Translucent Full-contour Zirconia... Innovation in the dental industry

By Alham Farah, Syria

Being able to Choose the same material for fabricating every single restoration in one case (whether they were bridges, full crowns or veneers) is always a big advantage, it serves in achieving the accurate matching and harmony among all the restorations in the following dimensions: (Value, Hue, Chroma, translucency, depth, etc.). The challenge for the dental manufacturers have been always strong and esthetic level of the dental restorative material, finally we started testing new generations that combine both, but the question is still: Did we esthetically get to the level of the glass-based material such as (Lithium Di-Siliicate), the answer might be no, but perhaps we are close with the TFZ (Translucent Full-Contour Zirconia) for the long span bridges in the posterior region. 

The pre-operative situation

38 years old lady presented to her consultation appointment at the dental studio asking to change her smile. Her main concern was the extensive yellowish-brownish discoloration in her front teeth, especially the upper ones. Besides the yellow mood teeth set up that reflected older age effect on her face (according to her). She was a senior manager in one of the beauty & skin care companies in Dubai, and her overall look was important to her. (Fig. 1a)

Data collection and analyses

We evaluated the patient pre-operatively, went through her dental history, took many photos from different angles, and discussed her expectations and goals.

Intra-Oral Diagnoses

After the dentist diagnosed the case he reported the following: Severe tetracycline discoloration, lack of vitality, poor appearance, besides disproportional dimensions of the teeth proportions, and conflicting smile line with the curvature of the lower lip line. (Fig. 4)

Radiographic exam revealed a need for endodontic treatment for some of the posterior teeth. Preliminary impressions were taken to have a study model for us to be able to see the physical reference where we can draw our lines, straighten long axes, adjust length and do the cosmetic counterengineering, etc.

The need for DSP (Digital Smile Philosophy) in this case

Enrolling the photos we took on our PC screen and digitally redesign the teeth arrangement according to the lips movements and curvature in the means of (Digital Smile Philosophy), was necessary since our patient’s main complaint was the smile. (Fig. 1a) There for, as a dental team, we should think further than esthetically reshaping each individual tooth. We should think more of relation between each tooth to the neighboring tooth next to it, from one hand, and to the harmony between the entire teeth arrangement and the lips movements, on the other hand. (Fig. 1b)

The Philosophy of redesigning the smile digitally

Through a simple software (power point Or Keynote), we can edit our photos based on our knowledge in the denso-facial esthetic and harmony. To have more sufficient ways of communicating between the clinic and its laboratory on one end, and for our patient to visualize our final outcome whether its meeting his/her expectation of the whole treatment or not.

So the dentist will not go over- invasive in his/her preparation of the patient teeth anymore, neither the dental technician will have to guess in creating the shape and measurements of his/her final restorations. But they both will follow a interdisciplinary plan where results are controlled and expected according to a preapproved-by-patient mock up test. The trick is that we need to make our measurements on our PC screen match the real measurements on our patient teeth and their replica of a cast stone model, thereafter we develop a digital roller, which measures distances on the PC. This will be our communicating tool between the digital world and the real world.

Then we calibrate our photos according to it (shrink & stretch), for any editing done on the photos from lengthening to shortening etc, will be able to be measured using our digital roller and these measurements can be used by the dental technician to fabricate his esthetic diagnostic wax-up. (Fig. 4, 5, 6, 7)

Choosing the tooth contour for our ceramic

No link has been proven 100 percent, between the face and tooth contour, and no certain rule has been followed to simplify the mission of choosing the fabricated restoration contour.

However, some theories have been put into good use, most of them rely on the physical facial analysis from all over contour and rounding. The rest rely on the morpho-psychology and emotional features of the patient.

