Smile makeover: advanced case

Ash Parmar describes an advanced smile makeover case, including diagnosis, treatment planning and outcome

Introduction

This article will review in detail a clinical case that I have treated. The case was fairly challenging and required careful and detailed treatment planning.

Case history

Dina presented to me wanting a much nicer smile. She was quite conscious of her smile, and had felt this way for many years, and lacked the confidence to smile in photographs. Her upper right canine had been extracted when she was 18 years old, but she had not received orthodontic treatment. UL2 and UL4 had also been crowned at this age (Figures 1-10).

Clinical examination

Table 1 illustrates some of the key findings during the comprehensive dental assessment. After the general assessment, a thorough smile analysis was carried out. Table 2 illustrates the key features to look for and the findings in this clinical case.

Diagnosis

The following diagnoses were made after the assessment:

- Poor root fillings at UL1, UL2 and UL4
- Decay at LL7
- Mild periodontal problems
- Cosmetic concerns.

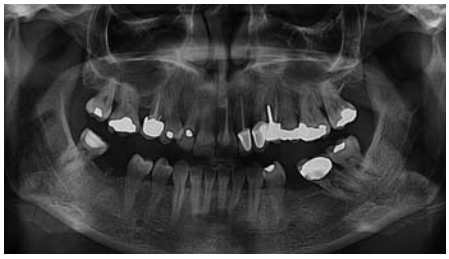

Figure 1: OPG

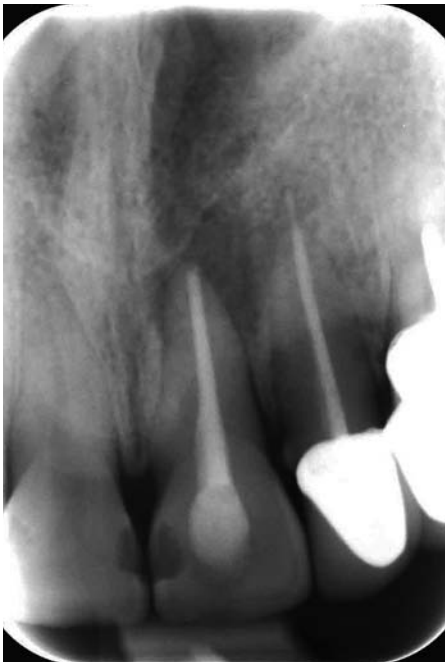

Figure 2: PA UL1 and UL2

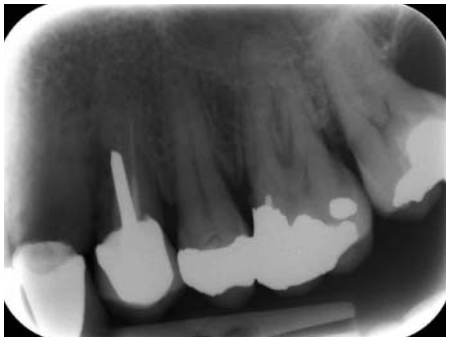

Figure 3: UL4 PA

Figure 4: Pre-op face

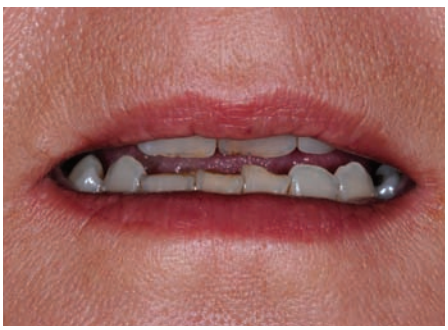

Figure 5: Pre-op at rest

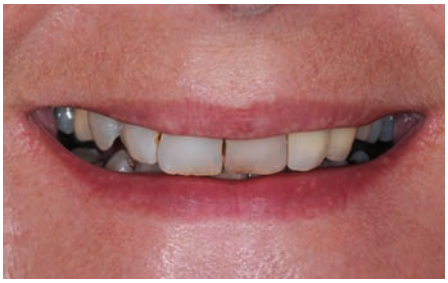

Figure 6: Pre-op smile

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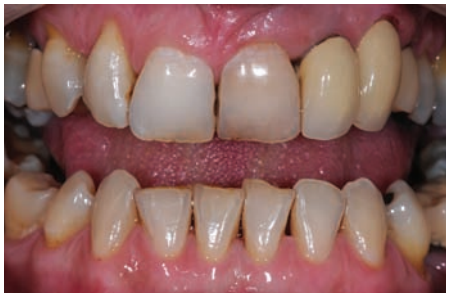

