

Orthodontic pre-alignment before indirect cosmetic dentistry

James Russell explains how securing a solid foundation before aesthetic treatment can pave the way for less invasive techniques

In its early days, cosmetic dentistry was a dirty, heavy handed affair, but improving technology, refined techniques, public knowledge and ethical considerations have driven cosmetic procedures to become some of the most influential disciplines in the development of contemporary dentistry.

Better results with less invasive techniques equal a 'win-win' for everyone who cares about the standard of care they deliver.

The three main types of orthodontics I use for pre-alignment are clear acrylic aligners, the Inman Aligner, and fixed lingual or labial orthodontics. In this article I will look at three classic pre-alignment cases and discuss how they were treated.

Case study 1: clear aligners

This 33-year-old presented for a consultation, wanting veneers to close the multiple diastemas in both arches. Initial impressions were that the case was ideal for a very minimal approach – but he had a cross bite in the canine regions (Figures 1 and 2).

While it would have been possible to create the space and alignment required for the porcelain via more aggressive preparation, the patient understood the benefits of conserving tooth structure and readily accepted the



Figure 1: Case 1, pre-op anterior



Figure 2: Case 1, pre-op left lateral



Figure 3: Case 1, trial smile



Figure 4: Case 1, completed upper preps



Figure 5: Case 1, upper preps close up



Figure 6: Case 1, temporaries at prep visit



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treatment plan of clear aligners, made by my orthodontic lab, followed by eight upper and lower veneers.

We made six sets of upper and lower aligners, each to be worn for 12 weeks. After 12 weeks the cross bite was corrected but, to reach an ideal situation, I suggested that another three aligners would allow even less

preparation on the lower left canine. The patient was too impatient, so we took impressions for the wax-up.

In a highly elective case like this I find that the use of a trial smile is invaluable (Figure 3). Once the patient has approved this, and it's documented, it helps to ensure a highly valid consent can be obtained. In this case,



Figure 7: Case 1, etched preparation at fitting



Figure 8: Case 1, post-op anterior



Figure 9: Case 1, post-op left lateral

the patient was delighted and ready to proceed to preps.

Preparation guides made from the wax-up were used to ensure sufficient tooth removal where required. In the vast majority of areas, no preparation was required as the wax-up was largely additive (Figure 4). No anaesthesia was required!

You can see in the close-up image (Figure 5) that the facial surfaces are untouched apart from a very light scribing of the margin. I prefer to provide a clear margin rather than a have completely no-prep situation, as there is then no need to polish the margins after the veneers are fitted, removing the glaze.

In the lower arch, preparation was limited to the facial of the canines and distal of LL2 (to help with ideal proportions), silicone impressions were taken and temporaries placed (Figure 6).

On the day of fitting, again, no anaesthesia was required for either arch. The upper arch was fitted first, all together, then the lower. In my opinion, it is vital that all the units are cemented at the same time via a spot tacking technique and impeccable clean-up, otherwise you will be likely to run into seating issues after only one or two units.

You can see on the image of the etched preparations (Figure 7) that the frosty appearance indicates the preservation of enamel, ensuring maximum bonding strength is possible with the right techniques.

In conclusion, clear acrylic aligners can quickly make a case that would have required heavily tooth reduction on several teeth into a highly conservative case, despite using indirect restorations. (Figures 8 & 9)

Case study 2: Inman aligner

The Inman aligner is a low-cost, removable appliance that moves teeth safely and quickly. It opens up many more viable treatment options for patients, especially those who want indirect cosmetic dentistry but understand the risks of heavy tooth preparation.

The Inman aligner is a removable appli-



Figure 10: Case 2, pre-op, rotated UR2



Figure 11: Case 2, after Inman aligner



Figure 12: Case 2, preps, contacts preserved



Figure 13: Case 2, final restorations, four veneers

ance, designed to align crowded anterior teeth or close spaces that are present due to protrusion. In crowded cases, up to 3mm of space is created with interproximal reduction, and up to 6mm of space can be created when an expander is incorporated into the aligner.

The Inman aligner works with two opposing spring-loaded aligner bars that apply a light, continuous load over a wide range of movement. This is the key to the speed of treatment and allows cases to be completed with only one appliance. Seven years of post-treatment follow up has shown no incidence of root resorption. In this case, the patient was concerned with her rotated upper right lateral tooth (Figure 10). She wanted veneers and a 'quick fix' but was not completely clear on how the result would be achieved.

As dentists, we can instantly see that a ve-

neer preparation on this tooth would almost certainly cause pulp to be exposed. Patients are largely unaware of these risks and it is our responsibility to educate them on the risks and benefits of all available treatment options. Photographs are a crucial aid and I always take a full BACD/AACD photo series on all new patients.

With a better insight into the treatment, this patient readily accepted pre-alignment with an Inman aligner, followed by four veneers. The case could have been completed with the Inman aligner alone, but the facial surfaces of her incisor teeth were pitted and she also wanted to add length.

Over a six-week period the Inman aligner de-rotated UR2 into a position where minimal preparation was possible and contacts would not have to be broken (Figure 11). UR1 was

also moved labially, which corrected the asymmetrical gingival heights of the centrals. The space for the orthodontic movements was created with Brassler Visionflex strips, 0.5mm per contact across UR3-UL3.

Once the Inman was completed, silicone impressions, facebow and a stick bite were taken for a diagnostic wax-up (Figure 12). An alginate was taken, a model made with quick-setting stone and a Essix retainer made.

The teeth were prepared two weeks later for porcelain veneers. Luxatemp temporaries were made from a putty matrix of the wax-up. The patient was reviewed three days later to check she was happy with the aesthetics, and also visited the lab for shade taking. The veneers were luted one week later with Variolink II resin cement (Figure 13). Retention was provided via an Essix retainer.

Case study 3: lingual orthodontics

In more complex cases, the degree and type of tooth movement required for pre-alignment means that fixed orthodontic treatment is indicated. The aesthetic benefit of lingual orthodontics has resulted in a huge increase in the acceptance of fixed braces amongst adults.

In this case the patient requested for cosmetic treatment; again, simply asking for veneers. She had a heavily restored dentition and would require indirect restorations, but the UR3 was severely displaced to the buccal (Figure 14). Prepping this tooth for alignment would have required elective RCT and also created a poor aesthetic outcome – the tooth would have been too long and thin with gross asymmetry of the gingival margins. To make matters more complicated the patient was getting married in nine months!

The treatment plan was:

1. Removal of UR4
2. Upper fixed lingual orthodontics
3. 12 porcelain restorations.

The orthodontics was complete in seven months (Figure 15), which allowed time for the teeth to be retained and diagnostic wax-ups to be evaluated before the restorative treatment was started.

A combination of porcelain crowns, veneers and onlay-veneers were used to create the final result. The patient now benefits from vastly improved aesthetics and much improved function, due to canine guidance being established and a stable, even, bite in centric relation (Figures 16 and 17). Final retention was provided with a bonded retainer.

Conclusion

Although most patients seeking cosmetic



Figure 14: Case 3, pre-op



Figure 15: Case 3, ortho complete, braces on



Figure 16: Case 3, final restorations



Figure 17: Case 3, final portrait

dentistry always seem to want a 'quick fix', it is often down a lack of knowledge of the risks of heavy tooth preparation.

It is our ethical obligation to discuss the options for pre-alignment in these people – it is amazing how patients, initially adamant that braces 'are not for them', will actually choose this treatment once they understand the benefits to their health, function and final aesthetics.

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James Russell was a winner at the Smile Awards 2009.

If you want to be a winner next year, then enter at www.smileawards.co.uk

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