INVESTIGATING PATIENT AND CLINICIAN PERCEPTIONS OF FACIAL PROFILES AND THE PSYCHOLOGICAL ASPECTS OF ORTHOGNATHIC CARE

Thesis submitted in accordance with the
requirements of the University of Liverpool for the
degree of Doctorate in Dental Science in Orthodontics

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ABBREVIATIONS

BOS	British Orthodontic Society
OGN	Orthognathic
AOB	Anterior Open Bite
BSSO	Bilateral Sagittal Split Osteotomy
LF1	Le-Fort 1
GDP	General dental practitioner
LUDH	Liverpool University Dental Hospital
NHS	National Health Service
OPG	Orthopantogram
Pre/Post Bond-up	Before/after placement of fixed appliances (braces)
OMF Surgeon	Oral and Maxillofacial Surgeon
UoL	University of Liverpool

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ABSTRACT

Background: With an increasing prevalence of mental health issues among orthodontic patients there is wider collaboration between orthodontists and mental health professionals. An increasing number of orthodontic units are implementing a psychologist as part of the multidisciplinary team. Further research is required to clarify the psychological issues facing patients, and how to best manage these. Patient outcomes have been associated with multiple psychosocial factors, such as self-esteem and self-perception. Current evidence suggests that the perception of patients and orthodontists significantly differs. A mismatch in perceptions can compromise the treatment outcome. Whilst research has attempted to quantify these differences, there is a lack of qualitative research exploring this topic on a deeper level. More research is needed to clarify the differences in perceptions between orthodontists, surgeons and patients. The mixed quantitative-qualitative methodology utilised in this study will explore and clarify how patient perceptions differ to those of their clinicians. The study will also assess the current psychological services available to patients at Liverpool University Dental Hospital.

Aim: To explore the perception and psychology of orthognathic patients from the perspectives of both orthodontists and patients.

Methods: The study utilised a mixed qualitative-quantitative methodology. The project consisted of three main arms, including:

1) A service evaluation of the psychological services available to orthognathic patients at Liverpool University Dental Hospital. This involved:
    a. a retrospective analysis of 238 patient case notes

b. cross-sectional questionnaire analysis involving nine orthodontists and six psychologists
c. three semi-structured interviews with psychologists

2) A prospective cross-sectional questionnaire analysis of 100 orthognathic patients.
3) Semi-structured interviews with 14 orthognathic patients and six orthodontists, analysed using Interpretative Phenomenological Analysis (IPA) and Thematic Analysis, respectively.

Results: Service Evaluation- Over a third of patients presented with mental health issues. 85% of these were either anxiety or depression. Importantly, over a third of patients with mental health issues did not disclose their mental health on the medical history form, only revealing it when prompted by their clinician (orthodontist or OMF surgeon).

Referral rates to psychologists were low, with only eight (3.4%) patients referred over a year. This was an assessment-only service. Orthodontists lacked awareness of the wider services available for psychological support, unlike psychologists who were aware of multiple free, direct-access, resources.

Feedback from psychologists and orthodontists strongly supports growing the access to and scope of psychological services. Orthodontists lacked confidence in screening and managing mental health issues.

Questionnaire analysis- Orthognathic patients report below average self-esteem scores. Prevalence of self-reported mental health issues was high (46%). Class 1 profiles were rated most attractive by the majority of patients (86%), whilst the remaining 14% selected the mild class 2 profile. Class 3 profiles were perceived as less attractive and as being in greater need of surgery than class 2 profiles.

Whilst patients rated their own skeletal discrepancies as more severe than clinicians ($p<.0001$); surgeons and orthodontists did not differ in their ratings ($p=.12$). Despite agreement between the clinicians in the abovementioned ratings, surgeons rated patients at greater need of orthognathic surgery than their orthodontic colleagues ($p=.006$).

Patient and orthodontist interviews- Patients' motivations and expectations were a combination of physical and psychosocial factors. These psychosocial factors appear to be underappreciated by orthodontists. Patients' perceptions of their jaws were often associated with strong negative emotions. Similarly, unrealistic expectations were common, primarily the expectation that other people's behaviour towards patients will change following surgery. Social media appears to have a significant role in the patient journey, acting as both a source of information and a source of support.

Conclusions: This study concluded that:

1) Orthognathic patients have a high prevalence of mental health issues and a low self-esteem.
2) Orthodontists lack the confidence and training needed to screen patients for mental health issues, indicating a need for further training. Greater psychological support from mental health professionals is warranted.
3) Patients often display a combination of realistic and unrealistic expectations.
4) Patients and clinicians significantly differ in their perceptions. Patients rate themselves as being in 'greater need of surgery' and as having more severe malocclusions than clinicians.
5) Maxillofacial surgeons appear to rate patients as being in greater 'need of surgery' than orthodontists.

6) Class 2 profiles are perceived as more attractive and as less in need of orthognathic surgery than class 3 profiles by both surgeons and clinicians.

7) The use of social media is common and is a source of peer support for patients. Clinicians should educate and guide patients on its use.

1.0 CHAPTER 1: INTRODUCTION & LITERATURE REVIEW

1.1 INTRODUCTION

On a physical level, the aim of orthognathic treatment is to correct skeletal discrepancies affecting the jaws. This is often in the form of significant size differences between the upper and lower jaws. With that said, failure to acknowledge and manage any associated mental health issues, or unrealistic expectations, can result in poor patient satisfaction and worsening of the patient's mental health (Naini & Gill, 2008; Collins et al., 2014).

A 'normal' jaw relationship is when the mandible lies slightly behind the maxilla. This is referred to as a class 1 skeletal relationship. In a class 3 relationship, there is a discrepancy in their relation leading to a concave profile. This may be due to the maxilla being retruded/hypoplastic, the mandible being prognathic/hyperplastic, or a combination of the two (Mucedero et al., 2008). In a class 2 relationship, the facial profile is convex (fig. 1). This may be due to a retrognathic/hypoplastic mandible, prognathic/hyperplastic maxilla, or a combination of the two (Angle, 1899). The aetiology of skeletal jaw discrepancies is polygenic, involving an interplay of both environmental and hereditary factors (Mossey, 1999).

The prevalence of class 3 malocclusions in the Caucasian population is less than 5%. It is significantly higher in other ethnicities, for instance it is up to 12% in Chinese and Japanese populations (Mucedero et al., 2008). The prevalence of class 2 malocclusions in the caucasian population is approximately 20% (Todd & Lader, 1988).

Figure 1- Illustration of skeletal profile classifications. From left to right: Class 2, Class 1, Class 3.

Most orthognathic patients require two years of orthodontic treatment prior to surgery. This is followed by approximately six months of post-surgical orthodontics. The surgical procedure itself is carried out after growth has ceased, with most patients being in their twenties (Venugoplan et al., 2012). Orthognathic patients may present with a variety of concerns. These commonly include one or a combination of the following: dissatisfaction with their facial appearance, difficulty eating, phonetic problems or temporo-mandibular joint disorders (Chen et al., 2002). Importantly, studies have shown that orthognathic patients have a high prevalence of mental health issues (Collins et al., 2014). For this reason, an increasing number of orthognathic units are beginning to utilise the expertise of mental health professionals (Liddle et al., 2015; Sinnott et al., 2020). In addition, a mismatch between the perceptions of the orthodontist and the patient can be highly detrimental to the patient's mental health and their treatment satisfaction (Naini & Gill, 2008; Collins et al., 2014). More research is needed to clarify how patient perceptions differ to those of their clinicians. There has been a lack of studies using a mixed qualitative-quantitative methodology to explore and compare the perceptions of orthodontists and patients.

1.2 LITERATURE REVIEW

A national review of orthognathic surgery in the NHS looked at the co-morbidities and co-diagnoses of patients on a national level over a decade (Cunningham & Moles, 2009). Interestingly, less than 1% of the patients had a mental health diagnosis recorded. This figure was due to clinicians not logging psychological conditions on the system. Overall, the authors concluded that there is significant nationwide under-reporting of mental health issues. Orthodontists and maxillofacial surgeons have extensive training in their respective clinical fields; however they lack confidence in managing patients' mental health issues (Sinnott et al., 2020). It is clear that there would be significant benefits to having a clinical psychologist join the multi-disciplinary team. This is a step which several units in the UK have already undertaken (Cunningham et al., 1995: Sinnott et al., 2020). Limited NHS funding is an obstacle, hence more evidence is required to justify these additional costs. A clinical psychologist is a well-established member of the team in the management of cleft lip and palate patients, where their input is considered invaluable (Liddle et al., 2015). It may be that in the future they are seen as a fundamental part of the multi-disciplinary orthognathic team.

Orthognathic surgery in the UK

The number of orthognathic procedures undertaken in England appears to be increasing, with close to 1,500 procedures performed annually (Moles & Cunningham, 2009). Studies investigating what motivates patients to seek treatment have reported mixed conclusions. Some report predominately functional reasons, however, most highlight a combination of aesthetic and functional motivations (Burden & Pine, 1995; Williams et al., 2005; Stirling et al., 2007; RCSEng, 2013).

There is significant pressure on NHS services to reduce costs. This is not only in the form of reducing spending, but also in diverting finances to 'high priority' treatments. These are treatments deemed to have a strong evidence base justifying their value. Orthognathic treatment is currently under review, with many expecting there to be stricter regulations on who qualifies in the future (Ireland et al., 2020). In the past, primary care trusts (PCTs) were responsible for distributing and commissioning their own services. In 2006 they assembled a list of 'low priority' treatments, orthognathic surgery was one of them. However, each PCT had a different list. This lack of uniformity risked creating a nationwide 'post-code lottery' (Audit Commission, 2011). To avoid this, orthognathic services continued to be funded on a nation-wide basis. This issue re-surfaced in 2012 when the southern cluster of the South Central PCTs decided that all orthognathic treatment should be classed as low priority except for cleft lip and palate, severe sleep apnoea and post-trauma disfigurements (Ireland et al., 2020). The PCTs were due to implement this change when a major restructuring of the NHS disrupted their plans. The Strategic Health Authorities in England structure was replaced with the Health and Social Care reforms of 2012 (Ham et al., 2012). Since then, all orthognathic services have been commissioned centrally by NHS England itself. Subsequently, in 2012 the Royal College of Surgeons of England were tasked with producing evidence to support the commissioning of orthognathic services. The British Association of Oral and Maxillofacial Surgeons (BAOMS) and British Orthodontic Society (BOS) produced the commissioning guide for orthognathic procedures which was accredited by the National Institute for Health and Care Excellence (RCSEng, 2013). The guide recommended that TMD and speech difficulties were not indications for orthognathic surgery. It did recommend it for patients with functional and/or psychological symptoms and select cases of sleep apnoea. Unfortunately, the guide has not been fully adopted by NHS England (Hunt, 2015). In 2017

Interim guidelines for commissioning these services were published by the Chief Dental Officer (CDO, 2017). These outlined the recommended selection criteria for orthognathic surgery that is to be funded by the NHS (table 1). These are still classed as 'interim', and future services will be re-structured based on the existing evidence base. As such, in order for the NHS to decide on the most appropriate level of commissioning, it is essential to provide good quality research into orthognathic surgery.

Table 1: Guidance selection criteria for the commissioning of orthognathic surgery (CDO, 2017)

IOFTN 4 or 5
Functional symptoms must have an impact on quality of life
The multidisciplinary team confirms that orthodontic treatment is insufficient by itself to adequately correct these functional symptoms
Patients must have reached skeletal maturity
Orthognathic treatment should be low priority for the improvement of speech problems and TMD

The psychology of orthognathic patients

Physical attractiveness plays an important role in people's psychological development. Attractive people are perceived as friendlier**,** kinder, more intelligent and more successful (Dion et al., 1972; Sinko et al., 2018). On the other hand, people with facial disfigurements are more likely to experience ridicule and bullying. These can have profound negative effects on a person's psychological wellbeing and development (Cunningham et al., 1995).

It has been suggested that patient perceptions and expectations play an important role in treatment satisfaction (Chen et al., 2002). Exploring the patient's perceptions of their malocclusion, their motivations for seeking treatment, and understanding their expectations is

crucial to improving treatment satisfaction (Cunningham et al. 1995). Evidence suggests that patients' assessments of their own appearance is not consistent with that of the clinicians (Chan et al., 2008; Imani et al., 2018). This is likely to in turn affect a patient's assessment of their need for treatment ultimately their satisfaction with the outcome.

The majority of research has focused on patient satisfaction and changes in confidence following surgery (Kiyak et al., 1984; Cunningham et al., 1995; Lazaridou-Terzoudi et al., 2003). Over the years, there has been a growing appreciation of the importance of pre-operative psychology (Sinnott et al., 2020). Clinicians may inadvertently impose their beliefs and views on patients. They might guess what the patient is thinking, however if this assumption is incorrect there can be a mismatch between what the patient and clinician perceive the problem to be. What is considered 'normal' or 'ideal' is often derived from traditional teachings and observations and is not necessary the same for everyone. During orthodontic training clinicians will be taught 'ideal' treatment goals based on these traditional concepts of beauty. However, a deep understanding of what the patient perceives as beautiful is crucial for shared decision making. A qualitative study by Stanford et al. (2014) investigated what patients perceived as beautiful. A total of 15 prospective orthodontic patients were interviewed. The researchers reported that patients' concepts of beauty were formed from a combination of personal observations, the influence of family friends, and the media. The study highlighted how a wide variety of biopsychosocial factors impact a person's concepts of beauty. They concluded that traditional concepts of beauty, derived from population 'norms', often did not match those of the patients. The study was not able to rank which factors had the most influence, e.g., for some patients the media was the most influential factor, whilst for others it was friends and relatives. A systematic review investigating the psychosocial effects of orthognathic surgery highlighted how a wide variety

of factors influence patient perception, which in turn leads to a large variation of what patients consider a successful outcome (Cremona et al., 2022). They concluded that for a successful outcome objective clinical data should always be paired with the patient's subjective views. Clinicians should appreciate that objective measures of treatment goals, such as cephalometric norms, often do not match patients' subjective views (Chew et al., 2007).

On a similar note, Vesey (2019) investigated the influence of patient race on how orthodontists and OMFS surgeons perceived patients. In this questionnaire-based study they presented a range of class 3 malocclusions to surgeons and orthodontists, asking them to rate their need for surgery and attractiveness. They concluded that there were significant differences in the perceptions of surgeons and orthodontists. Ultimately, it appears the views of patients, orthodontists and surgeons all differ to a notable extent. The literature is sparse in qualitative research investigating how these views differ, something clinicians must be aware of when embarking on treatment. It also highlights the importance of communication between the orthodontists, OMFS surgeons and patients to explore and clarify these differences before any irreversible treatment is carried out.

Another crucial aspect for orthodontists to explore is the patient's motivation. A strong motivation for treatment has been linked to greater satisfaction with outcomes (Meade & Inglehart, 2010). Several studies have investigated motivations and the factors that influence patients' decisions to pursue surgery. Patcas et al. (2017) carried out a large audit investigating what motivates prospective orthognathic patients to undergo treatment at two units, one in the United Kingdom (UK) and the other in Switzerland. The most common motivating factor selected by UK participants was an improvement in appearance (91%, n=149). This was followed by functional improvements (73%), psychosocial wellbeing

(52%), pain relief (5%), and speech improvement (4%). Studies have also shown that friends and family have a significant role in the decision-making process (Jacobson, 1984; Flanary et al., 1985; Garvill et al., 1992). Whilst quantitative studies have been useful in highlighting the main motivating factors, they lack depth and detail. For instance, an improvement in appearance may be the main motivating factor for a patient, however qualitative research is required to clarify what exactly this means to them, the origins of this motivation, and the expectations associated with it. For example, could peer pressure or social media be the driving factor behind a patient's motivation to improve their appearance? In an interview-based study Forssell et al. (1998) found that an individual's self-perception and self-concepts (such as self-esteem) significantly influenced their motivation to pursue orthognathic surgery. In another qualitative, interview-based, study Ryan at al. (2012a) explored patient motivations for orthognathic surgery. Patients were found to be motivated by an inter-related combination of physical and psychosocial factors. This complex relationship cannot be appropriately captured in a quantitative study. Patient's previous experiences in life, e.g. bullying, were related to their motivation to improve their appearance. The key takeaway message from the study was to explore motivations on a deeper level as they are usually multi-faceted, and not as simple as 'I want to look better'. The study also highlights that patient's motivations lie on a continuum from internal, e.g. an inner desire for more efficient mastication, to external, e.g. a desire to find a partner. If the latter predominates it should be considered as a 'red flag' for clinicians to investigate. The authors also reported that motivation is intimately related to the impact the malocclusion has had on a patient's life.

Studies have also investigated the relationship between motivation and satisfaction. A review paper (Peterson & Topazian, 1976) looking into cosmetic surgeries found that patients with vague expectations were more likely to be unsatisfied. They also reported that having friends

and family be the driving motivators for surgery was associated with dissatisfaction. Furthermore, a lack of support from one's social circle (Holman et al., 1995; Chen et al., 2002), or excess pressure from others, or unrealistic expectations (Flanary & Alexander, 1983; Chen et al., 2002) are all associated with outcome dissatisfaction. Mental health issues such as Body dysmorphic disorder (BDD) and low self-esteem have also been associated with treatment dissatisfaction (Cunningham et al., 1995; Rispoli et al., 2004).

Body dysmorphic disorder is described as a subjective feeling of ugliness or a physical defect which the patient feels is noticeable to others although their appearance is within normal limits (Thomas, 1984). The incidence of BDD in orthognathic patients is between 7% and 16% (Crerand et al., 2004; Vulink et al., 2008). A patient's attractiveness does not necessarily correlate with their motivation for surgery. Hence it may not be wise to assume one's desire to look more attractive is the sole motivating factor (Vargo, 1996).

1.3 RATIONALE FOR THIS STUDY

Under a financially strained NHS, the question of whether orthognathic surgery should be funded has been a topic of debate. As previously discussed, some NHS commissioning bodies believe the procedure should be decommissioned as they feel it has a low benefit to cost ratio. Many view the procedure as not contributing to 'health', whilst others argue that it has a significant impact on mental wellbeing. If funding for this expensive procedure is to continue it is important that there is robust evidence to justify it.

In recent decades society has developed a much more holistic view of what health is. This is reflected in the World Health Organisation's updated definition of 'health', which highlights the importance of mental wellbeing (WHO, 2020). As orthognathic surgery can result in such

dramatic physical changes, it is important for researchers to investigate the psychological effects.

This project will improve understanding of how patients perceive their facial profiles and need for surgery. It will clarify if patients view facial profiles differently from clinicians. It will explore what motivates patients to undergo this invasive procedure and their expectations/concerns. It will improve understanding of the mental health issues orthognathic patients face and the psychological management offered at the Liverpool University Dental Hospital.

Understanding these aspects is crucial when discussing treatment options and consenting patients. It will allow orthodontists to address patient concerns more effectively, improving overall care. In addition, the qualitative approach used will explore the patient perspective at a deeper level.

With the future financing of orthognathic surgery under scrutiny, this project can highlight its impact on individuals. The explorative nature of this study will identify areas which require more focused future research.

2.0 CHAPTER 2: AIMS AND OBJECTIVES

2.1 AIMS

To explore the perception and psychology of orthognathic patients from the perspectives of orthodontists and patients.

2.2 OBJECTIVES

To further understanding towards the project aim, the research objectives were to explore:

- How patients, orthodontists and surgeons perceive the facial profiles of orthognathic patients
- Patient expectations, motivations and concerns regarding orthognathic surgery
- How patients discover and research orthognathic treatment
- The prevalence of mental health issues amongst orthognathic patients
- The psychological services available for orthognathic patients at the University of Liverpool Dental Hospital
- How patients' self-esteem relates to mental health

3.0 CHAPTER 3: ETHICS, SPONSORSHIP AND DATA MANAGEMENT

3.1 ETHICAL APPROVAL, SPONSORSHIP & INDEMNITY

Ethical approval was provided by HRA and Health and Care Research Wales (REC reference: 20/PR/0929; IRAS project ID: 291300. Appendix I). The University of Liverpool sponsored the study (ID: UoL001589. Appendix II). The University of Liverpool holds Indemnity and insurance cover with Marsh UK LTD, which applied to this study. This insurance would meet any legal liability of the sponsor for harm to participants arising from the management or design of the research.

3.2 DATA HANDLING & CONFIDENTIALITY

Patient confidentiality was maintained throughout the study. Transcripts were coded, removing identifiable information. All data was stored on a secured university laptop and a secured, password protected, University network drive. The laptop was kept in a locked drawer at the Liverpool University Dental hospital. Data was not available to anyone not involved in the project. Microsoft Teams interviews were carried out through a secure NHS network on a University laptop, which was not taken out of the dental hospital.

During analysis care was taken to ensure no unique experiences that have the potential to identify patients were presented.

3.3 ARCHIVING & DATA MANAGEMENT POLICY

Data was managed in accordance with the General Data Protection Regulation 2016 and the Data Protection Act 2018. It followed the University of Liverpool 'Research Data Management Policy'. All research data is owned by the University of Liverpool. It will remain within the University even if the researchers leave the institution. The anonymised

research data will be securely stored on a university computer by the Chief Investigator for a minimum of 10 years after the completion of the study. Data will then be irreversibly discarded. The Computing Services Team at the University of Liverpool (UoL) will oversee the secure disposal of all IT data, ensuring it is deleted in an appropriate and irreversible manner that complies with the UoL Information Security Policy. There were no incidents of lost or compromised data during the study.

3.4 FUNDING AND BUDGET

Funding was provided by the UoL DDSc fund. Printers at the Liverpool University Dental Hospital were used to print the questionnaires, this cost approximately £75. There were no additional costs.

4.0 CHAPTER 4: SERVICE EVALUATION OF THE PSYCHOLOGICAL SERVICES AVAILABLE FOR ORTHOGNATHIC PATIENTS

4.1 ABSTRACT

Introduction: With mental health issues on the rise, orthodontists are increasingly appreciating the role of psychology in healthcare. More orthognathic units across the world are implementing psychological services as part of their treatment. To date, the availability and suitability of the psychological services at Liverpool University Dental Hospital has not been explored.

Aim: To evaluate the psychological services available for orthognathic patients at Liverpool University Dental Hospital.

Methods: The study consisted of three arms.

1) Retrospective evaluation of 238 case notes to assess the prevalence of mental health conditions and related referrals.
2) Questionnaire analysis of orthodontist and psychologist views on the current state of the NHS psychological services.
3) Semi-structured interviews with psychologists discussing the psychology of orthognathic patients.

Results: Out of the 238 patient records, 86 (36%) self-reported a mental health issue. A significant minority of these were not reported on medical history forms. Referral rates to psychologists were low, with a total of eight patients referred. Orthodontists lacked awareness of external direct-access services available for psychological support. Overall, there was significant dissatisfaction with the current state of the psychological services

among orthodontists. Commonly cited concerns were lack of funding, lack of access to psychological support and long waiting lists.

Conclusion: There was a high prevalence of mental health concerns among orthognathic patients. Orthodontists and psychologists acknowledge the importance of managing mental health, which is unmatched in current service provision. Further training in, and greater availability of, psychological support services for orthognathic patients is recommended.

4.2 INTRODUCTION

Some orthodontic departments have begun seeing the presence of psychologists as an essential part of the multidisciplinary team (Clarke et al. 2005; Sinnott et al., 2020). This is likely related to the increased prevalence of mental health conditions such as Body Dysmorphic Disorder (BDD) in patients seeking cosmetic treatment (Cunningham et al., 1995). It may also be that in a world with an ever-increasing focus on appearance, patients' expectations are becoming more unrealistic, and as a result orthodontists seek the support of mental healthcare professionals (Clarke et al. 2005; Sinnott et al., 2020).

Orthodontists refer patients to psychology services when they feel this is required, however, screening and referral criteria are unclear (Morris, 2006). This position likely reflects resource constraints and mirrors the position at the current study's setting. At LUDH patients can be referred to a psychologist for an assessment only service at the clinicians' (orthodontist or OMF surgeon) discretion. There are no services within the hospital offering long term psychological therapy to orthognathic patients. If a patient requires ongoing treatment they are usually referred to their GP, who would then refer to NHS mental health services.

Most orthodontists are not adequately trained to screen for psychological conditions (Naini &

Gill, 2008). There is concern that if the orthodontist fails to identify these conditions, then the patient's expectations may be left unmet. Simply correcting their skeletal jaw relationship will not necessarily lead to a satisfied patient, which is ultimately the primary aim of orthodontic interventions (Liddle et al., 2015). Ultimately, orthognathic treatment is a long journey with many risks, and some patients with psychological conditions may not be ready to undergo the journey.

The main reasons orthognathic patients seek treatment are functional and/or aesthetic in nature (Stirling et al., 2007). Despite this, a significant minority dropout before the surgery. Reports suggest a pre-surgical dropout rate of approximately 6-7% (Asquith et al., 2009; Muqbil & Hodge, 2012). These were often because the patients' desired aims were addressed by simple alignment (Muqbil & Hodge, 2012). However, in some cases dropout was attributed to poor compliance with treatment. It should be noted that the stage of treatment at which patients dropped out was not always clearly recorded or reported (Stirling et al., 2007). The reasons for drop out and the stage could account for variation or bias in how we understand patient responses. However, this could also indicate inconsistency in treatment pathways.

Some patients report a mixed view of the pre-surgical information provided to them, suggesting variation in the availability and adequacy of information provided to make an informed decision. Stage appropriate counselling has a clear role in supporting patients to make informed decisions about their holistic care (Stirling et al., 2007; Muqbil & Hodge, 2012).

Physical and/or mental health concerns were also reported as a causative factor in attrition (Muqbil & Hodge, 2012). Dropout due to mental health concerns could suggest that patients

are not appropriately briefed or counselled, which may be compounded by high rates of unreported mental health concerns. For some time, concerns have been reported about availability of access to psychological support during orthognathic treatment (Asquith et al., 2009). Incomplete assessment may mean that patient's desired treatment outcomes are not fully realized, which may lead to an early exit from treatment with patients reporting lower satisfaction.

Patients may decide to not pursue orthognathic treatment for a wide variety of reasons, and it is difficult to extrapolate the exact reasons. However, the above reports do suggest that a significant minority of patients commence pre-surgical orthodontics only to then dropout (Asquith et al., 2009; Stirling et al., 2007; Muqbil & Hodge, 2012). Whilst a proportion of these may do so because they are satisfied with alignment alone, this may suggest a failure of the consent process. During initial appointments the option of alignment only is always discussed and offered to patients. In theory if this discussion process is robust then there should be little to no patients who abandon surgery. A psychologist can play an important role in the consent process in a variety of ways. For instance, a deeper exploration of expectations and concerns may allow the patient to conclude that simple alignment is the best option for them. Identifying underlying psychological conditions or unrealistic expectations can prevent the patient from making a decision which ultimately is not in their best interest.

4.3 RATIONALE FOR PROJECT

The literature highlights shortcomings to orthodontists' ability to identify and manage mental health conditions (Naini & Gill, 2008). To this end, authors have proposed that input from a psychologist can be invaluable. Benefits include clarifying patient concerns (Muqbil and Hodge, 2012), screening for mental health issues, identifying patients unsuitable for treatment (Asquith et al., 2009), aiding the decision making/consent process (Morris, 2006), managing

expectations, and supporting patients through emotional reactions (Stirling et al., 2007).

This project aims to clarify the nature of the psychological services available at Liverpool University Dental Hospital. With a growing prevalence of mental health issues and an increasing appreciation of the importance of consent and joint decision making, the orthodontic profession needs to explore the state of mental health in orthognathic patients and clarify the needs which should be addressed.

4.4 AIM

The aim of this chapter was to evaluate the psychological services available for orthognathic patients at Liverpool University Dental Hospital.

4.5 OBJECTIVES

To further understanding towards the project aim, the research objectives were to explore the:

- psychological support available for orthognathic patients, including the pathways involved, referral patterns and outcomes.
- prevalence of mental health issues in orthognathic patients.
- views of orthodontists and clinical psychologists regarding the state of the psychological services and their management of patients with mental health issues.
- level of orthodontist training in, and confidence in, carrying out psychological assessments.
- qualitative feedback from clinical psychologists regarding the psychological services.
- characteristics and outcomes of patients referred to a clinical psychologist.

4.6 METHODOLOGY

4.6.1 DESIGN

The service evaluation consisted of three inter-related parts, summarised in figure 2:

A) Retrospective case note analysis: The case notes of patients seen on an orthognathic clinic at Liverpool University Dental Hospital during the period of 01/01/19 to 31/12/19 were retrospectively analysed.

B) Cross-sectional questionnaire survey: Six psychologists and nine orthodontists were asked to complete a questionnaire (appendix III) aimed at obtaining their views on the current psychological services available.

C) Semi-structured interviews with psychologists: Semi-structured interviews with three clinical psychologists involved in the management of orthognathic patients. These aimed to gain a deeper understanding of their views on the management of mental health issues in this patient base.

Figure 2: Flowchart outlining the structure of the study.

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The three arms of the project are described in greater detail below.

4.6.2 A) METHODS-RETROSPECTIVE ANALYSIS OF CASE NOTES

The clinical notes of patients seen on an orthognathic clinic from the 01/01/19 to 31/12/19 were collected and analysed using Microsoft Excel.

PARTICIPANTS

A total of 247 patients were identified. Of these, nine case notes could not be retrieved, making the final cohort 238. The mean patient age was 25 years (range: 17-40), with the majority female (146 females, 92 males). The most common ethnicity was Caucasian (199) followed by Afro-Caribbean (21), East Asian (11), South Asian (6) and Hispanic (1).

Patients were treated by four orthodontists. The number of patients treated by each of the four orthodontists was as follows: 96, 75, 43 and 32.

DATA COLLECTION

The following data was collected and directly input into a Microsoft Excel spreadsheet: Demographic data (age, gender, ethnicity); Self-reported mental health conditions declared on the medical history form (this form is completed by patients whilst in the waiting room); Self-reported mental health conditions noted by the orthodontists or surgeons in the notes (only the first five appointments were analysed to avoid conflating the data with mental health issues developed further into the treatment); Whether a referral to a clinical psychologist was made; If referred, the waiting times to see a psychologist were recorded.

The notes of all patients identified as being referred to a clinical psychologist were further investigated in detail. Information extracted included: Reasons for referral; Analysis of patient's expectations, motivations, and mental health; Recommendations for further treatment; Whether the patient continued with orthognathic treatment; Key findings from the psychology report (including results from screening surveys).

Prior to seeing a psychologist, patients are sent out a battery of eight screening questionnaires. These are briefly described below:

Hospital anxiety and depression scale (HADS) (Zigmond and Snaith, 1983): 14-item survey assessing symptoms of anxiety and depression. Originally designed for hospital inpatients, but use has popularized beyond this setting.

Derriford Appearance Scale-DAS 59 (Harris and Carr, 2001): This screening questionnaire is specifically designed for patients with disfigurements. It aims to objectively measure the psychological distress a patient is experiencing due to disfigurements and deformities.

Motivation Questionnaire (Baron et al., 2002): Aims to assess what motivates a patient and the factors which influence the individual's motivation. The survey aims to assess the impact of others on the patient's motivation and to highlight areas which may be potentially unrealistic.

Rosenberg self-esteem scale (Rosenberg, 1965): A 10-item questionnaire which aims to quantify an individual's self-esteem.

Abnormality scale (Snyder and Fromkin, 1977): A 8-item scale on which patients rate how 'abnormal' they feel specific parts of their body are, including their jaws, face, hair, torso, physical shape, weight, height and overall appearance.

