# Shared decision-making in orthodontics: the clinician's perspective

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## iii. Abstract

**Background:** Shared decision-making (SDM) in orthodontics is not carried out as well as it could be. Orthodontic clinicians are key stakeholders in instigating and facilitating the SDM process. Capturing information about clinicians' experiences and their perceptions regarding what might make SDM encounters easier or more challenging could help to identify interventions aimed at improving the SDM processes.

**Aim:** To examine orthodontic clinicians' perspectives and experiences of decision-making encounters with people.

**Design:** Cross-sectional survey using an online questionnaire.

**Participants:** Orthodontic consultants, specialty trainees, specialists and dentists with a special interest in orthodontics.

**Method:** Potential participants were invited through the British Orthodontic Society via email. The validated iSHARE questionnaire was used to capture clinicians' perspectives of SDM by reflecting on a previous patient encounter of their choosing. The theoretical domains framework (TDF) was used to analyse free text responses regarding barriers and facilitators to engaging in SDM.

**Results:** 122 unique responses revealed that clinicians felt they engaged most in highlighting choice awareness, explaining the differences between treatment options, and giving the patient enough time to make a decision. The least frequently reported SDM practices were patient-related: patients asking questions about treatment, stating their values and weighing up the advantages and disadvantages of treatment. Commonly reported barriers to SDM were a lack of time, uncertainty around treatment outcomes, and patients' ability to understand information. Commonly reported facilitators included patients taking an active role in the SDM process, having enough time, and using/having access to resources which support information-giving.

**Conclusions:** Clinicians' perception of their engagement in SDM in orthodontic consultations varies. This research highlights potential areas to target when designing interventions aimed at improving SDM in orthodontics.

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# 1. Introduction

The purpose of this thesis is to help address the issue of a lack of implementation of shared decision-making (SDM) in orthodontics by exploring clinicians' perspectives on the topic, to what degree they feel they engage in SDM, and what they perceive the barriers and facilitators to it are.  The findings can be used to develop interventions aimed at improving SDM in orthodontics.

# 2. **Literature Review**

This chapter describes shared decision-making (SDM) in the context of the dental specialty of orthodontics, identifies gaps in the scientific literature and describes how this study endeavours to provide new knowledge.

## 2.1 Shared decision-making

### 2.1.1 What shared decision-making is, and what it is not

Shared decision-making (SDM) is the process of communication between the patient and the healthcare professional when making decisions between different treatment options. There is no single agreed definition or model of how to undertake shared-decision-making, but the process of SDM is generally regarded as the meeting of two experts:

1. The clinician who is the expert on the best available evidence, the treatment options available, their pros and cons, risks and benefits
2. The patient who is the expert of their own preferences, values and beliefs, personal circumstances, attitudes towards risk and illness.

Both parties use this information and accept joint responsibility for the decision that is made by two-way information sharing and reaching a decision together (Coulter and Collins, 2011; (NICE), 2021). Due to its proven benefits, it is the way the NHS and professional bodies advocate non-emergency decision-making (England, 2023a).

Since SDM shares features with, but is distinct from, the process of informed consent (Barber, 2019; Kunneman and Montori, 2017), it is important that clinicians understand the key differences between the two concepts to ensure integration of SDM into current practice. SDM focuses on improving communication between people and professionals by encouraging information-sharing and deliberation by both parties so they can agree which option best meets peoples' needs. Arguably, the interaction involved in SDM requires a "human connection of careful and kind care", and informed consent can be more one-directional information sharing by the clinician which fulfils the legal and administrative requirements for undertaking a medical procedure on a patient. Within SDM there is emphasis on the process of deciding between treatment options available, whereas informed consent can occur once the decision has been made (Kunneman and Montori, 2017).

It has been argued that SDM is best used when there is clinical equipoise about treatment options which makes the decision more sensitive to personal preferences (Elwyn, 2010).

However, others argue that this is overly restrictive as there are more circumstances where SDM can be applied, including:

- Multiple options are available regardless of clinical equipoise or the decision is preference-sensitive
- Uncertainty regarding difficulty applying available evidence to the individual
- Where trade-offs exist e.g. advantages and disadvantages of cancer screening
- High impact decisions which may lead to major impact on health or quality of life
- Patient commitment required e.g. physiotherapy for chronic pain

(van der Horst *et al.*, 2023).

Elwyn *et al.*, (2023) also discussed some potential limitations of SDM:

- When the interest of the wider population is put at risk e.g. a patient requesting antibiotics for a virus will have no benefit and may contribute to antibiotic resistance.
- Insufficient scientific evidence e.g. when a patient expresses a strong preference for a particular treatment modality for which there is little to no evidence of benefit. This option may cause harm or represent an indefensible use of resources.
- When the scientific evidence or clinical guidelines points to one option being clearly superior over another. Clinicians may feel the need to follow the guidelines strictly for fear of being under scrutiny if they choose the "inferior" option.
- At national policy-level, some countries may not offer certain treatments due to cost. Similarly, some screening may be legally mandatory e.g. newborn screening.
- SDM cannot be applied when patients' ability to make decisions is impaired e.g. under the influence of drugs/alcohol, evidence of cognitive impairment, and loss of consciousness.
- Even if people are deemed to have the capacity to make decisions, they may need more time and opportunity when under stress, or there is vast and complex information to process. Healthcare professionals must take care not to overestimate a person's ability to absorb information.
- In the face of clinical uncertainty and unpredictable outcomes, SDM can be difficult for clinicians to engage in. E.g. treatments for incurable lung cancer which are aimed at delaying its progression may result in painful side-effects whilst not prolonging life by much, if at all. Such patients may have lowered decisional capacity due to intense feelings of fear and so, involving them in the decision could damage their health. (Elwyn *et al.*, 2023)

The NICE (National Institute for Health and Care Excellence) guidelines on SDM clearly outline how it should be introduced and carried out ((NICE), 2021). Skilled communication which may utilise several tools and techniques is required to support information-sharing, risk communication and deliberation about options. However, there are still challenges with implementation in clinical practice. We must first understand these challenges before identifying which decisions require the most support and how to support both clinicians and people accessing healthcare.

SDM is an integral part of the overarching aim of delivering person-centred care (PCC). The term PCC was an attempt to shift medical professionals' and healthcare systems' focus from medical problems, illnesses, diagnoses and treatment plans back to the people and their families at the centre of them. The emphasis of PCC should be to increase peoples' understanding of their medical problem and address the *person's* needs rather than that of the clinician/institution. This is achieved by respecting and understanding peoples' values, preferences and needs. SDM takes consultations where choosing options is taking place, to the next level of patient-centredness by explicitly presenting more than one option to the patient, stimulating them to consider all of the options and invites people and clinicians to deliberate together on what is best (Kunneman and Montori, 2017).

The Picker Institute described 8 characteristics of care as the best indicators of quality and safety according to people and their families. They found that care must:

1. Respect for peoples' values, preferences and expressed needs
2. Coordinated and integrated care
3. High quality information and education for the patient and their relatives.
4. Physical comfort, including pain management.
5. Emotional support and alleviation of fear and anxiety
6. Involvement of family and friends
7. Continuity and transition of care
8. Access to care (Barry and Edgman-Levitan, 2012).

In orthodontics, a study conducted at the Eastman Dental Hospital showed that both patients and clinicians report high engagement in patient-centredness (Amin *et al.*, 2020). However, this study was undertaken in a single unit with a research interest in patient centred care and clinicians in this unit may be more familiar with implementing SDM into day-to-day practice than those in other units.

### 2.1.2 Traditional decision-making models versus shared decision-making

When there is a decision to be made about treatment there are various perspectives to consider. Clinicians are expected to have the appropriate level of knowledge and skills to diagnose and offer suitable treatments in line with best available evidence. However, it is imperative that the patient is at the centre of the decision-making process as they are the person who will be undergoing tests and treatment and experiencing the sequelae of the decision made (Ratliff *et al.*, 1999).

Traditionally in healthcare, when a choice is to be made about treatment, multiple models of decision-making have been described. Widely recognised models include:

- Paternalistic
- Informed decision-making
- Professional-as-agent

There is some overlap of these models, and all are problematic in that they do not encapsulate a truly shared decision between clinician and patient.

The paternalistic model assumes that the patient plays a passive role, limited to providing consent, and depends on clinicians to make the decision on their behalf as the expert in diagnosing the problem and choosing the “best” option in their opinion. The clinician may provide limited information but encourages the patient to choose what the clinician feels is best. In contrast, in the informed model, the clinician recognises they have greater knowledge than the patient about the medical problem and treatment options. For the patient to overcome this “information deficit”, they must be informed by the clinician of treatment options, their effectiveness, pros and cons. In this model, once the patient is armed with the information, they can make the decision based on their new-found knowledge and preferences. However, this model means that the decision may not be shared, as clinicians’ preferences are not necessarily considered. The professional-as-agent model is almost the mirror image of the informed model. Again, the clinician recognises the imbalance in information and knowledge between themselves and the patient. However, in this model, the clinician has shared information with the patient, may or may not have elicited the patient’s preferences, then takes on the role of “agent” in assuming they know what is best for the patient without testing their assumption. The *clinician* is the sole decision-maker (Charles, Gafni and Whelan, 1997).

### 2.1.3 Shared decision-making models

Since the initial conceptualisation of SDM, there have been many different suggestions as to how best to implement SDM, and a multitude of models produced as a result.

A systematic review from 2019 analysed shared decision-making models published in the literature in order to identify which components of SDM occurred most frequently and which components were most important depending on the healthcare setting (Bomhof-Roordink *et al.*, 2019). 40 decision making models were identified and 24 overarching components were formed based on the data.

The most frequently mentioned components were:

- Describe treatment options (88%): a list of treatment options with the advantages and disadvantages of each being described. The feasibility of each option and current evidence should also be discussed.
- Make the decision (75%): A decision is reached or explicitly deferred and a record of this should be made. The patient has authority over the decision and any deferred decisions are revisited.
- Patient preferences (68%): patient values, preferences, concerns and goals for treatment are elicited.
- Tailor information (65%): the patient is asked how they would prefer to receive the information e.g. written, verbal etc. The patient's understanding is checked and there is an individualised approach to delivering the information. Jargon is avoided and clear language used.
- Deliberate (58%): deliberation involves careful discussion and negotiation.
- Create choice awareness (55%): this involves making the need for a decision to be made clear and explicit when there is more than one option which has not been shown to be superior to another (clinical equipoise).
- Learn about the patient (55%): as well as clarifying whether the patient has understood the information, it is important to learn about their values and beliefs in relation to the treatment options.
- Reach mutual agreement (35%): both the clinician and the patient come to the same decision together.

The remaining 16 components were: healthcare professional expertise, patient expertise, support the decision-making process, advocate patient views, prepare, offer time, provide information, provide neutral information, provide recommendation, healthcare professional preferences, gather support and expertise, determine roles in the decision-making process, set agenda, foster partnership, patient questions and determine next step.

### 2.1.4 Importance and limitations of shared decision-making

SDM is an ethical and legal imperative for good reason. Decisions about a person's health can have life-changing consequences and so no decision should be made about a patient without them (Ward *et al.*, 2020). Effective shared decision-making is currently not carried out as well or as consistently as it should be and evidence shows that people are currently less involved in their care than they would like to be (Chewning *et al.*, 2012).

Evidence shows that people who are more involved in decisions about their care have better outcomes (Shay and Lafata, 2015). As well as being beneficial to people, it is important to commissioners as it can lead to more consistent practice (Coulter and Collins, 2011).

### 2.1.5 Barriers and facilitators to shared decision-making

Workforce attitudes, skills, behaviours, systems and processes need to change before SDM is more easily integrated into practice. Suggestions for how to make SDM a reality are:

- Nationwide development and provision of decision aids
- Development of common and consistent approaches to delivering healthcare
- Identifying common points in care pathways where decisions are likely to be made
- Specific training on shared decision-making with incentivisation
- Better support, recording and provision of shared decision-making by clinicians
- For commissioning standards and contracts to include shared decision-making

(Coulter and Collins, 2011)

One of the widely cited barriers to the widespread implementation of shared decision-making is the attitudes of clinicians towards it. For each barrier stated, there is evidence to the contrary.

- "I already do it"

Clinicians and nurses often think they are implementing shared decision-making to a greater extent than their patients do. Although informed consent is the aim of most clinicians before invasive treatment, people are not always invited to communicate their values and preferences nor given complete information about treatment, alternatives, advantages and disadvantages. This may be due to a historic culture of medical paternalism. (Coulter and Collins, 2011; Coulter *et al.*, 2011; Légaré and Thompson-Leduc, 2014)

- "People do not want it"

Most people *do* want to be involved in making decisions about their own care. They would like to be cared for by clinicians they trust and who treat them holistically. Most people would like more information than they are given about diseases and treatments, benefits, risks and side effects. Furthermore, people have expressed disappointment in lack of opportunity to participate in decisions about care (Coulter and Collins, 2011; Légaré and Thompson-Leduc, 2014).

- “It is not appropriate for those with low health literacy”

Health literacy has been defined as *“the degree to which individuals can obtain, process, understand, and communicate about health-related information needed to make informed health decisions”*(Berkman, Davis and McCormack, 2010). Those who come from less privileged backgrounds have the most to gain. Shared decision-making is for everyone, not just those from well-educated backgrounds. Although evidence shows those with lower health literacy do tend to allow clinicians to make decisions for them, it has been proven that it is possible to involve people from different backgrounds in healthcare decisions especially when reinforced by well-designed information materials and the clinicians involved have received good training on how to support people with making decisions. Such people may lack knowledge about health and thus not feel comfortable expressing their views. It is important that staff members do not use this as an opportunity to make decisions for the patient which can further push these people into a more passive role rather than active partners in reaching the decision (Légaré and Thompson-Leduc, 2014)(Coulter and Collins, 2011).

- “People will want inappropriate/expensive treatments”

There is a misconception that if given all treatment options, people will choose the most expensive. Trials involving decision aids have shown that people are generally risk-averse compared to the professionals treating them, therefore when properly informed about treatment options, risks, benefits and alternatives, they tend to opt for the least invasive therapies and treatments where they can manage themselves e.g. through improving their diet and exercising more (Coulter and Collins, 2011).

- “There is no time to do it”

Clinicians feel that shared decision-making consultations take longer than those where the clinician makes the decision. Although the initial consultation may take longer, engaging the patient and discussing potential treatment in future can reduce the overall time spent discussing treatment with people who then have more questions since they are unhappy with the treatment undertaken and were less involved than they would have liked to be in the first instance. It is recommended that clinical pathways be restructured to incorporate time for information provision and good shared decision-making practices (Légaré and Thompson-Leduc, 2014; Coulter and Collins, 2011).

- “It is irrelevant and ineffective”

There are multiple studies which show the benefits of shared decision-making which are:

- People developing greater knowledge and understanding about their own health
- More accurate perceptions of risk
- Feeling more comfortable making decisions
- Greater participation in making decisions
- Fewer people choosing more invasive surgery
- Better compliance and adherence to treatment once it has been chosen
- Greater confidence and coping skills
- Improved health behaviours
- More appropriate use of services (Coulter and Collins, 2011).

- “There’s no incentive to do it”

Since people who are better-informed through SDM tend to opt for less invasive treatments or no treatment at all, there is an argument that in systems where clinicians are rewarded for activity, this would be a disincentive to engage in SDM. However, people should be receiving no less than the care they need and no more than the care they want. Therefore, it is essential that clinical systems and pathways incorporate rewards for engaging in good and effective SDM. To achieve this, a method of measuring and monitoring SDM would need to be implemented. It has been proposed that the quality of a decision depends on the extent to which the treatment or management decision reflects the considered preferences and values of well-informed people (Coulter and Collins, 2011).

According to the King’s fund, some key aspects to measure are:

1. How informed the patient was about the key knowledge a person should have before starting a specific treatment option, medical test, self-management programme or behaviour change.
2. The extent to which the decision was personalised to reflect the patient’s preferences, values and goals.
3. The extent to which clinician informed and involved the patient in the decision process

(Coulter and Collins, 2011).

A systematic review conducted in 2008 of health professionals’ perceptions to implementing SDM in clinical practice showed that the most widely cited facilitators were:

- Motivation of health professionals.
- The perception that implementing SDM into clinical practice will lead to improved patient outcomes and health care processes (Légaré *et al.*, 2008).

### 2.1.6 Resources aimed at facilitating the shared decision-making process

To help clinicians make decisions about treatment, there are many clinical guidelines and clinical reasoning tools available to help support their decision-making. However, these are not designed for patient use. When discussing treatment options with a patient, ideally the clinician would use the best quality evidence available whilst presenting potential outcomes, risks and uncertainties. This vast amount of information can be challenging for clinicians to deliver verbally in a busy clinical setting where time is limited. This is where decision aids (DAs) can be incredibly useful (Coulter and Collins, 2011).

Decision support tools e.g. decision aids and decision coaching are aimed at helping people make better decisions about their care ((NICE), 2021). These are designed to be used at decision points in non-emergency care. Examples of decision points in the wider healthcare setting are whether or not to undergo a diagnostic test or undergo a medical procedure. Decision points may be reached in a number of different settings e.g. during a scheduled appointment, on a hospital ward or even at a patient’s home. Decision aids support shared decision-making between the patient and clinician by explicitly naming treatment, care and support options. They must include clear and easily understandable information which is presented without bias. They also provide information about the risks, benefits and advantages and disadvantages of different treatment options to help people decide which would suit them best. One way in which they can be used is for people to take a DA home so that they have time to consider and evaluate the information before returning to finalise their decision with the clinician. Not only are they based on evidence, like clinical guidelines, they aim to stimulate the patient to consider how different treatment options might affect them personally and to form an *informed* preference.

A systematic review of patient decision aids in 209 trials across healthcare found that they increased knowledge, supported a better understanding of risk, improved congruence between choice and values, facilitated greater patient participation and reduced the number of people who were unable to reach a decision (Stacey *et al.*, 2024). Evidence-based decision aids also result in a more suitable match between people’ preferences and treatments chosen, leading to greater patient satisfaction with treatment. These more engaged or “active” people are therefore better prepared to make informed and personally tailored decisions about their care, make healthier lifestyle choices and are more likely to adhere to treatment, they are better at managing chronic conditions themselves and less likely to access healthcare inappropriately. People at lower levels of “activation” will tend to rely on clinicians to make decisions on their behalf and if professionals do not encourage their active involvement, they will remain at a low level of activation. Such people, if not involved in conversations about their care by the clinician may assume their views and opinions are irrelevant and are less likely to express them in future (Coulter and Collins, 2011).

The most widely cited decision support tools are patient decision aids. However, decision support involves much more than providing a patient with a DA. Clinicians need to understand what the individual person who is to receive treatment needs to make a decision and provide them with the best support for that decision.

It is important to note that decision aids do *not:*

- Replace a detailed conversation with a clinician – they exist to facilitate and enhance the decision-making consultation
- Tell people which treatment to have
- Prioritise one option over another
- Aim to influence decisions people make
  (England, 2023b)

## 2.2 Orthodontics

### 2.2.1 Malocclusion and its impact

Occlusion describes the arrangement and position of teeth in the upper jaw (maxilla) and lower jaw (mandible) in contact in their usual position. To understand what malocclusion is, it is first necessary to understand what is considered an “ideal occlusion”. An ideal occlusion is where the teeth are in the optimum anatomical position within each jaw and when they meet (Littlewood and Mitchell, 2019). A “normal occlusion” is one which is within accepted deviation from ideal and does not cause functional and aesthetic issues (Houston, Stephens and Tulley, 1992).

“Malocclusion” is not a disease state *per se* but can be defined as a noticeable deviation from ideal that may be considered functionally or aesthetically unsatisfactory. There is a spectrum of severity of malocclusions from mild to severe (Cobourne and DiBiase, 2015).

Malocclusion may have detrimental effects on dental health, psychological wellbeing, and social wellbeing (Dimberg *et al.*, 2016; Zhang, McGrath and Hägg, 2006) . A systematic review undertaken in 2014 showed that there is a modest association between a person’s malocclusion/orthodontic need and quality of life (Liu, McGrath and Hägg, 2009). However, the evidence on whether misalignment of teeth results in a greater risk of periodontitis due to them being more difficult to clean remains unclear (Addy *et al.*, 1988).

### 2.2.2 Orthodontic treatment

Orthodontics is a specialty within dentistry which involves managing and treating malocclusions.

Prior to undertaking orthodontic treatment, it is imperative that a risk-benefit analysis is undertaken to ensure treatment is justified. Overall, orthodontic treatment has been shown to have a small but positive effect on quality of life (Zhou *et al.*, 2014). The psychosocial benefits of orthodontic treatment are widely cited by clinicians (Hunt *et al.*, 2001). Additionally, it has been shown that orthodontic treatment can reduce the risk of dental trauma in those with prominent upper front teeth (Batista *et al.*, 2018).

The following benefits are also widely cited but have weak evidence behind them:

- Improvements in masticatory (chewing) efficiency (Kobayashi *et al.*, 2001; van den Braber *et al.*, 2004)
- Facilitation of oral hygiene after crowded teeth are aligned (Addy *et al.*, 1988) and therefore resistance to dental decay and gum disease (Hunt *et al.*, 2001)
- Improvement in speech (Hassan, Naini and Gill, 2007)
- Prevention or cure of temporomandibular joint dysfunction (Hunt *et al.*, 2001; Cobourne and DiBiase, 2015)

The common risks are enamel demineralisation, gum disease, root resorption (Travess, Roberts-Harry and Sandy, 2004), treatment failure in the form of relapse of tooth positions (Little, 1999; Littlewood, Kandasamy and Huang, 2017).

People with dental crowding often require dental extractions which carry additional risks. People may require general anaesthesia to uncover or remove buried teeth before they can have orthodontic treatment. General anaesthesia carries risks of morbidity and even death (Roberts *et al.*, 2020).

Premature tooth loss can sometimes occur as a result of root resorption caused by orthodontics. This can affect the function and aesthetics of the dentition which can have significant negative consequences for people (Weltman *et al.*, 2010). Some rarer complications include loss of tooth vitality due to the effect of orthodontic forces on the dental vasculature i.e. inflammation and dental pulp ischaemia (Cobourne and DiBiase, 2015; Travess, Roberts-Harry and Sandy, 2004) . Loss of tooth vitality reduces the prognosis of teeth significantly (Kato *et al.*, 2021) as the patient would then either require a root canal treatment or removal of the tooth to avoid potential pain and infection.

In 1986 in the UK, the Report of the Committee of Enquiry into Unnecessary Dental Treatment was published after an investigation was conducted in response to concerns that people were receiving poor or unnecessary dental treatment. Orthodontic treatment formed part of this investigation and it was confirmed that people were be treated in high volumes and receiving poor standard treatment (Britain and Schanschieff, 1986). As a result, the Index of Orthodontic Treatment Need (IOTN) was developed to avoid unnecessary treatment of mild cases. However, in more recent years is used to allocate limited NHS funding for orthodontic treatment by governments fairly and transparently to prioritise those who would benefit most (Cobourne and DiBiase, 2015).

