The Minimal Invasive Smart Smile Design

By Asst. Prof. Dr. Cagdas Kislaoglu, Turkey

We live in an era where patients are becoming more specific about how they would like their anterior teeth to be restored. Not only are they requesting an aesthetic solution to their dental problems, but they are also seeking procedures that will have a limited effect on the remaining tooth structures. Porcelain Laminate Veneers are one of the most conservative and aesthetic techniques that we can apply. The life span of the veneers is long and they are durable, especially if the right indications are chosen and the correct techniques are applied. The most important thing is the conservation of sound tooth structure, so we should limit our preparations on enamel. When we limit our preparations on enamel, the tooth will not flex and it will stay as rigid as a tooth can be. Even if our preparation line passes through the dentin enamel junction, minor invasions won't create a major problem. However, if the finished preparation is in contact with large amounts of dentin, this will create complex bonding issues with the dentin and will also increase the flexing factor on the tooth structure. If a tooth, which has been aggressively prepared and is more flexible as a result, is subjected to different occlusal forces and keeps on flexing, the luting resin at the margin will start coming off slowly and this situation will result in micro leakage or even de-lamination.

Analyzing The Smile

In order to understand and visualize the desired outcome clearly and to produce the final smile design, the existing smile should be analyzed carefully, using a 3-dimensional view. We should follow a photo and video protocol (Fig. 1). Facial view

When we analyze the smile using a facial view, we see the mesiodistal and vertical problems. We can also see the midline, the occlusal plane and the length and axes of the incisal teeth and can determine the desired future smile curve and the length of the future incisors (Fig. 2). 45-degree-angle view

This angle gives us the opportunity to check the buccal-lingual position of the teeth and their crowding. It also gives us an idea of how the lips are supported by the teeth (Fig. 3).

The view according to the lip

This view can determine the buccal-lingual position of the teeth from a different angle (Fig. 4).

Digital Scan of the Upper and Lower Jaw

This gives us a chance to observe all aspects of the teeth in different angles from a 3-dimensional viewpoint (Fig. 5).

Treatment Planning with Digital Wax Mock-Up

The digital scan of the patient is opened in software that can produce a wax-up digitally. In order to enhance each patient’s facial features and create a pleasing restoration, harmony in the size, shape and arrangement of the teeth is required. The dentist designs the new wax-up digitally and can also use pre-existing tooth templates from the software; this helps to speed up the digital wax-up (Fig. 6).

The finalised digital mock-up is printed as a 3-dimensional acrylic model (Fig. 7).

Aesthetic Communication with the Patient with the Acrylic Template

The dentist should be able to understand all the signals coming from the patient, whether verbal or non-verbal. Using all these signals, the dentist designs the digital wax-up, so that the design can be tried in the mouth. The silicone index - made from the digital wax-up model to indicate the final contours of the teeth - is placed over the dental arch in order to allow the visualisation of the existing positions of those teeth on the dental arch, relative to the final outcome of the wax up and veneers (Fig. 9). The lip support of these restorations and the aesthetic length can be easily evaluated and should be approved by the patient. Also, we want to evaluate the functional movements of the patient to see whether the design would create an anterior construction or not. The patient can easily look at the new smile design in the mouth and will be able to determine what he/she likes and dislikes. At this stage, minor changes can be made to the acrylic. If the patient wants longer teeth, free-hand composite can be added to the existing acrylic template to make the teeth longer. If the patient wants shorter teeth, the teeth can be shortened and arranged to the length the patient wants, using a composite shaping disc. In rare cases, we cannot satisfy the patient and we spend hours on the design. This is not because the dentist does not know his job, but because the patient does not know what he wants. The ability to say no to such patients will save the dentist and patient many sleepless nights! If the aesthetic dentist and patient find it difficult to agree on the objectives, it is in the best interests of everyone not to begin the treatment. Since, by using this additive technique, you have not touched the sound tooth structure, you can easily consider not going on with the case. But, as I said, this kind of case is very rare. Most of the patients are very happy with the design in the mouth. Then, a suitable tooth shade is chosen and we go on to the next step.

