec-19	20264
Jan-20	26538
Feb-20	24940
Mar-20	19109
Apr-20	698
May-20	747
Jun-20	4692
Jul-20	10573
Aug-20	12254
Sep-20	15365
Oct-20	16734
Nov-20	16480
Dec-20	15596
Jan-21	16482
Feb-21	18089
Mar-21	57573
Apr-21	72004
May-21	86620
Jun-21	110352

Jul-21	122773
Aug-21	130264
Sep-21	164043
Oct-21	180970
Nov-21	217646
Dec-21	190956
TOTAL	1766895

To investigate the distribution and potential inequalities in oral surgery secondary care access via referrals during the first year of the pandemic, the Index of Multiple Deprivation (IMD) codes were plotted for referrals received over a 24-month period (March 2019 – February 2021, inclusive (Figure 2). IMD(5) combines information from the seven key domains measured to give an overall relative measure of deprivation during the pandemic. The index ranks every small area in England from the lowest number to the highest. Health deprivation and disability accounts for 13.5% of the index. The lower the rank, the higher the deprivation. This demonstrates that pre-pandemic the most deprived patients (IMD 3 or less) account for approximately 50% of all referrals. However, in April and May 2020 these increase to 60%, but soon returned within the evaluation period to pre-pandemic levels.

Figure 3 –IMD deciles of referrals for oral surgery during the period March 2019 – February 2021. Individual deciles are colour coded according to the embedded key.



Discussion

There has been widespread recognition that pandemic disruption to healthcare will be long-lasting and that services will need to plan their way through an extended recovery period that makes the most of the NHS resources available. This is the first report that captures and quantifies the impact of ongoing disruption to pre-pandemic referral patterns for oral surgery care across England through the analyses of 1.75M referrals. As illustrated in figure 2, there was broad geographical coverage across England within the dataset, London as the largest city is partially represented. Despite the sampling not being from across all of England, this large dataset was drawn from areas representing a full range of deprivation profiles thus increasing confidence in the generalisability of the findings. The eRMS captures referrals to NHS services but not to private services.

During 2020, Oral Surgery (along with Orthopaedics & Trauma and Ear, Nose and Throat) was one of three specialties in England with the largest reduction in completed pathways compared to 2016 (Health Foundation 2021). Reduced referral numbers and suspension of treatment pathways can be expected to be major factors on this adverse disruption to pre-pandemic services.

The literature suggests that patients were able to access emergency care, and explanations for the dramatic increase in referrals post-pandemic could be due to GPs having limited clinical time to provide care and therefore are referring more or patients' oral health has deteriorated during the pandemic due to no ongoing oral healthcare.

Since the restrictions were imposed on dental care in March 2020 due to the pandemic, there has been a reduction in access to routine dental care for all which includes those patients' seeking treatment for odontogenic infections. There was a delay in the publication of guidance for UDCs following the pandemic with the key message of advice, analgesia, and antibiotics (AAA). Despite this however, perhaps due to the effectiveness of Urgent Dental Care Centres (UDC), there appears to have been a reduction (Politi 2020) in those

patient's requiring admission and treatment in secondary care for acute admissions for dento-facial infections. There has been a reported decrease of patients in the attendance in oral and maxillofacial departments for dental related issues with the advent of urgent care centres (Hammon 2020, Long 2020). Politi et al (Politi 2020) reported that during 2020 no patients presented with a post-extraction infection and suggested that this was due to the number of extractions being carried out in UDC's as opposed to general dental practitioners. There was however an increase in the percentage of those requiring admission who presented with infection during lockdown. With respect to the management of paediatric patients requiring exodontia under general anaesthesia, during the first two months of lockdown 1,456 children had their appointments cancelled and although activity resumed later in the year (Elsherif 2021) services are insufficient to manage the backlog and continued increase in numbers of children on the waiting list.

In this study we have demonstrated large changes in referrals to oral surgery services, which at the end of the study period remain very different from the pre-pandemic levels. This is within the context that the pandemic would not have an immediate impact on the pattern of clinical disease that would typically trigger an oral surgery referral, given that access to routine care was suspended and therefore patients would develop dental disease over time which may then require oral surgery care. However, the longer the period of disruption to pre-pandemic patient pathways, there is an increased likelihood of delayed clinical presentations that place an increased burden on the delivery of care in primary care and by specialist services.

The data reveals 3 phases to a disrupted pattern of referrals following the onset of the pandemic: immediate drop (March – April 2020), gradual increase (May 2020 – Jan 2021) and accelerated increase (Feb – Nov 21).

The immediate dramatic drop in referrals at the start of the first national lockdown reflects dental practices suddenly closing for face-to-face care and a switch to telephone consultations and advice without the benefits of clinical examination (Moore 2022). Although face-to-face dental care didn't cease until 25th March 2020, there was a general awareness in dentistry and amongst the public of the potential issues relating to COVID-19 and this may account for

the decline in referrals immediately prior to practice closures. Concerns in oral surgery that the early stages of the pandemic would see an increased need to manage patients with acute dental infections, including as in-patients, did not materialise (Politi 2020). The early introduction of the advice, analgesia and antibiotics (AAA) approach coupled with establishment of Urgent Dental Care Centres (UDC) are likely to have been key initiatives. For other patients, who represent the majority, the suspension of non-urgent oral surgery care would need to be delivered in the future consistent with a broad theme recognised across many areas of healthcare. Key initiatives in relation to this would include ongoing dental care and an emphasis on prevention.

The re-opening of general dental practices for face-to-face care was expected to generate a rise in referral activity and by the middle of 2020 referrals were gradually increasing along with the capacity of oral surgery services to deliver routine care even though both remained reduced compared to pre-pandemic levels. Mitigations to reduce the risk of transmission of COVID-19 associated with general dental and oral surgery practice were developing and represented a shift from the earliest stages of the pandemic when oral and maxillofacial procedures were categorised as 'high-risk aerosol generating procedures' (Howard 2020). Changing public attitudes to COVID-19 would also have been a factor in their willingness to seek general dental and specialist oral surgery care as the pandemic evolved.

The accelerated increase in referrals that started in early 2021 and was sustained throughout the year was dramatic, unexpected and is likely to reflect a variety of factors. The period immediately before included the pre-Christmas 2020 national lockdown and the introduction of the national COVID vaccination programme. Early in the accelerated phase the vaccination roll-out progressed well but there was a need for a third national lockdown. Through 2021 the vaccination programme brought a new confidence to many living in England within an increased understanding of how to medically manage those who became unwell due to COVID. Patient throughput in dental practices increased reflecting a switch from crisis measures to planned recovery.

Overall, the data demonstrates that the average referrals received per month pre-pandemic were 25,498 compared to an average of 84,953 in the period

July 2020 to December 2021. This increase of 57% per month over a sustained period with a peak 8.5-fold excess over pre-pandemic average numbers in November 2021 that represents a huge and unprecedented challenge for services that are already stretched and continue to be disrupted by multiple factors. The pandemic period has been characterised by large scale changes in referral numbers with an average of 84,953, with referrals ranging from 10,573 in July 2020 to 217,646 in November 2021.

At the end of 2021 and the end of the study period there is a noticeable downturn in referral numbers. It is unknown if this represents the peak of the accelerated referral phase. This coincided with identification of the rapidly transmissible COVID-19 Omicron variant (WHO 2021) and the implementation of restrictions including working from home wherever possible, although face-to-face dental care continued. The seasonal holiday period and better understanding of the effectiveness and limitations of the national vaccination programme may also have been factors. Further, it is possible that issues of limited access to NHS dentistry may have resulted in some patients opting for private care to expedite the resolution of their dental problems.

To better understand the dramatic changes to referral numbers made over the study period we investigated the numbers of referrers. On average there were 5,871 individual healthcare professionals referring each month prior to the pandemic, and since the pandemic this has reduced by 4% to 5,399 per month. Accordingly, fewer referrers made more referrals. The reasons for this are likely to be multifactorial and may include a reduced capacity to deliver patient care within dental practices including fewer patient treatments being delivered by each dentist and a reduction in the total number of GPs across the referral network. Other contributory factors may include delayed clinical presentations or co-morbid health issues that mean that care needs are increasingly complex and prompt onwards referral. We have previously reported that pre-pandemic there was a wide variation in the number of referrals made per practitioner with a small subset accounting for a high number of referrals (Moore 2022). This may also be a contributory factor but was not one investigated in this study.

The variations in oral surgery referral patterns place a huge strain on oral surgery services across England. We investigated if the increased referral numbers affected the rejection rate at clinical triage. Pre-pandemic an average of 1.5% of referrals were rejected, but since August 2020 this has risen to 2.7%. Whilst this has increased, it will have a minimal impact on the overall strain on oral surgery service delivery. The increased referral numbers coincide with the NHS in England setting ambitious targets to manage the backlog in routine care created by the pandemic(13).

In addition to the disruption experienced by patients, there are also consequences for workforce development and how foundation, core and specialty trainees are supported to develop their skills appropriately in oral surgery(14). This data highlights the need for considered planning of workforce development to ensure that the disrupted referral patterns presented do not have a long-term destabilising impact.

The pandemic disruption had the potential to disproportionately disadvantage individuals in areas of highest deprivation. The IMD data presented confirms a disproportionate use of oral surgery services by those in lower deciles across the time periods studied. During the initial lockdown period those with a lower IMD score (i.e., more deprived) were not disproportionately disadvantaged in accessing oral surgery care, within the context of an overall reduction in numbers of referrals received. The Health Foundation(6) reported that 45,187 oral surgery treatment pathways were completed in April 2019 compared to 12,989 in April 2020. They also reported that between 2019 and 2020 the number of completed treatment pathways fell by 9,162 per population in the most deprived areas of England, compared with a fall of 6,765 in the least deprived areas. It therefore suggests that pre-existing inequalities did have had an impact of the patient's healthcare experience during the initial period of the pandemic.

In summary, analyses of 1.75M referrals to oral surgery services in England have highlighted the ongoing impact of the pandemic and the need for active management to minimise the adverse impacts on patients, NHS services and the workforce. This study also demonstrates the need for the more effective use of healthcare data to inform future planning of healthcare services and in preparation for future pandemics or other disruptive events.

References

- Aulakh G, Wanis C, Wilson G, Moore RJ. 2021. The impact of COVID-19 on Oral Surgery Training. *Oral Surg.* 14(4):313-320
- Elsherif N, Lewney J, John JH. 2021. Impact of cancelled general anaesthetic dental extraction appointments on children due to the COVID-19 pandemic. *Comm Dent Health.* 38(3):209-14
- Hammond D, Hughes F, Stirrup P, Barkworth N. 2020. Setting up and maximising the usage of an urgent dental care centre in Blackpool. Sharing our experiences. *Br J Oral Maxillofac Surg* 58(7):834-837
- Howard BE. 2020. High-Risk Aerosol-Generating Procedures in COVID-19: Respiratory Protective Equipment Considerations. *Otolaryngol Head Neck Surg.* 163(1):98-2-103
- Long L, Corsar K. 2020. The COVID-19 effect: number of patients presenting to the Mid Yorkshire Hospitals OMFS team with dental infections before and during the COVID-19 outbreak. *Br J Oral Maxillofac Surg* 58(6):713-4
- Moore RJ, Keshani D, Coulthard P. 2022. UK Oral Surgeons' early response to the COVID-19 pandemic and impact on patient care. *Oral Surg* 15(3):315-323
- Moore RJ, Pretty I, Douglas G, Mighell AJ. 2022. An evaluation of referrer factors for 98,671 referrals made to the West Yorkshire Oral Surgery managed clinical network over a three-year period. *Br Dent J* <https://doi.org/10.1038/s41415-022-4034-z>
- NHS England 2022. Delivery plan for tackling the COVID-19 backlog of elective care. <https://www.england.nhs.uk/coronavirus/publication/delivery-plan-for-tackling-the-covid-19-backlog-of-elective-care/> (accessed December 2025)
- Politi I, McParland E, Smith R, Crummey S, Fan K. 2020. The impact of COVID-19 on cervicofacial infection of dental aetiology. *Br J Oral Maxillofac Surg.* 58(8):1029-33
- World Health Organisation 2021. Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern [https://www.who.int/news/item/26-11-2021-classification-of-omicron-\(b.1.1.529\)-sars-cov-2-variant-of-concern](https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern) (accessed December 2025)
- The Health Foundation 2021. Long waits, missing patients and catching up. <https://www.health.org.uk/reports-and-analysis/analysis/longer-waits-missing-patients-and-catching-up> (accessed December 2025)

Chapter 8 - Understanding referral behaviours of General Dental Practitioners towards patients requiring Oral Surgery Treatment in England. A framework analysis informed by the COM-B model

Abstract

Referrals from General Dental Practitioner's (GDPs) are a critical gateway to secondary care oral surgery (OS) services in England, yet considerable variation exists in referral behaviours. This study aimed to explore and understand the factors influencing GDP referral decision making for patients requiring OS treatment. A qualitative analysis was undertaken informed by the COM-B model to systematically examine determinants of referral behaviour via an inductive approach. Findings highlight that referral behaviours are shaped by a complex interaction of factors ranging from experience, confidence, time pressure and perceived risk. The study provides a theoretically informed understanding of referral behaviour and identifies potential targets for educational, organisational and policy-level interventions to support more consistent and appropriate referral practices in OS.

Introduction

OS has its origins in the barber surgeons, who for centuries extracted teeth prior to development of effective, safe anaesthetics and the establishment of dentistry as a clear branch of healthcare. From these origins OS has kept a distinct identity that is reflected in the educational outcomes to be achieved as a dental undergraduate in the UK prior to first registration as a dentist (Macluskey 2008). Undergraduate education is explicitly framed around the GDC's Safe Practitioner Framework, which emphasises the attainment of core competencies necessary for independent practice at the point of registration, including the assessment and management of uncomplicated OS procedures. This came into effect for those starting their undergraduate training in 2025 (GDC 2023). Subsequent skill development through training and experience, including for some to specialist level, remains popular amongst General Dental Council (GDC) registrants. Changing patterns of healthcare need and thinking about how these needs are most effectively met within healthcare policy has placed Oral Surgery at a crossroads. Whilst the structures and policies described are relevant to England, the underlying trends and challenges have a shared identity between the 4 nations of the United Kingdom.

Background

Historically OS was largely delivered by General Dental Practitioners (GDPs) in primary care. Following the 2nd World War and establishment of the NHS, the transfer of general anaesthesia (GA) from dental practices to a hospital setting led to the expansion of hospital-based oral surgery services and the emergence of Oral & Maxillofacial Surgery (OMFS). Dental GAs peaked in the late-1960s before a reduction over time, with under 370,000 GA episodes a year by the late 1980s (Poswillo 1990). Dental surgery GA's ended in January 2002 on safety grounds coupled with changing standards of care and patient expectations.

Patients who require oral surgery treatment are often referred from their general dental practitioner (GDP) to either a dentist with a special interest in oral surgery or a specialist oral surgeon. Referrals are commonly managed through a managed clinical network (MCN) and patients then seen by the appropriate clinician in the appropriate environment, this could either be a primary or secondary care-based service according to the levels of care provision.

Referral behaviours of General Dental Practitioners (GDPs) are pivotal in ensuring patients receive timely and appropriate oral surgery treatment. In England, the decision-making process regarding referrals for oral surgery can be influenced by numerous factors, ranging from individual practitioner experience and behaviours to healthcare structure and processes.