Social avoidance and distress scale (SADS) (Watson and Friend, 1969): A 28-item scale aiming to quantify aspects of social anxiety such as distress, fear and social avoidance. It attempts to differentiate between social anxiety and social avoidance in different aspects of life.

MBSRQ-BASS (Multidimensional Body Self Relations Questionnaire- Body Areas Satisfaction Scale) (Cash, 2000): This 9-item scale aims to assess patient's satisfaction with specific body areas, including their jaws, hair, face, torso (lower, mid and upper) muscle tone, weight, height, and overall appearance.

Data analysis: Results were analysed using Microsoft Excel and descriptive statistics were used to display and interpret the data. Findings from the psychologist reports were condensed and presented in both prose and table form.

4.6.3 B) METHODS- CROSS-SECTIONAL QUESTIONNAIRE SURVEY

Nine orthodontists and six clinical psychologists completed questionnaires containing nine questions (appendix III). A mixture of open and closed questions were used to elicit understanding. Items included: The role of a psychologist in the management of orthognathic patients; Past training in the management of patients with mental health issues and desire for further training in this area; Referral routes; Satisfaction with the current psychological services; Limitations of the psychological services and suggestions for improvement.

Analysis: Results were analysed using Microsoft Excel. Descriptive statistics were used to display and interpret the data.

4.6.4 C) METHODS- SEMI-STRUCTURED INTERVIEWS

Semi-structured interviews were carried out with three clinical psychologists. The aims were to explore their opinions of the current psychological services and the management of orthognathic patients with mental health issues.

Interviews were recorded using Microsoft Teams. They were subsequently transcribed verbatim into Microsoft Word. The interviews were analysed using Thematic Analysis (Braun and Clarke, 2006). This method of analysis was chosen as it is a widely used and is a

tried and tested method of identifying patterns and themes in qualitative data. In contrast to other qualitative methods, thematic analysis is not associated with a specific theoretical perspective, making it an adaptable and non-specific method (Green and Thorogood, 2014).

Broadly speaking thematic analysis was carried out using the six-step approach described by Braun and Clarke (2006). These steps were as follows: Familiarization with the data, coding, searching for themes, reviewing themes, defining the themes, and consolidating the information into a report. As there is a lack of a standardized and universally accepted protocol for thematic analysis, it is important for researchers to outline their process. As such, this process is described in more detail below.

Familiarization: Interviews were viewed multiple times to ensure not only accuracy of the text, but also that intonations and non-verbal cues were captured. Key to this stage was being inclusive and open minded, as well as continuously reviewing the data.

Coding: Relevant information from sentences was coded. Switching between interviews allowed greater familiarization with recurring themes and for refinement of codes.

Searching for themes: Codes were merged into themes. A theme could sometimes emerge from a single code if deemed significant enough. Often multiple codes were grouped under a theme.

Reviewing themes: Themes were reviewed multiple times, re-evaluating and editing them across the different interviews. It is important for this process to be carried out over a long period of time because it allows the researcher time to view the themes with a fresh perspective and appreciate different interpretations.

Defining themes: Themes were named. Quotes which represent them were selected. Themes

were discussed with the supervisory team as analysis progressed.

Generating a report: Discussion points from the data were noted down, and each discussed in the context of the wider literature supported by appropriate quotes.

4.7 RESULTS

4.7.1 A) RESULTS FROM THE RETROSPECTIVE CASE NOTE ANALYSIS

All new patients complete a medical history form. This form contains a question specific to mental health, "*Do you have any issues with your mental health*?". Fourteen case notes (5.8%) did not contain a medical history form and 56 (23.5%) had a mental health issue noted on the medical form. Notably, when the clinical notes were fully examined, the number of patients with mental health issues increased to 86 (36.1%), meaning 35% of the patients with mental health issues did not disclose them on the medical history form. Instead, these patients divulged them only when the orthodontist specifically asked them about mental health. Patients who stated they were depressed were recorded as having depression. As such, conditions were self-ascribed and may not have been associated with a confirmed diagnosis. The two most commonly encountered conditions were depression (27; 11.3%) and anxiety (24; 10.1%), with 22 (9.2%) respondents experiencing both depression and anxiety. Less common conditions were bulimia (5; 2.1%), anorexia (3; 1.3%), bipolar (3; 1.3%), personality disorder (2; 0.8%). Three patients reported experiencing suicidal thoughts.

A total of eight patients (3.4%) were referred for a psychological assessment. The average waiting time from referral to being seen by a psychologist was 3.2 months (range: 2.5-4.1 months).

The eight reports also summarised the findings of the screening surveys patients were asked to complete. Numerical scores for the questionnaires were not provided by the psychologists,

just a written interpretation of the results. It should be noted that the findings of these reports are highly individualized and difficult to interpret out of context. Only two of the eight reports advised that the patient was ready to proceed with treatment. The reports recommended that the remaining six seek psychological therapy to stabilize their mental health, followed by a review period, before being re-assessed for suitability to proceed.

All patients scored low self-esteem on the Rosenberg self-esteem scale **(RSE)**; moderate or high for anxiety and/or depression **(HADS);** commonly experienced feelings of inferiority with associated moderate to strong emotional reactions and social anxiety **(DAS 59)**; except for one who scored 'a little abnormal' on the **Abnormality scale**, the remaining seven scored their jaws 'abnormal' or 'highly abnormal'. Abnormality corresponded with high reports of dissatisfaction with the teeth, smile and jaws in all patients on the Multidimensional Body Self Relations Questionnaire - Body Areas Satisfaction Scale **(MBSRQ-BASS),** with variance in satisfaction with the rest of their appearance, some were "satisfied" and others "mostly dissatisfied". The reported experiences of **Social avoidance and distress (SADS)** varied, with all patients reporting moderate to severe social distress. Conversely, social avoidance varied markedly with some patients almost always avoiding social interactions whilst others did not. In relation to the **Motivation Questionnaire**, patients noted an array of factors. Most were considered realistic, such as "I will smile more". However, some were considered unrealistic. These included "I will feel normal" and "I will be happier". These were considered unrealistic as they are not aspects the patient has control over. Table 2 summarizes the results of the screening questionnaires. It should be noted that displaying these reports in such condensed tables is reductionist and omits much of the context and nuance of the psychological assessment.

Table 2: Summary of the screening questionnaire outcomes for patients referred to a psychologist. Green denotes patients who were advised they could proceed with orthognathic treatment

	Pt 1	**Pt 2**	**Pt 3**	**Pt 4**	**Pt 5**	**Pt 6**	**Pt 7**	**Pt 8**
Reason for referral	Bipolar disorder	Severe anxiety & depression	Under psychiatrist for bulimia	Severe anxiety and depression	Severe anxiety and depression	Under psychiatrist for anorexia	Borderline personality disorder	Severe anxiety and depression
Unrealistic expectations?	No	No	Yes	Yes	Yes	No	Yes	Yes
Suicidal thoughts	Yes	No	Yes	No	No	No	Yes	No
HADS	Anxiety & Depression	Anxiety & Depression	Anxiety	Anxiety & Depression	Anxiety & Depression	Anxiety & Depression	Anxiety	Depression
DAS59	Strong	Strong	Strong	Strong	Moderate	Strong	Moderate	Strong
Motivation	Unrealistic	Unrealistic	Mostly realistic	Unrealistic	Unrealistic	Mostly realistic	Unrealistic	Unrealistic
RSE	Low	Low	Low	Low	Low	Low	Low	Low
Abnormality scale	Highly abnormal	Abnormal	A little abnormal	Highly abnormal	Highly abnormal	Highly abnormal	Highly abnormal	Abnormal
SADS	Avoidant & distressed	Avoidant & distressed	Avoidant & distressed	Distressed only	Avoidant & distressed	Distressed only	Avoidant & distressed	Distressed only
MBSRQ-BASS	Mostly dissatisfied	Satisfied	Dissatisfied	Satisfied	Satisfied	Mostly dissatisfied	Satisfied	Dissatisfied

KEY THEMES FROM THE PSYCHOLOGIST REPORTS

Following analysis of the psychologist reports the following themes were prominent. All patients reported becoming conscious of their jaws in the early to mid-teenage years. They all experienced bullying during adolescence. Psychologists had concerns with patients' abilities to cope with surgery and the associated facial changes. They advised that it would be beneficial for patients to develop coping strategies prior to treatment. In six reports the psychologists expressed concerns with unrealistic expectations. These mostly consisted of patients expecting the procedure to change the way others behave towards them. These are factors outside of an individual's control, and they are unlikely to be affected by their appearance to a significant extent. They stated that if these expectations are not managed the patient's mental health may deteriorate once these expectations are not fulfilled. More specific details were not outlined in the reports. The two patients for which the psychologists reported no significant contra-indications to proceeding with treatment both had a history of eating disorders (bulimia and anorexia). Both patients had made an almost full recovery and were under the regular care of a psychiatrist. Only the two patients who were deemed 'psychologically fit' enough for orthognathic treatment had begun pre-surgical orthodontic treatment. Four were awaiting further mental health assessments and support. The final two patients were due to be reviewed.

4.7.2 B) RESULTS FROM THE QUESTIONNAIRE SURVEY

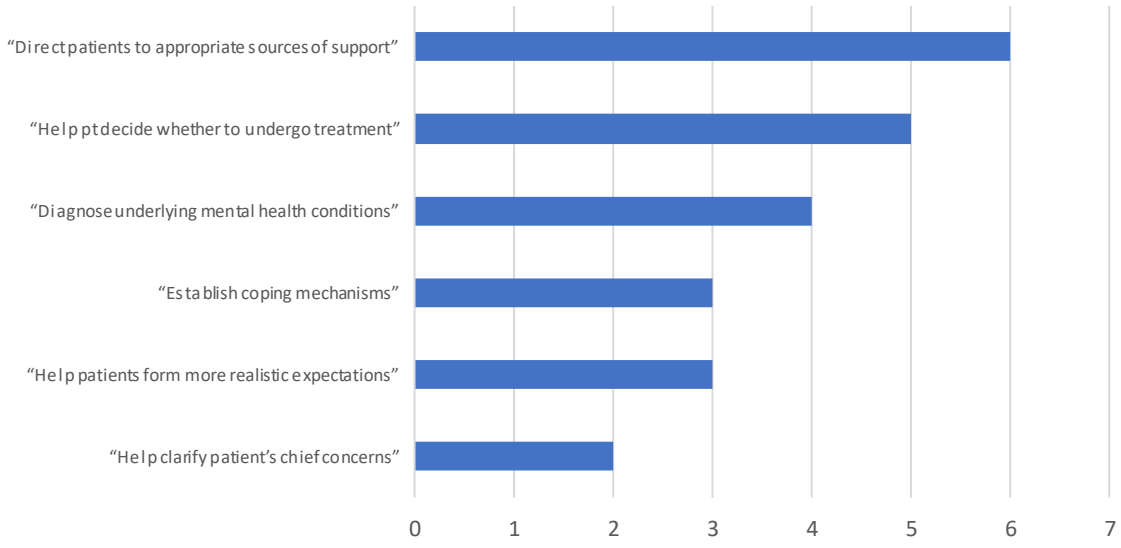
Nine orthodontists and six clinical psychologists completed the questionnaires outlined in appendix III. The results are outlined below.

Analysis of psychologist questionnaires (N=6): NB-multiple responses were permitted.

All six psychologists felt that the **quality of referrals** was "Good". None felt there was any

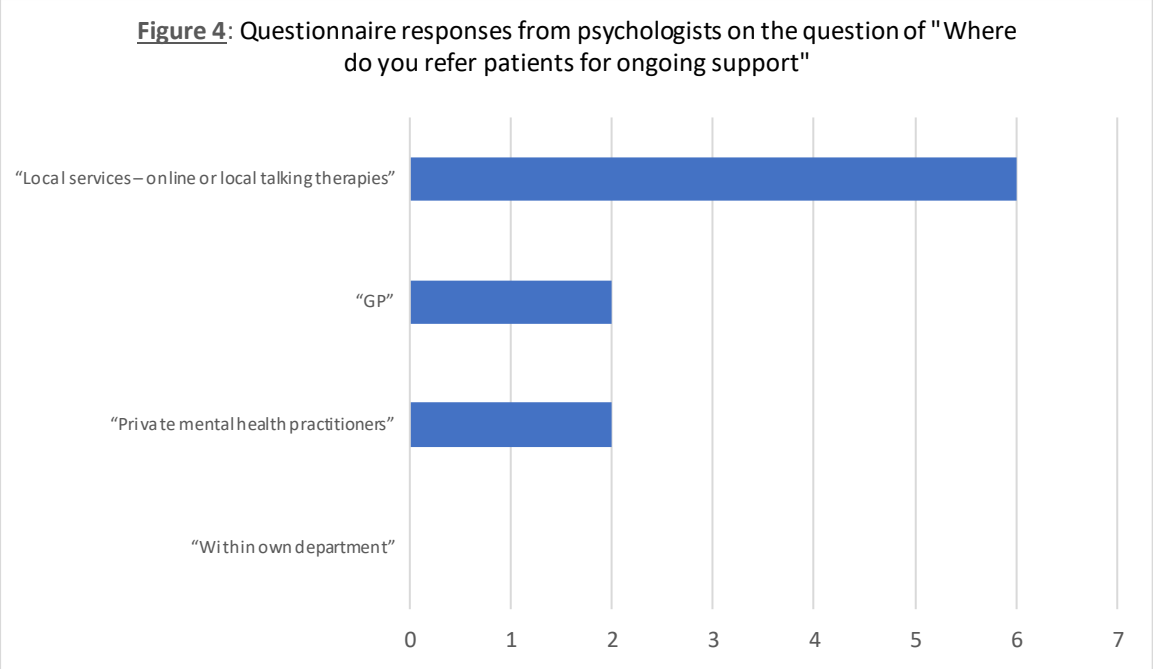
missing information. Psychologists were asked what the **benefits of patients seeing a psychologist are**. As outlined in figure 3, all selected the option of "direct patients to appropriate sources of support".

Figure 3: Questionnaire responses from psychologists on the question of "Perceived benefit of patients seeing a psychologist"



All psychologists felt it would be beneficial for patients to see them on an on-going basis. Likewise, they all believed it would be beneficial for them to be present on joint orthognathic clinics.

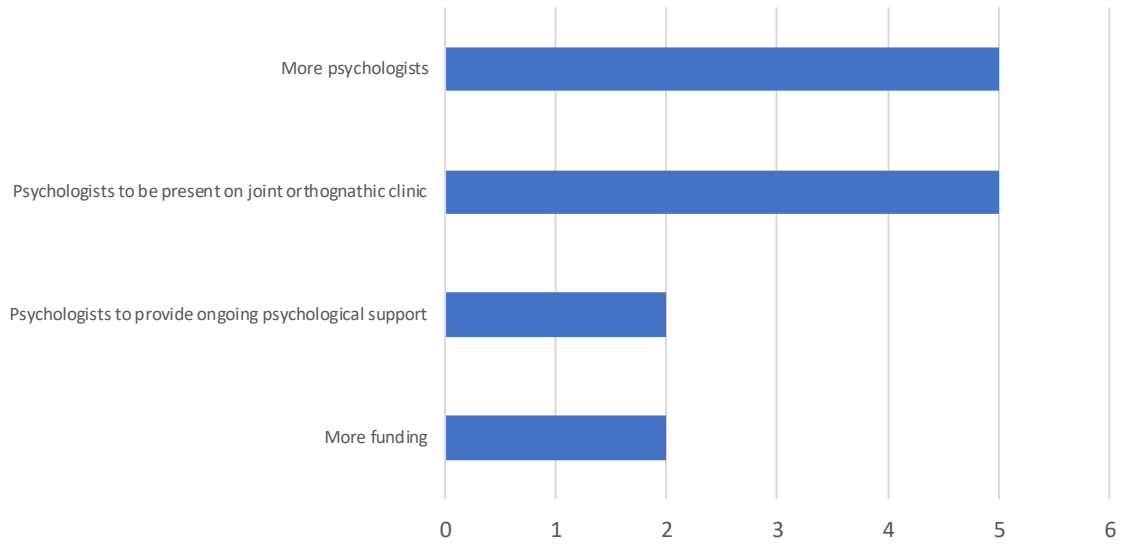
When psychologists were asked **where they refer patients for ongoing support**, all of them stated "Local services- online or local talking therapies". Notably, none selected their own department, highlighting that they do not provide ongoing support, see figure 4.



Five of the six psychologists stated that **their training** consisted of watching "orthognathic related webinars/lectures". One psychologist selected "no training" and another selected "practical training by a colleague". None had been to an official course.

When asked **what changes to the services they would like**, five wanted more psychologists and for them to be present on the joint clinic, see figure 5.

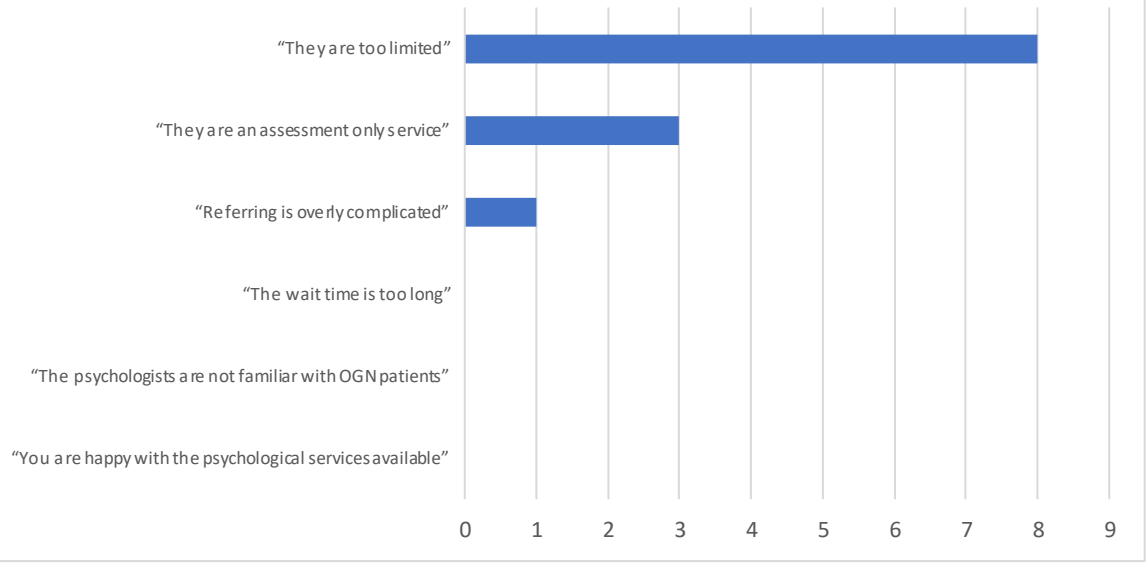
Figure 5: Questionnaire responses from psychologists when asked what changes to the services they would like



Analysis of orthodontist questionnaires (N=9): NB-multiple responses were permitted.

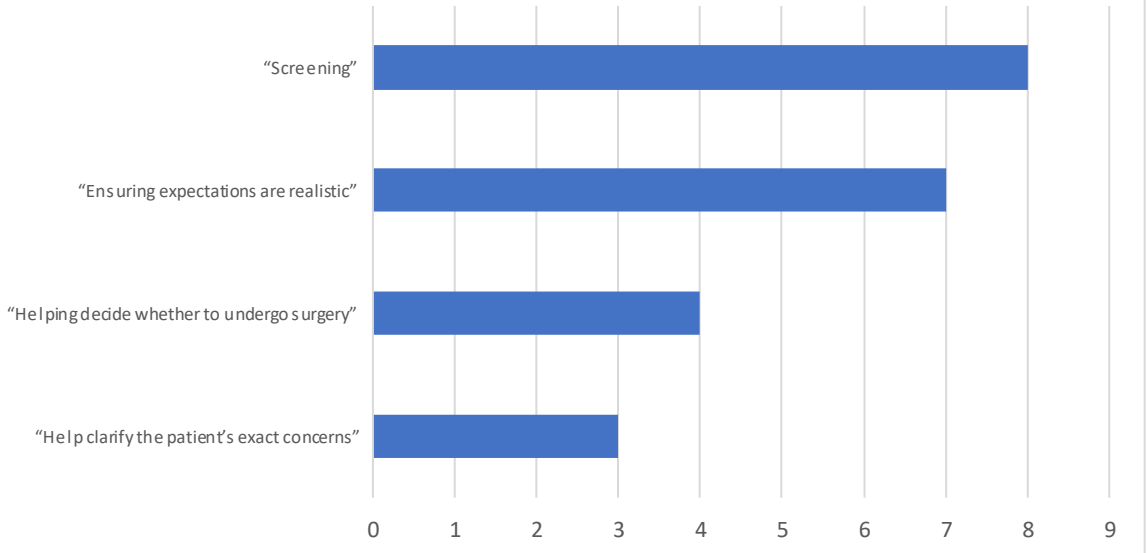
When orthodontists were asked to critique the **quality of the psychological services** available, eight out of nine stated they were "too limited", see figure 6. None of them had issues with the waiting time, or with the familiarity of psychologists with orthognathic patients.

Figure 6: Questionnaire responses from orthodontists when asked about the quality of the psychological services



When orthodontists were asked **how often they felt input from a psychologist was required** five out of nine felt it was "often needed", whilst four felt it was "sometimes needed". Almost all of them felt the two **main benefits of a psychologist** were screening and ensuring patients have realistic expectations, see figure 7.

Figure 7: Questionnaire responses from orthodontists when asked what the benefits of patients seeing a psychologist are



Orthodontists lacked **confidence in screening patients for mental health issues**, with only two stating they were confident, and the remaining seven selecting "somewhat".

Orthodontists' training in psychology was almost exclusively "lectures", with all respondents choosing this option. One stated that they carried out a literature review as part of training. There were no respondents that chose the following options: Formal qualifications, informal training with a mental health professional, whole day course, webinars. As such, it is not surprising that seven out of nine orthodontists stated they would like **further training on the topic of psychology**.

When asked **where they refer for ongoing psychological support**, five selected the patient's GP, whilst three stated they expected the psychologist to refer patients, see figure 8.

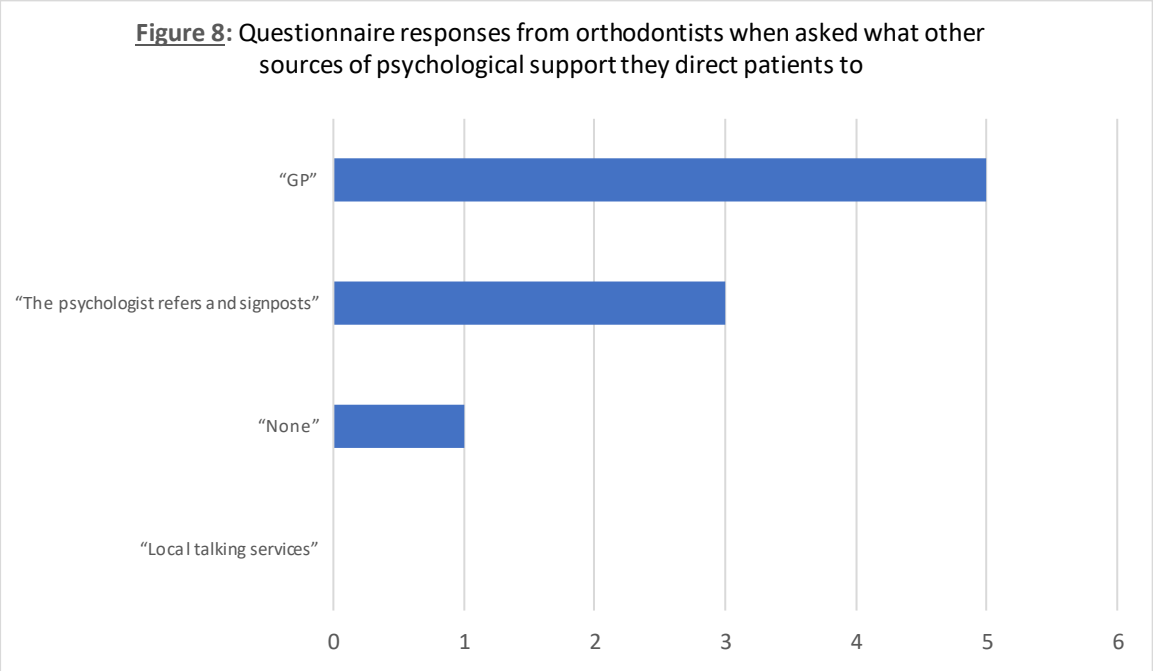
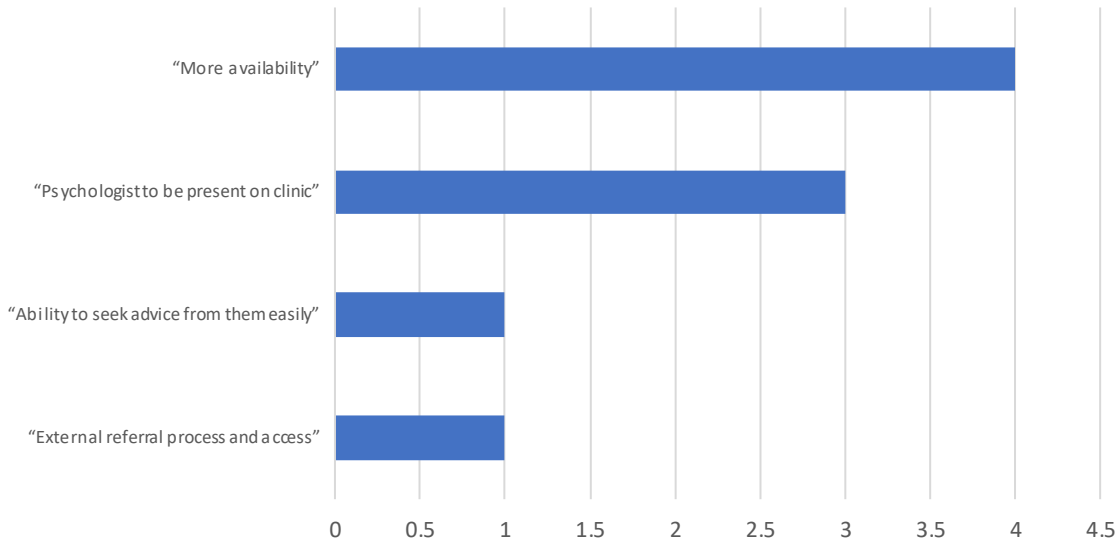


Figure 8: Questionnaire responses from orthodontists when asked what other sources of psychological support they direct patients to

Orthodontists were asked what **changes to the services they would like to see**. "More availability" was suggested the most (four responses), whilst there were three responses for having the psychologist be present on clinic, see figure 9.

Figure 9: Questionnaire responses from orthodontists when asked what changes they would like to the psychological services



4.7.3 C) RESULTS FROM THE SEMI-STRUCTURED INTERVIEWS

The interviews conducted provide an insight into the role psychologists have in managing patients' mental health, and the difficulties they encounter. An understanding of their experiences and challenges can help improve the available services. The themes extracted from the data are outlined below and summarised in Appendix IV.

In total there were four main themes, these were as follows: mental health in orthognathic patients, external mental health services, roles of professionals in the management of patients' mental health and service improvement.

Mental health in orthognathic patients:

All the psychologists had noticed a rise in mental health issues. They were unsure if it was due to a true rise in the incidence of conditions, due to more adults seeking help, or a combination of the two.

"*Yes, there has definitely been a rise in body dysmorphia and unrealistic expectations. People presenting with minor deviations that really disturb them. Concurrently, anxiety and depression I feel have increased. It may be that as a society we are talking more about mental health*." (Psy Int 2, pg4, line 112).

The most common mental health conditions that psychologists encountered when seeing orthognathic patients were anxiety and depression. Rarer ones included BDD, trauma and eating disorders.

"*Many have anxiety and/or depression. Body dysmorphia is relatively common, whether its full blown BDD or a mild version. Eating disorders occasionally, and other rarer ones*." (Psy Int 3, pg3 line 108,).

External mental health services: It was clear that psychologists had a wealth of knowledge when it came to signposting patients to support services.

"*Erm… I can't remember all of their names off the top of my head, there is a local organisation for adults called Talk Liverpool. There are a few others, I can email them to you, but I direct patients to those, and I think they provide invaluable support. There is a children's advisory service too, and KOOTH, which is specific to young peoples*." (Psy Int 2, pg2, Line 42,).

There was a wide range of support services available. Most were in the form of talking therapies, both NHS and charity funded. For most services patients could self-refer, which allows for a more streamlined process, less burdened by admin. It also highlighted that psychologists felt that most patients do not need the specialised care of psychologists, instead talking therapy is likely to be sufficient in providing them with support and coping mechanisms.

"*As we discussed, it's a shame we don't have the resources to provide ongoing help. That really cripples us. I would like the opportunity to keep many of these patients under us, so we have continuity, and it doesn't delay them. However, most patients don't need a specialised service, they just need some support through the treatment. Talking therapies can be a good alternative*." (Psy Int 3, pg3, line 93).

Roles of professionals in the management of patients' mental health: Psychologists saw themselves as having a variety of roles in the psychological management of orthognathic patients. Commonly cited ones included the previously discussed mental health issues of patients and their concerns/expectations. Another key role was signposting patients to appropriate sources of ongoing psychological therapy, something orthodontists were not familiar with, as discussed in the theme above.

"*We discuss what concerns them, expectations. We assess for mental health issues.*" (Psy Int 2, pg1, line 15).

All of the psychologists were involved in treating a wide range of patients, of which orthognathic patients were a small proportion.

"*I work with a variety of patients, not just orthognathic, many which are dealing with psychological issues, mainly adults, but also children*." (Psy Int 2, pg1, line 4).

One of the orthodontists was heavily involved in the management of cleft lip and palate (CLP) patients.

"*I work with the CLP team, which is a lifespan service, so I see children, young people, adults with a cleft. I occasionally also see regular orthognathic patients*" (Psy Int 1, pg1, line 3).

Given that psychologists undergo limited training specific to orthognathic patients, and that instead they learn on the job, it may be that having a narrower and more focused patient base may allow the psychologist to understand and manage patients better.

> "*I have accessed various CPD activities in relation to cleft. The CLAPA website provides a lot of resources, it's very useful since that's the majority of my patient base*" (Psy Int 1, pg1, line 10).

Psychologists believed that orthodontists had an important role to play in the management of mental health issues. They appreciated the importance of the long-term relationship orthodontists have with their patients, and the strong rapport they develop.

> "*I mean, it's significant. You guys see the patients for such a long time and build a strong relationship. This level of rapport means a lot and can really put you in a position where you can help a patient that is struggling*." (Psy Int 3, pg2, line 40).

Psychologists felt there was a discrepancy between the views of orthodontists and patients. They felt orthodontists were more objective in their assessments.

> "*We often have conversations about the patient's subjective evaluation versus the objective surgical or orthodontic view. And the importance of, as much as possible, being clear what the patient's perception is and hopes and beliefs are about what the treatment can achieve for them, both physically and emotionally and psychologically*" (Psy Int 1, Pg3, line 15).

It was felt that an important benefit of seeing a psychologist was that they provide patients with a more comfortable physical and mental environment.

> "*I think patients open up a lot more to psychologists than clinicians. Since there is a*

*difference in terms of power. We are not doing anything to them. There is a difference in terms of… the circumstance where you have a probably very short consultation with yourself, versus an hour in a comfortable seat with me and a tea *laugh*. And yeah, what people feel able to share is greater. When they feel there is an expectation of what they should say to you, versus what they can say to us*" (Psy Int 1, pg3, line 97).