### 2.2.3 Need versus demand and inequity in orthodontics

In the UK, orthodontic treatment provided by the National Health Service (NHS) is limited to those with moderate to severe malocclusions due to limited government subsidisation. In order to be deemed as eligible, one must be below the age of 18 at the time of referral and be above a certain threshold on the IOTN. Limitations of the IOTN are that it does not take into account the individual's view on their requirement for orthodontic treatment (perceived need), nor their expressed need (when a person turns their perceived need into action by seeking care)(Cure, 2019). Further criticisms of the IOTN are that its scores can be subjective and often do not match lay peoples' views on what needs to be treated (Hunt *et al.*, 2002).

It is a contractual requirement for orthodontic providers to use the IOTN so that acceptance of people for NHS orthodontics is justified. However, in many areas there is a lack of contracted treatment to meet need and demand which then leads to elongated waiting lists due to a lack of availability. Inappropriate referrals to secondary care have also contributed to increased waiting list times for orthodontic treatment in the hospital setting (England, 2015). Those who would prefer not to wait for NHS orthodontic treatment can seek private treatment but not all people have the means to do so which also raises the issue of inequity. There is no robust data available from practices providing private orthodontic care to be able to quantify whether NHS waiting lists are affected by the provision of private orthodontics.

It is estimated that the prevalence of moderate-severe malocclusions in adolescents, who make up the majority of NHS orthodontic patients, is 40-50% (Littlewood and Mitchell, 2019). Adults can receive NHS orthodontic treatment but only in the hospital setting if they have certain complex treatment needs such as jaw (orthognathic) surgery in combination with orthodontics to correct their malocclusion (England, 2015).

There is inequity in access to orthodontic care (Morris and Landes, 2006; Breistein and Burden, 1998; Price *et al.*, 2017; Drugan *et al.*, 2007). This is related to the fact that there is also inequity in access to general primary dental care; in order to receive specialist dental care such as orthodontics, people must be able to readily access a general dental practitioner who can make the onward referral to specialist services. Access to orthodontic care for those who need it is reliant on effective use of the primary dental care system such as dentists reducing recall periods for stable people with healthy mouths to free up capacity to assess and treat new people and those who are in greater need of dental treatment. Recent guidelines have been published to help solve these issues through commissioning (England, 2015).

### 2.2.4 Provision of orthodontic treatment in the United Kingdom

In the UK, orthodontic treatment is provided by:

- Specialist orthodontists
- Consultant orthodontists
- Specialty trainees (dentists training to be specialists or consultants)
- Dentists with a special interest in orthodontics
- General dental practitioners

Specialist orthodontists are qualified dentists who have pursued further training to become specialists in orthodontics, completing three years' full-time training and passing the Membership in Orthodontics (MOrth) examination managed by the Royal Colleges of Surgeons. Consultant orthodontists are specialists who have undertaken a further two years of full-time post-certificate of completion of specialty training (post-CCST).

Dentists with a special interest (DWSI) in orthodontics are general dentists who have pursued further training in orthodontics but did not undertake formal specialty training. They are formally recognised by commissioners of orthodontics known as local area teams and can undertake some simpler orthodontic treatments. Furthermore, general dental practitioners, who would not classify themselves as DWSIs, are increasingly providing short courses of orthodontic treatment on a private basis for people who request simple alignment of teeth (England, 2015).

NHS Orthodontic treatment can be accessed in primary care or secondary care. Primary care orthodontics is carried out in "high street" orthodontic practices or in general dental practices by specialists or DWSIs in orthodontics. Secondary care orthodontics is carried out in dental teaching hospitals or district general hospitals under supervision of a consultant orthodontist.

Simpler orthodontic cases are treated in primary care. Examples include crowded teeth, increased overjet, crossbites, mild hypodontia (1 or 2 congenitally missing teeth) and single impacted teeth. More complex orthodontic cases are usually carried out in secondary care. These cases include: people requiring interdisciplinary care i.e. the input of multiple types of dental specialists (e.g. orthognathic jaw surgery/craniofacial abnormality/cleft lip and palate cases, hypodontia cases, people with multiple impacted teeth etc.), and people with additional needs.

People that want and qualify for NHS orthodontic treatment via the IOTN are usually referred by their general dental practitioner to either primary or secondary care based on complexity. General dental practitioners are often the gatekeepers for orthodontic referral and so referring to the appropriate institution at the right time is key to managing waiting lists and ensuring people receive best care (England, 2015).

Different secondary care institutions may have varying acceptance criteria, and some may take on some simpler cases to help train specialty trainees in orthodontics.

### 2.2.5 Shared decision-making in orthodontics

In orthodontics, for any given malocclusion, there are usually several feasible treatment options, including not undertaking any treatment and accepting the malocclusion. There are risks, benefits and consequences associated with each of the treatment options which is why it is important that clinicians work with people to help them understand the options and identify the right treatment for that particular person.

As well as the above clinical and commissioning factors determining who should or can have orthodontic treatment, ultimately it is the patient who, if accepted for treatment by a practitioner, then decides whether they wish to proceed with treatment and which treatment option to pursue. Increasingly, professional bodies and governments advocate the use of SDM when it comes to making healthcare decisions. Figure 1 outlines the NHS orthodontic pathway and decision points within it. This study will focus on the clinician’s perspective on the decision-making encounter.

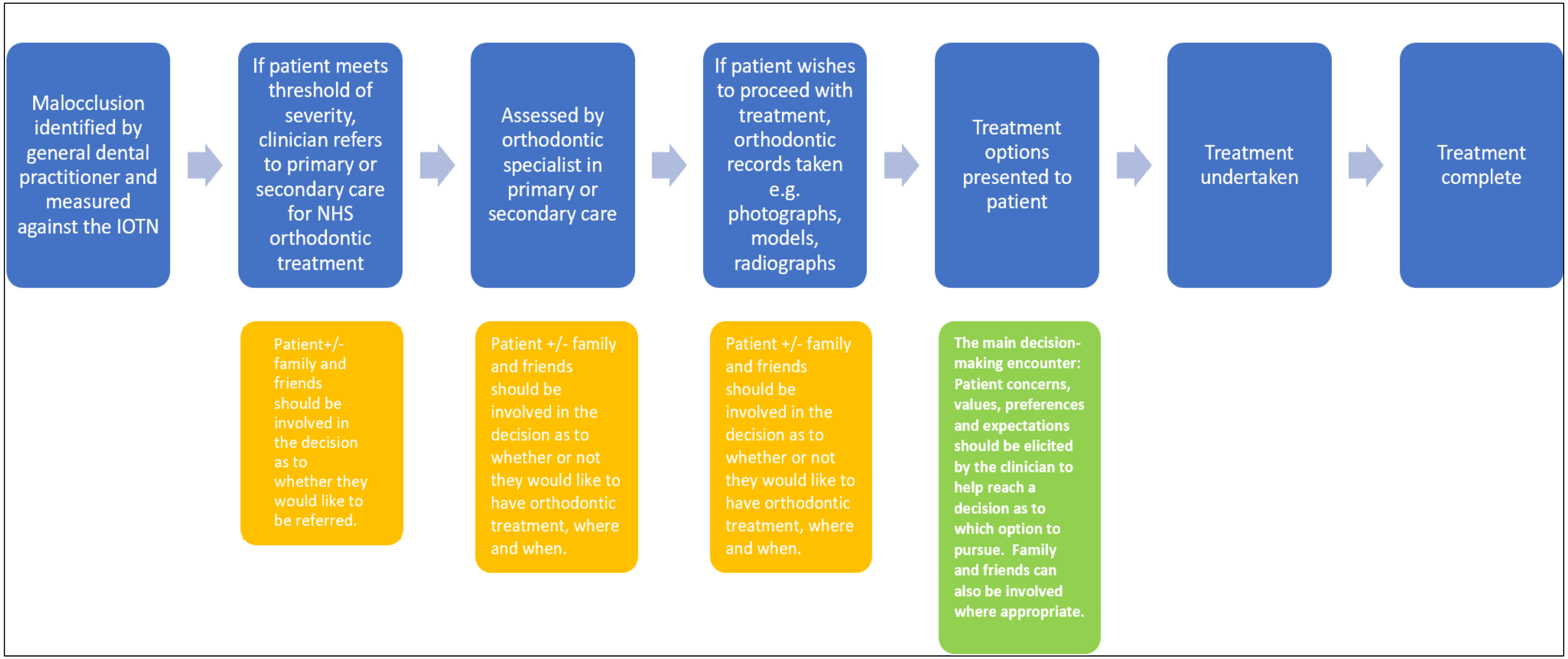


**Figure 1. The NHS orthodontic pathway and decision points.**

**<u>Key:</u>**

- ***Blue:*** The NHS orthodontic pathway
- ***Yellow:*** Decision point and patient involvement
- ***Green:*** Decision point being studied in this research

Many people undergoing orthodontic treatment are under 16, so parents/guardians have an important role to play in decision-making. Previous studies have shown that parents can be a help or a hindrance to the SDM process depending on their influence on the consultation (Kovshoff *et al.*, 2012; Hayes *et al.*, 2019; Tam-Seto and Versnel, 2015). It is important to note that age should not be considered a barrier to involving patients in decisions about their care (Alderson, 2017; Alderson, Sutcliffe and Curtis, 2006; Sutcliffe *et al.*, 2004).

Despite growing emphasis on patient involvement in care decisions, there is evidence that SDM is not yet the standard approach taken in choosing orthodontic treatment. A cross-sectional survey in 2007 involving orthognathic patients in Yorkshire found that some people were not making informed decisions about treatment and had unmet needs regarding support with decision-making (Stirling *et al.*, 2007).

An evaluation of the hypodontia dental care pathway (treatment for people born with missing teeth) found challenges in supporting SDM due to low patient involvement, clinicians' limited awareness of and training in SDM, absence of support tools and organisational barriers. Furthermore, adolescents and their parents showed a lack of knowledge about hypodontia and its treatment, and their role in SDM (Barber *et al.*, 2019a).

A study on clinician and adult patient perspectives of patient-centredness in the clinical encounter showed that discussions of: personal/family issues affecting the patient's health, respective patient and clinician roles and exploring how manageable treatment would be for people were perceived to be practised least (Amin *et al.*, 2020).

A paper by Bekker *et al*. in 2010 described how current information in orthodontics, both written and verbal, do not aid people's decisions about treatment nor their adherence to it. There is a lack of evidence regarding *how* people interpret information about orthodontic issues and treatment options as well as how parents make decisions about their child's treatment. In addition, there is no research on how people's need for information may change over the course of their treatment (Bekker, Luther and Buchanan, 2010).

### 2.3 Rationale for the study

Although some aspects of SDM are used routinely, we know from the literature that it is not wholly being implemented in orthodontics and the existing evidence raises important questions:

- Why are certain stages of shared decision making not routinely undertaken and what can be done to address this?
- When is the best time to offer decision support?
- Which components of decision support tools are effective?
- How can decision support tools promote equity in orthodontic treatment provision?
- How would decision support tools feasibly fit into existing clinical pathways?

This research will use a questionnaire to explore orthodontic clinicians' perspectives including barriers and facilitators to engaging in SDM to better understand the challenges of decision-making in orthodontics. This information is fundamental for identifying the components of complex interventions and/or mechanisms of change that will enhance decision-making about orthodontic treatment.

## 2.4 Justification for methodology

### 2.4.1 Use of a survey

Before taking steps to improve and facilitate shared decision-making in orthodontics, it is important to capture all stakeholder views. Clinicians are generally responsible for initiating and guiding SDM during the consultation and capturing clinicians' views first allows for an understanding of current practice and delivery. Subsequent stages could then involve researching the views of the patient and their family and friends as well as observations of the consultations themselves.

Surveys are generally recommended when the research aims to explore general trends in people's opinions, experiences and behaviour and are useful for finding small amounts of information from larger numbers of people. This may allow the research to make a general claim from its findings. Interviews on the other hand, are useful for finding in-depth information for specific people (Driscoll, 2011). They are particularly helpful for finding out participants' perspectives and experiences. Interviews can also provide the opportunity to find out reasons behind the statements given (Fitzpatrick and Boulton, 1994) and could be used for respondent validation to clarify answers given in questionnaires where there may not have been time for the participant to explain their answer at the time.

An alternative method of capturing clinicians' perspectives on and experience of SDM are interviews. Interviews allow for finding out in-depth information from participants so these could be used for follow-on research after the general trends have been found from this research.

Another method of determining the levels of SDM taking place in orthodontic decision-making consultations is to observe them taking place. This could help determine if clinicians' reported levels of SDM are the same as perceived by an observer and/or the patient. However, again, this would only allow a small number of consultations to be researched within the confines of a masters project during the COVID-19 pandemic and this project aims to get general sense of SDM in orthodontic across the country.

Since orthodontic clinicians are the group of interest for this study the primary researcher decided it would be best to gain a general overview of orthodontic clinicians' perceptions and experiences of SDM and then, plan to explore subtopics in more depth with interviews in a separate follow-on study. An online survey could be used to ask clinicians about their knowledge and perspectives on SDM, what they feel the barriers and facilitators are to engaging in SDM with patients are whilst referring to a specific consultation in recent memory, and whether they had had any specific training on SDM. The benefit of using an online survey over a postal one is the ease of sending the response by clicking a button rather than having to physically use a post box thus the response rates are more likely to be greater. There are also the advantages of faster distribution to a wide population and lower associated costs (Wright, 2005).

### 2.4.2 How to measure shared decision-making

Shared decision-making as a concept can be interpreted differently by various people and there is no single, agreed-upon definition in the literature. This suggests that there are differing arguments for how best to measure it and what makes a "good decision" which is why various SDM models exist.

It has been argued that explicitly defining behaviours which prescribe how to engage in SDM is controversial since there is no single route to do it well. A standardised, highly prescriptive instructional checklist of steps to follow for SDM across all consultations would not allow for the differences in clinician and patient behaviour, thought processes and relationships. Instead of such specific behavioural directives, it would be better to agree on some essential principles that should be incorporated into every decision-making consultation. Examples of this are that people' preferences for degree of participation in the decision should be elicited and respected as well as how they want the decision-making process to ensue. People' wishes should always be respected and followed by clinicians (Charles, Gafni and Whelan, 1997).

Different aspects of decision-making can be measured (Elwyn and Miron-Shatz, 2010):

- Execution of process
- Satisfaction with process
- The actual decision itself
- Satisfaction with decision

- The health outcome

SDM can also be measured from different perspectives i.e. that of the patient, the clinician or an outside observer (Gärtner *et al.*, 2018). Table 1 shows tools which have been developed to measure SDM from the clinicians' perspective.

**Table 1. Summary of available tools which measure SDM from the clinician's perspective**

| Name of tool | What is being measured | Structure | Previous applications |
|---|---|---|---|
| **Ican questionnaire** | Clinicians' perceptions of their ability to adopt SDM | 8-item questionnaire using a visual analogue scale ranging from 0 (strongly disagree) to 10 (strongly agree) | Primary care (Giguere *et al.*, 2020) |
| **iSHARE (physician) questionnaire** | Clinician behaviour and patient behaviour from the clinician's perspective during a decision-making consultation | 16-item questionnaire using a 6-point unbalanced scale (not at all to completely) | Oncology (Bomhof-Roordink *et al.*, 2020), respiratory medicine |
| **MAPPIN'SDM doctor questionnaire** | Clinician behaviour and perceptions of SDM (Kasper *et al.*, 2012) | 15-item questionnaire using a 5-point scale to assess the clinician's perception of the decision-making consultation and their own behaviour (not at all to absolutely true) | Anaesthesia, dental medicine, oncology, surgery, stroke, multiple sclerosis, radiation, general practice (Forner *et al.*, 2022) |
| **OPTION clinician questionnaire** | How much healthcare professionals involve patients in decision-making processes (Melbourne *et al.*, 2010) | 12-item questionnaire using a 4-point scale (strongly agree to strongly disagree) | Mental health (Pilling *et al.*, 2022), dentistry (Keshtgar *et al.*, 2021), primary care (Ford *et al.*, 2019), physical therapy(Dierckx *et al.*, 2013). |
| **SDM-Q-Doc** | The physician's perspective during SDM processes in clinical encounters (Scholl *et al.*, 2012) | 9-item questionnaire using a 6-point scale ranging from completely disagree to completely agree | Anaesthesia (Stubenrouch *et al.*, 2017), oncology (Nakayama *et al.*, 2020), surgery (Santema *et al.*, 2016) |

#### 2.4.2.1 What makes a good decision

A series of short essays by a range of experts from differing clinical backgrounds described what they believe makes a decision "good" or "bad". Although the content of the essays differed, with some offering opinions and others offering highly prescriptive methods of how to ensure a "good" decision is made, they agreed that judging a decision by its outcome is not advisable. Due to the role of chance, a bad outcome could result no matter the quality of the decision-making process and conversely, an excellent outcome could result from a careless decision (Ratliff *et al.*, 1999).

Elwyn proposed that the decision-making process should be judged in two separate phases; the pre-decisional phase which is named the “deliberation” phase, and second phase which is actually choosing a treatment option, the “determination” phase. If the deliberation phase is executed well, it is hypothesised that the “determination” phase that follows will also be of good quality. Furthermore, commonalities between articles in the literature which describe what makes a good decision are:

1. The patient being well-informed and having adequate knowledge on the choice to be made.
2. That the decision made is in harmony with the patient’s views, attitudes, beliefs and preferences.

These are features which constitute “shared decision-making” (SDM). In the clinical environment, SDM is becoming increasingly recognised in medicine as it becomes more prominent in healthcare policy. This is due to the fact that there is often not enough scientific evidence to determine clear superiority between treatment options and this uncertainty points to the fact that people’ individual preferences need to be determined to help make better decisions about treatment(Elwyn and Miron-Shatz, 2010).

Since much of the literature agrees that if the pre-decisional phase of shared decision-making is carried out well, good patient outcomes will follow, the purpose of this study was to assess the execution of the process of SDM from the orthodontic clinician’s perspective in order to find areas of “strongest” and “weakest” SDM practice.

### 2.4.3 Use of the validated iSHARE questionnaire

In 2022, Bomhof-Roordink *et al* published a paper describing the development and assessment of their SDM measuring instruments, the iSHARE questionnaires. The authors explained that they developed the iSHARE as a solution to issues found with existing instruments in the literature. Many popular instruments only assess the behaviour of the healthcare professional and not the patient (e.g. OPTION and CollaboRATE). Others do not assess the patient’s behaviour independently from the clinician’s behaviour (SDM-Q-9 and SDM-Q-doc) which means the patient’s role in the decision-making consultation cannot fully be assessed. There are two questionnaires: the iSHARE physician questionnaire is designed to be completed from the clinician’s perspective and the patient questionnaire from the patient’s perspective to allow for collection and comparison of each party’s viewpoint independently. They also state that the iSHARE questionnaires are based on a clear definition of the construct of SDM and that they can thoroughly assess the process of SDM both inside and outside consultations.

The iSHARE questionnaire is made up of 16 items and captures information about 5 SDM constructs:

1. Choice awareness: (items 8 and 9)
2. Medical information: (items 1-7)
3. Preferences: (items 10 and 13)
4. Deliberation: (items 11 and 14)
5. Time for deliberation: (item 12)
6. Preferences: (items 15 or 16)

The authors used the iSHARE to assess levels of SDM after unique oncology consultations where there was a decision to be made regarding either beginning, ending or forgoing curative or palliative treatment. A summative score out of 100 is calculated and a higher score is indicative of greater levels of SDM taking place. The questionnaires have been shown to have good construct validity and test-retest agreement and moderate inter-rater agreement. In the oncology study, high levels of SDM were recorded on the iSHARE by both clinicians and patients.

This study will utilise the iSHARE because within the realms of a Masters project undertaken over the COVID-19 pandemic it was not feasible to have a researcher observe live consultations on clinic and have questionnaires measuring SDM completed by all three parties. Instead, a questionnaire measuring orthodontic clinicians' perspectives has been developed and the clinician version of the iSHARE gives some insight as to how the patient responded during the decision-making consultation via items 7, 13, 14 and 15 (Bomhof-Roordink *et al.*, 2020). Other SDM questionnaires designed for clinicians to complete do not provide such insight (SDM-Q-Doc, OPTION, CollaboRATE). The MAPPIN'SDM tool does give some indication of the clinician's perceptions of the patient's knowledge and understanding but the researcher felt these questions could cause the respondent to become uncertain about the answers to give as they may not feel that they could read the patient's mind to be able to answer confidently. The iSHARE clinician questionnaire asks explicitly about behaviour that the patient displayed during the decision-making consultation and therefore the questions would be easier for clinicians to answer as they are less subjective. The primary researcher also felt that the language used in the MAPPIN'SDM questionnaire was verbose and confusing compared to the iSHARE and was thus deemed to be more user-friendly and less likely to lead to attrition of respondents.

The Ican SDM questionnaire is useful for measuring clinicians' ability to adopt SDM (Giguere *et al.*, 2020). Although this may have been useful in the context of this research, the primary researcher felt that this asked attitudinal questions about SDM generally and it has already been found that orthodontic practitioners have good attitudes towards SDM (Barber, Ryan and Cunningham, 2020). Thus, it was felt to be more beneficial to ask respondents to choose a specific clinical encounter which they found to be interesting or challenging and use the iSHARE questionnaire to find out to what extent they engaged in SDM during a "real-life" consultation rather than their attitudes towards it. However, despite good attitudes, there is still a lack of SDM occurring in orthodontics (Barber *et al.*, 2019a; Barber, 2019b; Barber, Ryan and Cunningham, 2020) and healthcare in general. It is the barriers to engaging in and implementing SDM despite good intentions that are of particular interest so that these can be addressed and facilitate greater levels of SDM in orthodontics.

### 2.4.4 Methods of measuring behaviour

For current shared decision-making practices to improve, the behaviour of both individuals and organisations needs to change. Before behaviour changes can be made, factors which influence behaviour change must first be identified in the context that they occur. The results of these investigations can then be used to guide intervention design. There are many theories in existence about behaviour and how to change it. Therefore, choosing which theories to use in developing interventions aimed at changing behaviours is a difficult task. To solve this issue a group of behavioural scientists and implementation researchers collaborated to form the Theoretical Domains Framework (TDF) to make the theories more accessible to those working in implementation. The framework was developed using 128 theoretical constructs from 33 theories considered to be the most relevant to questions about implementation. The TDF aids identification of factors that influence behaviour but does not attempt to provide causality about the determinants of a behaviour in a specified circumstance. It is a validated tool which has since been applied across a range of diverse healthcare settings and behaviours (Atkins *et al.*, 2017).

Existing behavioural *theories* propose testable hypotheses between variables and resultantly provide an overt statement of the processes hypothesised to control human behaviour and changes in behaviour. The *theoretical domains framework* (TDF) does not deliver definite and testable hypotheses about determinants of a behaviour but is a tool which can be used to determine the affective, cognitive, environmental and social influences on behaviour. Previous systematic reviews undertaken to change practice have only quoted low numbers of studies using behavioural theory to investigate implementation problems in the first place, or to aid intervention design. The TDF has thus far been cited in over 800 peer reviewed publications, for instance investigating the barriers and enablers to effective interprofessional team working in the operating room (Etherington *et al.*, 2021). The TDF has also been used to investigate patient behaviours e.g. increasing physical activity in children with motor impairments (Kolehmainen *et al.*, 2011). There are 14 domains within the TDF; knowledge, skills, social/professional identity, beliefs about capabilities, optimism, beliefs about consequences, reinforcement, intentions, goals, memory attention and decision processes, environmental context and resources, social influences, emotion and behavioural regulation.