The COM-B model (Michie 2011) is commonly used to understand practitioner behaviour and has proven utility by previous research to explore dentist behaviour (Buchanan 2021). The COM-B model serves as a foundational framework, breaking down into the three components and identifying which of these components influences GDP's referral behaviours. It helps pinpoint where interventions may be most effective. These domains offer a detailed understanding of the specific psychological, social and environmental factors which shape GDP's behaviours. This approach enables a comprehensive analysis of the barriers and facilitators to effective referral practices.

Applying the COM-B model to the referral behaviours of GDPs allows for a holistic understanding of the factors influencing their decision and allows

exploration and understanding of their referral behaviours. For example, a lack of capability may stem from insufficient training or knowledge relating to the treatment needs of the patient. Conversely, opportunities could be affected by limited access to referral pathways or specialist support. Motivation might be influenced by GDPs beliefs about patient outcomes or their past experiences with referrals.

Understanding the referral behaviours of GDPs using these models has practical implications for developing targeted interventions, and recent research has demonstrated that the volume of referrals in oral surgery is high in England, both pre and post the COVID-19 pandemic (Moore 2023).

Training programmes and support can be designed to enhance knowledge and skills (capabilities), while systemic changes, such as streamlining and improving referral processes and increasing access to specialist services, can provide the necessary opportunities. Addressing motivational factors might involve changing perceptions about the importance of specialist care and highlighting positive patient outcomes associated with timely referrals.

Aims

To explore GDPs perspectives on providing oral surgery care within primary care, and to identify key factors which shape their referral behaviour.

Materials & Methods

A qualitative approach was used with semi-structured interviews, and a topic guide based (appendix 1) on the COM-B (capabilities, opportunities, motivation, and behaviour) with mapping of developing themes.

Ethical approval was gained from the University of Leeds Research Ethics Committee (070322/RM/346).

An initial focus group was formed of local practitioners referring patients to the West Yorkshire Oral Surgery Managed Clinical Network (WYOSMCN) and those providing care. Piloting of topic guides was undertaken in this group for both providers and referrers to test the data collection method and to ensure suitability for the main study and to add any further questions to the topic guide which were deemed suitable by the participants.

Following completion of the pilot group by the primary author, an advertisement was placed on a secure dental social media site inviting GDPs in England to participate in the qualitative interviews with a link to the participant information sheet and questionnaire which included consent to their email addresses.

The 'pre-interview' registration form served as a tool in capturing demographic and professional characteristics of participating GDPs and their self-reported referral behaviours in oral surgery. Participants were able to self-assess their referral tendencies, categorising themselves along a spectrum from high to low referrers.

The primary researcher is a Consultant Oral Surgeon, and it was felt that their professional and academic experience could introduce bias to how the participants perceived and responded to questions. To minimise this and encourage open and uninhibited discussions, the interviews were conducted by an experienced independent researcher with no clinical or supervisory relationship to participants. The independent interviewer was a clinical researcher based in the University with qualitative research experience and appropriate training. Each interview lasted approximately one hour and was scheduled at the participants' convenience, ensuring that it did not interfere with the National Health Service (NHS) working commitments. They were conducted on Zoom™, recorded and automatically transcribed into a Microsoft Word™ document and stored securely via password protection within The University of Leeds OneDrive™ account. All interviews were recorded with video and audio; video files were deleted to preserve anonymity. Each transcript was checked for accuracy by replaying the corresponding recording and correcting transcripts against the audio to ensure an accurate representation of the responses. Any identifiable data was then deleted from the secure OneDrive™ account.

Transcription and coding were carried out using Microsoft Word™, each interview was stored as an individual document. Two columns were formatted with the left-hand side containing the transcript and the right-hand column with space for coding and annotations.

The qualitative data was initially coded by the primary researcher (main author) through a detailed line by line review of each transcript. To enhance analytical rigour and reliability, two additional authors (members of the supervisory team) with qualitative experience independently reviewed and verified the coding. Areas of divergence were discussed between the three researchers until a consensus was reached. This ensured consistency and transparency.

Thematic analysis began by coding deductively guided by the COM-B model which was used as the primary analytical framework. After which sub-themes were identified inductively within each domain to capture context-specific insights into referral behaviour.

Framework analysis and thematic analysis are both well-established qualitative research methods that provide valuable insights into complex datasets. However, they differ epistemologically. Framework analysis is grounded in a more pragmatic and applied epistemology which is often post-positivist. Within this approach participants accounts are subjective and can be interpreted in a systematic way reflecting 'real-world' phenomena. Within this study the framework analysis supports a deductive approach allowing the integration of pre-existing theories such as COM-B but whilst retaining the flexibility to incorporate themes derived inductively whilst carrying out the analysis.

In contrast, thematic analysis is rooted in a more interpretivist epistemology which allows for more exploration and inductive approach with the data. Thematic analysis allows underlying patterns of experience, attitudes and beliefs to be explored which within this research will give insight into the referral behaviours of GDPs.

By combining framework analysis with thematic analysis, this study adopts a comprehensive methodological approach that balances structure with flexibility (Rosen 2023). The structured nature of framework analysis ensures that key referral factors, such as clinical criteria, perceived risk, and previous training, are systematically examined, while thematic analysis allows for the emergence of nuanced insights, including subconscious biases, external pressures, and personal experiences that shape referral behaviour. This dual approach not only enhances the depth of understanding of GDPs' referral practices but also provides a robust framework for generating discussions on improving referral pathways, professional education, and patient outcomes.

This methodological combination ultimately ensures that the research captures both the consistency of referral patterns and the individuality of practitioner decision-making, therefore giving an in-depth perspective on the factors that influence GDPs referral behaviours for specialist oral surgery care.

Results

37 dentists completed the questionnaire out of a group of 4,500 targeted via a social media secure professional group of UK registered dental professionals, all of which were invited to participate in the interview. 10 dentists responded to the interview request, one of which failed to attend. Therefore, a total of 9 interviews were held.

Participant number	Years since qualification	Age range	Sex	Years since first registered with GDC	UK or overseas graduate	Practice type
1	0-5	25-34	F	3	UK	Mixed
2	0-5	25-34	M	1	UK	NHS
3	0-5	25-34	M	1	UK	NHS
4	0-5	25-34	F	1	UK	NHS
5	0-5	25-34	F	2	UK	Private
6	30 years plus	55-65	M	37	UK	Mixed
7	30 years plus	55-65	F	34	UK	Mixed
8	30 years plus	55-65	F	34	UK	Mixed
9	16-20 years	35-44	F	12	Overseas	Mixed

Thematic analysis identified six interrelated but distinct dimensions of behaviour, mapped against the COM-B model. Whilst experience was a recurrent influence across all themes, its meaning, form and behavioural function varied according to the specific component. Confidence emerged as the predominant theme in the analysis serving as the key mediating factor. Notably, physical opportunity and psychological capability were the most frequently discussed, with some elements of social opportunity and reflective motivation featuring. In contrast, certain COM-B dimensions such as physical capability and automatic motivation were less consistently developed, often appearing only in relation to stress or avoidance rather than as standalone themes.

With regards to capability, the most dominant theme was the variation in undergraduate training experiences, with participants reporting stark differences in the quality and quantity of clinical exposure, especially regarding oral surgery experience. This variability directly influenced their confidence and readiness for practice. A lack of hands on, supervised experience during

training was linked to low psychological capability, leading to increased referral rates. Conversely, repeated exposure and supportive supervision fostered confidence and independence. The themes of generational differences, experiential learning and the transition from undergraduate or trainee status to independent practice highlighted how both technical skills and professional confidence are developed incrementally. The availability of supervision and structural issues within the NHS either enabled or formed barriers to practitioners' ability to perform oral surgery in house. Motivation was associated to the fear of complications and risk appraisal, which deterred many from carrying out oral surgery procedures. However, some participants demonstrated a developmental growth mindset where they actively sought challenges and further training in the area. This demonstrates an importance of training being consistent with supportive supervision and key areas to target building confidence in practitioners to allow them to manage patients requiring oral surgery more independently.

Table 1

COM-B		Sub-theme
Capability	Physical	1.1 Variation in experiences during training <i>“I think students these days get less experience, I got a lot more.....I had loads of experience”</i> <i>“We didn’t do much oral surgery as students”</i> <i>“I don’t have the experience or confidence to actually do it.....most of my extractions at uni I assisted”</i>
	Psychological	2.1 Self-confidence in clinical decision making. <i>“More confidence means I would refer less”</i> <i>“my confidence to do extractions is quite low”</i> <i>“If I had more experience at uni I would feel more confident”</i>
		2.2 Temporal and generational variation <i>“Because the younger generation are afraid or stressed and haven’t had the exposure”</i> <i>“Because we (this generation) take risk, you become more competent”</i>

		2.3 Impact of experiential learning <i>"I did some post-graduate oral surgery training, and I have become more competent"</i>
Opportunity	Physical	3.1 External barriers to in-house treatment <i>"The UDAs don't relate to the time and workload, so I am more likely to refer:</i> <i>"If you treat a patient with lots of extractions, it's not feasible with the cost which does play a huge factor"</i>
		3.2 External factors impairing treatment provision <i>I got quite a reasonable amount of experience but observed a lot and had issues with clinical experience due to COVID"</i>
	Social	4.1 confidence related to supervision <i>"In foundation training I was in a supportive environment, so I tried to do more extractions before referring out"</i> <i>"I wouldn't have taken these teeth out, but he (the supervisor) is there and I knew I can get him to help"</i>
Motivation	Reflective	5.1 feeling anxious and stressed about provision of treatment

		<i>“most people are scared if it goes wrong”</i> <i>“I don’t want to cause more harm than good”</i>
	Automatic	6.1 Avoiding risks due to potential consequences <i>“I still do gear them (extractions), but have more confidence when someone is around”</i> <i>“because they are afraid or stressed and haven’t had the exposure”</i>

1. Capability – Physical

Subtheme 1.1 – variation in experiences during training.

This theme encapsulated the procedural and technical aspects of skill acquisition. There was a variation in the response of participants which revealed striking variability in the quantity and quality of experiences, which in turn shaped their confidence and perceived confidence.

Experience within this domain referred to tangible, hands-on engagement in clinical settings which affected their perceived competence. In contrast to later themes where experience is linked to confidence or motivation, within physical capability, experience represents the physical behaviour of the skill being performed. This relates to the direct performance, repetition and sensory-motor learning which underpins the ability to perform the skill in question as opposed to how they may have felt about carrying out the skill.

Quality of experiences were described as the different components of education training received as an undergraduate. Further insight focused this onto the teaching methods and contents of the curriculum. Participants also outlined the variability of clinical training quality such as supervision in the clinical setting, breadth and depth of exposure to patients and the care provided.

Additionally, participants highlighted the role of undergraduate education in shaping their baseline capability, with some reporting limited experience and others describing extensive experience opportunities. For example, one observed *“a key factor is the quality in the undergraduate teaching they receive”* (P6), while another contrasted their experience with younger cohorts: *“I think students these days get less and less experience, I got a lot more....I had loads of experience”* (P7).

Several participants reported limited exposure to extractions as students, with one commenting *“we weren’t exposed to lots of extractions as a student”* (P1), and *“We didn’t do much oral surgery as a student”* (P1). This lack of hands-on opportunity was directly linked to reduced self-efficacy by the same participant explaining *“I don’t have the experience or confidence to actually do it*

(extractions)”. Similarly, P5 explains *“Most of my extractions at uni I assisted”*, suggesting that observational roles often took precedence over individuals providing active treatment for patients.

2. Capability – Psychological

Subtheme 2.1 – self-confidence in clinical decision making

This theme referred to the cognitive and affective components of capability, particularly self-efficacy and confidence in clinical decision making. This relates to participants beliefs about capabilities, behavioural regulation and decision processes.

In contrast to physical capability, which is shaped by hands-on procedural exposure, psychological capability relates to clinicians’ cognitive processes i.e. how they think, reason and manage their emotions when performing or planning treatment. In this context, experience operates as a cognitive anchor which underpins self-belief and perceived competence, as opposed to representing a practical skill in itself.

Participants reported their confidence was a mediating factor between knowledge, skills and decision making. Often this related to participants’ lack of experience in their undergraduate oral surgery training, particularly exodontia.

Participants frequently described low confidence in their ability to carry out extractions which translated into high referral rates.

Participant 3 states *“....more confidence means I would refer less”*.

As participant 1 explained *“my confidence to do extractions myself is quite low”*, whilst another reflected *“If I had more surgical experience at uni I would feel more confident”* (P2).

A lack of experience was directly associated with reduced confidence. Participant 1 admitted *“I don’t have the experience or confidence to actually do it (extractions)”*. This highlights the interdependence between opportunity and self-belief; without hands on-practice, psychological capability was undermined, regardless of theoretical knowledge.

Conversely, confidence appeared to increase as participants gained more opportunities for independent practice. Participant 2 describes *“In my final year of study, I felt confident as I did more independent practice”* and further reflected *“I think I have got better since foundation training, I do feel more confident”*. These reflections illustrate the incremental building of confidence through structured progression, moving from observation to supervised practice and then independent performance.

Some participants highlighted how confidence developed by confronting clinical challenges. As participant 8 stated *“Because we (this generation) take risk, you become more competent”*. This suggests that calculated risk taking within the safety net of a supervisor or within the stages of early clinical practice may accelerate both skill acquisition and self-assurance. Confidence in this context is not simply the product of repetition but also exposure to increasingly complex or uncertain situations.

Therefore, psychological capability is differentiated from physical capability by its focus on internal cognitive and affective processes, how knowledge, emotion and perceived self-efficacy shape clinical behaviour rather than the technical skill itself.

Sub-theme 2.2 – temporal and generational variation

This sub-theme describes how beliefs and capabilities and social and professional norms have evolved across the generations captured in this group of participants. Unlike physical capability, which is a constant over time, this reflects a shifting cognitive framing of risk and competence linked to a broader socio-professional context.

Graduates with 20 years' experience or more typically reported more robust exposure and confidence; *“...because the younger generation are afraid or stressed and haven't had the exposure”* (P8), *“because we (this generation) take risk, you become more competent”* (P8), *“as a student I felt very comfortable with oral surgery, and as the older generation we feel its ok to have a go”* (P7).

Newer graduates often enter practice with diminished self-assurance; *“more experience will give me confidence”* (P4).

The reference to *“this generation”* is particularly insightful, as it suggests a perceived shift in professional attitudes across cohorts which demonstrates a difference rooted less in procedural skill as discussed above, and more within social cognition and environmental contexts. While it is difficult to draw broad conclusions from a single participant’s account, this observation may reflect wider systemic changes. However, one should be mindful that the more experienced participants are recollecting accounts from over 20 years ago. Contemporary dental education and practice are shaped by an increasing emphasis on evidence-based care, a more complex regulatory environment, and heightened patient awareness of litigation. Within this context, what one generation might characterise as *risk-taking* could be regarded by another as the routine application of modern techniques and a pragmatic response to patient needs.

Sub-theme 2.3 Impact of experiential learning

A lack of consistent, hands-on practice may undermine both technical skills and professional confidence, whereas repeated supervised opportunities appear to foster readiness for independent practice; *“I didn’t do much oral surgery as a student”, “I don’t have the confidence or experience to actually do it”* (P1).

These comments suggest that the variation in undergraduate oral surgery training directly impacts capability through experiential learning. Early-career and postgraduate training opportunities were also viewed as important in strengthening capability. Foundation training, dental-core training posts (DCT) and continuing professional development were described as valuable routes to building surgical confidence. Participant 3 noted *“I want to do DCT training to be exposed and learn more to make me more confident”*, while participant 9 shared *“I did a course in oral surgery as I wanted to have the confidence in myself”*. These reflections suggest that structured postgraduate training and CPD are key facilitators for bridging the gap left behind by variable undergraduate exposure. Experience within this theme is represented as a

learning process and focuses on how 'doing' consolidates knowing and transforms participants beliefs about their competence. This distinguishes it from the physical capability of 'hands-on' procedures and the psychological capability of emotional confidence.