None of the psychologists had formal training in the management of orthognathic patients, instead they relied on peer-to-peer learning. They felt learning from colleagues was effective, although they were open to more structured and specific training for managing craniofacial patients.

"*Not formal training per se. I have had lectures, and online training. A lot of it you learn through colleagues. We have a large team and always discuss cases with each other*" (Psy Int 2, pg1, line 8).

"*Erm. No, it's been an area that I've developed more of an interest in as I have progressed in my career. I have colleagues that have been treating such patients for decades, and so a lot of my learning has been from them*." (Psy Int 3, pg1, line 13).

Service improvement: All of the psychologists felt limited by the amount of support they can provide to patients. There was a strong desire to provide ongoing support, but funding and staffing was insufficient.

"*No ongoing support sadly, which I think some patients would benefit from*." (Psy Int 1, pg1, line 24).

Psychologists were asked to give their opinions regarding the use of a screening questionnaire to help orthodontists detect mental health issues in orthognathic patients.

Overall, psychologists had a positive view on the use of a screening questionnaire.

"*That would make sense sure. I think it can be a useful tool*" (Psy Int 3, Pg 2, line 51).

However, some cautionary points were highlighted.

> "*Everyone will interpret them slightly differently, which is fine, that's the nature of the field. You just have to personalise it and not be too strict with the results, and just use it as a tool*" (Psy Int 1, pg2, line 54).

Psychologists were asked for their opinion on another service improvement proposal. This was the concept of pairing up prospective orthognathic patients with previous patients to provide them with peer support. Opinions were generally positive. It was highlighted that they can support the patient in building coping mechanisms and provide reassurance.

> "*The evidence does show that peer support can massively help patients overcome worries and concerns they may have and provide them with coping mechanisms and reassurances*." (Psy Int 1, pg3, line 106).

One of the psychologists had experience facilitating this to a "*great outcome*" (Psy Int 1, pg3, line 109).

However, there was also caution expressed, particularly about the difficulty of properly matching patients up, and the negative effects a poorly matched patient might have.

> "*It may be that it sounds better than in reality. Simply because… I'm thinking*. *It may be that it's hard to match up the patients appropriately. If they have very different experiences that can worry the patient. They might think, "why did this happen to me, but not them?", it can skew their expectations which can be an issue*." (Psy Int 3, pg 3, line 84).

They key changes psychologists wanted to the current services included: increase in budget, ability to follow-up patients, presence on joint clinics, group therapy.

> "*So, I'd like to be able to fully follow the protocol and intend to see people at all those time points*." (Psy Int 1, pg4, line 123).

Psychologists felt that their presence on joint clinics would allow them to address problems quicker and more efficiently, potentially on the spot, thus negating some referrals. In addition, patients could be followed-up appropriately and, if needed, signposted to resources right away.

> "*In terms of working with you guys, ideally, we would be together on clinic. That way I can get to know the patients better and we can pick things up quicker. Issues such as expectations can be clarified, and if needed patients signposted right away*." (Psy Int 3, pg3, line 99).

4.8 DISCUSSION

The aim of this service evaluation was to assess the psychological management of, and services available for, orthognathic patients at Liverpool University Dental Hospital. The project has highlighted that orthognathic patients face significant challenges to their mental health, and that the current services are limited in their availability and scope, with both orthodontists and psychologists noting substantial shortcomings to the existing services.

The findings highlight the importance of clinicians specifically enquiring about mental health, and not solely relying on the medical history forms. The percentage of patients with mental health issues disclosed on the medical forms was 24%. This increased to 36% when orthodontists specifically enquired about their mental health. Anxiety and depression accounted for 85% of the conditions disclosed, which aligns with the experience of

orthodontists and psychologists. It is important to appreciate that these were patient reported mental health conditions, not confirmed diagnoses. A study by Collins et al. (2014) investigated the incidence of BDD, obsessive-compulsive disorder (OCD), depression and anxiety in a cohort of pre-operative orthognathic patients and they reported much higher figures. The incidence was 13% BDD, 29% OCD, 42% depression and 23% anxiety. The key difference between that study and the current one is that Collins et al. screened for mental health conditions using questionnaires. This highlights a potential benefit of screening, and the fact that many patients may have undiagnosed mental health conditions. More efficient screening and diagnosis will result in more patients receiving the support they need and ultimately achieving better outcomes.

It is interesting that mental health issues were noted in 36% of the patients in the current study, whilst only 3.4% were referred for a psychological assessment. This likely reflects a combination of factors. Firstly, many of these mental health conditions may not have been deemed severe enough to warrant a referral. Another factor may be the perceived limitations to the current psychological services. These figures are almost identical to those reported by Burden et al. (2010) who compared the psychological status of orthognathic patients to a control group consisting of laypeople. Anxiety, self-esteem, depression and behavioural problems were assessed using a variety of survey measures, the results of which were examined by a clinical psychologist. Any patients with concerning results, such as thoughts of self-harm, were referred to an external psychologist. Mental health issues were present in 26% of the study's cohort of orthognathic patients. This is slightly lower than the present study, which may be due to the fact the current study relied on patients self-reporting mental health issues. Interestingly, Burden et al. reported that 3% of their cohort required a referral to a psychologist, a figure which accords with the 3.4% in the present study. The authors

concluded that whilst mental health issues are prevalent amongst this population group, intervention from psychologists is not routinely required. Nonetheless, there are currently no guidelines as to what constitutes a referral to a psychologist, meaning there are no threshold guidelines for referral. In addition, there are many different tiers of psychological support, ranging from seeing a clinical psychologist for structured therapy such as cognitive behavioural therapy, to simply speaking to a volunteer at a talking therapy charity. Given the complexity of the patient experience, the type of support that a patient needs varies and needs to be individualised.

Just two of the eight patients referred to a psychologist were advised they should go ahead with treatment. The rest were deemed in need of more psychological support prior to surgery. The fact that six out of the eight patients were advised against treatment highlights the importance of obtaining input from a psychologist. It would be interesting to explore how the presence of a psychologist on a joint clinic may affect the number of patients deemed psychologically fit enough to proceed with treatment. Sinnott et al. (2020) reported that over a third of the orthodontists surveyed altered their plans following a psychologist referral, although they did not investigate how the plans changed. It was noteworthy that 35% of their orthodontists experienced clinical incidents related to patient mental health. Of these incidents 11% were suicide attempts, highlighting the importance of screening and appropriately referring patients.

Of course, the benefits of psychologists are not limited to their pre-operative input. In a nine-month questionnaire-based study, Kiyak (1993) reported that self-esteem and body image peaked at four months post-surgery and then begun to decline. This may suggest patients experience a degree of euphoria after seeing the immediate post-surgical changes, but subsequently adapt to their new appearance, relapsing back to a previous state of mind. This

concept of ‘hedonic adaptation’ is important for understanding patients’ post-operative experience. Hedonic adaptation is the notion that after a positive experience people return to a relatively stable pre-existing baseline level (Kiyak, 1993). This will inevitably be experienced to some degree by patients; as such, it’s important to expect a degree of post-operative relapse of pre-existing issues with self-image, confidence and so forth. Some patients may not expect this relapse, and may be disappointed by it, thus potentially exacerbating any mental health issues. This is another time point in the orthognathic treatment journey that patients may benefit from psychological support.

In the present study, four out of the nine orthodontists stated that a perceived benefit of a psychologist was to help patients decide whether to undergo treatment. Discussing treatment and gaining consent are routine tasks for orthodontists. However, when it comes to treating certain patients, orthodontists feel more comfortable doing so with input from a psychologist. What may be an issue with referring patients is that the consent/discussion process is split between the orthodontists and the psychologist, who are in different locations. This is further complicated by the fact there is on average a three month wait for the patient to see a psychologist. Sharing the consent process between professionals who see the patient in both a different place and at a different time may create difficulties. Ideally the patient would see both professionals in the same place at the same time, so questions can be answered together, and a joint discussion can be held. As such, it's unsurprising that all orthodontists stated that they would like a psychologist to be present on clinic. Orthodontists felt a key benefit of working with psychologists is screening for mental health issues and assessing patient expectations. This suggests that orthodontists are not comfortable with screening for mental health issues, and it may be why most would like a psychologist on clinic. This could be a potential area of further training.

Similarly, eight out of the nine orthodontists felt the psychology services were too limited in scope. All of them believed that input from a psychologist was either always or sometimes needed. These data further supports the need to increase the psychological support available for orthognathic patients. Orthognathic units significantly differ in their access to psychological services. Some do not have access at all, some have an assessment only service (such as Liverpool University Dental Hospital), some may offer treatment, whilst others may have a psychologist as part of the team (Sinnott et al. 2020). There has been limited research into the impact of having a psychologist join the orthognathic team. If orthodontists are unable to access psychological support, there may be mental health issues left unidentified, which would increase the chances of patient dissatisfaction or even psychological harm. The introduction of psychologist services in a plastic surgery unit was studied by Clarke et al. (2005). The screening model they introduced significantly reduced the number of patients progressing to surgery. The benefits included a reduction in costs and, more importantly, preventing unsuitable candidates from undergoing surgery. Considering the high-cost orthognathic surgery presents to the NHS, it may be that even a modest reduction of patients proceeding to surgery could compensate for the cost of having a psychologist join the orthognathic team. Of course, this would also have to be balanced with the cost of some patients undergoing psychological therapy instead of surgery, and some having both the therapy and surgery. Such a cost-benefit analysis study would be an invaluable addition to the existing literature. Considering that six of the eight patients referred to a psychologist in this study were advised against treatment, it would seem feasible that introducing routine psychological assessment could result in significant savings. For similar reasons, the use of a brief psychological screening tool may also be of value. Such a tool may also focus valuable psychologist time towards relevant patients. Ryan et al. (2012b) cautioned against the use of

screening to ration treatment, advocating it should instead be used to identify patients who would benefit from either no treatment, different treatment, or extra support.

The average waiting time for a psychological assessment was 3.2 months. This compares favourably to other trusts, such as the 17-week wait time reported by Corcoran and Byrne (2017), albeit these values were prior to the COVID-19 pandemic. The pandemic has exacerbated waiting lists, with a study investigating eight psychology departments in the North of England reporting that waiting times had increased to an average of 35.7 weeks (Purrington & Beail, 2021). Corcoran and Byrne (2017) also reported that over half of GPs referred less to psychology services because of excessive waiting times. It should be noted that the above reported referral time of 3.2 months is for an assessment only service. Waiting times for patients referred for ongoing psychological therapy could not be investigated due to a lack of data. There are also no studies investigating this topic for dental professionals, however anecdotally these wait times are reported to be very long. It would be beneficial to investigate how referral patterns might change if orthodontists had quick and efficient access to such services.

Orthodontists and psychologists both had limited informal training in managing the psychology orthognathic patients. Orthodontists' training consisted of several lectures during their specialty training, whilst psychologists mostly learnt from their colleagues. Seven out of the nine orthodontists desired further training in psychology. The questionnaire used in this service evaluation was limited in that it did not investigate the type of training they desired in greater detail. A similar survey of orthodontists by Sinnott et al. (2020) revealed that 90% of the 102 orthodontists surveyed wanted further training. These findings suggest there are significant limitations to the current training of orthodontists, and that additional

psychological training should be explored. Currently orthognathic patients make up only a small portion of psychologists' patient base. In the hospital there is an insufficient patient volume to allow a psychologist to exclusively work with orthognathic patients. Should services become more widely available, it may be that psychologists can subspecialize and work more exclusively with orthognathic patients. Regional referral hubs could be established for psychological services aimed specifically at orthognathic patients. That being said, having exposure to a wide patient base may enrich the clinical ability and experience of psychologists. Clearly, much more research is needed to clarify the type and level of psychological support the orthognathic patient base requires, in addition to what form this can be most effectively and efficiently delivered in a financially constrained NHS.

4.9 LIMITATIONS

There are several limitations to the methodology used in this service evaluation. Referral pathways, patterns and outcomes were clarified to an extent, however, due to the low number of patients referred, and lack of clarity in the notes, it was not possible to clarify what the long-term psychological management of these patients was. It would be beneficial to know how long it takes for patients referred to their GP to receive psychological treatment, and how their orthognathic treatment is affected. Timelines and outcomes could be effectively assessed by carrying out a prospective audit of patients referred for psychological assessment/treatment.

It is important to appreciate that the questionnaire results represent the opinions of the orthodontists and are not objective measures of the psychological services. For example, questions such as how orthodontists would rate the quality of referrals are not objective measures of the service, simply opinions. In addition, further bias may have been introduced by the fact that the responses were not collected anonymously.

The prevalence of psychological conditions was evaluated; however, a limiting factor was that this relied on either patients declaring them on the medical history form, or on the orthodontists documenting them in the first five appointments. As a result, it may be that more patients with such conditions were not picked up.

Similarly, identifying patients referred to a psychologist relied on good documentation. As such, it may be that more patients were referred to a psychologist, however this was not recorded, and the correspondence letters were not filed appropriately.

There was a relatively small number of orthodontists and psychologists included in the study. This would inevitably produce results which may not be generalizable to all clinicians, or clinicians in other services. In addition, there were areas which could have benefited from further exploration in the interviews, such as what type of psychology training orthodontists desired. At this point the researcher was relatively new to conducting research interviews. Through the process of reflexivity the quality and depth of the interviews improved, however further probing would have been beneficial. A standard of quality assurance was maintained by regularly discussing the interviews and analysis process with the research supervisors (who have extensive experience in interview research). Thematic saturation could not be achieved as the sample size was limited to the three psychologists that agreed to participate.

4.10 RECOMMENDATIONS

Considering the service evaluation findings, the following recommendations are made:

[1] Introduce a screening questionnaire for new orthognathic patients with the aim of assessing the patient's body image, self-esteem, depression and anxiety. It is to be used as a guiding tool by the orthodontists, and as a convenient starting point to begin discussing mental health. Orthodontists will need brief training on use and interpretation of said

questionnaire.

[2] Create a leaflet which signposts patients to sources of direct-access psychological support.

[3] Encourage orthodontists to enquire about mental health specifically during consultations, as patients will often not disclose them on the medical history form.

[4] Modify the medical history form to encourage more patients to share mental health concerns they may have. The current form asks: "*Do you have any issues with your mental health*". It is clear that patients are not adequately disclosing depression and anxiety, hence it is worth altering the form to highlight these. An alternative wording which provides an example may encourage more patients to disclose this information. The proposal of changing the question to: "*Do you have any issues with your mental health. e.g. anxiety and/or depression"* was met with positive feedback at a departmental meeting.

4.11 FUTURE DIRECTIONS

It would be valuable to study the views of patients seen by a clinical psychologist. Semi-structured interviews along with questionnaires can evaluate their experience and provide constructive feedback. The opinions of routine orthognathic patients would also be beneficial. These can be obtained through a sample of randomly selected patients attending orthognathic clinics. Patients' views of how psychological services can benefit them would help future service provision planning.

The average waiting time to see a psychologist was 3.2 months. However, it was not possible to assess the wait for patients who were referred to the NHS Adult Mental Health Services. A future project could follow-up patients referred to these services and investigate the waiting times, experience, and outcomes of patients.

Mental health issues were highly prevalent in this study's cohort. Future research should investigate the clinical implications of this, and how it may be prevented and addressed. For instance, could mental health issues be prevented by early psychological intervention during the patient's adolescence? Could orthodontists have an interceptive role by screening and referring these patients?

An in-depth cost-benefit analysis of a psychologist joining the orthognathic team would be highly beneficial. It may be that it would result in savings for the NHS by reducing the number of unsuitable orthognathic patients pursuing treatment.

4.12 CONCLUSIONS

This service evaluation has revealed several important aspects concerning the psychological management of orthognathic patients at Liverpool University Dental Hospital, including:

1. There appears to be a high prevalence of mental health issues among orthognathic patients, with approximately a third suffering from anxiety and/or depression.
2. Patients often do not disclose mental health issues on medical history forms. Orthodontists should specifically enquire about this.
3. There are clear limitations to the current psychological services available for patients at the Liverpool University Dental Hospital. Both orthodontists and psychologists acknowledge the importance of these services and would like them expanded.
4. Referral rates to psychologists are low. This is currently an 'assessment only' service, whilst referrals to NHS adult mental health services for ongoing treatment are associated with long waiting times.
5. Orthodontists lack awareness of the wider services available for psychological support. In contrast, psychologists are aware of multiple sources of free, direct-access

support patients can access.

6. Orthodontists lack confidence in screening and managing patients' mental health issues. Greater psychological support is desired.
7. The service evaluation supports further training on this subject and a widening of the psychological services for orthognathic patients.

5. CHAPTER 5: DO PATIENT AND CLINICIAN PERCEPTIONS DIFFER? A CROSS-SECTIONAL QUESTIONNAIRE ANALYSIS

5.1 ABSTRACT

Introduction: The literature suggests there are differences in how clinicians perceive patients and how patients perceive themselves. As a result, a thorough exploration of patient views is crucial during the consultation process. More research is required to clarify how patient perceptions differ to those of OMF surgeons and orthodontists.

Aim: To explore patients' perceptions of their facial profiles and perceived need for orthognathic surgery, and to compare these to the views of clinicians (OMF surgeons and orthodontists).

Methods: 100 prospective patients were recruited from orthognathic clinics. Questionnaires were completed by the patients and their treating clinicians (an OMF surgeon and an orthodontist). This cohort of patients was treated by a total of four orthodontists and two OMF surgeons. The questionnaires collected information regarding how clinicians and patients perceive the patient's profile and their potential benefit from surgery. They were also asked to rank the attractiveness of several profiles which consisted of class 2 and class 3 profiles of varying severities. Finally, patients completed the Rosenberg self-esteem survey.

Results: Orthognathic patients reported low self-esteem and a high prevalence of self-reported mental health issues (46%). Class 1 profiles were deemed most attractive by patients (86%), followed by mild class 2 profiles (14%). Class 3 profiles were deemed the most 'in need of surgery'. 97% of mild class 3 profiles were rated as 'in need of surgery' compared to 14% of mild class 2 profiles.

Surgeons rated patients as being in greater need of orthognathic surgery than orthodontists (p=.006). Patients rated themselves as being in greater need of surgery than both orthodontists and surgeons (p<.0001). Surgeons and orthodontists gave patients' profiles similar ratings of severity (p=.12). In contrast, patients scored their profile significantly worse than clinicians (p<.0001). Lower self-esteem correlated with patients rating themselves as being in 'greater need of surgery' than clinicians (r=-.33; p=.001), in addition to patients rating their profile as more severe than clinicians (r=-.32; p=.001).

Conclusion: Orthognathic patients present with low self-esteem and a high prevalence of mental health issues. Overall, there are significant differences between patients' and clinicians' perceptions. Patients rate themselves as being in 'greater need of surgery' and as having more severe malocclusions. Both patients and clinicians perceive class 2 profiles more positively than class 3 profiles.

5.2 INTRODUCTION

A fundamental element of medical consultations and the consent process is a discussion of the patient's concerns. This is the foundation upon which the treatment plan and the consent process are built upon (Cunningham et al, 1995). Patient and clinician perceptions that agree on the nature of the issue set a good foundation, where there is disagreement, significant issues may arise further into the treatment (Clarke et al., 2005).

Bell et al. (1985) compared how patients, surgeons, orthodontists and laypeople perceived malocclusions. They found that a patient's own perception of their malocclusion was more influential than recommendations and opinions of specialists when deciding whether to undergo surgery. Laypeople were more likely to rate profiles as normal. Patients perceived their profiles differently from specialists. As such, self-perception is an important factor in a

patient's decision to undergo treatment. For clinicians to fully understand why a patient is undergoing treatment, they need to have an appreciation of how they view their jaws. More research is needed on this important topic to clarify what the common points of contention between clinicians and patients are. The present study aims to contribute to the literature on this topic.

Clinician perceptions of patients and their need for surgery

There has been research into how facial profiles influence the perceived need for orthognathic treatment. Pithon et al. (2014) investigated whether photographs and silhouettes are suitable for evaluating facial profiles. They manipulated an image of a female with bimaxillary protrusion to produce seven photos and silhouettes. The lip position was altered in increments of 2mm. Laypeople were asked to rank the attractiveness of these seven profiles. The scores were subsequently compared to the 'ideal' lip position which was considered to be 0-2mm behind Rickett's E-line (Ricketts, 1968). They concluded that both photographs and silhouettes showed equally good agreement and coincided with the 'ideal' lip position. This highlights that the validity of silhouettes and photographs is similar in questionnaire based orthognathic studies. In the present study silhouettes were chosen as they do not show characteristics such as hair or skin colour, which in theory may bias the responses. With that said, there have been no studies investigating whether altering the hair or skin colour of photographs would change responder's perceptions of their jaw relationships.

In a silhouette study Naini et al. (2012a) investigated how chin prominence influenced the need for surgery. The perception of attractiveness was also compared between clinicians, patients and lay persons. The findings were that clinicians recommend surgery for patients with chin protrusion greater than 6mm or with chin retrusion of over 10mm. Chin movements

of up to 4mm made no difference in the scoring. Interestingly they found no difference in the attractiveness scores between clinicians, laypeople and patients. A similar silhouette study investigated how mandibular prominence affected attractiveness between patients, laypeople and clinicians (Naini et al., 2012b). The mandibles were moved in 2mm increments up to 16mm retrusion and 12mm protrusion. A 7-point Likert scale was used in the questionnaires. They found that clinicians recommended surgery in profiles with ≥5mm protrusion or ≥8mm retrusion. Orthognathic patients were more critical and recommended surgery for protrusions greater than 3mm. The study concluded that orthognathic patients were more critical and suggested that future studies should focus on evaluating the perceptions of patients. Naini et al. (2012c) also investigated the impact of facial convexity on perceived attractiveness. They altered silhouette profiles from the norm with 2º increments from -16º to 14º. Increasing facial convexity was found to be correlated with poorer aesthetic ratings. A straight profile was deemed more attractive. Once again, they found that patients were more critical than both clinicians and laypeople. With that said, a drawback to the above-mentioned studies by Naini et al. (Naini et al., 2012a; Naini et al., 2012b; Naini et al., 2012c) was that they did not clarify how laypeople were defined or how their sample was selected. In a similar study, Almeida and Bittencourt (2009) altered profile photographs to investigate the relationship between mandibular protrusion/retrusion and the perceived need for surgery. Participants found male convex and female concave profiles to be of greater need for surgery. OMF surgeons had a lower threshold for recommending surgery than laypeople. There were no significant differences between Afro-Caribbean and Caucasian profiles.

The concerns and views that patients have develop over a long period of time and are influenced by many factors. One of these may be patient's self-perceptions (Bell et al. 1985; Cunningham et al., 1995). To this end, the present study investigates whether self-esteem is

related to patients' self-perception. Self-esteem was the chosen measure as it has been found to relate to other concepts such as confidence and mental health issues including anxiety and depression (Beck et al., 1990; Cooper-Evans et al., 2008).

The Rosenberg Self-Esteem scale (RSE)

Due to the high rates of psychological issues and body dysmorphia in patients seeking cosmetic treatment, some units have adopted routine psychological screening of orthognathic candidates. Whilst some OGN units advocate that screening should be routine practice, few departments have adopted this practice (Clarke et al., 2005; Sinnott et al., 2020). The orthodontic unit at the Liverpool University Dental Hospital has links with clinical psychologists with a special interest in patients with facial concerns. Referrals are made to this service at the clinician's discretion. Once referred, they attend a consultation appointment with a psychologist. Prior to this appointment, patients are asked to complete seven surveys which are used to support the psychological screening process. These tests include: Derriford Appearance Scale (DAS-59) (Harris and Carr, 2001); Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983), Multidimensional Body-Self Relations Questionnaire (MBSRQ) (Cash, 2000), Motivation Questionnaire (Baron et al., 2002), Abnormality Scale (Snyder and Fromkin, 1977), Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965), Social Avoidance and Distress Scale (SADS) (Watson and Friend, 1969). This study has chosen to specifically investigate the RSE for several reasons. Self-esteem (i.e. their feeling of worthiness) is an important constituent of mental health wellbeing. In addition, the scale has strong correlations with happiness, confidence, quality of life and negative correlation with depression and anxiety (Beck et al., 1990; Cooper-Evans, 2008).

The RSE tool consists of ten statements scored on a four-point scale (0-3) culminating in a score ranging from 0 to 30 (Rosenberg, 1965). A 'normal' score is considered 22, with scores below 15 suggesting significantly low self-esteem. The scale is simple and quick to use yet displays high reliability and validity. Test-retest reliability has been consistently quoted above 0.75 (Rosenberg, 1986; Carroll & Coetzer, 2011; Tinakon & Nahathai, 2012). Furthermore, the scale has strong validity as a measure of self-esteem, having been tested many times over the years, and shows a good correlation with other self-esteem scales, and related concepts such as confidence and lack of depression/anxiety (Beck et al., 1990; Cooper-Evans et al., 2008).

Rationale for this study

The literature suggests there are significant differences in how clinicians and patients rate profiles, with most studies concluding that future research should focus on studying patients' perceptions. Questionnaire-based research is limited in how much insight it can provide on this topic. To this end, the present study is supplemented by a qualitative interview-based component (Chapter 6), which aims to provide a deeper understanding of how patients view themselves. In addition, most studies involve patients rating a series of model profiles. There has been a lack of studies focused on patients rating their own profiles. The present study is unique in that it is focused on both patients and clinicians rating the patient's profile.

5.3 AIM

To explore patients' perceptions of their facial profiles and perceived need for orthognathic surgery, and to compare these to the views of clinicians.

5.4 OBJECTIVES

To further our understanding towards the project aim, the research objectives were to:

- Explore whether patients and clinicians differ in their perceptions of the patient's skeletal profile
- Explore if OMF surgeons and orthodontists differ in their perception of patients
- Explore how patients' self-esteem relates with incidence of mental health issues
- Investigate whether self-esteem correlates with patient perceptions
- Explore how patients view class 2 and class 3 profiles of different severities

5.5 METHODOLOGY

5.5.1 DESIGN

This study was a prospective cross-sectional observational questionnaire-based survey based in the University of Liverpool Dental Hospital.

5.5.2 PARTICIPANTS

Demographics: 100 patients were recruited into the study. The mean age was 23.4 years (range: 17-36). Most participants were female (female=62; male 38). 71 of patients were prior to fixed appliance treatment.

Ethnicities: Most patients were Caucasian (n=68). The remainder were South Asian (n=14), Afro-Caribbean (n=12), and East Asian (n=6).

Most patients were planned for bimaxillary surgery (n=74). 23 patients were planned for BSSO surgery with only three having a Le-Fort 1 osteotomy alone.

Socio-economic class**:** Patients' socio-economic class was classified using the simplified three-class version of the National Statistics Socio-Economic Classification (NS-SEC) (ONS, 2016). Most patients were either students (n=29) or were intermediate class (n=29). 26 participants were classified as lower class, 11 higher class and six were unemployed.

Gender and type of malocclusion: Slightly greater proportion of women presented with a C3 malocclusion (n=36, 58%), whilst men were mostly C2 (n=21, 55%).

5.5.3 METHODS: DESIGNING THE STUDY QUESTIONNAIRES

Questionnaires (Appendix V) were designed using silhouettes of facial profiles manipulated into varying anteroposterior jaw relationships, using Adobe Photoshop. Silhouettes were chosen to reduce bias which may be introduced by characteristics such as hair and skin colour. The aim of the questionnaires was to quantify how patients and clinicians perceive the patient's profile and their need for orthognathic surgery.

The questionnaires contain seven images. One represents a C1 profile (profile C). The remaining six images represent varying severities of C2 (profiles B, D, F) and C3 profiles (profiles A, E, G). The three C3 profiles consist of a protrusive mandible that has been manipulated anteriorly in 3mm increments. The remaining three images represent C2 profiles in which the mandible is set back in a retrusive position at 3mm increments. Increments of 3mm were chosen as they were deemed to provide a good range of skeletal relationships. 10mm is the proposed limit for surgical advancement of the maxilla (Proffit et al., 1992). Whilst the surgical limit for a mandibular setback is 24mm, previous research suggests

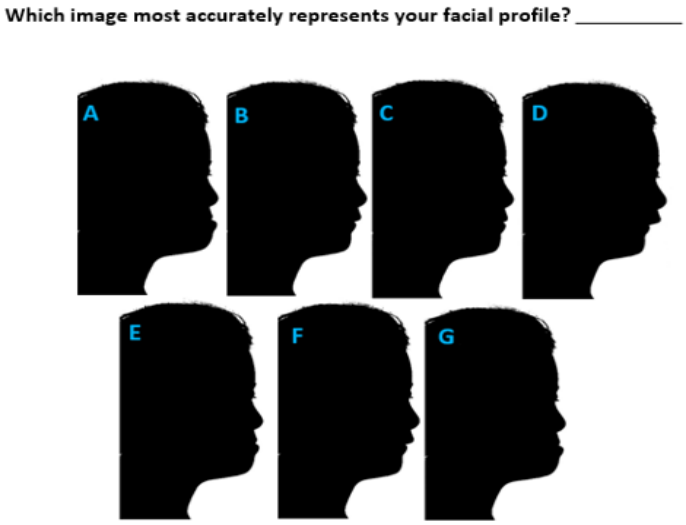
clinicians recommend surgery for mandibular prognathism of over 5mm (Naini et al., 2012b). As such, protrusion was kept under 10mm to keep the images realistic and clinically relevant.

The decision to only manipulate the mandible was made for two reasons. Firstly, it reduces the number of combinations possible and simplifies the malocclusion to one jaw. Secondly, attempts at manipulating the maxilla resulted in anatomically unrealistic profiles. This is because the maxilla is part of the naso-maxillary complex, and as such its manipulation in isolation of the mid-face created unrealistic appearances.

To maximise the response rate several design strategies were used in the design of the questionnaires. Length is an important factor for improving response rate (Jepson et al., 2005). The use of close-ended questions also improves response rate (Griffith et al., 1999). The questionnaires have been kept short, with close-ended questions, and with minimal silhouettes for participants to evaluate.

A VAS scale was chosen to quantify the perceived benefit from surgery. This was due to its simple, intuitive and quantifiable nature. A score of 10 represents maximum perceived benefit from surgery, whilst 0 represents no benefit. Patients selected which of the seven silhouettes they found most aesthetic, which they believed would benefit from orthognathic surgery, and which most accurately represented their profile (fig. 10).

Figure 10: The seven silhouettes representing profiles with different antero-posterior jaw relationships.



The RSE survey consisted of 10 questions, scored 0 to 3, the scale produces a score between 0 to 30 (Appendix VI). A score of 15 or below indicates significantly low self-esteem. The population mean score is approximately 22 (Rosenberg, 1965).

5.5.4 PROCEDURE

Recruitment: Patients were recruited from joint orthognathic clinics at the Liverpool University Dental Hospital. Prospective patients were screened for suitability as they attended orthognathic clinics. 100 patients participated in this part of the study (106 patients were invited, six decided not to continue with participation. The reasons for refusing were not recorded).

Patients were recruited from a joint orthognathic clinic. If potential participants met the inclusion criteria (table 3), they were asked if they would consider participating in a study. If agreed, the patients were taken to a side room where the study was discussed in detail, and consent was obtained (appendix VII).

Table 3: Inclusion and exclusion criteria for orthognathic patients.	
Inclusion criteria-orthognathic patients	*Exclusion criteria*
1) Patients with class 2 or 3 skeletal relationships.	1) Craniofacial disorders (e.g. cleft lip and/or palate).
2) Aged 16 or over.	2) Acquired deformities (e.g. trauma).
3) Able to provide informed consent.	3) Orthognathic surgery.
4) Suitable and willing to undergo orthognathic surgery, but who have not yet commenced pre-surgical orthodontics.	5) Not satisfying the inclusion criteria.