Once the data have been collected, the TDF is used to develop a framework for content analysis. For the purposes of this research, the TDF will be used to identify influences on behaviours by exploring barriers and facilitators to implementing shared decision-making behaviours.

The 14 domains of the TDF underpin the COM-B model or behaviour. The "COM" stands for capability, opportunity and motivation which interact with each other to form the "B" which stands for behaviour i.e. for a person to behave in a certain way, they need to have the capability, opportunity and motivation to do so. For example, capability can be linked to the TDF domains of knowledge, skills behavioural regulation, and memory, attention, and decision processes. The connection between the TDF and COM-B is then used to identify intervention functions, policy categories and behaviour change techniques to remedy the issues identified, see Figure 2 (Atkins *et al.*, 2017).

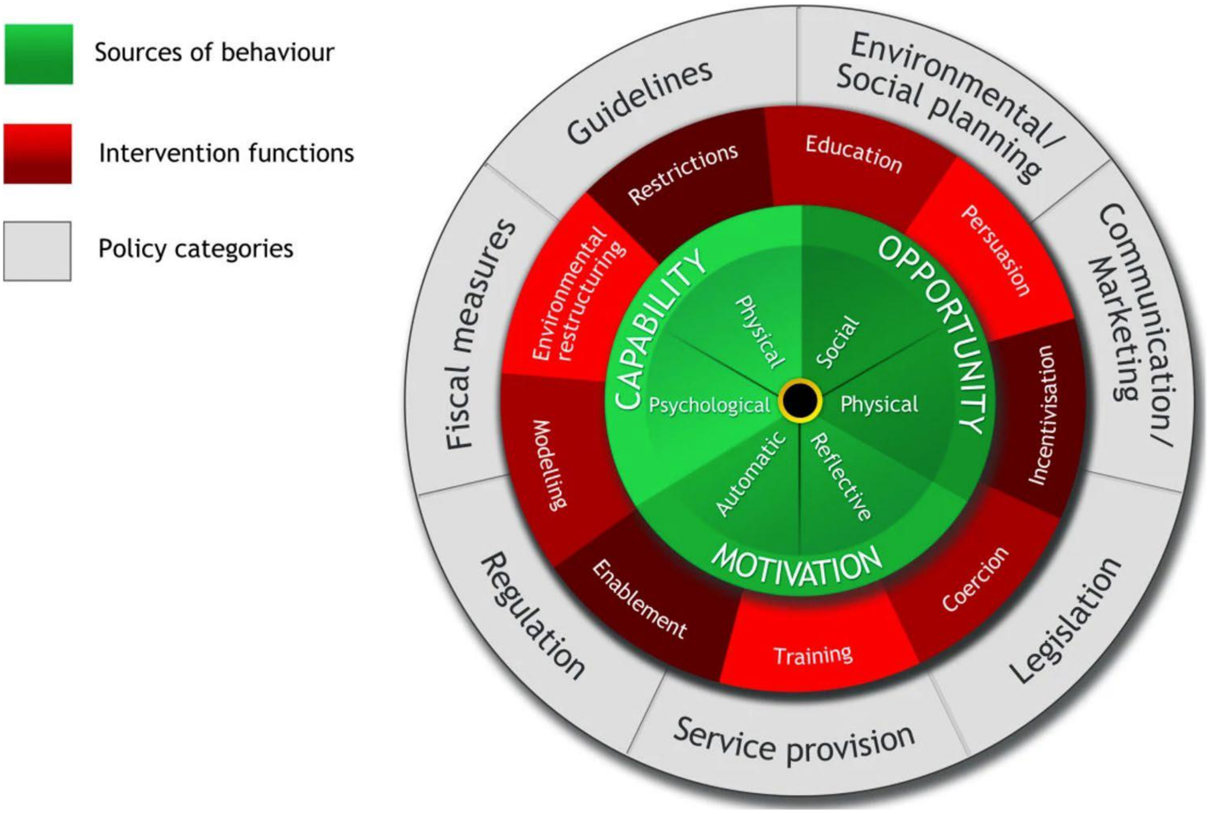
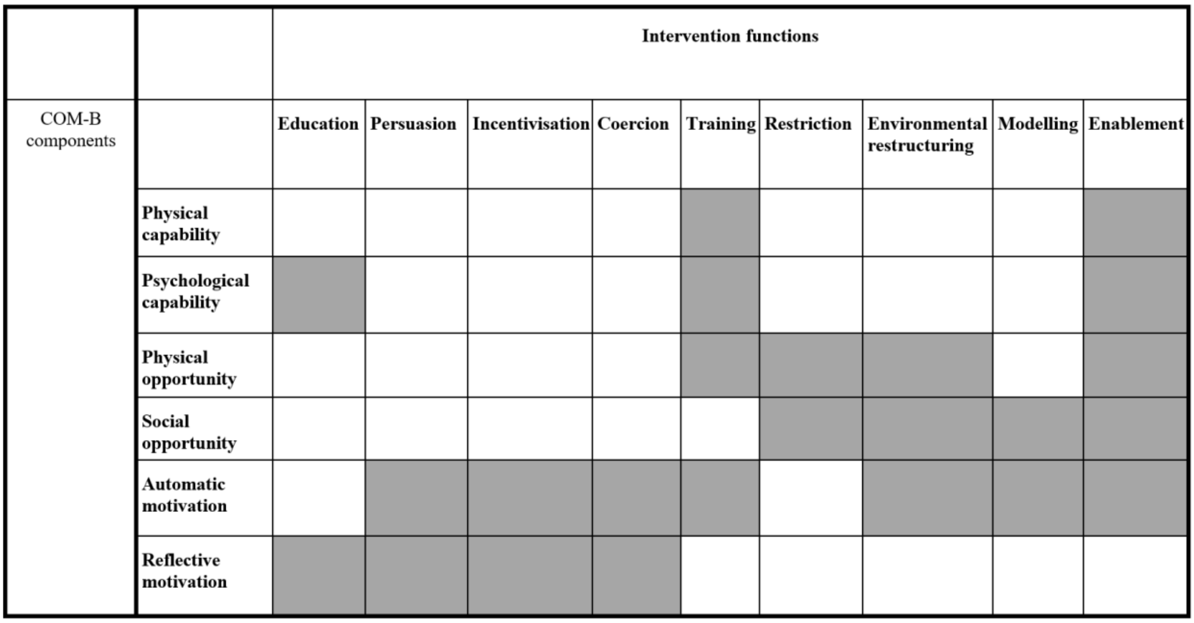


**Figure 2. The COM-B wheel of behaviour change (Atkins *et al.*, 2017)**

Capability can be divided into psychological (having the capacity to participate in comprehension and reasoning) and physical capabilities. Opportunity can be divided into physical (afforded by the physical environment or available resources) and social opportunities (afforded by the social environment e.g. culture in which people live which can affect the way they think). Motivation can be divided into automatic (driven by emotions and impulses) and reflective (involves planning and evaluating) motivation. Figure 3 shows how the COM-B model can be linked to 9 intervention functions designed to change behaviour.



| | | **Intervention functions** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COM-B components | | **Education** | **Persuasion** | **Incentivisation** | **Coercion** | **Training** | **Restriction** | **Environmental restructuring** | **Modelling** | **Enablement** |
| | **Physical capability** | | | | | ▨ | | | | ▨ |
| | **Psychological capability** | ▨ | | | | ▨ | | | | ▨ |
| | **Physical opportunity** | | | | | ▨ | ▨ | ▨ | | ▨ |
| | **Social opportunity** | | | | | | ▨ | ▨ | ▨ | ▨ |
| | **Automatic motivation** | | ▨ | ▨ | ▨ | ▨ | | ▨ | ▨ | ▨ |
| | **Reflective motivation** | ▨ | ▨ | ▨ | ▨ | | | | | |

**Figure 3. Matrix of links between the COM-B model and intervention functions** (Michie, Atkins and West, 2014)

## 3. Aim and objectives

The aim of this study is to:

- Examine orthodontic clinicians’ perspectives and experiences of decision-making encounters with patients.

The objectives of this study are to:

- Evaluate the extent to which clinicians perceive themselves to be engaging in shared decision making.
- Explore what clinicians perceive to be the challenges, barriers and facilitators to engaging in shared decision-making.

# 4. Materials and methods

## 4.1 Design

A cross-sectional survey using an online questionnaire.

## 4.2 Population and setting of interest

Orthodontic clinicians who work in the United Kingdom and are therefore involved in orthodontic decision-making consultations.

This includes:

- Specialty trainees in orthodontics (pre- or post-CCST)
- Specialist orthodontists
- Consultant orthodontists
- Dentists with a special interest (DWSI) in orthodontics. For the purposes of this study a DWSI is define as a registered dentist who is not a specialist orthodontist but plans and treats at least 30 orthodontic cases per year. The definition of a DWSI was agreed with the research supervisors.

## 4.3 Sample size

This was an exploratory study and as such, there was no precedent for sample size. The aim was for a 10% response rate which we deemed a realistic target for an online questionnaire of this nature being sent via email to a large number of orthodontic clinicians who receive many similar emails from the BOS mailing list including those about other research projects.

## 4.4 Questionnaire development and testing

The purpose of the online questionnaire was to:

- To examine the extent to which clinicians feel they are engaging in SDM using the iSHARE questionnaire.
- To stimulate clinician reflection on their own shared decision-making experiences and practices.
- To facilitate purposive sampling for additional interviews by identifying clinicians with varying experiences of shared decision making for a follow-up project on shared decision-making.

The rationale for use of the iSHARE questionnaire is described in Section 2.4.3 above.

Modifications to the use of the iSHARE were to add a Q18 which asks participants “Overall, I felt the patient was involved in the decision as much as they wanted to be” to get a complete representation of the consultation from the clinician’s perspective and to see if this overall rating matched the ratings given for the other questions on the iSHARE. The other modification to use of the iSHARE was in its analysis. Rather than calculating a score out of 100 for each participant and working out an average, the researcher felt it would be more useful to look for patterns and trends in the data rather than calculating numerical scores to represent the non-numerical construct of SDM especially as we anticipated high self-ratings by clinicians across the board. Instead, the frequency of “completely” ratings for each question was analysed, since anything less than “completely” on the 6-point scale suggests a lack of certainty about whether this part of SDM actually occurred during the consultation.

The theoretical domains framework was used to analyse data on barriers and facilitators to SDM.

Development of the Online Surveys questionnaire was centred around the validated iSHARE questionnaire. The iSHARE questionnaires were designed by Bomhof-Roordink *et al,*. to measure shared decision-making practices. Higher total scores indicate that higher levels of SDM have taken place. There are two versions one for clinicians and one for patients. Questions 7, 13 and 14 of the iSHARE give some insight to patient behaviour during the consultation which is what makes this questionnaire advantageous over other clinician questionnaires used to analyse SDM consultations, especially as we are only assessing clinician perspectives in this research. An additional question has been placed at the end of the iSHARE to give an overall picture of patient involvement in the decision-making process during the consultation. To capture further information about decision-making consultations, questions around barriers and facilitators to SDM were added with free text boxes to enable further information to be gathered.

The questionnaire content for the main and additional questionnaires is outlined in Table 1. The introduction to the questionnaire outlined the study and include confirmation of consent to proceed.

For additional questionnaires, the participants were asked to provide email addresses as an identifier to enable responses from multiple questionnaires to be linked.

### 4.4.1 Piloting and resultant changes

Once the initial questionnaire was designed it was presented to the research supervisors. It was suggested that the primary investigator pilot the questionnaire with members of the target audience. The questionnaire was therefore piloted with 5 orthodontic consultants and 2 specialty registrars.

Feedback resulted in rewording and removal of some questions so that the questionnaire was easier to read, less onerous to complete and broken down into more sections so that participants would more easily be able to refer back to them if required.

To increase response rates, one consultant suggested naming the supervisors on the project as anyone who knew them may feel more obliged to complete the questionnaire.

Initially the questionnaire asked what age the patient was, but clinicians may not recall a specific age. The options were changed to “child”, “adolescent” and “adult”.

To begin with, clinicians were going to be asked to think of a consultation which occurred within 7 days as the original iSHARE was designed to be completed within that timeframe. However, most clinicians who piloted the questionnaire said this would dramatically reduce response rates as clinicians may not necessarily have had a decision-making consultation within this timeframe.

The wording on the questionnaire was designed not to use the term “shared decision-making” directly to begin with so as not to put people off completing the questionnaire if they have strong opinions against SDM as a concept. These are the people who were of real interest as we would want to capture information on why they might not agree with SDM or not engage with it. Language such as “making decisions with your patient” was used instead.

Originally, clinicians were to be asked to list 5 barriers and 5 facilitators to making decisions with the patient in their chosen consultation. Then they were also going to be asked to list 5 barriers and 5 facilitators to making decisions with patients generally. Clinicians who piloted the survey suggested that this was too onerous, so this section of the questionnaire was changed so that clinicians only had to list *up to* 5 barriers and 5 facilitators that they faced during the consultation they chose to discuss in the questionnaire.

Demographics questions were asked to assess the diversity of the population captured and to help choose a diverse group of people to interview for a follow-up study. Rather than their age, participants were asked how many years they had been practicing orthodontics as clinical experience was seen to be more relevant to SDM practice. Participants’ gender was not captured as it was not deemed by the primary investigator to be relevant to SDM practices and would not be used for subgroup analyses.

### 4.4.2 Summary of content of the main and additional questionnaires

The full version of the main questionnaire is available in the appendices (please see Appendix 1). Table 1 summarises the contents of both questionnaires.

**Table 2. Summary of contents of the main and additional questionnaires.**

| Page | Contents | Main questionnaire | Additional questionnaire |
|---|---|---|---|
| **1. Introduction** | Introduction to the study | Yes | Yes |
| | Important information | Yes | Yes |
| | Consent | Yes | Yes |
| | Requesting email addresses as identifiers from the beginning | No | Yes |
| **2. About you** | Participant demographics | Yes | No |
| **3. About the consultation** | Patient demographics | Yes | Yes |
| | Nature of the consultation | Yes | Yes |
| **4. Your experience of decision-making during this consultation** | Modified version of the iSHARE clinician questionnaire | Yes | Yes |
| **5. Reflective comments** | Participants' understanding of SDM<br>Difficulty of consultation<br>Barriers and facilitators to SDM<br>Other comments on SDM | Yes | Yes |
| **6. Training and guidelines** | Indication of previous SDM training<br>Awareness of NICE guidelines | Yes | No |
| **7. Further discussion and prize draw** | Indication of whether participants wish to take part in further research | Yes | Yes |
| | Contact details for prize draw | Yes | No |

| | | | |
|---|---|---|---|
| **8. End of questionnaire with the PI's contact details** | Primary investigator's email address | Yes | Yes |

## 4.5 Recruitment and enrolment

### 4.5.1 Completion of main questionnaire

Potential participants were recruited via email invitation via the British Orthodontic Society mailing list. The society's secretary was informed of the target audience and the email was sent to 1482 members.

The introductory email contained information about the study and those interested in participating followed the hyperlink to complete the online survey.

The first page of the questionnaire contained details of what the study entailed, how long it was expected to take, how participant data is handled and how to contact the research team with any concerns or queries (see Appendix 1).

### 4.5.2 Additional questionnaires

The purpose of the additional questionnaires was to gather data on further unique decision-making consultations by the same respondent if they had more than one that they wished to share their experiences of. Those who wished to complete further questionnaires were able to provide their email addresses at the end of the questionnaire so the primary investigator could make further contact and send an email with information and a link for the shorter, additional questionnaire.

### 4.5.3 Incentive

Classically, online surveys yield low response rates. This was likely to be the case as it was intended to distribute the questionnaire via the British Orthodontic Society Mailing list where multiple surveys are sent out and so clinicians may be less obliged to complete this one. To try and improve response rates, a financial incentive of a prize draw for a £250 voucher as part of completing the survey was offered.

## 4.6 Data collection

**Stage 3a: Main questionnaire**

- Participants were sent a link to access the survey via Online Surveys.

- Consent was limited to an introductory page of the questionnaire with consent gained from participants by indicating they wish to proceed with answering the online questionnaire. It was made clear that participants were free to withdraw from the survey at any point without saving their responses or providing any explanation by exiting the webpage that they were accessing the questionnaire from. However, once the data has been submitted when the participants click the “Finish” button it would not be possible to identify individual responses to remove them.
- The survey remained open for 4 months in an attempt to reach the desired 10% response rate. Two reminder emails were sent via the appropriate British Orthodontic Society mailing lists.
- Participant demographics were collected.
- Participants were asked to complete one or more surveys in different decision-making scenarios of their choice and indicate what they felt were the barriers and facilitators to shared decision-making, if any, during the consultation.
- No patient data was collected, and participants were asked to avoid sharing any potentially identifiable patient information.
- Burden to participants: Checked during piloting, this survey took between 10-20 minutes to complete. Participants’ time was given voluntarily and expected time to complete the survey was outlined in the introduction of the online survey.

**Stage 3b: Additional questionnaires**

If a participant indicated they were willing to complete another questionnaire, their email addresses were collected which allowed the primary investigator to send a link for a shorter version of the questionnaire.

The second questionnaire was a copy of the first, again through Online Surveys, but without the demographics questions (page 2 of the questionnaire), the question on their understanding of shared decision-making (page 5), questions on training and guidelines (page 6) and the entry for the prize draw (page 7) as these had already been answered by the participant in the first questionnaire.

## 4.7 Data management

### 4.7.1 Contact details

Personal contact data were stored separately to research data and processed in accordance with General Data Protection Regulation (GDPR). Responses were collected via OnlineSurveys.ac.uk which meets GDPR requirements. Data downloaded was downloaded and stored in a password protected spreadsheet on the University of Leeds (UoL) secure One Drive.

### 4.7.2 Questionnaires

- Online Surveys automatically collated responses pseudonymously i.e. each participant was given a participant number and any email addresses were separated into a different Microsoft Excel document and stored in a different folder on the secure University of Leeds One Drive. This data was accessible only to the PI through a password protected account.
- All data was stored on the secure UoL One Drive. Raw data was not transferred outside of the research team.
- Participants would not be identifiable in any publication nor presentation of this research.
- Responses were pseudonymous. Email addresses were collected to enter the participants into a prize draw and they also had the option to leave their email addresses to be contacted again for further discussion or to complete another questionnaire. The email addresses were immediately be removed from the participants' responses to prevent them from being identified. Within the questionnaire it is made clear that if participants wish to be contacted for further discussion or would like to complete another questionnaire, that their responses will no longer be anonymous to the researcher but that they will not be identifiable in any report, presentation or publication of the research. This allowed participants' responses to be linked if they completed multiple questionnaires and/or allow discussion of participants' answers during the subsequent interviews which were due to take place as part of a follow-up study associated with this research.

## 4.8 Data analysis

### 4.8.1 Quantitative analysis

The aim was to investigate whether there were any differences in spread of the data between the items and between different clinical scenarios. For questions 1-14 and 16-18 of the iSHARE questionnaire, the percentages of participants answering each point on the Likert scale were calculated and trends in the data were investigated. Once this was calculated, the data was then sorted by clinicians' perceived difficulty of the consultation (easy, average or difficult) for those who answered "for a large part", "almost completely" and "completely" to questions 1-14 and 16-18 of the iSHARE questionnaire. This was not done for the "not at all", "hardly" or "a little" points on the Likert scale since there were either few or no participants who selected these options on the questionnaire.

### 4.8.2 Analysis of free text answers

The theoretical domains framework (TDF) was used to categorise the free text answers given in response to questions about barriers and facilitators to shared decision-making. Once participants' answers were categorised under each domain, key themes were extracted and mapped to the COM-B wheel of behaviour change so that potential interventions with the aim of changing clinician behaviour could be identified.

Coding was an iterative process undertaken by the primary investigator (AP) and a second coder (CH) who had experience of using the TDF in a prior research project. Any disagreements were resolved by consulting a third-party (KGB) who had extensive experience in using the TDF. Use of a second coder made the process more robust and reduced the likelihood of bias.
Specific beliefs were derived from grouping similar-themed barriers and facilitators together.

Other free text answers were analysed using simple categorisation to identify common and interesting statements. These were then grouped together into descriptive themes based on their direct content to allow for organisation of and comparison between categories. This was an iterative process undertaken by the primary investigator.

To evaluate participants' understanding of shared decision-making, percentages of participants mentioning the following five components of SDM were calculated:

- Informed: evidence, options, risks, benefits
- Individuals: preferences/beliefs/values person
- Empowered – support/engage
- Deliberate – active thinking and reasoning through discussion
- Collaborative – reaching a joint decision together

These components were derived from the NICE guidelines on shared decision-making (NICE, 2023).

## 4.9 Reflexivity

The primary investigator is a 30-year-old female orthodontic specialty trainee of Asian ethnicity. The second coder for the theoretical domains framework is a 30-year-old, Caucasian female specialty trainee in paediatric dentistry and an academic clinical fellow with previous experience of using the TDF in her own research(Heggie *et al.*, 2022). Both researchers' own experiences, attitudes towards and assumptions about shared decision-making in orthodontics may have influenced the qualitative analysis of the data.

The coding of the barriers and facilitators using the theoretical domains framework and subsequent formation of the specific beliefs was a subjective and iterative process and may have been coded differently if analysed by different researchers.

## 4.10 Ethics

### 4.10.1 Ethical approval

Ethical approval was sought from and approved by the University of Leeds Dental Research Ethics Committee (DREC). Ethical approval number: 010223/VP/366. Date of approval: 13.04.2023.

### 4.10.2 Ethical considerations

To indicate whether the person who has clicked on the link to begin the questionnaire, the first question asked whether participants are happy to proceed and, if they are not, they are directed to a page which tells them to close the webpage and exit the survey (see Questionnaire content).

The PI was contactable by email throughout the duration of the study to answer any questions.

Recruitment was fair and non-coercive: participation was open to all who fulfilled the target audience and was inclusive as possible. There was one introductory email, with a maximum of 2 reminder emails over the course of data collection sent out via the British Orthodontic Society mailing list.

The potential burden to participants was checked via piloting. The piloting process showed that this survey took 10-20 minutes to complete which is outlined in the introduction page of the questionnaire. It was made clear on the introductory page that participants' time is given voluntarily, and NHS employees are not expected to complete the questionnaire during NHS working hours.

## 4.11 Materials

The following materials were required for the study:

1. Invitation email sent to BOS members
2. Main questionnaire (please see Appendix 1)
3. Further email if participants indicate they would like to complete another questionnaire
4. Introductory page for additional questionnaire

# 5. Results

## 5.1 Response rates

The main online questionnaire was distributed to 1437 orthodontic clinics via the British Orthodontic Society member mailing list. The population of interest were targeted via specific mailing lists: the consultant orthodontists' group, training grades group, specialists group and practitioners group. 116 clinicians responded to the questionnaire yielding a response rate of 8%.

Six of the 116 respondents completed an additional questionnaire for another unique consultation which brought the total number of unique consultations studied to 122.

## 5.2 Respondent demographics

Table 2 shows that the greatest proportion of respondents by grade were consultant orthodontists who did not work in specialist practice and specialist orthodontists who were not consultants. The least represented in the sample were those with dual-roles i.e. consultant orthodontists who also worked in specialist practice and specialty trainees who also worked in specialist practice (post-CCST trainees).

The median number of years practicing orthodontics in this sample was 13.5 years with a range of 1 to 47 years.

