Direct composite resin veneers combined with minimal-invasive direct composite restorations

Dr. Richard Coates

Treatment list
- Routine hygiene visit
- Dual arch tooth whitening
- Direct bonded composite veneers and restorations

Restorative material
- Ecosite Elements (DMG)

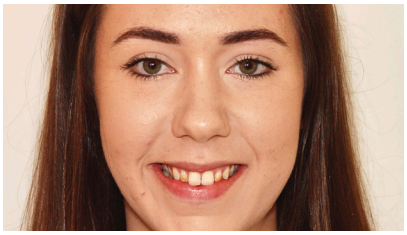


Fig. 1: Pre-op childlike smile with spacing and dominant central incisors.

Introduction
This young lady presented to us requesting her options for removing brown hypoplastic areas on her lateral incisors and also closing her spaces. She said she had always hated her smile as her back teeth didn't show when she smiled, and her front central teeth seemed too big compared to all of her other teeth. Our patient is 25-year-old but the spacing and morphology of her teeth make her smile appear more childlike (Fig. 1). She requested minimally invasive options in order to lighten her anterior teeth and to improve her smile. She showed no interest in orthodontic movement of teeth and I felt that this would not address morphology and ideal smile proportions for her smile.

Fig. 2: Lateral incisors only.

Planning of smile design
I felt that direct composite resin veneers (Terry DA. (2004)) in combination with tooth whitening could possibly give an aesthetically pleasing result. Patient did not want orthodontics or a porcelain option as she didn't wish to have her teeth prepared.
The options for our patient depending upon budget and wants were as follows:
1. Whiten teeth.

2. Restore lateral incisors only to give a more appropriate shape/size and removal of hypoplastic staining (Fig. 2).

3. In addition to restoring laterals, also close diastema upper central incisors and correct incisal level with some incisal edge bonding/minimally invasive (MI) restorations (Fig. 3).

Fig. 3: MI restorations UL1 UR1.

4. Lengthen canine teeth and improve morphology in addition to step 3 (Fig. 4).

5. In addition to step 4 widen buccal corridors by adding buccal direct composite veneers to UR45 UL4 which were palatally in standing (Fig. 5).

Fig. 4: Addition of canine veneers.

A direct free hand composite intraoral mock-up was carried out (Marus R (2006)) for each option and clinical diagnostic photographs were taken for each option. The patient was then shown the options with results we could achieve for each. Our patient opted for the restoration of 9 teeth with tooth whitening.
Using the tool of direct mock-ups directly in surgery allowed me to fabricate an incisal edge lap silicone stent (Fig. 6) which would be used to guide the definitive restorations. The mock-up was presented to the patient (Fig. 7).
A highly polishable high quality multi-layer composite resin was required with exceptional handling to achieve the patient's desires. I therefore chose Ecosite Elements (DMG).

Fig. 5: Widening of buccal corridor R side.

The pre whitening colour/shade of the patient's teeth was assessed in natural light to be primarily A2/B2 Vita (Fig. 8). After tooth whitening shade was found to be B1/040 bleaching shade (Fig. 9).

Prior to placement of composite resins, shade assessment is carried out by placing custom shade tabs on teeth to be matched (These shade tabs are fabricated using Ecosite Elements

composite in the surgery to give the most realistic colour representation for final result). This is carried out by placement of dentine shade initially (Fig. 10) and a thin layer of enamel shade over the top (Fig. 11) until a match is found.

Treatment Plan Summary

1. Full examination, medical, dental and social history recorded, along with patient expectations of treatment. Direct composite mock-up agreed with colour analysis. Incisal edge lap silicone stent fabricated. Limitations explained and patient consent and financial agreement reached.

2. Hygiene visit to ensure periodontal health.

3. At home tooth whitening with custom trays and 10% carbamide peroxide (Fig. 9).

4. Shade taking to be completed 2 weeks after tooth whitening (Wilson. D (2009)) using custom shade tabs and small pieces of composite placed on teeth to confirm enamel and dentine shades (Fig. 11).

5. Minimal preparation and sand blasting of UL1234 UR12345 then placement of bonded direct Ecosite Elements composite resin MI restorations on central incisors and direct composite resin veneers UL234 UR2345 utilising stent fabricated from mock-up. Enamel/dentine composite shades B1/EB and slight Ecosite Elements Highlight shade WHITE to mimic inclusions which exist in central incisors, the patient liked these and as such we wanted to copy these (Dietschi. D (2008)).

6. Refinement of primary and secondary morphology and final finishing and polishing of composite resin with addition tertiary morphology.

7. Review 1 week later.

Operative Procedure and Completion of treatment

Treatment visits:

1. Minimal periodontal scaling.

2./3. Fit of whitening trays and completion of whitening.