Participants were provided with the RSE survey and the patient questionnaire (appendices V & VI). In addition to the questionnaires, further information was collected including age, gender, ethnicity, profession and skeletal classification.

Sample size: A power calculation was not conducted, as this exploratory study recruited from a limited population of available patients in a predefined data collection period. Available patients within the scope of the study were approached to consider participation. Data collection continued throughout the whole available period to maximise the number of participants. 100 participants were reached shortly before the data collection period was due to end, and this was deemed to be an adequately robust cohort.

5.5.5 CLINICIAN QUESTIONNAIRE:

Two consultants working together on a joint clinic (an orthodontic consultant and an OMF surgeon) completed a questionnaire for each of the patient participants (Appendix V). They rated how much they thought the patient would benefit from surgery on a VAS scale. They also selected which silhouette image most accurately represented the severity of the patient's malocclusion. Overall, two surgeons and four orthodontists participated in the study. There were always two clinicians paired on a clinic, a surgeon and an orthodontist, however the pairing combinations varied.

5.5.6 DATA ANALYSIS

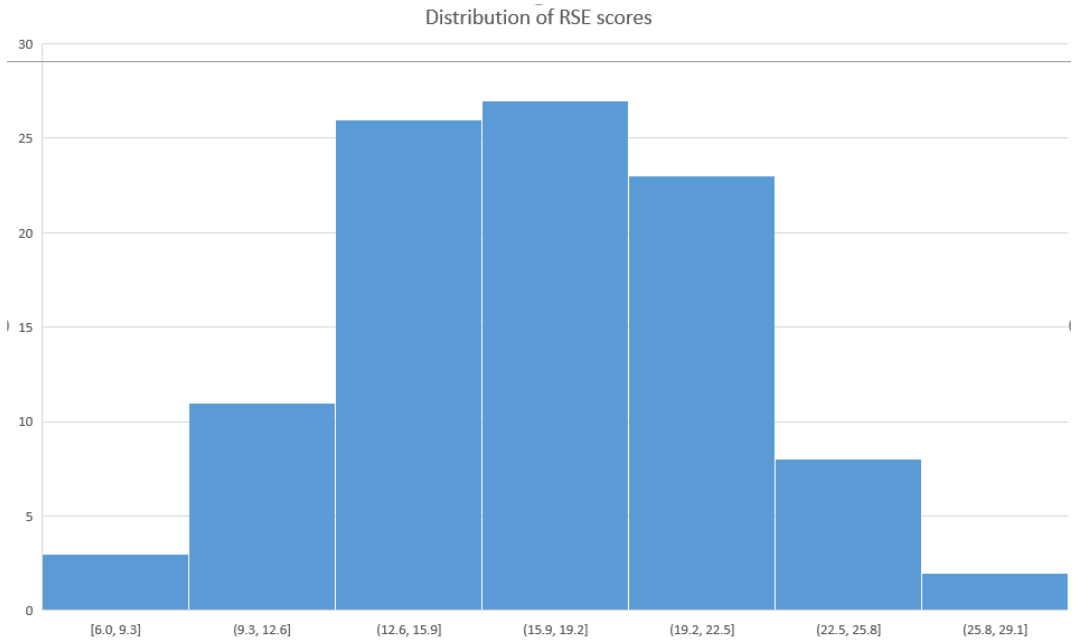
Data from the questionnaires was analysed using descriptive and inferential statistics. Interpretation of correlation coefficients and kappa scores were based on the work by Cohen (1988). This was as follows:

- Pearson's correlation co-efficient: <0.3 mild correlation; 0.3-0.49 moderate correlation; >0.5 strong correlation.
- Intra class correlation coefficient: <0.5 poor agreement. 0.5-0.75 moderate; >0.75-0.9 good agreement; <0.9 excellent agreement.
- Kappa values: <0.2 none to slight agreement; 0.21-0.40 fair agreement; 0.41-0.60 moderate agreement; 0.61-0.80 good agreement; >0.81 excellent agreement.

5.5.7 DATA DISTRIBUTION

In order to determine whether to use parametric or non-parametric statistical analysis all continuous data was visually assessed on a histogram. Below is an example of this process, showing a histogram of the RSE scores and its normally distributed data. All data was analysed using parametric statistical analysis.

Figure 11: Histogram of RSE scores showing a normal distribution.



5.6 RESULTS

Rosenberg Self-Esteem Scale: RSE scores range from 0 to 30. A 'normal' score is considered to be 22. Scores under 15 are indicate significantly low self-esteem. The mean in the current study was 17.2 (range: 6-28; SD: 4.7). The percentage of patients with RSE scores under 15 was 33% (n=33).

Skeletal classification: 52% of participants were Class 3 with the remaining 48% being Class 2. 20% of patients had an AOB whilst 17% had a skeletal asymmetry. It was notable that asymmetries were more common in C3 malocclusions than in C2 (14% of C3 profiles

versus 3% of C2). Conversely, AOBs were slightly more common in C2 profiles (9% of C3 profiles versus 11% of C2).

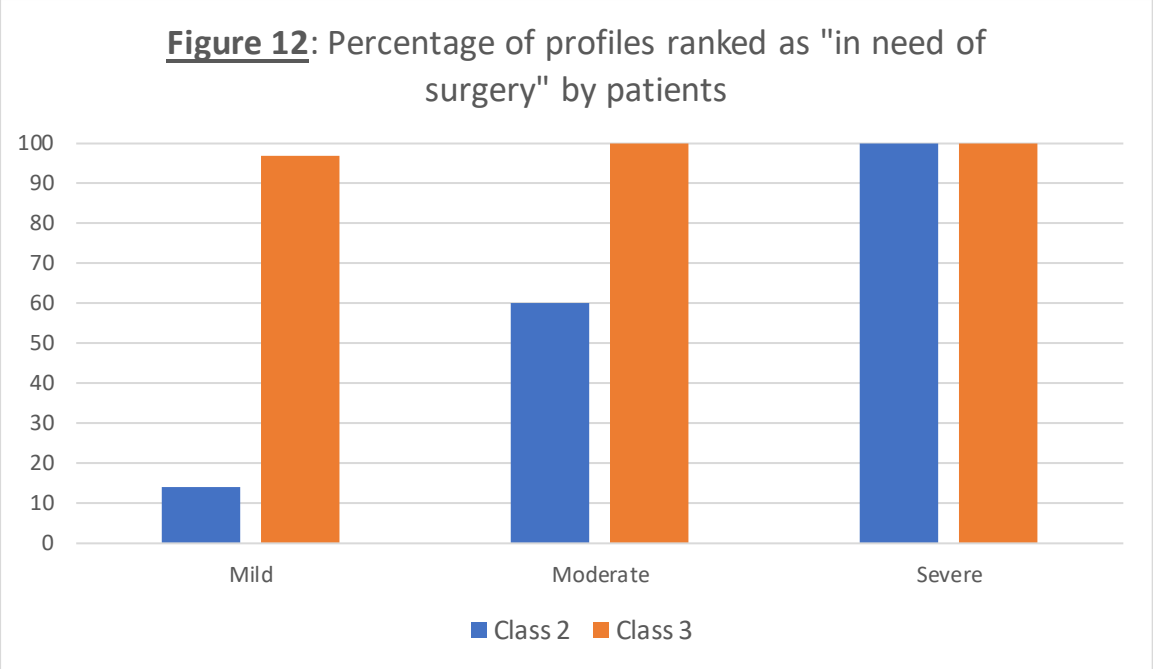
Table 4: Proportion of patients with different skeletal malocclusions.			
Skeletal Profile	**Total**	**With asymmetry**	**With an AOB**
Class 2	48%	3%	11%
Class 3	52%	14%	9%
		Total: 17%	Total: 20%

Mental health: 46% of patients suffered from a self-reported mental health condition. These were as follows: 15% anxiety; 13% depression, 12% anxiety and depression, 2% personality disorder, 2% BDD, 2% bipolar disorder.

Most attractive silhouette: When patients were asked to select the most attractive silhouette the vast majority (86%) selected the C1 profile (profile C, fig. 10). Interestingly, 14% selected the mild C2 profile (profile B).

Silhouettes ranked as 'in need of surgery':

All severe C3 and C2 profiles were rated as needing surgery (Figure 12). Almost all (97%) of moderate severity C3 profiles were selected as opposed to 60% of moderate severity C2 profiles. The largest difference was seen between the mild C2 and C3 profiles: 97% of mild severity C3 profiles and only 14% of mild C2 profiles were perceived as needing surgery.



Perceived benefit of surgery (VAS scale): Patients and clinicians used a VAS scale to rate how much they felt the patients would benefit from orthognathic surgery (fig. 13). The mean scores were as follows:

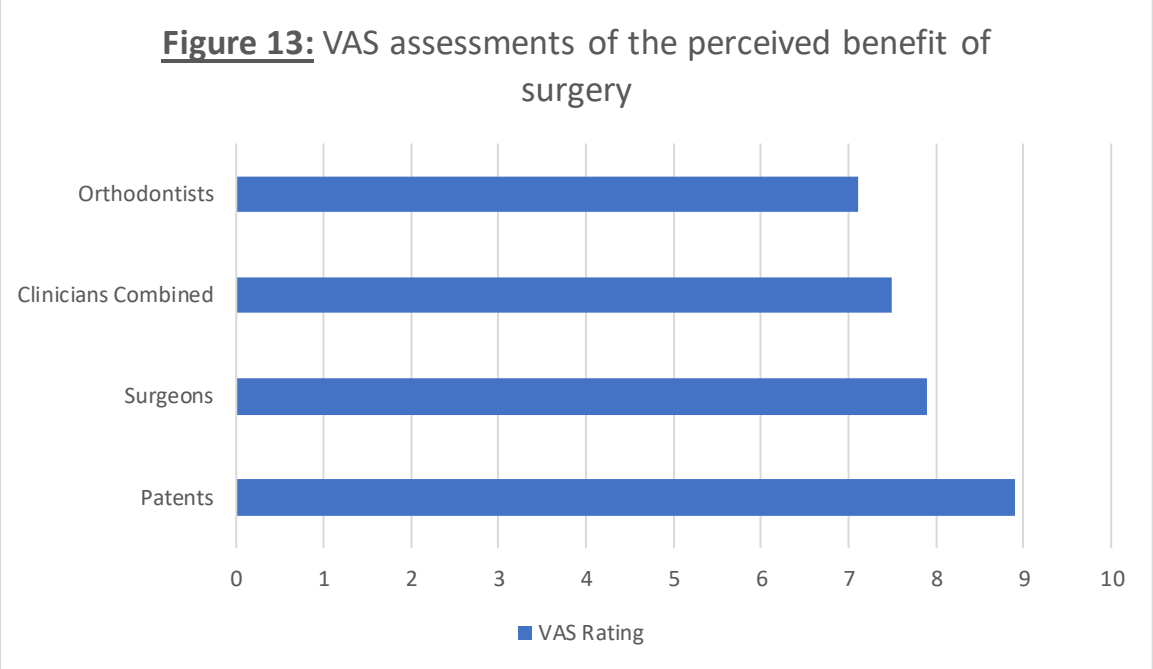
Patients: 8.9 (SD: 1.3)

Orthodontists: 7.1 (SD: 1.5)

Surgeons: 7.9 (SD: 1.4)

Clinicians Combined: 7.5 (1.4)

A paired samples t-test suggested that surgeons perceived a greater benefit from surgery than orthodontists, ($p = .006$). Similarly, the results suggest that patients (8.9 SD: 1.3) perceived a greater benefit than the clinicians combined (7.5 SD: 1.4), ($p<.0001$).



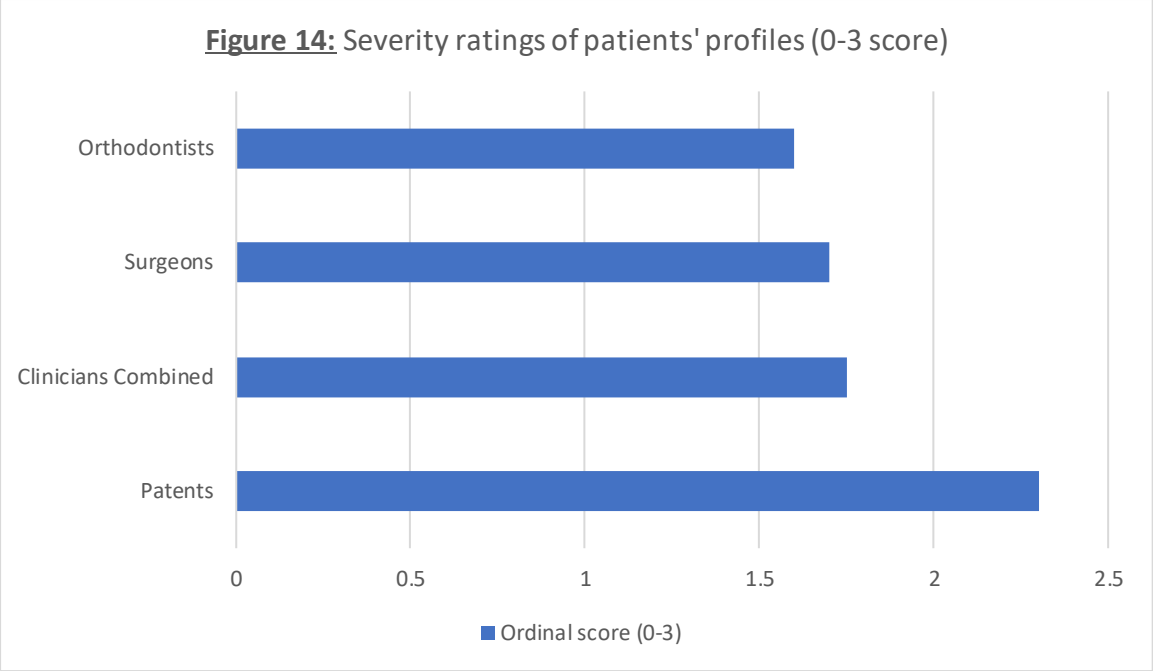
Severity ratings of patient profiles: The questionnaires contained 7 silhouettes. One was C1 (scored as '0'). There were three C2 and three C3 profiles. These were mild, moderate and severe (1=mild 2=moderate 3=severe). Patients and clinicians were asked to select which of the seven profiles best represents the patient's profile (fig. 14). The mean scores were as follows:

Patients' ratings: 2.3

Orthodontists' ratings: 1.6

Surgeon's ratings: 1.7

Clinicians' ratings: 1.75



Surgeons' rating was 0.1 greater than that of orthodontists. This was not statistically significant (wilcoxon signed rank test p=.12). Conversely, patients scored their profile worse than clinicians by an average of 0.6 (p<.0001).

Trends based on occlusion:

Table 5 shows the questionnaire scores based on the skeletal malocclusion. It is notable that C3 patients were scored as having a less severe skeletal discrepancy yet rated as being in 'greater need of surgery'. C3 patients with an asymmetry had particularly high perceived benefit scores and low self-esteem.

Table 5: Mean RSE scores, perceived benefit, and profile severity ratings categorised by type of malocclusion.					
	RSES (SD)	Patient Benefit (SD)	Clinician Benefit (SD)	Patient severity rating of their profile	Severity rating by clinicians
All C2	17.3 (±4.5)	8.4 (±1.5)	7.3 (±1.6)	2.4	2.0
All C3	17.6 (±4.9)	9 (±1.7)	7.7 (±1.3)	2	1.6
C3 with an asymmetry	12.7 (±4.0)	9.8 (±1.5)	7.0 (±1.6)	2.4	1.1
C3 with an AOB	17.5 (±4.5)	9.4 (±1.7)	8.5 (±1.5)	2.5	1.8
C2 with an AOB	20.8 (±4.2)	8.0 (±1.6)	9.1 (±1.6)	2.3	1.3
C2 with an asymmetry	19.3 (±4.6)	9.1 (±1.7)	7.9 (±1.4)	1.7	2.7

Inter-rater agreement between orthodontists and surgeons: Intra-class correlation coefficient for 'benefit of surgery' scores was 0.61, indicating moderate correlation (Cohen, 1988). Weighed kappa scores for severity of profiles ratings was Kappa= 0.54, also indicating moderate agreement. The distribution of agreement is shown in Table 6.

Table 6: Contingency table showing agreement of patient profile ratings between **orthodontists** and **surgeons**.

	0	1	2	3
0	5	0	3	0
1	6	25	7	0
2	0	7	16	4
3	0	4	9	14

Footnote- Scores along the diagonal correspond to the number of times there was perfect agreement between the clinicians.

Given the agreement between orthodontists and surgeons, a decision was made to group their scores together (under 'clinician scores') and compare them to patient scores. The

disadvantage of this approach is that surgeons gave systematically higher scores for 'benefit of surgery' than orthodontists. With that said, grouping them together reduced the number of analyses carried out. Avoiding overanalyses of data is important to avoid compounding the chances of type 1 error.

Self-esteem and 'patient-clinician discrepancy scores': The difference between the 'perceived benefit of surgery' scores of each patient and their clinicians was calculated, this score will be referred to as the 'patient-clinician discrepancy score for surgery benefit'. The relationship between RSE scores and these scores was assessed using Pearson's correlation coefficient at r=-.33 (p=.001), indicating a statistically significant moderate strength correlation (Cohen, 1988). This suggests that lower self-esteem is related to the patient feeling they are in higher need of surgery than the clinicians. Similarly, correlation between RSE scores and the 'patient-clinician discrepancy score for profile severity' was r=-.32, (p=.001) indicating moderate correlation. This suggests that lower self-esteem is related to patients rating their profile as more severe than clinicians.

Self-esteem and mental health issues: The average RSE score in patients without mental health issues was 17.8 in comparison to 16.7 in patients with mental health issues. This difference was not statistically significant (paired t-test: p=.14).

Differences between genders: There were no significant differences between males and females in terms of self-esteem scores (17 vs 18.7, respectively; paired t-test: p= .25), patient perceived benefit scores (8.5 vs 8.9; paired t-test: p=.18), clinician perceived benefit scores (7.1 vs 7.7; paired t-test: p=.73) or 'patient-clinician discrepancy scores' (0.5 vs 0.6, Wilcoxon signed rank test: p=.43).

5.7 DISCUSSION

The results of this study provide an insight into how patient and clinician perceptions compare. Significant differences were seen, in particular with patients perceiving their profiles as more severe and as being in greater need of orthognathic surgery. The results also provide an additional understanding into how the concept of self-esteem may be related to patient perceptions and mental health.

Differences between class 2 and class 3 profiles

C3 patients were rated as being in greater need of surgery than C2 patients by both the clinicians and the patients themselves. In contrast, when asked to rate the magnitude of the skeletal malocclusion C3 patients received lower severity ratings. In other words, C3 patients appeared to have a milder jaw size discrepancy than C2 patients, nevertheless they were rated as being in greater need of surgery. This suggests that a relatively small jaw size discrepancy in a C3 direction may be perceived quite negatively, proposing that the threshold for surgery for C3 profiles is lower. The finding that jaw discrepancies in a C3 direction have a greater impact on the perceived need for surgery in comparison to similar C2 discrepancies is consistent with the wider literature which suggest that C3 profiles are less socially acceptable and have a lower threshold for surgery. Naini et al. (2012b) reported that clinicians recommend surgery with chin protrusion of over 5mm, or chin retrusion of over 8mm. Patients in the present study were even more critical of C3 profiles, and recommended surgery for protrusion of just 3mm.

Further analysis of the data revealed that C3 profiles with an asymmetry had lower self-esteem scores. Patients' perceived benefit of surgery ratings and severity of profile ratings were higher for C3 profiles with an asymmetry. Given the importance of symmetry in

aesthetics (Burden & Pine, 1995; Bashour, 2006), it is perhaps not surprising to see this difference. It may be that clinicians do not perceive asymmetries as negatively as patients do, as they rated them less severe and in less need of surgery than C3 profiles without an asymmetry. From a clinician perspective it is important to appreciate the significance asymmetries may have on patients' perceptions and mental health wellbeing.

In contrast, patients with an anterior open bite (AOB) were perceived as being in greater need of surgery by clinicians than patients. This may be because clinicians are influenced by their own clinical biases. An AOB is a complicated malocclusion to treat. Clinicians may be imparting their own desire to achieve a 'perfect' occlusal interdigitation, when in contrast the patients themselves may not be as concerned since an AOB does not affect their facial aesthetics. These results suggest that a clinician's training could be imparting beliefs which do not correlate with the patient's desires. Ultimately, the literature is mixed as to what extent orthodontists, surgeons and patients agree with each other's views. Some studies have shown significant differences (Bell et al., 1985; Juggins et al., 2005; Vasey, 2019), whilst others show good correlation (Imani et al., 2018). The reasons for these differences are unclear, however each of the studies used significantly different methodology. The questionnaires employed were different and one would expect there to be an innate bias in how patients interpret them. In addition, studying a multifaceted topic such as perception is challenging with quantitative tools such as questionnaires. With that said, although there is moderate agreement between clinicians, this is not uniform agreement, suggesting some degree of subjectivity.

Inter-clinician agreement

There was moderate agreement between orthodontists and surgeons with regards to severity ratings and VAS scores (0.54 and 0.61, respectively). However, whilst their scores correlated, their mean 'need for surgery' scores were different. Orthodontists' mean score was 7.1 versus surgeons' 7.9 (p=.006). In contrast, their ratings of profile severity did not significantly differ (orthodontists=1.6, surgeons 1.7; p=.12). These findings suggest that surgeons and orthodontists perceive the severity of patient profiles similarly, but their perceptions of how much surgery would benefit the patient differ. Other studies have suggested surgeons have a lower threshold for surgery. Vesey (2019) investigated the perceived need for surgery between orthodontists and surgeons. They utilised C3 silhouettes manipulated into varying severities in a similar manner to the current study. OMF surgeons were 3.9 times more likely to recommend surgery than orthodontists. Other factors which influenced decision making were the number of years qualified, the race and gender of the image, the number of patients treated per year, and the race of the clinician themselves. It's clear that there are many factors which influence the clinician, highlighting the complexity and uniqueness of the decision-making process. Clinicians should appreciate that they bring a certain degree of personal bias to the decision-making process.

Clinician versus patient ratings

Patients rated their profiles worse than clinicians by an average of 0.6. This is both statistically (p=<.0001) and clinically significant, given the scale range was from 0 to 3. Similarly, patients rated their 'need for surgery' as significantly higher than clinicians (8.9 vs 7.5; p=<.0001). These findings highlight how important it is to have a thorough discussion during the initial appointments to ascertain how perceptions differ. There are many psycho-

social factors that modify how patients and clinicians view a profile. Bell et al. (1985) compared how patients and clinicians perceived patient profiles using a questionnaire scale. Much like the present study, they found significant differences, with patients rating their profiles worse. Moreover, whilst there was good agreement between the surgeons and orthodontists in terms of their severity ratings, surgeons were more likely to recommend surgery. They concluded that the self-perception of an individual is more important in the decision-making process than the recommendations of the clinicians. Similarly, Cheng et al., (2021) assessed the perceptions of orthodontists, general dentists and patients in a questionnaire-based study. Significant differences were noted between clinicians and patients in a variety of aspects such as tooth show, lip thickness and others. The results of the above studies, alongside the current study, highlight how what clinicians 'see' and what patients 'see' may be significantly different. The implications of this are substantial, as it may result in orthodontists failing to meet patient expectations, which has been shown to affect patient outcomes (Ryan et al., 2012b). This topic is further discussed in Chapters 6 and 7.

RSE scores and 'patient-clinician discrepancy scores'

There was moderate correlation between RSE scores and the 'patient-clinician discrepancy scores for surgery benefit' ($r=-.33$, $p=.001$) and 'for profile severity' ($r=-.32$, $p=.001$). In theory this may suggest that patients with a low self-esteem are more likely to overestimate the positive impact surgery would have on their life and perceive their profile worse than clinicians. It may be that they have more unrealistic expectations and feel the procedure would be 'unrealistically' transformative. Given that 33% of the current sample reported an RSE score of less than 15, this is an important issue to acknowledge. It would be beneficial for future studies to assess how psychometric scores relate to unrealistic expectations and perceptions.

Most attractive profiles

One would expect the C1 profile to be judged as the most attractive as it conforms to the accepted 'textbook' standard of beauty. In agreement with that, 86% of patients selected the C1 profile (profile C, fig. 10) as the most attractive, whilst 14% felt the mild C2 profile (profile B) was more attractive. This highlights how a mild C2 profile is often not perceived as a malocclusion, but instead as an attractive feature. C2 profiles are often perceived as more socially submissive. This contrasts with C3 profiles which are associated with more aggressive and dominant personality traits (Bell et al., 1985). This propensity towards a 'softer' more retrusive profile may be a cultural phenomenon, as studies suggest that there are significant differences in how cultures perceive profiles, for instance some cultures preferring mild C3 skeletal relationships (Sinko et al., 2018).

Similar results were seen when patients were asked to select which silhouettes were 'in need of jaw surgery'. There was a significant difference between the C2 and C3 profiles. All of the C3 moderate profiles, and almost all (97%) of the mild C3 profiles were selected, as opposed to 60% of the moderate and 14% of the mild C2 profiles.

Cochrane et al. (1999) carried out a similar study assessing how manipulated profiles were perceived by surgeons, orthodontists, students and laypeople. The C1 profiles were deemed most attractive by all groups, however there were some significant differences. Clinicians consistently selected the C1 profile as most attractive. However, students and laypeople selected the mild C2 profiles significantly more than clinicians. This is an interesting discrepancy. It may be that the years of clinical training that clinicians undergo, during which they are taught to aim for the 'ideal goal' of a C1 profile, could be influencing their perceptions. Conversely, laypeople may be more influenced by social factors such as trends

and celebrities, whilst patients would also be influenced by their own history and experiences, such as bullying (Stanford et al., 2014).

Self-Esteem

The average RSE score of 17.2, and the fact that 33% of the participants scored <15, suggests that orthognathic patients have a lower-than-average self-esteem (Rosenberg, 1965). This finding agrees with the wider literature (Kiyak et al. 1984; Chen et al., 2002). Studies investigating other facial disfigurements have also reported similar outcomes. A study by Versnel et al. (2012) compared the psychological functioning of adults with severe congenital facial disfigurement to a cohort with a harmonious facial appearance. Patients with both acquired and congenital disfigurements displayed lower self-esteem scores. Interestingly, they found self-esteem to be a predictor of depression/anxiety and greater dissatisfaction with facial appearance. They concluded that self-esteem is an important factor in the long-term psychological functioning of patients. Frejman et al. (2013) reported that patients with facial deformities displayed lower quality of life and self-esteem scores compared to controls. Interestingly, they did not find an association between dentofacial deformities and depression.

Mental health and SE scores

There was a tendency for patients with self-reported mental health conditions to obtain lower RSE scores, however this difference was not statistically significant (16.7 vs 17.8; p=.14). This is surprising given that the wider literature suggests that low self-esteem correlates with mental health issues such as anxiety and depression (Kiyak et al. 1984; Chen et al., 2002). This may have been because the study cohort had a high prevalence of mental health issues,

hence finding such a pattern would be difficult. In addition, the study was not specifically designed and powered to investigate this relationship.

5.8 LIMITATIONS

The results from the current study should be interpreted with caution for several reasons. Firstly, due to the exploratory nature of the study there is a risk that it is underpowered to identify a true effect. Secondly, it is possible that the significant number of analyses carried out could have increased the likelihood of type 1 error occurring. This is often termed 'data dredging' and introduces bias as the likelihood of an alpha error occurring accumulates (Papageorgiou et al., 2019). To an extent, this could have been compensated for by using correction methods such as Bonferroni correction. However, it is not the aim of this study to come up with definitive conclusions, but rather to generate a discussion, theories and hypotheses. Future research should focus on specifically addressing questions that arise with appropriate power calculations.

RSE was chosen as a measure of self-esteem due to its simple nature and high reliability/validity. The literature has consistently confirmed its high reliability and validity (Rosenberg, 1986; Carroll & Coetzer, 2011; Tinakon & Nahathai, 2012). However, does not measure all aspects of the self-esteem concept. For instance, self-esteem may differ in one's school performance or appearance. Specific tools to measure these sub-concepts of self-esteem do exist, however the RSE has the advantages of wide generalisability.

Another disadvantage is that the RSE scale is very transparent in what it is trying to measure. Its high face validity makes it apparent to the patient what is being measured. This may result in some respondents artificially inflating or deflating the score (Tinakon & Nahathai, 2012).

Finally, there was an imbalance between the number of clinicians and patients that participated. Overall, two surgeons and four orthodontists participated in the study. They were always paired together (a surgeon and an orthodontist), in a total of four combinations. As such, the results will be subject to the personal biases and opinions of the clinician pair that is scoring any given patient. Ideally, a larger number of consultants would have assessed each patient in order to provide large scale data.

5.9 FUTURE DIRECTIONS

Despite moderate agreement, surgeons tended to perceive a greater need for surgery than orthodontists. Further research is warranted into how and why surgeons and orthodontists differ in their views. The present study also suggests that patient and clinician perceptions differ. Further research is needed to clarify exactly how and why this differs. A qualitative approach would be beneficial in providing a more detailed and nuanced understanding of their views. Where does the subjectivity in clinical assessment originate from? Psychosocial factors which influence the perceptions and views of surgeons, orthodontists and patients warrant further study. Further work is needed to clarify the clinical implications of these differences in perception. For example, how do they directly influence patient care, and how can clinicians work towards minimising any negative effects.

The present study was focused on antero-posterior jaw discrepancies. Future studies can investigate vertical and transverse skeletal malocclusions. For instance, patients with asymmetries had the lowest self-esteem and their corresponding facial profiles were perceived negatively by patients. Conversely, patients perceived AOBs much more positively than clinicians did. Future studies should investigate how AOBs and asymmetries are perceived, and why there may be differences between clinicians and patients. In addition, real

life is three dimensional, as such there would be benefit to undertaking this study with the use of 3D technology.

The study reported clear differences in how C2 and C3 profiles were perceived by patients and clinicians. Further qualitative-quantitative studies should investigate where these differences originate from. An example of a question worth exploring would be the role of ethnicity and culture on the perceptions of profiles.

5.10 CONCLUSIONS

This study has provided insight into how the perceptions of surgeons, orthodontists and patients differ. The key findings are:

1. Orthognathic patients appear to have a low self-esteem and a high prevalence of self-reported mental health issues.
2. Class 2 profiles were generally perceived as being more attractive and as less in need of surgery than class 3 profiles by both clinicians and patients.
3. Patients and clinicians significantly differ in their perceptions. Most patients rated themselves as being in 'greater need of surgery' and as having more severe malocclusions than clinicians.
4. Oral & Maxillofacial surgeons appear to rate patients as being in greater 'need of surgery' than orthodontists.
5. Low self-esteem correlated with a greater discrepancy between the views of the patients and their clinicians. In other words, the difference between the clinician and patient ratings of malocclusion severity and 'need for surgery' inversely correlated with self-esteem scores.

6.0 CHAPTER 6: EXPLORING THE PSYCHOLOGY OF ORTHOGNATHIC PATIENTS USING SEMI-STRUCTURED INTERVIEWS

6.1 ABSTRACT

Introduction: There is a plethora of quantitative, questionnaire-based, research into the psychology of orthognathic patients. Patient satisfaction appears to be associated with a variety of psychosocial factors, not directly related to physical features. In addition, there appear to be substantial differences in the perceptions of patients and orthodontists. This is a topic underexplored with qualitative methodology, which can provide a deeper understanding of patients. This chapter explores the qualitative accounts of the psychology of orthognathic patients from both an orthodontist and patient perspective to gain a greater depth of understanding.

