

Complex interdisciplinary aesthetic rehabilitation

Dr Martin Wanendeya BDS(Bristol) DiplImpDent RCS Eng (Adv Cert)

Introduction

An interdisciplinary approach is essential if we wish to achieve a high standard in the functional and aesthetic results we desire for our patients who present with complex situations that they themselves often do not perceive as such.

Whilst we might always aim high, we need to also accept that not every case will achieve a perfect outcome and yet we are often able, through working together and utilising each other's expertise and experience, to achieve a standard of excellence. The challenge is recognising what we are dealing with and knowing when we need to call in specialist expertise so that we can do our best work.

Figure 1: a-b



Figure 2

Main complaint

The patient presented having recently moved to the area and wanted to improve the appearance of her teeth (*Figure 1*). She was aware of the impacted 13 and the need to consider a long-term replacement to this tooth. She also wanted to have the spaces at the front of her mouth closed. In her words, "I need to get my teeth sorted out now I have moved to London. I have a baby tooth present and some gaps between my front teeth that I want to have filled"

Medical history and clinical examination

Fit and healthy patient who was a non-smoker. Extra-orally the patient presented with a skeletal Class 1

pattern with average lower facial height and a very mild mandibular asymmetry, with the chin off to the left side of the facial midline by 2mm (*Figures 1, 2*). TMJ assessment was unremarkable with no crepitus or clicking.

Intra-orally the patient presented with good gingival health and a minimally restored dentition. With the exception of the 13, all the teeth up to and including the second molars were present in all four quadrants. She had a retained 53 (upper right deciduous canine) present. Her incisal occlusal relationship was a mild Class 3, with a normal overjet but reduced overbite. The upper and lower dental midlines were not coincident, with the upper centreline being in the facial midline while the lower centreline

Figure 3



being co-incident with the centre of the chin was therefore also 2 mm to the left of the facial midline. The

aforementioned mild mandibular asymmetry also led to a very mildly asymmetric buccal segment relationship with molars and canines on the right side at Class I and canines and molars on the left side at $\frac{1}{4}$ unit Class II. This resulted in lateral guidance on the canines on the left and guidance on the first premolars on the right. She had incisal protrusive guidance with no interferences. The 14 had drifted slightly distally and the 24 had drifted mesially and was rotated. There was mild crowding in the lower arch and severe spacing in the upper arch.

Pre-orthodontic radiographic examination consisted of a dental panoramic radiograph, a lateral ceph and a CT scan, which revealed an unerupted 13. There was no pathology evident. The CT scan revealed that the 13 was palatally placed and showed no signs of causing root resorption to the adjacent teeth.

The patient's dentition was largely unrestored with only an occlusal composite restoration present on the 36. There was minimal wear present on the upper and lower incisor teeth but there was some erosion present on the lower molars (*Figure 4*).



Figure 4



Figure 5



Figure 6



Figure 7

Other clinical and radiographic findings:

- Tooth size discrepancy /Boltons discrepancy on the anterior teeth due to the microdontia of the upper central and lateral incisors
- Over-erupted upper right third permanent molar due to a missing opposing molar. Missing lower third permanent molars and unerupted upper left third permanent molar
- Mildly increased gingival display on smiling. The upper lip length was average but increased muscular activity was noted on smiling
- Upper incisor display at rest was ideal.

Problem list

(See Figures 5-7)

1. Midline 2-3mm to the RHS of the face
2. Centrelines not coincident
3. Space present 25 and 26 area that needs to be closed
4. Tooth size/arch width discrepancy
5. Uneven spacing between the upper anterior teeth
6. Peg shaped laterals
7. Deciduous tooth present - upper right canine
8. Impacted 13- this was removed before orthodontic treatment

Treatment options

1. Accept 13 in situ and restore the deciduous canine (53). Taking into consideration the patient's

age, the 13 is highly unlikely to move or cause root resorption to the adjacent teeth and therefore accepting it in situ was a reasonable option. The aesthetic outcome of a restoration on the 53 would be compromised and the medium term prognosis of the tooth was deemed guarded to poor.

