Composite bonding and injection moulding technique

Janine Sohota present a two-hour smile makeover case study.

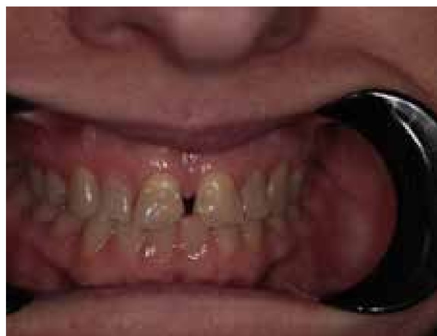


Fig 1.

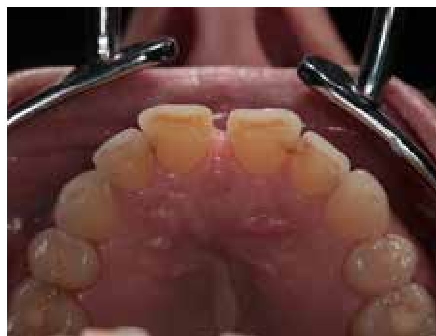


Fig 2b.

Fig 2a.

Fig 3.

Day to day in general practice, we as clinicians are used to seeing our regular patients over a number of years. Restorative and preventative treatments along with examinations form part of a regular dental routine, but do you ever stop and take the time to ask if these patients are happy with their smiles?

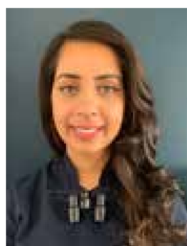
The reality is many people are dissatisfied with their smile. Often patients are unaware of the services that may be available at their own dental practices, instead they look further afield with travel abroad becoming a popular option.

In the last five to 10 years, however, there has been a huge rise in UK cosmetic dentistry and it's showing no signs of slowing down.

Patients are now wanting more than just routine dental care; there is a huge emphasis on aesthetics for both interpersonal relationships and self-esteem. This case study relates to the boom in a relatively new treatment, composite bonding. An alternative to veneers/crowns (in certain cases), this treatment has become extremely popular simply due to the reduced cost and the speed and ease of treatment. Patients can walk into the surgery as themselves and then leave a few hours later as the 2.0 version with no downtime.

Patients with severe wear are a prime example of this. Where previously they would suffer with deteriorating dentition, now there is another option for treating these seemingly overwhelmingly complex cases in safe and predictable fashion.

It is worth mentioning that each patient case is different and careful planning is needed before embarking on a course of treatment.



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Composite bonding: clinical indications

- Replacing a smile full of mismatched/patched up existing composites
- Masking mottled/discoloured enamel (fluorosis, hypoplasia, tetracycline staining for example)
- Closure of spaces, correction of minor misalignment, correction of peg laterals/retained deciduous teeth
- Upon completion of orthodontic treatment to correct symmetry/proportions
- Restoration of the worn dentition

Bonding can be desirable for a multitude of reasons. Some patients may request a subtle and natural improvement. However, others may be on the other side of the spectrum requesting extra bleach white and a fuller, bigger smile.

When dealing with a smile makeover it is vital to consider all options best suited to each patient. No matter how much a patient may have their heart set on composite bonding, they may have to accept the facts given to them by their dentist if it is deemed more appropriate to have indirect restorations, or none at all.

Case study

My patient presented as a new patient to me. She was self-conscious of her severely worn dentition and also had been unhappy with the central diastema for many years. ➲

Fig 4.

Fig 5a.

Fig 5b.

Previously she had never been given any restorative options and had simply accepted the decline in her dentition. Bruxism and toothbrush abrasion were diagnosed and attributed to the decline in tooth structure.

Initially we had discussed possibly placing ceramic crowns on the two centrals and then restoring the laterals via composite veneers. The other option I suggested would be to try a more conservative approach, six composite veneers. After discussion, the latter option seemed more appealing to the patient both in terms of cost and the overall procedure itself as the patient was nervous of invasive dental treatment.

Aims of treatment:

- Address patient's primary aesthetic complaint, restore lengths and close diastema
- Restore anterior teeth and improve long term fracture resistance/chipping risk
- Increasing vertical dimensions of occlusion (VDO) so as to reduce the incisal guidance angle therefore creating a more favourable biomechanical situation thus reducing destructive non-axial forces
- Provide a natural, aesthetic smile
- Conserve tooth tissue
- Provide a treatment that was affordable and minimises dental phobia without the need for anaesthetic/drilling

Fig 6.

