

The Concept of Progressive Smile Design and its potential impact on Cosmetic Dentistry

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Cosmetic dentistry is commonly at the forefront of everything interesting and exciting in dentistry. Rightly, all dentistry can and should be carried out in an aesthetic way, and as a result the term "cosmetic" could apply to nearly any type of treatment, even an extraction if executed with aesthetics in mind.

The way treatment planning is carried out for smile makeovers has fundamentally been the same for some time. Recently Digital Smile Design has taken another step and has made the very best and most intelligent use of software, imaging and video to creating a very powerful and emotional communication tool. This can allow a patient to see a smile makeover mockup not just on a screen as a static image, but watching themselves on video and actually to trial it within their mouths also and deliver an emotional response to that preview.

Ideal smiles and fantastic results can be achieved this way and this is appropriate for patients who want perfection... or is it?

The concept of progressive smile design is a little different.

The idea of PSD to allow the patient to see improvements in staged approaches to really decide if they want a perfect smile at the end of treatment. Now of course Progressive smile design and Digital smile design are not mutually exclusive, they can be combined but commonly PSD will result in less treatment for the patient.

The Concept of Progressive Smile Design often uses a mixture of tooth alignment, whitening, direct bonding and contouring. Indirect treatments can certainly be considered but are only ever after the patient is able to see changes alignment, bleaching or shaping can achieve.

The logic to this approach is that we are trying to see if a patient is satisfied with small staged improvements rather than going straight to a perfect result in an irreversible way. It may well be that they do end up with a perfect smile but at least the consenting process is real, because the patient is able to see the very best in their own smile before moving forward to the irreversible stages. Looking at this in a more extreme way, it might be the difference between a patient choosing 8-10 veneers accepting some tooth preparation to do so, and alternatively absolutely no tooth removal whatsoever with less financial and biological risk.

The case described shows a patient's journey and how her perception of her own smile changed with progressive smile design.

The Case

This young 26 year-old lady presented wanting a smile makeover. Her main complaint was her diastema, the color and length of her teeth. She requested porcelain veneers to address this problem. On examination, a 3.5 mm diastema existed and the patient had a class 1 base with a mild lower crowding and slightly rotated upper laterals. She also had reducing canine guidance from previous evidence of pa-

ra-functional wear. She had no TMJ complaints or symptoms. It was explained to the patient that orthodontics could improve the anterior position of the teeth to make any further treatment, which might include veneers, easier at a later time.

The patient was not keen on orthodontics particularly fixed braces, but all options were thoroughly explained, including the Inman Aligner diastema closer appliance. The patient was interested in this option because of the short treatment time and the fact that it was removable. Once she understood that the diastema could be closed in less than 10 weeks she suddenly became keen on using the appliance.

Before any treatment was decided upon, x-rays, photos and study models were taken and a full orthodontic diagnosis and assessment was carried out.

A landmark/ reference point was also decided on with the patient. This is a critical point that is aesthetically and functionally correct in a misaligned arch. An arch evaluation curve is then set using Spacewize TM software. The reference point sets the curve and the curve then is used to calculate the amount of potential crowding and potential space creation that might be required.

(1). The patient described the position of the two centrals as ideal from an anterior posterior position. She liked the angle and vertical inclination. But she felt they were simply too far apart.

She felt both laterals were too pro-

trusive. As a result the curve was set through the landmark points.

This Spacewize curve provides valuable information in anterior orthodontic planning.

- 1) It will give the amount of space creation required or the amount of space left over after alignment
- 2) It dictates the occlusal setup to the technicians who will set the case up digitally.
- 3) It is also important in the consenting process and evidence of planning

The Spacewize trace revealed that the case would require 0.2mm of space creation to achieve alignment. With a diastema present, this might seem a surprise but the laterals closing inwards and being rotated were already accounting for much of that space.

Impressions were taken and sent to the Inman Aligner laboratory with the spacewize trace. Two days later a digital STL was sent of the proposed Archwize setup.

This was checked and the lab was instructed to create the 3d print of the proposed setup.

The patient was keen to see this before committing to understand the real potential outcome. The advantage of a 3d print over 3d images is that a patient can hold the models and really appreciate the potential outcome with a clearer picture of scale, position and shape. On viewing the models the patient was highly satisfied with the proposed outcome and could also see that the teeth still looked short and further treatment would be needed to lengthen them.

This was discussed and planned. The models were returned to the lab for the modified Inman Aligner to be constructed.

