Eight indirect restorations to improve shape, colour and proportion

Accreditation Case Type 1

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Synopsis of treatment provided

Restoration of eight upper anterior teeth with six veneers placed on 11, 14, 15, and 21, 24, 25; and two, ¾ crowns on 13 and 23. Composites that were placed previously as a temporary measure had started to discolour. At that time the patient was not suitable for long term solutions in view of her age but now, as a young adult at university, is concerned about the aesthetics. Laser gum re-contouring was provided at 14, 15 and 25.

Introduction and chief complaint

The patient had fractured one of the old composite restorations, others had discoloured and she was conscious of the size and shape of the anterior teeth. She had both upper lateral incisors congenitally missing and had orthodontics for space closure; the canines were repositioned in the laterals' positions and other teeth moved into more favourable positions. She also wanted whiter teeth with natural morphology.

Medical and dental history

The patient was a healthy 20 year old female with no medical complications or contraindications.She has both upper lateral incisors congenitally missing and about five years previously had had orthodontic treatment to align the canines into the space of the laterals as there was insufficient space to make room for the natural position of the laterals.

Following orthodontic treatment she had composite build ups on the canines to mimic the laterals and first premolars to simulate canines respectively. This was a temporary measure as, in view of her age at the time a long term solution was not considered appropriate.

The patient had been a regular annual attendee as a full time student at university. Her caries rate was low, with a few small composite restorations which seemed to wearing reasonably. Oral hygiene was good and no periodontal involvement evident. Radiographs had been taken routinely and been monitored for position of the third molars. Recent bitewings and periapical radiographs confirmed the absence of any pathology, with bone levels normal and consistent with clinically healthy soft tissues.

On clinical examination the anterior composite build ups showed signs of discolouration and wear but no caries. The patient was concerned about appearance and wanted her teeth whiter and more natural looking with a better smile. Occlusal status was reasonable considering

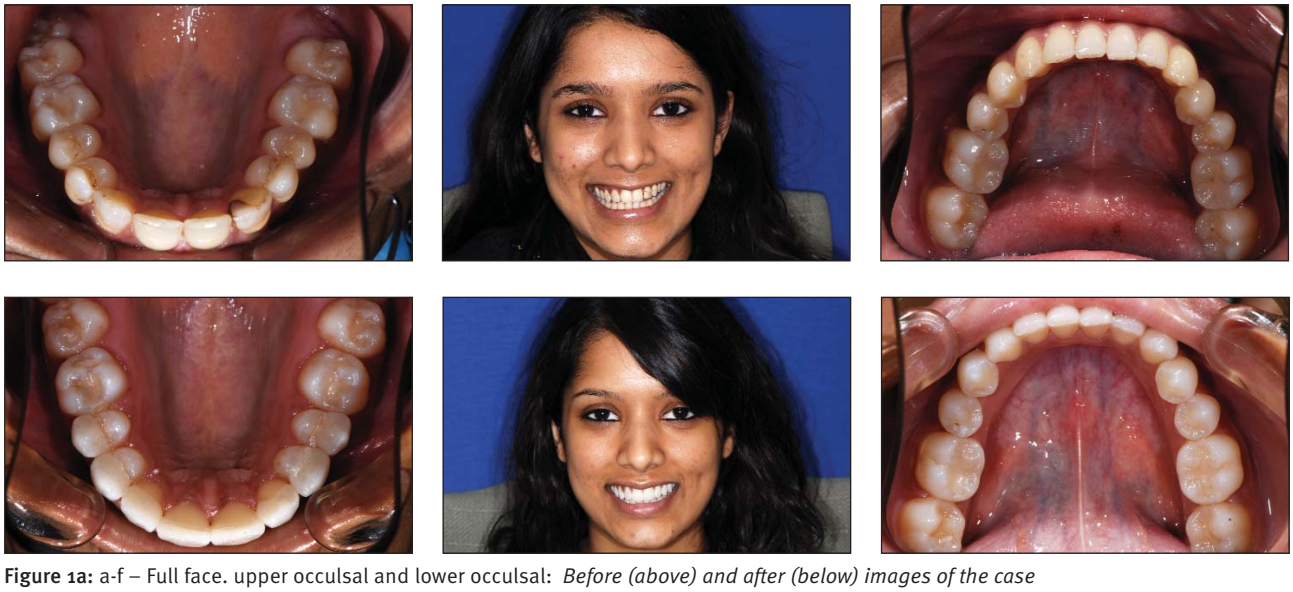

Figure 1a: a-f – Full face. upper occulsal and lower occulsal: *Before (above) and after (below) images of the case*

Figure 1b: a-f – Smile: *Before (above) and after (below) images of the case*

lack of normal canine guidance however this had been facilitated by group function on the premolars. Overall, the patient had good oral health.