The question still is whether the original tooth shape, that our patient was born with, is what we need to go back to when we design our restorations, OR a NEW tooth shape is what we need to improvise, that might add up on the patient character. (Fig. 8, 9)

Preliminary treatment and preparation

6 upper anterior were prepared according to the general principles of preparing all-ceramic Veneers, 0.9 mm buccal reduction was given, taking the degree of stump discoloration and final shade approached into consideration. 1 mm bevel preparation was prepared at the incisal edge, and 0.6mm rounded shoulder (almost 1-1.5 mm subgingival).

8 lower anterior and one additional premolar were prepared according to the general principles of preparing porcelain laminate veneer, 0.5 mm buccal reduction was given with a 0.4 chamfer (equigingival).

Final impression was made using additional silicone (Virtual, Vivadent Virtual). Shade of the prepped teeth was also taken using the natural die material shade guide (from Ivoclar Vivadent) and reported in ND6, which needed a special caution in choosing the ingot level of (Translucency – Opacity), in order to mask this discoloration and reach the bleach BL4 shade (according to the patient need). (Fig. 11; shows the bleach shade guide, 0.5 mm buccal reduction was given, taking the degree of stump discoloration and final shade approached into consideration. 1 mm bevel preparation was prepared at the incisal edge, and 0.6mm rounded shoulder (almost 1-1.5 mm subgingival).

Direct temporary restorations were made with the aid of an index. No signs or symptoms of discomfort were observed or reported over two weeks.

The periodontal situation was kept under surveillance, and the healing process of the gingival tissue was clear, in means of color and positioning. At the same time, those restorations were our patient's future look, so adjustments in shape at this stage can still be conducted intraorally by carving or adding gingival tissue. (Fig. 12)

The challenge of combining Zirconia to e.max in the same case.

> Explained in details in Lab Tribune page 1C

Working technique Restriction

Our lab working techniques for characterizing a pressed set of veneers are either staining technique, cut back technique, or layering technique. But in combination cases where we

Fig. 2

Fig. 1a

Fig. 3

Fig. 1b

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Lab Tribune

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Our lab working techniques on to reach adequate harmony among lips, smile and face character.
have glass based veneers (SiO2) and Zirconia based Full Contour bridges in the same case, the scenario is different, and our working options are minimized to have mostly the staining technique working protocol to conduct simultaneously on both the veneers and the bridges. In order to guarantee that both materials react to light as close as possible to themselves, so shade dimensions (Hue, Value, Chroma) in both materials can almost match. (Fig. 17)
That scenario is valid mostly when the required final shade is one of the bleach shades, then the ratio of translucent enamel is pretty much relevant to the patient desire, but majority of patient who ask for a bleach shade are concerned about showing a high brightness of their smiles rather than showing a natural looking translucency on the incisal third.

Staining technique will prevent us from layering feldspathic ceramic (enamel) on top, which leaves the glass LiS2 exposed, that allows more light and brightness to radiate from the pressed material, at the same time that would lessen the esthetic look of a natural tooth, but the question again is; what does our patient need? And what category of patient he/she is? He/she wants to bring teeth back to their natural look? Or he/she wants bleach teeth with no translucency graduation. (Fig. 18, 19: note the matching, after final cementation, between the IPS e.max press & the Zerostar Zr.

I realized that finally found my robust restorative material for long span bridges in the posterior region that I can combine to the IPS e.max material without any risk of hesitation, thanks to the innovative TFZ Zerostar.

Cementation and follow up:
E.max veneers were finally cemented using VarioLink II (Ivoclar Vivadent resin cement-adhesive cementation technique), then Zerostar posterior zirconia bridges were followed using the same VarioLink II base mixed with catalyst, after the cementation surface had been blasted in the lab with AL2O3. Finishing and polishing rubber heads (OptraFine Assortment, Ivoclar Vivadent) were used to remove excess residual cement and to eliminate all occlusal interferences. During the follow up appointment, a final checkup and modifications were made to eliminate all occlusal interferences. (Fig. 20 – 25)

Conclusion
After that outstanding match I had between the IPS e.max press & the Zerostar Zr.

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