One week later it was fitted- Instructions were given and no space creation needed. The patient was to wear the appliance for 18-20 hours a day. The patient turned the midline screw once every 3 days. After 2 weeks a significant improve was seen.

At 4 weeks home bleaching was started using Daywhite 6% H₂O₂, (Philips) using super-sealed trays. (trays with sealing grooves cut into the stone models before sucking down). She whitened for 35 minutes a day while the Inman Aligner was out of the mouth for 2 weeks.

At this appointment a little flattening of the contact was carried out to reduce the risk of a black triangle and lengthen the connector- this was done using a soflex disc using the digital models for guidance. Buccal anchors were also placed to help the laterals rotate in.

At 6 weeks the diastema was closed and the teeth were noticeably whiter.

The moment of truth-

At this review appointment the patient then commented that her teeth looked far better than she ever imagined. She asked what could be done to the edges of her teeth to lengthen them and if there was an alternative to veneers as the newly positioned and whitened teeth looked so good. Flowable composite was used to mockup an outline. This was cured



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

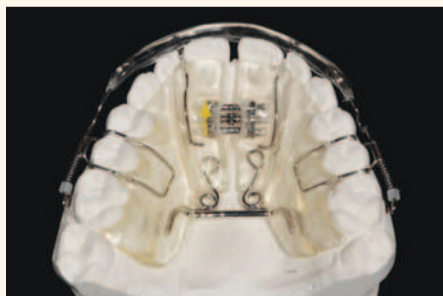


Fig. 7.

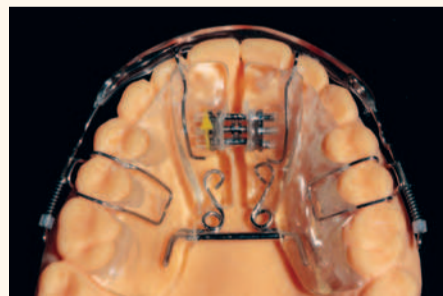


Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.

and the patient was shown the new potential outline. Immediately the patient was thrilled and happy to just have no preparation composite bonding as the final part of the treatment rather than veneers.

The part of the process is vital as allowing a patient to see their teeth align and whiten often helps them to comprehend the best potential in their own natural smile before taking an irreversible route.

Two weeks later, an indirect wire retainer was bonded in place after roughening the teeth and using etch and optioned with Venus Diamond Flow.

On the same day, direct composite edge bonding was carried out. Venus Diamond (Heraeus Kulzer) OL shade dentine was placed initially to block out the visual join and B1 and BL shade were used on the facial surfaces- and blended into the surface of the teeth. The patient returned for her polishing appointment and the material was fully blended into the tooth. At this point the black triangle was closed also.

Lateral and anterior guidance was rechecked and adjusted and a new impression was taken for a night-time essix/ back up retainer.

Discussion

This case was completed in less than 10

weeks. By allowing this patient to see small changes a little at a time, she was able to see the very best potential in her own smile- and to make the decision to move to composite edges instead of just jumping straight into porcelain veneers. The long term biological and cost and economic cost also means that the risks are lower. There is certainly nothing wrong with placing porcelain veneers on a case like this, but one can see that following the logic of progressive smile design, you never really know what the patient wants unless they are able to see the very best in their own smile and they might be happy with a small amount of bleaching, alignment or bonding. Added to the fact that the long term risks of cases like this are lower, and this kind of treatment is more accessible to many more patients, and one can see the potential for many patients around the world.

Disclosure

Inman Aligner training run courses and mentoring through Intelligent Alignment Systems Orthodontic Academy.

Visit: www.iasortho.com **DT**

Dr. Tif Qureshi, UK, Past President of the British Academy of Cosmetic Dentistry. Director of Intelligent Alignment Systems.



Fig. 15.



Fig. 16.



Fig. 17.



Fig. 18.



Fig. 19.

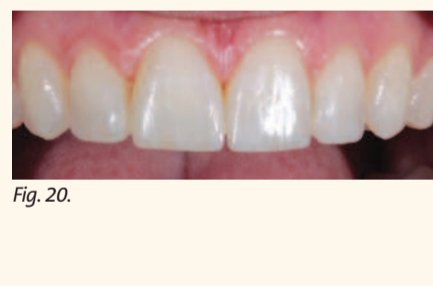


Fig. 20.



Fig. 21.



Fig. 22.



Fig. 23.



Fig. 24.



Fig. 25.



Fig. 26.

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