Tooth Preparation Through the Acrylic

The beauty of these Aesthetic Acrylic teeth is that, besides the evaluation of the aesthetic functions and phasic aspects, we have a great tool in our hands now to prepare the teeth. Since this Acrylic resembles the exact final contours of the final outcome, such as the incisal-edge position and the facial contours of the teeth, now...
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we can start preparing the teeth using the Acrylic. We prepare our teeth using depth cutter burs and, according to the shade we have chosen, we determine the depth of our preparation and paint over the acrylic guide with a felt tip pen (Fig. 10a, Fig. 10b, Fig. 10c).

After that, the Acrylic guide is removed from the tooth surface and the areas that need to be prepared more are clearly seen because of the marked areas that we already painted (Fig. 11). The preparation depth is limited until we take off all of the remaining paint on the tooth. On some occasions, the tooth doesn’t have any remaining paint on the tooth. On some occasions, the tooth doesn’t have any remaining paint on the tooth. This is because we have chosen an additive approach and this means that we only have to prepare a very shallow chamfer margin and round the sharp corners with a flexible disc to finalise our teeth preparation (figure 12). This shallow chamfer margin is to ensure a nice fit on the margins and enable a healthy peri-odontal state.

The Lab Procedures
There are two fabrication options to carry on from here: the ‘conventional way’ or the ‘digital way’. In the conventional way, two impressions are taken from the patient. One impression is of the tooth preparation and the other impression is of the impression of the acrylic template on the patient’s teeth. The technician can use this as a guide and build up his veneers using pressable ceramics with external staining or layering techniques. In our case, we continued with the digital way and only used digital impression techniques from the start to the finalisation of the case. We took a digital impression of the tooth preparation (Fig. 13) and then we took a digital impression of the patient’s chosen acrylic smile design (Fig. 14). Then, using a digital copying technique, the veneers were designed digitally (Fig. 15). The veneers were then milled, externally stained and glazed (Fig. 16).

Try In
When the veneers are fabricated they should be first tried out in the mouth. The veneers should be tried out one by one in order to check the margins fit accurately, and then together, to see their overall integra- tion with each other, with the lips and finally, with the face.

Bonding
I prefer a sectional rubber dam placed in the mouth, because it is much easier for the patient and the dentist to isolate the teeth. Once the teeth and the inside of the veneers are surface-treated, they can now be bonded. Preferably, the bonding should start with the centrals, proceeding with the lateral, canine on one side and the other lateral, canine on the other side. The soft tissues should be handled very gently. The easiest way to do that is to place the veneer on the tooth and, once it is completely seated, spot tack it from the middle with a 2mm tip. This will hold the veneer in place intact and then the tip of the light source can be switched to a larger diameter. Light cure the excess flash around the gingiva for only 1 or 2 seconds. This will not fully polymerise the luting resin but will bring it to a jelly consistency that will be very easily cleaned with an explorer or a number 12 blade for the narrow areas. Then, go in between the veneers with a dental floss to clean the interproximal contacts. Then a full polymerisation is done, after applying a gel on the margins for the oxygen inhibition layer of the composite cement. Then, the margins should be polished with a rubber cup, but never with a diamon bur since this will totally ruin the glaze and the polish of the porcelain on the margins (Fig. 17). The final results of the cemented veneers are seen from different angles (Fig. 18a, Fig. 18b, Fig. 18c).

The techniques explained above will help to make communication between the patient and the lab more reliable and solid. It will be helpful in achieving the best aesthetic results with minimal tooth reduction.

One Visit Crown (OVC)

**FASTER** **BETTER** **EASIER**

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![Fig 14](image14.png)

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![Fig 18](image18.png)

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*Crown finished in 30 minutes!*

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