3 Opportunity - physical

Sub-theme 3.1 – external barriers to in-house treatment

In contrast, structural and economical barriers within the primary care setting frequently acted as extrinsic drivers of referral. The misalignment between remuneration, time and the complexity of the case was particularly salient. Experience within this context is constrained by the barriers such as time, financial structures and clinical resources rather than the ability of confidence of the participant.

Participant 1 explained *"The UDAs don't relate to the time and workload so I am more likely to refer"* and expanded that *"it would be great if you had more time in your diary and more money to do these extractions and be rewarded for your time"*. Similarly participant 2 reflected *"if you need to treat a patient with lots of extractions, it's not feasible with the cost which does play a huge factor"*.

These comments highlight how the organisation of the NHS dental contracts and time pressures in practice create opportunity constraints that discourages practitioners from managing oral surgery cases in primary care.

Sub-theme 3.2 – external factors impairing treatment provision

External factors illustrate how physical opportunity can limit practical experience and skill maintenance such as the COVID-19 pandemic further disrupted clinical exposure. Participant 2 reflected *"I got quite a reasonable amount of experience but observed a lot and had issues with clinical experience due to covid"*. This illustrates how systemic constraints limited the development of procedural skills despite theoretical preparation. Unlike capability related experience this limitation is externally imposed, not self-

determined and demonstrates how system level barriers shape behavioural opportunity.

4. Opportunity – social

Sub-theme 4.1 – confidence related to supervision

A recurrent theme across participants was the importance of supervision during training, particularly within foundation training, in shaping their confidence and willingness to attempt procedures rather than defaulting to referral.

Participants highlighted that working in a “supportive training environment” where supervision was readily accessible encouraged them to attempt more extractions independently before considering referral.

Participant one reflected *“in foundation training I was in a supportive environment, so I tried to do more extractions before referring out”*. The presence of a supervisor provided not only practical oversight but also a psychological safety net, reducing fear of error and allowing them to take on procedures that might otherwise have been avoided.

As participant one noted *“I think that’s where my confidence came from in foundation training.....there was just someone kind of just stood there. But, kind of just there to support me...you know”*.

This sense of being “cushioned” by supervision was echoed by participant 2 who described the reassurance of knowing support was immediately available *“you feel cushioned when doing it (extractions)....and you can get your supervisor in when needed. I think that’s good, gives me the confidence to keep going”*.

Importantly the availability of supervision not only encouraged participants to engage with oral surgery procedures but also enabled them to take more complex cases than they might otherwise have attempted. Participant 4 exemplified *“...I wouldn’t have taken these teeth out but he (the supervisor) is there, and I knew I can get him to help”*.

Supervision functions as both a social resource, giving access to expertise and a contextual enabler by reducing perceived risk and therefore collectively building capability and confidence in oral surgery. Participants highlighted that working in a 'supportive training environment' it encouraged them to attempt more extractions before referring out.

One of the issues relating to this is when practitioners leave training posts and move into independent practice the opportunities for direct supervision diminish which may therefore contribute to reduced confidence and changes in behaviour causing increases in referrals. Experience within this context relates to socialism, and it develops through interactions, mentorship and supervision. These aspects provide the opportunity for transfer of knowledge and also the psychological sense of safety. This differs again from experience in other themes which are individual or structural.

5. Motivation – reflective

Sub-theme 5.1 – feeling anxious and stressed about provision of treatment

Motivation was closely linked to dentists' appraisal of risk, their emotional responses to surgical procedures and their professional identity. For some, the prospect of complications created a powerful deterrent to undertaking extractions. Participant 3 explained "*I don't want to cause more harm than good*", while another reflected "*What it comes down to with them (younger dentists) is confidence and the fear of what the consequences would be*" (P6). Similarly, participant 7 suggested that "*Most people are scared if it goes wrong*".

These reflections highlight how reflective motivation, rooted in risk appraisal and avoidance of adverse outcomes, can increase the likelihood of referral, even where knowledge and skill may be adequate.

6. Motivation – automatic

Sub-theme 6.1 – avoiding risks due to potential consequences

Emotional drivers, particularly fear and stress were also evidenced. For example, participant 1 admitted *“I still do fear them (extractions) but have more confidence when someone is around”*. Anxiety in the clinical setting appeared to heighten referral tendencies, particularly among younger or less experienced practitioners.

In contrast, some participants adopted an approach-orientated mindset, seeking to build capability through challenge. As participant 3 stated *“I’m always keen to give things a go, I try and improve myself”*. Similarly participant 9 reflected on actively pursuing postgraduate education to strengthen their self-confidence. These accounts demonstrate how intrinsic motivational differences can either reinforce avoidance and referral or encourage persistence and skill development.

Generational contrasts also appeared to influence motivation. Some more senior practitioners framed their own approach as more pragmatic and less risk-averse, with participant 8 observing *“the older generation feel it’s ok to have a go.....you just got on with it”*. By contrast younger colleagues were described as more anxious and more likely to refer, with one participant noting, *“because they are afraid or stressed and haven’t had the exposure”* (P8).

Such reflections suggest that broader cultural shifts in education, regulation and patient expectations may have reframed the motivational balance, with fear of adverse consequences playing a greater role in contemporary practice.

Motivation encompassed both reflective and automatic practices. While motivation was influenced by supervision, it was analytically distinct from it. In supervised clinical environments, supervision acted as a contextual enabler that shaped motivational states, rather than constituting motivation itself. Participants described feeling reassured and “cushioned”, which reduced anxiety and fear of negative consequences, thereby enhancing confidence and willingness to engage with OS procedures. This sense of safety which has enhanced confidence creates a positive feedback loop: the more procedures attempted under supervision in independent practice, the more motivated they became to try again. In contrast, the absence of supervision in independent practice altered the motivational landscape.

Taken together, these findings indicate that motivation functions as a critical determinant of referral. Fear, stress, and risk-aversion act as barriers, while growth orientated attitudes and post-graduate learning act as facilitators.

Crucially, these motivational drivers interact with capability; where confidence is low, fear dominates, where confidence is reinforced through training, motivation shifts towards a willingness to manage cases in practice.

The findings across the COM-B model illustrate a dynamic interplay between capability, opportunity and motivation with 'experience' acting as a central yet multifaceted construct whose meaning shifts across the domains. Although 'experience' underpins all themes, its function differs depending on whether it manifests as a skill, a belief, a contextual opportunity or an emotional driver. The interdependence between these elements helps to explain variations in referral behaviour and clinical confidence amongst practitioners.

Discussion

This study demonstrates that confidence is the central mechanism underpinning referral behaviours in oral surgery, acting as both an outcome of experience and determinant of future clinical decisions. Rather than existing in isolation, confidence emerged from the dynamic interplay of capability, opportunity and motivation as outlined by Michie's COM-B (2011) model of behaviour change. Applying this framework enables a more nuanced understanding of referral behaviour, highlighting that decisions to treat or refer are multi-factorial, contextually situated and shaped by both individual and system-level influences rather than purely by clinical competence alone.

Undergraduate oral surgery training consistently emerged as the foundational stage for developing capability. However, participants reported a marked variability in both the quantity and quality of undergraduate exposure, ranging from repeated supervised surgical experience to minimal or predominantly observational involvement. Such variability raises important questions regarding the consistent application of the national undergraduate oral surgery curriculum published in 2008 (Maccluskey 2008). Whilst this curriculum was intended to standardise minimum competence at graduation, participants' accounts suggest that its implementation may be inconsistent across dental schools.

There is limited evidence of systematic evaluation of what has been learnt from its introduction, or how undergraduate OS education has evolved in response to changing service demands, patient complexity and risk culture since its publication. Graduates whose exposure was limited described diminished confidence, heightened anxiety and a lower threshold for referral, whereas those with repeated hands-on experience reported greater technical assurance and psychological readiness. These findings align with Ericcson's (2004) research relating to acquisition of competence through the role of hands-on purposeful learning.

Importantly, participants differentiated between the purpose of UG training and PG training. UG programmes were perceived as establishing baseline competence, ensuring that graduates can undertake procedures, whereas

DFT was viewed as critical phases for scaling experience, consolidating skills and developing confidence within a supervised clinical environment. However, participants questioned the robustness of controls that ensure consistent exposure to OS during their training. Variability in trainer expertise, practice case mix and local commissioning arrangements appear to influence opportunities for experiential learning, suggesting that progression from competence to confidence is not uniformly supported.

Confidence continued to evolve through post-graduate training particularly through DFT and dental core training (DCT), where supervision functioned as both a physical and psychological safety net. These environments encouraged engagement with procedures they may have otherwise avoided, supporting the development of physical capability and psychological resilience. This finding reinforces the notion that confidence is not a static attribute acquired at graduation, but a developmental construct that requires reinforcement across a continuum of training rather than in segmented phases.

The transition to independent practice emerged as a key point of vulnerability. Participants described how, in the absence of readily available supervision, avoidance behaviours could become entrenched. This suggests that confidence may be established more so in postgraduate training than undergraduate training, often in a reactive form rather than a proactive manner. These findings highlight the importance of longitudinal support mechanisms that extend beyond formal training posts, particularly for practitioners delivering level 1 care.

Opportunity played a pivotal role in shaping referral behaviours. Supportive professional environments with access to mentorship, peer support and informal clinical advice fostered greater confidence and willingness to manage OS cases in practice. Within the context of emerging MCNs, participants highlighted the potential for structured support mechanisms such as advice and guidance services, peer review, targeted upskilling and enhanced supervision.

Conversely, systemic NHS constraints significantly restricted opportunity. Time pressures, financial limitations and operational workload were frequently cited as barriers to providing OS care in-house. Participants described how the UDA

model rendered complex surgical cases economically unviable and practically unfeasible, with referral becoming a default rather than a last resort. Within this context, patient pathways were perceived as relatively easy to access, with few perceived consequences for inappropriate referral. This raises questions about whether referral pathways are sufficiently clear and balanced for those delivering level 1 care, or whether ease of referral inadvertently disincentivises skill maintenance and case management in primary care.

Motivation was closely intertwined with confidence and risk perception. Previous adverse experiences, medico-legal concerns and the awareness of potential complications discouraged treatment provision, particularly among less experienced practitioners. Automatic motivation drivers such as stress and anxiety reinforced avoidance behaviours, consistent with broader trends to defensive practice in healthcare. However, a growth orientated mindset was evident in some participants who actively sought further training and viewed complex cases as opportunities for professional development rather than threats.

Generational differences were also apparent and may be understood through the lens of generational theory as applied to healthcare professionals. More experienced GDPs described a pragmatic, less risk averse approach, shaped by longitudinal clinical exposure and evolving professional identity. In contrast, newer graduates reported heightened anxiety, greater sensitivity to risk and stronger medico-legal concerns. These generational differences may influence not only clinical decision making but also expectations of supervision, feedback and institutional support, with implications for how education, training and MCN support structures are designed.

In summary, referral behaviour in OS is shaped by the interaction of capability, opportunity and motivation, with confidence acting as the key mediating factor. Undergraduate training establishes foundational capability, but inconsistencies in exposure risk leaving graduates underprepared. Post-graduate supervision can bolster confidence, yet access is variable and may diminish at precisely the point when practitioners begin independent practice.

Systemic pressures within the NHS further constrain opportunities to deliver OS care, while motivational factors shaped by risk appraisal, professional

culture and generational influences determine whether clinical challenges are embraced or avoided. Collectively, these findings suggest that improving referral behaviour requires coordinated educational, organisational and culture interventions rather than isolated changes at any single stage in training.

Future developments / recommendations

These findings may offer some useful considerations for curriculum design and workforce development which needs to be a multifaceted approach.

Standardisation of clinical exposure

If the views expressed by the participants in this research are reflective of true variation in new graduate competence, more consistency between dental schools may be needed. While simulation, including haptic and digital platforms, can provide rehearsal opportunities for undergraduate dental students, the findings suggest that baseline competence might better be assured through necessitating a minimum level of supervised experience in extractions.

Psychological dimensions of learning

Curricula should be focused and address confidence and motivation in psychological safe environments, allowing students to practice under supervision. Additionally, students should be encouraged to reflect and learn from mistakes, this may help reduce fear-drive avoidance and foster resilience.

Explicit teaching on risk management

Fear of complications was a recurrent barrier. Training should integrate systemic instruction on risk assessment, complication management and uncertainty which would shift risk from a source of anxiety to an area of competence and professional mastery. This aligns with Miller's pyramid with competent performance being the highest goal.

Continuity across the education continuum

Undergraduate training, foundation posts, resident training post and continuing professional development need to be better aligned and focused. This will ensure incremental development from observation to supervised practice to independent autonomous decision making. This will assist with sustaining confidence beyond graduation.

References

- Braun V, Clarke V. 2006. Using thematic analysis in psychology. *Qual Res in Psych* 3(2),77-101
- Buchanan H, Newton JT, Baker SR, Asimakopoulou K. 2021; Adopting the COM-B model and TDF framework in oral and dental research: A narrative review. *Community Dent Oral Epidemiol* 16;49:385-393
- Ericcson E. 2004. Deliberate Practice and Acquisition and Maintenance of Expert Performance in Medicine and Related Domains. *Acad Med*; 79:70-81
- GDC Preparing for practice (2015 revised edition)
[https://www.gdc-uk.org/api/files/Preparing%20for%20Practice%20\(revised%202015\).pdf](https://www.gdc-uk.org/api/files/Preparing%20for%20Practice%20(revised%202015).pdf)
 Accessed February 2019
- Macluskey M, Durham J, Cowan G 2008 UK national curriculum for undergraduate oral surgery subgroup for teaching of the Association of British Academic Oral and Maxillofacial Surgeons *Eur J Dent Educ* 12 2008; 48-58
- Michie S, van Stralen MM, West R. 2011. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science* 6:42
- Moore RJ, Pretty I, Douglas GVA, Mighell AJ. 2023. A Review of 1.75 million referrals over 34 months identifies the disruptive impact of the SARS-CoV-2 pandemic on oral surgery care in Engand. *Br Dent J* 16
- Rosen RK, Gainey M, BNasrin S, Garnern SC, Lantini R, Elshabassi N, Sultana S, Hasnim T, Alam NH, Nelson EJ, Levine AC. 2023. Use of Framework Matrix and Thematic Coding Methods in Qualitaitve Analysis for mHealth: The FluidCalc app. *Int J of Qual Meth*
<https://doi.org/10.1177/16094069231184123>

Chapter 9 – Exploring Foundation Trainers’ Perceptions of Foundation Dentists’ Experiences, Attitudes, Confidence and Behaviours towards Oral Surgery

Introduction

The development of clinical competence in oral surgery among early-career dentists represents a critical component of foundation training and workforce preparedness within primary dental care.

Foundation training which bridges the transition from undergraduate education to independent clinical practice, provides an important environment in which Foundation Dentists (FDs) consolidate both technical and non-technical skills. Within this context, the perceptions and supervisory experiences of foundation trainers (FTs) play a pivotal role in shaping the learning culture, influence clinical confidence and informing patterns of referral for oral surgery procedures.

Understanding the oral surgery behaviours of FDs is essential to ensuring that early-career practitioners develop the necessary competences, confidence and judgement required for safe and effective patient care. FTs who supervise and mentor FDs during their first year of professional practice, are uniquely positioned to observe and evaluate their clinical performance and professional development. Their insights provide a valuable perspective on how newly qualified dentists approach oral surgery, including their clinical skill mix, decision making and referral behaviours.