Figure 7: Pre-op retracted anterior

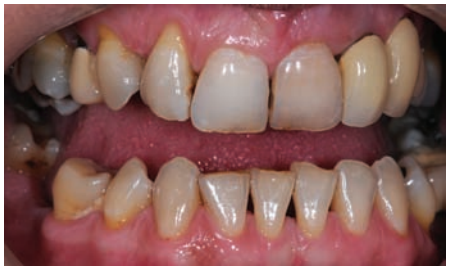

Figure 8: Pre-op RHS retracted

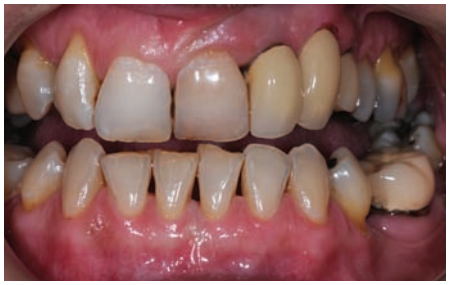

Figure 9: Pre-op LHS retracted

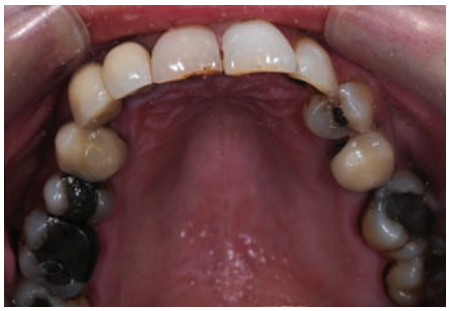

Figure 10: Pre-op occlusal

Figure 11: Face mock-ups

Table 1: Key findings from dental assessment

Feature	Observation	Comments/significance
Muscles	No tenderness	All OK
TMJ	No clinical signs or symptoms	All OK
Manipulation in to centric relation (CR)	Moderate to difficult	If the vertical dimension is to be changed, then it is important to deprogramme the muscles with a device such as an NTI appliance before the accurate CR record is taken
Maximum opening	39mm	Normal (40-50mm)
Movement of mandible sideways (measure at centre line)	Right side: 11mm Left side: 10mm	Normal (8-12mm)
No pain at TMJ in excursions	Yes	All OK
Occlusion	**Observation**	**Comments/significance**
Molar relationship	Right: unsure Left: class II	
Canine relationship	Right: unsure Left: class II	
Lateral excursion	Right side: UR2, UR4 Left side: UL4	Aim for canine guidance in the final result
Protrusive guidance	UR1, UR2, UL1 and UL2	Balanced protrusive contacts at four incisors is ideal
Non-working interferences	None evident	Important to avoid in the final result. Occlusal equilibration would be required if there were non-working interferences
Shimstock hold in centric occlusion (CO)	At UR4, UR6 and UL6	Excellent record to keep for all cases involving laboratory work
Evidence of grinding	No	No obvious wear anteriorly, except slightly at incisal edges of UR1 and UL1
Wear pattern	Clencher	Patient suggested that she clenches her teeth at times
Restorations	Some older restorations present. LL7 had extensive recurrent decay	LL7 extraction was advised
Periodontal	**Observation**	**Comments/significance**
Hygiene	Generally good (fairly motivated patient). Was not doing interproximal cleaning in the past	Appropriate hygienist treatment was required for ideal gum health and guidance was given for ideal homecare
Root canal history	**Observation**	**Comments/significance**
UL1	Root filling appeared satisfactory, but there was a large apical area (symptom free)	Apicectomy was carried out. There was extensive bone loss. A retrograde root filling was performed
UL2	Overextended root filling present	Apicectomy and retrograde root filling was also done for this tooth while UL1 was being treated
UR5	Slightly short root filling	Accepted the root filling
UL4	Perforation mesially, post present with no root filling. Poor long-term prognosis	Extraction was advised
Gap history	**Observation**	**Comments/significance**
LR6 and LL6	Extracted many years ago	

Treatment plan

It is important to always establish a healthy foundation before smile design is carried out. The following treatment was required in stage one:

- UL4 and LL7 extractions. A three-unit Luxatemp Star transitional bridge was created with UL3 and UL5 as retainers
- UR6 occlusal, UL6 mesio-occluso-palatal, and LL5 occlusal composite restorations
- Apicectomies at UL1 and UL2. A healing time of about three months was allowed before any further restorative treatment was done
- Elective root canal treatment for UL3 as minimal coronal tooth was present
- Everstick fibre post and composite cores for UR5, UL1, UL2 and UL3
- Lower teeth whitening and cosmetic contouring (making the lower incisal edges appear better)
- Smile makeover: all-porcelain crowns for UR5, UL1, UL2; porcelain veneers for UR4, UR2, UR1; and a three-unit fixed-fixed all porcelain bridge with UL3 and UL5 as retainers and UL4 as a pontic. The option of an implant was discussed. The ceramist technician used E.max (pressed ceramic) to do the case.

Smile design treatment

Initial records

Upper and lower preoperative silicone impressions were taken using Honigum putty and wash impression material (DMG). Accurate bite registration was recorded using O-bite material (right and left sectional bites) (DMG).
A facebow record (Denar system) was taken, and a 'stick bite' record was done. Mock-ups (using Luxaflow flowable B1 composite) were done to give the patient an idea of how the smile would look.

Digital caliper measurements to 0.01mm accuracy were taken of the front six teeth, as well as digital photographs and also an accurate upper alginate impression. From this information, the technician created accurate wax-ups. The other items required from the technician were:

- Putty/wash index of the wax-ups for making the temporary restorations (trial smile)

Table 2: Key findings from smile analysis

Cosmetic	Observation	Comments/significance
Patient concerns (upper teeth)	• Smaller teeth • Teeth not white	
Patient concerns (lower teeth)	• Would like whiter teeth • Uneven edges	
Nose	Satisfactory	
Facial profile (lateral view)	Normal	
Lips	Normal shape and fullness, and also symmetrical	
Teeth showing on smiling	Upper eight teeth	
Buccal fullness	Satisfactory. However, improved fullness would be required to UR1, UR2, UR3 and UL1	
Gingival display on smiling	None, ie low lip line	Not a gummy smile
Laser use	None	Therefore no laser work was required for the repositioning of any zenith position
At rest (tooth amount showing)	UR1: 2mm UL1: 1.5mm	It was decided to keep the incisal edge position the same as UR1, ie still show about 2mm in the at rest position
CEJ-CEJ measurement	12.97 (between UR1 and LR2)	Important measurement when assessing how much to open up vertical dimension (VD) – if this is being changed
Profile of central incisors	Deflective	Better aesthetic result will be achieved if teeth are reflective compared to deflective (ie, retroclined). We therefore wanted to bring out the incisal half of the central incisors with the porcelain restorations
Size of central incisors	UR1: 9.31mm wide, 10.27mm high UL1: 9.18mm wide, 11.34mm high	Important to understand the width-height ratio (ideally 8:10)
F and V sounds	On the wet part of lips	Ideal position on the vermillion border, ie in this case the edges were retroclined. A better cosmetic outcome would be achieved if the edges were brought forwards
J sound	3mm at mesiobuccal cusp of upper first molar	If there is more than 2mm between upper and lower teeth, when the patient keeps saying 'J', then a better prognosis would be achieved by opening up vertical dimension (VD) (if this is actually required)
Incisal edges of upper teeth parallel to interpupillary and commissural lines	No	
Midline	0.5-1.0mm to right side, and vertical	Ideally the centre line should be vertical (and not canted), and can be up to 2mm either side of the patient's facial midline
Pre-op shade	UR2 was 3L 1.5 UL1 was 4R 1.5 UL3 was 3L 2.5 (recorded using the Vita 3D Master shade guide – in natural daylight as well as in the treatment room)	It is important to carefully select the preoperative colours with the patient, and also get a team member's opinion too
Desired colour	1M1	Patient wanted a natural look

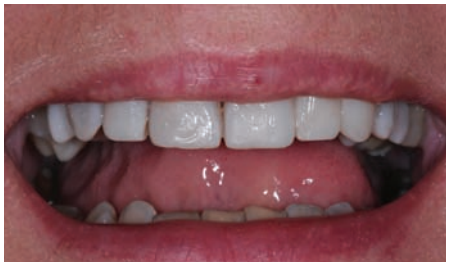

Figure 12: Smile mock-ups

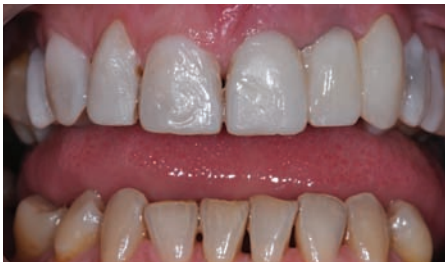

Figure 13: Mock-ups (retracted)