Diagnosis and Treatment plan and options

Smile evaluation indicated tooth size and shape discrepancies with more gingival tissue visible on the right than the left, spacing present between the anteriors, height to width ratios not within normal levels and appearance. There appeared to be a slight facial asymmetry but dental midlines were acceptable, with an occlusal cant.

Treatment options:

- Replacement of composites as provided previously since better materials are available today
- As above with involvement of the second premolars and soft tissue with/without bone recontuoring
- Provision of eight crowns and gingival recontouring with soft and hard tissue involvement
- Provision of eight restorations (bonded porcelain veneers and three quarter crowns)[2,3] with minimally invasive procedures and recountouring of soft and hard tissues.

Since the patient is now of a suitable age a long term solution was considered with minimally invasive procedures as restorations were needed mainly due to missing tooth structure[1] i.e. the last of the above options.

Treatment sequence and clinical stages

- Full clinical assessment with radiographs and digital images
- Several impressions for two sets of diagnostic mounted casts, whitening trays
- Face bow and CRB bite registrations.
- A diagnostic wax up with templates to be fabricated after case presentation to the patient and her mother, who wanted to be involved at all stages. This was encouraged as it would aid the patient's decision and acceptance of treatment procedures.

The case presentation was divided into:

- Diagnostic cast consultation and digital simulation and fabrication of whitening trays
- Diagnostic wax up and template fabrication for patients physical evaluation in her own mouth without any preparation of tooth structure or commitment to treatment.

The treatment sequences were:

- Consent forms for general and specific laser use, including publication and presentation permissions

- At home whitening procedure commences
- Template fabrication as temporaries
- Modification of the above as required and start gingival tissue re-contouring
- Preps for veneers and shade selection, confirmation etc.
- Try in at bake stage and patient approval etc.
- Cementation and finishing of restorations
- Follow up and post treatment digital images etc.

Once the patient had understood and accepted the protocols of the procedures, all necessary consent forms were signed and treatment commenced.

Laser Curettage[4-6]

A routine oral hygiene phase maintenance was established as a base line requirement before any treatment could be contemplated. A soft tissue diode wave length of 940nm was used in conjunction with sonic scaler and standard HP and prophylaxis paste. It was imperative that a week or so was allowed before the whitening procedure to avoid any sensitivity problems.

Whitening[7-9]

A tray system was used and favoured using a 9% hydrogen peroxide buffered solution over a four week period, as the patient was a student and coming up for final exams. On completion of whitening a further two week period was allowed for normalisation.[10] A desensitisation pack was also included in her whitening kit.

Tooth preparations

To aid in preparations of these teeth, all stents ,lab wax up, prep guide and other matrices were on hand. At the start of finalisation stage, due to composites already bonded it was decided to fabricate temps directly on them from the stents and modify to our and the patient's satisfaction, then take an impression and further fabricate a prep guide etc, which was done to conserve tooth structure.

Veneers were prepared on all teeth except the canines which had modified ¾ crowns. Shades were taken using a visual light based unit and software based system[11,12] with mapping possible.

Regular rubber based impressions were taken, with face bow registration at prepped level which was also sent to the lab, along with digital images. The patient also attended the lab for shade evaluations as well. Temporaries were constructed with a composite based syringe material and fitted with tooth coloured temporary cement and spot etched on veneers.

Tissue re-contouring was performed with the aid of a hard and soft tissue laser at 14, 15 and 25 using specific laser protocols and the biological width[13] principles, at the prep

Figure 1c: a-f – Retracted: *Before (above) and after (below) images of the case*

Figure 1d: a-f – *Before (above) and after (below) images of the case*

appointment.[14] Teeth 14 and 25 needed very little modification of the cervical margins which was all soft tissue based, the 15 needed some bone removal but this was kept to a minimal, taking into account the patient's age and expected normal gingival changes.

Veneer fabrication

The veneers and crowns were fabricated in Pressed Authentic ceramic ingots built and layered with authentic enamel and effect porcelains.

Try in stage

The next appointment was for Bake try in of the restorations using tack gel. Any alterations and modifications were sent to the lab along with shade confirmation.

Cementation

The restorations were bonded to enamel and dentine (WET) using current etch and bonding protocols. The patient was anaesthetised with infiltrated local anaesthetic (Septnest 4%) the abutment fitting surface was also hard tissue laser treated at very low powers to enhance bonding and smear layer removal[15-17] (the fitting surface margins were not laser treated to avoid any discrepancies in fit or sealing of restorations). A dual cured resin cement was used after a try paste stage and approval.

All polishing and occlusal adjustments were checked and performed after fully cured cementation procedures and the patient was able to come back after few hours for final finishing and polishing. Initial digital images were taken and an impression in alginate was taken to provide the patient with an instant soft mouthguard to protect the restorations. A follow up appointment was arranged after one week for a review and for final digital images.