The transition from undergraduate training to independent practice often highlights variations in graduates’ competence and confidence, particularly in oral surgery; a domain that commonly generates anxiety amongst new practitioners (Ali 2018, Macluskey 2012, Brown 2021)

This study builds directly on the preceding qualitative research undertaken as part of this thesis, which examined the referral behaviours of general dental practitioners to specialist oral surgery services. The earlier component,

informed by the COM-B model identified multifactorial influences on referral behaviour. It highlighted how experiential learning, confidence and perceived risk tolerance shape clinicians' willingness to manage or refer oral surgery cases. It also revealed a recurring theme of 'experience' as both a psychological and physical construct, one that influenced decision making far beyond technical ability alone.

By examining FT's perspectives, this study seeks to extend and contextualise those earlier findings. Whereas the previous qualitative work explored behaviours from the viewpoint of established GDPs, this chapter focuses on those responsible for guiding the earliest stages of professional development. Trainers are uniquely positioned to observe how emerging practitioners negotiate uncertainty, develop procedural confidence and clinical behaviours. Their observations provide complimentary and developmental perspectives to the earlier work, offering insights into how behaviour patterns in oral surgery may begin and evolve during the foundation year.

Aims

The rationale for this component of the research lies in the need to better understand the formative influences on oral surgery decision making and experience amongst FDs.

To analyse Foundation Trainers' perceptions of Foundation Dentists' oral surgery behaviours including skill mix, referral behaviours and perceived overall competence through a qualitative focus-group discussion.

Methods

Study Design

This component of the research adopted a qualitative design, using a single focus group to explore FTs perceptions of FDs oral surgery behaviours. The epistemological positioning is grounded in an interpretivist paradigm, which assumes that knowledge and meaning are socially constructed through experience, interaction and context, rather than existing as an objective, measurable reality. Importantly, this study does not seek to capture or verify FDs referral behaviours, but instead to understand how those behaviours are interpreted, evaluated and made sense of by FTs within the educational and supervisory relationships.

By focusing on FT's accounts, the research adopts a second order interpretive perspective, which participants are asked to reflect on and interpret the practices of another group rather than report on their own behaviour. This epistemological stance is appropriate because this study is concerned with how trainers construct understandings of competence, risk, preparedness and decision making in early career dentists and how these may influence supervision, support and expectations during FT. From an interpretivist standpoint, these interpretations are not treated as objective truths about FDs, but as socially situated meanings shaped by trainers own professional experiences, clinical norms and educational roles.

Consequently, the importance of the data is not in determining whether FTs perceptions of their FDs are objectively correct, instead it is in recognising that their perceptions represent a meaningful reality within the FT context. The beliefs and interpretations held by FTs can influence the feedback they provide, their willingness to intervene and the informal guidance they offer to FDs. These factors may then shape how referral behaviours develop or are learned, supported and managed in practice. An interpretivist epistemological approach is therefore appropriate for this study as it allows exploration of how FTs understand their FDs behaviour within a specific educational and clinical context, rather than seeking to produce a causal explanation or generalisable claim about referral behaviours.

The use of a focus group was chosen to allow the participants the freedom to articulate their perspectives and experiences in their own terms, additionally this enabled interaction and discussion among participants, allowing shared experiences, consensus, and divergence in views to emerge naturally. The approach was consistent with the broader qualitative methodology employed in earlier stages of this research, which sought to explore behavioural determinants in oral surgery decision-making through the lens of the COM-B model (Michie 2011).

Acknowledging my own professional background in OS, education and supervision I recognise the potential for pre-existing assumptions and professional norms to influence the framing of questions, facilitation of discussion and interpretation participants accounts. To manage and make explicit potential bias, as the primary researcher I engaged in ongoing reflexive practice, including the documentation of assumptions at the outset of the study and regular critical reflection during analysis to question how interpretations were shaped. During data collection, open ended questions and neutral facilitation techniques were used to minimise leading responses and allow divergent perspectives to emerge.

Throughout analysis, themes were repeatedly checked against the original transcripts to insure that the interpretations were grounded in participants' accounts rather than my expectations.

Development of the Topic Guide

A topic guide was developed to facilitate discussion while ensuring alignment with the behavioural constructs of capability, opportunity, and motivation. Questions were informed by themes identified in the previous qualitative analysis of GPs referral behaviours. The guide was designed to prompt reflection on GPs preparedness for oral surgery, confidence in performing procedures, and attitudes towards risk, complexity, and referral. Additional prompts encouraged participants to consider how training environments, supervision quality, and perceived expectations influenced observed behaviours. Prior to the focus group, the topic guide was piloted with colleagues within the primary researcher's educational institution to ensure validity and suitability for the focus group. Participants in this group were colleagues with an academic and clinical background in oral surgery who have had direct experience in both provision of primary care oral surgery, onward referral and managing referrals in both level 2 and secondary care.

Participants

Participants were recruited through two main routes: a post in a dentists' private social media group and an email circulated on behalf of the researcher to foundation trainers affiliated with the Yorkshire and Humber Deanery. Inclusion criteria required participants to be currently or recently involved in the supervision and assessment of foundation dentists. Although five trainers expressed interest and consented to participate, only three attended the scheduled focus group. While the sample size was small, a focus group with three participants was deemed to be acceptable to explore the subject area, with the aim of generating rich, descriptive data rather than achieving representativeness.

Data Collection

The focus group took place online via a secure video-conferencing platform (MS Teams™). The discussion lasted approximately 60 minutes and was

recorded with participants' consent. Recordings were transcribed via the software and the primary researcher reviewed and corrected the transcript while listening to the audio to ensure accuracy. The video recording was deleted following transcription to maintain confidentiality. The final transcript was anonymised, with identifiers removed and pseudonyms (P1-3) assigned to participants.

Data Analysis

Reflexive thematic analysis was carried out as described by Braun and Clarke (2020) undertaken following the framework approach previously applied in the earlier qualitative component of this PhD.

Initial coding was carried out by the primary researcher, followed by verification and discussion with two supervisors with expertise in qualitative research. This process aimed to strengthen analytical rigour and minimise interpretative bias. An inductive approach was initially applied, with emerging themes mapped onto the COM-B framework.

Reflexivity

As a clinician with experience in both oral surgery and education, the primary researcher acknowledged potential biases in interpreting participants' views. Reflexivity was maintained throughout data collection and analysis by recognising personal preconceptions, prior experiences as a trainer, and the influence of professional familiarity with the topic. The focus group setting also allowed for a more collective exchange of perspectives, helping to mitigate researcher dominance and ensuring participants' voices guided the direction of the discussion. As the focus group was small, the researcher was very mindful of this.

Ethical Considerations

Ethical approval was obtained via the Dental School Ethics team (DREC - 2025 2420-4169) prior to data collection. Participants provided informed consent and were assured of confidentiality, voluntary participation, and the ability to withdraw at any time without consequence.

Results

Thematic analysis was carried out using COM-B as a structure to identify the themes which emerged from the research. By using COM-B this enabled exploration of how clinical, educational and emotional elements shape FD's oral surgery behaviour and their decision to manage or refer cases.

Overall, a coherent pattern of interrelated themes emerged across COM-B components. FTs consistently described a wide variation in FDs preparedness for oral surgery citing undergraduate inconsistencies and limited procedural experience as barriers to competence. Environmental influences including patient availability, practice setting and trainer expertise shaped learning opportunities. Emotional and psychological dimensions including fear, confidence and evolving professional identity further influences FDs willingness to undertake extractions or surgical procedures. These interacting factors culminated in varied referral behaviours with some FDs demonstrating risk aversion and over referral, whilst others exhibited inappropriate risk take in pursuit of autonomy. FTs viewed these behaviours as developmental, shaped by confidence, supervision and opportunity rather than purely clinical judgement.

Theme	Subtheme	Quotes
Capability	Variation in undergraduate training	<i>"We're seeing a big variation in what they come with. Some can take out a tooth with no issues; others haven't lifted a flap before"</i>
	Skill acquisition and transferability of skills	<i>"They might not have done many extractions, but if they've got good hand skills and respect for the tissues, they can progress quickly"</i>
	Confidence as a mediating construct	<i>"Confidence is the biggest difference between the ones who will give it a go and those who will refer straight away"</i>
	Knowledge vs application	<i>"They have the knowledge behind it, but whether they have treated those patients, I think that's limited:"</i>
Opportunity	Access to cases	<i>"The difference is huge, in some city centre practices you're doing extractions daily, while others might go weeks without one....it's the luck of the draw"</i>
	Mentorship and feedback	<i>"even by the end of the year, they still have relatively limited oral surgery experience. They get better, but it's slow"</i>
Motivation	Emotional responses and fear avoidance	<i>"If they've had a bad one (extraction) early on, that can put them off for weeks."</i>
	Professional growth and identity	<i>"Their attitude often depends on past experiences; if they've enjoyed it before, they lean in, if not, they're hesitant"</i>

1. Capability

1.1 subtheme – variation in undergraduate training

FTs consistently highlighted wide disparities in the exposure of oral surgery to new graduates which they attributed to differences between dental schools and post-pandemic disruption. This variability was perceived to directly affect FDs initial procedural confidence and their readiness to manage surgical cases.

“We’re seeing a big variation in what they come with. Some can take out a tooth with no issues; others haven’t lifted a flap before” (P2)

“The pandemic years definitely set some of them back – they just haven’t had enough time with patients” (P3)

“Some have barely taken any teeth out at Dental School – it’s not their fault, but it really shows early on” (P2)

“Others come in and they’re much more capable and relaxed with surgicals” (P1)

“There is a real variety in their levels of experience and their levels of competence with extractions depending on where they qualified” (P1)

FT’s describe this variability in experience impacting on their supervision levels, intensity and expectations and having to adjust them accordingly with their FD’s on an individual basis, suggesting that capability is strongly determined by prior experiential learning. Participants also described that inconsistency created inequities in development trajectories during their foundation year. FTs described the initial months of foundation training as a ‘levelling period’, where baseline competence is established through supported experience. FTs also discussed the perceived readiness and competence of FDs which they related to the use of quantitative thresholds at undergraduate level, for example

“Back in the day, everything was numbers.....you just didn’t get to sit finals if you hadn’t done a significant amount”.

1.2 sub-theme skill acquisition and transferability of skills

FTs observed that some FDs with limited surgical experience still demonstrated transferable motor skills from restorative or endodontic procedures, facilitating rapid adaption, and that progression through competence in oral surgery was largely experienced-driven. As FDs encountered more extractions and surgical procedures, their technical skills improved alongside their situational judgement. However, some required extended supervision and structured repetition to develop a safe technique.

“They might not have done many extractions, but if they’ve got good hand skills and respect for the tissues, they can progress quickly” (P3)

“They start to realise its pattern recognition – what feels routine, what’s risky, what’s beyond them” (P1).

FTs described the importance of a ‘scaffold’ learning by introducing procedural difficulty as their confidence grew, which essentially mirrors the experiential learning cycle.

1.3 sub-theme - Confidence as a mediating construct

Across the dataset, confidence emerged as the key mediating variable linking capability and behaviour. FTs noted that even technically competent FDs often lacked self-assurance in oral surgery decision making and demonstrated excessive caution.

“Confidence is the biggest difference between the ones who will give it a go and those who will refer straight away” (P2).

In contrast to this, a recurring observation was those FDs who lacked insight into their competence boundaries, often misjudging their competence and overestimating their ability after early successes.

“They often don’t know what they don’t know, some rush in too quickly, others avoid everything that looks even slightly surgical” (P1).

FTs linked both physical and psychological capability and described confidence as both an outcome of experience and a precondition for engagement with more complex procedures.

“They might have the ability, but without confidence, they won’t test it” (P1).

1.4 sub-theme – knowledge versus application

All participants recognised that FDs possess strong theoretical knowledge of oral surgery principles but struggled to apply that knowledge in real-time decision making.

“They have the knowledge behind it, but whether they have treated those patients, I think that’s limited”. (P1)

“They seem to have quite a good understanding of the medical impact, but they need leading through the process”. (P2)

Participants discussed how FDs can often recall guidelines or theoretical management principles but hesitate or misjudge when required to implement them in the clinical setting.

This recurring theme of disconnect between theoretical knowledge and practical application is further demonstrated with P3’s comments:

“They can tell you the theory of flap design, but when faced with a bleeding socket they freeze. It’s about transferring that textbook knowledge into real world decision making” (P3).

FTs also commented that FDs often demonstrated difficulty in anticipating potential complications or adapting techniques intra-operatively, suggesting that they have an underdeveloped situation awareness.

“They go in too deep or not section enough, because they’re focused on the immediate step rather than the bigger picture of tissue handling or patient comfort” (P2).

FTs emphasised that these deficits improved with repeated exposure, structured feedback and guided reflection.

2. Opportunity

2.1 subtheme – access to cases

FTs frequently described the availability of suitable oral surgery cases as a ‘limiting factor’ for experiential learning. FDs in NHS practices with high volumes of patients generally encountered high volumes of extractions, whereas those in mixed or private practices often experienced reduced exposure.

“Some of my trainees get a steady flow of difficult extractions because our list is mostly NHS, but others barely seen any surgical cases because the practice doesn’t have that patient base” P2.

FTs commented that themselves and other colleagues in urban practices serving deprived populations reported high caseloads of complex extractions due to caries and poor oral health, providing richer learning opportunities. Conversely, they described those in more affluent areas with a lower surgical demand resulting in limited case exposure.

“The difference is huge, in some city centre practices you’re doing extractions daily, while others might go weeks without one....it’s the luck of the draw”. (P3).

FTs also discussed that the NHS UDA contract system could directly influence access to oral surgery experience, as those practices with heavy UDA targets or limited appointment times were less able to accommodate slower, supervised procedures for training purposes.

“We’d love to just let them take their time and learn, but when the pressure is on to hit UDAs, it’s difficult to justify spending 40 minutes on a case” (P1).

One FT described how they mitigated such challenges by arranging dedicated surgical sessions or collaborated with their local secondary care unit to facilitate observation or 'hands-on' experience.

"I've arranged for my FD to spend a session in the local hospital oral surgery department; it's the only way they'll get exposure to surgical flaps and bone removal" (P3).

2.2 subtheme – opportunity for mentorship and feedback

A theme which all participants discussed was the need to 'retrain basic skills'. P1 described how early foundation months were spent observing extractions and rebuilding confidence before granting more independence.

"...even by the end of the year, they still have relatively limited oral surgery experience. They get better, but it's slow" (P1).

Participants also reflected on structural mechanisms used to assess and support FDs development through opportunity. P2 described the use of a 'confidence grid' at the start of training followed by direct observation and feedback after initial procedures.

"We always go through the patient list with them, then watch the first extractions like a hawk and give feedback" P2.

Trainers described mentorship as not merely a technical oversight but as an emotional and cultural scaffold which framed learning safety and risk tolerance.

"They need to feel supported to have a go. If they think I'm going to jump in the moment something goes wrong, they'll never pick up the surgical handpiece again" (P2).

Trainers emphasised that a psychologically safe environment was key for developing confidence and autonomy.

"You have to let them make small mistakes and learn, safely of course, but without that they stay paralysed by fear" (P3).

Trainers felt that FDs often mirrored their supervisors' attitudes towards surgery.

"If they see me comfortable and calm doing a surgical extraction, they pick that up. If they sense hesitation or stress, it rubs off" (P3).