Methods: Semi-structured interviews were carried out with 14 orthognathic patients and six orthodontists. Patient interviews were analysed using Interpretative Phenomenological Analysis (IPA), whilst interviews with orthodontists were analysed using Thematic Analysis. IPA was deemed more suitable for patient interviews as it encourages a deeper exploration of an individual's experiences.

Results: Patients' perceptions of their jaws were associated with strong negative emotions. Patient's motivations and expectations were a combination of physical and psychosocial factors. These psychosocial factors appear to be less well explored and appreciated by orthodontists. Unrealistic patient expectations were common, primarily the expectation that other people's behaviour towards them will change. Social media plays a significant role in the patient journey, acting as both a source of information and a source of support. Orthodontists should be aware of this and provide guidance to patients. Overall, patients'

malocclusions appear to have a deleterious effect on their mental health. Orthodontists have limited training in diagnosing and managing mental health issues, stating that input from a psychologist is valuable but scarce.

Conclusion: Mental health issues are a significant concern for both patients and their orthodontists. Orthodontists lack the confidence and expertise to manage these conditions, as such, input from a psychologist is valued by both parties. Orthodontists appear to underexplore patient's psychosocial perceptions and expectations. Finally, social media plays a significant role in providing patients with information and a form of peer support.

6.2 INTRODUCTION

Satisfaction following orthognathic surgery has been studied extensively in the literature, with most studies reporting an outcome satisfaction rate of over 80%. Studies have shown that pre-operatively patients have a lower self-esteem and body image (Kiyak, 1993; Cunningham et al., 2000; Johnston et al., 2010). Reported benefits of orthognathic surgery include improved self-esteem, improved function, and improved quality of life (Derwent et al., 2001; Zhou et al., 2001; Chen et al., 2002; Liddle et al., 2015). However, alongside this an important minority of patients remain unsatisfied with treatment, an understanding which is underexplored in the literature.

There has been a lack of studies utilising a qualitative approach, with most studies exploring patient expectations and satisfaction solely based on questionnaires. Although this quantitative approach is valuable, it has innate limitations when it comes to exploring the patient perspective. A combined qualitative-quantitative approach, utilising in-depth semi-structured interviews, can explore deeper and more meaningful insights. Qualitative methods are the optimum method of exploring sensitive subjects (Dickson-Swift et al., 2009).

Understanding emotions experienced by patients can be challenging, but through the process of qualitative analysis, and the practice of reflexivity, emotions and experiences can be better understood.

Ryan et al. (2012b) investigated the expectations of patients about to undergo orthognathic surgery using a qualitative approach. They carried out semi-structured interviews with 18 patients. They noted that expectations fell into two main categories. Expectations of the physical changes, and expectations of how these will impact their life. Their data suggests that patients can be classified into four categories based on expectations: metamorphosizers (high expectations of physical and non-physical changes), pragmatists (high expectations of physical changes but low expectations of non-physical changes), shedders (low expectations of physical but high expectations of nonphysical changes) and evolvers (low expectations of physical and nonphysical changes). This study was important in highlighting how patient expectations lie on a wide spectrum from physical to psychosocial.

Chen et al. (2002) used a qualitative-quantitative approach to investigate the factors which influence post-operative satisfaction. Overall satisfaction was high; however, the study highlighted the important role that people close to the patient have, whereby greater support was associated with greater satisfaction. Additionally, individuals' interpersonal sensitivity and having realistic expectations were important factors. Thus, patient satisfaction is not purely based on how well a clinician corrects their jaw deformity, it is augmented by many other psychosocial factors, which clinicians may overlook. Other studies support this finding. Kiyak et al. (1984) reported that neuroticism and an external locus of control were predictors of post-operative dissatisfaction, whilst Auerbach et al. (1984) concluded that good communication between surgeons and patients was a crucial factor in satisfaction.

It may therefore be important for clinicians to explore patients' locus of control and related motivations associated with their decision to pursue orthognathic surgery. Broadly speaking, control motivations can be either extrinsic or intrinsic. Extrinsic motivation is related to an external locus of control, and it arises from the need to appease others, or from the desire to obtain a certain response from others (Halvari et al., 2013). For example, a patient believing others will treat them better following surgery or thinking it would make them more successful in their career. Whilst this type of motivation is common, it requires careful consideration by the orthodontist, as it is often unrealistic. Such expectations will not be fulfilled by surgery alone; rather, they require a change in the patient's personal environment and/or life. It is important for patients to be largely driven by intrinsic motivations, as these are in their control and are often related to more realistic and predictable outcomes. The three fundamentals to intrinsic motivation are: Autonomy, i.e. the individual makes the decision for themselves, without external pressure; Purpose, there is a clear meaning behind the motivation, e.g. to reach their potential, enjoyment etc; Mastery, e.g. an internal reward for mastering a skill (Pink, 2012). The rewards for this motivation come from inner feelings of satisfaction. In the context of orthognathic surgery, such motivation can arise from true inner dissatisfaction of one's appearance. Such patients are often more satisfied with the outcome of surgery then those with external motivations (Jacobson, 1984). Most patients present with a mix of the two, as such a detailed exploration and understanding of what motivates them is important prior to embarking on treatment.

A qualitative approach was used by Stanford et al. (2014) to explore what orthodontic patients perceived as beautiful. They concluded that conventional concepts of dento-facial beauty, as defined by traditional textbooks (often derived from population 'norms'), frequently do not fully represent those of patients. Instead, patient perceptions were a

combination of both measurable biological factors (i.e. textbook features of traditional beauty) and psychosocial factors (namely personal observations and influence from friends, family and the media). Previous studies have also shown a significant variation in how the perception of a malocclusion and the perceived need for surgery differ between orthodontists and surgeons (Vesey, 2019). Ultimately, whilst the media, friends and family all play an important role in the development of a patient's self-image, the most important factor is the patient's own perception. It is crucial that orthodontists do not impose their assumptions about what the patients' views are and what changes they desire. For this reason, a deeper understanding of patient perceptions, using a suitable qualitative approach, is an important topic to research.

Whilst an understanding of the patient's views is critical, the decision-making process also involves the orthodontist and surgeon. Their views will inevitably influence the patient and so understanding them is important. Studies have suggested there is a difference between the views of clinicians and patients. Vesey (2019) reported orthodontists to rate malocclusions less severely than surgeons, and to have a higher threshold for proposing orthognathic surgery. On a similar note, Bell et al. (1985) found that patients rated themselves much more severely than orthodontists. It is worthwhile exploring the potential biases that clinicians bring that influence their own views.

As previously discussed, this patient base has a high prevalence of mental health issues, and orthodontists feel underconfident in diagnosing and managing these (Juggins, et al., 2006). As such, this study will explore the difficulties orthodontists have in managing the psychology of orthognathic patients.

The study will look at the psychosocial issues orthodontists face in managing their orthognathic patients, a topic underexplored in the literature. It will also explore what motivates patients and their perceptions on a deeper level to complement the findings of the previous two, largely quantitative, chapters. In addition, orthodontists' perspectives will be investigated to gain an understanding of the difficulties they face in managing the psychological health of orthognathic patients.

6.3 AIMS

To explore the psychology of orthognathic patients from the perspectives of orthodontists and patients.

6.4 OBJECTIVES

To further understanding towards the project aim, the research objectives were to explore:

- How patients perceive their facial profiles
- Patient expectations, motivations, and concerns regarding orthognathic surgery
- Patients' psychological wellbeing
- How patients discover and research orthognathic treatment
- The process of joint decision-making from both an orthodontist and a patient perspective
- Orthodontists' views on managing the mental health of orthognathic patients

6.5 METHODOLOGY

6.5.1 DESIGN

The study was a cross-sectional qualitative design utilising semi-structured interviews.

6.5.2 PARTICIPANTS

The mean age of patients was 23 years (range: 19-36). Nine of the 14 patients were female. In terms of ethnicity, the majority were Caucasian (n=9), four were Afro-Caribbean and one was East Asian. Demographic data for the participating orthodontists was not collected. The inclusion and exclusion criteria for patients and orthodontists are outlined in Tables 7 and 8.

Table 7: Inclusion and exclusion criteria for patient interviews

Orthognathic patients *- Inclusion criteria*	*Exclusion criteria*
1) Patients with class 2 or 3 skeletal relationships.	1) Patients with craniofacial disorders (e.g., cleft lip and/or palate).
2) Patients aged 16 or over.	2) Patients with acquired deformities (e.g., trauma).
3) Patient able to provide informed consent.	3) Previous orthodontic/orthognathic treatment.
4) Patients suitable and willing to undergo orthognathic surgery.	6) Patients who have commenced pre-surgical orthodontic treatment.

Table 8: Inclusion and exclusion criteria for orthodontist interviews

Orthodontists *- Inclusion criteria*	*Exclusion criteria*
1)Qualified orthodontists	1) Orthodontists not satisfying the inclusion criteria
2) Regularly involved in the management of orthognathic patients (minimum once every month).	

6.5.3 PROCEDURE- PARTICIPANT RECRUITMENT

Patients were prospectively recruited from joint orthognathic clinics at Liverpool University Dental Hospital (LUDH). Patients on joint clinics are seen by both an orthodontist and an

OMF surgeon. Patients who fulfilled the inclusion criteria (table 7) were approached and the study was discussed with them. If they showed interest, they were briefed on the nature of the study and provided an opportunity to ask questions. An interview date and time were arranged, and the patient was reassured they could withdraw consent at any time.

Patient recruitment continued until thematic saturation was reached. The point of saturation occurred at 14 patients, which is comparable to other studies in which this was between 10-20 patients (Chen et al., 2002; Pabari et al., 2011; Ryan et al., 2012a; b; Liddle et al., 2018).

To supplement the aim, nine orthodontists working at Liverpool University Dental Hospital were asked to be interviewed, with six agreeing.

Sampling Method: In order to obtain a heterogenous sample with regards to age, gender and ethnicity, purposive sampling was attempted using a sampling framework (table 9). The framework outlines the minimum number of patients of each characteristic to be recruited, before further patients are invited. Unfortunately, due to a limited number of East Asian and South Asian patients, and the constrained timeframe of the recruitment period, this sampling framework was abandoned. In the end, consecutive sampling was used to recruit the participants, accepting the disadvantages of a less heterogeneous sample.

Table 9: Attempted sampling framework for patient selection

Gender	
Male	≥3
Female	≥3
Age	
16-23	≥3
≥24	≥3
Ethnicity	
Afro-Caribbean	≥2
East Asian	≥2
South Asian	≥2

6.5.4 CONSENT PROCESS

Informed consent was obtained from each participant after fully describing the study and explaining what participating would involve, how the data will be stored, preserved, used, and how confidentiality will be maintained. Each participant was provided with a participant information sheet (clinician or patient version-appendix VII).

The rights of participants to refuse involvement and withdraw consent at any point was highlighted. Patients were able to withdraw their data from the study up to the point of anonymisation; this was within two weeks of its collection.

6.5.5 METHODS

Semi-structured interviews were carried out remotely using Microsoft Teams. The interviews were transcribed verbatim. Each transcript was reviewed multiple times to ensure accuracy of transcription and to ensure that non-verbal cues such as intonation and laughter were captured.

The interviews were directed by two topic guides, one for patient interviews and one for interviews with orthodontists (appendix VIII) to ensure consistency and full coverage of topics. The topic guides were developed following a review of the literature and discussion within the research team. The interviewer had the freedom to investigate any issues or novel topics that came up during the conversation. The interviewer was an Academic Clinical Fellow in Orthodontics with some formal training in qualitative methodology and semi-structured interviews.

6.5.6 ASSESSMENT AND MANAGEMENT OF PATIENT RISKS

Interviews explored potentially sensitive topics. As such, measures were taken to ensure patients felt comfortable. Firstly, the researcher is an orthodontic trainee routinely involved in the treatment of orthognathic patients. They have had training in communications skills and are able to empathise with patients and make them feel at ease. Debriefing in the form of professional psychological support was available to participants in the event they experienced distress. No referrals were required for either the interviewed patients or orthodontists.

6.5.7 DATA ANALYSIS

Patient interviews were analysed using Interpretative Phenomenological Analysis (IPA) (Smith, 1996). IPA was chosen because of its strength in exploring personal experiences. Compared to other commonly used qualitative analyses IPA has a stronger emphasis on finding meaning across the experiences of participants. IPA is well suited for experiential questions, with a focus on phenomenology. Since an important aspect of this study is to explore patient's past experiences, how they make sense of them, and their influence, IPA is the optimal tool to help readers understand their perspective (Smith & Shinebourne, 2012).

IPA shares many similarities to other popular methods of analysis such as Thematic Analysis, however it has a stronger focus on understanding the interviewee's experiences. To optimise the IPA data yield, the interviewer encouraged a detailed and accurate description of the patients' experiences. The interview topic guide and interviewing style were designed to encourage rich descriptions of experiences. For instance, initial questions on a topic were straightforward to ensure patients are comfortable. They then progressed into more thought provoking, open ended, and often reflective forms of questioning.

Each interview was analysed in-depth before moving on to the next in order to extract all themes and connect them to the subsequent interviews. Making connections between the

interviews was an important part of the process as it enriched the quality of the data. Plausible interpretations of the patient's experiences were constructed by the researcher, all whilst acknowledging that patients are experts of their own experiences, and the researcher can never fully understand their world. This concept of the 'double hermeneutic approach' is a central pillar of a successful IPA. In essence, throughout the analysis the researcher seeks deeper and more meaningful interpretations of the material, often extrapolating the patient's experiences (Tuffour, 2017).

The process of analysis began with data familiarisation (i.e. reading and re-reading the transcript). Any impressions or ideas were noted during the analysis process (see example in appendix IX). The transcription was then annotated with codes. Following further analysis and editing of the codes, themes were noted on the opposite side of the page. These were further clustered into broader, 'superordinate themes' (appendix IV). The data was analysed laterally by assessing links and themes between the interviews themselves.

As IPA should only be used when the focus is on exploring people's experiences, it was not used for the clinician interviews. These were analysed using Thematic Analysis (Braun and Clarke, 2006), a widely accepted and adaptable method of qualitative analysis. For a description of thematic analysis and how it was carried out please refer to Chapter 4.

Reflexivity and data quality

To ensure the emerging analysis was of a high quality it was discussed with supervisors at regular meetings. Code tables and descriptions are outlined in Appendix IV to provide an audit trail, and supporting quotes are presented in the results narrative.

Conduct and analysis of interviews is innately influenced by the researcher. Ultimately, the coding of the data represents that individual researcher's interpretation. This personal input

that a researcher has on the data analysis contrasts with quantitative analysis where the researcher follows a more structured approach to analysis. As such, it is important to acknowledge that the researcher will always influence how data from semi-structured interviews is analysed (Braun and Clarke, 2006). Therefore, reflexivity is important as it encourages the researcher to identify what biases they may have and question these. Four interviews were also analysed by the research supervisors. Codes and themes were discussed in detail within the research group, enhancing the exploration and validity of the emerging analysis. Having a reflexive approach during analysis ensures the researcher is always questioning themselves and trying to view things from a different perspective. It helps them engage with the data more intimately. To this end, the researcher kept a reflection diary throughout the process. An excerpt of this is shown in Appendix IX.

6.6 RESULTS

6.6.1 PATIENT INTERVIEWS

The interviews conducted provide an insight into the psychology of orthognathic patients. A better understanding of the patient journey, what motivates them, and how patients perceive themselves will help clinicians during both the shared decision-making process and throughout the treatment itself. The themes and superordinate themes extracted from the data are outlined below and summarised in Appendix IV.

In total there were five themes, these were: psychosocial effects, researching orthognathic surgery, self-perception and agreement with clinicians, expectation and motivation, service experience and improvement.

1] Psychosocial effects: Patients reported a variety of negative effects their malocclusion has had on their mental health and/or social life. When describing their jaws patients often used emotional language.

"*Oh god I hate it. It's just… I'm like a bulldog, just all chin. It's all I can see when I look at myself. I hate it"*- (Patient Int 14, pg 6, line 182)

They thought their appearance has been quite detrimental to their mental health wellbeing. Other people had a significant influence on patients' mental health, with bullying being a commonly mentioned experience. These negative effects were often a source of motivation for patients to pursue surgery. Similarly, often their expectations were that these negative psychosocial effects would improve following surgery.

"*Yeah, I'd say anxiety really. I've been diagnosed with anxiety by my GP and I think a lot of it stems from my appearance and feeling abnormal. Being bullied at school, not feeling good enough. All that kind of stuff, really*." (Patient Int 9, pg 4, line 123)

Patients frequently altered their behaviour due to their malocclusion. Frequently described examples were either avoiding pictures or changing their posture in pictures to disguise the malocclusion.

"*So, the way I do make up, I always make sure I have defined cheekbones, and things like that, and I put my head down in pictures. So definitely anxiety, I'd never get a picture taken, just stuff like that*."- (Patient Int 12, pg 5, line 163)

Some patients avoided social situations, often due to social anxiety. They felt this was a very detrimental consequence of their appearance.

"*Any big gatherings I don't do well in. It just feels like I stand out and everyone looks at me. So, it does stop me, I don't… Often I don't go if there will be many people*"- (Patient Int 10, pg 5, line 197).

Patients struggled with dating as they felt self-conscious and less confident.

"*It's difficult because I'm not as confident as I could be you know*" – (Patient Int 7, Pg 3, Line 96).

However, some patients were able to overcome their anxiety and maintain a good social life. They often reported having to make a conscious decision about whether to become more reclusive or to overcome their anxiety.

"*So, you have to go either way. You either retreat and become this quiet person so nobody will notice you. Or you do what I did and go the opposite way, and just become really confident and outgoing. To try and distract from it*." (Patient Int 12, pg 7, line 231).

Past experiences significantly influenced patient's psychological wellbeing. Patients first begun noticing their jaws during the teenage years. They struggled growing up and jaw concerns increased with age. The majority of patients also experienced bullying during this period which had a detrimental effect on their mental health wellbeing.

"*Yeah, I was bullied at school. And of course, the focus was always my jaws, they would say things like its goofy and so on*"- (Patient Int 7, pg 8, line 220)

Bullying had negative effects on their psychological wellbeing, making patients more self-conscious, anxious and less confident.

"*It makes you much more self-conscious you know… I feel like it did make it a much bigger part of my life. Before that I had noticed my jaws, but after kids started bullying me, I became almost obsessed by them*"- (Patient Int 10, pg 9, line 281)

2] Researching Orthognathic Surgery: Patients were overall inquisitive and eager to research the operation. They often reported a strong desire for an official diagnosis from the clinicians. They felt acknowledged and reassured when the clinicians presented them with a diagnosis. They felt the consultation appointments gave them a greater understanding of their malocclusion.

"*I just wasn't sure what was wrong with me exactly, I knew something was off, and so when my dentist saw me and mentioned this option…I was very keen to see the specialists. I wanted their expert opinion, you know*"- (Patient Int 8, pg 3, line 98).

"*They really went into detail analysing my jaws from all angles. It was great, because they are experts…you know. It… I knew what I disliked about them, but they managed to explain it in much clearer detail, and explained exactly where the issues were*"- (Patient Int 2, pg 6, line 221)

Patients carried out a significant amount of research into the procedure. They used a wide range of resources, including the ones provided by clinicians. Some patients did feel the leaflets (BOS orthognathic surgery leaflet) and website (BOS website) provided by clinicians were insufficient.

"*It's hard to just have one appointment with you guys and you tell us about it and give a leaflet, but the leaflet I'll be honest is so short and simple, with little drawings, I don't think it gives enough information*." – (Patient Int 7, line 137, pg 5).

All of the patients had positive views on the use of social media to research the procedure. They would watch informative videos on social media and follow vloggers through their orthognathic journey. They found this to be a very comforting experience, highlighting how information and having a support network can influence their mental health state.

"*And I follow many people having the procedure, from Russia, from Singapore, USA, England many places. It's amazing, and you see them go through it a few steps ahead*"- (Patient Int 7, pg 4, Line 135)

Patients' understanding of the risks of the procedure were mixed. It does appear most had forgotten key risks discussed with them.

"*I'm not sure about specifics, I don't remember. I know there will be pain afterwards*"- (Patient Int 3, pg 6, line 281)

However, some patients did demonstrate a detailed understanding of the key risks involved.

"*There are many risks, and I've done my research, I've seen the possible consequences. There is death, blindness, loss of muscle movement, nerve damage, infections. You can get facial changes you don't want, so it's not fully predictable*" – (Patient Int 2, Pg 6, line 52)

The effect of having the initial consultation with the clinician had an interesting effect on the psychology of patients. While they felt comforted and validated by the fact there was treatment available, some did report it made them even more conscious of their jaws, as it acknowledged it as an actual diagnosis.

"*It was great to finally have someone acknowledge it you know, confirm that I'm not crazy. But it does make it more real. You know when you have two doctors saying you*

should have major surgery, it kind of makes it more of a thing if that makes sense" – (Patient Int 3, pg 5, line 161).

Beyond the initial consultation, a key aspect of the patient-clinician relationship was their perceptions of the patient's malocclusion.

3] Self-perception and agreement with clinicians: The interviews reveal an intimate relationship between patients' psychological state and their self-perception. Interviewees felt their self-esteem and confidence were low due to the appearance of their jaws. As a whole, patients had fairly negative perceptions of themselves, often using strong analogies to bulldog or witch appearances. Most reported mild to moderate dislike of their teeth, highlighting that their key concern was the facial appearance.

"*The chin makes me look like a witch! It's very pointy, and it's all you can see. It's wonky and just terrible*"- (Patient Int 9, pg 4, line 112).

"*It's massively affected my self-esteem. I don't feel confident, especially in social situations. But even you know, when I have an interview, I dread it, I'm worried about them looking at my jaw*"- (Patient Int 6, pg 5, line 146)

When patients were asked whether the views of clinicians aligned with their own there was a largely positive response. Physically they did feel the clinicians understood what the issues were. This compliments the findings from the previous theme, 'researching orthognathic surgery', which reported that many patients felt relief when they were provided with a diagnosis by a clinician.

"*I really liked them; they knew exactly what bothered me. Straight away we agreed*" – (Patient Int 3, pg 4, line 133)

However, some did feel that clinicians did not fully understand what concerned the patient. Some patients felt that clinicians perceived their malocclusion more of a 'clinical' manner, suggesting clinicians have a good understanding of patient's physical appearance, but potentially fail to fully appreciate the psychosocial aspects of how patients are affected.

"*Kind of. But I don't think they see it as I do. I think they see me as a clinical case. I like them. But I felt like it wasn't like, "oh she is feeling this sort of way". That empathy is not there. They discuss, clinically this is what it looks like, so clinically we can do this and that etc.*"- (Patient Int 12, Pg 8, line 271)

4] Expectation and motivation: Patients displayed a variety of expectations and motivating factors. These were physical, social and/or psychological in nature, suggesting a closely interlinked relationship between patient's psychosocial factors and their expectations/motivations. Some expectations were realistic, whilst others the researcher felt were unrealistic. Most expectations were physical in nature and realistic, such as reducing the prominence of their jaw.

"*I'd expect to you know, still look like myself, but just with a less prominent jaw, the bite would not be reversed*"- (Patient Int 13, pg 7, line 244)

However, some physical expectations the researcher felt was unrealistic. These were largely to do with soft tissue changes such as having fuller lips, or certain changes to the nose and cheekbones.

"*My cheekbones would fill out, and my nose would look more balanced, less obvious. Right now it dominates my face. So, the face would just become more balanced you know*"- (Patient int 6, Pg 3, Line 108)

Psychosocial expectations varied greatly and highlighted how interlinked they are to the themes of psychosocial effects and self-perception. Some patients did not expect their own personality or how others treat them to change at all, whilst others did. Most reported expectations that the researcher felt were reasonable, such as a boost to their confidence.

"*I think it would make me a bit more confident*."- (Patient Int 11, pg 7, line 228)

However, some expected drastic life changes, or for other people to change their behaviour towards them.

"*I knew straight away it would change my life*"- (Patient Int 7. Pg 2. Line 48).

"*I think people would take me more seriously*"- (Patient Int 11, Pg 2, line 37)

The major motivating factor for patients was a desire to change their appearance. They were excited and motivated by the prospect of taking pictures and smiling more.

"*Idea of taking pictures and the jaws looking nice really encourages me*"-(Patient Int 7, Pg 4, line 108).

Other people were also a motivating factor. Family was sometimes supportive, whilst at other times not keen on the idea of surgery. Most patients did find their friends to be a source of motivation and someone who they could share concerns with and seek support from.

"*My family are very encouraging, especially my sister who has had it*"- (Patient Int 5, Pg 5, Line 124)

Friends and family were mostly a source of support for patients, although some did find their parents were against the procedure. Some felt that their parents were not acknowledging the

jaw abnormality and were pretending there was nothing atypical about their appearance. This was a source of frustration.

"*My family and girlfriend have been massively supportive*"- (Patient Int 7, Pg 4. Line 126)

"*And my mum, she thinks I'm absolutely bonkers. She thinks I'm crazy. She went with my sister to her consultation, and they never consented her at the time because my mum was just like "no, no, no". So, she had to go home and come back*."- (Patient Int 12, pg 4, line 135)

Social factors played a significant role in patient's motivations and expectations. It appears that other people have a significant role in patient's decision making. In addition to the previously discussed effects of bullying, patients also mentioned how people starring at them is something they disliked. The role of other people as a source of peer support was further discussed below.

"*Well, you do notice people starring. And for example, one of my colleagues brought her little girl into work, and I swear to you Hans this little girl would not stop starring at my jaw *laughs*, it was terrible, I just wanted to shrink*"- (Patient Int 11, pg 5, line 147).

5] Service experience and improvement: All patients, bar one, were keen on the idea of seeing a psychologist before or during the orthognathic treatment. They felt it was beneficial even without having significant mental health issues, simply for the support. It appears there was no stigma that concerned patients. This finding makes sense given the negative psychological effects experienced by patients.

"*I think it's a great idea. Its someone else to talk to, a professional who would understand, who would know what to say. I mean no offence to you guys, but I wouldn't exactly tell XXXX (patient's OMF surgeon) or XXXX (patient's orthodontist) about my mental health you know, it's not their job*". – (Patient Int 4, pg 5, line 161).

Similarly, the patients felt that the idea of 'buddying' them up with someone who has been through the orthognathic journey would be beneficial, as they would have someone to seek personal advice and support from. This strongly relates to the theme of 'researching orthognathic surgery', where patients were found to seek out a 'virtual' buddy for support through social media.

"*It's a bit like following the people on social media. I think it would make a massive difference to have someone go through it with you, or before you even so you can ask them questions*." (Patient Int 7, pg 6, line 179).

Most patients were referred by their general dentist, subsequently assessed by a specialist in primary care, and then finally seen on a joint clinic at LUDH. They felt the process worked well, except the waiting times were too long.

"*Long waiting period but overall smooth journey*" (Patient Int 7, Pg 1, Line 28)

Patients were excited at the prospect of having orthognathic surgery. In addition, when they first discovered this treatment option, they found a lot of comfort in the fact that there is a treatment option for them.

"*It was a wonderful feeling, imagine you have a condition, and you think nothing can be done with it, you have to live with it your whole life, then you suddenly discover there is an option. It was such relief*"- (Patient Int 6, pg 3, line 103)

Patients had confidence in their surgeons, believing they were experienced and knew what they were doing.

"*I know I'm in good hands*"- (Patient Int 7, Pg 4 Line 119).

6.6.2 ORTHODONTIST INTERVIEWS

The findings from the orthodontist interviews provide an insight into the difficulties of managing the psychological aspects of orthognathic patients and the perceptions orthodontists have of the decision-making process. The themes and superordinate themes extracted from the data are outlined below and summarised in Appendix IV.

The six superordinate themes identified were: psychology of orthognathic patients, training in screening and management of mental health issues, signposting and referring to external mental health services, shared decision making and differences in perceptions, role of the psychologist and orthodontist, service improvement.

1] Psychology of orthognathic patients: Orthodontists reported a high prevalence of mental health issues in their orthognathic patient base, in particular anxiety and depression, complementing the similar results revealed by the patient interviews.

"*The incidence is high, higher than your standard orthodontic patient base. I'd say there is a range, but orthognathic patients do tend to present with more issues such as anxiety*" – (Ortho Int 1, pg 1, line 3).

Anecdotally, they felt this incidence is increasing, and that it is due to a combination of more people openly discussing mental health, in addition to a true increase in the incidence of mental health issues. Orthodontists also felt patients are becoming more demanding, and that social media has a large role to play in this.

"*I think mental health has been more normalised and so people are more open to talking about it and getting help. This makes a big difference. Years back patients would not have presented to their GP, not sought help. But social media I think has a large role to play. With TikTok and all this **** kids are seeing too many filters and other unrealistic images*."- (Ortho Int 2, pg 1, line 8)

Orthodontists felt most patients had somewhat realistic motivations and expectations. Appearance was the most common motivator. Patients motivated by the expectation that their social life would significantly improve were relatively common, and orthodontists felt this was not wholly realistic. They felt that a skeletal jaw discrepancy does not preclude someone from having a social life, and that this is more of an internal issue patients need to address. The findings in this theme correlate to the above discussed theme "expectations and motivations" from the patient interviews.

"*Sometimes the patient is not too bothered by it, but their partner or parents are. Other times the patient may feel it will help them in their career progression. Or it may be stopping them from approaching a girl they like. Motivation is a tricky thing, and it can have so many aspects. I'm always a bit wary if their main source of motivation is expectations from someone else, or not having friends etc. That's not a good sign*."- (Ortho Int 3, pg 4, line 135).

Linked to the theme of research in patient interviews, there was an overall negative view of patients using social media to learn about orthognathic surgery, in particular the idea of following people on Instagram who are going through orthognathic treatment. Orthodontists frequently felt it "*can give patients a false idea*" – (Ortho Int 4, pg 2, line 56). They felt social

media was detrimental to mental health. They also felt wary of the effect the social media influencers may have on their patients.

"*Well in terms of education of patients I think it can be. But it's difficult to say because a lot of social media is garbage and causes the mental health issues we have been discussing*" – (Ortho Int 1, pg 4, line 120)

"*Think about who the people on these platforms are, they aren't exactly your normal patients, it takes a special type of character to post their personal life on there*"- (Ortho Int 4, pg 2, line 59).

Only one orthodontist had a more positive view of patients using social media.

"*Not all social media is the same. I have many patients that have seen other people go through the journey, and its well documented and realistic, and it shows the highs and lows, and explains it in a patient friendly way*"- (Ortho Int 1, page 4, line 120).

2] Training in screening & management of mental health issues: Given the mental health challenges orthognathic patients face, it is important to investigate what training orthodontists have in identifying and/or managing these. Most orthodontists had limited teaching on the topic of diagnosis and management of psychological conditions. This teaching was in the form of lectures, with several orthodontists attending day long course, and one whose masters research project was on this topic. All but one orthodontist expressed a desire for more training in this area.

"*I've not had any official education in this. Just your standard lectures as a trainee. You mostly learn through your consultants and through experience. I'm not aware of more*

formal training course. In senior StR training you get more experience in this, with some tricky patients referred to you."- (Ortho Int 1, pg 2, line 76).

Orthodontists varied in how confident they were at detecting 'red flags' and in screening for mental health disorders. Some felt inadequately prepared for this, whilst others felt it was easy for them.

