Simple, planned aesthetic orthodontics for the General Practitioner

By Dr. Tiff Qureshi

Dr. Tiff Qureshi shows how digital technology has moved progressive smile design on and the enormous benefits this will have for planning and consent. Digital Smile Design is making a come back in a very smart and intelligent form through the use of live video, cameras, and keynote presentations.

I commend the users of this technique as it is clearly a far better form of smile design planning than just using plain static before and after pictures with someone else’s smile stitched into place.

However in cases where there are alignment issues, I would still argue that any patient who does not at least go down the pathway of alignment and bleaching, cannot really see their teeth change in a dynamic way.

I have found that patient’s feelings about their smiles change, you may think they want one thing but after they see their smile change a little they start to appreciate it in a different way. How can someone really be consented unless they are given the opportunity to bleach their teeth, perhaps with slight alignment and bonding.

This case is the perfect example and will show how progressive smile design also using digital technology can produce beautiful predictable results that often require far less invasive treatment.

We use digital technology in a different way of course and this is all to do with planning and consent. Previously with Inman Aligners, we had to use metal models. These are effectively fairly crude stone models which take a cut and once repositioned in wax the aligner is then built on that model. As soon as the aligner is fitted into an uncorrected mouth the forces are there to push the teeth to the final position. The real downside of it all the wax creates quite large inaccuracies. Also it is very difficult to see how much adjustments have been made to the teeth to get them to fit within the curve. This is even more so of a problem for flared teeth which have been cut out of the arch for many more years. These teeth tend to be highly triangular and often need more targeted adjustment to get them to fit within the arch form. You can visualize the fits of these teeth, it is almost impossible to accurately know how much production is required to each.

Of course with digital 3-D printing this has all changed. The difference if you like it is night and day. We can also use printed models to show the patients the proposed outcome. This is excellent for the consenting process. Untreated patients will now see any compromises areas and the final outcome. If they are not happy they could reject the treatment before it starts.

A case

A 22 year old gentleman did not like the appearance of his teeth especially because the two centrals was so prominent. He had considered having porcelain veneers done just to improve his smile in one treatment. He did not like the appearance of his enamel and also the discrepancy in the shape of his front teeth. We showed him the occlusal view of his teeth and he could see that the upper anterior is one mildly misaligned. Indirect veneers would have been far less invasive towards the preparation of the upper central incisors. By showing examples of other cases where simple alignment had dramatically improved the aesthetic value the patient agreed to try to align his teeth first before having veneers done.

Consent part one

A full orthodontic examination was carried out. All orthodontic options were discussed and the patient understood the benefits of fully comprehensive orthodontics, and was also given a range of short-term techniques that he could have chosen. He declined comprehensive orthodontics on the basis that he only wanted to deal with his anterior teeth.

He chose to have an Inman Aligner because of the shorter wear time and the minimal cost impact on his overall treatment desires. Our first goal was to evaluate the aesthetics and function to decide on landmark or reference teeth. As part of the digital planning process these teeth are not moved and ensure the setup accommodates these teeth to ensure the proposed curve is not flared out or over constructed.

In this case the patient also had a retained upper left deciduous tooth (no canine had developed). Fortunately this tooth was in the right position so it became the reference tooth and hence no orthodontic force would need to be applied to it. Both upper centrals needed to be retracted and both laterals slightly advanced. It was important to visualize a chin up view to ensure this was viable for the patient from an occlusal and guidance point of view. All the movements were possible.

The 3D model was returned and the lateral central was so prominent. He had like the appearance of his teeth and he could see that the upper anterior was one mildly misaligned. Indirect veneers would have been far less invasive towards the preparation of the upper central incisors. By showing examples of other cases where simple alignment had dramatically improved the aesthetic value the patient agreed to try to align his teeth first before having veneers done.

Consent part two

The 3D model was returned and we could view the proposed setup made according to the spacewize instructions.

An appointment was made with the patient to sit down and examine the models. At this point the patient clearly sees any compromises in the posterior region of his mouth. These were again highlighted but the patient insisted he did not want these treated. The over jet was also discussed with the patient he could see a reduction but not total closure, he was happy with this.

You can see the width differences in the anterior teeth that would require adjustment and the laterals advanced by about 1.75mm exactly. These setups can be viewed as digital files in 3D if needed beforehand by the dentist and adjustments can be made if needed. Once we are happy, the 3D model was printed.

Figure 1: Overjet before

Figure 2: Overjet reduced and proposed on 3D print

Figure 3: 3D Print Occlusal

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tooth shaping with PPR (predictive proximal reduction). This made it far easier for him to understand the processes required to create the space. Finally he could also see the differential wear in his tooth outline that would be evident after alignment. He clearly understood that edge bonding and tooth contouring might be required after alignment and bleaching were complete. That is assuming he did not want to continue with porcelain veneers.

It was noted that the patient had reviewed and understood the 3-D model and what it was proposing. The Inman Aligner was then built and fitted.

**Treatment**

Inter-proximal and Predictive proximal reduction were carried out in a progressive and measured manner over 5 visits. This was done to ensure good anatomy and to reduce the risk of gouging, over stripping and poor contacts. With Inman Aligner treatment stripping is never carried out in one go.

Composite anchors were also placed in a timed and sequenced manner to ensure the forces could be directed at the right time. This allows for rapidly increased treatment times.

After only nine weeks the patient’s anterior teeth had nearly aligned. Bleaching trays impressed on the 7, 9 and 10. All these were carried out in a progressive and sequenced manner over 3 visits. This was done to ensure good homogenous and the teeth have been balanced enough to far outweigh the parameters of those protocols but arguably patients should not be shown images of multiple veneers until they can visualize their own teeth looking better.

It is fine if whitening, bonding and alignment are part of the treatment, but still requires further treatment/maintenance and replacement. On a 22 year old if alignment, bleaching and bonding can satisfy the patient that it has to be better than placing ceramic veneers. As good as ceramic restorations are, they will always require further treatment/maintenance and replacement.

The problem with digital smile design is that the patient is not really given the opportunity to see the teeth change slowly and in situ.

You can see how very subtle changes can dramatically improve the appearance. Even though the colour is not truly homogenous and the teeth have a mottled appearance the most important thing here is that the patient was completely delighted with the treatment.

Ultimately a patient being happy with their own smile has to far outweigh the parameters that are set up traditional smile design.

Final images at the 6 month review are also shown.

**Discussion**

If the wire de-bonded.

Roughening, total etch Opti-bond solo and Venus flow were used to bond the wire in place. A clear essix retainer was also given to the patient to wear at night initially then to use occasionally and to have as a back up if the wire de-bonded.

Composite bonding was carried out on the 7.9 and 10. A composite veneer was placed on the 11. All these were carried out with only roughening and no prep or bevel. Venus Diamond composite from Heraeus Kulzer was used. I find that the Opague shades allow superb block out of light meaning that if layered as dentine, it means a long bevel is not required to block out the join. Enamel shade can then be placed thicker towards the incisal edge.

A wire retainer was fitted and the guidance adjusted to ensure there were still balanced excursive contacts on the left side so the load was not focused on the deciduous tooth.

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**Conclusion**

On viewing the sequenced shots it is clear to see the changes.

The patient was delighted that he had emerged from the treatment with his own teeth looking more attractive rather than having ceramic porcelain veneers. As good as ceramic restorations are, they will always require further treatment/maintenance and replacement.

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