4. Placement of MI composites UL1 UR1 + Direct Composite Veneers UR2345 UL234. Shade taking was completed using custom shade tabs and small pieces of composite placed on teeth to confirm enamel and dentine shades (Figure 10/11).
Articaine 4% (1:100,000 Epinephrine) local infiltration given, PTFE tape on adjacent teeth and 00 Ultrapak (OPTIDENT) retraction cord on each tooth individually. Incisal edge silicone stent made from mock-up utilised as palatal matrix for palatal and incisal enamel shade initial build ups. UR1 UL1 teeth initially completed in order to dictate correct centre line and incisal level (Devoto et al (2010)).
The surfaces of the teeth were abraded with a coarse polishing disc and stains removed. The area to be bonded was sandblasted (Prepstart-DANVILLE). A total etch technique (37% phosphoric acid by SDI) was undertaken then rinsed and part dried, and Adhese Universal bonding agent (IVOCLAR) applied, dried and cured. Utilising the silicone stent Ecosite Elements Layer shade EB was placed to give incisal/palatal enamel shell layer and form proximal lobes. Ecosite Elements Pure shade B1 was used to form dentine body and mamelons (Fahl N Jr (2006)), this provides a more opaque dentine layer as we would find in nature. The dentine shade was brought onto existing enamel to hide transition in junction at neck of tooth and to give a higher chroma in this area. Ecosite Elements Highlight shade WHITE was placed into incisal 1/3 area using a number 8 endodontic file, copying white inclusions already present in central incisors. Final facial enamel layer of Ecosite Elements Layer shade EB was then placed and cured in one increment (Dietschi, D (2001)). Ti Fine composite instruments (COSMEDENT) were used for manipulation of composite under 4.3x magnification (Zeiss eyemag pro S). These composite layers were placed freehand without the use of a matrix, in order to provide the correct proximal lobe morphology and emergence

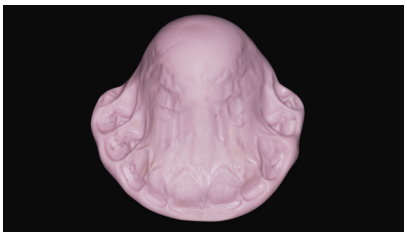


Fig. 6: Silicone stent from mock-up.

Fig. 7: Mock-up presentation.

Fig. 8: Pre bleaching.

Fig. 9: Post bleaching.

Fig. 10: B1 Dentine shade.

Fig. 11: EB Enamel shade.

profile. Palatal surface was shaped and finished with Jet Carbide egg and bullet jet finishing burs (Kerr). The same process was completed on remaining teeth using the same stent with the appropriate changes in number of mamelons and morphology to correspond to tooth being restored.
Photographs were taken in order to study Colour, Primary and secondary tooth morphology between treatment visit and refinement visit.

5. Follow up and refinement/finishing/polishing to all veneers and restorations was now carried out.
It was decided on review of photos that some minor adjustments to contour was required in order to improve smile design.
Secondary morphology was then developed in order to achieve correct line angles (Fig. 12) utilising long tapered diamond burs (G850-314-012-10ML, G856-314-018-8-F) (Fig. 13) and flexible soflex discs (Fig. 14), guided with the use of pencil drawn on the teeth. Each of the teeth were contoured in order to mimic their contralateral corresponding mirror image. Tertiary morphology was then created with coarse diamonds at 5000 RPM (G850-314-012-10ML) (Fig. 15) and a long thin flame diamond (G889-314-0009-3.5-F) (Fig. 16) and polishing was begun using green and pink polishing flexi cups and points (COSMEDENT) (Fig. 17), final lustre created using Optishine brushes (Kerr) (Fig. 18), goats hair brushes for perikymata grooves (Fig. 19) and felt discs (Micerium enamel plus composite finishing kit) (Fig. 20) and aluminium oxide paste (Shiny C Optident) (Peyton JH (2004)). Margins at gingival level and interstitially were refined using No 12 scalpel blades and polishing fine flamed diamonds. Polishing strips Flexidiamond and Flexistrips (COSMEDENT) were used interstitially with COMPOSHINE plus shapeguard polishers RA (COLTENE) (Fig. 21) run at 4000 RPM. Photographs were taken.
Review one week later to refine/polish margins, check aesthetics, and take photographs (see section “Before and after clinical photos”).

