

Cosmetic Dentistry *is* Everyday Dentistry

Accreditation Case Type 2

(One or two indirect upper anterior restorations with natural teeth beside)

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Cosmetic dentistry has so much to offer and yet we need to listen to what our patient wants. Dr Richard Lee takes us through yet another everyday situation where a patient is quite clear about what they want. His description of the consent process and involvement of the patient in the decision making process in this Accreditation Case Type 2 was completed and written up pre-CQC and yet perfectly fulfils one of their 'outcomes'. More importantly his attention to detail and background knowledge and skill means he is able to deliver exactly what the patient wants.

Treatment provided

- Porcelain Veneers 11, 21
- Direct Composite 12, 41
- Vital Bleaching
- Soft Tissue Re-Contouring

Introduction

Few challenges are as great in aesthetic dentistry as the delivery of one or two indirect units at the front of the mouth. Communication is absolutely key if the dentist and technician are to produce a result that blends seamlessly into the surrounding natural dentition.

History

In this case, a 31-year-old female attended the practice seeking an aesthetic improvement to her front teeth. She felt that they were becoming darker in colour and were stained. She said she no longer smiled widely as this pulled her upper lip up, revealing the dark teeth.

Medically, she was in excellent health. Dental examination revealed minimal restorative work, extensive non-carious tooth surface loss affecting the labial surface of her upper central incisors (11, 21) and

superficial tooth fractures at 12 and 41. There was minor lower crowding present. Her periodontal condition was good with effective oral hygiene measures in place and her TMJs were healthy and classified as Piper stage 1.¹ Aesthetically the overall colour of the teeth was relatively dark and the upper central incisors were severely worn with exposed dentine. The gingival heights of 11, 21 demonstrated asymmetry. Radiographically, all teeth were judged to be vital and the periradicular tissues were intact.

The non-carious tooth surface loss affecting 11 and 21 appeared to be

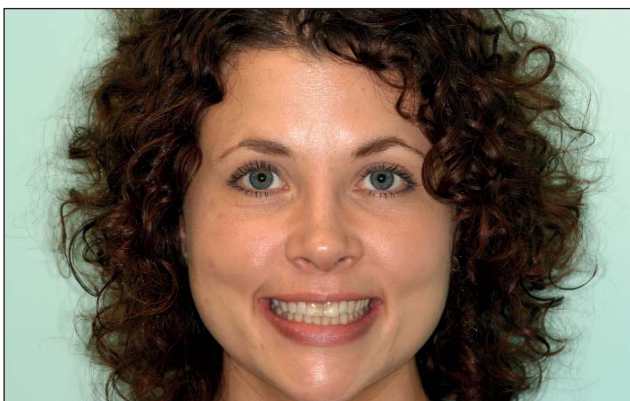


Figure 1: a-b – Full face: Before (left) and after (right) images of the case

Figure 2: a-f – Smile: *Before (left) and after (right) images of the case*



primarily erosive in origin. The labial, localised position of the lesions indicated that the causative factor was most likely dietary.

Questioning revealed that heavy consumption of fizzy drinks from a

wide bore bottle – the diameter of which was approximately the width of two central incisors – with the fluid being ‘drawn through the front teeth’ had occurred historically. The erosive nature of this carbonated cola drink had completely removed

the labial enamel in the cervical third of the tooth; the exposed dentine was now becoming stained and noticeable to the patient.

The presence of some horizontal grooving across the central incisors

Figure 3: a-f – Retracted: *Before (left) and after (right) images of the case*



would seem to indicate that there were some contributive abrasive habits present also. Advice and counselling regarding erosive and abrasive habits were given to the patient and the cause of her tooth surface loss explained.

A detailed discussion was held with the patient regarding her aesthetic expectations and the treatment options available. The treatment plan formulated in cooperation with the patient was to perform home whitening to lighten all of her teeth,

gingival reshaping of 11 to equalise the gingival heights, porcelain veneers to restore 11 and 21 and composite bonding to repair the fractures to 21 and 41. Direct veneers were discussed with the patient but these were rejected in favour of the

longevity and superior aesthetics of porcelain. Orthodontic treatment to reduce the amount of rotation of the lower central incisors was rejected by the patient.

Treatment

Probing depths around 11 showed an excess of gingival tissue and we were able to level the gingival zeniths using electro-surgery without the need for any osseous reshaping.² Impressions were taken along with a full set of clinical photos and these were sent to the laboratory to create our prescribed diagnostic wax-up, along with custom whitening trays.