Most respondents were based in the South and North of England. The least represented were those who worked in Northern Ireland and Wales (Table 3). Table 4 shows that most respondents worked secondary care in either dental hospitals or district general hospitals. There were only two clinicians who worked in the community dental services.

**Table 3. Grade of clinician**

| Grade of Clinician | Frequency (n=116) | % |
|---|---|---|
| **Specialty trainee only** | 27 | 23 |
| **Specialist orthodontist only** | 35 | 30 |
| **Consultant orthodontist only** | 37 | 32 |
| **Dentist with special interest in orthodontics (a non-specialist who personally plans and treats a minimum of 30 fixed appliance cases per year)** | 7 | 6 |
| **Specialist orthodontist and consultant** | 6 | 5 |

| | | |
|---|---|---|
| **Specialty trainee in orthodontics and specialist orthodontist (post-CCST trainees)** | 4 | 3 |

**Table 4. Distribution of orthodontic clinicians by geographical location**

| **Area of work** | **Frequency (n=116)** | **%** |
|---|---|---|
| **North of England** | 38 | 33 |
| **English Midlands** | 15 | 13 |
| **South of England** | 41 | 35 |
| **Scotland** | 14 | 12 |
| **Wales** | 6 | 5 |
| **Northern Ireland** | 2 | 2 |

**Table 5. Distribution of orthodontic clinicians by type of workplace**

| | **Main place of work** | | **Additional place of work** | |
|---|---|---|---|---|
| | **Number (n=116)** | **%** | **Number (n=79)** | **%** |
| **Dental hospital** | 38 | 33 | 17 | 21 |
| **District general hospital** | 38 | 33 | 25 | 32 |
| **Specialist orthodontic practice** | 33 | 28 | 25 | 32 |
| **General dental practice** | 7 | 6 | 10 | 13 |
| **Community dental services** | 0 | 0 | 2 | 2 |

## 5.3 Clinicians' understanding of the term "shared decision-making"

Table 6 shows how clinicians' understanding of SDM was assessed by analysing whether their responses reflected five themes which were derived from the NICE guidelines. The themes most represented were those of informing the patient and those of collaborating with the patient to reach a joint decision. The theme which was least represented in respondents' answers was that of empowerment. Three answers captured all 5 themes and one answer captured none of the themes.

**Table 6. Respondents' answers to the question "What does shared decision-making mean to you in your own orthodontic clinical practice?"**

| Shared decision-making component | N | % |
|---|---|---|
| Informed: evidence, options, risks, benefits | 80 | 69 |
| Individuals: preferences/beliefs/values person | 42 | 36 |
| Empowered: support/engage | 27 | 23 |
| Deliberate: active thinking and reasoning through discussion | 36 | 31 |
| Collaborative: reaching a joint decision together | 62 | 53 |

### 5.4 Clinician awareness of the NICE guidelines on shared decision-making

Thirty-five (30%) of 116 participants stated that they were aware of the NICE guidelines on shared decision-making. Eleven (31%) of these participants said they did *not* find them useful to their practice. Table 7 shows the free text answers provided by respondents categorised based on whether they found the NICE guidelines useful. Many of the answers given by respondents who did not find the guidelines useful felt that this was due to the fact that they were already carrying out SDM. Conversely, those who did find the guidelines useful felt the guidelines were a good point of reference when needed. Four of the respondents who found the guidelines useful one of the respondents who did not find the guidelines useful, did not provide free text comments to elaborate on their answer.

**Table 7. Respondents' answers to how the NICE guidelines on SDM are useful or not useful to their practice**

| Effect of SDM NICE guideline on respondents' practice | Example quotes |
|---|---|
| Useful to practice | • Provides guidance<br>• As I have not been formally trained it gave me a framework to work to<br>• We tend to use this anyway<br>• Useful having other experts to give opinions to allow patient to know all relevant pros and cons |

| | |
|---|---|
| | • It makes decision making easier especially as we are now in a different litigious era to when I was trained.<br>• Helps you understand how to involve patients in decisions about their own treatment.<br>• Useful tips for some patients encountered.<br>• It supports the correct clinical practice and gives you confidence to do the right thing for your patients, it encourages discussion so that patients/parents/carers are involved, and I think this makes it less likely to get problems further down the line.<br>• keep in them in mind when making decisions about patients' treatments.<br>• I presume others have used it as a template as it seems to be in line with what I do day-to-day.<br>• I reviewed a paper on shared decision making. The NICE package on SDM was informative, although I don't remember the exact content whilst completing this questionnaire.<br>• Sharing any information gathered from the clinical exam with the patient and responsible party, as well as adjunctive parts of the exam eg radiographs and using other aids eg picture book / YouTube videos as well as the option to refuse treatment at any point during treatment means compliance for consent has been obtained<br>• It is helpful in outlining the key concepts for shared decision-making<br>• Guidelines are always useful adjuncts in clinical practice. |
| **Not useful to practice** | • It would be good to have these developed for our specialty by BOS for consistency<br>• Already employ<br>• We are trained to automatically practice SDM as part of consent. Thinking about it sequentially ensures quality but won’t necessarily change practice because orthodontics is largely elective and patient-led.<br>• The guidance was aligned with my existing practice, although it is always helpful to be able to refer to it. |

| | |
|---|---|
| | • I feel that being early in my training often means that the majority of discussions that ultimately result in shared decision making have been led by consultants.<br>• We went through it briefly as a team but it did not change what we were doing already.<br>• Already undertaking this process<br>• We do this all the time anyway<br>• Haven't really spent time reading it, although I know the document exists! |

### 5.5 Previous training on shared decision-making

Forty (34.5%) of 116 participants stated that they had received prior training that helped them to involve patients in decision-making about their care and a range of training types were reported. Some participants felt that attending a research presentation on SDM constituted training. The consent process during day-to-day practice was deemed as SDM training by some respondents and many attended a specific SDM pre-conference course as part of the British Orthodontic Conference. One participant regarded the NICE guidelines on SDM as specific training. The greatest proportion of participants reported attending courses or receiving SDM-specific training as part of undergraduate or postgraduate dental education. Some of the training reported under this category was “All our undergraduate and post-graduate training involves discussing options and helping patients make decisions, I think we are already good at doing this” and “Communication skills teaching throughout dental training”. Other respondents referred to continuing professional development courses such as communication skills courses, study days and medicolegal courses organised by indemnity providers e.g. Dental Protection.

### 5.6 Consultation of choice

Respondents’ chosen scenarios could be categorised into four broad categories. Table 5 shows that the greatest proportion of cases were interdisciplinary cases i.e. people requiring input from more than one dental specialty, followed by routine orthodontic cases and the smallest proportion of clinical scenarios were to do with interceptive orthodontics which is undertaken earlier than comprehensive orthodontic treatment and aims to either to simplify future orthodontic treatment or negate the need for it altogether.

Respondents were asked whether they found their chosen clinical scenario “easy”, “average” or difficult. Of the 122 decision-making consultations described, 57% of consultations were deemed by participants to be of “average” difficulty whilst 30% were deemed “difficult” and 13% were deemed “easy”.

Table 6 shows that when the clinical scenarios are analysed by perceive difficulty, the greatest proportion of “difficult” clinical scenarios fell under the “interceptive orthodontics” category. However, it is worth noting that only 4 cases were categorised as “interceptive orthodontics”. The interdisciplinary cases chosen by clinicians could be further subdivided into joint orthognathic care, joint oral surgery care and joint restorative care. The distribution of those who found the consultations “easy”, “average” and “difficult” were relatively even across the three interdisciplinary case types.

An almost even proportion of consultations took place in a dental hospital (34%), district general hospital (33%) and specialist orthodontic practice (28%). Only 6% of consultations were undertaken in general dental practice. The vast majority of patients in the cases chosen by clinicians were adolescents as opposed to children or adults (Table 8).

5 of 122 patients did not speak English as their first language. Clinicians reported that patients not speaking English as their first language had an effect in 3 out of 5 of the consultations. Table 9 shows the effects and quotes given by respondents to reflect this.

75% of patients attended with a parent or guardian, 21% attended alone and 4% with either a partner or grandparent. Of the 96 patients who were accompanied, 85 (88.5%) of these consultations were influenced by the accompanying person according to respondents.

Table 11 shows how respondents perceived the accompanying person/people affected the consultation. The quotes could be categorised into 12 categories. The majority of quotes related to the accompanying person/people expressing their opinions. This included opinions on which treatment option they preferred, which treatment outcomes were important to them and whether or not they wanted the patient to pursue orthodontic treatment in the first place.

However, where the quote reflected that the expressed opinions were strong, dominating or forceful in nature, these were categorised separately to represent respondents’ likely perception that the accompanying person’s influence on the consultation was negative. Examples of these situations are when the patient asserted their views over the patient or insisted on pursuing a treatment option that the respondent was not in favour of.

Another frequently reported theme was that of the accompanying person being supportive of the patient. Examples of this are when the accompanying person encouraged the patient to deliberate, clarified points made by the clinician and checked the patient's understanding. On the contrary, only one quote reflects that the parent was unsupportive of the patient.

Many accompanying persons also asked questions. Questions included those about how treatment options differed, risks and benefits of treatment. Respondents also reported that accompanying persons expressed their concerns such as future cost implications of treatment and dental extractions.

Two contrasting categories also emerged from the data in that the accompanying person either made the decision on behalf of the patient or were jointly involved.

Language barriers were again mentioned, and one respondent explained that this meant the consultation took longer than usual. One quote reflected the fact that the accompanying people were children who were distracting.

**Table 8. Clinicians' chosen clinical scenario by type of case (n=122)**

| Clinical scenario | Frequency N (%) | Example quotes |
|---|---|---|
| **Complex interdisciplinary care e.g. orthognathic, hypodontia, cleft care, oral surgery** | 90<br>(74%) | "Whether or not to proceed with orthognathic surgery"<br>"Orthognathic surgery vs orthodontic camouflage"<br>"Missing upper laterals, close or open space"<br>"Impacted palatal canine. Decision to surgically remove or expose and bond" |
| **Routine orthodontic modality e.g. fixed, functional** | 28<br>(23%) | "Whether Twin block or extractions would be preferable"<br>"Whether to use Invisalign or fixed appliances for treatment of a class I malocclusion on a non-extraction basis"<br>"Extraction vs non extraction treatment" |
| **Interceptive orthodontics** | 4<br>(3%) | "Decision to suspend interceptive functional orthodontic treatment"<br>"Provide a URA or monitor growth"<br>"Concern over canines going off course" |

Table 9. Clinical scenario by difficulty

| Clinical scenario | N (%) | | | TOTAL |
|---|---|---|---|---|
| | Easy | Average | Difficult | |
| Complex interdisciplinary care | 12 (13%) | 52 (58%) | 26 (29%) | 90 |
| Joint orthognathic care | 5 (13%) | 23 (59%) | 11 (28%) | 39 |
| Joint restorative care | 3 (10%) | 20 (65%) | 8 (25%) | 31 |
| Joint oral surgery care | 4 (20%) | 9 (45%) | 7 (35%) | 20 |
| Routine orthodontic modality | 4 (14%) | 17 (61%) | 7 (25%) | 28 |
| Interceptive orthodontics | 0 (0%) | 1 (25%) | 3 (75%) | 4 |

Table 10. Clinical setting where clinical scenario took place

| Clinical setting | N | % |
|---|---|---|
| Dental hospital | 41 | 34 |
| District general hospital | 40 | 33 |
| Specialist orthodontic practice | 34 | 28 |
| General dental practice | 7 | 6 |

Table 11. Age of patient in chosen clinical scenario

| Age | N | % |
|---|---|---|
| Child | 18 | 15 |
| Adolescent | 70 | 57 |
| Adult | 34 | 28 |

**Table 12. Quotes from respondents outlining how the consultation was affected, if at all, when the patient/accompanying person's first language was not English**

| Effect on consultation | Quote |
|---|---|
| **Needed to involve family members to aid translation** | "Some discussion took place with parents and her brother in her first language." |
| **Independent interpreters are not clinicians** | "Need for a link worker. Link worker independent but not able to check that information correctly relayed as link worker not dentally trained" – use of translating services not perfect as they are not clinicians |
| **Language barrier makes communication more challenging** | "Mum's English understanding poor" |

**Table 13. Clinician's perceived influence, if any, of the patient's accompanying person on the consultation**

| Influence on consultation | Example quotes |
|---|---|
| **Offered opinions** | • They expressed their treatment preference<br>• Offered personal opinion on long-term aesthetics and considerations<br>• The patient was under 16 so discussion re options needed to include the parent. Mum was more balanced in her views about options whereas patient had a set idea about which outcome she would prefer<br>• Mum and Dad both very keen for 'optimal' occlusal outcome, pt prioritised shorter duration of overall treatment.<br>• Supportive role to patient but stated their views that did not want surgery<br>• They wanted the treatment to be carried on<br>• Parent had a different opinion from the patient's wishes |

| | |
|---|---|
| | Mother financially influenced about paying for prosthetic replacement<br>Re explaining the options. Asking most of the questions but ultimately patient decided<br>They added their thoughts on the treatment options<br>Tried to convince child to undergo treatment |
| **Dominating/forceful opinions** | His father did not acknowledge that I had discussed surgery since I started seeing him aged 13. Instead his father told my patient that straight teeth was all he wanted.<br>They insisted that the permanent canines were to be aligned and did not want their child to have the deciduous canines maintained and the permanent canines extracted.<br>One parent was particularly against exploring orthognathic surgery as an option and would frequently voice this assertively, often during when the patient was exploring their own concerns and desires for treatment, in effect cutting them off. This made the consultation challenging as the patient was capable of making their own decision - which transpired to be orthognathic due to facial concerns - but it was difficult to ascertain initially with that one parent in the room<br>Extremely forceful parent who wanted complex treatment carried out.<br>Mum was thinking back to the initial patient consultation with another orthodontist where the plan had been to leave the UL4 in situ. Although situation with caries had changed Mum still wanted to retain the premolar of hopeless prognosis |
| **Supported patient/discussed** | Questioning and reflecting on discussion with child<br>Helped to understand the options and finally made the decision on preferred course of action in consultation with patient<br>Parent so advising patient on best long-term choice thinking about maintenance and aesthetics<br>Adolescents often look to parents for advice and help. Mother gave opinion and encouraged child to ask questions. |

| | |
|---|---|
| **with patient/ helped patient to understand/checked patient's understanding** | • They re-explained options to the teenager to ensure they understood both options to them<br>• Advised the patient on what they would do.  Questioned the adolescent's thoughts to clarify if they 'were sure'  Made comments such as 'well it's your teeth'<br>• As the parent of the patient, they have guided the patient on which decision to make.<br>• Supportive role to patient but stated their views that did not want surgery<br>• They helped understand the benefits / risks of both options and guide the Pt as to what would be most appropriate for him.<br>• The parent consents to the treatment for the child however, the child was the main decision maker.<br>• Asked questions on how long treatment will be and what retainers are like and supported patient with decision to go ahead with treatment.  Easy as parent seemed to agree with patient and didn't have any objections<br>• They asked questions.  They discussed my proposals with patient.  They clarified or added to the patients input<br>• Encouraged the patient to make up their own mind.<br>• Both parents very knowledgeable as highly educated. Dad - Lawyer. Mum - psychiatrist. Dad wrote notes during all appointments. Patient's sister had been treated within the same service. Parents listened to options and allowed daughter to ask questions but also helped daughter to probe the options more fully. |
| **Was unsupportive** | • The parent was keen on the patient not having a residual overjet at the end of treatment. However, the parent was not supportive of their child wearing TBs! |
| **Shared/joint decision with parent** | • The parent wanted to be part of the decision with their child<br>• Parents expects to be involved in decision making<br>• Parent and child both equally involved by their own choice<br>• Joint decision making<br>• Discussing the options with the patient |

| | |
|---|---|
| | • Patient was 15yo and came with Dad who was also involved in the decision making and discussed with the patient the advantages and disadvantages of orthodontic treatment<br>• Shared the decision as pt under 16<br>• Collectively involved in decision<br>• Shared decision-making following discussion of options |
| **Made decision on behalf of patient** | • Mother of child, most options discussed with her and decision made by her<br>• They made the decision for the teenager essentially<br>• They guided the patient and effectively made the decision on behalf of the patient.<br>• Wanted to make the decision on behalf of child<br>• The parent made the final decision as the child was unsure what to do. |
| **Expressed concerns** | • Mum attended and was keen for her son to have treatment, although she was worried about further growth and the cost of restoring composite build ups when he was an adult<br>• They expressed their concerns regarding the extractions.<br>• Parental input - they care about the outcome and long-term problems: including ongoing costs<br>• |
| **Asked questions** | • Asked relevant questions the patient may not have considered<br>• We discussed the possible timing of treatment options and the risks/benefits of all options with Mum asking questions and checking she understood what I was saying.<br>• Discussed with both the clinicians and patient about the three options, picking out key factors of the differing options that were likely to be significant for the patient e.g. length of treatment and age of patient in education pathway<br>• They helped to ask appropriate questions about the risks and benefits of treatment.<br>• They asked many of the questions as the patient was very anxious. The parent's understanding of English was not as good as the |

| | |
|---|---|
| | patient's and therefore I took more time explaining the procedures with photos and leaflets.<br>- Mum attended with patient. Asked lots of questions on risks versus benefits of each option.<br>- Asked questions on how long treatment will be and what retainers are like and supported patient with decision to go ahead with treatment. Easy as parent seemed to agree with patient and didn't have any objections |
| **Distraction** | - Young children distracting and difficult to hear over them |
| **English not first language** | - Discussions in first language<br>- They asked many of the questions as the patient was very anxious. The parent's understanding of English was not as good as the patient's and therefore I took more time explaining the procedures with photos and leaflets.<br>- Mum's understanding of English poor |
| **Parent knowledge** | - Both parents are dentists<br>- Mum had experienced Ortho Rx (orthodontic treatment) and had insight into appliances, attendance pattern, commitment, retainers & extractions.<br>- They tried to input knowledge from previous treatment of another child. This was helpful. |

## 5.7 Responses to the iSHARE questionnaire

As shown in Figure 4, areas where the highest levels of SDM were reported i.e. the questions within the iSHARE to which the participants answered "completely" to at least 70% of the time were:

- **Informing the patient that there is a choice to be made (iSHARE Q8) at 79%.** This question is designed to capture the choice awareness dimension of SDM i.e. the clinician tells the patient or checks that the patient knows there is a choice to be made since more than one feasible treatment option exists for their diagnosis.
- **Giving the patient time to weigh up the advantages and disadvantages of the treatment options (iSHARE Q12) at 71%.** This question is designed to capture information about whether time for deliberation was given by the clinician as part of the SDM process i.e. the

clinician gives the patient the time, space and therefore opportunity to deliberate. Deliberation involves active two-way discussion, asking questions, expressing concerns, values, preferences, ideas, expectations and consideration of the treatment options.

- **Explaining differences between treatment options (iSHARE Q6) at 70%**. This question is designed to capture information about the medical information construct of SDM i.e. the clinician provides information about the risks and benefits, advantages and disadvantages of the different treatment options. The clinician should also highlight the trade-off between options.

Areas where the lowest levels of SDM were reported i.e. the questions within the iSHARE which participants answered “completely” to less than 40% of the time were:

- **The patient asking questions about the treatment options (iSHARE Q7) at 39%.** This question is designed to capture data on the medical information construct of SDM in terms of whether the patient asked for clarification during the consultation. If any information delivered by the clinician is not clear to the patient, they should feel comfortable to ask for more information.
- **The patient telling the clinician what was important to them (iSHARE Q13) at 38%**. This question is designed to capture the preferences dimension of SDM i.e. the patient expresses their values, concerns, expectations, thoughts and preferences about the treatment options whether or not they were prompted to do so by the clinician.
- **The patient weighed up the advantages and disadvantages of the treatment options (iSHARE Q14) at 38%.** This question is designed to capture the deliberation construct of SDM, specifically in relation to the patient considering the treatment options based on what they have learned about them. The patient should reflect on what is important to them in their lives in relation to the malocclusion or problem at hand and how this aligns with the treatment options available. Patients should think about what they would like to gain through treatment and what they would like to avoid. The process of deliberation may occur before, after and during the consultation, especially if the patient has had multiple appointments to think about the options before making a decision.

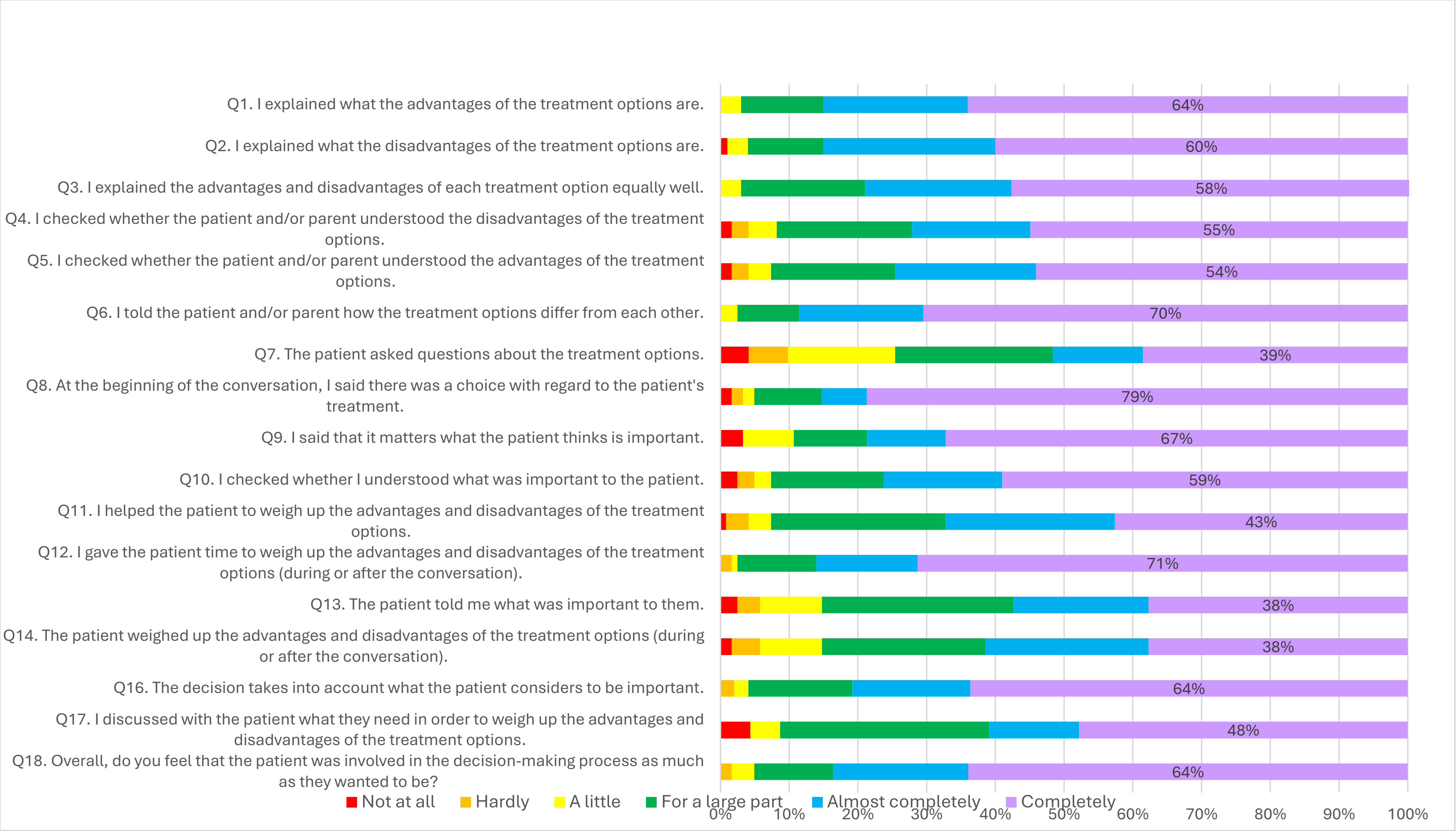


**Figure 4. Overall distribution of answers to the iSHARE questionnaire**

### 5.8 Subgroup analyses: Distribution of answers based on perceived difficulty of consultation

Figures 5,6 and 7 subdivide the answers given to the iSHARE questionnaire based on whether participants found the consultations to be “easy”, “average” or “difficult”. When assessing the for differences in the frequency of those who answered “completely” to each of the iSHARE questions, differences of greater than 20% were found for each of the following dimensions of SDM.