2. Extract 53, expose and bond a gold chain on the 13 and orthodontically erupt and align the 13 using fixed orthodontics. As the 13 was in a challenging position for alignment and taking into consideration the patient's age, the orthodontic treatment would take 2-3 years.
3. Surgical removal of 13 and extraction of 53. Idealise space for an implant or a bridge with fixed orthodontics with consideration for canine guidance on the contralateral side. The orthodontic treatment would take 1 year.
4. Surgical removal of 13 and extraction of 53. Provision of an orthodontic mini-implant in the upper right anterior region for anchorage to protract upper premolars and permanent molars into a full unit class II position. Space closure without the use of mini-implant anchorage would have inevitably resulted in the centreline shifting to the right side. The upper right premolar would be rotated mesiopalatally and disguised as an upper canine. The orthodontic treatment would take 2-3 years.

The patient decided on Option 3. She was not interested in lower arch treatment to align the mildly

imbricated lower labial segment and was not concerned that at the end of the treatment the upper and lower centrelines would not be coincident. The upper centreline was to be maintained correct with the facial midline.

The orthodontic plan also included idealising spaces mesial and distal to the upper central and lateral incisors for either composite restorations or veneers. The patient was not concerned about the increased gingival display on smiling. All fixed appliance options were discussed with the patient including labial, lingual and ceramic fixed appliances. Due to concerns about speech and also aesthetic concerns about the lingual orthodontic wire showing through spaces in between the upper central and lateral incisors, the patient decided on a ceramic fixed appliance system for treatment limited to the upper arch.

Treatment objectives

(See Figures 8-15 - overleaf)

1. Move midline to LHS and make perpendicular to reduce the cant present
2. Open up more space 13 to accommodate a full size canine tooth, root parallelism between 12 and 14
3. Even out the spaces between the 22, 21, 11, 12, 53 to allow correctly proportioned restorations
4. Place an immediate implant to replace 13. Grafting on 13 if needed
5. Minimal preparation veneers on 22, 21, 11, and 12

Figure 8



Figure 9



Figure 10



Figure 11



Figure 12

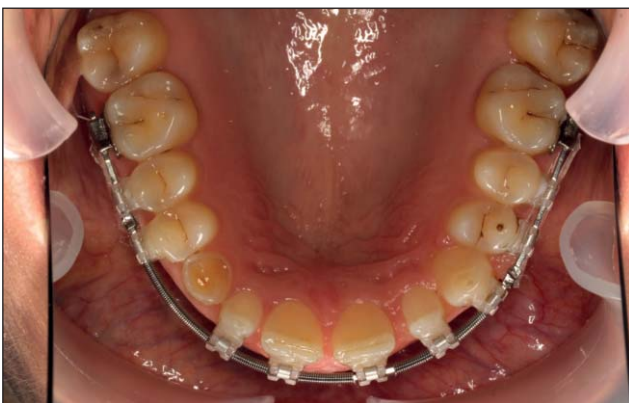


Figure 13



Figure 14



Figure 15

6. Implant supported crown on the 13
7. Orthodontic retention.

Treatment rationale

The patient was keen on having the best aesthetic and functional result that we could achieve with her current teeth, and was not keen on heavy preparation that she had seen on various TV programmes. She wished to maximise the aesthetic outcome but with minimal loss of tissue and without grafting if this could be avoided.

Her teeth were a square shape and if positioned correctly could be restored with minimal preparation veneers. The orthodontic treatment was designed to maximise restorative space between the teeth and upright the 11 in order to allow minimal preparation veneers.

I decided to restore the patient with a gold coated titanium abutment rather than an all-ceramic abutment, as we could get excellent aesthetics and metal to metal contact on the abutment as well as a lifetime abutment guarantee that comes with

these abutments, the latter being important for such a young patient.

Key stages in treatment progress

(See Figures 16-19 - below and overleaf)

1. Initial joint-assessment of the patient by dentist and orthodontist, followed by initial treatment planning and DSD plan formulation