"*I wouldn't say I was very confident, no. It's not something I've had training or experience in. I mean of course if someone has obvious psychological issues, or clearly unrealistic expectations then, ye…but it can be subtle sometimes, and it can come out unexpectedly*"- (Ortho Int 6, pg 1, line 38)

The practice of reflexivity and learning from past experiences was a significant way clinicians evolved their practice. It appears to be one of the main ways they learn and change their approach to managing patients.

"I think motivation is an important area to explore. As a young consultant I used to not ask about this, because I felt it was obvious, but now I do tend to ask patients this specific question, because it may not be what you think. ."- (Ortho Int 3, pg 4, line 133).

3] Signposting and referring to external mental health services: Given the lack of training and confidence orthodontists had in managing mental health issues, it was important to investigate how they utilise external help. All the orthodontists were aware that they could refer to a psychologist for an assessment. Those referrals were reserved for patients with more serious mental health conditions, or for patients they had apprehensions about.

"*When patients have a more serious mental health condition, a diagnosis. For example, eating disorders, body dysmorphia, psychosis etc. And in general, for anyone for who my*

gut is saying will be trouble. Very unrealistic expectations, severe anxiety or depression. Difficulty communicating with them and so on."- (Ortho Int 1, pg 2, line 41).

Orthodontists were aware they could refer to psychologists for an assessment only service. However, none of them were aware of direct-access psychological services that they could signpost patients to. Instead, orthodontists simply relied on the GP to refer patients to the NHS mental health services for ongoing psychological support.

"*I'm not aware of any myself, usually the psychologist or the GP would direct patients"*- (Ortho Int 5, pg 2, line 68)

4] Shared decision making & differences in perceptions: The decision-making process was discussed in detail. All orthodontists felt that this was a joint process between the surgeon, patient, and themselves. They were all comforted by the fact they had a surgeon colleague to rely upon during the decision-making process. They also felt this made communication easier with patients, as there were two professionals to explain things to patients.

"*Remember that there are two of us there. There is also the surgeon, that makes a large difference*."- (Ortho Int 1, pg 1, line 25).

Most orthodontists felt their perspectives were similar to both the patient and the surgeon, though they did show an appreciation for the fact that patient views are modified by their personal experiences. A small but significant proportion of patients did present with wildly different views from the orthodontist. Taken together with the findings that orthodontists lack training in diagnosing and managing mental health issues, and their high prevalence in orthognathic patients, this reinforces the need for professional psychological support.

"*Erm most I think its similar enough. I think it's always different to an extent, however. We see them as a patient, and we begin analysing nasio-labial angles and stuff, but they don't see it like that. It's a bit like when you hear your voice on a recording, you can't believe you sound like that. So, it's the same, their perception of themselves is influenced by so many factors we can't know. Some patients and I are completely off. I feel like they see a different person. They might fixate on something I don't feel is an issue*."- (Ortho Int 1, page 3, line 88).

With surgeons they felt they had a very comfortable relationship and felt they were almost always in agreement.

"I would say we are. The differences between us are much smaller than between patients. With time it's even more so. You build the relationship. There are small things we might disagree on and discuss, but that's normal."- (Ortho Int 4, pg 3, line 101)

5] Role of the psychologist & orthodontist: It was important to clarify the roles orthodontists and psychologists have in the management of orthognathic patient's mental health issues. It was encouraging to note that both the orthodontists and psychologists (outlined in Chapter 4) agree as to what these roles are. Here, orthodontists acknowledged the important role they have in terms of building long-term trusting relationships with patients, screening for mental health issues and appropriately referring. Neither of the professionals felt orthodontists should be the ones to manage mental health issues.

"*We see patients for a long time, and we build a relationship with them. They can open up to us, so… with these things it's all about getting patients to open up. We need to identify issues and refer to the appropriate people"*- (Ortho Int 4, pg 3, line 102).

There was an overwhelming support for the role of psychologists in the management of orthognathic patients. Orthodontists acknowledged that patients are more open with psychologists. They also felt that psychologists were more efficient at screening for mental health issues, signposting patients to sources of ongoing care and equipping them with coping strategies. All orthodontists bar one wanted to have a psychologist join the multidisciplinary team, however they also felt it was unrealistic given the financial constraints, questioning how cost effective such a change would be. Some of the described benefits included…

"*Well, there are many. Setting realistic expectations. Exploring and supporting them with mental health problems. Providing them with resources to handle them. Counselling, although they don't provide it themselves, but they can refer to the appropriate resources. Providing patients with coping strategies they will benefit from. There's many I think, and of course as you know some units have them on the MDT clinic and I would love that we could learn a lot from them, but I don't know how they justified the funding, there is no way the average orthognathic patient needs a psychologist on the clinic. It's a very expensive cost to justify*."- (Ortho Int 1, pg 2, line 59)

Coping mechanisms were identified as something important that psychologists can help patients develop.

"*They're often quite young when their jaws become noticeable, and of course then come the teenage years, and bullying and so on, and they often haven't developed the coping strategies at that point. And that can be quite detrimental. If an individual has a good support structure and has developed coping strategies, they can fair better. Counsellors can help patients develop these, that's important"*- (Ortho Int 4, pg 3, line 131)

6] Service Improvement: The concept of a screening questionnaire was discussed with orthodontists. All but two reacted positively to the idea. Reservations included concerns about patients filling them out truthfully, standardising its use, and ensuring orthodontists do not interpret it differently.

> "*I think it could work well. I've heard of units using questionnaires. With those things I always wonder if patients properly fill them in or they try to play the game. With some thinking a high score will get them treatment, and others thinking the opposite. But that's just me wondering, I think it will be a useful thing to have. It would be a starting point to delve deeper in their mental health. And it's some objective data which is useful*."- (Ortho Int 1, pg 2, line 51)

The idea of pairing prospective patients with previous orthognathic patients was also discussed and received a mixed response. In agreement with the patients themselves, most of the orthodontists felt it would be a good source of support for patients. Conversely, several expressed concerns regarding the fact it would be unpredictable, as a bad pairing could result in more issues than it solves.

> "*I think it can be beneficial, really beneficial for patients to have a peer for support, someone that's been through it. I think… in reality it would be difficult to arrange. There would be data protection implications, you know who would match them up, how, who would look after the system. Also, what happens if the person you match them with is, has had a bad experience, or is a bad influence"*- (Ortho Int 5, pg 4, line 122)

Orthodontists' main concerns with the current services were the lack of funding for psychologists, the unavailability of psychologists to provide ongoing support, and the long wait for NHS support. Orthodontists felt psychologist reports often advise that patients

should have ongoing therapy, whilst being unable to provide this themselves. As a result, orthodontists refer to the GP, who then refers to the NHS psychology services. They felt these referrals were too long and significantly delayed treatment.

> "*Well, the main problem is that it's just an assessment service. I don't need someone to tell me the patient needs therapy, I know that, it's why I referred them. Do you know what I mean? Theres no facility to provide actual therapy, then we have to refer to the GP who refer to the NHS services, but the waiting times are very long"*- (Ortho Int 4, pg 4, line 154)

6.7 DISCUSSION

This study investigated the **psychology of orthognathic patients** from the perspectives of both patients and orthodontists. It was clear that patients felt their psychosocial state had been negatively impacted by their malocclusion, often attributing their social anxiety and mental health issues to it. The orthodontists acknowledged this too. The finding is also in accord with the wider literature which shows that orthognathic patients score lower on a variety of measures such as self-esteem, anxiety and depression (Cunningham et al., 1995; Vulink et al., 2008). Nonetheless, the interviewed patients had never seen a mental healthcare professional. When asked if they would be open to seeing a psychologist, all of them stated they would be. Both orthodontists and patients believe it would be beneficial for orthognathic patients to have access to psychological support. Moreover, patients felt they would be more comfortable discussing sensitive issues with a psychologist, something they did not feel was appropriate with orthognathic clinicians. The theme '**training in screening and management of mental health'** was addressed by orthodontists. Whilst they appreciated the expertise that a psychologist could bring, they felt frustrated with the current level of services. Some stated that the psychology reports are often clinically irrelevant and simply

advised that the patient should have ongoing psychological support. Orthodontists unanimously expressed a desire for the psychologists to offer long-term psychological treatment, as opposed to their current experience of an 'assessment only' service. Several orthodontists proposed that there should be an occasional joint clinic which a psychologist would attend. Orthodontists thought that psychologists were valuable in giving them a 'green light' to treat patients with pre-existing mental health conditions. These findings bode well for the argument of expanding the psychology services in orthodontic departments, something other hospitals have begun to implement (Cunningham et al., 1995; Clarke et al., 2005; Cunningham & Moles, 2009; Sinnott et al., 2020). With that said, there is a lack of research investigating the impact they are having on patient experiences and/or outcomes.

On the theme of what the **orthodontists' role** is in managing patients' mental health, orthodontists recognised their importance with regards to building rapport with patients and supporting them through their journey. They felt their training in mental health issues was limited and highlighted the importance of screening and referring**.** Given the challenges orthodontists face in managing a patient base with a high prevalence of mental health issues, orthodontists may benefit from having access to a mental healthcare professional for support. A survey by Juggins et al. (2006) reported that orthodontists are not confident in diagnosing or managing mental health conditions, although they recognise the importance of doing so. From their respondents, 85% expressed a desire for further training in this area. Ryan et al. (2012a) similarly advocated for the increased utilisation of psychologists' expertise as a significant proportion of patients present with unrealistic expectations and/or mental health issues. Given orthodontists' unique role in providing long term care to a patient base in which mental health issues are common, it would seem logical that they should be adequately trained and supported by mental health professionals. As the orthodontists suggested, and as

discussed in Chapter 4, embedding a psychologist into the orthognathic team may be ideal, but may not be practicable. As such, it may be that the most pragmatic approach is for orthodontists to have access to support from a psychologist for patients when appropriate. The interviews highlighted that one of the main ways orthodontists learn was by reflecting on their past experiences. Whilst reflexivity is a sign of good practice, there is no evidence that this is an adequate method of learning how to handle patients with mental health issues. It may be that an added benefit of having a psychologist join the orthognathic team would be that orthodontists can learn from them. In the current study's setting (LUDH) psychological support is limited to a screening and advice only service. There are a lack of studies assessing the referral pathways and accessibility of psychological services for orthognathic and/or orthodontic services. A standardised, evidence based, approach linking orthodontic and psychological services across the UK would be highly beneficial for patients.

Given the difficulties orthodontists face in screening patients' mental health, the interviewed orthodontists proposed a **service improvement** idea in the form of a pre-treatment questionnaire. This can provide value by screening for certain psychological 'red flags', such as unrealistic expectations, whilst also acting as a springboard for discussing mental health. Pabari et al. (2011) designed and validated a questionnaire which assessed the motivation and psychological characteristics of orthognathic patients. They did so using a mixed qualitative-quantitative approach with feedback from focus groups. The authors stated that the questionnaire could clarify if patients were internally or externally motivated, as well as provide an insight into the complicated process of decision making. They felt the questionnaire was a good starting point for an in-depth discussion on this topic, thus enhancing communication with patients and reducing divergent views between patients and orthodontists. In addition, the questionnaire quantified certain psychological characteristics

such as self-esteem and body image. With that said, the questionnaire has not been tested on a larger scale and there has been no research assessing its impact on the consultation and consent processes. The study concludes that further research is required to search for specific types of motivations and/or psychometric factors which can be categorised as validated 'red flags' that could predict patient satisfaction and aid orthodontists in their screening process. Other fields of medicine have successfully utilised screening questionnaires. Wright et al. (2005) designed, validated, and tested a screening questionnaire for soldiers prior to deployment. The questionnaire results were verified using a secondary screening interview with a psychologist. A total of 885 soldiers were screened. The rate of false negatives was low with the psychologists diagnosing mental health problems in only seven patients who had screened negative on the questionnaires. The questionnaires detected red flags in a total of 183 soldiers (20.7%), 40% of which required psychological treatment. A questionnaire has been successfully used to help diagnose Body Dysmorphic Disorder (BDD). The Body Dysmorphic Disorder Examination consists of semi structured interviews alongside a questionnaire (Rosen & Reiter, 1996).

Ultimately, a screening questionnaire can be an invaluable tool for orthodontists. With that said, the questionnaire should be validated, otherwise it risks misleading orthodontists. Orthodontists would also require training on the use and interpretation of scores. Above all, even a validated questionnaire should not replace an in-depth discussion on the topic of mental health. The questionnaire can facilitate the start of, and the direction of, such a conversation. If the orthodontist feels the patient may benefit from a mental health professional, then the patient should be referred even if the screening questionnaire does not raise any flags. The literature is sparse on this topic and further research is needed into how such tools can be effectively designed and used.

On the topics of **perceptions and shared decision making**, it was positive to note that most orthodontists and patients felt their views aligned with one another. The literature on this topic is mixed, with some studies showing good agreement (Imani et al., 2018) whilst others show a lack of it (Bell et al., 1985; Cheng et al., 2021). Notably however, both the orthodontists and patients highlighted that a significant minority of the time their views do not align. Similarly, the interviews also showed that a significant minority of patients have unrealistic expectations of the surgery. Such expectations were often the patient believing other people's behaviour towards them would change as a result of the surgery, for example expecting that people would respect them more. In a qualitative study involving 18 patients Ryan et al. (2012b) highlighted the importance of **managing patient expectations** to achieve a good treatment outcome. They advocated that patients with unrealistic expectations (as determined by the orthodontist) may be inappropriate candidates for treatment or may require additional support to enhance their outcome satisfaction. This patient group is more likely to experience negative outcomes and treatment satisfaction as their treatment aims may not be met if their views do not align with those of the orthodontist. It would have been beneficial to further discuss this topic in the interviews and question how orthodontists manage this situation with patients. Three of the orthodontists interviewed in the current study highlighted a key question they ask patients in order to clarify their expectations. This question is "how do you expect this procedure to change your life". They felt this open-ended question prompted the patient to reflect on their expectations and provide a more in-depth answer. Interestingly, this specific question has been previously promoted in the literature for the same reason (Cunningham and Feinmann, 1998). Its open-ended and broad nature invites patients to share their true expectations, which the orthodontist can then carefully consider.

Patient expectations, motivations, and their role in shared decision making are further discussed in Chapter 7.

The initial consultation appears to be an impactful event for patients. They had two main responses to receiving an official diagnosis from the clinicians. Some patients were comforted by the fact their malocclusion had finally been acknowledged and that there was a treatment for it. However, for some patients the fact that two clinicians were saying they qualify for major surgery made them even more self-conscious, making their malocclusion it into an even 'bigger deal' in their minds. Overall, the patients were quite inquisitive about their procedure and had a strong desire for information. This culminated in some **researching orthognathic surgery** on of their own. They felt the initial consultation improved their understanding; however, they stated it was important to carry out further research as the leaflets and initial consultation alone were insufficient. Ultimately, through the internet patients can access an incredibly wide variety of information. In a cross-sectional survey Siddiqui et al. (2022) assessed patients' engagement of social media related to orthodontics. A third of the patients engaged with orthodontic related material on social media, predominately Instagram and Snapchat. They found social media engaging, accessible and educational. The authors concluded that social media can be a valuable tool for providing information. They also stressed that with the growing use and influence of social media orthodontists must assess the quality of the information patients access and steer them towards high quality resources. It would be of interest to assess the type and quantity of social media consumed specifically by orthognathic patients. The patients interviewed in the current study mainly watched vloggers on YouTube and Instagram. Patients expressed comfort in following vloggers through their orthognathic journey. The vloggers would post Q&A sessions, share their personal experiences and provide tips on recovery. Patients valued

this personal perspective. Conversely, orthodontists mostly held negative views on the use of social media and advised patients to avoid it. Their concerns were that procedures are highly individualised and that they may differ between countries. As such, a patient may be misled by following a foreign individual who is having a different procedure.

A study by Bhamrah et al. (2015) concluded that orthognathic internet forums are an important source of support for patients. They recommended that patients should not simply have access to these resources, but also be guided on their use. Research has shown that patients are very keen to meet previous orthognathic patients and ask them questions which orthodontists are unable to answer due to a lack of personal experience (Broder et al., 2000). On a similar note, when patients were asked about the concept of 'buddying' them up with a previous orthognathic patient they were enthusiastic. They felt it would be beneficial to have personalised advice and be supported by someone who can relate to them. There have been no studies assessing the impact of introducing this system. Whilst orthodontists also appreciated the potential peer support benefit this **service improvement** would provide, they had reservations with the practicalities of how it would work, and the potential side effects of pairing a prospective patient with a negative individual. Ultimately, these findings align with the literature in highlighting the importance of support networks for patients. It may be that individuals who lack support from friends and family may benefit more from a psychologist or from a 'buddying up' system during treatment. This is an area that warrants further research.

6.8 STUDY LIMITATIONS

A sampling framework was attempted to achieve a heterogenous sample of participants with respect to age, gender and malocclusion. This was abandoned as there was a lack of South-

Asian and East-Asian patients. Ultimately, the patients were predominately Caucasian, which limits the external validity of the data.

As previously discussed, qualitative research is significantly affected by the researcher and the inherent biases they may bring to the data interpretation. As such, it would have been good practice for multiple researchers to analyse the data and compare their themes and conclusions. To limit this, the interviews were discussed and analysed in conjunction with the research supervisors, who have extensive experience of qualitative research. In addition, carrying out interviews is a skill in itself. After each interview was conducted the researcher reflected on it in a reflective diary (Appendix IX) and noted down possible ways it could have been improved. The constant reflective practice throughout the study minimised bias and continually improved their IPA technique, analysis, and theme development.

6.9 FUTURE RESEARCH

This project studied patients at a single time point. As such, it remains unknow how patient views evolved as treatment progressed. A future project could follow patients throughout the whole treatment, interviewing them at separate time points to provide a more comprehensive view of the journey. This can be supplemented by video diaries that can provide an added personal perspective. Video diaries allow patients to record contemporaneously and have been described as more informative and accurate than retrospective reporting in interviews (Rich et al., 2000; Buchbinder et al., 2005).

The current study suggests that patients have a positive view of seeing a psychologist. Future studies should investigate the opinions and outcomes of patients who have seen a mental healthcare professional to obtain their views on the service and its impact.

The literature lacks studies comparing the perceptions of surgeons, orthodontists and patients using a qualitative approach. It would be insightful to interview clinicians straight after they see a patient to get their detailed opinion on that patient's appearance, motivations and complaints. These findings could then be compared to those of the patient themselves. This method would be better at directly comparing clinician and patient views; in addition, it would provide insight into what may be causing differences.

6.10 CONCLUSION

It appears that skeletal malocclusions have a significant impact on patients' psychological development. This needs to be appreciated and managed during treatment. Key conclusions and recommendations from this chapter include:

1. Orthodontists lack confidence and training in diagnosing and managing mental health issues. Further training in this field is indicated.
2. Limitations to the current psychological services were highlighted. Both patients and orthodontists felt a mental healthcare professional should have a larger role in the orthognathic journey.
3. Patients often expect other people's attitude or behaviour towards them to change following surgery. Clinicians and patients should explore these expectations in detail to clarify just how realistic they believe they are.
4. There are discrepancies in the perceptions that patients and orthodontists have in terms of their psychosocial, non-physical, views of patients. Orthodontists should be wary of this and ensure they investigate these aspects in detail.
5. Social media use is common and appears to provide patients with a form of peer support. Orthodontists should educate and guide patients on its use.

7.0 CHAPTER 7: INTEGRATED DISCUSSION

The aim of this thesis was to explore the perception and psychology of orthognathic patients from the perspectives of clinicians and patients. It sought to clarify commonalities and differences in the views of orthodontists, surgeons and patients. It also explored expectations, motivations, mental health, and the role psychologists may have in the patient journey. The three arms of the thesis collectively offer a variety of perspectives and a deeper understanding of the psychosocial aspects of orthognathic surgery. The findings from these three chapters converge on several key topics, these include: the mental health challenges faced by patients, including social avoidance and coping strategies; the role of self-esteem and self-perceptions; patient motivation and expectations; the roles of orthodontists and psychologists in managing patient mental health; the differences in views between clinicians and patients; the differences in how class 2 and 3 patients are perceived; and joint decision making.

An important topic discussed in chapters 4 and 6 concerns the concepts of social distress and social avoidance. Eight patients from the service evaluation attended a screening assessment with a psychologist. All were deemed socially anxious, whilst only three of them were socially avoidant. This meant that whilst they found social situations anxious, they did not avoid them. This phenomenon correlates with the findings from the patient interviews (chapter 6), which suggest that patients seem to take one of two paths; either becoming progressively more socially reclusive or fighting to overcome their social anxiety. These findings appear to apply to other patient populations. A study investigating the psychosocial effects of psoriasis patients reported a significant variation in social avoidance and social anxiety (Schneider et al., 2013). Regression analysis concluded that the main modifying factors were social support, disease severity and feelings of helplessness. It appears that facial disfigurements correlate with social anxiety, however whether an individual displays social

avoidance is modified by multiple psychosocial factors. This conclusion would correlate with the findings of chapter 4, in which psychologist reports and interviews highlighted how patients' coping ability is an important determining factor of whether they develop and maintain a healthy social life. Likewise, in chapter 6 the interviewed patients clearly highlight this finding, with one patient stating how it was a clear crossroads life decision of either becoming a recluse or fighting to overcome their anxiety. On a similar note, a systematic review reported on the psychosocial aspects of facial palsy (Hotton et al., 2020). They found that the severity of facial palsy did not correlate with the levels of anxiety or depression. They concluded that other psychological factors modified the individual's response. It may be that patients with effective coping strategies overcome their anxiety and ensure it does not detriment their social functioning (Baker et al., 2009; Schneider et al., 2013). Coping strategies can take a variety of forms. Approach coping is when a person purposefully faces and addresses their stressor, whilst avoidance coping is when they avoid it (Baker et al., 2009). A study investigating the psychological impact of cleft lip and palate patients found that approach coping is crucial in preventing negative psychological effects (Baker et al., 2009). More research is needed to clarify the role of coping strategies in both dentistry and orthognathic surgery, and how clinicians can enhance these. In retrospect, this should have been a topic discussed in greater detail during the interviews with psychologists.

Touching on the theme of previous experiences, bullying is highly detrimental to mental health (Moore and Woodcock, 2017). Newman et al. (2011) reported that avoidant coping strategies often develop during the teenage years because of bullying. In the long term these prove to be highly maladaptive. This is an important consideration, as most of the interviewed patients experienced bullying during adolescence. It appears the teenage years were a highly formative period for them. It is often when they first started noticing their jaws.

Bullying negatively affected patients' mental health, and often made them more self-conscious about their jaws. Some stated their bullying experiences triggered their "obsession" with their jaws. These findings highlight the sensitivity and importance of the teenage years. Could intervention during these crucial years support patients in developing approach coping strategies as opposed to avoidant ones?

Similar to how some display avoidant coping strategies, patients can also adopt avoidant approaches to other aspects of their behaviour. Bogart et al. (2022) interviewed sixteen participants with facial disfigurements about how and why they disclose their facial disfigurements. Some avoided disclosing their condition to others, instead concealing or avoiding discussions as an attempt to avoid being stigmatised, bullied or discriminated. Others were more open about discussing their facial disfigurements, the benefit of which was empowering the patient, normalising their disfigurement, and allowing them to build social support.

The results of this thesis suggest there is an important link between psychological traits, such as self-esteem, and patient's self-perceptions. Interviewees suggested that their appearances caused their mental health to suffer and damaged their self-esteem. In reality, there is likely to be a bidirectional relationship between the two, as poor self-esteem results in patients perceiving themselves worse than they really are (Dos Santos et al., 2017). The results of the quantitative chapter 5 support this finding, as low self-esteem correlated with individuals rating themselves as being in 'greater need of surgery' than clinicians, in addition to patients rating their profile as more severe than clinician. Exploring these differences may be important in managing concerns.

Aligned with this, a major theme of this study was exploring the roles orthodontists and psychologists have in identifying and managing patient's mental health issues. Orthodontists may have a role in identifying patients who would benefit from gaining coping skills and in signposting them to appropriate sources of support. In the current study there was a lack of awareness of such services among the surveyed and interviewed orthodontists (Chapters 4 and 6). This was in contrast with psychologists who had extensive knowledge of direct access support services they could signpost patients to (Chapter 4). Often this is in the form of direct-access support services such as talking therapies provided by local organisations and charities. Talking therapy is a type of psychological treatment for mental problems such as anxiety and depression. There are many different types, and can be in person, virtual, solo or group. A common example of talking therapy is cognitive behavioural therapy (CBT), in which the patient aims to re-contextualize their views and alter their thinking patterns (McGinn and Sanderson, 2001). Unlike CBT, not all forms of talking therapy require a highly trained individual to carry out. For instance, talking therapy can simply involve speaking to volunteer 'laypeople' for support. Promoting free, direct access, talking therapy services may be beneficial to the orthognathic patient base and could avoid lengthy NHS waiting times (something highlighted as an issue by orthodontists Chapters 4 and 6). There is a significant shortage of mental healthcare professionals and psychological services in the NHS, which has in turn resulted in long waiting times (Beail & Purrington, 2021). In addition, the Chapter 4 survey of orthodontists and psychologists highlighted that both groups feel there is a need for further training in the management of mental health in the orthognathic patient base. Whilst the NHS IAPT scheme (improving access to psychological therapies) provides treatment for patients with general anxiety and depression, there are no services specific to dentistry and pre-surgical anxieties. External sources of talking therapy, such as charities, are provided by

individuals of varying qualifications, ranging from trained clinical psychologists to laypeople with minimal training. The effectiveness of talking therapy provided by non-specialist mental healthcare workers with minimal training was the topic of a Cochrane review which reported promising improvements to patient outcomes (Van Ginneken et al., 2013). Similarly, a systematic review investigating interventions provided by 'lay mental health workers' concluded that they were effective at providing interventions and were a potential solution to address the shortage of mental healthcare professionals (Shahmalak et al., 2019). Moreover, they reported that patients found the service to be less intimidating and stigmatising than a more formal service. To this end, there are many more resources available for psychological help beyond a GP referral to the NHS mental health services. These are often free, direct access, talking therapies. The orthodontists in the current study had limited knowledge on these sources of support (Chapters 4 and 6). It may be beneficial for orthodontists to be more aware of these services so they can offer them to patients. This could have the benefits of patients receiving faster and less stigmatised treatment, in addition to alleviating the burden on the NHS. However, questions remain with regards to how these services differ and how well suited they are for orthognathic patients. They may be suitable for people with mild to moderate anxiety, but they are unlikely to provide tailored orthognathic support that may be required for more severe cases. As such, it raises the question of whether orthodontists would be able to determine the most appropriate services suited for different patients. This may depend on the assessment of need, as such a psychologist input may still be required.

An important topic this thesis explored was that of patient expectations. The reports from psychologists outlined in Chapter 4 highlighted that patients commonly had unrealistic expectations. These were mostly related to aspects outside of the patient's control, in particular expecting other people's behaviour towards them to change. For instance, "people

will accept me more" is a concerning expectation as it is beyond one's control. The reports stressed that if these expectations are not met then the patient's mental health may deteriorate. What makes an expectation realistic or unrealistic is not always an easy assessment, albeit an important one to make. The expectations of the interviewed patients varied significantly. They ranged from physical to psychosocial in nature. All patients expected physical changes, most of which the researcher felt were realistic. These were aspects such as having a less prominent jaw. Physical aspects are somewhat easier for orthodontists to clarify with patients, as they are less subjective and visual aids can be used. On the other hand, psychosocial expectations are more challenging to explore. Several of the patients reported expectations which are not fully within their control, which was of concern. For example, an expectation that other people would respect them more. This type of external expectation has been shown to negatively correlate with treatment satisfaction (Chen et al., 2002). Therefore, if such expectations are not fulfilled, the disappointment may negatively impact the patient's mental health (Liddle et al., 2015). As previously mentioned, it is difficult to define what unrealistic expectations are. For example, a patient expecting increased confidence; whilst there is evidence that the improved appearance following surgery boosts confidence in the short to medium term (Kiyak et al., 1984), true confidence requires self-development. It must come from within the patient, otherwise there is a tendency for this confidence boost to be only temporary (Lazaridou-Terzoudi et al., 2003). It was positive to note that most of the interviewed orthodontists quoted external motivations as a 'red flag'. This agrees with both the interviewed psychologists and the wider literature. 'External' expectations, wherein patients expect the way others behave towards them to change, are not realistic (Meade & Inglehart, 2010).

On a similar note, what motivates a patient is another important topic explored in this thesis. Evidence indicates that internally motivated people cope better with orthognathic treatment, experience less severe side effects, and report greater satisfaction (Flanary et al., 1985). In orthodontics, patient compliance is important. For example, patients are often asked to wear elastics to achieve desired tooth movements. Good compliance with these elastics may reduce treatment duration and improve the final outcome. Studies have shown that internally motivated patients are more compliant (Meade & Inglehart, 2010). Analysis of the interviews suggested that most of the patients were internally motivated. A desire to look better for themselves was the most common motivator. Other people did have influence, with some family and friends providing encouragement, although they were not the primary driver of it. The interviewed orthodontists were wary of patients who were motivated by others, they felt it was crucial for patients to want the procedure for themselves first and foremost. The literature supports this view, as satisfaction has been reported to be significantly lower in patients motivated by others (Belluci & Kapp-Simon, 2007). Ryan et al. (2012a) utilised a qualitative approach to investigate the impact dentofacial deformities had on patients and what motivated them to have surgery. They concluded that motivations lie on a spectrum of functional to psychological. Motivation for surgery was often related to the impact the malocclusion has had on them. However, in some patients the motivation was related to a complicated mix of factors such as childhood experiences, relationships, and personality traits. Overall, the advice to clinicians was to avoid making assumptions about a patient's concerns or motivations, but to instead explore these. The present study strongly supports this conclusion, as it shows that perceptions significantly differ between patients and clinicians, and other factors such a patient's self-esteem influence these. Given the complexity and the

number of factors that modify a patient's perception, it is crucial to not assume, but instead explore these.

Another key area this study investigated was whether clinicians (OMF surgeons and orthodontists) and patients have similar views. The interviewed patients did overall feel that clinicians were in good agreement with regards to their physical concerns. Overall, patients were pleased with how clinicians were able to immediately 'diagnose' their abnormality. Nonetheless, several patients did make comments to suggest that clinicians do not fully understand them and that they were too "clinical", lacking empathy. This highlights that there may be a deficiency in orthodontists' understanding of patients with respect to the non-physical psychosocial factors. It may be that some patients would benefit from a more in-depth discussion of the psychosocial factors related to their malocclusion. In contrast, most orthodontists felt they held similar views to patients and surgeons. In contrast, analysis of the questionnaire data revealed a significant difference in how patients rated the severity of their jaws and their 'perceived need for surgery' in comparison to the clinicians. The literature is mixed with regards to how alike orthodontist and surgeon views are, with some papers showing good agreement (Imani et al., 2018), and others highlighting significant differences (Bell et al., 1985; Juggins et al., 2005; Vasey, 2019). The lack of training that orthodontists have on this topic may be a contributing factor. Greater awareness amongst clinicians of the need to explore this topic would be valuable. A strength of the current study is its qualitative-quantitative approach. This has allowed for a greater exploration of the above, and for a more precise identification of the areas in which there may be a disagreement between the views of patients and clinicians. The Chapter 5 questionnaires suggest patients perceive their malocclusions worse than clinicians do. Concurrently, Chapter 6 suggests that patients feel clinicians understand their physical malocclusion adequately but lack appreciation of the

psychological and social factors affecting patients. It may be that these psychosocial factors modify patients' views and are the cause of the discrepancies found between patients and clinicians.

