Pre-Align then design

By Dr. Tif Qureshi

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 smiles 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 8 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 crooked 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 anteriors where the occlusal surfaces 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. He felt their enamel was too thin and he wanted the appearance of 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 aesthetic/restorative treatment afterwards.

3) Veneers placed instantly were requested 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-expectation 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 after-wards 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 3.5mm 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.

The patient turned the midline expander once a week and some
progressive, anatomically re-
spectful IPR was carried out.
At week 9 of alignment, bleach-
ing trays were constructed and
shown. A whitening gel was used to whiten over
the same period. Because the lingual teeth 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 ante-
crior 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 ex-
pressed a wish to still have ve-
ners 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 that the 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 dimen-
sions. At the next appointment, Edge bonding was placed from lower premolar to premolar to open the bite and enhance guidance. The Dahl principle was used and no more than 2mm of composite was added anteriorly with root loading on the canines and a long centric on the incisors. (Within 2 months the posterior were in full contact again)

One week later the upper teeth were prepared. Minimal prepa-

tions could be used because the teeth were in the right posi-
tion so the preparations could be truly in enamel.

Temporaries were placed imme-
diately based on the silicone stent of the wax up. At this point no retainer was needed because the temporar-
ies were locked together except of course at the gingival embrasse-
ures where small interdental brushes could be used to ensure adequate hygiene.

Aesthetics, function and phonet-
ics were checked, redressed and modified over a 4 week period. Guidance corrections were made in situ on the temporaries 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 for the final veneers.

The patient visited the lab for a shape match and discussion on tooth characteristics. 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 re-

moved 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 retainers made on the ve-

ner cast.

One week later a wire retainer

was made and 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 facial surface so 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 using emax edges makes Emax veneers ideally suited to mini-

mal prep techniques. With such a thin veneer the skilled ceramist has little space to create his mag-
ic with internal layering tech-
niques. In order to create the illu-

sion of depth in the ceramic very subtle washes of almost invisible colour must be applied layer on layer and fired after each colour


Figure 11. Close view after align-

ment

Figure 12. Close view after ve-
ners

Figure 13. Fine anatomy carved with fine FG diamonds

Figure 14. Enhancing colour with surface shades

Figure 15. Natural surface mor-

Figure 16. Final IPS Emax veneers

Figure 10. Close view before

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.

Conclusion

This multidisciplinary case shows what is possible when orthodontics, whitening, and advanced ceramic techniques are combined and sequenced.

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-

ogy it is now making advanced cosmetic dentistry far simpler and safer for all.