Reflection
Our patient during the consent procedure was very clear on her desire for the most minimal but effective approach to treatment. Due to acceptance of the look of the free hand mock-up I felt a reasonable success could be achieved. The lack of symmetry in the anterior segment and also the generalised diastemata brought some significant challenges in achieving symmetry in the smile. Obviously, we need to offer the best technical product we can, mindful of every technical advantage we can find for our patients to achieve their restorative and aesthetic goals. Ecosite Elements is a nano-hybrid composite which provides us with long lasting polish whilst conveying strength and wear resistance to our restorations. In this case the patient said she would be happy with a result similar to that of the mock-up. The change in appearance was not only accepted by the patient but she could not believe how such a minimally invasive procedure could change her appearance so dramatically. This goes to emphasize the importance of managing patient expectations utilising a mock-up.


Fig. 12: Pencil proximal line angles and mamelon grooves.


Fig. 13: Secondary morphology developed.


Fig. 14: Secondary morphology smoothed.

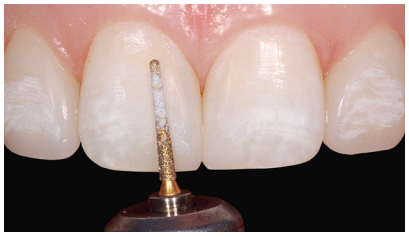


Fig. 15: Perikymata developed at 4000rpm.


Fig. 16: Mamelon groove vertical lines giving tertiary texture.


Fig. 17: Use of rubber cups to soften tertiary anatomy.

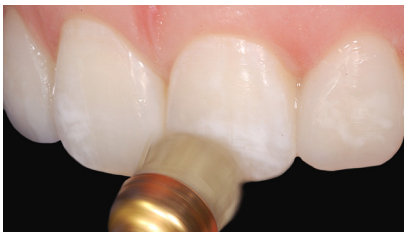


Fig. 18: Optishine brush.

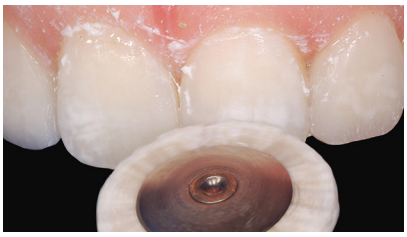


Fig. 19: Goats hair brush with shiny C paste.

Fig. 20: Felt disc.

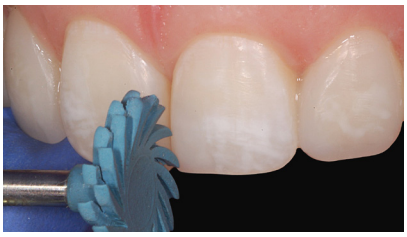
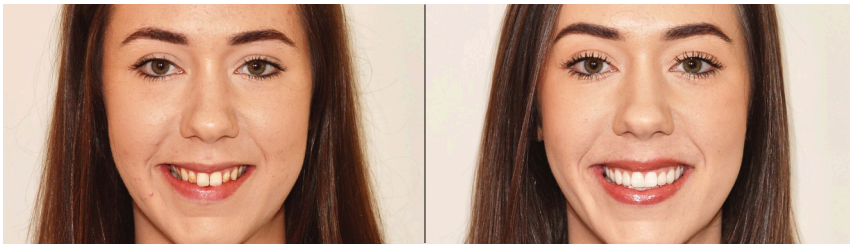


Fig. 21: Composhine rubber for interproximal space.

Before and After Clinical Photos



References:

1. Dietschi, D. (2008). „Optimising aesthetics and facilitating clinical application of free-hand bonding using the 'natural layering concept'." BDJ 204(4): 181.
2. Dietschi, D. (2001). „Layering Concepts in Anterior Composite restorations." J Adhes Dent 3(1): 71-80.
3. Devoto, Walter & Saracinelli, Monaldo & Manauta, Jordi. (2010). Composite in everyday practice; How to choose the right material and simplify application techniques in the anterior teeth. The European journal of esthetic dentistry: 5 102-24.
4. Marus R. Treatment planning and smile design using composite resin. Pract Proced Aesthet Dent. 2006;18(4): 235-241.
5. Fahl N Jr. A polychromatic composite layering approach for solving a complex class IV/direct veneer-diastema combination: part I. Pract Proced Aesthet Dent. 2006;18(10): 641-645.
6. Cosmetic mock-ups. In: Reality. 15th ed. Houston, TX: Reality Publishing Co, 2001: 429-432
7. Terry DA. Contemporary composite resins. In: Terry DA. Natural Aesthetics With Composite Resin. Mahwah, NJ: Montage Media Corporation, 2004: 20-37.
8. Peyton JH. Finishing and polishing techniques: direct composite resin restorations. Pract Proced Aesthet Dent. 2004 May; 16(4): 293-8. jCD
9. Wilson, D., Xu, C., Hong, L. et al. Effects of different preparation procedures during tooth whitening on enamel bonding. J Mater Sci: Mater Med 20, 1001 (2009).

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