Whitening

The patient performed home whitening for two weeks using a hydrogen peroxide product; the shade was noted as ranging from B2 to B1 according to the Vita shade guide. Following the home whitening, a break of two weeks was allowed. Bleaching reduces the bond strength of resin-based materials to enamel³ and is probably related to the presence of residual oxygen in the teeth. This short break meant we would reduce the risk of any adhesive problems and also allowed the colour to stabilise within the tooth.

Composite bonding

Following the whitening, teeth 12 and 41 were restored with composite resin. The system I use is based on the natural layering concept, which works with dentine and enamel masses whose optical properties are comparable with those of the original tissue. The dentine shade was selected by examining the tooth in the cervical area. This is where the

enamel is thinnest and contributes least to the overall shade of the tooth. The enamel shade was selected by examining the incisal edge and interproximal region – again, this is where the enamel is at its most abundant and can be assessed without too much interference from the dentine body.

These shade tabs can then be ‘nested’ into each other to give the overall shade and held next to the tooth to confirm the desired shade can be created.

Tooth 41 was isolated with rubber dam and a bevel was created to increase the amount of enamel available to bond to. Following etching, a dentine-bonding agent was applied. The selected dentine shade was used to replace the missing dentinal body portion of the tooth and light cured.

The enamel shade was then applied in a thin layer to replace the missing enamel tissue. Care was taken to ensure that these two resins were applied in the correct three dimensional spatial arrangement so that heavy shaping or occlusal adjustment would not be required. If this were the case the optical effect of the polychromatic layering technique might be lost.

Tooth 12 had very little tooth structure missing and so, following etching and bonding, only the enamel resin was used. The occlusion was checked and both teeth were finished and polished using a combination of silicone points and diamond-polishing pastes.

Veneers

A large amount of tooth tissue had been lost from teeth 11 and 21 and so the restorations were to be mainly additive to restore the tooth volume.

A silicone index of the additive wax-up was made; this was to be used as a reference guide for subsequent tooth reduction. As we were planning to increase the tooth volume it was desirable for the patient to approve the planned changes before any tooth reduction took place.

Magne⁴ has advocated a technique whereby a diagnostic matrix is fabricated from the diagnostic wax up, allowing the patient and the clinician to visualise the end result in the mouth before any tooth reduction takes place. This can then be used as a preparation platform to ensure the most conservative amount of tooth reduction is performed.

Prior to local anaesthetic being administered, the teeth were spot etched with 37% phosphoric acid for 20 seconds, a putty matrix fabricated from the diagnostic wax up was loaded with a self-curing bis-acryl composite provisional material and placed over the teeth and allowed to set.

The putty matrix was removed and the new increased tooth volume could now be assessed for phonetics, function and aesthetics, as the tissues had not been anaesthetised and full lip mobility was possible. Following approval by the patient local anaesthetic was administered and tooth preparation could begin.