**Dimension I – Choice awareness:**

- “Q9 I said that it matters what the patient thinks is important”. Those who found the consultation “easy” answered “completely” to this question 28% less frequently than those who found the consultation “difficult” at 78%.

This suggests respondents were more likely to express that the patient’s opinion and values are important in the decision-making process during a more challenging consultation.

**Dimension II – Medical information:**

- “Q1 I explained what the advantages of the treatment options are”. Those who found the consultation to be of “average” difficulty answered “completely” 54% of the time. This was over a 20% difference to those who found the consultation “easy” and “difficult” at 75% and 78% respectively.
- “Q2 I explained what the disadvantages of the treatment options are”, those who found the consultation to be of “average” difficulty answered completely 50% of the time which was 28% less than those who found the consultation to be “difficult” at 78%.
- “Q3 I explained the advantages and disadvantages equally well”. Those who found the consultation to be of “average” difficulty answered completely 49% of the time which was 26% less than those who found the consultation to be difficult at 75%.

This suggests that those who found the consultation to be “difficult” were more likely to provide a more complete explanation of the advantages and disadvantages. This subgroup was also more likely to provide more balanced information about advantages versus disadvantages.

When the consultation was “average”, respondents would only offer explanations about advantages and disadvantages *and* balanced information about them around 50% of the time.

- "Q7 The patients asked questions about the treatment options". Those who found the consultation to be of "average" difficulty answered completely 33% of the time which is 23% less than those who found the consultation to be "easy" at 56%.

The patient was more likely to ask for clarification about treatment options during an "easy" consultation and least likely to ask for clarification during a consultation of "average" difficulty.

**Dimension IV - Deliberation:**

- "Q11 I helped the patient to weigh the advantages and disadvantages of treatment" [Deliberation]. Those who found the consultation "average" answered "completely" 34% of the time as opposed to those who found the consultation "easy" at 56%.

The clinician was more likely to support the patient to deliberate about the treatment options when the consultation was "easy" rather than when the consultation was of "average" difficulty.

**Dimension V – Time for deliberation:**

- "Q12 I gave the patient time to weigh up the advantages and disadvantages of the treatment options (before or after the conversation)". Those who found the conversation to be "easy" answered "completely" 56% of the time which was much less frequent than those who found the consultation to be "difficult" at 81%.

The respondent was much more likely to give the patient the opportunity to contribute to the shared decision-making process by giving the patient the time and opportunity to ask questions and express themselves when they found the consultation "difficult" as opposed to when the consultation was "easy".

**Dimension VI – Decision:**

- "Q17 I discussed with the patient what he/she needs in order to weigh up the advantages and disadvantages". Nobody who found the consultation "easy" answered "completely" to this question, whereas 58% of people who found the consultation "average" and 44% of those who found the consultation "difficult" answered "completely".

If the decision was postponed for any reason, respondents were more likely to clearly ascertain what the patient needed to make the decision before the next consultation when the consultation was "average" or "difficult" as opposed to "easy".

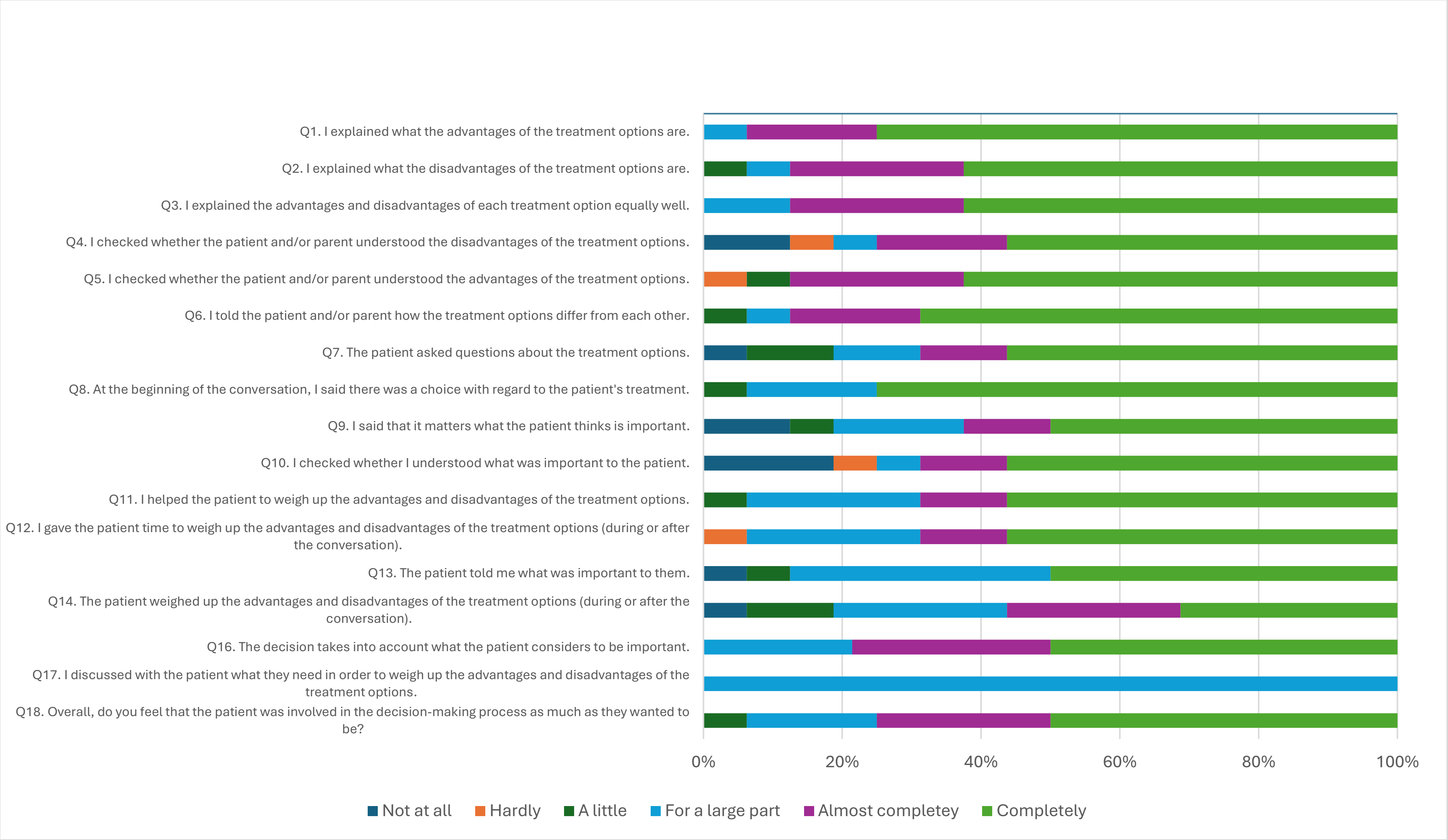


**Figure 5. iSHARE answers for those who found the consultation to be "easy"**

**Figure 6. iSHARE answers for those who found the consultation to be of "average" difficulty**

**Figure 7. iSHARE answers for those who found the consultation to be "difficult"**

## 5.9 Clinician-reported barriers and facilitators to shared decision-making coded against the theoretical domains framework (TDF)

Respondents’ answers to questions about which factors made it easier and more challenging to make decisions with patients revealed their perceived barriers and facilitators to making decisions with patients. Table 14 provides an overview of the number of barriers and facilitators as well the number of consultations perceived to be “easy”, “average” or “difficult”. This shows that for “difficult” consultations, the most frequently reported barriers were associated with social influences and beliefs about consequences and social/professional role/identity.

The specific beliefs derived from the barriers and facilitators, subdivided by whether they are associated with patients, clinicians or organisations and how they were mapped against the TDF/ COM-B model are shown in tables 14 to 22. The red highlighted areas represent barriers, and the green highlighted areas represent facilitators. Example quotes from respondents are provided.

The barriers and facilitators to decision-making with patients could be coded against the following 9 domains from the TDF as shown in Tables 15-23: Skills, Memory, attention and decision-processes, Environmental context and resources, Social influences, Social/professional/role/identity, Beliefs about capabilities, Beliefs about consequences, Reinforcement and Intentions. The numbers highlighted in red show which domains had the highest number of barriers coded against them and the numbers highlighted in green indicate which domains had the highest number of facilitators coded against them.

Table 24 summarises the links between the TDF domains identified, components of the COM-B model and the suggested intervention functions and policy categories which can be used to address them. Definitions of the intervention functions which can be linked to respondents’ reported barriers and facilitators are as follows:

- **Education** aims to increase knowledge by informing, explaining, showing and correcting.
- **Training** aims to change behaviour by equipping people with the required skills or habit strength through demonstration, explanation, practice, feedback and correction.
- **Environmental restructuring** aims to facilitating changes in behaviour by altering the physical or social environment.
- Restriction as an intervention function, aims to limit certain behaviours by establishing rules.
- **Coercion** aims to change the appeal of a behaviour by creating the expectation of an undesired outcome or denial of a desired one.
- **Persuasion** aims to use communication to encourage positive or negative emotions or incite action.
- **Enablement** is recommended for all components of the COM-B model other than reflective motivation. (Michie, Van Stralen and West, 2011; Michie, Atkins and West, 2014).

**Table 14. Overview of number of barriers and facilitators coded against the TDF and COM-B domains categorised by difficulty of consultation.**

| COM-B component | TDF domain | Barriers/ facilitators | Number of unique barriers/facilitators reported | Perceived difficulty of consultation | | |
|---|---|---|---|---|---|---|
| | | | | Easy | Average | Difficult |
| **Capability** | Skills | Barriers | 28 | 4 | 21 | 3 |
| | | Facilitators | **32** | 4 | 16 | 12 |
| | Memory, attention and decision-processes | Barriers | 24 | 2 | 13 | 9 |
| | | Facilitators | 14 | 0 | 10 | 4 |
| **Opportunity** | Environmental context and resources | Barriers | **42** | 7 | 24 | 11 |
| | | Facilitators | **32** | 2 | 20 | 10 |
| | Social influences | Barriers | 28 | 1 | 10 | 17 |
| | | Facilitators | 11 | 3 | 8 | 0 |
| **Motivation** | Social/professional role/identity | Barriers | 29 | 1 | 15 | 13 |
| | | Facilitators | **38** | 6 | 22 | 10 |
| | Beliefs about capabilities | Barriers | **31** | 3 | 18 | 10 |
| | | Facilitators | 28 | 2 | 18 | 8 |
| | Beliefs about consequences | Barriers | **55** | 5 | 31 | 19 |
| | | Facilitators | 3 | 0 | 2 | 1 |
| | Reinforcement | Barriers | 0 | 0 | 0 | 0 |
| | | Facilitators | 1 | 1 | 0 | 0 |
| | Intentions | Barriers | 24 | 0 | 20 | 4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Facilitators | 14 | 0 | 10 | 4 |

**Table 15. Respondents’ perceived barriers and facilitators mapped against the theoretical domain of “skills” and COM-B model component of “capability”.**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Skills**<br>**(Capabilities)** | Decision-making with patients is more challenging when I find it difficult to convey technical information in lay language | “Complex options to concisely explain in plain English without losing technical precision.”<br>“Explaining the orthodontic concepts necessary to make an informed decision.”<br>“To simply explain the purpose of treatment and what will happen during the treatment in words that are understandable for patient/people who do not have knowledge about dental terms and orthodontic science.” | 14 |

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| Clinician-related barriers | Decision-making with patients is more challenging when I find it difficult to gauge whether a patient has fully understood the information, I have given them | “Patient was indifferent to most things- hard to gauge whether they fully understood or simply didn’t mind.”<br>“Many questions from both husband and patient. I thought they understood the options and pros and cons. Following the extractions -2wks into ortho they changed their mind and wanted lower incisor put back in and lower premolars extracted instead. In hindsight perhaps I didn’t make it clear that it was irreversible decision regarding extractions.”<br>“Hoping the patient understands your concerns about their preferred option if different to yours.” | 4 |
| | Decision-making is more challenging when I find it difficult to elicit patient values | “It is hard to know what info the patient feels is most important rather than giving a bland one size fits all description” | 1 |
| | | “Making all the risks and benefits clear when there are lots of options”<br>“Borderline case for orthognathics. Discussing the disadvantages of camouflage option (i.e. trying to quantify the compromise to the occlusion of camo vs OGS)” | |

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| | Decision-making is challenging when I find it difficult to explain the advantages, disadvantages/ consequences of treatment | “The advantages between functional vs extractions are very difficult to adequately explain to lay people when they are asking for the 'best result'.”<br>“To ensure that the patient understood the facial changes which would result following complex bi - max surgery with minimal movements.”<br>“Realistic description of impact of orthodontic treatment.”<br>“Ensuring the patient understood that both options will not achieve the same outcome, and that the goals for each approach are different.” | 9 |
| **Skills**<br>**(Capabilities)**<br>Clinician-related facilitators | I believe that I can effectively communicate the information required to share decisions with patients (good communication skills) | “Simplifying discussions (and focus less on minute info).”<br>“I was comprehensive in the explanations I gave the patient”<br>“1. Listing the key issues with the malocclusion e.g.: crowding and increased overjet. 2. The listing the options e.g.: do nothing, fixed appliances or aligners 3. The advantages and disadvantages of each keeping them brief and understandable.” | 8 |

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| | Making decisions with patients is easier when I use visual aids/resources to communicate with patients | “It was useful to have an example of a similar case to show the aesthetic outcome to the patient. “<br>“Giving examples of similar situations with pictures of other patients are helpful “<br>“Using a Kesling set-up to help discuss options and so patient could see what end-result would look like”<br>“Showing pt/ parent the X-rays and photographs because it made more sense as they could see what I was talking about. Also showed photos of previous exposure cases and what was involved.”<br>“The use of visual aids i.e. a typodont to show what an expose and bond looks like and using the OPG to discuss location of the canine.”<br>“CBCT radiograph to demonstrate the damage/ issue with the teeth proposed for extraction”<br>“Having models photos and X-rays to show patient and having information leaflets and sample pictures to discuss options with patient and parent” | 24 |

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| | | "I also found the use of displaying extra and intra-oral photos during the consultation useful as it allowed the patient, who was otherwise shy, to specifically point at aspects of their facial appearance that they found difficult to describe." | |

**Table 16. Respondents' perceived barriers mapped against the theoretical domain of "Memory, attention and decision-processes" and COM-B model component of "capability".**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Memory, attention and decision-processes (capability)**<br>Clinician-related barriers | Decision-making is more challenging when there is a lot of information to process | "There were a lot of different factors to consider" | 1 |

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| Patient-related barriers | Decision-making is more challenging when there is a lot of information to process | "Information retention of patient."<br>"Pros/cons are extensive - a lot of information for pt to process, both treatment options and pros/cons of each"<br>"When discussing prosthetic replacement options there are a lot of pros and cons and information for patients to process. I feel like an info sheet would be beneficial for patients to be able to refer to after the consultation as it is easy to forget some of this information delivered verbally."<br>"The patient had not yet been to a joint clinic, therefore I did not want to overload the patient with information which may not be relevant to the patient."<br>"And not sure if the patient then could take in the information given fully so he had another appointment to discuss options again without grandparent to keep things calm and made sure he understood pros and cons and that it was his decision. It took 3 appointments but I'm happy that he made an informed decision that was right for him and his concerns. "<br>"Probably too much information for the pt to take it all in and make a decision and we have given her time to think it through and a psychology appt also." | 10 |

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| | Sharing decisions is challenging when patients remain uncertain at the end of/after the consultation | “Pt had time to think about options before but still wasn't sure what she wanted”<br>“Patient couldn't figure out what they wanted.  Each option had distinct disadvantages, but the patient seems to want best of both worlds.”<br>“The consultation was challenging as I repeated the advantages and disadvantages over 5-6 times. I showed cases that had a similar situation and yet the parent still asked the same questions repeatedly. The parent and patient were given time to think about their options and a review appointment was booked 3 weeks later. I also advised the patient and parent to speak with the GDP to discuss restorative options in the long-term. I attended that visit as well. At the review appointment, the options were discussed at length again and then finally, the mother made a decision.”<br>“The family changed their mind about their treatment choice later and contacted us for additional consultation and were removed from waiting list. Lengthy and difficult consultation. Repetitive.”<br>“The patient’s uncertainty about her own wishes meant that an in-depth discussion was essential and made reaching a decision difficult.” | 14 |

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| Patient-related facilitators | I believe that sharing decisions with patients is easier when I give the patient enough opportunity to process the information given before making a decision | “They needed to go to x-ray so had the opportunity to discuss things in private. I do feel patients need ‘space’ and time out of our glare to make their own decision. I have introduced an ‘option slip’ that I often give patients and ask them to discuss things at home then let me know.”<br>“BOS information and have previously signposted patient to yourjawsurgery website which is excellent and provides independent information that the patient can review prior to the consultation.”<br>“Should have given information and then asked pt to go away and think about it. Half of the appointment was spent with them mainly asking the same question in different ways, with me giving the same answer.”<br>“Giving patient time to think about her options and clarifying she can access care at a later point if she wishes. This ensures she does not rush into a complicated treatment pathway if she is not ready to.”<br>“I have a photo book that I used to show treatment options and support patients by using QR codes from BOS. I think this helps not to overload the patient with information, so they can view at their leisure.”<br>“A review appointment and the offer of another appointment following the examination to ascertain the level of understanding and their likely compliance” | 14 |

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| | | “Offering a second appt to review the treatment to give time for patient to consider what they wanted from the treatment.” | |

**Table 17. Respondents’ perceived barriers and facilitators mapped against the theoretical domain of “social/professional role” and COM-B model component of “capability”.**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Social/professional role/identity (motivation)** | Making decisions with patients is more challenging when I find it difficult to ensure my professional | “Sometimes the pt saying I’ll do whatever you think best is really hard, as then it seems like I have to choose, and they do need support in choice but must ensure they have confirmed it’s best for them!”<br>“Not projecting my own beliefs onto the patient.” | 4 |

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| Clinician-related barriers | role does not unduly influence patients' decisions | "I found it difficult to give unbiased advice since the pt was very concerned by her profile and bite but I perceived the problem to be more minor." | |
| | Decision-making is difficult when multiple dental professionals have an influence on the decision | "1. This was not just a shared decision between me and the patient, but also the larger team who were not all in accord. 2. I had to decline treatment that I felt should be provided, as the surgical team felt the risks outweighed the benefits of combined treatment. 3. the patient felt able to accept risks, but the surgeons were not able to accept the risks for this patient. Acting in the patients best interests is absolute. Do no harm. Do only good."<br>"The mother had been advised on a different treatment option, a different extraction pattern, by a previous orthodontist, when the patient was still in the mixed dentition. Once the dentition developed further, a different extraction pattern was preferable but the mother found it difficult to understand that the first orthodontists decision was now being changed."<br>"To open close space in hypodontia case is sometimes difficult but when you have the child of 2 dentists one of who believes that opening space is always the answer and the other parent is an excellent cosmetic dentist whom had done sone beautiful | 15 |

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|---|---|---|---|
| | | augmentations of upper 3’s to make them look like 2 I know that space closing can be a fab job.”<br>“Mum very concerned why resorption not seen earlier and wanted to complain about referring dentist for referring too late. patient had hypodontia of other lateral incisor so Mum was extra concerned about the loss of additional tooth. This made the discussions much more sensitive.” | |
| Patient-related barriers | I find decision-making more difficult when patients/family members play a passive role in the decision-making process | “Patient wasn’t keen to be involved in decision so constantly had to make sure they understand and are involved.”<br>“Lots of our patients are teenagers who are not forthcoming with their views / values.”<br>“The patient had no clear objective for treatment. the patient did not give any opinion on our previous discussions and options. the patient was very quiet and did not offer much to the process. No decision was made or even a preference given.”<br>“The patient whilst of consenting age was fairly disengaged with the process.”<br>“Younger patients often are not vocal about what they want. They can often shrug and not get involved in decision making.” | 11 |

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| | | “Whilst the patient was 18, I felt she needed parental support to make the decision. Some of her responses were 'I don't know'. I think she wanted to be told what would be best to do.” | |
| Clinician-related facilitators | Support from other professionals can facilitate shared decision making | “Support of an experienced consultant nearby who could see that the consultation was taking longer than usual, recognised that the patient and mother needed more time to decide so suggested that I give the patient my contact details and that they could contact me to let me know when they had discussed everything at home (with no external pressure)”<br>“I found it easier to make the decision with the mother and patient following collaboration with a consultant colleague who agreed with the extractions I wanted to carry out for this patient.”<br>“Having the surgeon present at the appointment to give the risks and benefits of the surgical side of the treatment.”<br>“Having an experienced nurse who could help me and explain things in different ways when I had difficulties to communicate with my patient.” | 10 |

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| | | "We do these conversations on the joint clinic with other orthodontists and surgeons where it is much easier to all have a meaningful conversation. other clinicians pick up on things that you didn't which is great." | |
| | Drawing on my professional skills and experience allows me to build relationships with patients that facilitate decision-making | "Previous experience in communication with patients about the subjects at hand."<br>"Experience- long-time qualified. Having children myself- helps - Pt often want that reassurance that the decision they choose would be one I would choose for my child. These decisions are so hard, in my early career I was worried about guiding pts to a decision too much but sometimes they want their hand held in choosing. If pt is really uncertain always best let them go home and consider and then come back to discuss again. But they often say you are the expert and I trust you. I always explain I can't choose for them but I do offer more support in their decision and if it were my child type discussion as they really value that. When I was 23 I wouldn't have dared to. There is so much education that it has to be the pts choice, if you give all options and don't have the human side to it they just seem lost. Depends on each case, but want my pts fully informed and to know their plan is what they are happy with. Then treatment is straight forward. Always spend a long time on first few appts so the treatment appts are easy!" | 13 |

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| | | "It is something I have done for years and in time I note that so long as the person feels listened to, you can generally have a valid two-way conversation and informed consent process."<br>"1. Me being calm, empathetic and referring to the facts rather than opinions 2. My deep understanding of the case and the merits/disadvantages of the various options 3. My understanding of the history of the case and why treatment outcomes at this stage were not as good as they could be 4. My confidence in understanding the mechanics to improve the outcome and in what estimated timescale. 5. The knowledge that I've tried my best regardless of the attitude and approach by the parents." | |
| | Sharing decisions with patients is easier when I do not try to unduly influence their decision | "Trying to discern whether she had any "facial" concerns without putting words in her mouth" | 1 |
| **Patient-related facilitators** | Decision-making is easier when patients/parents play an active role in the process | "The fact she was clear what the problem was from her perspective and what she wanted."<br>"Pt and parent engaged and interested in options, asked sensible and meaningful questions, had read information leaflets I provided."<br>"Patient was open to the discussion" | 14 |