Armamentarium

- Nikon D200 with Macro and RICI flash system
- Various cheek and lip retractors and mirrors
- Digital x-ray system – Dexis
- Laser systems – hard and soft tissue lasers
- Biolase MD hard and soft tissue lasers
- Laser Smile 810 Diode
- Ezlase 940 Diode
- LaserSmile bleaching H/P + Modifications
- Loops 4 8 magnification surgical microscope
- LED curing light.

Instruments:

- Standard mirrors, tweezers, probes etc.
- Composite placement instrument from Coltene
- Perio probes, various colour coded and measuring tips.
- Miller forceps and various articulating papers (colours, sizes and thickness)
- Shimstock foil

Composite material:

- Enamel Plus System Enamel Plus Shiny polishing system.
- Bonding System: Tenure A+B, self-curing systems.
- Standard rubber dam and accessories. ETC
- Denar Slidematic
- Denar Semi-adjustable Articulator
- X-Rite Shaderite device
- Luxa Bite
- Symmetry- horizontal bite recording device
- Pumice
- Surface anaesthetic gel Tac 20
- Local anaesthetic (Lignocaine 2% with Adrenaline,Septonest 4% articaine 1:100 , 1:200)
- Air-rotor handpiece
- Contra angle handpiece
- Sonic scaler
- Front-surface reflecting dental mirror
- Silicone impression material
- Rimlok metal impression trays
- Expasyl gingival retraction gel
- Bis-acryl provisional crown material
- Unfilled resin
- Luxatemp glaze
- Silane Coupling Agent
- Light-safe Box
- Benda brushes
- Disposable plastic Dappens dishes
- Peroxyl H2O2 1.5% mouthwash
- Corsodyl mouth wash
- 35% phosphoric acid etch gel
- Flowable composite resin
- Luxatemp
- Carbide bladed finishing instruments
- Soflex ET contouring and polishing Discs
- Ultafine Rotary diamond burs
- Silicone Porcelain Polishing Kit
- Diamond Polishing Paste
- Rubber polishing cups for contra angle handpiece.
- Serrated Saw
- Epitex finishing strips
- Dental floss

Conclusion

The patient returned a week later with a bright smile and did not report any complications from the treatment or any discomfort and with not being numb could smile better. The patient was very happy with the result and so were we as a team, with one of our new team members commenting "I want a smile like that!"

This minimally invasive treatment will last her for years and she still has the option of more radical treatment should she need it in the future.

Acknowledgement

Thanks to Tony Knight.

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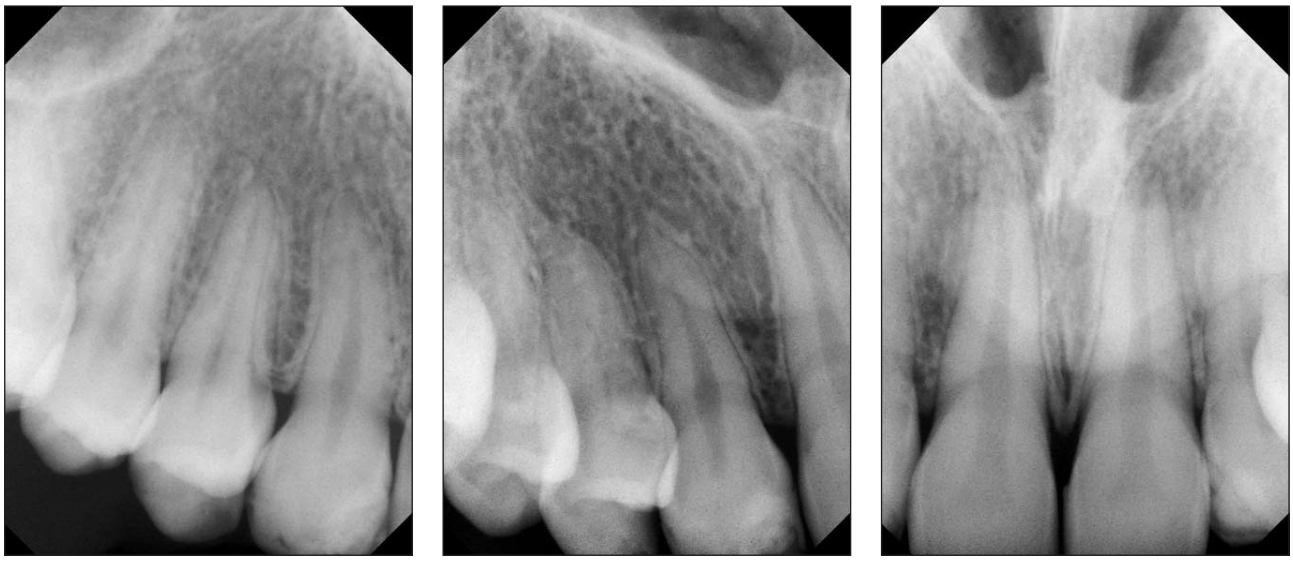

Figure 2a: a-c – Associated radiographs

Figure 2b: a-d – Associated radiographs

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