By Dr. Tif Qureshi

If Qureshi, Past President of the RACD shows how the combination of pre-alignment with simple orthodontic techniques and ceramic technology have created a paradigm shift in the way cosmetic dentistry can be carried out.

If the nineties were the decade of the Ultra White Hollywood Smile the noughties seem to have ushered in an era of more refined tastes in smile design. While there is still demand for whiter teeth many patients are now asking for a more natural look rather than the over-bright identikit smile designs of the last decade.

In keeping with this more conservative mood patients are also becoming more aware of the good sense of preserving as much of their own tooth structure as possible and are questioning how their restorations will affect the health of their teeth. Can combination therapy with orthodontics and minimal thickness veneers satisfy patients demands for minimum intervention, natural aesthetics and a rapid result?

Smile makeovers with ceramic veneers can certainly achieve patients desire for an instant cosmetic result, for patients with mild misalignment good aesthetic outcomes can be achieved with minimal enamel loss. However for patients with moderate to severe misalignment deep preparation into dentine and possible devitalisation may be the result of trying to align by tooth preparation alone.

Frequently adult misaligned patients have explored and rejected orthodontic options as too slow a route to their aesthetic goal and are willing to risk their pulp to have the perfect smile for their wedding, holiday or new partner. Many of these patients can now be offered a safer way to the ideal smile. The risk of re-storing these patients has been reduced by two recent developments, rapid adult orthodontics and emax high strength pressed ceramics. Appliances such as the Inman Aligner have speeded up the alignment process to as little as four weeks for moderate misalignment to eight weeks for severely misaligned cases. While emax has enabled thinner, stronger veneers to be produced with a natural appearance.

For older patients misalignment is often associated with occlusal abnormalities and enamel wear which paradoxically may become more visible after aligning.

Misaligned anterior teeth often show irregular incisal edge wear which after aligning becomes more apparent due to the differing lengths of the teeth. While the arch alignment may have been perfected the crowded incisal line now becomes more apparent. Starkly outlined against the darkness of the oral cavity the differing incisal outlines of the incisors require further treatment before the ideal smile can be achieved.

Lengthening the incisal edges with composite tips may provide a medium term solution particularly on the lower anterior where the occlusal forces are mostly compressive and less likely to debond the composite from the tooth. In the upper arch however incisal tips are subject to more shear stress during function and guidance and in this situation composite tips are more likely to chip or debond than a well-designed incisal wrap ceramic veneer.

The Inman Aligner

This patient presented complaining that he hated his smile. He felt they were dark, short and crooked.

On examination several key problems existed. Firstly his anterior teeth were badly misaligned. They were also dark having had years of staining and this had been compounded by occlusal trauma that had worn the edges of his teeth allowing absorption of stain through the tips. The misalignment and occlusal wear also meant that his teeth were actually quite different lengths.

He wanted a great smile and he wanted it quickly.

Several options were available and outlined:

1) Fixed orthodontics - the patient did not want fixed brackets placed in his mouth even with short term ortho being presented as a compromised alternative to a referral for ideal specialist orthodontics.

2) Invisible clear aligner braces - the patient refused this because of the time quoted for treatment, but was keen on the removability. The cost was also an issue because the patient would still need further invasive aesthetic/restorative treatment afterwards.

3) Veneers placed instantly were recommended by the patient, but due to the massively destructive preparations, were discouraged immediately. An occlusal view showing the amount of tooth destruction needed was enough to convince the patient that it was a poor choice.

4) Inman Aligner - the patient accepted this because of the short-expected treatment time and because he wanted removability.

Our plan was then to perform anterior alignment of the teeth with simultaneous whitening and then to re-assess the smile design and occlusal function afterwards to realign, then design.

Treatment

A full examination with x-rays and occlusal analysis was carried out. Full BACD style photos were taken. Analysis of the occlusal photo showed that there was 3.3mm crowding. We chose to use an Inman Aligner with combined expander.

The Aligner was used over 12 weeks by the patient and only worn 16-18 hours a day.

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progressive, anatomically re-
sealable FPR was carried out.

At week 9 of alignment, bleach-
ing trays were constructed and slow,
while whitening gel was used to whiten over the same period. Because the lingual margin can be removed and because it only needs to be worn a maximum of 20 hours a day, it is very easy for the patient to whiten at the same time. This is excellent for motivation.

By week 12 the patient’s teeth were whiter and straighter. The patient was then held in retention on a temporary essix retainer. However at this point we needed to reassess including the patient’s perception of the aesthetics. The patient’s posterior occlusion was balanced but he had no anterior or canine guidance.