In addition to the above, the interviewed psychologists felt that clinicians are more 'objective' in their views, when compared to patients who are more 'subjective'. It should be noted that psychosocial factors are likely to be more prevalent in the patients that psychologists see as they are a select group and do not represent the average orthognathic patient. This may skew psychologists' perceptions of orthognathic patients. The findings of this thesis suggest that orthodontists and surgeons differ in their perceptions from patients. However, the extent to which clinicians are 'objective' is an interesting point of discussion. Clinicians are likely to display a degree of subjectivity as they would also be influenced by psychosocial factors, such as the appearance of their own jaws, their personal values, families etc. Future research is warranted to investigate just how objective clinicians are, and how much psychosocial factors influence them. Ultimately, evidence-based medicine is defined as a triad of; best practice, patient's opinion and the clinician's own personal experience (Sackett, 1997). As such, when applying clinical judgement there is significant scope for non-clinical factors to influence the clinician's judgement.

Patients' motivations and emotions were intimately linked to their past experiences. Negative experiences, such as bullying, and the related negative emotions were commonly cited motivating factors in the Chapter 6 interviews. Patients often evoked emotive and negative imagery, such as that of witches and bulldogs, when describing their jaws. In addition, they spoke about their jaws with a degree of loathing. This was particularly the case for patients with class 3 skeletal patterns. The researcher noticed that whilst patients were talking about their jaw, they seemed to always grab a hold of it and gesture pushing it back. These findings

correspond to the results from the questionnaire portion of this thesis (Chapter 5) which reported that patients with a class 3 skeletal pattern (C3 patients) had lower self-esteem and a greater dislike of their jaws than their class 2 counterparts (C2 patients). This could be due to a combination of factors. For instance, it may be that C2 profiles are more socially accepted, due to their 'softer', more submissive appearance. Another contributing factor could be that C2 patients can 'camouflage' their appearance in social situations by posturing their jaw forwards. The interviewed patients (Chapter 6) would commonly alter their behaviour in social situations. This was particularly the case for pictures, when they would posture in a manner that masked their malocclusion. For example, C3 patients described facing the camera, avoiding profile views, and tilting their chin down to 'hide' it. It is essential for clinicians to understand this so that they can discuss with patients how their malocclusion is affecting their life and behaviour.

Joint decision making was an important theme of this study. Ultimately, treatment decisions should be made jointly between the patients and clinicians, each of whom have different roles. One such role of the clinicians is to inform patients of the risks associated with procedures. The interviewed patients were inconsistent in their accuracy of discussing the risks of orthognathic surgery. This information is likely to have been discussed with them in detail during the consultation appointments; however, it was not possible for the researcher to confirm whether these discussions took place, how thorough they may have been, or whether the patient understood them. With that said, it does bring into question how effective current consent strategies are. Of course, it may be that the patients fully understood the information at the time but have since forgotten parts of it. The literature has demonstrated that simply telling patients the risks and benefits is not an ideal method of consenting them, as patients forget approximately 70% of the information by day ten (Witt & Bartsch, 1993). Bergkulla et

al. (2017) attempted to address this by piloting an 'orthognathic information clinic', in which patients observed a short presentation from an orthodontist, an OMF surgeon, and a former orthognathic patient. They received excellent feedback on this model, with patients stating that the most important aspects were the surgical information and meeting a former orthognathic patient. Another route to improving the consent and decision-making process could be the addition of a psychologist to the clinic. It has been suggested that input from a clinical psychologist can aid the decision-making process and better assess patient suitability for orthognathic treatment (Morris, 2006). This is due to their focus on exploring the patient's psychology, social life and involving them more intimately in the process.

What makes an informed decision is not a simple question. On a basic level, if a patient does not understand the risks, they are unable to make an informed decision. However, it can be argued that even a well-informed patient may not make an informed decision if, for example, they have formed unrealistic expectations which the orthodontist fails to identify and address. If these expectations were to be identified and addressed by the orthodontists, then the patient may decide orthognathic surgery is not for them as it would not meet their expectations. Two audits investigating this concluded that there are frequent failures in the consent and decision-making process (Asquit et al., 2009; Muqbil & Hodge, 2012). These audits questioned whether clinicians are identifying patients' true concerns and whether treatment plans are effectively addressing these. Could the expertise of a psychologist help reduce this number? A survey by Stirling et al. (2007) explored the decision-making process of orthognathic patients and revealed that knowledge of risks and benefits was poor, indicating that a substantial portion of the patients do not make a fully informed decision. The implications of this are significant, as there is an ethical obligation for orthodontists to help patients reach a fully informed decision. Some patients reported that staff communication made them feel

worse. These patients reported becoming more self-conscious after the consultations due to their perceived severity of the condition increasing, i.e. becoming more 'aware' of their condition. Finally, some patients had strong emotional expectations, such as an expectation to be more socially accepted, which were not always met by their treatment, leading the authors to conclude that some patients require additional support in the decision-making process. Given the intricate nature of this the authors suggested that a psychologist could play an important role in the shared decision-making process. Taken together these findings suggest that a multi-disciplinary perspective could provide additional benefit that will support patients in making an informed decision.

8.0 CHAPTER 8: CONCLUSIONS

This project has provided insight into the mindset orthognathic patients. It appears that malocclusions have a significant formative role in patients' psychological development. The key take aways from the study are as follows:

1. Orthognathic patients display a high prevalence of mental health issues and low self-esteem. Patients often do not disclose mental health issues on medical history forms. Clinicians should specifically enquire about these. -Chapters 4 and 5.

2. Orthodontists do not have adequate confidence and training to screen and diagnose mental health issues. Further training is both warranted and desired. There are clear limitations to the psychological services available at Liverpool University Dental Hospital. Support from a psychologist is highly valued by both orthodontists and patients and may have an important role to play in the management of orthognathic patients. – Chapters 4 and 6.
3. Patients often display a combination of realistic and unrealistic expectations. Unrealistic expectations commonly include anticipating that other people's behaviour towards the patient will change following surgery. Such expectations should be explored in detail. – Chapters 4 and 6.
4. Patients and clinicians significantly differ in their perceptions. Patients rate themselves as being in 'greater need of surgery' and as having more severe malocclusions than clinicians. Surgeons appear to rate patients as being in greater 'need of surgery' than orthodontists. - Chapter 5.
5. Class 2 profiles are perceived as more attractive and as less 'in need of orthognathic surgery' than class 3 profiles by both patients and clinicians. – Chapter 5.

6. Orthognathic patients consume a significant amount of social media related to orthognathic surgery. They perceive it as a strong source of peer support. Clinicians should educate and guide patients on its use. – Chapter 6.

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APPENDIX I: ETHICAL APPROVAL

NHS
Health Research Authority

London - City & East Research Ethics Committee
Bristol Research Ethics Committee Centre
Whitefriars
Level 3, Block B
Lewins Mead
Bristol
BS1 2NT

Please note: This is the favourable opinion of the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

21 December 2020

Dr Norah Flannigan
Senior Clinical Lecturer/Honorary Consultant in Orthodontics
University of Liverpool Dental Hospital
Orthodontic Department, LUDH, Pembroke Place
L3 5PS

Dear Dr Flannigan

Study title:	**Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery.**
REC reference:	**20/PR/0929**
Protocol number:	**UoL001589**
IRAS project ID:	**291300**

The Proportionate Review Sub-committee of the London - City & East Research Ethics Committee reviewed the above application on 17 December 2020.

Ethical opinion

On behalf of the Committee, the sub-committee gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start

APPENDIX II: SPONSORSHIP 'PERMISSION TO PROCEED' DOCUMENT

Dr Norah Flannigan
Institute of Psychology, Health and Society
University of Liverpool

Dr Neil French
Head of Clinical Operations

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4th Floor Thompson Yates Building
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31 March 2021

Sponsor Ref: UoL001589

Re: Sponsor Permission to Proceed notification

"Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery"

Dear Dr Flannigan

All necessary documentation and regulatory approvals have now been received by the University of Liverpool Research Support Office in its capacity as Sponsor, and we are satisfied that all Clinical Research Governance requirements have been met. You may now proceed with any study specific procedures to open the study.

The following REC Approved documents have been received by the Research Support Office. Only these documents can be used in the recruitment of participants. If any amendments are required please contact the Research Support Office.

Document title	Version	Date
Protocol	2.2	23/01/21

Please note, under the terms of your Sponsorship you must;

1. Gain NHS Confirmation of Capacity and Capability from each participating site before recruitment begins at that site;

2. Ensure all required contracts are fully executed before recruitment begins at any site;

3. Inform the Research Support Office as soon as possible of any adverse events especially SUSARs and SAE's, Serious Breaches to protocol or relevant legislation or any concerns regarding research conduct (as per *SOP007)*;

APPENDIX III: SERVICE EVALUATION QUESTIONNAIRES

Psychological Services Questionnaire (Psychologist)

1. Do you feel the quality of orthognathic referrals are:
    a. Good
    b. Adequate but missing some beneficial information
    c. Poor: Please elaborate

    _____

    _____
2. Is there key information lacking in the referrals of orthognathic patients?
    a. No, all the required information is usually present
    b. The key patient complaint is often not clear
    c. The purpose of the referral is often not clear
    d. Other_____

    _____
3. What do you feel are the major benefits of orthognathic patients seeing a psychologist? (circle all that apply)
    a. Help patients decide whether to undergo orthognathic treatment
    b. Help patients form more realistic expectations
    c. Help diagnose underlying mental health conditions
    d. Help clarify the patient's chief concerns
    e. Help direct patients to an appropriate source of ongoing psychological support.
    f. Other:_____

    _____
4. Do you feel it would be more beneficial for you to see the patient on an ongoing basis throughout their treatment?
    a. Yes
    b. No
    c. Unsure
    d. Other:_____
5. Do you feel it would be beneficial for you to be present at the orthognathic clinics?
    a. Yes
    b. No
    c. Unsure
6. If, following assessment, you feel a patient requires ongoing psychological support, where do you most commonly refer to?
    a. Patient's GP
    b. Within your own department
    c. A referral to a private mental health professional

d. An external referral. Please outline common ones:
_____

7. Have you had any specific training in treating patients with craniofacial disorders?
    a. No
    b. Yes. The format of this training was (may circle multiple)
        i. Practical training by an experienced colleague
        ii. Webinars/lectures
        iii. An official course
        iv. Informal self-directed learning
        v. Other:_____
8. Overall, are there any changes you would like to suggest that may improve the working relationship between orthognathic clinicians and clinical psychologists. Your feedback would be highly valued:

_____
_____
_____

Psychological Services for Orthognathic Patients (Orthodontist)

1. Do you feel there is adequate availability of psychological services for orthognathic patients?
    a. Yes
    b. Unsure
    c. No:
        i. It is too limited
        ii. The waiting times are too long
        iii. The referral process is too complicated
        iv. The psychologists are not familiar with orthognathic patients
        v. Other- Please elaborate:

_____
_____

2. With regards to the role of psychological services in the management of orthognathic patients, do you feel:
    a. They are rarely needed
    b. They are sometimes needed
    c. They are often needed
    d. They are almost always needed
3. The main benefits of psychological input are:
    a. Screening for mental issues e.g. Body Dysmorphia
    b. Helping patients decide whether to undergo orthognathic treatment

    c. Ensuring expectations are realistic
    d. Helping clarify the exact concern patients have
    e. Other:_____

4. Do you feel confident identifying patients who require referral to a mental health professional?
    a. Yes
    b. Somewhat
    c. No
5. What past training have you had in the topic of 'the psychology of orthognathic patients' (circle all that apply)?
    a. None
    b. Lectures as part of CCST/Post-CCST
    c. Webinars
    d. Whole day courses post-StR training
    e. Informal training with mental health professionals
    f. Formal qualifications e.g. PGCert
    g. Other:_____
        i. Would you like further training in this area?
            1. Yes
            2. No
6. Which hospital/mental health professional do you refer to (e.g. Dr. X at St. Helens)?

_____

7. Do you utilize any other sources of psychological support for patients?
    a. Patient's GP
    b. Other: _____

8. Do you routinely ask post-surgery orthognathic patients to complete a satisfaction questionnaire?
    a. Yes
    b. No
        i. If so, is this:
            1. The NFORS questionnaire
            2. Other:

_____

9. Are there any changes to the psychological services you would like to see?

_____

APPENDIX IV: THEMES FROM INTERVIEWS

Themes from psychologist interviews

Global Theme	Theme	Description	Example
Mental health of orthognathic patients	Commonly encountered mental health issues	Commonly encountered mental health issues	"*Commonly anxiety, depression, appearance anxiety*."-Line 130. Pg 4. Int 1.
	Changes in mental health	Trends in mental health they've noticed	"*I've seen a rise in adults returning for treatment. And those adults tend to come with more anxieties, more low mood*." Line 136. Pg 4. Int 1.
External mental health services	Referring patients for long term treatment	Options for ongoing treatment of patients	"*If we identify there are wider or longer term or significant mental health conditions, then I would signpost or refer, to adult mental health services, to manage those locally*"- Lines 30. Pg 1. Int 1. "*We are quite limited, so mostly not. There just isn't that service. If we feel they can benefit from it we would often signpost them to local mental health services*."- Line 34. Pg 1. Int 3 "*However, what many people don't appreciate is that there are a lot of charity organisations out there. Changing faces specialises in facial procedures for example*."-Lines 35. Pg 2. Int 2
	NHS referrals	Discussion of NHS treatment	"*We would often refer patients to NHS therapy, which unfortunately can have a long waiting list*" Line 23, Pg 1, Int 2.
	NHS waiting lists	Comments related to NHS waiting lists	"*Oh, I couldn't tell you an exact figure but now after COVID we are talking over a year*" Line 27. Pg 1. Int 2
Roles of professionals in the management of patients' mental health	Role of orthodontist	The role of the orthodontist in patient's mental health	"*I mean, it's significant. You guys see the patients for such a long time and build a strong relationship. This level of rapport means a lot and can really put you in a position where you can help a patient that is struggling*."-Line 40. Int 3. Pg 2.
	Benefits of seeing a psychologist	Comments regarding the benefits of seeing a psychologist	*"And I think patients open up a lot more to psychologists than clinicians. Since there is a difference in terms of power. We are not doing anything to them."*- Line 97. Pg 3. Int 1
	Role of psychologist	The role of the psychologist in patient's mental health	"*We discuss what concerns them, expectations. We assess for mental health issues*."- Line 15. Pg1. Int 2.
	Patient base	Regular patient base of psychologists	"*I work with a variety of patients, not just orthognathic, many which are dealing with*

Global Theme	Theme	Description	Example
			psychological issues, mainly adults, but also children". Line 4. Pg 1. Int 2
	Differences in perceptions between clinicians and patients	Clinicians and patients having different perceptions	*"*Laughs* No. Definitely not. Not always. And also, I guess you're more interested in adults, but I guess even young people and their parents not necessarily match up."-Line 89. Pg 3. Int 1.*
	Training in managing craniofacial patients	Training/experience related comments	"*Erm… Not formal training per se. I have had lectures, and online training. A lot of it you learn through colleagues*.". Int 2. Line 8. Pg 1.
Service Improvement	Positivity for Screening questionnaire	Positive opinions regarding the implementation of a screening questionnaire	"*That would make sense sure. I think it can be a useful tool*" Line 51. Pg 2. Int 3.
	Caution regarding screening questionnaire	Concerns regarding the use of a screening questionnaire	"*Everyone will interpret them slightly different, which is fine, that's the nature of the field*"-Line 54. Pg 2. Int 1. "*I think it can be a useful tool, but I would always combine it with your clinical judgement. Often with this subject it's hard to quantify patients*." -Line 51. Pg 2. Int 3.
	Positive feedback for 'buddying up' proposal	Positive comments regarding the idea of buddying up patients	"*That would be very useful to the patients, definitely. The evidence does show that peer support can massively help patients overcome worries and concerns they may have and provide them with coping mechanisms and reassurances*." Line 106. Pg 3. Int 1.
	Negate feedback for 'buddying up' proposal	Negative comments for the idea of buddying up patients	"*It may be that it sounds better than in reality. Simply because… I'm thinking. It may be that it's hard to match up the patients appropriately. If they have very different experiences that can worry the patient. They might think, "why did this happen to me, but not them?", it can skew their expectations which can be an issue*." -Line 84. Pg 3 Int 3.
	Desired changes to the services	Changes they would like to the services	"*Yes, definitely. As we discussed, it's a shame we don't have the resources to provide ongoing help. That really cripples us*." Line 93. Pg 4. Int 3.

Themes from patient interviews

Superordinate themes	Themes	Description	Examples quotation
Psychological effects	Emotive dislike of appearance	Issues with appearance triggering negative emotional feelings	"*Oh god I hate it. It's just… I'm like a bulldog, just all chin. It's all I can see when I look at myself, I hate it*"- Int 14, pg 6, line 182
	Mental health issues	Signs of mental health issues	"*It has definitely affected my mental health, I definitely think that. It's been very bad for me*" Int 2, pg 2 line 41.
	Anxiety	Signs of anxious thoughts/behaviours	"*Yeah, I'd say anxiety really. I've been diagnosed with anxiety by my GP and I think a lot of it stems from my appearance and feeling abnormal. Being bullied at school, not feeling good enough. All that kind of stuff, really*." Int 9, pg 4, line 123
	Altered behavior due to malocclusion	Changes in their behavior due to their malocclusion	"*So, the way I do make up, I always make sure I have defined cheekbones, and things like that, and I put my head down in pictures. So definitely anxiety, I'd never get a picture taken, just stuff like that*."-int 12, pg 5, line 163
	Social avoidance	Comments relating to social avoidance	"*Any big gatherings I don't do well in. It just feels like I stand out and everyone looks at me. So it does stop me, I don't… Often I don't go if there will be many people*"- Int 10, pg 5 line 197.
	Dating	Dating related comments	"*It's difficult because I'm not as confident as I could be you know*" – Int 7 (dec 21). Pg 3 Line 96.
	Overcoming social anxiety	Patients overcoming their social anxiety	"*So, you have to go either way. You either retreat and become this quiet person so nobody will notice you. Or you do what I did and go the opposite way, and just become really confident and outgoing. To try and distract from it*." Int 12, pg 7, line 231
	Excitement for OGN treatment	Emotions of excitement for the treatment	"*I cannot wait, it's been something I've wanted for so many years, I honestly can't wait to have the surgery, I'm ready for it*". Int 5, pg 4, line 124
	Comfort in discovering OGN surgery	Finding out about OGN provided the patient with comfort	"*It was a wonderful feeling, imagine you have a condition, and you think nothing can be done with it, you have to live with it your whole life, then you suddenly discover there is an option. It was such relief*"-Int 6, pg 3, line 103
Researching & understanding of orthognathic surgery	Desire for a diagnosis	Comments relating to a desire for a diagnosis	"*I just wasn't sure what was wrong with me exactly, I knew something was off, and so when my dentist saw me and mentioned this option…I was very keen to see the specialists. I wanted their expert opinion, you know*"-Int 8, pg 3, line 98.
	Gaining deeper understanding of their malocclusion	The patient has developed a deeper understanding of	"*They really went into detail analysing my jaws from all angles. It was great, because they are experts…you know. It… I knew what I disliked about them, but they managed to explain it in much clearer detail, and*

Superordinate themes	Themes	Description	Examples quotation
	during consultations	their malocclusion during consultations	*explained exactly where the issues were*"- Int 2, pg 6, line 221
	Researching OGN Surgery	Comments on how they found out about OGN surgery and what it entails	"*Yeah, I researched it online. I looked at the official websites, and organisations, YouTube videos, many websites. There's a lot of good information out there*"- Int 7. Pg 2. Line 46
	Watching OGN related content on media platforms	Comments regarding social media, pictures, videos and other media	"*And I follow many people having the procedure, from Russia, from Singapore, USA, England many places. It's amazing, and you see them go through it a few steps ahead*"- Int 7 (dec 21), Line 135, Pg 4 "*I must have watched over a thousand videos and read hundreds of websites*"-Int 7. Pg 2. Line 37
	Sources of information	Discussion of the sources of OGN information	"*It's hard to just have one appointment with you guys and you tell us about it and give a leaflet, but the leaflet I'll be honest is so short and simple, with little drawings, I don't think it gives enough information*." - Int 7, line 137 pg 5.
	Adequate awareness of risks	Good understanding of the risks involved	"*There are many risks, and I've done my research, I've seen the possible consequences. There is death, blindness, loss of muscle movement, nerve damage, infections. You can get facial changes you don't want, so its not fully predictable*" -Int 2, Pg 6, line 52
	Poor awareness of risks	Signs of poor understanding of the risks involved	"*I'm not sure about specifics, I don't remember. I know there will be pain afterwards*"- Int 3, pg 6 line 281
Others' influence on self-perception			
Self-perception & agreement with clinicians	Self-esteem	Self-esteem and related concepts	"*It's massively affected my self-esteem. I don't feel confident, especially in social situations. But even you know, when I have an interview, I dread it, I'm worried about them looking at my jaw*"- Int 6. Pg 5, line 146
	Self-perception	How patients view themselves	"*kind of a bulldog appearance*"- Int 7 (dec 21). Pg4 line 103. "*The chin makes me look like a witch! Its very pointy, and it's all you can see. Its wonky and just terrible*"- Int 9, pg 4, line 112.
	Dental appearance	Comments relating to their dental appearance	"*They are gappy, I don't like the gaps between the teeth, and they are wonky on the sides as well*"- Int 14, pg 2, line 48

Superordinate themes	Themes	Description	Examples quotation
	Good agreement with clinicians	Views aligning with those of the clinicians	"*I really liked them, they knew exactly what bothered me. Straight away we agreed*" -Int 3, pg 4, line 133
	Poor agreement with clinicians	Views which do not align with clinicians	"*Kind of. But I don't think they see it as I do. I think they see me as a clinical case. I like them. But I felt like it wasn't like, "oh she is feeling this sort of way". That empathy is not there. They discuss, clinically this is what it looks like, so clinically we can do this and that etc*."-Int 12, Pg 8, line 271
Past experiences	Perception as a child	How they viewed themselves as children/adolescents	"*I think about 12 I started noticing it more, with high school things change, kids begin looking more at stuff*."- Int 7. Pg 2. Line 54
	Bullying	Experiences related to bullying	"*Yeah, I was bullied at school. And of course, the focus was always my jaws, they would say things like its goofy and so on*"- Int 7, pg 8 line 220
	Effects of bullying	How bullying has affected them	"*It makes you much more self-conscious you know… I feel like it did make it a much bigger part of my life. Before that I had noticed my jaws, but after kids started bullying me I became almost obsessed by them*"- Int 10, pg 9, line 281
	Growing up with their malocclusion	Comments about growing up with their malocclusion	"*It was difficult because I always felt a bit abnormal. So, when you get together with kids, you know they have no filter *laugh* so they would either stare or say something. So, it just makes you shy during the childhood*"-Int 6, pg 5, line 153
Expectation & motivation	Desired OGN changes	The changes they wish to achieve	"*In an ideal world I would still look like me, but just have a slightly shorter jaw. So instead of the bite being reversed, it would be the opposite. That's all I want*." Int 12, pg 7, line 144
	Potentially unrealistic physical expectations	Physical expectations of surgery which may be unrealistic	"*my cheekbones would fill out, and my nose would look more balanced, less obvious. Right now it dominates my face. So, the face would just become more balanced you know*"- Int 6. Pg 3. Line 108
	Potentially unrealistic social expectations	Psychosocial expectations of surgery which may be unrealistic	"*I knew straight away it would change my life*"- Int 7. Pg 2. Line 48. "*I think people would take me more seriously*"- Int 11, Pg 2, line 37
	Expectations of the recovery	Post-operative recovery expectations	"*I know it takes a full year to fully recover. That's something else I found on Instagram. Don't judge the final result until at least a year. It takes a full year for the swelling and everything to go down*."-Int 12, pg 7, line 253
	Physical Expectations	Physical changes they expect	"*I'd expect to you know, still look like myself, but just with a less prominent jaw, the bite would not be reversed*"- Int 13, pg 7, line 244

Superordinate themes	Themes	Description	Examples quotation
	Psychosocial expectations	Psychosocial changes they expect	"*I think it would make me a bit more confident*."-Int 11, pg 7, line 228
	Motivation from others	Motivation from other people	"*My family are very encouraging, especially my sister who has had it*"- Int 5. Pg 5. Line 124
	Appearance related motivation	Motivation by appearance	"*Idea of taking pictures and the jaws looking nice really encourages me*"-Int 7. Pg 4 line 108.
	Influence from family and friends	How family and friends have influenced them	"*My family and girlfriend have been massively supportive*"- Int 7, Pg 4. Line 126 "*And my mum, she thinks I'm absolutely bonkers. She thinks I'm crazy. She went with my sister to her consultation, and they never consented her at the time because my mum was just like "no, no, no". So, she had to go home and come back*."- Int 12, pg 4, line 135
	Other people's opinions and influence	Comments relating to how others have influenced them	"*Well, you do notice people starring. And for example, one of my colleagues brought her little girl into work, and I swear to you Hans this little girl would not stop starring at my jaw *laughs*, it was terrible, I just wanted to shrink*"-Int 11, pg 5, line 147
	The effect of having a consultation	Positive or negative effect of having an OGN consultation	"*It was great to finally have someone acknowledge it you know, confirm that I'm not crazy. But it does make it more real. You know when you have two doctors saying you should have major surgery, it kind of makes it more of a thing if that makes sense*" -Int 3, pg 5, line 161
Service experience and improvement	Open to idea of seeing a psychologist	Positive views on seeing a psychologist or having psychological support	"*It would be good. It's a crazy thing to go through. There would be big benefits, I think. I would be open to it*." Int 7, pg 5, line 160.
	Concept of 'buddying up'	Patient comments regarding the idea of 'buddying up' previous patients with new ones	"*I think it's a great idea. It's a bit like following the people on social media. I think it would make a massive difference to have someone go through it with you, or before you even so you can ask them questions*." Int 7, pg 6, line 179.
	Journey to the joint clinic	The experience from referral to the joint clinic	"*Long waiting period but overall smooth journey*" Int 7, Pg 1, Line 28
	Discovering OGN treatment	Comments relating to first discovering OGN surgery as a treatment option	"*it's just mad this is done*"-Interview 7. Pg 1. Line 21.
	Trust in clinicians	Comments related to having trust in the clinicians	"*I know I'm in good hands*"-Int 7, Pg 4 Line 119.

Superordinate themes	Themes	Description	Examples quotation
	Grateful for low cost of OGN treatment	Comments related to the low cost of treatment	"*Incredible this is free on the NHS*"- Int 7, Pg1, Line 30

Themes from orthodontist interviews

Global theme	Theme	Description	Examples
Psychology of orthognathic patients	Mental health of orthognathic patients	Comments regarding the psychology of orthognathic patients	"*The incidence is high, higher than your standard orthodontic patient base. I'd say there is a range, but orthognathic patients do tend to present with more issues such as anxiety*" Int 2, pg 1, line 3.
	Trends in patient behaviours/psychology	Comments relating to how the psychology of orthognathic patients may be changing	"*I think mental health has been more normalized and so people are more open to talking about it and getting help. This makes a big difference. Years back patients would not have presented to their GP, not sought help. But social media I think has a large role to play. With TikTok and all this **** kids are seeing too many filters and other unrealistic images*."- Int 1, pg 1, line 8
	Social media	Opinions relating to social media	*"Think about who the people on these platforms are, they aren't exactly your normal patients, it takes a special type of character to post their personal life on there"- Ortho Int 4, pg 2, line 59.*
	Patient motivation and expectations	Patient motivation and expectations	"*Specific things. Well, many patients want larger facial changes which jaw surgery will not achieve, or cannot predictably do so, such as a double chin being reduced*."-Int 1, pg 3, line 110.
Training	Training in psychology	Training orthodontists have received in psychology	"*I've not had any official education in this. Just your standard lectures as a trainee. You mostly learn through your consultants and through experience. I'm not aware of more*

Global theme	Theme	Description	Examples
			formal training courses. In senior StR training you get more experience in this, with some tricky patients referred to you."- Int 1, pg 2, line 76.
External mental health services	Referring patients	Comments relating to where and why they refer patients	"*When patients have a more serious mental health condition, a diagnosis. For example, eating disorders, body dysmorphia, psychosis etc. And in general, for anyone for who my gut is saying will be trouble. Very unrealistic expectations, severe anxiety or depression. Difficulty communicating with them and so on*."- Int 1, pg 2, line 41.
	Signposting patients to sources of support	Sources of support for patients	"*I'm not aware of any myself, usually the psychologist or the GP would direct patients*"-Int 5, pg 2, line 68
Roles of professionals in the management of patient mental health	Role of orthodontist	The role of the orthodontist in managing patient mental health	"*We see patients for a long time, and we build a relationship with them. They can open up to us, so… with these things it's all about getting patients to open up. We need to identify issues and refer to the appropriate people*"- Int 4, pg 3, line 102.
	Role of psychologist	Role of the psychologist in managing patient mental health	"*Well, there are many. Setting realistic expectations. Exploring and supporting them with mental health problems. Providing them with resources to handle them. Counselling, although they don't provide it themselves, but they can refer to the appropriate resources. Providing patients with coping strategies they will benefit from.*"-Int 1, pg 2, line 59
	Benefits of seeing a psychologist	Comments related to the benefits of patients seeing a psychologist	"*Well, I think they do feel more comfortable with them. It's the atmosphere, you know, they aren't clinical, the patients know why they are there"*- Int 3, pg 2, line 69
Shared decision making	Difference in perceptions between	Discrepancies between the	"*Erm most I think its similar enough. I think it's always different to an extent, however.*

Global theme	Theme	Description	Examples
	orthodontists and patients	perceptions of orthodontists and patients	*We see them as a patient, and we begin analysing angles and stuff, but they don't see it like that. It's a bit like when you hear your voice on a recording, you can't believe you sound like that. Their perception of themselves is influenced by so many factors we can't know. Some patients and I are completely off. I feel like they see a different person. They might fixate on something I don't feel is an issue*."-Int 1, page 3, line 88.
	Difference in perceptions between surgeons and orthodontists	Discrepancies between the perceptions of surgeons and orthodontists	"*I would say we are. The differences between us are much smaller than between patients. With time it's even more so. You build the relationship. There are small things we might disagree on and discuss, but that's normal*."-Int 4, pg 3, line 101
	Joint decision making with surgeons	Comments relating to making decisions jointly with surgeons	"*It's a decision to be made between the surgeon, orthodontist and patient. Each have an important role"-Int 2, pg 1 line 28*
Service improvement	Positivity for Screening questionnaire	Positive comments regarding the implementation of a screening questionnaire	"*I think it will be a useful thing to have. It would be a starting point to delve deeper in their mental health. And it's some objective data which is useful*."- Int 1, pg 2, line 52
	Caution regarding screening questionnaire	Concerns regarding the use of a screening questionnaire	"*There would be potential problems to consider. How to design it, validation. Will it bias clinicians. You… like how will we actually use it, would it be a cut off score etc*"- Int 4, pg 2, line 41
	Comments regarding 'buddying up' concept	Comments relating to the idea of 'buddying up' patients	"*I think it can be beneficial, really beneficial for patients to have a peer for support, someone that's been through it. I think… in reality it would be difficult to arrange. There would be data protection implications, you know who would match them up, how, who*

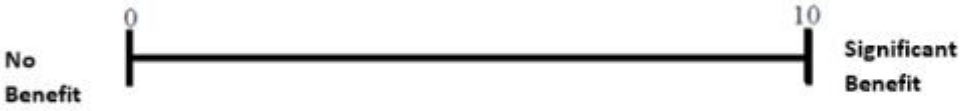
Global theme	Theme	Description	Examples
			would look after the system. Also, what happens if the person you match them with is, has had a bad experience, or is a bad influence"- Int 5, pg 4, line 122
	Desired changes to the psychology services	Changes they would like to the psychology services available to OGN patients	"*Well, the main problem is that it's just an assessment service. I don't need someone to tell me the patient needs therapy; I know that it's why I referred them. Do you know what I mean? Theres no facility to provide actual therapy, then we have to refer to the GP who refer to the NHS services, but the waiting times are very long*"- Int 4, pg 4, line 154
Non-appearance related concerns	TMD, Speech and Functional concerns	Patient concerns related to TMD, speech and mastication	"*We get these fairly commonly. TMD not too much. Speech not too common, unless a severe class 3 or AOB. They are often referred to SALT. Chewing is more common. AOB and severe class 3 patients can struggle with chewing*."-Int 1, pg 4, line 127.