3. Motivation

3.1 subtheme – emotional responses and fear avoidance

FTs observed that negative emotional experience, such as difficult extractions or patient distress leads to avoidance behaviour. They also frequently cited anxiety, fear of failure and embarrassment as barriers to attempting procedures.

“If they’ve had a bad one (extraction) early on, that can put them off for weeks” (P2).

“The fear of making a mistake or looking incompetent is real – it can paralyse them”. (P1).

FTs also reflected that some FDs internalised criticism deeply, affecting future behaviour. They felt that constructive, non-judgemental feedback was essential to restore confidence and encourage re-engagement.

“You have to be careful how you phrase things. If feedback feels punitive, they retreat. If it’s supportive, they’ll bounce back” (P3).

3.2 subtheme – professional growth and identity

They also observed that FDs engagement with oral surgery depended on whether they viewed it as an integral part of their professional identity.

“Some see oral surgery as part of being a complete dentist, and they want to be competent at everything. Others just seen it as something they have to get through” (P1).

“Their attitude often depends on past experiences, if they’ve enjoyed it before, they lean in, if not, they’re hesitant” (P2).

Some FTs reflected that FD’s who aspired towards oral surgery or maxillofacial pathways exhibited stronger intrinsic motivation.

“You can tell who’s considering hospital posts – they approach it differently; they want to learn in more detail” (P3).

Discussion

The transition from UG education to clinical practice remains a critical and, at times, a vulnerable phase in professional development. FTs consistently described substantial variation in the procedural capability of FDs, largely attributed to differences in UG curricula and the residual effects of pandemic-related clinical disruption. Such disparity aligns with prior research demonstrating marked inconsistency in undergraduate OS exposure, experience and self-reported confidence across UK dental school (Gabella 2024, Macluskey 2012, Brown 2021). Within the COM-B framework, this variation represents differences in both physical and psychological capability, which subsequently influences FDs' behavioural choices, clinical decision making, and willingness to engage with oral surgery procedures during FT and thereafter.

Importantly, participants also reflected that similar patterns of limited confidence and perceived competence were among qualified GDPs, suggesting that capability gaps established during training may persist into independent practice and continue to shape referral behaviours beyond the foundation years.

Beyond UG preparation, participants highlighted a further layer of variability arising from inconsistencies between FT practices and trainers, with limited standardisation in the delivery, supervision, and progression of OS training. This variability was frequently attributed to differences in trainers' own clinical experience, confidence and scope of practice. As demonstrated in chapter 8, individual experience in OS varies considerably, which in turn shapes the learning environment, case selection, thresholds for intervention and the degree of autonomy afforded to FDs. In the absence of consistent national standards for procedural exposure within FT, learning opportunities may become contingent on individual FTs expertise as opposed to training needs, reinforcing inequalities in capability development. Participants suggested that these trainer-dependent thresholds may normalise higher referral rates within

practices, particularly where GDPs themselves demonstrate limited confidence or routinely refer procedures they perceive as high risk.

FTs described early foundation training as a 'levelling period' reflecting the process of developing procedural competence through experiential learning and supported exposure. This aligns with the experiential learning theory (Kolb, 1984), whereby knowledge is constructed through cycles of experience, reflection, conceptualisation, and active experimentation. However, where FT confidence or experience is limited, opportunities for experiential learning may be constrained, potentially disrupting this developmental cycle and prolonging variability in competence acquisition. Several participants noted that where this experiential consolidation does not occur during FT, GDPs may continue to avoid OS procedures later in practice instead relying on referral as a default strategy for managing uncertainty.

Confidence emerged as a key mediating construct between capability and behaviour, consistent with evidence that self-efficacy is a critical determinant of performance and learning in clinical context (Ali 2022). The 'confidence-gap' observed here, where technically competent individuals remain hesitant to act, illustrates how psychological capability may lag in physical competence. This reinforces the importance of structured feedback and safe supervision. Conversely FTs also identified instances of overconfidence, where limited insight into personal limitations led to unsafe decision making. This was mirrored in discussions of GDP referral patterns, where both under confidence and uncertainty were associated with higher referral volumes, while overconfidence occasionally resulted in delayed or inappropriate referral, highlighting the complex relationship between confidence, competence and patient safety.

Opportunity as conceptualised in the COM-B model encompasses both the environmental and social contexts that enables behaviour. FTs described marked inequalities in access to oral surgery cases, shaped by the demographics of the patient population, NHS contract pressures and variations in local supervision models. These structural constraints echo

broader concerns raised in the literature that the current NHS UDA framework may inadvertently limit learning opportunities for trainees (Brocklehurst 2013). Where opportunities were restricted, FTs described proactive strategies such as liaising with secondary care departments or creating dedicated surgical sessions, thereby illustrating the adaptive responses of trainers to the environmental barriers within opportunity.

Equally, the presence of supportive mentorship and psychological safety was identified as crucial to enabling engagement. FTs described how feedback style, emotional climate and perceived supervisory support directly affected FD's willingness to attempt surgical procedures, therefore reflecting the growing recognition that learning in practice is deeply influenced by workplace culture and relationships (Mann 2007).

Motivation emerged as both an internal driver and an emotional regulator of behaviour. Negative experiences, such as failed extractions, discouraged engagement, while positive reinforcement and 'safe failure' restored engagement. FDs who viewed oral surgery as integral to their professional identity or career aspirations demonstrated greater intrinsic motivation and persistence.

Viewed collectively through the COM-B framework, the findings suggest that FDs' referral behaviours and engagement in OS practice are the emergent outcomes of dynamic interactions between capability, opportunity and motivation. Reduced procedural exposure at UG level constrains both capability and early confidence, while infrequent case access in practice environments limits opportunities for skill consolidation or further development. These constraints are compounded by emotional and motivational factors such as fear of failure or limited professional identity alignment.

The GDC Safe Practitioner Framework (GDC 2023) emphasises that new graduates should demonstrate not only technical competence but also situational awareness, judgement and reflective capacity. This study suggests that while FDs may meet theoretical thresholds for knowledge, their readiness

to enact those competencies in the real-world clinical environment remains variable. FTs narratives underscore the need for more structured and standardised transition mechanisms that integrate mentorship, feedback and graded responsibility across both UG and FT.

In this context, participants identified the Educational Transition Document (ETD) as an underutilised mechanism for enhancing continuity between dental schools and foundation training schemes. A more robust, bidirectional feedback process whereby dental schools provide meaningful contextual information about graduates' clinical exposure, and FTs reciprocally feedback on preparedness gaps, could support more tailored supervision and targeted skill development. By strengthening this interface unmet learning needs can be addressed, a greater alignment between the UG outcomes and FT expectations can be promoted.

Although this study provides rich insights into the behavioural mechanisms influencing FDs' engagement with OS, its scope is limited by the small sample size of three participants. The literature suggests that smaller groups naturally restrict the breadth of perspectives and the potential for data saturation (Guest 2006). As a result of this, consideration should be given to the transferability of these findings to a wide population of FTs or a national context. However, small focus groups can still yield valuable, in-depth data when participants possess substantial expertise and share contextual familiarity. The interactive dynamics of a smaller group can promote open, detailed discussion and reflexive exchange, these are conditions which are particularly conducive to exploring professional reasoning and behavioural constructs with the COM-B framework. Accordingly, this study can be viewed as an initial exploratory phase that provides a conceptual foundation for further qualitative research.

Future iterations of this qualitative research could be strengthened through broader and more purposeful selection to better capture the diversity of GDP referral behaviours. Expanding recruitment to include GDPs from a wider range of practice type, geographic areas, levels of experience and training backgrounds would provide a more representative understanding of the factors

influencing OS referrals. In addition, incorporating focus groups alongside individual interviews could offer further insight by allowing participants to discuss and debate referral behaviours collectively, potentially revealing shared norms, pressures and decision-making processes that may not emerge one-to-one interviews. Focus groups can also help to explore sensitive topics, such as confidence, competence or perceived financial incentives in a dynamic setting where participants may feel more comfortable discussing common challenges (Jordan 2007).

To address the variation in OS referral patterns, enhancement of UG clinical experience in OS is required. This will provide students with more opportunities to manage a wide range of cases, including those with complex needs and management of complications with experienced supervisors allowing UGs to build their confidence and competence before entry into FT. Greater exposure to case assessment and treatment planning in OS will equip graduates to make more informed decisions about which cases can be managed in primary care as opposed to those being referred. The research demonstrated that those lacking in confidence to carry out treatment did feel that they had the underlying knowledge and understanding from an academic perspective. Development of practical clinical skills at an early stage could reduce reliance on level 2 providers and secondary care services, therefore improving patient outcomes and support a more equitable distribution of OS workload amongst GDPs.

However, as discussed earlier, increasing the clinical exposure for UGs is challenging given the already crowded curriculum. Over the years, the Dental Surgery curriculum has incorporated additional subject areas and competences. Whilst these expansions are important, they can inadvertently reduce the time available for hands on clinical experience. This presents a tension between achieving a broad-based education and ensuring sufficient practical training in key clinical areas such as OS. Without dedicated OS time, students may graduate feeling less confidence in manage cases independently, perpetuating the referral patterns seen in this qualitative data set.

Structural and organisation factors within dental school's further influence students' clinical exposure. As discussed, many schools operate with limited on-site facilities or rely heavily on hospital-based clinics which may constrain the number and variety of cases available for student learning. Challenges in partnership with NHS Trusts can limit the scope of UG teaching, however, the use of more outreach-based teaching has proven to be beneficial in some schools. The lack of sufficient academic staff and recruitment into such posts, clinical supervisors and administrative support further restricts the capacity for intensive OS teaching.

For newly qualified GDPs who wish to upskill barriers exist. Opportunities for supervised clinical experience in OS is limited, and there is often minimal structured support to navigate governance and indemnity requirements in practice. Without accessible pathways for continuing professional development, including mentorship and supervised experience with complex cases, GDPs may continue to refer cases they are capable of manage, contributing to high referral volumes.

To address these systemic and education constraints, curriculum design, enhanced outreach placements and an increase in academic support with structured upskilling pathways will be critical to equip GDPs with the confidence and competence required to manage OS effectively in primary care.

References

- Ali K, Tredwin C, Kay E. Slade A. 2018. Transition of new dental graduates into practice: A qualitative study. *Eur J Dent Ed* 22(2), e228-235
- Braun, V. & Clarke, V. (2006). *Using thematic analysis in psychology*. *Qualitative Research in Psychology*, 3(2), 77-101.
- Brocklehurst, P., Tickle, M., Birch, S., et al. (2013). The effect of different contract models on the behaviour of NHS dental practitioners. *British Dental Journal*, 215(9), E16.
- Brown J, Baker R, Moore RJ. 2021. An investigation into the oral surgery curriculum and undergraduate experience in a sample of DFTs in the UK. *Eur J Dent Educ* 25(3)421-434
- GDC 2023 Safe Practitioner Framework – Dentist
https://www.gdc-uk.org/docs/default-source/education-and-cpd/safe-practitioner/spf-dentist.pdf?sfvrsn=c198211d_5
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? *Field Methods*, 18(1), 59–82.
- Jordan J, Lynch U, Moutray M, O'Hagan MT, Orr J, Peake S, Power J. 2007. Using focus groups to research sensitive issues: insights from group interviews on nursing in the northern Ireland troubles. *International Journal of Qualitative Methods* 6(4)1-19
- Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Prentice-Hall.
- Kitzinger J. (1995). Qualitative Research: Introducing focus groups. *BMJ* 311:299
- Macluskey M, Durham J, Bell A, Cowpe J, Crean SJ, Dargue A, Dawson L, Freeman C, Jones J, McDouagh A, McHanwell S, Marley J, Myrddin L, Milsopp L, Oliver R, Renton R, Taylor K, Thomson P. 2012. A national survey of UK final year students' opinion of undergraduate oral surgery teaching. *Eur J Dent Ed* 16:e205-212
- Mann, K., Gordon, J., & MacLeod, A. (2007). Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education*, 16(4), 595–621.
- Michie, S., van Stralen, M. M. & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, 6, 42.

Chapter 10 – Discussion & Conclusion

This thesis set out to explore GDPs' patterns of referral activity to OS, identify the key factors influencing their referral behaviours and highlight key areas for potential intervention. Beyond describing patterns of referral, it also aimed to understand the underlying behaviours and other factors which might shape their referral decisions.

Using an MMR design, the research integrates a large quantitative analysis of data from an electronic referral management system (eRMS) with two qualitative enquires of GDPs and FTs structured around the COM-B behaviour model.

The findings presented in this thesis contribute to a growing body of literature that seeks to bridge the gap between service level data and decision-making behaviours by the clinician. This study has several strengths, it triangulates a large eRMS dataset with theory-informed qualitative enquiry, enabling both description of system-level patterns and exploration of the behavioural mechanisms underpinning referrer decision-making. The MMR design allows quantitative trends to be interpreted through practitioners' accounts thereby giving insight into referral behaviours. The study builds directly on and contributes to the emergent literature using e-referral analytics to inform service planning, commissioning and targeted educational resources.

Qualitative Bias

Within the qualitative component of this study elements of bias may have been introduced and therefore warrant further discussion. Acquiescence bias may have occurred where participants, consciously or unconsciously, agreed with the perceived expectations of the researcher or framed their responses in a manner they believed to be professionally acceptable. This risk may have been heightened during certain sensitive topics, such as financial implications (as discussed later) or referral appropriateness. Social desirability bias may have also influenced participants to underreport behaviours perceived negatively

such as frequent or inappropriate referrals or limited clinical confidence. In addition, selection bias can occur if GPs with a particular interest or strong view on referral behaviours were more likely to participate. Recall bias may further affect the accuracy of self-reported experiences, particularly when reflecting on past training or referral decisions. Collectively such biases may have shaped the findings by moderating the openness, depth or framing of responses and should therefore be considered when interpreting the results. Mitigation of such biases is discussed later.

Primarily, descriptive statistics were used to summarise key variables and this gave an essential overview of the data set allowing for basic comparisons to be made. However, there are several additional statistical approaches that could be applied to further strengthen the research and analysis. Multivariable regression modelling for example would allow for adjustment of confounding variables and provide a greater insight into the independent predictors of referral behaviour. Multilevel modelling could account for clustering effects, such as practitioners nested within regions or practices, thereby improving the accuracy of estimates.

Addition of more advanced statistical methods would enhance the depth of analysis and support a more comprehensive understanding of the factors influencing referral practices.

Mixed methods triangulation

By triangulating quantitative referral data with qualitative insights, this study offers insight into how capability, opportunity, and motivation interact to produce referral behaviours. The quantitative strand of this study analysed two periods of data, the initial data set of 98,761 referrals over a 3-year period in West Yorkshire, followed by a review of 1.75 million referrals in the COVID-19 period all submitted via an eRMS platform, the initial set in West Yorkshire and the second data set across multiple regions in England. This represents the largest evaluation of OS referrals published to date and provides a robust

empirical foundation for understanding referral trends, case mix, and insight into practitioner behaviour.

Quantitative Referral analysis

Pre-pandemic referral volumes averaged approximately 25,500 per month, with a sharp decline during the initial COVID-19 lockdown in March 2020. This was followed by a gradual recovery and a dramatic surge in late 2021, peaking at levels eight times higher than baseline in November 2021. This surge was driven not by a broad increase in referrer numbers but by a concentration of activity among a smaller group of GDPs making significantly more referrals. The dataset does not extend beyond this point, and it is therefore not possible to determine whether then reduction in the last month represents a sustained change in referral behaviour. As this decline is based on a single post-peak observation, it may reflect a transient or spurious fluctuation rather than a true downward trend. Potential explanations include seasons variation in referral activity, particularly towards the end of the calendar year, as well as a temporary reduction following the resolution of accumulated unmet need during the pandemic period. Alternatively, referral rates may be expected to stabilise or plateau as services and patient access normalise post-pandemic. Further longitudinal data would be required to confirm which of these patterns subsequently occurred.