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| | | “The parent had a clear preference.” | |

**Table 18. Respondents’ perceived barriers and facilitators mapped against the theoretical domain of “environmental context and resources” and COM-B model component of “opportunity”.**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Environmental context and resources (opportunity)**<br>Patient-related barriers | I feel that it is more challenging to make decisions with patients when the options have different financial implications | “Patient asking for options that need to be paid for but they can’t afford”<br>“Cost implication- if not seen then will need to pay?” | 3 |
| | I feel that it is more challenging to make decisions with patients when | “Costs” | 2 |

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|---|---|---|---|
| Organisational-related barriers | the options have different financial implications | “Cost to practise” | |
| | Decision-making with patients is difficult when there is not enough allocated time | “Three appointments and more than an hour discussion”<br>“Time constraints/shortage in consultation.”<br>“Lack of time in a busy NHS treatment plan visit I have 20 mins. I often over run in these cases as there are a lot of things to consider. I often like patients to make decision at home and phone me with their decision. I don't want them to feel pressure to make a decision there and then on the spot.”<br>This was probably the most 'shared-decision making' discussion I have had with the patient and parent, but it was also the longest treatment planning appointment I've had, and ran over the 30 mins time slot to 50 mins. 1. Issues to discuss took a long time<br>“Discussing all the risks and benefits of the surgery - challenging to cover all of this in full with limited time during the consultation”<br>“Time constraints can make it difficult to ensure you have enough time for everything to sink in but gave patient ample time to decide on treatment as had records appt, then joint clinic before the consent and bond up appointment.” | 17 |

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| | Decision-making is more challenging when it is influenced by wider service issues which are out of my control | “NHS huge waiting lists and times”<br>“I did think about long term monitoring within the hospital, however as a unit we have capacity issues and therefore discharged and as GDP to monitor”<br>“Long waiting lists for joint clinic appointment.”<br>“Late presentation due to new patient waiting list.”<br>“Lack of readily available NHS restorative and surgical services.”<br>“I don’t control the surgeons and their lists - so it’s not all in my control.”<br>“Booking system had lost the patient and they hadn't received the appointment” | 12 |
| | The working environment is not always conducive to supporting patients to make a decision | “Noise in background - Dental Hospital has lots of background noise.”<br>“Open clinic - potentially a lot of background noise at times.”<br>“Additional children being present and distracting”<br>“Facilities available” | 9 |

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| | | “Joint clinic environments do not always facilitate patients speaking freely about their own concerns/desires.“ | |
| Organisational-related facilitators | The availability of adjunctive materials and resources facilitates decision-making with patients | “Visual aids/ photos of previous cases”<br>“The BOS My jaw surgery website was helpful as the patient came back with more questions after being advised to visit the webpage”<br>“BOS information and have previously signposted patient to yourjawsurgery website which is excellent and provides independent information that the patient can review prior to the consultation.”<br>“Digital study models, clinical photographs, OPG radiograph”<br>“Providing the patient with a website link to BOS your jaw surgery - making it easier for patients to look into the information at home”<br>“Itero scanner with virtual simulation”<br>“Models, good radiographic imaging, photographs and 3D models”<br>“Having access to all materials and training from consultant and senior registrars” | 18 |

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|---|---|---|---|
| | | “Readily available literature” | |
| | I find that making decisions with patients is easier when there is sufficient time available for the consultation | “No time pressure can consider options.”<br>“Booking enough clinical time to decide”<br>“Sufficient time available for good discussion.”<br>“We’d had a previous conversation on the new patient clinic about the options. Patient was returning for further discussion following CBCT scan”<br>“Enough time to have the conversation, no one wants to be rushed“<br>“As patient had previous appointments as mentioned and referring dentist had mentioned surgery, patient knew what to expect with treatment and so decision was easier to make.”<br>“Plenty of time in secondary care compared to primary care” | 11 |
| | It is easier to make decisions with patients when the working environment is conducive to discussion | “Closing door on clinic noise.  Expecting others in the room to be quiet during the conversation.”<br>“Having a one-to-one conversation” | 3 |

| | | | |
|---|---|---|---|
| | | "Calm, friendly, collegiate atmosphere of the larger team." | |
| | Making decisions is easier when there is no financial implication to the decision | "No pressure of cost/funding by NHS" | 1 |

**Table 19. Respondents' perceived barriers and facilitators mapped against the theoretical domain of "social influences" and COM-B model component of "opportunity".**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Social Influences (opportunity)**<br>Patient-related barriers | Making decisions with patients can be challenging in triadic consultations when parents/family negatively influence the consultation. | "Dad asks many questions almost trying to put her off"<br>"Parents can dominate question responses unless controlled." | |

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| | | "Parents often want to control their son/daughter's decision for treatment (which can be difficult during SDM interactions)."<br>"Parent had a different opinion/which from the patient's treatment wishes."<br>"Parent had very strong opinions based on past experiences about what should happen. Child had little voice. It was testing to communicate with the child."<br>"The parents were extremely intense and derogatory about the treatment that had already been undertaken previously.. Despite a full and open discussion, the parents appeared to be fairly hostile and aggressive."<br>"The parents often as in this case don't really give their child space to discuss options."<br>"Patient initially attended as a new patient with parent (not grandparent) - options given, records taken and patient keen. When he returned to the joint clinic with grandparent, she was very negative and kept saying she didn't want him to have treatment as it wouldn't work etc. This made the environment a bit tense. And not sure if the patient then could take in the | 21 |

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| | | information given fully so he had another appointment to discuss options again without grandparent to keep things calm and made sure he understood pros and cons and that it was his decision. It took 3 appointments but I'm happy that he made an informed decision that was right for him and his concerns. Difficult to explain to a grandparent that it's not up to them in a diplomatic way!"<br>"Patient was more influenced by parent than clinician" | |
| | Shared decision-making is more challenging when there is a language barrier with the family | "Mums limited understanding of English"<br>"Language barrier; despite having an independent link worker I was unsure what exactly they were saying to each other. Non-verbal cues seemed to verify the conversation I think they should've been having and questions were appropriate." | 5 |
| | Decision-making is more challenging when patients/parents are influenced by social media | "Basically, they persisted in declining all the options given. Referring to the 'proper brace' and what they had seen on TikTok. Not a common occurrence but the number of functional cases referring to 'the proper brace' and what TikTok says is increasing" | 2 |
| Patient-related facilitators | Shared decision-making is facilitated by parents/family members playing a supportive role in triadic consultations | "Supportive parent encouraging patient to be involved." | |

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| | | “Having a parent there, I feel helps as they can re-explain all at home again if child misses anything out.”<br>“Supportive parent that allows child to voice their concerns/opinions/wishes”<br>“That Mum was brace-aware & had experienced treatment. This made the hurdles easier to navigate.”<br>“Parent was willing to consider all treatment options and understood that it may be a lengthy treatment.” | 11 |

**Table 20. Respondents' perceived barriers and facilitators mapped against the theoretical domain of "beliefs about capabilities" and COM-B model component of "motivation".**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Beliefs about capabilities/ (motivation)**<br>Clinician-related barriers | Making decisions with patients is difficult when I think that treatment will be difficult for me to carry out | "I found a difficult case to treat in the specialist practice due to the complexity of the malocclusion but no choice to refer for treatment to a hospital setting apart from a second opinion. Lack of support from restorative/interdisciplinary team colleagues for these kinds of decisions."<br>"Referred patient for a second opinion from a consultant to support my treatment plan and make sure I covered all the options needed to be covered for the patient. I found a difficult case to treat in the specialist practice due to the complexity of the malocclusion" | 10 |

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| | | "I felt that I could perform better at one option over another and so in my head the outcome may be better with one over the other."<br>"Also, mechanically, it will be hard to open space for LR2 and correct the centreline" | |
| Patient-related barriers | I believe that patients do not always have the capability to understand the necessary information needed to make a decision | "Not enough intelligence to be able to weigh up options as they do not have as much knowledge as us."<br>"Patients struggle to understand difference between the two plans"<br>"1. Parent and child did not really understand what a bridge is. 2. Long term benefits of both options had to be explained and I am not sure if they completely understood. 5. We also talked about a partial denture and that was not easy to grasp."<br>"Many questions from both husband and patient I thought they understood the options and pros and cons"<br>"The patient had learning and communication difficulties" | 13 |

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| | | "A teenager cannot really visualise the problem so I have to explain the problem and explain what options are available to restore spaces ie what a resin retained bridge is, implant etc"<br>"The age of the patient and making sure their competence is of sufficient to understand the treatment completely and in its entirety. The perception / understanding of the risks. The perception / understanding of the benefits. Understanding the likely consequences of not carrying out the treatment. The need to understand the importance of retention" | |
| | Making decisions with patients is difficult when I am unsure if the patient will be a suitable candidate for orthodontic treatment | "Patient had poor OH so that played a large role in discussion of risks of treatment"<br>"Patient was unsure on what she was planning to do in the coming years (I.e travelling vs uni) therefore it made it more challenging for her to make a decision"<br>"Patient reported being set on having a combined orthodontic orthognathic treatment approach as discussed. However, the timing of treatment provision may not be right as patient has two small children to look after. She is aware of the time commitment associated with treatment and she is currently evaluating whether this is the right time for her to be undergoing this."<br>"Patients fear of an extraction" | 8 |

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| **Clinician-related facilitators** | Shared decision making is easier when I am confident in my ability to deliver the treatment | “Missing laterals. Class 2 molars.  Easy close space case.”<br>“Clinically one option was much more straight forward than the other thus the clinical decision was 'easier' to make and discuss with the patient” | 2 |
| **Patient-related facilitators** | Making decisions with patients is easier when it is clear whether the patient is a suitable candidate for orthodontic treatment | “Degree of periodontal disease ensured decision was less borderline.”<br>“Her oral hygiene was good. Her diet was good (water drinker, no sweet tooth)” | 2 |
| | It is easier when I believe that patients are capable of understanding the information required to make a decision | “Patient and parent were articulate and able to understand the relative complex detail that was being presented to”<br>“The patient was very certain in her decision and repeatedly assured me she understood her options and the risks”<br>“Patient was listening and asking appropriate questions - he obviously understood the different outcomes for each treatment option and was trying to make an informed decision”<br>“The patient was a dentist, so that meant it was easier to explain and for her to fully understand the advantages and disadvantages of each treatment option.” | 24 |

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| | | "Pt and parent were engaged, understood the information and asked thoughtful and sensible questions."<br>"Patient was well educated so could understand the discussion well. He has looked up the BOS surgery website and had read the leaflets. He had excellent recall of the risks. This made it much easier."<br>"The patient seemed entirely reasonable, his concerns were concrete and realistic and his acceptance of the risks and benefits was ostensibly well-considered."<br>"As patient had previous appointments as mentioned and referring dentist had mentioned surgery, patient knew what to expect with treatment and so decision was easier to make." | |

**Table 21. Respondents' perceived barriers and facilitators mapped against the theoretical domain of "beliefs about consequences" and COM-B model component of "motivation".**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Beliefs about consequences (motivation)**<br>Clinician-related barriers | Making decisions with patients is more challenging when each option results in significantly different treatment outcomes | "Extraction decision - A therapeutic diagnosis would have affected the treatment time and outcome. Restorative options and long term restorative burden: Who would take on the responsibility for the long term management and care of the pt?"<br>"None of the options discussed were without risk and long term negative consequences. The presenting diagnosis meant that we were considering the least worst option rather than guaranteeing a perfect outcome"<br>"Due to the tooth that will be lost will be a high aesthetic impact and will be lifelong retention involved with the prosthesis." | |

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| | e.g. treatment time, outcome, restorative burden for the patient | "The case is borderline so could open or close space, not a clear one way best situations so must ensure pt knows negative outcomes of each option, so that optimal plan is appropriate for pt."<br>"The time treatment will take will often strongly influence the choice. The cost of treatment also has a strong influence."<br>"Balancing two separate decision align vs extract ectopic canine, and FU vs extractions to correct AP" | 12 |
| | | "There were a lot of unknowns (e.g. growth and patients ability to pay for treatment in future)"<br>"Not being able to tell him what he would look like afterwards as so unpredictable. Not being able to tell him if it would be "worth it" which is what he wanted."<br>"They were not sure if they wanted to close the spaces and how it will look."<br>"It was quite difficult to predict what effect further growth would have on the patient's malocclusion and to explain this to the patient and carer." | |

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|---|---|---|---|
| | Making decisions with patients are more challenging when the treatment outcome is unpredictable or uncertain | "I didn't know if it was possible to place braces I didn't know if extraction of premolars was possible I didn't know if the patient would tolerate the brace I didn't know if the patient would keep the brace clean I didn't know if the patient was mentally prepared for treatment"<br>"The unpredictability of TADs miniscrews."<br>"Would be great to have a way of visually showing patients what they would potentially look like using a very quick and accurate method." | 15 |
| | Making decisions with patients is difficult when I know that the outcome will be suboptimal regardless of which option is chosen | "Asymmetry of the front 6 (no UL2). UL2 may have been resorbed by the overlying UL3."<br>"This was a patient who had undergone the orthodontic treatment for a long time - pre covid start! but had developed diabetes and so as she could not achieve blood sugar stability her surgery had been delayed considerably - new job and she didn't want to take time out - so she asked for a debond 1. the previous investment the patient has made wearing her appliances 2 Her OH has not been great so I am worried about her Oral health 4 I was concerned that her diabetes may cause infections etc " | 3 |

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|---|---|---|---|
| **Patient-related barriers** | I find it challenging to make decisions with patients because I, as the clinician, know what will result in the best outcome for them | “Patient was very keen on pursuing orthognathic treatment, however treatment likely to cause detriment to dentition, so compromise had to be explored for overall benefit of patient.”<br>“This was a consultation on the joint orthognathic clinic concerning a patient in his late 50s who wished to proceed with orthognathic treatment. He a had a background of gingival recession and active localised periodontal diseases, a heavily restored dentition and peri-implantitis around an implant restored UL2. This consultation was challenging because - I felt like proceeding with orthognathic treatment was not appropriate - the patient understood and accepted the risks, including death under general anaesthetic and loss of teeth, but I feel it's impossible to feel the weight of these consequences until and if they occur - the patient was offered treatment by the orthodontic and surgical team on the proviso he achieves stable dental health as a precondition”<br>“Patient asking for treatment that would be unwise”<br>I had concerns about the patient’s expectations or treatment and the level of concern that the patient had regarding what was a relatively mild malocclusion. Having discussed the options, advantages and disadvantages they elected for OGN surgery even though their malocclusion was within the scope for camouflage | 13 |

| | | | |
|---|---|---|---|
| | | treatment.  I found it hard that the pt preferred a treatment option where I felt the risks outweighed the benefits<br>"I know from an orthodontic point of view what would be best for the patient, however the patient was certain that she would not get on with the TBA."<br>"The patient refused to accept my advice and insist that the treatment dispensed by their previous orthodontist was correct.  This is despite the child only age 10 had a functional appliance to treat a Class III malocclusion since she was 8 years old with no discernible effect (the mother had brought the start study models with her)"<br>"The patient made a decision, against what I would usually advise. However, they made it based upon what was important to them"<br>"Patient had a borderline need to orthognathic treatment but would really need a bimax & genioplasty to get the best result, plus SR 8s and ext lower premolars. I found it difficult to give unbiased advice since the pt was very concerned by her profile and bite but I perceived the problem to be more minor."<br>"Patient wanted non extraction treatment when has bimax proclination and a large centreline problem.  The challenges related to explaining the need for extractions that the patient doesn't want." | |

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| | Making decisions with patients is challenging when they have unrealistic expectations of care | I have referred for a second opinion that suggests x4 pm extractions instead of functional. Patient refuses extractions. Explained cannot treat then. But they are very insistent that the should be treated as they have waited so long on the waiting list. They drove me mad. They are coming back to the clinic again as they are not happy and want to complain now."<br>"High expectations in terms of treatment length from both parent and patient - expected much shorter length than discussed."<br>"Patient's sister got a great result and the patient referred to this - patient expectations."<br>"The parent's other child never needed blocks and allegedly had a bite worse than this child. - I had to explain that if I was going to extract anyway then I may be more likely to suggest I don't need TBs."<br>"Patient and parent wanted a treatment plan that would be ***fast*** as she did not want to be toothless in the front, felt shy. Tooth impacted UR1 (upper right central incisor)." | 12 |

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| | | “The parent had previous experience of being denied care for her child because it was perceived as being difficult - so I felt she had a very negative association with 'no treatment'” | |
| Clinician-related facilitators | Shared decision-making is easier when I believe that all options will result in a good outcome | “If they have 3 equally good alternatives”<br>“Can still have RRB even if E falls out”<br>“Significant progress made already in her treatment. “ | 3 |

**Table 22. Respondents’ perceived facilitators mapped against the theoretical domain of “reinforcement” and COM-B model component of “motivation”.**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Reinforcement (motivation)** | Decision-making is facilitated by putting a time limit on when the | “Hard deadline given to patient” | 1 |

| | | | |
|---|---|---|---|
| Clinician-related facilitators | patient should make the final decision | | |

**Table 23. Respondents' perceived barriers mapped against the theoretical domain of "intentions" and COM-B model component of "motivation".**

| **Theoretical domain / (COM-B model component)**<br>Clinician/patient/organisational barriers or facilitators | **Specific beliefs** | **Example quotes** | **No. of beliefs** |
|---|---|---|---|
| **Intentions (motivation)**<br>Clinician-related barriers | Shared decision-making can be challenging when the clinician is resolute to make a certain decision (coercion and influence) | "**The 2nd option was described to the patient in a way to put them off this treatment modality**. I needed to experience the first option as part of my training and so I was in favour of supporting this option"<br>"As clinically the option was more obvious to do one option (as was easier) than the other, it was hoped the patient would pick the option which was more straight forwards. The other would have been v.difficult to achieve**. The wording might have been more swayed towards that option."** | 3 |

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|---|---|---|---|
| Patient-related barriers | Shared decision-making can be challenging when the patient/parent is resolute to make a certain decision | “The patient had a firm idea in her head as to what she wanted and therefore did not really in my opinion fully consider the disadvantages of the orthognathic option.”<br>“Pt adamant did not want braces so this reduced treatment options - did not like the look of braces […]  Parents keen for braces and exposure but pt adamant”<br>“Pt adamant they want surgery so then discussing disadvantages it was hard to keep them engaged as their mind was set”<br>“The patient came with the idea that they would not want "blocks".” | 10 |

## 5.10 Types of intervention functions

**Table 24. Suggested intervention functions and policy categories to address clinicians' perceived barriers and facilitators based on the TDF and COM-B model.**

| COM-B component | TDF Domain | Summary of reported barriers and facilitators | Suggested intervention functions based on the COM-B model | Complimentary policy categories |
|---|---|---|---|---|
| Capability | **Skills** | **Barriers**<br>Difficulties related to:<br>• Communicating in lay language<br>• Checking patient/parental understanding<br>• Eliciting patient values and preferences<br>• Explaining advantages, disadvantages and consequences of different treatment options | **Training**<br>**Enablement** | **Guidelines**<br>**Fiscal Measures**<br>**Regulation**<br>**Legislation** |
| | | **Facilitators**<br>• Good communication skills<br>• Using visual aids to communicate with patients | | |
| | **Memory, attention and decision-processes** | **Barriers**<br>• Vast amounts of information to process<br>• Information overload | **Training** | |

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| | | • Lack of information retention<br>• Indecisive/uncertain patients | **Enablement** | **Service Provision**<br>**Environmental/ Social Planning** |
| | | **Facilitators**<br>• Providing patients with the opportunity to process information before decision-making | | |
| **Opportunity** | **Environmental context and resources** | **Barriers**<br>• Lack of time<br>• Long waiting lists<br>• Noise<br>• Busy clinic<br>• Costs | **Restriction**<br>**Environmental restructuring**<br>**Enablement** | **Guidelines**<br>**Regulation**<br>**Legislation**<br>**Fiscal Measures** |
| | | **Facilitators**<br>• Having enough time allocated to the consultation<br>• Working in a pleasant environment<br>• Availability of resources and materials for SDM<br>• No financial implications | | |
| | **Social influences** | **Barriers**<br>• Negative influence of the parent/family member<br>• Language barrier<br>• Social Media | **Restriction**<br>**Enablement** | |

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|---|---|---|---|---|
| | | **Facilitators**<br>• Supportive parent/family members | | **Environmental/ Social Planning**<br>**Service Provision** |
| | **Social/professional role/identity** | **Barriers**<br>• Patient/family member assumes passive role in decision-making process<br>• Multiple professionals involved in decision<br>• Clinician unduly influences decision<br>**Facilitators** | **Education**<br>**Persuasion**<br>**Coercion**<br>**Modelling** | **Communication/** |

| | | | | |
|---|---|---|---|---|
| **Motivation** | | • Patient/family member assumes active role in decision-making process<br>• Support from other clinicians<br>• Own professional skills and experience<br>• Clinician *not* unduly influencing decision | | **Marketing**<br>**Guidelines**<br>**Regulation**<br>**Legislation**<br>**Service Provision**<br>**Fiscal measures**<br>**Environmental/ Social Planning** |
| | **Beliefs about capabilities** | **Barriers**<br>• Clinician doubts patient's ability to understand information<br>• Clinician doubts own ability to carry out treatment<br>• Unsure whether patient is a suitable candidate for orthodontics | **Education**<br>**Persuasion**<br>**Enablement** | |
| | | **Facilitators**<br>• Clinician confident in patient's ability to understand information<br>• Clinician confident in ability to deliver good treatment<br>• Clinician confident that patient is a suitable candidate for orthodontic treatment | | |
| | | **Barriers** | **Education** | |

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|---|---|---|---|---|
| | **Beliefs about consequences** | • Clinician believes different options will result in significantly different outcomes<br>• Clinician believes treatment will be unpredictable or is uncertain about outcome<br>• Clinician feels that outcome will be suboptimal regardless of chosen option<br>• Clinician knows what is best for the patient<br>• Patient has unrealistic expectations of care<br>**Facilitators**<br>• Clinician believes outcome will be good regardless of option chosen | **Environmental restructuring** | |
| | **Reinforcement** | **Facilitators**<br>• Giving patient a deadline to make a decision | **Education** | |
| | **Intentions** | **Barriers**<br>• Clinician is resolute to make a decision<br>• Patient is resolute to make a decision | **Education**<br>**Environmental restructuring**<br>**Enablement** | |

## 5.11 Clinicians' views on the themes explored in the questionnaire

Forty-four (36%) of 122 participants provided free text responses about the themes explored in the questionnaire and these are outlined in Table 24 below. More barriers and facilitators to SDM in general are listed here as well as general challenges faced in decision-making consultations.