APPENDIX V: PATIENT & CLINICIAN QUESTIONNAIRES

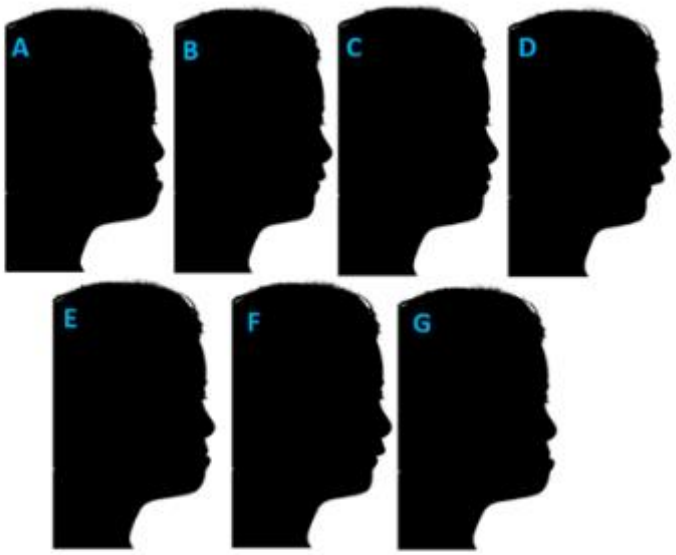
Patient Questionnaire

Figure 2: Questionnaire to be completed by patients.

Mark on this scale a line which best represents how much you will benefit from jaw surgery?



Which image most accurately represents your facial profile? _____



Which is the most attractive profile?_____

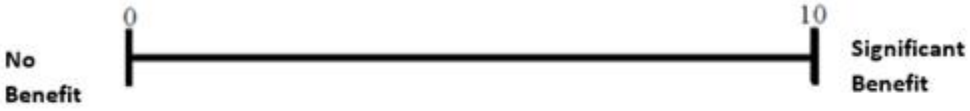
List ALL profiles you feel could benefit from jaw correction surgery

_____

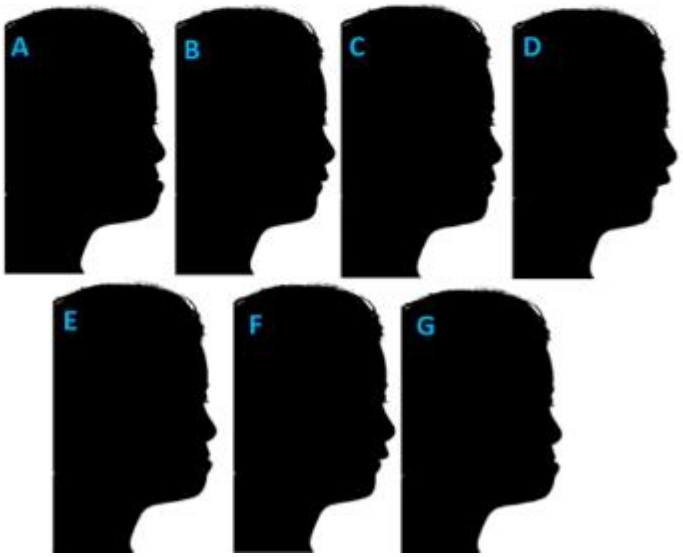
Clinician Questionnaire

Figure 4: Questionnaire to be completed by clinicians

Place a mark which best represents how much you believe the patient will benefit from orthognathic surgery?



Which image most accurately represents their facial profile? _____



APPENDIX VI: ROSENBERG SELF-ESTEEM SURVEY

#	Questions	1	2	3	4
1	I feel that I'm a person of worth, at least on an equal plane with others.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I feel that I have a number of good qualities.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	I am inclined to feel that I am a failure. **	Strongly Disagree	Disagree	Agree	Strongly Agree
4	I am able to do things as well as most other people.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	I do not have much to be proud of. **	Strongly Disagree	Disagree	Agree	Strongly Agree
6	I take a positive attitude toward myself.	Strongly Disagree	Disagree	Agree	Strongly Agree
7	On the whole, I am satisfied with myself.	Strongly Disagree	Disagree	Agree	Strongly Agree
8	I certainly feel useless at times. **	Strongly Disagree	Disagree	Agree	Strongly Agree
9	I wish I had more respect for myself. **	Strongly Disagree	Disagree	Agree	Strongly Agree
10	At times I think I am no good at all. **	Strongly Disagree	Disagree	Agree	Strongly Agree

** *indicate negatively loaded questions*

APPENDIX VII: PARTICIPANT INFORMATION SHEETS & CONSENT FORMS

Clinician Consent form for interviews

UNIVERSITY OF LIVERPOOL

Interview consent and data processing statement

• This project - "Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery" is being conducted by research teams at the University of Liverpool (UoL). It is funded entirely by the UoL

•I confirm that I have read and understood the information sheet dated [25.11.2020_V_1.0] for the above study. I've had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

•I understand that my participation is voluntary and that I'm free to withdraw at any time without giving any reason, without my rights being affected. In addition, should I wish to not answer any particular question or questions, I am free to decline.

•I give permission for members of the research team to have access to my responses. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any reports or publications. I understand that once my data is submitted it will be anonymised, and once anonymised data is published it will no long be retrievable for destruction.

• I understand that, under the Data Protection Act (2018), I can at any time ask for access to the information I've provided and can also request the destruction of that information if I wish.

• Interviews will be recorded and transcribed by the research team.

•I consent to the use of audio recording / transcription of meetings and later verbatim quotation in reports/publications (provided I am not identifiable).

• Data collected may be processed manually and with the aid of computer software.

• Please indicate, by ticking ONE of the boxes below, whether you are willing to be identified, and whether we may quote your words directly, in reports and publications arising from this research.

□ I may not be identified in reports made available outside the research team, nor in any publications. My words may be quoted provided that they are anonymised.

□ I may not be identified in reports made available outside the research team, nor in any publications. My words may not be quoted.

Please print your name:.....

Signature:..... **Date:**.....

Name of Person taking consent.....

Signature..... **Date**.....

Contact Details - Chief Investigator: Dr Norah Flannigan, Senior Clinical Lecturer/Honorary Consultant in Orthodontics. Orthodontic Department, LUDH, Pembroke Place, L3 5PS. Telephone: 0151 706 5021

Sponsorship Number: UoL001589

IRAS ID:291300

Patient Consent form for questionnaires

UNIVERSITY OF LIVERPOOL

PATIENT CONSENT FORM

IRAS ID:291300

Sponsorship Number: UoL001589

Title of Research Project: "Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery"

Study funded by: The University of Liverpool

Researchers: Hans Antov, Norah Flannigan, Mark Jellicoe, Helen Poole

Please tick box

1. I confirm that I have read and understood the information sheet dated [25.11.2020_V_1.0] for the above study. I've had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I'm free to withdraw at any time without giving any reason, without my rights being affected. In addition, should I wish to not answer any particular question or questions, I am free to decline. ☐
3. I understand that, under the Data Protection Act (2018), I can at any time ask for access to the information I've provided and can also request the destruction of that information if I wish. ☐
4. I understand that the information collected about me will be used to support other research in the future and may be shared anonymously with other researchers. ☐
5. I give permission for members of the research team to have access to my responses. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any reports or publications. I understand that once my data is submitted it will be anonymised, and once anonymised data is published it will no long be retrievable for destruction. ☐
6. I agree to take part in the above study. ☐

Patient Name	Date	Signature

Name of Person taking consent	Date	Signature

Patient Consent form for interviews

UNIVERSITY OF LIVERPOOL

Interview consent and data processing statement

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•I give permission for members of the research team to have access to my responses. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any reports or publications. I understand that once my data is submitted it will be anonymised, and once anonymised data is published it will no long be retrievable for destruction.

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•I consent to the use of audio recording / transcription of meetings and later verbatim quotation in reports/publications (provided I am not identifiable).

• Data collected may be processed manually and with the aid of computer software.

• Please indicate, by ticking ONE of the boxes below, whether we may quote your words directly, in reports and publications arising from this research.

□ My words may be quoted provided that they are anonymised.

□ My words may not be quoted.

Please print your name:_____

Signature:_____ **Date:**_____

Name of Person taking consent_____.

Signature_____ **Date**_____.

Contact Details - Chief Investigator: Dr. Norah Flannigan, Senior Clinical Lecturer/Honorary Consultant in Orthodontics. Orthodontic Department, LUDH, Pembroke Place, L3 5PS. Telephone: 0151 706 5021

IRAS ID: 291300

Sponsorship Number: UoL001589

Clinician information sheet

UNIVERSITY OF LIVERPOOL

Participant Information Sheet

Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery

The Royal Liverpool and Broadgreen University Hospitals NHS Trust

Dear Clinician

We would like to invite you to take part in our study.

Entry is entirely voluntary, but before you decide we would like to explain why this research is being carried out and what it will involve. You will be free to withdraw from the study at any time. A member of our team will explain this information sheet to you and answer any questions you may have.

University of Liverpool - Department of Orthodontics

Floor 2, Liverpool University Dental Hospital, Pembroke Place, Liverpool L3 5PS

Email: h.antov@liverpool.ac.uk

Tel: 0151 706 5021

STUDY PURPOSE

- There is an ever increasing demand for cosmetic procedures. Orthognathic treatment is a long journey, which culminates in a significant change in a patient's appearance. One of the key objectives of orthognathic treatment is to address the patient's cosmetic concerns.
- It is crucial that clinicians understand how a patient perceives themselves. This factor is important when discussing the available treatment options. If there is a significant discrepancy between the clinician and the patient's perception, then an optimal outcome may be compromised.
- Research investigating patients' perception of their own appearance is limited. In this study we are aiming to gain a deeper understanding from a patient perspective, and how it may differ from how clinicians perceive them.
- You are being invited to participate in this study because you are involved in the treatment of orthognathic patients in the UoL Dental Hospital.
- We will be inviting 3-6 clinicians such as yourself to participate in a focus group.

WHAT'S INVOLVED

No interventions/experiments will be made in this study as it is purely observational.

As part of this research, we will ask you to participate in a focus group discussion with 2-5 other orthodontists. This will be held remotely over Microsoft Teams.

The purpose of this focus group is to gain a deeper clinician perspective on how orthognathic patients perceive their malocclusions. We will explore your experiences with orthognathic patients. We will discuss what you feel they commonly seek from orthognathic surgery. We will ask you to consider if there were times where there was a mismatch between your own perceptions and those of your patients.

We will try to arrange the meeting for a time well suited to you. You should expect it to be 30-45 minutes in duration. The meeting will be recorded and transcribed. Importantly, it will NOT contain any identifiable data. The recording will be destroyed after transcription.

In addition to this, the following information about yourself will be collected: age, profession, years involved in the treatment of orthognathic patients, gender, ethnic background.

Further Study Details

- Study Researchers: Norah Flannigan (Chief Investigator). Hans Antov. Mark Jellicoe. Helen Poole.
- The study will be recruiting patients for approximately a year (02/2021 to 05/2022).
- After the study is complete, if you wish to receive a summary of the research findings this can be arranged. Please inform the Chief Investigator.

What if I don't wish to participate?

Participation is voluntary, if you do not wish to participate you need do nothing further, thank you for taking the time to read this information.

You have the right to withdraw from the study at any point. If you decide to withdraw, we will destroy any identifiable data we may hold. Please note that we will not be able to remove any data you have provided us after it has been anonymised. Your data will be fully anonymised between 1-2 weeks after its collection.

Your data will be handled, processed, stored and destroyed in accordance with the Caldicott Principles and more information can be found at the following URL:https://www.igt.hscic.gov.uk/Caldicott2Principles.aspx

Will my feedback be made public?

Your responses will be coded so that no one can identify them. If a particularly relevant comment is made, this may be included in any report, but you will not be identified and your name will not be included.
The research findings of this study are to be reported as part of a DDSc (Doctorate of Dental Science) project and will likely be submitted in an abraded manuscript for publication in a scientific journal. **You will not be identifiable from any report or publication.**

Are there any benefits to taking part?

The data you provide will be used to further the scientific evidence base and will benefit future patients who undergo similar treatment.

Are there any risks in taking part?

No.

What will happen to the results of the study?

The data will be analysed and published as part of a thesis for a DDSc University Degree (Doctorate of Dental Science). It will also be published as a peer review scientific paper in a journal. The data will be anonymised. You will not be identifiable from the data. If you would like a copy of the thesis and/or paper this can be arranged. Please contact the Chief Investigator (details are on page. 5).

Will my participation be kept confidential and my data kept secure?

Yes.

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of 'public task', and in accordance with the University's purpose of "advancing education, learning and research for the public benefit.

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University's research. The Chief Investigator (Norah Flannigan) acts as the Data Processor for this study, and any queries relating to the handling of your personal data can be sent to [Dr. Norah Flannigan 0151 706 5021].

There will be no names listed in the research project reports. Your data will be stored in a secure area and destroyed after 10 years. To protect confidentiality all of your data will be anonymised and only the research team will have access.

Your details and the anonymisation code will be kept separate to the anonymised data and securely stored with the research coordinator. In addition to the information above, your name, date of birth, gender and contact details will be stored with the research coordinator. Only the research coordinator will have access to identifiable information.

ADDITIONAL INFORMATION

Study sponsor, insurance and funding

This study is sponsored by the University of Liverpool (UoL). The University of Liverpool has vicarious liability for the actions of its staff, when through the course of their employment they are involved in the design and initiation of a clinical trial, including but not limited to the authorship of the Clinical Study Protocol. The UoL has appropriate insurance in place to cover this liability.

Funding for this study is to be provided by the University of Liverpool as part of a Doctorate in Dental Science (DDSc Orthodontics). The study has been assessed by peer review from assessors at the University of Liverpool and there are no conflicts of interest to declare.

Ethics

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the North West – Liverpool Central Research Ethics Committee.

Complaints

If you are unhappy, or if there is a problem, please feel free to let us know by contacting [*Dr. Norah Flannigan 0151 706 5021*] and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research

Ethics and Integrity Office at ethics@liv.ac.uk. When contacting the Research Ethics and Integrity Office, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

The University strives to maintain the highest standards of rigour in the processing of your data. However, if you have any concerns about the way in which the University processes your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling 0303 123 1113.

If you are happy to enter the study please sign the consent form attached

THANK YOU VERY MUCH FOR YOU TIME AND INTEREST IN THIS PROJECT.

Research Team: Hans Antov, Norah Flannigan, Mark Jellicoe, Helen Poole

Should you have any questions, please do not hesitate to contact us at:

Chief Investigator:
Dr. Norah Flannigan,
Senior Clinical Lecturer/Honorary Consultant in Orthodontics
Orthodontic Department, LUDH, Pembroke Place, L3 5PS
Telephone: 0151 706 5021

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Pembroke place, Liverpool, L3 5PS
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Participant information sheet

UNIVERSITY OF LIVERPOOL

Participant Information Sheet

Patients' perceptions of their facial profiles and their perceived need for orthognathic surgery

The Royal Liverpool and Broadgreen University Hospitals NHS Trust

Dear Patient

We would like to invite you to take part in our study.

Entry is entirely voluntary, but before you decide we would like to explain why this research is being carried out and what it will involve. You will be free to withdraw from the study at any time and this will not disadvantage your treatment. A member of our team will explain this information sheet to you and answer any questions you may have.

University of Liverpool - Department of Orthodontics

Floor 2, Liverpool University Dental Hospital, Pembroke Place, Liverpool L3 5PS

Email: h.antov@liverpool.ac.uk

Tel: 0151 706 5021

STUDY PURPOSE

- There is an ever-increasing demand for cosmetic procedures that focus on changes in appearance. Orthognathic treatment (jaw surgery) is a long journey, which culminates in a significant change in appearance. One of the key objectives of this treatment is to address the patient's cosmetic concerns.
- It is crucial that clinicians understand how a patient sees themselves. This factor is important when discussing the available treatment options. If there is a mismatch between how you and the clinician think about your appearance, it might be more difficult to obtain the best outcome.
- Research investigating patients' views of their own appearance is limited. In this study we are aiming to gain a deeper understanding of this from a patient perspective, and how it may differ from the views of clinicians.
- You are being invited to participate in this study because you are a patient from the orthognathic surgery clinic at the University of Liverpool Dental Hospital.

Why have I been chosen to take part?

You have been chosen because you are considering undertaking orthognathic surgery. We will be recruiting approximately 100 patients such as yourself to investigate how they view their bite and jaws.

WHAT'S INVOLVED

Involvement in this study is in addition to your orthodontic treatment.
No interventions/experiments will be made in this study as it is purely observational.

As part of this research, we will ask you to complete two short questionnaires designed to capture how you think about your appearance and how this impacts you. These should take approximately 10-15 minutes.

You will be asked to complete the following:

- **1] Facial appearance questionnaire**: You will be asked to assess the appearance of several facial silhouettes which have different jaw relationships. The questionnaire will also assess how much you feel you will benefit from orthognathic treatment.
- **2] Self-esteem questionnaire**: This will be a short questionnaire which will assess your positive and negative attitudes towards yourself e.g. self-confidence.

You may also be asked to participate in a 1-to-1 discussion
We will be inviting up to 15 patients to participate in an informal discussion, the purpose of which will be to help us better understand and appreciate the patient perspective. Participation will be purely on a voluntary basis.
Some of the topics we may ask you about include how you perceive your facial appearance, what you would like to change, why you wish to have the treatment. This informal discussion will carried out remotely, either over the phone, or over an internet platform. We will try to arrange the meeting for a time well suited to you. You should expect it to be 30-45 minutes in duration. The meeting will be recorded and transcribed. Importantly, it will NOT contain any identifiable data. The recording will be destroyed after transcription.

In addition to this, some information from your clinical records will be collected. This will be non-identifiable data such as your age, sex and clinical information about your diagnosis.

Study details

- Your treatment **WILL NOT** be influenced by your involvement in this study.
- Research Team: Norah Flannigan (Chief Investigator). Hans Antov. Mark Jellicoe. Helen Poole.
- The study will be recruiting patients for approximately a year (02/2021 to 05/2022).
- After the study is complete, if you wish to receive a summary of the research findings this can be arranged. Please inform the Chief Investigator.

What if I don't wish to carry on with the study?

Participation is voluntary, if you do not wish to participate you need do nothing further.

You have the right to withdraw from the study at any point. If you decide to withdraw, we will destroy any identifiable data we may hold. Please note that we will not be able to remove any data you have provided us after it has been anonymised. Your data will be fully anonymised between 1-2 weeks after its collection.

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The research findings of this study are to be reported as part of a DDSc (Doctorate of Dental Science) project and will likely be submitted in an abraded manuscript for publication in a scientific journal. **You will not be identifiable from any report or publication.**

Are there any benefits to taking part?

The data you provide will be used to further the scientific evidence base and will benefit future patients who undergo similar treatment.

Are there any risks in taking part?

No. Involvement in this study will not alter your treatment in any way. It will require a time commitment of approximately 10-15 minutes to complete the questionnaires, and an additional 30-45 minutes if you decide to partake in the interviews.

You don't have to talk about anything you don't want to. Your name will not be in any report I write about the study, so you need not worry that other people will know what you have said to me. Everything you tell me during the interview or in the questionnaires will be entirely confidential.

What will happen to the results of the study?

The data will be analysed and published as part of a thesis for a DDSc University Degree (Doctorate of Dental Science). It will also be published as a peer review scientific paper in a journal. The data will be anonymised. You will not be identifiable from the data. If you would like a copy of the thesis and/or paper this can be arranged. Please contact the Chief Investigator.

Will my participation be kept confidential and my data kept secure?

Yes.

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All of your data will be fully anonymised. There will be no names listed in the research project reports. Your data will be stored in a secure area and destroyed after 10 years. To protect confidentiality all of your data will be anonymised and only the research team will have access.

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This study is sponsored by the University of Liverpool (UoL). The University of Liverpool has vicarious liability for the actions of its staff, when through the course of their employment they are involved in the design and initiation of a clinical trial, including but not limited to the authorship of the Clinical Study Protocol. The UoL has appropriate insurance in place to cover this liability.

In terms of liability, NHS Trust and Non-Trust Hospitals have a duty of care to patients treated, whether or not the patient is taking part in a clinical trial, and they are legally liable for the negligent acts and omission of their employees. Compensation is therefore available in the event of clinical negligence being proven.

Clinical negligence is defined as:

"A breach of duty of care by members of the health care professions employed by NHS bodies or by others consequent on decisions or judgments made by members of those professions acting in their professional capacity in the course of their employment, and which are admitted as negligent by the employer or are determined as such through the legal process".

Funding for this study is to be provided by the University of Liverpool as part of a Doctorate in Dental Science (DDSc Orthodontics).

Ethics

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the North West – Liverpool Central Research Ethics Committee.

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If you are unhappy, or if there is a problem, please feel free to let us know by contacting *Dr. Norah Flannigan 0151 706 5021* and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Ethics and Integrity Office at ethics@liv.ac.uk. When contacting the Research Ethics and Integrity Office, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

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THANK YOU VERY MUCH FOR YOU TIME AND INTEREST IN THIS PROJECT.

Research Team: Hans Antov, Norah Flannigan, Mark Jellicoe, Helen Poole

Should you have any questions, please do not hesitate to contact us at:

Chief Investigator:
Dr. Norah Flannigan,
Senior Clinical Lecturer/Honorary Consultant in Orthodontics
Orthodontic Department, LUDH, Pembroke Place, L3 5PS
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Liverpool University Dental Hospital
Pembroke place, Liverpool, L3 5PS
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APPENDIX VIII: TOPIC GUIDES

Topic Guide for orthodontist interviews

➔Do you commonly encounter mental health issues in orthognathic patients? (what types etc). If so any correlation with age, gender or otherwise? Correlation with specific diagnoses or malocclusions?

How do you manage them. Where refer? On-going support?

➔Have you had to use the help of a psychologist?

Did you find this useful? Would you like a psychologist to be part of the team? Would you change anything about the psych services available? What issues have you found with the psych services?

What do you see the role of a psychologist being (screening, referral, on-going support etc?).

➔What is the role of the orthodontist in managing pts with mental health issues?

➔Do you screen for mental health issues (how. Psychometric Questionnaire? Comfortable?)

➔What kind of training have you had related to psychology and orthognathic patients? Would you like more or less?

➔Do you feel the way you view patients differs from surgeons' perspectives?

➔Do you feel patients view themselves different to you?

➔How often do you have issues with patients having unrealistic expectations? (when do these tend to come out, after/before surgery?, how do you manage them).

➔Throughout your career what changes have you noticed in the psychology of OGN patients (social media?).

➔Any specific areas that you find pts have unrealistic expectations e.g. cheekbone changes etc? Difficult area to consent.

➔How do you assess a patient's motivation for surgery? Is this something you find easy to pick up or not straight forward? Any red flags?

➔what role do friends, family have?

➔How often do they present with difficulties not related to appearance such as TMD, chewing, speech?

➔How are patients' expectations of the procedure? Which aspects do they tend to struggle appreciating?

➔NFORCE questionnaire etc?

Borderline need cases hard to make decision?

Topic Guide for patient interviews

The topic guide will be adapted throughout the interview process to accommodate new insight and approaches to care.

Introduction

- Welcome, introduction and thank you for participating.
- Confirm confidentiality & data storage.
- What the interview will cover and length.
- Opportunity to ask questions.
- Confirm consent to participate and commence audio recording.

Question	Rationale
1. Can you give me an overview of your treatment journey to date? • *Explore any critical points.*	Still warm up. Idea of how patient developed their interest. Overview of their journey.
2. Can you tell me a little about your experience as a patient so far?	Warm-up. Rapport building.
3. "I'm going to ask you a few questions about your jaws and their appearance". • *How would you describe your jaws?* • *How do you feel when you see yourself in the mirror or in pictures.* • *Do you think other people see them like you? Or differently? Why? How?* • *Tell me how you feel about the appearance of your teeth? (Delve deeper if it's a significant issue and differentiate from their jaws).*	Open question exploring their perception of their malocclusion.
4. When did you first begin noticing the appearance of your jaws?	
5. Overall, has your perception of your jaws changed throughout your life? If so, how? Why do you think that is? (probe further as appropriate). • *Has it changed since you started your OGN journey*	Challenging and reflective question. A lot of room for the interviewer to improvise depending on the answer.
6. What is a key aspect you would change about the appearance of your jaws? • *Why this specifically? Has this changed over the years? How do you expect it will change after the surgery?*	Beginning to explore expectations
7. What has prompted you to pursue this treatment? • *How did you first find out about OGN surgery?* • *Did other people play a part in your decision? Who? How?*	First substantive question.

Question	Rationale
• *Did any life experiences significantly influence your motivation (+vely or –vely)?* • *What thoughts or ideas motivate you to pursue this treatment (e.g. idea of a future self-image etc).*	
8. Thinking back over the last few months, were there occasions where the appearance or function of your jaws significantly impacted your life or concerned you? • *What happened? Where were you? Who were you with? How did you feel?*	Exploring patient experiences often provides rich and meaningful data.
9. Thinking back, have any people influenced the perception of your jaws the most. • *Who? In what way? Age at the time. Has their influence changed over the years?*	Explores the people that have influenced them the most.
10. Have you had to adapt or alter your life in any way as a result of your appearance? • *If so how? Can you say more about this?* • *How typical is this scenario?* • *Are there any other similar scenarios which have occurred multiple times?*	Explores if this is a typical experience and provides an opportunity for the patient to provide a range of other experiences.
11. Do you think your jaws have influenced your personality and/or social behaviour in any way? • *E.g. how it's changed their self-image, self-esteem, how outgoing they are etc.*	Explores how they feel their malocclusion has affected them.
12. Do you have any difficulties which are not related to appearance (prompt the following: TMD, chewing, speech)? • *Tell me about them. How do they impact you? How have they evolved? How important are they. How do you expect they will change?*	Exploring other issues. Scope to divert significantly here.
13. Reflecting on what we've discussed, how have your jaws impacted your life?	A reflective and exploratory question- ideal final question as it allows patient to reflect on the conversation so far and can deliver new information even if a similar question had already been asked.
14. What are your expectations from the procedure? *Do you think it will change you in other ways? E.g. in terms of personality changes? In terms of appearance/function? In terms of how others treat you?*	More abstract question, allows interviewer room for exploration.
15. Anything else you'd like to add?	This question can garner rich data
Record demographic and other data. Thank the participant. Ask if they have any further questions.	

<u>Topic Breakdown</u>:

A. Blue – treatment experience [Q1 and 2]

B. **Light orange– perception of appearance / jaws [Q3-6]**

C. **Green – self / other motivations influencing perceptions [Q7-9]**

D. **Grey – appearance and function impact on life [Q10-13]**

E. **Purple – Expectations [Q14]**

Potential other questions to include?

How did you feel when you received your diagnosis?

Where else have you sought information about the procedure from?

APPENDIX IX: REFLEXIVITY DIARY & EXCERPT OF INTERVIEW ANALYSIS

Reflexivity Diary

The process of reflexivity involved a constant reflection on the process of data collection and analysis. This resulted in me noticing several key themes in the data. In addition, my interview style changed significantly as I reflected on it. The following paragraphs provide an example of some noteworthy outcomes from the reflection process.

Excerpt from Diary: Patients are quite willing to open up and discuss personal issues. Almost as if they have been looking for someone to 'open up' to. Although some are the opposite, giving me short and superficial answers. Saying to them "other people have mentioned X & Y" is a very useful way of getting them to open up. They suddenly feel its OK to share deeper experiences.

Patients seems to be quite invested in their treatment, appear to have a good understanding of what the journey involves, albeit expectations do differ. Some appear to expect a massive change to their quality of life whilst others expect a more mild positive change.

Following vloggers about their OGN journey seems popular, they seem to find it very educational and comforting to see someone go through the journey.

A question that keeps showing up in the literature was mentioned by a couple of the consultants "how do you expect this procedure to change your life". This open-ended question is excellent at beginning a discussion on the patient's expectations. This could be a great addition to a screening questionnaire.

Could the BOS monitor and run a FB group for OGN support where patients can interact?

Seems orthodontists have no idea of where they can signpost patients to. They tend to just refer to GPs. Could I collate all the direct access places psychologists signpost patients to?

I need to avoid leading questions. Even with the topic guide sometimes I find myself doing this.

Seems people have two extreme responses to consultants acknowledging their issue, some are reassured and happy they have found a solution and that someone has acknowledged it, whilst for others the issue becomes more serious and 'medicalised'.

We seem to advise patients against social media use, but they love it and find it informative, especially the "support" they feel they get by going through the journey with someone. Maybe our approach should be not to advise against it, but GUIDE and educate them on how to pick and choose.

Coding Excerpt from patient interview

Hans: How would you describe your jaws?

Pt 1: Oh, God, absolutely terrible Hans, terrible. I've always hated them. So, I guess I would describe my jaws as very pointy and long, almost like a witch's jaw, and they are facing downward towards the bottom, *haha* it's difficult to explain.

Hans: Okay, okay, I can see what you mean, and how about the rest of your face and upper jaw, anything specific about that?

Pt 1: Well, to be honest with you I've never really noticed anything else with the top jaw, but you know since coming to see the surgeons they have brought attention to the fact that my top jaw is quite small. That it's not supporting my cheeks well so that's something that I've noticed as well.

Hans: Okay, I see, so you've noticed that since you began the treatment. Is that something that bothered you before.

Pt 1: Not really, I guess I was more focused on the lower jaw.

Hans: Okay, and now you're concerned about your upper jaw as well? Has your overall concern about your appearance changed since being seen on the joint clinic with the orthodontist and surgeon?

Pt 1: Yeah I would say now that I've noticed that, I do want to correct it Hans. I'm not sure I would say I'm more self-conscious overall, I know more specifically what I dislike about them, but I disliked them just as much before. Even now I feel less self-conscious as I know there are many people like that out there and they have procedures routinely.

Hans: Excellent, so actually discussing it with experts may have made you reassured and less self-conscious?

Pt 1: Yes I do feel better and re-assured I think. Otherwise, you know, I felt a bit of an oddball outcast.

Hans: Okay, interesting thank you for sharing, that's very helpful. Can you tell me how you feel when you see yourself in the mirror, or in pictures?

Pt 1: Oh I hate it, I hate looking at myself in pictures you know, I never take selfies and anything like that. So, you know yeah I do definitely feel self-conscious. I sometimes, when I'm out with friends I forget about it but when it comes to watching myself in videos or pictures, it definitely comes back. It really reminds me that I really hate them.