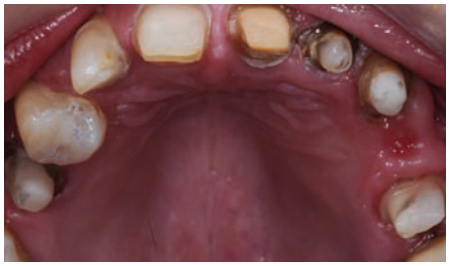

Figure 14: Preps

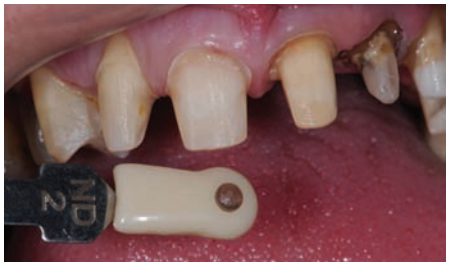

Figure 15: Stump shade

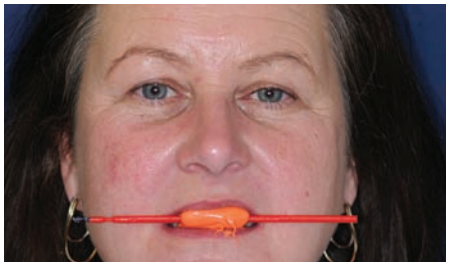

Figure 16: Stick bite

Figure 17: Trial smile face

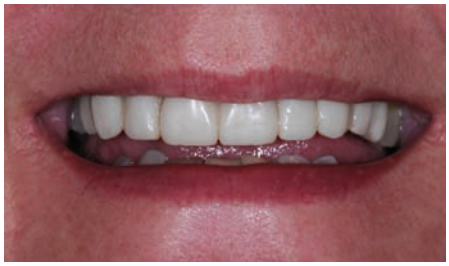

Figure 18: Trial smile (smile)

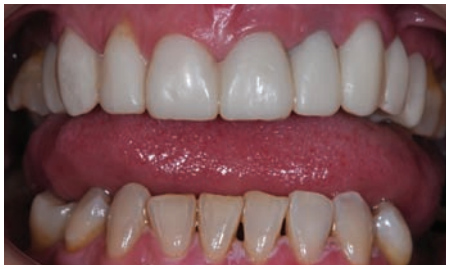

Figure 19: Trial smile retracted anterior

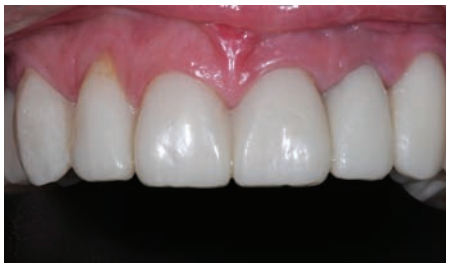

Figure 20: Trial smile close-up

- Putty preparation guide (from the wax-ups)
- Trial preparation model.

Figures 11-13 illustrate the mock-ups.

Preparation visit

This was a long visit (approximately four hours). The temporary bridge on the top left was removed, as well as a temporary crown at UR5. The margins were redefined perfectly. UR1, UR2 and UR4 were prepared for porcelain veneers. UR2 and UR4 had old palatal and occlusal fillings respectively – these were removed and carefully redone with composite.

The definitive bites were recorded in centric occlusion using O-bite (left and right sectional bites). A 'stick-bite' record was taken using O-bite and a benda brush (a digital photograph of the face was taken). A facebow record was also taken with the Denar jig and facebow using warm composition (Kerr) as a recording medium for the incisal edges of the upper teeth. The stump shades were recorded using the Ivoclar Natural Die Material shade guide (the colour recorded was ND2 for UL1 and ND3 for UR1 and close-up digital photographs were taken). The master impression was recorded using Honigum Heavy Body material dispensed from a Mixstar machine, Honigum Light Body material (DMG) and a Borderlock tray (Optident). The trial smile was then created using Luxatemp B1 shade (DMG). The patient was overwhelmed with the trial smile (Figures 14-16).