**Table 25. Free text comments regarding participants' opinions on the research topic**

| Topic | Quotes |
|---|---|

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| **Facilitators to decision-making with patients generally** | • Doing this properly requires sufficient time with the patient / parent.<br>• The importance of sufficient time and a "cooling off" period for the patient so that a decision is not rushed.<br>• A BOS leaflet on SDM would be helpful for patients to stimulate questions that they could ask at appointments.<br>• Always have before and after photos of some decision making difficult and different scenarios<br>• I think having visual aids such as photographs/typodonts of missing teeth, resin retained bridges, implant etc would be helpful<br>• Give time for child to think of some questions.<br>• I would like to have access to a psychologist as we do in the cleft service where all cleft patients who have orthognathic surgery have an assessment as part of their work up.<br>• In some instances the patients need multiple conversations to process and insert their options<br>• Most often than not to be able to have these meaningful conversations with patients adequate time is required. |
| | • Difficult when parent overrides competent child's wishes. |

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| **Difficulties encountered in decision-making with patients generally** | • I find it interesting how patients’ priorities vary in very similar circumstances. I don’t like being asked ‘what would you do if this was your..... son/daughter/partner?” If feel that’s really hard as my priorities are likely to be very skewed!!<br>• Difficult to cover all the options in time available sometimes esp with written consent forms to be completed - digital consent would be easier to allow the patient to review in their own time and be able to ask more questions<br>• One of the difficulties when you give the patient all the options is sometimes, they choose the most difficult and unpredictable option which can result in lengthy treatment and uncertainty of result.<br>• I am learning more and more despite very detailed and lengthy discussion at treatment planning stage patients and parents don’t retain much. Thankfully I record it all well in my notes.<br>• SDM is hard when adolescents and parents have different views.<br>• I think having visual aids such as photographs/typodonts of missing teeth, resin retained bridges, implant etc would be helpful.<br>• I think shared decision making is much harder with patients who lack understanding of basic principles or who just want to be told what to do.<br>• I think it is difficult to fully know how you support the patient into making a genuinely 'shared' decision, I feel it is almost always guided/directed to the option that you feel will clinically benefit them most given your experience and operative skill. I think it is the experience of the operator that is the biggest indicator of what tx modality the patient will receive (not what they decided they wanted) for example- some consultants simply say 'I don't use TADs’ or 'I haven't used headgear for 10 years' and so the decision of what the patient gets is never truly their decision in this sort of scenario<br>• Sometime patients just do not like hearing what you have to say. |

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| | • Decision making in a specialist practice by qualified orthodontists sometimes can be very challenging. It’s mainly due to time constraints and lack of support from other colleagues such as perio, restorative colleagues, obviously this depends on the geographic location of the practice and secondary care support available in that area. Not everyone has access to a hypodontia referral clinic.<br>• I think it is difficult to ensure / test patient understanding.<br>• I feel like I've always been doing shared decision making but haven't put a label on it.<br>• It’s always difficult not to steer patients and I think if there is not a clear choice - such as severe crowding - which in my opinion would require extractions then I would not discuss a non-extraction option. If the patient or parent wishes in this situation to have a non-extraction treatment then I would tell them to find someone else to treat them.<br>• There is a need for GDPs to be more aware of the developing dentition in children especially when sourcing NHS orthodontics is currently so problematic. |
| **Benefits of SDM** | • There have been consultations where after explaining the options and pros and cons we have gone with a plan that the patient prefers that may not be my initial first choice. After fully discussing the risks we chose to proceed as the expectations and outcomes for the patient were different to those that I perceived may be important. Often in orthodontics there are multiple options to get a good outcome so shared decision making helps to enhance selection of the right plan for the right patient at that time.<br>• I feel as though shared decision making is important for all patients, but particularly for more complex malocclusion i.e. impacted canine options, hypodontia options, orthognathic vs camouflage and specific WBAs on communication during these consultations, perhaps at Post CCST level, would be a valuable feedback tool to aid communication development. |

| | |
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| **Reflection of own experience/practice of decision-making with patients** | • On occasion I do not give the patient options which I feel are completely unreasonable from my perspective even though I suspect others may. One example is when a patient request non-extraction treatment and I feel it would be inappropriate I will not offer it to the patient and inform the patient they should seek another opinion if they feel that is an option they wish to explore<br>• Experience of seeing thousands of completed cases gives you the confidence to make joint decisions.<br>• There are so many variables.  One missing lateral. The other is peg. Hate it   Class 3 on a boy. I tend to camouflage.  On a girl I sway to surgery.   Any tooth impacted in a crowded case I extract. The hospital exposes 3s and extracts the 4s. Why oh why. It fries my brain. We think the patients know the difference. They don't they just wonder how long the treatment is going to take and whether they'll be straight. No one looks for perfection patients wise.   I don't like illogical thought.<br>• Decisions should ALWAYS be made by the patient based on clear and complete guidance from a clinician.<br>• The parents of some children attending for orthodontic consultation have many questions and want to be very involved. Other parents may be more accepting of decisions so it's not the same with all families, each case is different.<br>• The whole idea of decision making means you make decisions, together, that are in the patient's best interests.<br>• It strikes me that shared-decision making should be happening all the time already, due to the requirements for informed consent - explaining risks and benefits of treatment options and coming to a shared decision.<br>• Most often than not to be able to have these meaningful conversations with patients adequate time is required. Fortunately, this is possible in hospital based setting so far. I am not sure it is as readily possible in practice setting. |

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| | • It is clear these days that we shouldn’t be proscriptive. Pts & parents often like a baseline to see what we think.<br>• I never understand clinicians who’s say “ I did xxxx because that’s what the patient wanted” when it is clearly not a good sound clinical treatment. I see more and more of this!<br>• Try to avoid change of operator and treatment delays in the service generally. Importance of documenting all discussions and high-quality diagnosis and treatment planning summaries and writing to GDP clearly saying whey the plan had changed |

# 6. Discussion

## 6.1 Key findings

### 6.1.1 Clinicians’ understanding of and engagement in SDM

The findings of this research suggest that orthodontic clinicians’ familiarity with the concept SDM requires improvement. Although most clinicians were able to describe that SDM involves the patient being informed about treatment options and their risks and benefits, most answers omitted the components of SDM which differentiate it from the process of informed consent i.e. accounting for individuals’ preferences, beliefs and values, empowering and engaging patients, and the concept of deliberation. Additionally, few clinicians knew about the existence of the NICE guidelines on SDM and not many had stated they had received formal SDM training. Even those who stated they had received training, mentioned events which the researcher does not feel constitutes proper training e.g. “attending a research presentation on SDM” as it does not directly involve healthcare providers in developing the skills required to actively engage patients in making decisions about their care. Interestingly, many who stated they did not find the NICE guidelines useful was because they were practicing SDM already.

Clinicians’ lack of awareness of how SDM differs from informed consent may be due to the to the fact that, from an early stage in UK undergraduate dental education, informed consent is taught and reinforced throughout dentists’ careers as a matter of ethical and legal imperative as well as a means of avoiding litigation (Council, 2015; Main and Adair, 2015). Thus, these components of SDM are more likely to be practised frequently and to a good standard. In contrast, a recent UK-based study found that only 36% of undergraduate dental students and 30% of dentists reported having received training in SDM (Sin, Butt and Barber, 2021). This may be a reflection of the fact that SDM is not included on undergraduate dental curriculums as it is not explicitly mentioned in GDC’s standards for education nor their standards for the dental team guidance and it is not a recommended CPD topic (GDC, 2014; GDC, 2015; Sin, Butt and Barber, 2021). Another contributing factor may be that definitions of SDM in the literature are inconsistent (Makoul and Clayman, 2006; Moumjid *et al.*, 2007; Berger *et al.*, 2022) and the fact that SDM has overlapping features with the process of informed consent (Whitney, McGuire and McCullough, 2004).

This may also explain why respondents reported best performance in iSHARE items which describe components of informed consent (discussing that there are different treatment options, a choice to be made between them and providing patients with time to weigh the advantages and disadvantages). Interestingly the three items that clinicians performed least well on reflected *patient* behaviour. Although the questions ask about the patient's actions during the consultation, they could also reflect the fact that clinician did not invite patients to ask questions, elicit patient values and preferences and did not support the patient to deliberate about the treatment options as well as they could have, and these behaviours are what differentiate SDM from informed consent. The issue of healthcare professionals, including orthodontic clinicians (Barber *et al.*, 2019), not involving patients in decisions about their care as much as they should or would like to be has been found in previous studies and discussed in the literature (Elwyn *et al.*, 2000; Légaré *et al.*, 2008; Légaré and Witteman, 2013; Joseph-Williams, Elwyn and Edwards, 2014; Couët *et al.*, 2015).

### 6.1.2 Potential effects of perceived difficulty of consultation on SDM practices

Discernible differences in iSHARE scores were found when accounting for whether the consultation was perceived by respondents to be “easy”, “average” or “difficult”. Consultations may be considered by clinicians to be “easy”, “average” or “difficult” by respondents a multitude of reasons including the complexity of the clinical case, social influences, environmental factors, patient factors etc. and it is not possible to discern exactly why from this research. This is because respondents were asked to provide an overall rating of difficulty and were not invited to provide specific reasoning. However, regardless of whether a consultation is perceived to be “easy”, “average” or “difficult”, clinicians should ideally be ensuring they undertake high levels of SDM in any case. Thus, it is important for clinicians to recognise that their perceived level of difficulty of a consultation may affect their SDM practices.

“Difficult” consultations were associated with higher iSHARE scores when explaining that the patients' opinions, values and preferences are important to the decision-making process. Perhaps when clinicians themselves do not have an obvious preference or there is not a treatment option which is regarded as clinically superior, they seek the patient's input as this will help guide them to an answer. People who are perceived to be demanding or have high expectations may be more likely to be dissatisfied with their care or outcomes. Therefore, when making decisions with such people, clinicians may be more conscious about ensuring they follow best practice including SDM to ensure they cannot be accused of poor clinical practice if a complaint is made about any aspect of their orthodontic care at a later stage because their expectations have not been met.

During “difficult” consultations, clinicians are also much more likely to “completely” explain the advantages as well as the disadvantages of treatment *and* explain them equally well. A potential reason for this may be that advantages of treatment options are usually obvious for orthodontics i.e. aesthetic improvement. A “difficult” consultation may prompt clinicians to go into greater detail about every aspect of information giving including the advantages and disadvantages. Many of the orthognathic (jaw surgery)-based consultations chosen were rated “difficult”. This may be because the surgical aspect of treatment carries risks of morbidity and mortality and has psychological implications which conventional orthodontic treatment or the option of having no treatment do not. Therefore, clinicians may feel that it is important to ensure that the patient understands all of the advantages and disadvantages in detail so that they can weigh the options are certain they wish to pursue this more invasive option.

From a patient behaviour perspective, they were most likely to ask questions during an “easy” consultation which could reflect the fact there was more time to ask questions, or that two-way communication was flowing more easily based on the way the clinician was facilitating the consultation. Another possible explanation is that the patient took an active role in the decision process or that the patient was more supported to ask questions by their accompanying family member and any of these reasons could have contributed to the clinician rating the consultation as “easy”.

Respondents were more likely to support the patient in the process of deliberation when the consultation was “easy” as opposed to “average”. However, they were more likely to give the patient enough *time* to deliberate when the consultation was “difficult”. When a consultation is “easy” perhaps this makes it easier to weigh up the treatment options with the patients as the clinician is confident to discuss all treatment options. Perhaps “difficult” consultations are deemed challenging as there is a lot of information to communicate to patients and the clinician feels that more time is needed for the patient to process and weigh the information being provided before making a decision.

If the decision was delayed until after consultation of choice was described in the questionnaire, the respondent was more likely to find out what the patient needed to support them in making a decision in future when the consultation was “average” or “difficult”. None of the participants who found the consultation “easy” answered “completely” to this question, whereas around half of the participants who were directed to this question answered “completely” for “average” and “difficult” consultations. It is worth noting that participants are only directed to Q17 if the patient did not reach a decision in the consultation and needed additional time to go away and consider the options. Only 23 participants were directed to Q17. The two participants who found the consultation “easy” were directed to Q17 but they both answered “for a large part”. Perhaps a prerequisite for clinicians perceiving the consultation as being “easy” is that the patient had to have made a decision at the time of the consultation. Naturally, if the patient had to go away and think about the options, it is less likely that the consultation was a straightforward one.

### 6.1.3 Barriers and facilitators to SDM in orthodontics

The theoretical domains under which *barriers* were most frequently coded against were:

- Beliefs about consequences: e.g. clinicians' beliefs about different treatment options resulting in significantly different, suboptimal or unpredictable outcomes, knowing what is best for the patient and patients' unrealistic expectations.
- Beliefs about capabilities: e.g. clinicians doubting a person's ability to understand information, whether a person will be suitable candidate for orthodontic treatment.
- Environmental context and resources: e.g. wider service issues out of the clinicians' control: lack of time, waiting lists, busy clinics.

The theoretical domains under which *facilitators* were most frequently coded against were:

- Social/professional role/identity: patients taking an active role in the decision-making process, support from colleagues, and the clinician's confidence in their own professional skills and experience.
- Skills: strong communication skills including use of visual resources to aid communication.
- Environmental context and resources: having enough time, suitable working environment, availability of resources which support information-giving and a lack of financial pressure.

Barriers to SDM reported by respondents in this study under *the beliefs about consequences* and *beliefs about capabilities* domains in the context of treatment outcomes, described uncertainty about treatment outcomes or a lack of clinicians' confidence in their own ability to deliver treatment well. This could be due to a lack of scientific evidence available about outcomes or a reflection of the clinician's own orthodontic knowledge and skills. Similarly, beliefs that different treatment options could result in significantly different outcomes made SDM more challenging. Clinicians may find it difficult to share decisions with patients when their own preferred outcomes are different to their patients'. This relates to some paternalistic practices highlighted in this research. Under the beliefs about consequences domains, as clinicians reported that they felt they knew what was best for patients. This practice is a hindrance to SDM as it disregards patient autonomy by ignoring patients' personal preferences and values which may differ from clinicians'. Many barriers reported under the beliefs about capabilities domain related to clinicians doubting patients' ability to understand the information given. Not being able to ascertain whether patients understand information, and reaching a decision anyway is not representative of SDM as the patient has not been properly informed (Waddell *et al.*, 2021). Many respondents related a patient's younger age having an impact on whether the clinician felt that the patient's ability to understand information.

Unrealistic patient/parent expectations were also highlighted in this study as barriers to sharing decisions with patients. Such expectations could pose a problem because clinicians do not feel they can reconcile patients' preferences using SDM (Légaré *et al.*, 2008).

Under *environmental context/resources,* time was a commonly cited barrier to SDM in this study and was also found to be the most commonly cited barrier in a systematic review reviewing barriers and facilitators to SDM in healthcare (Légaré *et al.*, 2008) and has been reported as a barrier in orthodontic research (Barber, Ryan and Cunningham, 2020). Free text responses outlined that this can be related to insufficient time to be able to carry out SDM well and have meaningful conversations with patients. Participants expressed that the issue of time is less of a problem in hospital than in the practice setting. This may be due to the fact that economic pressures on orthodontic practitioners in primary care practices to produce a high turnover of completed cases are greater than in secondary care hospital settings (Turbill, Richmond and Wright, 2001). Although there is evidence to state that SDM does not add significant time to appointments, the frequency of reporting of this barrier could reflect the fact that further research is required regarding the effect of time on SDM practices and vice versa (Légaré *et al.*, 2008). Barriers associated with the physical orthodontic environments were distractions related to noisy and busy clinics. These barriers were also found in a recent systematic review which described how these environments can cause stress and a lack of privacy thereby hindering SDM processes (Waddell *et al.*, 2021).

Identification of these barriers and facilitators highlight areas to target for future interventions aimed at improving the implementation of and engagement with SDM by both service providers, including organisations, and service-users alike. Each domain of the TDF can be paired with a section of the COM-B model. The COM-B model posits that, for clinicians to be able to implement a behaviour, they must have the capability, opportunity and motivation to do so. The specific beliefs derived from participant data regarding barriers and facilitators to SDM have been coded against the TDF and organised into the COM-B model. Using this link between TDF and COM-B, intervention functions under the categories of training, education, enablement, restriction, persuasion and environmental restructuring were identified. Details of some potential intervention functions aimed to improve SDM in orthodontics based on the findings of this research are provided in section *6.2 Implications for clinical practice.*

Interestingly, many of the reported facilitators to SDM in this study were matching pairs of the barriers e.g.:

- Being confident that treatment options will result in a good outcome
- Being confident that the patient has understood the information given

- Having good communication skills
- Having enough time and access other useful resources e.g. visual aids, learning materials. patient information leaflets and websites

This suggests that some solutions to the challenges identified already exist in some settings, and efforts should be made at individual, local and organisational levels to devise strategies to enhance them by fitting them into current clinical care pathways.

## 6.2 Implications for clinical practice

Although numerous relevant intervention functions were identified by this research, the most salient are discussed in this section.

### 6.2.1 Education and training

A great number of the barriers could be overcome, and facilitators enhanced by the intervention functions of education and training.

Despite clinicians *not* citing a lack of knowledge about SDM as a barrier SDM, the findings from this study imply that orthodontic clinicians lack awareness of all the components of SDM. Both a lack of understanding of SDM and clinicians' beliefs that they already do it are frequently cited in the literature as reasons for inconsistent implementation of SDM in healthcare (Stevenson *et al.*, 2000; Légaré *et al.*, 2008; Légaré and Thompson-Leduc, 2014). This highlights a clear educational need for orthodontic clinicians to improve their understanding of SDM.

*Education* is the recommended intervention function to address barriers which fall under the psychological capability, and reflective motivation domains of the COM-B model and training is recommended for physical and psychological capability, physical opportunity and automatic motivation domains of the COM-B model. Education is aimed at increasing knowledge by informing, explaining, showing and correcting (Michie, Atkins and West, 2014). Nevertheless, knowledge alone is not enough to lead to behaviour change (Arlinghaus and Johnston, 2018). Clinicians and patients must have the psychological and physical capabilities to be able to engage in SDM. *Training* as in intervention function may help with this by equipping clinicians with the required skills or habit strength through demonstration, explanation, practice, feedback and correction (Michie, Van Stralen and West, 2011; Michie, Atkins and West, 2014).

Many of the barriers identified in this research can be addressed with communication skills training specific to SDM. Studies have shown that fostering a strong provider-patient relationship founded on trust means that the patient feels comfortable and able to ask questions about the treatment options, be forthcoming with their opinions, preferences, values and expectations concerning treatment ((NICE), 2021b). The MAGIC (Making Good Decisions in Collaboration) programme has shown that practical interactive skills workshops involving role playing and clinical scenarios can help with developing understanding of SDM and highlighting how SDM differs from clinicians' regular practice, thereby challenging attitudes. Where possible, using a healthcare team's usual training modalities such as continuing professional development is more likely to engage more senior clinicians. Such workshops can also help clinicians to understand the importance of peoples' values (Joseph-Williams *et al.*, 2017).

To address any doubts about patient understanding, clinicians should be able to check and improve a patient's understanding of the information which has been provided. A method of doing this which has been shown to be successful in medicine is the teach-back method which aims to improve communication between patients and professionals by clarifying patients' level of understanding of the health information which has been provided and ensure that the clinician and patient are on the same page (Dillon *et al.*, 2017; Yen and Leasure, 2019). Improving patient understanding can improve a patient's health literacy (Joseph-Williams *et al.*, 2017).

To address issues related to communicating the advantages and disadvantages of different options which can be difficult in the face of uncertainty, clinicians should be trained in the process of deliberation where the clinician supports the patient to reason about how the risks and benefits of each treatment option weigh up in the context of their own life, to arrive at a decision which takes their individuality into account. The "choice-option-decision" talk model can help to support deliberation by structuring SDM consultations (Elwyn and Miron-Shatz, 2010; Elwyn *et al.*, 2014). This may be difficult where respondents in this study identified that they can struggle with communicating the advantages and disadvantages, risks and benefits of treatment.

To address these issues, clinicians should use the evidence-base available to advise on treatment outcomes where possible such as differences in treatment modalities, treatment times, perceived aesthetics of different treatments. In the face of uncertainty, every effort should be made to support the patient to orient themselves in the decision-making process using honesty, openness about how emotions and non-logical thinking can influence decisions, willingness to readdress the decision as new information may emerge which reduces uncertainty, respecting personal decisions and explaining that the option of no treatment is an option (Berger, 2015). An international consensus of experts in SDM agreed that two core competencies required for clinicians to be able to effectively implement SDM. *Relational competencies* involve fostering an environment which creates a positive environment for open and honest communication between parties involved in the decision. *Risk communication* was the second competency because patient representatives have expressed the need for clinicians to be familiar with an individual person's health literacy so that they can adapt information e.g. converting it into plain language so it is communicated at a level which can be understood the individual in front of them (Légaré *et al.*, 2013).

### 6.2.2 Enablement

Another finding from the MAGIC programme was that clinicians felt that they were not equipped with the necessary tools for SDM such as patient decision aids. Decision support tools should be seen as an adjunctive aid not a replacement for good communication. There will never be a decision aid for every orthodontic decision nor will all patients necessarily find them helpful. Clinicians must first have the right attitudes towards SDM and have the right skills to implement it. They should not be reliant on decision support tools because skills are superior to tools and attitudes have a greater influence than skills when it comes to SDM (Joseph-Williams *et al.*, 2017).

In orthodontics, a starting point for designing decision support tools could for common decision-making scenarios identified by this research:

- Whether or not to have orthognathic surgery. The other options may be to have no treatment or orthodontic treatment without having surgery.
- Whether to have spaces between teeth opened or closed when teeth are missing (hypodontia care).
- Whether to have a functional appliance or tooth extractions to reduce prominent front teeth.

Orthodontic decision support tools should then be tested for effectiveness before being disseminated for widespread use.

A review of current orthodontic information aimed at patients discussed what should be considered when designing resources to facilitate decision-making specifically:

- The purpose of the information: to help patients make a choice, balanced information about all of the options available as well as the risks and benefits.
- Whether the information enables understanding: Information should be concise and have good readability scores to ensure accessibility to children, adolescents and their parents. The addition of any images must be accompanied by text which rationalises why specific treatments work for some orthodontic problems and not others. Images can also serve as prompts to aid discussion about the causes of orthodontic malocclusions and why different treatments are used to address them. Understanding risks is easier when they are presented as figures e.g. "1 in 250" instead of using terms such as "rare".

- Whether the information enables reasoning: in real-life consultations, clinicians will patients to deliberate between treatment options and how each aligns with patient's individual values and preferences. For example, "treatment option 1 will give the best "textbook/gold standard" result but it will take longer and require more cooperation than treatment option 2 because you would have to wear a removable functional appliance." Most of the information given to orthodontic patients in *written* is simply informative and does not encourage reasoning in this manner. Examples of how decision support tools can help patients to deliberate about options is by asking them to rate on a scale how much they want or do not want specific consequences of treatment, or asking patients to write down what their values and preferences are and what effect they think having orthodontic treatment will have on their lives as opposed to having no treatment or in the face of other treatment options. Most information presents treatment options separately but having the options and their consequences presented in one place e.g. in a diagrammatical form showing decision pathways.
- Whether the information encourages patient involvement: Even if patients are invited to contribute their opinions, values and preferences, they may still find it difficult to voice them to a clinician. Some techniques to aid this are to ask the patient and parent to write down questions in prior to the consultation to ensure the information is more tailored to the individual and their family. Asking patients and their parents to complete separate quality of life questionnaires in advance can also be helpful as the parent's perception of their child's quality of life may differ (Bekker, Luther and Buchanan, 2010).