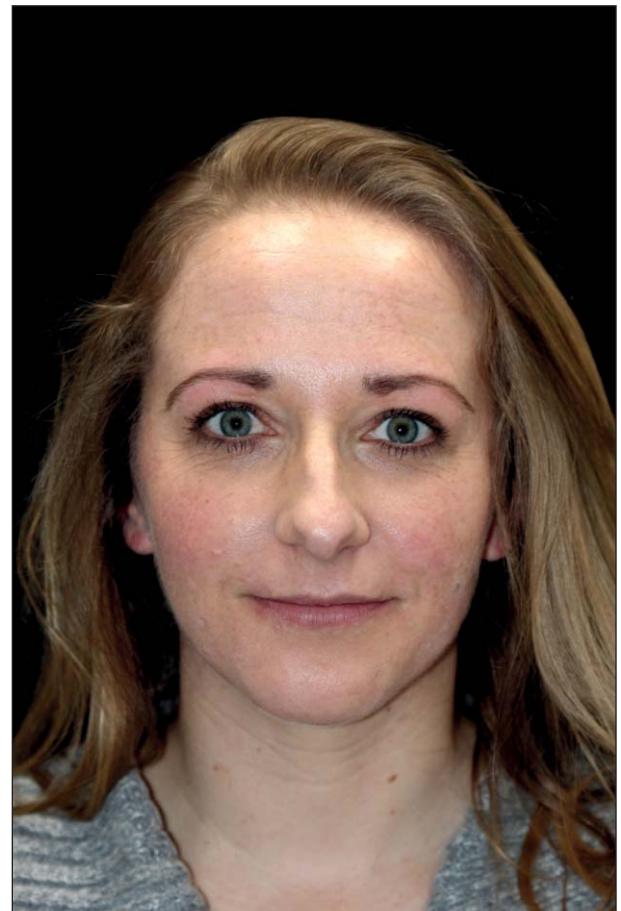


Figure 16: a-b

Figure 17: a-b



Figure 18



Figure 19



2. Referral to the local maxillofacial department for extraction of the 13. We liaised and shared the CT scan and final treatment plan information so that the surgeon was aware of the need to preserve bone
3. Time allowed for bony healing
4. Orthodontic treatment commenced to move the midline to the LHS and make

- perpendicular to reduce the cant present. Opened up more space in the 13 area to accommodate a full size canine tooth. Evened out the spaces between the 13, 12, 11, 21, 22 to allow restoration with correctly proportioned teeth
5. Reviewed before the end of orthodontic treatment to ensure that restorative aims had been met

6. Upon completion of orthodontic treatment a diagnostic wax up was done and a further CT scan was taken at this stage to decide whether bone augmentation was required. While the scan revealed adequate bone for implant placement in the 13 area, the quality of the bone was very poor. It was decided that the implant in the 13 would need to be placed

Figure 20



Figure 21



Figure 22: a-b



with minimal drilling and using bone expansion and manipulation to allow the remaining poor quality bone to be used to support an implant (*Figure 20*)

7. The implant was placed to replace 13 and provided with an immediate provisional crown (*Figure 20*)

8. A trial smile was carried out to show patient the planned appearance of the teeth prior to preparation (*Figure 21, 22*)

9. Tooth Whitening carried out
10. Gingival contouring and minimal
veneer preparations were
completed (*Figures 23-28*)



Figure 23



Figure 24

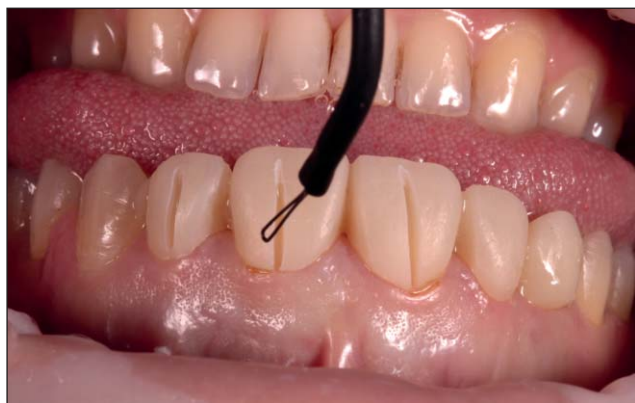


Figure 25



Figure 26



Figure 27



Figure 28

Figure 29



11. A period of healing was allowed and the patient then attended to review healing and to check the soft tissue profile of the 13 (Figures 29-30)

Figure 30



12. The final veneers on the 12, 11, 21, 22 and the implant supported crown on the 13 were then all fitted (Figures 31-40 - below and overleaf).



Figure 31



Figure 32



Figure 33



Figure 34



Figure 35



Figure 36



Figure 37



Figure 38



Figure 39

Figure 40



Long term considerations and reflective comments

(See Figures 41-47 - right and overleaf)

The patient is using a removable retainer and her oral hygiene is excellent, so the long term prognosis for this result is good. We will need to monitor this young patient for further facial growth as this could lead to a step defect around the 13.

