Orthodontics and orthognathic surgery. So what?

Olly Keith, FDS (Orth) RCSEng; Peter V Dyer, FRCSEd (Maxfac)

INTRODUCTION

Patients presenting with a malocclusion involving a severe underlying skeletal discrepancy often have significant concerns regarding oral function, dental health and/or facial aesthetics. Functional problems such as difficulty eating and impaired speech may arise from certain dento-skeletal relationships, eg anterior open bite. Unfavourable occlusal relationships can pose a threat to longterm dental health by damaging both hard and soft tissues, eg a deep traumatic overbite, or by making oral structures more prone to damage, eg very prominent incisors. Facial appearance is a major concern for many people in this patient group, as physical appearance is a determinant of social acceptability, identity and a source of non-verbal communication. Any self-perceived deviation can lead to profound effects on a patient's psychological well-being.

In order to correct dento-facial disharmony, it is often necessary to consider treatment involving a combination of orthodontics and orthognathic surgery. Orthodontics to align the teeth correctly in three dimensions, antero-posteriorly, vertically and transversely within each jaw, in combination with either maxillary, mandibular or bimaxillary orthognathic surgery to place the underlying skeletal bases in an optimal position. Patients referred with severe malocclusion commonly expect that orthodontic treatment alone will correct their problem.

Their motivation for seeking treatment is typically a combination of difficulty eating, compromised dental health and poor aesthetics, although the relative contribution of these factors varies. The suggestion of such complex interdisciplinary intervention can come as a huge shock to patients and may be accompanied by a variety of emotional responses, sometimes quite dramatic, including disbelief, tears and anger. This is usually followed by a period of composure, of variable duration, consideration and acceptance.

THE PROCESS

If a patient elects to go ahead with the planning process, the interdisciplinary team will then discuss with them, and ideally member(s) of their family or other support network, the benefits of such treatment and of course the risks. In the short-term, these include a very significant amount of swelling and interrupted function, often accompanied with a period of low mood. Significant longterm risks can include damage to the teeth and supporting structures, and paraesthesia of some branches of the trigeminal nerve. Other rare complications can occur:

As with any major elective intervention, it is this informed consent that is vital to the decision-making process. In view of the range of aesthetic concerns with which patients present, it is necessary to identify and differentiate between those seeking a 'cosmetic' improvement who may be psychologically vulnerable, and those in whom correction of the deformity would have a significant positive impact on their self-esteem,

body image and self-confidence. Identification of patients with any degree of dysmorphophobia is essential and appropriate caution exercised in managing their expectations. These people believe themselves to be unattractive although their appearance is within normal limits. Evaluation of the psychosocial indications and implications is, therefore, of paramount importance, so as to reliably address patients' concerns and meet their expectations with regard to outcome. Although the extent of changes in appearance with orthognathic surgery are less dramatic than those achieved with craniofacial reconstruction for severe craniofacial deformities such as Crouzon's syndrome and Apert's syndrome, the effects on personality and behaviour are certainly recognisable.

CASE STUDY

Initial presentation

A 24-year-old female patient presented to the orthodontic department in the maxillofacial unit in June 2004, with fixed appliances in place, having recently relocated to the area. She had been referred by her general dental practitioner, with whom she had registered for continuation of care. The treatment had been ongoing for 18 months. The patient had hoped that this treatment would eliminate the significant discrepancy between her upper and lower incisors.

Initial examination confirmed that she had a severe class 2 division 1 incisor relationship, 11 mm overjet and clinically a severe antero-posterior and vertical skeletal discrepancy. The patient was pregnant, therefore no radiographs were taken, and her oral hygiene was poor. Medical and dental histories were otherwise unremarkable.

The appliances had been in place for approximately 18 months and the aims of treatment were unclear. Her concerns included difficulty eating, excessive maxillary gingival exposure and extremely prominent teeth. The options for treatment were discussed and included discontinuation of active treatment, retaining the teeth in their current position, or a combination of continued orthodontic treatment in conjunction with bimaxillary orthognathic surgery.

To put it mildly, the patient was disappointed and quite understandably very angry, as she felt she had been led to believe that the treatment she had embarked upon, and indeed funded herself, would achieve her desired aims. It clearly would not have done. As she was at that stage pregnant, the treatment was discontinued and the suggestion was made that definitive treatment could be undertaken, once the baby had reached approximately six months of age.