Enablement may aid in situations where clinicians feel that the parent/accompanying person is dominating the SDM consultation. For adolescents, SDM involves at least a triad: the patient, the clinician and a parent/guardian. However, a lot of research is based on the parent-clinician dyad which means that the capabilities of the child to engage in SDM are not considered as well as they could be. Children should be involved in SDM as much as their cognitive development allows. For example, younger children should be invited to express basic preferences but as they develop into adolescents they learn to report symptoms, express preferences, and ask questions. More research is required to find ways of managing differing preferences and expectations between family members and decision aids should be designed to take both the patient and family member's views into account (Lin *et al.*, 2021). Patient preferences of whether or not to undergo orthodontic treatment can change between the ages of 12 to 20. It is worth noting that adolescents' decision-making in orthodontics is often subconsciously influenced by social norms and beauty culture. Values which are developed heuristically in this way are more likely to change compared to values developed systematically based on a patient engaging with the information being presented to them. Adolescent and parent values with regards to orthodontic treatment can differ, however, as adolescents progress to adulthood their values change to align with that of their parents' (Bekker, Luther and Buchanan, 2010).

### 6.2.3 Environmental restructuring

An organisation's ethos and culture should aim to promote the benefits of SDM and incentivise good SDM practices for both healthcare providers and patients. One method of helping to activate patients in decisions about their care is to use multimedia e.g. posters, websites, appointment letters to encourage patients to ask their providers questions ((NICE), 2021) e.g.:

1. What are my options
2. What are the benefits and harms?
3. How likely are these?
4. What will happen if I do nothing?

The study that investigated this technique showed that patients received better quality information from clinicians about their treatment options and their benefits and harms without adding time to the consultation (Shepherd *et al.*, 2011). Public health initiatives could be a way of raising patient awareness this strategy which is simple and likely to be inexpensive (Légaré and Witteman, 2013).

To address physical environmental issues, having dedicated quiet zones on the clinic where possible when you know a patient is attending for a dedicated appointment e.g. side surgery or bay at the end of the clinic. In terms of resources, having visual aids of realistic treatment outcomes may help to pacify patient's unrealistic expectations of care.

## 6.3 Strengths and limitations

### 6.3.1 Novelty, value and impact of the research

Previous studies on SDM in orthodontics have investigated:

- Whether the current hypodontia pathway promotes SDM (Barber *et al.*, 2019)
- Extent of SDM practice from the perspectives of patients, clinicians and independent observers during clinical consultations (Keshtgar *et al.*, 2021)
- Effectiveness of patient decision-making aids (Marshman *et al.*, 2016; Parker *et al.*, 2017)
- The preferred role of adult (16 years of age and above) patients in SDM (Motamedi-Azari *et al.*, 2020)

This is the first study to ask clinicians to recall a specific decision-making consultation and use the iSHARE questionnaire to assess the extent to which they felt they engaged in different aspects of SDM (choice awareness, medical information, preferences, deliberation, time for deliberation and the decision) throughout the interaction. Although it is important to gain the perspectives of both clinicians, patients and even family members, arguably, clinicians tend to initiate the decision-making process by means of arranging the consultation and presenting the patient with treatment options. Therefore, it is important to gain insight into what extent clinicians engage with SDM, what the barriers and facilitators are to implementation and thus suggest recommendations to help clinicians better facilitate good quality shared decision-making for the benefit of their patients.

This is also the first study to use the theoretical domains framework (TDF) to analyse participants' reported barriers and facilitators to making decisions in the specialty of orthodontics. Use of a theory-based approach to understand clinicians' experiences of SDM is advantageous because it then encourages theory-informed interventions which are evidence-based (Atkins *et al.*, 2017).

Other projects assessing unique decision-making consultations had smaller sample sizes due to the nature of being undertaken on clinic including direct observation and analysis of full consultations. The centres are often all single-centre or undertaken in one region and so the generalisability of the findings is potentially lower. In this study, 122 unique decision-making consultations were described by orthodontic clinicians of varying grades in different clinical settings and across different regions of the country which adds breadth to the data available about SDM in orthodontics.

### 6.3.2 Use of a validated tool

Use of the validated iSHARE questionnaire was advantageous because it had undergone rigorous testing to ensure it accurately measures shared decision-making or more specifically in this instance, clinicians' experiences of SDM. This means that the analysis is more robust which increases the likelihood that the conclusions drawn from this research are valid and that any recommendations made are more likely to be effective when applied to clinical practice (Tsang, Royse and Terkawi, 2017). Use of a validated tool also facilitates comparison of findings across different scientific studies (Marshall, 2005).

### 6.3.3 Potential biases

#### 6.3.3.1 Response bias

Although 122 unique responses were captured, the overall response rate was low compared to response rates to online questionnaires by healthcare professionals in the literature although closer to response rates yielded by others sent via the British Orthodontic Society mailing list (Oliver, Lynch and Fleming, 2020; Jennings, Seehra and Cobourne, 2021; Jopson *et al.*, 2021). Those who did not opt to complete the questionnaire may have different characteristics to the sample who did. Those who are interested in shared decision-making may have wanted to complete the questionnaire because they believe in the benefits of it and therefore implement it into their day-to-day practice which could explain the high scores on the iSHARE questions generally. Conversely, those who do not engage in high levels of shared decision-making may not have completed the questionnaire for lack of interest or belief in SDM as a concept. However, these clinicians' opinions are those who would have been of great interest. To identify how SDM in orthodontics can be improved, the thoughts, opinions and behaviours of those not engaging in it must be explored in order to understand how to remedy this.

#### 6.3.3.2 Recall bias

The iSHARE questionnaire was designed to be completed within 7 days of the consultation, but respondents in this study were asked to choose a consultation in recent memory. Arguably this could have resulted in a greater risk of recall bias if respondents chose a consultation from long ago. However, it was felt that restricting respondents to choosing one within 7 days was likely to have dramatically reduced the response rate if they had not had a decision-making consultation in this time. They were also asked to choose an interesting or challenging consultation and such a restriction may also have yielded limited and less interesting answers. It was also felt that clinicians were more likely to have chosen consultations that they remembered well regardless of how much time had elapsed which is why the respondents were not asked when the consultation occurred. Respondents were asked to choose interesting or challenging consultations because such interactions may have been more likely to elicit greater emotions than normal consultations and people are more likely to remember these (Kensinger, 2009).

One reason for lower levels of reported engagement by patients is that clinicians may have reflected more on their own behaviour when they were completing the questionnaire which was likely easier to recall than the patient's. Or, perhaps, during the decision-making consultations being assessed, the patient simply did not ask many questions or disclose their values even if the clinician invited them to. A lack of questions from the patient could be due to them feeling that they had been well-informed and therefore did not have many questions to ask, if any. Some patients do not want to be labelled "difficult" and thus abstain from taking a more active role in the decision-making process (Frosch *et al.*, 2012).

#### 6.3.3.3 Clinicians’ perspectives only

A clear limitation of the research is that the consultations described by clinicians were not observed by a researcher and so observer and patients’ perspectives of the consultation were not captured by this study. This means that it is not clear whether the barriers and facilitators reported by clinicians actually exist or are simply perceived by the clinician. Investigating patients’ perceptions on SDM may provide completely different data to the findings of this research which would help to add richness to the available literature about SDM in orthodontics. The perspectives of organisational leaders would help to develop interventions aimed at healthcare systems rather than individuals. This way a top-down approach to improving SDM could be implemented which makes improvements at the local level more likely (Joseph-Williams *et al.*, 2017).

### 6.3.4 Generalisability

In a report of the orthodontic workforce survey of the UK which was undertaken in 2005, 1660 orthodontic providers were identified, and this was before the existence of orthodontic therapists (a type of dental care professional who can provide orthodontic treatment under the supervision of a specialist orthodontist). 919 (55%) were on the GDC specialist list, 243 (15%) were NHS consultants, 432 (26%) were practitioner and non-specialist providers and 548 (33%) were specialist providers, 221 were training grades (13%) and 55 (3%) were community orthodontists.

In this research 32% of respondents were NHS consultants who did not work in specialist practice, 30% were specialist providers who were not working as NHS consultants, 5% were both NHS consultants and working as specialists in practice, 23% were specialty trainees, 4% were specialty trainees who also worked in specialist practice and 6% were DWSIs. 2% of participants worked in the community dental services. The proportions of NHS consultants, specialists, specialty trainees and those working in community dental services are similar to those from the 2005 report. Non-specialist practitioners are underrepresented in this research perhaps due to the strict inclusion criteria of having to have completed at least 30 orthodontic cases per year under the guidance of a specialist orthodontist. The sample were recruited via the BOS mailing lists and it may be that non-specialists are less likely to be members of the British Orthodontic Society which is a specialist organisation.

There was representation from all regions of the UK with greater distributions in the north and south of England and the least in Wales and Northern Ireland. The 2005 report showed that the geographic distribution of the workforce was 84% in England and Wales, 8% in Scotland and 3.5% in

Northern Ireland. In this sample, the distribution was similar as 86% of clinicians practiced in England and Wales, 12% in Scotland and 2% in Northern Ireland.

However, data from the 2005 workforce report was collected 21 years ago. It may be outdated and could be unrepresentative of the current workforce. It is not possible to say whether the sample is representative of orthodontic clinicians across the UK in present day and so the external validity of the research could be limited.

## 6.4 Future research

This research utilised an online survey which can only capture so much detail and it is not possible to undertake respondent validation without contacting people again. A follow-up study has been planned by the primary investigator to explore orthodontic clinicians' perspectives on SDM in more detail.

It has been recognised that implementing shared decision-making is challenging and no single intervention is the solution. In reality, multiple interventions which target different areas whilst complementing each other are required to support patients, individuals and organisations to integrate SDM across healthcare settings (Joseph-Williams *et al.*, 2017; Agbadjé *et al.*, 2020). It has been suggested that interventions to improve SDM should not be reliant on the use of tools since people's skills are more influential than tools. However, individual and organisational attitudes must first be addressed for people to use their skills to fully engage in SDM (Joseph-Williams *et al.*, 2017).

A Cochrane review has shown that interventions which target clinician and patient behaviour is more effective that those that target just one group (Légaré *et al.*, 2018). A secondary analysis of this review (Agbadjé *et al.*, 2020) revealed positive effects of interventions were most associated with:

- The functions of a) modelling and b) training
- 8 combinations of functions e.g. education + training + modelling + enablement
- Behaviour change techniques e.g. instruction of how to perform the behaviour

This research identified potential intervention functions and policy categories specifically in relation to orthodontic *clinicians'* perceived barriers and facilitators to making decision with patients as shown in Table 23. However, further research is required to find out what orthodontic *patients and organisational leaders* perceive to be barriers and facilitators to SDM. This will further help to identify which functions, combinations of functions and behaviour change techniques are likely to yield the greatest benefit in terms of improving SDM from all sides: clinician, patient and organisation. Research should then be undertaken to investigate whether the suggested interventions are effective in improving SDM in orthodontics and which interventions will best fit into existing clinical care pathways. This in turn should ensure best use of limited resources.

It is important to investigate whether barriers and facilitators to SDM as reported by patients and clinicians truly do have an effect to ensure that interventions are only developed to combat true barriers and not perceived ones. Patients' perspectives on their knowledge, experiences of, and attitudes, beliefs and perceived barriers and facilitators to SDM should be gained. The third perspective of an observer using objective observer-based outcome measures to record the extent to which SDM occurs in orthodontic consultations will add further information to this field of research. Then, combining the perspectives of clinician patient, and observer could be combined to inform development of interventions aimed at improving SDM in orthodontics. Examples include decision support tools for clinicians and patients and behaviour change techniques where appropriate.

## 7. <u>Conclusions</u>

Clinicians' perceptions of their engagement in SDM varies. Across the consultations studied, clinicians feel that they are generally engaging in high levels of SDM, especially with regards to:

1. Informing the patient that there is a choice to be made (choice awareness)
2. Explaining differences between treatment options (delivering medical information)
3. Giving the patient time to weigh up the advantages and disadvantages of the treatment options (time for deliberation)

Clinicians reported the lowest levels of SDM for the following components of shared decision-making:

1. The patient asking questions about the treatment options (delivering medical information)
2. The patient telling the clinician what was important to them (eliciting patient preferences)
3. The patient weighing up the advantages and disadvantages of treatment options (during or after the conversation) (the process of deliberation)

The theoretical domains which captured the most reported barriers were:

1. Beliefs about consequences: e.g. clinicians' beliefs about different treatment options resulting in significantly different, suboptimal or unpredictable outcomes.
2. Environmental context and resources: wider service issues out of the clinicians' control: lack of time, waiting lists, busy clinics.

3. Beliefs about capabilities: e.g. clinicians doubting a person's ability to understand information

The theoretical domains which captured the most reported facilitators were:

1. Social/professional role/identity: people taking an active role in the decision-making process, support from colleagues, and the clinician's confidence in their own professional skills and experience.
2. Skills: strong communication skills including use of visual resources to aid communication.
3. Environmental context and resources: having enough time, suitable working environment, availability of resources which support information-giving and a lack of financial pressure.

Interventions to address the challenges perceived by orthodontic clinicians in SDM as highlighted by respondents in this research should be aimed at:

- Designing education, training programmes and resources aimed at increasing clinicians' capability, opportunities and motivations to engage in it.
- SDM should be routinely taught in dental undergraduate education so that good SDM practices are more likely to be undertaken from an earlier stage in orthodontists' careers.
- Organisational changes: environmental restructuring, culture changes and policy developments to facilitate, improve and incentivise good SDM practices from the top down.
- This research provides the clinicians' perspective on SDM. Patients' perceptions of SDM in orthodontics is required to get an overall picture of the implementation issues with SDM in orthodontics from the patient's perspective.

Future research should involve in-depth qualitative investigations to explore these themes in more detail. Interventions aimed at addressing barriers identified by clinicians may help increase levels of SDM, but further research is required as to which interventions are truly effective.

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# 9. Appendix

**Main questionnaire content**

**Page 1 – Introduction and consent**

**What is this study about?**

This is a questionnaire-based study to explore orthodontic clinicians' perceptions of a specific decision-making consultation they have had with a patient. For the purpose of this research, we have defined a decision-making consultation as any face-to-face appointment where you are meeting with a patient to make a decision about their treatment e.g. which treatment option to pursue.

We would like to understand how clinicians engage in decision-making consultations and what they find easy or difficult about them. If possible, please choose a memorable decision-making consultation you found to be particularly interesting or challenging.

**What will this involve and how long will it take?**

Responses are pseudonymous but there are options following the survey for you to leave contact details if you are willing to be contacted about this research.

If you leave your contact details, the researcher will be able to link your responses to you but you will not be personally identifiable in any publication or presentation. This allows the researcher to link multiple questionnaires by the same participant or allows the researcher to discuss the participant's specific questionnaire in the follow-up interview.

Participation in the study is voluntary and you can withdraw at any point by closing this webpage. It is not possible to identify or withdraw responses if you click the "Finish" button. NHS employees are not expected to take part in the study during their normal working hours.

### Who has reviewed the study?

Ethical approval has been granted by the University of Leeds School of Dentistry Research Ethics Committee.

### What will happen to the information collected?

Once the study is complete a report will be written based on the findings. You may, if you wish, have a copy of this report by providing contact details in the appropriate section of the questionnaire. We plan to present our findings at a scientific conference and publish them in an academic journal. You will not be personally identified in any report or publication. Following publication, the data will be made publicly available via the University of Leeds Data Repository to allow academic challenge and for use in future research. Data is typically stored for ten years.

### Prize draw

To thank you for participating in this research, on completion of this survey you will automatically be entered for a prize draw for a £250 John Lewis voucher. The email address you leave for this will not be linked to your responses.

### How to contact us for further information

If you would like further information about this study please contact:

Veena Abigale Patel or Sophy Barber, School of Dentistry, University of Leeds, Worsley building, Clarendon Way, Leeds, LS2 9LU

Email addresses:

veenaabigale.patel@nhs.net

s.k.barber@nhs.net

If you agree with the above points and are happy to continue with the survey, please confirm by selecting 'yes' below. I consent to take part in this research:

- ☐ Yes
- ☐ No *(If ticked the participant is routed to page 8)*

**Page 2 – About you**

What is your job role? If you have more than one, please select as many that apply. If your job role is not included in this list, please do not complete this questionnaire.

- ☐ Specialty registrar in orthodontics (pre- or post-ccst)
- ☐ Specialist orthodontist
- ☐ Consultant orthodontist
- ☐ Dentist with special interest in orthodontics

Number of years practicing orthodontics including specialist training (if less than one year, please write "1") _______

Area of UK practicing orthodontics

- ☐ North of England
- ☐ English Midlands
- ☐ South of England
- ☐ Scotland
- ☐ Wales
- ☐ Northern Ireland

What is your main place of work?

- ☐ Dental hospital
- ☐ District general hospital
- ☐ Specialist orthodontic practice
- ☐ General dental practice
- ☐ Community dental services

Do you have another place of work? Please tick as many that apply.

- ☐ No
- ☐ Dental hospital
- ☐ District general hospital
- ☐ Specialist orthodontic practice
- ☐ General dental practice
- ☐ Community dental services

**Page 3 – About the consultation**

**You will now be asked a series of questions related to a specific shared decision-making consultation you had with one of your patients.**

Where did the consultation take place?

- ☐ Dental hospital
- ☐ District general hospital
- ☐ Primary care practice
- ☐ Community dental services

Please briefly describe the decision which was to be made during this consultation e.g., *"Missing upper lateral incisors, closing space versus opening space"*

Which age category does the patient fall into?

- ☐ Child
- ☐ Adolescent
- ☐ Adult

Was English the patient’s first language?

- ☐ Yes
- ☐ No

Did this affect the consultation in any way? (If answered “yes” to the previous question)

- ☐ Yes
- ☐ No

Please indicate how the consultation was affected by this.

Did anyone else attend with the patient?

- ☐ The patient attended alone
- ☐ Parent/guardian
- ☐ Other

If you selected Other, please specify: ____________________________________________

If somebody did attend with the patient, did they have any influence on the consultation?

- ☐ Yes
- ☐ No

Please briefly explain how they influenced the consultation. (If answered “yes” to the previous question).

Did anyone else attend with the patient?

- ☐ The patient attended alone
- ☐ Parent/guardian
- ☐ Other, please specify __________

If somebody did attend with the patient, did they have any influence on the consultation:

- ☐ Yes
- ☐ No

Please briefly explain how they influenced the consultation. *(Appears if the participant answered "yes to the previous question")*

**Page 4 – Your experience of decision-making during this consultation (modified version of the iSHARE questionnaire)**

When completing this questionnaire please think about the consultation in which you discussed the decision about treatment with the patient. You may have had several consultations with the patient about this decision. When you are completing the questionnaire, please think about all these consultations.

The following statements are about the patient and their parent/guardian, if they also attended the consultation, and about yourself. There are no right or wrong answers.

The answers should be based on your own perspective of the consultation.

*(Each question has the same Likert scale associated with it with the exception of question 15)*

- ☐ Not at all
- ☐ Hardly
- ☐ A little
- ☐ For a large part
- ☐ Almost completely
- ☐ Completely

**Q1.** At the beginning of the conversation, I said there was a choice with regard to the patient's treatment.

**Q2.** I explained what the advantages of the treatment options are.

**Q3.** I explained what the disadvantages of the treatment options are.

**Q4.** I explained the advantages and disadvantages of each treatment option equally well.

**Q5.** I checked whether the patient and/or parent understood the disadvantages of the treatment options.

**Q6.** I checked whether the patient and/or parent understood the advantages of the treatment options.

**Q7.** I told the patient and/or parent how the treatment options differ from each other.

**Q8.** The patient asked questions about the treatment options.

**Q9.** I said that it matters what the patient thinks is important.

**Q10.** I checked whether I understood what was important to the patient.

**Q11.** I helped the patient to weigh up the advantages and disadvantages of the treatment options.

**Q12.** I gave the patient time to weigh up the advantages and disadvantages of the treatment options (during or after the conversation).

**Q13.** The patient told me what was important to them.

**Q14.** The patient weighed up the advantages and disadvantages of the treatment options (during or after the conversation).

**Q15.** Has a decision about treatment been made?

---

- ☐ Yes, the decision has been made *(skips to question 16, does not allow question 17 to be answered)*
- ☐ No, the decision has not been made *(skips to question 17)*

---

**Q16.** The decision takes into account what the patient considers to be important.

**Q17.** I discussed with the patient what they need in order to weigh up the advantages and disadvantages of the treatment options.

**Q18.** Overall, do you feel that the patient was involved in the decision-making process as much as they wanted to be?

**Page 5- Reflective comments**

What does shared decision-making mean to you in your own orthodontic clinical practice?

Did you find this encounter easy, average or difficult?

- ☐ Easy
- ☐ Average
- ☐ Difficult

Please list up to 5 things which made it challenging/difficult to make decisions with your patient in this consultation? If you have time to, please explain why you found them challenging.

Please list anything you feel made it easier to make decisions with your patient in this consultation. If you have time to, please explain why they made it easier.

Do you have anything else you wish to share related to the themes explored in this questionnaire?

**Page 6 – Training and guidelines**

Have you ever received training on how to engage in shared decision-making?

☐ Yes

☐ No

Please provide brief details:

Are you aware of the NICE guideline on shared decision-making?

☐ Yes

☐ No

Did you find it useful to your practice? *(Appears if participant answered "yes" to the previous question)*

☐ Yes

☐ No

Please briefly explain your answer.

**Page 7 – Further discussion and prize draw**

Thank you for completing the survey. We are interested in understanding how people's experiences differ across different decision-making encounters. If you are willing to be contacted about a discussing this further or completing a further shortened survey for a different decision-making encounter, please tick the corresponding box below so I can contact you further about this. Please note that by indicating you wish to be contacted, your questionnaire answers will no longer be anonymous to the researcher, but you will not be personally identifiable in any publication or presentation. This allows the researcher to link multiple questionnaires by the same participant or allows the researcher to discuss the participant's specific questionnaire in the follow-up interview.

- ☐ I would like to discuss shared decision-making in more detail over video call e.g. Zoom, Teams.
- ☐ I would like to complete another survey on a different decision-making consultation
- ☐ I would like to discuss shared decision-making in more detail and complete another survey on shared decision-making
- ☐ I do not wish to be contacted

You have indicated that you wish to be contacted for a follow-up questionnaire or interview or both, please provide your email address below. If you have indicated you wish to complete another questionnaire, I will email you a link to a shortened questionnaire for a different consultation. If you have indicated you wish to be interviewed, I will contact you once the survey has closed. *(This question appears if the participant ticks one of the first 3 boxes)*

If you would like to be entered for a prize draw for a £250 John Lewis voucher, please enter your email address below. This will only be used for the purposes of the prize draw and will not be linked to the answers you have given in your questionnaire.

____________________________________________

**Page 8 - Please close the webpage and exit the survey (***this page only appears if participants click "no" to consenting to complete the survey)*

You have indicated that you do not wish to complete the survey, please close the webpage.

**Page 9 – Final page**

End of survey.

If you have any queries or concerns about this survey, please contact Veena Patel or Sophy Barber via email: veenaabigale.patel@nhs.net or s.k.barber@leeds.ac.uk