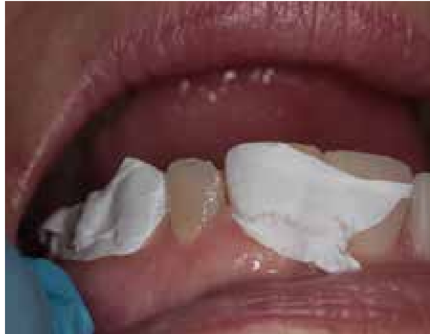
Fig 7.

Fig 8.

Fig 9.

Methodology

Clinical photos and alginate impressions were sent to the laboratory for an additive wax up. I specifically requested that the anteriors were restored so as to improve the shape/length/symmetry and proportions of the upper 3-3 whilst closing the diastema.

From the wax up a stent was fabricated using GC Exaclear. Using Tempsmart DC G-aenial (shade A1) I was able to try the proposed wax up directly in situ for a trial smile thus allowing the patient to see first-hand what her new smile would look like.

The patient was delighted with the result and we were now ready to book the bonding appointment. A consent form was given to the patient explaining the procedure in full, the general advantages of composite veneers and the limitations when compared with porcelain veneers.

The patient was informed of the need for a lifelong occlusal splint to wear overnight to protect against nocturnal bruxism. It was also explained to the patient to consider composite bonding as an interim treatment, a future upgrade to porcelain would be the likely long-term plan depending on how well the bonding functions over the next three to five years.

G-aenial Universal Injectable has a high flexural strength and is highly wear resistant, once polished it can achieve an excellent lustrous and glossy finish. It comes in a wide range of shades.

Treatment

Injection moulding using the Exaclear stent is performed tooth by tooth. The adjacent teeth are isolated with PTFE tape.

After etching and bonding the stent is placed over the teeth and the composite is slowly injected through the stent. Once cured, excess composite is removed using a scalpel or bur. Good care is taken to ensure any interproximal overhangs are removed so as to ensure good contact points.

A strict polishing protocol is adhered

Fig 10.

Fig 11.

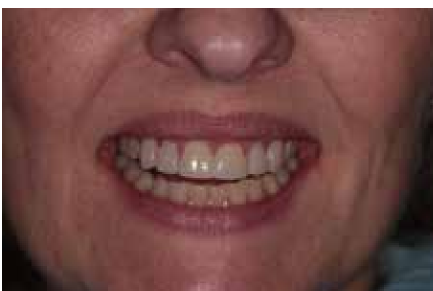
Fig 12.

Fig 13.

Fig 14.

Fig 15.

Fig 16.

Fig 317

to, this ensures an excellent finish and shine to each tooth. Once excursive movements have been checked and adjusted accordingly then a final cure with GC Gradia Plus means an air barrier is done to remove the oxygen inhibition layer. Two hours later, the smile is completed.

Summary

The advantages of injection moulding technique are:

- Accurately transferred from wax up into mouth
- Time saving method
- Economical thus allowing a broader patient base
- Conservative as little/no tooth adjustment required
- Can be used as an interim, treating before upgrading to porcelain/indirect restorations
- With regular maintenance optimal aesthetics can be maintained for many years.

The disadvantages are:

- Aesthetics will diminish over time
- Life span five to seven years
- Dependent on patient compliance for immaculate oral hygiene/ maintenance of gum health.
- Can chip/wear
- Can stain

Reflections

Both myself and the patient were delighted with the end result. In a two-hour appointment the smile had been transformed without any tooth tissue removal or the need for local aesthetic. The rise in the patient's confidence was immediate and the result was extremely natural.

Injection moulding provides the clinician with predictable treatment options that can be performed quickly and accurately within the surgery. Whereas before a patient's only option may have been crown/ veneer work, they now have a more affordable second option with appealing aesthetics. Thanks to advancements in the composite G-aenial Universal Injectable we can place restorations with a high wear resistance and a glossy finish for exceptional long-lasting results.

The patient has been stable now for the past 12 months. She has diligently been wearing her occlusal splint and so far there have been no fractures. I will continue to review the patient every six months with the long term intention to upgrade to porcelain as and when there is a cause to.