Case mix analysis within the initial quantitative data set revealed a dominance of dentoalveolar procedures, particularly exodontia, which accounted for over 60% of referrals. This is consistent with historical referral studies and national service reviews, including the *Getting It Right First Time* (GIRFT) programme, which has long advocated for the delivery of Level 2 oral surgery outside hospital settings under agreed quality standards (GIRFT, 2018). However, the data also revealed some inefficiencies in triage, with rejection rates rising modestly from 1.5% to 2.7%, and a total rejection proportion of approximately 12%.

The quantitative findings demonstrate that there remain high volumes of OS referrals from GPs to Level 2 providers. As the first data set is limited to a single geographic area the findings may not fully capture a national picture of variation in service configuration, workforce pressures or referral cultures. Despite this, referral numbers were nonetheless substantial. West Yorkshire's population is around 2.4 million and densely populated, this may account for the high number of referrals and there is likely to be considerable variations across the regions of England. Further research is therefore required to determine whether similar patterns exist elsewhere. Limited contextual data was available regarding referrers' practice characteristics, including practice size, type (e.g. single handed, co-operative or community), patient population demographics and whether practices were in areas of relative deprivation.

There was limited insight into the professional backgrounds of referrers, including their prior experience in OS, length of time in post, place of UG training or country of qualification. The analysis of the datasets identified no evidence to suggest that overseas graduates exhibited higher referral rates compared to UK graduates. Across the available data, referral patterns did not demonstrate any consistent or statically significant meaningful associated with the location of undergraduate training. Therefore, within the limitations of the datasets analysed, qualification original does not appear to be a determining factor influencing referral behaviour to OS. These factors are known to influence access to care, clinical thresholds and referral behaviour. Their absences restrict the ability to interpret findings in relation to structure inequalities, and such variables may meaningfully shape confidence, risk tolerance and familiarity with referral systems. Future work would benefit from capture of such information.

Previous studies have reported much smaller volumes of OS referrals within more localised areas of England, highlighting the need for broader, standardised analyses to better understand regional differences and the factors influencing referral behaviours.

A particularly striking finding was the high concentration of referrals among a small subset of practitioners. The analysis of the data in chapter 6 indicates

that 10% of GDPs accounted for 60% of all referrals within the West Yorkshire MCN. This concentration raises important questions regarding the role of oversight and support mechanisms, such as those provided by NHS England. While it might appear that such disproportionate referral patterns warrant intervention, several factors complicate the situation. The underlying reasons for this were not investigated in this study, however the referral patterns may be justified with potential explanatory factors such as practices operating in areas of higher deprivation, large NHS patient volumes or variations in practitioner confidence and competence in undertaking OS procedures.

If NHS England were to address such disparities, questions arise regarding the scope of their authority. While guidance and audit mechanisms exist, NHS England does not routinely have the remit to directly challenge GDPs clinical decision making or competence without formal processes. Any intervention such as targeted training, mentorship or clinical support would also require resources, funding and coordination raising practical barriers to implementation.

Conversely, there are GDPs who contribute very few referrals, and it is unclear whether this reflects optimal management within primary care or under-referral of cases that would benefit from specialist input. Addressing both over and under referral requires a nuanced approach that balances clinical autonomy with the need for equitable access to care and consistent standards, potentially through education, feedback and support.

This highlights the need for further research and potential targeted support, audit, and peer feedback. This observation echoes earlier work in West Yorkshire and Greater Manchester, which documented wide variation in referral rates and quality across practitioners (Halai 2014, Coulthard 2000). The eRMS captures NHS referrals only, excluding private pathways and some medical referrals which may limit generalisability. A small subset of referrals could not be linked to GDC registration, and miscoding (e.g., use of “other” categories) diluted category specificity. Despite these limitations, the overall findings align with existing behavioural, and service led evidence and provide a robust foundation for future, more expansive MMR.

Individual referral insights

Currently, there is a lack of research examining the referral behaviours of individual practitioners, particularly studies that explore referral patterns in relation to practitioner demographics, training background and clinical experience. A granular analysis of this would provide valuable insight into the factors driving high referral activity and therefore enable a more nuanced understanding of variation in practice. Such information could be collected through national OS MCNs allowing them to better integrate and audit their data sets and identify patterns of high referral behaviours. A key subsequent consideration is how high referrers might be effectively supported through targeted education, feedback, and governance processes, to enhance diagnostic accuracy, treatment planning and clinical competence. The combination of such factors would allow optimisation of patient care and referral appropriateness (Simpson 2023, Al-Haboubi 2014).

The impact of COVID-19 on referrals

The COVID-19 data set (Chapter 7) demonstrated a marked increase in OS referrals during and following the pandemic, reflecting reduced access to routine dental care and a backlog of unmet treatment need. Although this data demonstrated a substantial increase in OS referral volumes, this analysis period was confined to the pandemic period and did not extend into the post-COVID recovery phase substantially. Further longitudinal research is therefore required to examine OS referral trends, as discussed above, beyond this period particularly in the context of service restoration, evolving NHS capacity and changes in workforce skill mix. Such work is essential to determine whether the increases observed were transient responses to exceptional system pressures or indicative of a longer-term shift in reliance on secondary care for OS. Additional insight is given into how these dynamics were disrupted and amplified by the COVID-19 pandemic. In doing so, it identifies key areas for discussion relating to intervention design which includes aspects such as

educational, organisational, and systemic policies. Development of an intervention addressing these points could improve referral quality, reduce unwarranted variation, and enhance access to appropriate care thereby improving patient outcomes (Goldthorpe 2018).

Quantitative Limitations

The extrapolation of these findings to other parts of England should be considered with caution, as both GDP and patient populations in Yorkshire may differ in important ways from those elsewhere. Yorkshire is characterised by marked ethnic and social diversity, alongside significant variation in oral health status, including areas of high deprivation with correspondingly great treatment need. These population characteristics may be reflected in the referral data collected, potentially contributing to higher OS referral volumes when compared with more affluent or less diverse regions. Conversely, some parts of England may experience different patterns of disease prevalence, access to care and service configuration. The variation in MCNs across the country is discussed at a later point in this discussion, but these variables could influence referral behaviours which would then be reflected in referral data sets.

This data set does not give insight into demographics of the referring population, of which varying demographics may account for referral behaviours. There is limited published evidence regarding whether GDPs tend to practise in the regions where they graduated, and any assumptions about local workforce retention remain largely anecdotal. This lack of workforce data represents a gap in the literature and introduces uncertainty when interpreting whether local training provision, practitioner experience or population need disproportionality influenced the findings. Yorkshire is the home to two Dental Schools which again may influence or bias the workforce in the area. Missing information on practitioner demographics, patient factors and regional workforce patterns may therefore result in an imbalance within the data and therefore limiting the results being interpreted in a broader context across England.

Qualitative Analysis

The qualitative data revealed that several participants reported referring cases due to a lack of perceived confidence, competence and experience, suggesting that personal limitations were influencing referral behaviour. The high number of OS referrals may indicate that these self-reported barriers directly contribute to elevated referral rates.

Mitigation of bias

In the initial qualitative research (chapter 8), careful consideration was given to the potential of researcher bias. Measures to reduce or mitigate this bias included reflexive practice, careful consideration to the topic guide design and use of an independent researcher. However, it is acknowledged that as an individual my positionality may have influenced how participants framed their responses, particularly when discussing sensitive issues such as remuneration, treatment costs, or perceived financial incentives to refer. GPs may have been reluctant to speak openly about pay-related factors or may have moderated their accounts due to social desirability bias or concerns about professional judgement. As a result, while no clear evidence emerged to suggest that financial gain was a driver for referral, this finding should be interpreted with caution. These limitations highlight the complexity of exploring financially and professionally sensitive topics and underscore the need for complementary research methods, such as anonymised surveys to further interrogate such issues (Silvero 2022).

Qualitative Limitations

The qualitative strand was constrained by a relatively small number of participants. While the analysis demonstrated evidence of conceptual saturation within the dataset, the limited sample size reduces both breadth and of perspectives represented and may underrepresent more marginal or time pressured practitioners. This limitation was compounded by low engagement with the original recruitment advert, which restricted opportunities to expand the sample. Future studies should consider alternative recruitment strategies,

such as targeted invitations via professional networks, collaboration with local dental committees or MCNs or endorsement by commissioning bodies. Framing participation around professional development, service improvement impact, or protected time may also increase engagement.

The concept of confidence

Some GDPs in the qualitative study (Chapter 8) reported that a lack of confidence or perceived competence influenced their decision to refer patients for OS treatment. This was often linked to limited clinical experience, especially among those who graduated in the past 10 years, having fewer opportunities to perform OS procedures during their UG training or in their early careers. In contrast, those GDPs with greater clinical exposure or who had completed more OS procedures as an UG reported higher confidence in managing cases themselves and tended to refer less frequently.

At the heart of the qualitative findings is the concept of confidence. A construct that emerged as the central mediator across the COM-B domains. Confidence, shaped by clinical experience, supervision, systemic support, and perceived risk, was found to be the pivotal factor influencing whether GDPs chose to treat or refer. This insight has profound implications for workforce development, service design, and the future resilience of OS pathways in England.

Some participants commented on the lack of feedback to referrers with regards to rejected referrals. Participants felt if there was a clearer and more effective communication channel between the referrers and providers then inappropriate referrals would decrease. In addition, some participants commented on the lack of clarity of referral criteria therefore causing some confusion as to who and what to refer. This suggests a need for clearer referral categories, improved feedback mechanisms and communication between the referrer and provider with enhanced referrer education and support.

Behavioural Mechanisms: ‘A COM-B Interpretation’

The qualitative component of this study, structured around the COM-B model, provided a rich interpretive lens through which to gain an understanding into the behavioural drivers of referral decisions. Michie et al (2011) COM-B that behaviour is a function of Capability (C), Opportunity (O), and Motivation (M), and this framework proved highly effective in elucidating the complex interplay of factors influencing GDPs’ choices.

Capability, encompassing both clinical skill and psychological readiness, was found to be shaped primarily by the quality and quantity of surgical experience. Participants consistently emphasised the importance of repeated, supervised exposure to OS procedures, particularly during undergraduate and early postgraduate training to allow the development of their confidence and competence. This finding aligns with the literature on deliberate practice, which emphasises structured, feedback-rich learning as the key to expert performance (Ericsson 2008).

Conversely, limited or observational exposure was associated with avoidance behaviour and a tendency to refer even relatively straightforward cases. The transition from supervised training to independent practice emerged as a critical vulnerability point, with many early career dentists reporting anxiety, uncertainty, and a lack of support. These insights suggest that confidence is not merely a function of time served but of the nature and intensity of clinical experience. There is evidence to support this in the medical literature (Monrouxe 2018), and within dentistry Sivarajasingam (2020) showed that there was a perception that new dental graduates lacked the skills to undertake oral surgery procedures.

Financial impact

The core UDA based payment model in England has remained largely unchanged during the period of research with no significant reforms directly targeting referral behaviour were implemented. While the Government and NHS England have published consultation documents and proposed incremental reforms including incentive schemes for urgent care and

adjustments to UDA values for complex treatments, these changes are primarily intended to improve access, remuneration and quality of care rather than regulating the volume or appropriateness of referrals. Opportunity, defined as the external factors that enable or constrain behaviour, was heavily influenced by system design. GDPs described a range of opportunity constraints, including high patient throughput, short appointment times, and the financial disincentives embedded in the Unit of Dental Activity contract.

These factors often made complex exodontia economically and logistically unattractive in primary care, tipping practitioners toward referral as the default option. The observed concentration of referrals among a small proportion of practitioners therefore reflects not only local service provision and patient need, but also a rational response to systemic pressures. This highlights the need for contract reform and review of the funding models within NHS dentistry in England in more detail.

Fear for referral

Motivation, encompassing risk appraisal, anxiety, and professional identity, was shaped by both individual psychology and broader cultural norms. Fear of complications and litigation particularly among early-career dentists was a recurrent theme. This aligns with emerging evidence of defensive dentistry, characterised by avoidance of perceived risky procedures and narrowing scope of practice (Mehta 2025). Such behaviour has implications not only for referral rates but for workforce skill mix, patient pathways, and service sustainability.

Taken together, these findings suggest that confidence built through capability, supported by opportunity, and modulated by motivation is the key determinant of referral behaviour. Capability was reflected in GDPs self-reported clinical competence and knowledge of OS procedures, with those lacking in confidence in complex extractions more likely to refer. Opportunity was shaped by external factors such as the fear of litigation, potential procedural consequences, time pressures and remuneration considerations. Motivation emerged through a sense of professional responsibility, a desire to optimise patient outcomes, and an interest in developing clinical skills.

This insight provides a coherent explanatory model and a practical foundation for intervention.

System-Level Context and Implications

The findings of this study are also relevant within the broader context of dental service design, commissioning, and policy development. The GIRFT report for OMFS explicitly recommends that a substantial volume of dentoalveolar surgery be delivered outside hospital settings within Level 2 services, supported by managed clinical networks (MCNs) and assured standards. The eRMS/MCN model studied here operationalises this ambition, offering a scalable mechanism for triage, data collection, and pathway optimisation (Mongomery-Cranny 2017, GIRFT, 2018).

Implementation studies have demonstrated that e-referral systems, when combined with enhanced primary care capacity, can be effective and acceptable to stakeholders (Goldthorpe 2018). However, they also highlight challenges related to governance, workforce development, and change management. This thesis contributes to this literature by providing empirical evidence of referral patterns, behavioural drivers, and system inefficiencies, and by proposing an outline of a multilevel intervention framework (Appendix 2). While the multi-level intervention framework provides a theory-driven overview of potential intervention and mapped components to COM-B domains, significant further development will be required to align such a proposal with the Medical Research Council (MRC) framework (Skinvington 2021).

The COVID-19 pandemic acted as both a stress test and a catalyst for change. Policy guidance during the pandemic rapidly reconfigured urgent dental care, introducing new standard operating procedures and Urgent Dental Care (UDC) hubs. The data presented in this thesis show the downstream effects: delayed presentations, backlog-related demand, and concentration of referrals among fewer GPs with the rapid increase in oral surgery referrals after lockdown was eased. These findings underscore the need for data-driven recovery strategies such as real time referral monitoring through MCNs or Integrated Care Boards dashboards to track referral volumes, waiting times alongside

predictive modelling to estimate future demand and support workforce and capacity planning. They also emphasise the importance of equity-focused commissioning including targeted support for under-represented practices, flexible commissioning for OS capacity and incentives to re-engage GDPs who may have disengaged from referral pathways during the pandemic. The data demonstrates the importance of resilience-building interventions for any future disruptions, such as escalation pathways for urgent cases, rapid access to specialist advice and the use of scenarios to map workforce planning.

Collectively the use of these approaches may mitigate the consequence of future disruptions, such as a pandemic but also enhance the efficiency of the OS services. This is explored in further detail in the interventions section.

Outline of suggested interventions (see appendix 2)

Based on the findings of this study, a series of pragmatic recommendations can be made for education, system design, and professional culture, these are outlined in the intervention table appendix 2.