Review of trial smile

The patient was reviewed a week later. At this visit, it is important to review the aesthetic appearance, the occlusion, comfort, speech, and the shade.

The patient was really happy with the shape of her new temporary restorations. The lengths of the front six teeth were recorded to 0.01mm accuracy using a digital caliper.

One of the temporaries at UR4 had come off a few days earlier. The occlusion was carefully reassessed in the lateral excursion to the right side. The shade was recorded using the Vita 3D Master shade guide (1M1 was the main body colour).

The other specification was to have smooth surface texture and also polished gloss in the final restorations. Notes were made regarding the minor changes to the temporaries that were required:

- UR3 had to be made more vertical, and slightly less pointed
- UL2, UL3, UL4, and UL5 needed to be made a bit longer to have a more pleasing Curve of Spee and smile line
- UR1 and UL1 needed to be made more reflective, ie the incisal half of the labial surface on each tooth

Figure 21: Face

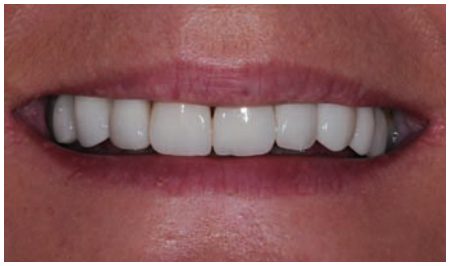

Figure 22: Smile

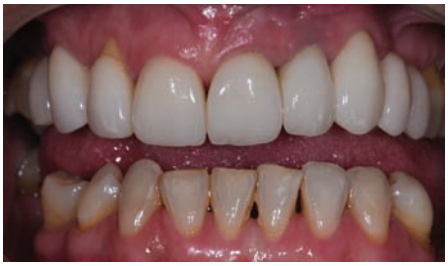

Figure 23: Retracted

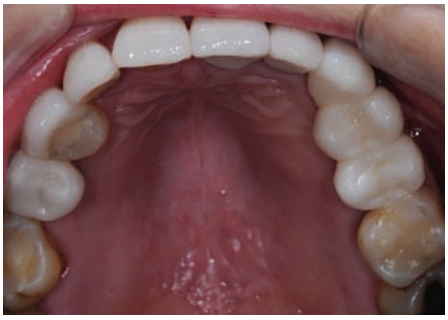

Figure 24: Occlusal

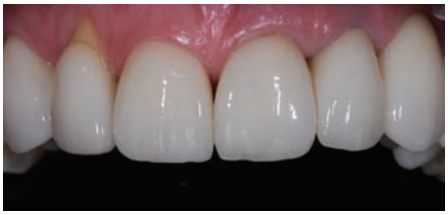

Figure 25: Close-up front

Figure 26: Makeover

had to be brought outwards slightly.

An accurate alginate impression was recorded of the trial smile, and a bite record of the trial smile against the lower teeth was also recorded. A full series of digital photographs was taken and saved on a CD-ROM for the technician (Figures 17-20).

Fitting appointment

Rubber dam (Roeko non latex) was applied and the laboratory made E.max (Ivoclar) all-porcelain restorations, which were fitted simultaneously using conventional bonding techniques. The materials used were Vitique cement (dual cure, transparent base and low viscosity catalyst) (DMG), and Excite (Ivoclar) bonding resin. My preferred acid etch gels are Ultra Etch (Optident) for the teeth, and hydrofluoric acid (Optident) to prepare the fitting surfaces of the porcelain crowns.

Review appointment

The patient was delighted with the new smile! The aesthetics were reviewed again. T-scan (computerised occlusion assessment software) was used to do a detailed occlusion review and refined occlusal adjustments as appropriate. It was ensured that all cervical margins were perfect and also that all contact areas were smooth and flossable. Final postoperative photographs were taken (Figures 21-26). PD

Acknowledgements

I would like to thank Rob Storrar of Amdecc Dental laboratory for his outstanding laboratory work. A long lasting and beautiful smile can only be created by achieving a high standard of dental care by the dentist, and using a world-class ceramist technician.

This clinical case has also been recorded by high definition video. The various clinical and laboratory stages can be viewed online at www.theacademybyash.co.uk/Ash-s-Gems/videos-of-a-clinical-case.html.