Figure 4: a-f – Anterior: *Before (left) and after (right) images of the case*

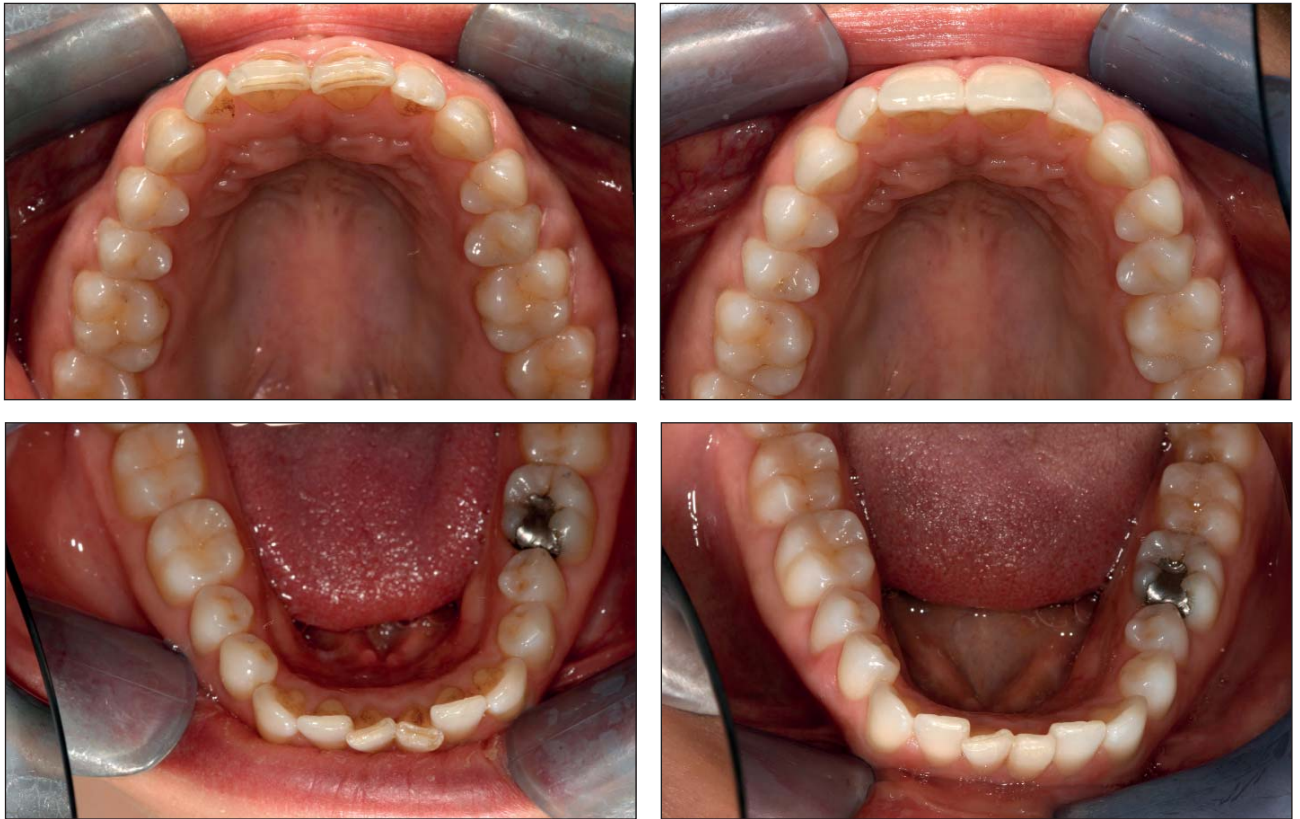


Appropriate depth cuts were made incisally and facially through the diagnostic matrix and these were marked with pencil lines to allow easier identification. The diagnostic matrix and a minimal amount of underlying enamel were then cut

back until the pencil lines were removed. This preparation technique allows the preservation of the maximum amount of enamel as well as facilitating accurate and swift tooth preparation. After the preparations had been refined the

amount of tooth reduction was checked using putty matrices that had been manufactured from the approved diagnostic wax up. Although there was some pre-existing dentinal exposure due to the severity of the acid erosion the

Figure 5: a-d – Upper and lower occlusal: *Before (left) and after (right) images of the case*



majority of the preparation remained in enamel.

Upper and lower impressions using an addition-cured silicone were taken along with photographs of the appropriate shade tab next to the prepared teeth. All of this, together with an impression of the approved diagnostic matrix, was sent to the dental laboratory to begin fabrication of the restorations. The shade for the veneers had been selected and the characteristics mapped by the ceramist prior to tooth reduction and desiccation.

The veneers were returned one week later unglazed. Following local anaesthetic administration the provisional restorations were removed and the tooth surfaces cleansed with pumice. The restorations were tried in to assess

fit and overall colour. The ceramist then carried out final custom finishing and glazing at the same appointment. The teeth were isolated with rubber dam and the restorations bonded in place using a transparent veneer bonding resin. Care was taken to remove any excess resin from the margins and interproximally.

The occlusion was checked and refined to allow equal multiple excursive pathways.

The patient returned one week later to check the occlusion and take the final clinical photographs. She was delighted with the final result; a combination of minimally invasive veneers, composite bonding and whitening had transformed her appearance and allowed her to smile fully once again.

References

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3. Unlu N, Cobankara FK, Ozer F. Effect of elapsed time following bleaching on the shear bond strength of composite resin to enamel. *J Biomed Mater Res B Appl Biomater* 2008 **84**: 363-368.
4. Magne P, Belser U. Novel porcelain laminate preparation approach driven by a diagnostic mock-up. *J Esthet Restor Dent* 2004 **16**: 7-18.