Re-referral

In 2007, the patient was re-referred aged 27. Her concerns remained the same. On examination, the overjet was found to have relapsed to 14 mm, due to lip-trapping beneath the upper incisors in the absence of the fixed appliance. Clinical and

Figures 1-8 Clinical and radiographic presentation

radiographic examination, including cephalometric analysis, revealed the extent of the severe skeletal and dental discrepancies. Upper incisor exposure was extreme at rest and increased dramatically in smiling because of the underlying vertical skeletal maxillary excess and shortness of the upper lip. A premolar tooth in the lower right quadrant was found to be non-vital and have evidence of periapical pathology. In discussion, it became obvious that the patient's facial appearance was and had always been a huge psychological handicap to her (see figures 1-8).

Management

Prior to the interdisciplinary consultation, the patient was advised to achieve a significant and consistent improvement in oral hygiene and undergo endodontic therapy to the lower right first premolar in general dental practice.

The treatment plan was subsequently finalised and then proceeded, commencing with extraction of the upper right and left second premolars and the lower left first premolar; again in general dental practice. These were necessary to

Figures 9-11

create space to enable alignment of the teeth in preparation for surgery. Fixed appliances were placed and adjusted regularly throughout the pre-surgical phase in order to prepare the dentition for surgical correction. The pre-surgical phase took 14 months (see figures 9-11).

Bimaxillary orthognathic surgery was undertaken in January 2010, involving a maxillary impaction of 6mm and a mandibular advancement of 9mm (see figures 12-15). The bony fragments were secured with titanium rigid miniplate fixation and the patient remained in hospital for three days post-operatively.

Post-surgical fixed appliance therapy continued for five months to detail the occlusion; this was completed in June 2010. Total active treatment time was 19 months. Removable retainer appliances were provided for night-time wear. After a 12-month period of supervised retention, these could continue to be worn at the patient's discretion. The patient was reviewed by the interdisciplinary team for two years and at her final review reported that although she had a minor loss of sensation of her lower lip, she was delighted with the outcome.

Outcome

Huge improvements in the patient's occlusion and facial appearance were achieved. The overjet was reduced from 14mm to 2mm, the vertical maxillary excess was reduced significantly and lip competence was achieved (see figures 16-21).

Her ability to eat was greatly improved, and her speech was clearer. The dento-facial appearance was altered dramatically and both subjectively and objectively, the psychological benefit was enormous.

DISCUSSION

Patients who have developed severe skeletal discrepancies through adverse growth, genetics or trauma often present with problems associated with function and oral health. Not surprisingly, these anomalies are often obvious and affect their appearance. Helping patients with severe dento-facial disharmony requires the team to manage not only their clinical problems but also their psychological issues concerning their self-image associated with their aesthetics and function. It is extremely important to separate patients with objectively minor discrepancies, treatment for which could and should be defined as 'cosmetic', from those patients who have significant facial abnormalities. Such anomalies can have a significant psychological impact, often affecting someone's perceived place in society. Treatment for these patients is often life-changing (see below).

ACKNOWLEDGEMENT

Enormous thanks go to the patient for allowing us to describe her case study and for kindly giving us permission to publish her poem. We all hope that this article goes towards helping clinicians to understand the impact such treatment can have on patients' lives.

YOU HAVE GIVEN ME ... ME

*I remember clearly that very first day
A long time ago like yesterday
You spoke the truth, you told it clear
Those painful words I did not wish to hear
So far I felt I'd come, but all in vain, my face had won!*

*So many years of lonely self-doubt
Low self-esteem is what my face brought about
Frustration and sadness they all set in
A million 'what ifs?' What might have been?
Years of simply not being me
The person behind the face, the person trapped was ME*

*So back I came, though the task seemed high
'This will work' you said, looking me straight in the eye
Your certainty, it never once faltered
My broken face, you were sure, could be altered
And although the mountain seemed huge to climb
You were there one step at a time*

*So forward we went – you, Sandra and me
Your support and encouragement meant so much to me
Surgery loomed, the time had come
To fight the nerves and finish what we had begun
I felt so bruised, a bit swollen and sore
My face felt more broken than it had done before !!
But as the days went by I began to see
The person that I always wanted to be*

*Looking in the mirror and liking me
This was an experience that was new to me
Now I can walk into a crowded room
My head held high no more impending doom
The laughter I hear now doesn't bother me
Because now I know they aren't laughing at me*

*So now we are here, my time is through
My broken smile fixed, all thanks to you!
The gift of a smile, I don't think you will ever know
What a wonderful gift that is to bestow*

*So thank you for everything words don't seem enough
What can I say you've changed my life so much?
Thank you for the gift
I just hope you can see just how much it means to me
You've given me a precious gift the gift of a smile
You've given me more, you have given me ... ME.*

Linda Corbett