Improvements I could have made were to either prepare the 22 more on the mesial surface or to rotate the tooth further with orthodontic treatment; this tooth appears rotated and also has a black triangle between it and the 21. The appearance of the back triangle 21, 22 will improve after soft tissue maturation, as the contact point is less than 5 mm from the crest

Regarding 22, 23 I know we have compressed the soft tissue, but the roots of the teeth are 1 mm apart meaning that we should get 5 mm papilla between 22, 23.

Figure 41

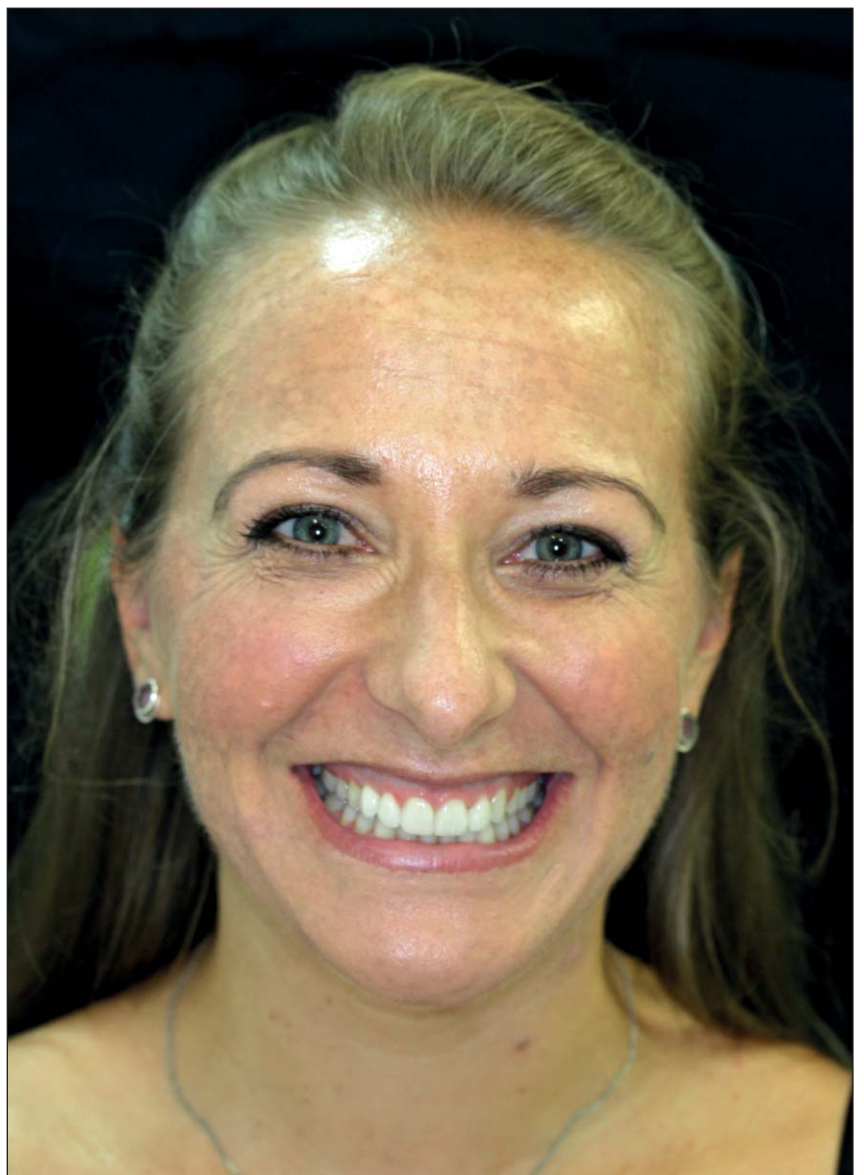


Figure 42



Figure 43



Figure 44



Figure 45



Figure 46



Figure 47



Acknowledgement

I would like to thank my ceramist, the maxillofacial surgeon and the orthodontist for contributing to the success of this case.

Further reading

1. Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol* 1992; 63: 995-996.
2. Rose TP, Jivraj S, Chee W. The role of orthodontics in implant dentistry. *Br Dent J* 2006; 201: 753-764.
3. Eger DE, Gunsolley JC, Feldman S. Comparison of angled and standard abutments and their effect on clinical outcomes: a preliminary report. *Int J Oral Maxillofac Implants* 2000; 15: 819-823.
4. Merz BR, Hunenbart S, Belser UC. Mechanics of the implant-abutment connection: an 8-degree taper compared to a butt joint connection. *Int J Oral Maxillofac Implants* 2000; 15: 519-526.