Undergraduate Education

The transition from undergraduate dental training into independent clinical practice is accepted as a critical time for newly qualified/foundation dentists' professional development. Despite the collective development of a national UG OS curriculum, its implementation across UK dental schools appears inconsistent. This is reflected in the variable adherence to the curriculum, with the extent of divergence currently unclear. The findings of this study demonstrate marked variation in UG OS curricula, differing levels of clinical exposure between institutions and inconsistent approaches to the assessment of competence. Such inter-school differences in clinical experience and preparedness for practice are commonly reflected in graduates reporting a need for further supported skill consolidation during their foundation year (Al-Yaseen 2024). DFT is intended to consolidate and further develop the core skills that were achieved during UG training. Although the specific developmental needs of individuals will inevitably vary, all will require a period of supported skill consolidation during their first year of independent practice.

However, DFT should not be required to compensate for the absence of core skills which should have been attained at dental school. In the absence of a clearly defined national framework and consistently applied standards across UG programmes, trainee preparedness is frequently judged on anecdote and subjective opinion as opposed to true objective benchmarks.

Due to the levels of care identified in OS and the installation of MCNs this has diverted level 1 cases, which would be suitable for UGs, away from teaching hospitals thereby constraining the clinical exposure and experience that UG students are exposed to, resulting in reduced opportunities for supervised, real patient experience and a lack of opportunity for undergraduates to treat appropriate cases (Halai 2014).

Curriculum review and standardisation of clinical experience

A national review of UG OS curriculum, undertaken with engagement of professional bodies such as ABAOMS, is necessary. This would build on the foundations of the original curriculum (Maccluskey 2008). Implementation of such a national curriculum would aim to standardise minimum clinical requirements and map to the competency domains as outlined by the GDC Safe Practitioner Framework. Therefore, this would establish a common approach to required clinical standards for all students, whilst providing opportunities for able and motivated students to extend and expand their experience, supporting a reliable and consistent transition into independent practice.

However, enhancing clinical exposure in OS within the UG curriculum presents significant challenges, particularly given the traditional alignment between Dental Schools and NHS Trusts. Currently, NHS England Education and Training Tariffs (ETT) are not consistently reflected in the educational provision delivered within the NHS clinical setting, and this can limit the range and complexity of cases available to students. Some universities, such as Bristol and Peninsula have partially addressed this issue by establishing a more autonomous outreach and community-based models of care. This approach allows students to gain exposure to a broader and more representative case mix while mitigating the financial and logistical constraints imposed by hospital-

based funding systems. This strategy improves clinical preparedness allowing students to progress gradually from simulation to patient care in a supportive, real-world context. Evidence suggests that such placements improve preparedness of students and allows consolidation of learning that cannot be replicated in clinical skills labs (Strang 2022).

GDC inspections can influence a university's performance rating, although such assessment may not reflect the operational realities of the Trust, highlighting the complexities of accountability in shared training environments. Inspections of regulated UG programmes leading to GDC registration are placed in the public domain and may impact confidence in a dental school and potentially perception of student's preparedness for registration. Dental schools are required to meet GDC standards irrespective of the strategic and operational challenges faced by partner NHS Trusts, for whom UG dental programmes represent only a fracture of their overall activity. Therefore, the risks and consequences of a poor GDC outcome sit firmly with the School and University.

Educational design should combine advanced high-fidelity simulation and repeated low-stakes workplace-based assessments (WBAs) to allow student to practice procedures, receive structured feedback and demonstrate competence in reproducible environments. Simulation case-based scenarios have been shown to improve student confidence, and systematic use of WBAs such as mini-CEX, direct observation of procedural skills (DOPS) and case-based discussions (CBDs) can provide continuous, formative evidence of progress rather than relying solely on a single high stake's examination. Embedding continuous assessment into curricula both shapes learning and supplies defensible, documented evidence of readiness for practice (Marsen 2022).

Assessment of competence

Assessment frameworks at UG level should prioritise competence over procedural counts which are the norm in many dental schools. Confidence and competence emerged as the dominant mediating factors which act as both a barrier and enable to appropriate referrals. Often these terms are used

interchangeably in clinical education, and they have distinct interrelated constructs which influence each other in important ways. To discuss these in more detail it is vital to have an appreciation and understanding of the two definitions.

Competence within dentistry represents the integration of knowledge, technical ability, professional judgement and ethical awareness which is required to perform clinical tasks safely and effectively to a defined standard. It is not merely a procedural skill, rather the consistent demonstration of capability across cognitive, psychomotor and affective domains that underpin professional practice (Chambers 1993, Cowpe 2010). The GDC (2025) defines competence as “*the ability to apply knowledge, skills and attitudes to deliver safe and effective care*”. The development of competence is dynamic and is shaped by experience, supervision and opportunities for reflection and cannot be reduced to procedural counts or checklists alone which is commonly seen in undergraduate dental schools (Albino 2008, Manogue 2001).

Confidence in contrast, is a subjective belief in one’s own ability to perform a task successful. It is self-perceived rather than objectively verified and reflects how capable a clinician feels, rather than how capable they are (Roland 2015). Confidence can fluctuate depending on prior experiences, feedback and anxiety and situational context. It influences behaviour, particularly the willingness to attempt a procedure, accept responsibility or tolerate uncertainty. Given these features, confidence is a key determinant of clinical decision making (Ali 2014, Gaballah 2023)

Although these two concepts do not always align, a practitioner may be competent but lack confidence which could lead to unnecessary referrals or avoidance of certain procedures; conversely an overconfident but under-competent practitioner may undertake treatments beyond their capability and thereby risk patient safety. In practice, competence determines what a practitioner can do, whereas confidence determines what they are willing to do. This alignment is crucial in the context of this research and clinical practice; when confidence appropriately mirrors competence, practitioners are more

likely to make safe, evidence-based referral decisions that protect both patients and system efficiency.

Workforce and academic capacity must be addressed if curricular improvements are to be delivered equitably. The UK dental workforce faces recruitment and retention pressures that reduce the pool of experienced clinical and academic staff available to teach, supervise and provide additional training. The clinical academic workforce, those who combine teaching, research and patient care is ageing with a substantial proportion of senior staff approaching retirement and too few successors entering the pipeline. This is creating a potential ‘cliff-edge’ that threatens sustainability of high-quality education and research. Dental Schools Council data shows that a significant proportion of clinical academics are aged over 55, and recruitment to research-active academic posts has declined, even as student numbers have increased (DSC 2015). This demographic imbalance complicates efforts to expand clinical exposure in OS within curricula, as many schools struggle to secure sufficient supervision capacity. A recent joint letter from the Dental, Medical and Pharmacy Schools Councils (2025) to government highlighted the critical role of clinical academics in delivering education, research and training, outlining that future NHS workforce plans, including the 2026 NHS Long Term Workforce Plan must recognise and resource these roles if innovations in training and curricula are to be realised. Without targeted interventions, such as ring-fenced academic fellowships, incentives for clinicians to take on educational roles (honorary contracts, sessional funding, CPD credits for supervision) and investment in training the next generation of clinical educators, there is a risk that curriculum ambitions will outstrip capacity and there will be a lack of high quality undergraduate and post-graduate supervision. Regional networks that share specialist supervision (e.g. hub and spoke models for oral surgery training) can partially mitigate local shortages (Evans 2023). Addressing the ageing academic workforce and supporting clinical academic careers is essential if the dental profession is to sustain excellence in education, adapt to evolving service needs, and deliver equitable improvements in training quality.

Referrer – level – interventions – Early Career Clinicians

Referral decisions for FTs, dental core trainees and other early career grade clinicians are often characterised by uncertainty around the complexity of a case, usually due to the lack of clinical exposure and experience. Competence directly informs the clinical decision-making processes that determine with the practitioner will treat or refer the patient.

A competent practitioner not only recognises their technical and cognitive limits but also exercises sound professional judgement in cases which exceed their scope of practice (Chambers 1994). Conversely, perceived or actual deficiencies in practical skills, experience and competence, especially within the oral surgery domains can lead to increase and at times unnecessary referrals to secondary care (Sivarajasingham 2020).

Such findings are consistent with the evidence that newly qualified dentists often report lower confidence and competence in oral surgery cases which prompts high referral rates for cases that might be within their expected level of ability (Ali 2014, Panagiotidou 2024, Brown 2021). Thematic analysis from this research similarly revealed that limited clinical exposure and uncertainty around assessment of case difficulty were key factors influencing referral decision. The consistent development of competence through authentic clinical exposure, structured feedback and competency-based assessment is central to shaping confident, capable practitioners whose referral decisions reflect both safe practice and appropriate use of specialist resources (Chambers 1998).

Intervention – Case Based Learning

Educational interventions for early career grade clinicians should focus on case-based learning to allow clinicians to develop their clinical reasoning skills rather than focusing on a rule-based referral criteria. Not all patients and clinical scenarios fit into the specific referral criteria. Reflective motivation will strengthen individuals through supportive clinical case discussion (Lutz 2016).

Intervention – supported clinical practice attachments

Funded clinical attachments via level 2 providers, experienced educational providers and secondary care supported by the MCN would allow early career grade clinicians to further develop their clinical assessment, diagnostic, treatment planning and skills under expert supervision. Thereby addressing the capability of individuals and improved diagnostic and procedure confidence. There is evidence of such projects in the Yorkshire and Humber Deanery in both Special Care Dentistry and Paediatric Dentistry.

Intervention – post-graduate clinical support

Structured educational support should continue after dental foundation training (DFT) into early career grade years. The existing DFT framework and regional educational supervisor networks are a scaffold to build on, but more systematic access to short, funded remedial modules (e.g. supervised lists in secondary care or level 2 providers, or 1:1 clinical sessions) would reduce risk, reduce referrals and overall improve patient safety where confidence and competence gaps are identified.

Primary care practitioners need timely access to advice and local training pathways where appropriate. Such innovations could include a regional oral surgery rapid access digital network whereby practitioners are able to contact a specialist or level 2 provider for advice in a secure way, supervised sessions to enhance or refresh their skills or more structured didactic courses to allow upskilling. It is essential that referral pathways have an educational feedback loop. Such mechanisms increase patient safety and create apprenticeship-style opportunities for postgraduate learning.

To ensure such educational interventions are successful they must be coupled with robust evaluation. For example, studies relating to the number of clinical requirements to later performance suggest quantity alone is not enough. The quality of supervised experience, feedback and clinical practice needs to be recorded and measured using the workplace-based assessment as described above (Marchan 2023).

In summary, from an educational perspective, addressing the confidence – competence gap may benefit from more consistence and high quality exposure

during undergraduate training, routine workplace-based assessments and documented progression, structured mentorship and remedial pathways to allow experiential learning coupled with a strategic workforce investment and development to grow the educator base and direct access for practitioners to gain clinical advice and support.

Team–Level Interventions for social and professional support

Practitioners in primary care often feel isolated with regards to a decision-making process within a specialty that they are lacking in experience (Stelling 2025). GDPs do not have immediate access to specialist advice and as outlined in the qualitative research rejected referrals without any explanation further undermines GDPs confidence which may then lead to defensive referral behaviours. The professional culture that shapes how GDPs refer patients for oral surgery care is a dynamic interaction between clinical judgement, perceived competence, system design and social norms within the profession. The findings from this research indicate that referral behaviours cannot be understood purely as procedural or administrative acts, rather they represent embedded expressions of professional culture. These behaviours reflect how GDPs interpret their roles within a broader healthcare system.

With regards to professional culture, efforts should be made to promote psychological safety, risk-sharing, and reflective practice. MCNs should host regular morbidity and learning forums to normalise discussion of complications and reduce fear-driven avoidance. Decision support tools such as risk-benefit checklists should be embedded in practice systems to scaffold clinical judgement and improve consistency.

Intervention – peer discussion forums

Local dental networks (LDNs) meet regularly to discuss contractual issues and a range of clinical matters. Introducing a regular session focussed on OS learning led MCN affiliates, could facilitate discussion of complex cases, referral criteria, challenges and any uncertainty within OS. This would support the development of stronger relationships between OS providers and referrers, whilst also enhancing the knowledge and insight of referring practitioners.

Intervention – mentorship schemes

The opportunity for a formal mentorship for early career grade clinicians or those wishing to upskill or review their skill set would provide continuity of professional support and as above, enhance the knowledge and insight of practitioners.

Intervention – access and advice

The availability of MCN-facilitated access platforms would allow clinicians to obtain timely advice and specialist input into patient care. This would help reduce fear or anxiety among referring practitioners by providing reassurance through access to a clear and reliable point of contact.

Organisation and service interface interventions

As described above the lack of transparency in triage decisions and friction between providers and referrers negatively impacts professional relationships and patient experience.

Intervention – feedback

MCNs and RMS should provide structured, supportive feedback to referrers when an inappropriate referral is identified. This creates an opportunity for learning and reflection on referral decision-making, supporting improvement in the quality of future referrals and ultimately enhancing patient outcomes.

Co-produced referral guidance

Service-level referral expectations should be co-produced with referrers, in alignment with national guidelines and evidence-based practice. This approach fosters a shared ownership and accountability for referral decision making.

System and policy level interventions

Findings so far have highlighted not only individual-level factors, such as confidence, clinical experience, and perceived risk but also systemic and environmental influences, including variations in service accessibility, feedback mechanisms, and commissioning structures. To improve referral pathways and address referral behaviours there needs to be improvement and modification of the broader organisation and policy context within oral surgery pathways in England.

A coherent and nationally consistent referral system for oral surgery must address three key areas; firstly, ensuring that patients are managed in the most appropriate setting by clinicians with the appropriate competencies; secondly protecting secondary care capacity for complex, specialist-level work; and thirdly providing transparent, educationally robust pathways that support workforce development and quality assurance. Current evidence indicates substantial unwarranted variation in how oral surgery services are organised, triaged, and commissioned across England. This variation, identified in both national reviews and empirical studies, has significant implications for equity of access, service efficiency, and training opportunities for the future workforce.

Despite clear national guidance, implementation of Level 2 provision has been inconsistent with significant variations in contract procurement and remuneration (Hierons 2017). Accreditation processes, provider assurance frameworks, and commissioning practices vary markedly across regions. Level 2 services require a robust governance framework, and contractual design which reflects case complexity and ensures sustainability.

Some areas have established formal Level 2 oral surgery contracts with transparent referral criteria and tariffs, while others rely on ad-hoc arrangements or continue to route most cases to secondary care. This inconsistency undermines the intended redistribution of workload and has resulted in postcode-based inequities in patient pathways. Moreover, empirical work suggests that local workforce preparedness and access to training are

key determinants of Level 2 uptake, with variation in dentists' self-perceived competence and availability of accredited training programmes.

Existing NHS General Dental Services (GDS) contract models are banded according to treatment type rather than complexity, offering limited incentive for primary care clinicians to manage oral surgery cases. As a result, the economic structure of dental service commissioning may inadvertently drive referrals to secondary care. Evidence from Wales and several English regions has shown that inadequate remuneration in primary care correlates with higher referral rates for routine surgical cases, highlighting the need for payment reform (Hierons 2017).

Several pragmatic service innovations have demonstrated measurable benefits in improving referral quality and appropriateness. Electronic referral and triage platforms, particularly those involving consultant led triage have been shown to reduce unnecessary hospital appointments, redirect appropriate cases to Level 2 providers, and generate cost savings per referral episode (Goldthorpe 2018). These systems are most effective when integrated within regional MCNs that support consistent referral criteria, shared learning, and escalation routes for complex cases. Hub and spoke models aligned with e-triage systems not only enhance operational efficiency but also offer educational value, enabling Level 2 providers to contribute to undergraduate and postgraduate training within local networks.

However, technological and contractual improvements alone are insufficient. The literature highlights the necessity of pairing system reform with workforce development and funding mechanisms that ensure Level 2 services are clinically and financially sustainable. Without a coordinated approach that combines governance, accreditation, data infrastructure, and education, the risk of perpetuating inequity and inefficiency remains high.