After alignment we offered the patient the option to simply use edge bonding on the upper teeth as we commonly do but he expressed a wish to still have veneers to give a fuller look. Upper edge bonding was simulated by adding in composite in a mock up fashion. He viewed the result but still felt his teeth looked flat and wanted them to appear fuller.

So at this point a purely additive wax-up was made and a direct preview was placed in the mouth from a silicone stent taken from the wax up.

The patient was happy with the new tooth length and dimensions.

At the next appointment, Edge bonding was placed from the lower premolar to premolar to open up the bite and enhance guidance. This principle was used and no more than 2mm of composite was added anteriorly with most loading on the canines and a long centric on the incisors. (Within 2 months the posterioreries were in full contact again)

One week later the upper teeth were prepared. Minimal prepara-
tions could be used because the teeth were in the right position so the preparations could be truly in enamel.

Temporary crowns were placed immediately based on the silicone stent of the wax up.

At this point no retainer was needed because the temporary crowns were locked together except of course at the gingival embrasures where small interdental brushes could be used to ensure adequate hygiene.

Aesthetics, function and phonet-
ics were checked, rechecked and modified over a 4 week period. Guidance corrections were made in situ on the temporary and the lower composite edge bondings.

Once the patient was happy and fully comfortable, an accurate silicone rubber impression was given to the technician and he then had an exact copy to follow with his final veneers.

The patient visited the lab for a shade match and discussion on tooth characterization. His input and requirements were noted by the technician.

In the lab once the veneers were made, an impression was taken of the veneers on a solid model and this was used to produce an immediate temporary retainer. Of course once the temps are removed the teeth will still need retaining so this could be used before a fixed retainer was fitted later. On the fitting appointment, the temporary veneers were removed and the finals tried in. The patient was happy and the veneers were then bonded.

A new impression was taken to make a wire retainer. In the meantime the patient wore the temporary essix made on the veneer cast.

One week later a wire retainer was given to the technician and he made the orthodontic lab was bonded to the back of the upper 6 front teeth. Because the preps were minimal the veneers were only on the front teeth. This bonding to the back of the teeth was easy.

The patient was thrilled with his result not only because he achieved a natural more attrac-
tive smile, but also he did it with the minimal amount of invasion needed.

Emax veneers

Due to its high strength of 400-500mpa (compared to feldspathic ceramic 100mpa) emax ceramic veneers may be fabricated as thin as 0.2mm. The high strength and resistance to chipping when glazed higher edges make Emax veneers ideally suited to mini-
mal prep techniques. With such a thin veneer the skilled ceramist has little space to create his mag-
ificent smile, but also he did it with the minimal amount of invasion needed.

The other challenging technique with ultrathin veneers is to cre- ate a natural surface texture on such a fine layer of ceramic. In order to create the micro fine surface texture in such a delicate structure standard dental labo-
ratory burs are often too course and bulky. Fine dental surgery burs in a low speed electronic contra-angle motor are ideal to reproduce the subtle surface de-
tail of the natural tooth.

Glazing locks in the colour washes and protects the effect. The glaze is then hand polished using silicon rubbers, fine varnish and diamond polish. This is done to achieve the texture and feel of teeth polished for years by the tongue, cheeks and lips. The dif-
ference between a hand polished ceramic to glazed ceramic is noticeable and pa-
tients often comment on the nat-
ural feel of the restorations. The high strength and polish-ability of the Lithium Disilicate Emax ceramic allows hand finishing with a low risk of fracture during the process.

For the patient with more com-
plex aesthetic or functional / oc-
clusal issues or high aesthetic de-
mands a combination therapy of realignment and minimally invasive ceramic restorations can be the solution that satisfies both the patients desire for great aes-
thetics and the clinicians desire to conserve enamel. An added advantage of this approach is that the pre-alignment of the teeth ensures much less dentine exposure during prep and a greater area for the stronger enamel bonding.

Conclusion

This multidisciplinary case shows what is possible when or-
thodontics, whitening, and ad-
vanced ceramic techniques are combined and sequenced.

Everything is done to simplify the treatment and lower risk to make the results more predict-
able and importantly to involve the patient along the way with decision-making.

The smile design is performed progressively not instantaneously.

It allows the patient to see the improvements in their alignment and whitening before a final de-
cision on ceramics is made. This is fundamentally different ap-
proach to what has gone before and thanks to the new techniques available such as simpler anterior orthodontics and Emax technol-
y it is now making advanced cosmetic dentistry far simpler and safer for all.