Intervention – national referral principles

Development of nationally consistent referral guidelines for OS, including the need for flexible level 1 work within MCNs, teaching hospitals and outreach

facilities allows trainees both UG and PG to develop their skill set therefore reducing inappropriate referrals once they transition into independent practice.

Integrated referral metrics and audit

Routine audit of referral patterns, outcomes and feedback quality would support service improvement as opposed to a focus on performance management and treatment targets.

National complications reporting

A national complication reporting system would provide transparency, shared learning and insight into the service quality and provision across the nation.

Conclusion

This thesis advances the understanding of practitioner referral behaviours in Oral Surgery in England by demonstrating that referral decisions are shaped not merely by individual experience but by a complex interacting system of capability, opportunity, and motivation. Confidence emerges as the dominant mediator, influenced by clinical exposure, systemic support, and perceived medico-legal and patient-related risk.

The quantitative signal of highly concentrated referral activity, together with the post-pandemic surge in demand, highlights both structural vulnerabilities and clearly targetable areas for intervention. In alignment with GIRFT and prior eRMS implementation studies (Goldthorpe 2008), the findings support expansion of Level 2 capacity, enhanced undergraduate and postgraduate educational exposure, standardised referral tools with embedded feedback, and MCN-led mentorship particularly for high-referring practitioners and those working in deprived communities.

Importantly, undertaking this research has led to a significant shift in my own perspective as a clinician, educator and academic. While OS has long been regarded as a core component of dentistry, this work has reinforced my view that OS training should be positioned as a fundamental pillar of UG dental education rather than a skill set variably acquired through experience after graduation. The findings suggest that gaps in confidence and competence often originate early, reflecting limited or inconsistent UG clinical exposure. Consequently, there is a strong argument for refocusing educational effort on improving the quality and range of UG clinical experience, not merely the quantity of procedures completed.

This support should extend seamlessly into foundation training, with structured opportunities to consolidate surgical skills, manage complications, and develop decision-making in supportive environments. Furthermore, the study has strengthened my belief that consideration should be given to mandatory completion of further PG training, such as dental core training to ensure broader and more standardised clinical development of graduates, in a manner more closely aligned with medical PG training pathways. Such an approach

may reduce unwarranted variation in confidence, referral behaviour, and service demand over time and allow individuals to be identified requiring additional support.

The translational impact of this research is already evident. Two peer-reviewed publications arising from this work have, within my geographic region, supported service reconfiguration and informed development of a district general hospital oral surgery service with the appointment of three OS consultants, rather than continuation of an OMFS model. This demonstrates the potential for referral analytics and MMR to directly influence service design and workforce planning.

This work provides a platform for further post-doctoral research. As outlined above, collaboration with ABAOMS is warranted to review the current OS UG curriculum across UK dental schools, examining how it is implemented in practice and how variation in delivery may contribute to downstream confidence and competence issues. From this, there is an opportunity to develop, evaluate and share innovative teaching approaches across institutions, ensuring greater consistency in educational outcomes in the 21st century.

Equally important is a re-examination of how OS competence is assessed. Current reliance in some schools on numerical thresholds of experience, such as extraction counts, may inadequately reflect true clinical competence. Greater emphasis should be placed on students' exposure to the wider of OS practice, including assessment and management of postoperative complications, acute pain, and clinical decision making as well as surgical and non-surgical management.

The development and distribution of OS academic units across the UK requires strategic review. Investment in academic clinical fellowships is essential to cultivate the next generation of academic oral surgeons, ensuring that educational reform, curriculum evaluation, and evidence-based development can be sustained.

In conclusion, this thesis has addressed its aims by systematically examining dental referral behaviours for patients requiring OS care through an integrated mixed-methods approach. The scoping review provided a comprehensive overview of the existing literature, identifying patterns, gaps and areas of variability in referral practices. Quantitative analysis of referral data in England offered objective insight into the volumes of referrals and trends and inconsistencies across settings highlighting the potential inefficiencies in the referral system. The qualitative component enabled a nuanced exploration of the behavioural factors influencing referral decision by GPs. By integrating these findings from both methods, the research has identified key, theoretically informed areas for suggested intervention design, providing an evidence-based foundation for targeted strategies to support appropriate, timely, and effective referral pathways for OS care.

References

- Albino JEN, Young SK, Neumann LM, Kramer GA, Andrieu SC, Henson L, Horn B, Hendricson WD. 2008. Assessing dental students' competence: best practice recommendations in the performance assessment literature and investigation of current practices in predoctoral dental education. *J Dent Educ* 72(12):1405-35
- Ali K, Tredwin C, Kay EJ, Slade A, Pooler J. 2014. Preparedness of dental graduates for foundation training: a qualitative study. *Brit Dent J* 217;145-149
- Al-Haoboubi M, Eliyas S, Briggs PFA, Jones E, Rayan RR, Gallagher JE. 2014. Dentists with extended skills: the challenge of innovation. *Brit Dent J* 217:E6 <https://doi.org/10.1038/sj.bdj.2014.652>
- Al-Yaseen W, Nanjappa S, Jindal-Snape D, Innes N. 2024. New dental graduates transition into UK professional practice; a longitudinal study of changes in perceptions and behaviours through the lens of evidence-based dentistry. *BMC Med Education* <https://doi.org/10.1186/s12909-024-05182-y>
- Brown J, Baker R, Moore RJ. 2020. An investigation into the oral surgery curriculum and undergraduate experience in a sample of DFTs in the UK. *Eur J Dent Educ* 25:421-434
- Chambers DW. 1993. Towards a competency-based curriculum. *J Dent Ed* 57(11):790-3
- Chambers DW. 1998. Competency-based dental education in context. *J Dent Educ* 2:8-13
- Cowpe J, Plasschaert A, Harzer W, Vinkka-Puhakka H, Walmsley AD. 2010. Profile and competences for the graduating European dentist – update 2009 *J Dent Ed* 14(4):193-202
- Ericsson KA (2008). Deliberate practice and acquisition of expert performance: a general overview. *Acad Emerg Med* 15(11):988-94
- Evans D, Burns L, Mills I, Bryce M, Hanks S. 2023. Recruitment and retention in dentistry in the UK: a scoping review to explore the challenges across the UK, with a particular interest in rural and coastal areas. *Brit Dent J* <https://doi.org/10.1038/s41415-022-5406-0>
- Gaballah K, Ali K, Zahra D, Neel EA, Ibrahim. 2023. Perceived confidence of dental students and new graduates in performing tooth extractions – an exploratory study. *Eur J Dent Educ*
- General Dental Council 2025. Guidance on Scope of Practice. <https://www.gdc-uk.org/news-blogs/news/detail/2025/09/16/gdc-publishes-revised-scope-of-practice-guidance>

- Goldthorpe J, Sanders C, Macey R, Gough L, Rogers J, Tickle M, Pretty I. 2018. Exploring implementation of an electronic referral management system and enhanced primary care service for oral surgery: perspectives of patients, providers and practitioners. *BMC Health Ser Res* 18:646
- Halai T, Yates JM. 2014. Assessment of oral surgery referrals from primary care to a regional dental hospital *Oral Surg* 7:168-176
- Hierons RJ, Gerrard G, Jones R. 2017. An investigation into the variability of primary care oral surgery contracts and tariffs in England and Wales (2014/2015). *Brit Dent J* 9;222(11):870-877
- Lutz G, Roling G, Berger B. 2016. Reflective practice and its role in facilitating creative responses to dilemmas within clinical communication – a qualitative analysis. *BMC Med Educ* 301: <https://doi.org/10.1186/s12909-016-0823-x>
- Manogue M, Brown G, Foster H. 2001. Clinical assessment of dental students: values and practices of teachers in restorative dentistry. *Med Educ* 35:364-370
- Marchan SM, Coldero LG, Smith WAJ. 2023. An evaluation of the relationship between clinical requirements and tests of competence in a competency-based curriculum in dentistry. *BMC Med Ed* <https://doi.org/10.1186/s12909-023-04438-3>
- Marsden JE, Deboo SP, Cripps M, Longridge NN, Aspden M, Fox K. 2025. Improving dental student confidence through the use of simulated patient cases *Eur J Dent Ed*
- Medical Schools Council 2025. Urgent intervention needed to address decline in clinical academics. MSC News <https://www.medschools.ac.uk/latest/news/urgent-intervention-needed-to-address-decline-in-clinical-academics/>
- Mehta S, Wassif HS. 2025. Defensive dentistry: perceptions and experiences among general dental practitioners in primary care. *Brit Dent J* Epub <https://onlinelibrary.wiley.com/doi/10.1111/eje.12867>
- Montgomery-Cranny J, Edmonson M, Reid J, Eapen-Simon S, Hegarty AM, Mighell A. 2017. Development of a managed clinical network in oral medicine. *Brit Dent J* 223(9):719-725
- Panagiotidou E, Lillis T, Fotopoulos I, Kalyvas D, Dabarakis N. 2024. Evaluation of Self-Perceived Confidence and Competence in Oral Surgery among Final Year Undergraduate Students in Greece. *Eur J Dent* 18:360-367
- Roland D, Matheson D, Coats T. 2015. A qualitative study of self-evaluation of

junior doctor performance: is perceived 'safeness' a more useful metric than confidence and competence? *BMJ* 5:e008521. doi: 10.1136/bmjopen-2015-008521

Silvero SA, Sheen KS, Bramante, Knighting K, Koops TU, Montgomery E, November L, Soulsby LK, Stevenson JH, Watkins m, Easter A, Sandall J. 2022 Sensitive, Challenging and Difficult Topics: Experiences and Practical Considerations for Qualitative Researchers. *International Journal of Qualitative Methods* 21 <https://doi.org/10.1177/16094069221124739>

Simpson S, Wallace CK, Smith M, Blaylock P, Vance G. 2023. Dentist' preparedness to provide Level 2 services in the North East of England: a mixed methods study. *Brit Dent J* <https://doi.org/10.1038/s41415-023-5569-3>

Strang A, Garshore LM. 2022. Dental students' clinical and academic experience during placement in a UK tertiary care children's hospital. *Eur J Dent Ed* 00:1-6

Stelling H, Brown M, Burford B. 2025. Valuing and retaining the dental workforce: a mixed-methods exploration of workforce sustainability in the North East of England. *BMC Health Serv Res* 26,672 <https://doi.org/10.1186/s12913-025-12803-9>

Appendix 1

INTERVIEW TOPIC GUIDE

Domain	Constructs	Questions	Prompts
1 Capability (Individuals psychological and physical capacity to engage in activity concerned)	Awareness of clinical experience. Ability to make appropriate referral.	How long have you been qualified for? Which country did you graduate from? What oral surgery experience did you gain as an undergraduate student? What oral surgery experience did you gain during your foundation training? Did your oral surgery experience as an undergraduate prepare you for foundation training?	What year did you qualify in dentistry? Did they perform many extractions or other oral surgery procedures at university? May not be UK graduate so not have completed 1 year after graduation.
2 Motivation (Those brain processes that energize and direct behaviour not just goals and conscious decision making. Includes habitual processes, emotional responding as well as analytical decision making)	Ability to gain insight into the reasons for referral and any issues surrounding these.	What are the main reasons you refer patients for oral surgery treatment? Approximately how many patients a month do you refer for oral surgery treatment?	For example, do they have medical issues, are the procedures complex or do they patients require sedation or a general anaesthetic? Consider asking pre-covid and post-covid as this may have changed due to the volume of patients now being seen after the peaks of the pandemic.
3 Opportunity (All factors that lie outside the individual that make the behaviour possible or prompt it).	Discussion of options	What barriers exist for you to treat patients in your own practice requiring oral surgery treatment? What intervention may assist you in reducing the number of referrals and allowing you to	Examples might include time, cost, facilities/equipment. Interventions such as mentoring and courses for individuals, or support from an oral surgeon locally if they have questions or issues.

		carry out more oral surgery in your practice? Are there any other points which you wish to discuss with relevance to primary care oral surgery referrals?	
--	--	---	--

Appendix 2

Multi-level Intervention Framework

A theory driven outline of a multi-level interventional framework to address referral behaviours identified from the research.

Level	Target group	Key problems identified from research <i>(extent unknown)</i>	Intervention components	Mapping to COM-B
0 Pre-qualification	Undergraduate Dental Students	- Lack of clinical experience as UG - Lack of confidence - Variation in experience across Schools	<u>Curriculum Review</u> <i>National OS curriculum review with engagement with ABAOMS</i> <u>Assessment of clinical practice</u> <i>Focus on competence in addition to volume of experience</i> <u>Clinical Experience</u> <i>Universities to develop increase in OS experience in primary care – link with MCNs / Outreach services</i>	<u>Capability</u> <i>Physical experience and psychological confidence</i> <u>Opportunity</u> <i>Physical clinical practice</i> <u>Motivation</u> <i>Reflective learning</i>
1 Referrer Key focus: <i>Capability & reflective motivation</i>	GDPs Dental Core Trainees Early career grade clinicians	- Uncertainty about referral criteria - Lack of competence - Lack of confidence - Lack of experience in OS	<u>Case-based learning modules</u> <i>Focus on referral decision</i> <i>Discussing reasoning not criteria based</i> <i>Understanding reason for referral</i> <u>Clinical Practice</u> <i>Support from OS MCN teams with clinical attachment funded posts</i>	<u>Capability</u> <i>Psychological – improved diagnostic and procedural confidence</i> <u>Motivation</u> <i>Reflective – strengthened professional judgement</i>
2 Team Level Key focus <i>Social opportunity &</i>	Practice Teams Local Professional Dental Networks Mentor relationships	- Isolation in decision-making - When, who and where to refer - Referral rejections with no clear explanation / support	<u>Structured peer discussion forums</u> <i>Local Dental Networks – regular OS sessions</i> <u>Mentorship Schemes</u> <i>Available for early-career grades or those wishing to revise skills</i>	<u>Opportunity</u> <i>Social – access to advice and support</i> <u>Motivation</u> <i>Automatic – reduction in concerns of referral</i>

<i>automatic motivation</i>			<u>Advice & Guidance</u> <i>MCN members available for support via digital means prior to referral</i>	
3 Organisation / Service Interface Key focus <i>Physical opportunity and Motivation</i>	Oral Surgery Services (MCNs and L2) Referral management Centres NHS Trusts	- Referral rejection which undermines confidence and lack of support - Friction between referrers and providers - Lack of clarity with regards to referral decision making process - Patient impact	<u>Structured referral feedback from triagers</u> <i>Not a binary rejection or acceptance</i> <u>Supportive feedback with advice</u> <i>Building working relationships between care teams</i> <u>Clear service-level referral expectations</u> <i>Co-production of guidance with referrers</i>	Opportunity <i>Physical – clearer objectives and processes/systems</i> Motivation <i>Reflective – reframe rejection as learning</i>
4 System / Policy Level Key focus <i>Opportunity and motivation</i>	NHS England Integrated Care Boards Commissioners	- Variability in referral pathways across England - Misalignment between commissioning signals and clinical confidence - Emphasis on demand and treatment targets as opposed to patient care and clinical development	<u>National referral principles for OS</u> <i>Modification to accept L1 work in teaching facilities and in line with current guidelines</i> <u>Integration of referral metrics</u> <i>Audit processes to allow service evaluation and improvement methods</i> <u>Complications reporting system</u> <i>Allowing national database and local insight into local providers and provision of care</i>	Opportunity <i>Physical ensuring consistent pathways</i> <u>Motivation</u> <i>Reflection – development of shared responsibilities</i>