

# Let's work in a system: steps for an all-ceramic restoration

By Szabolcs Hant



*“Conscious planning, preparation and implementation always lead to a rewarding outcome. Creating the restorations in a well thought out way and using trustworthy materials causes less headaches and far more predictable results...”*

**T**his article shows the detailed steps of the fabrication of an all-ceramic restoration from the dental technician's approach, through a specific example. **I find it important in my job to be able to prepare designable and safely constructible restorations.** Experience gained throughout the years and a close communication between dentist and dental technician are both essential. Photography, situation samples and a well-designed temporary prosthetic provide the basis for communication. Long-term provisionals also play a vital role in achieving a successful result.

## Step 1: Determination of dental colour

In an ideal scenario, the patient's dental "colour" should be observed and analyzed in a dental laboratory. It is important to take photographs (Figure 1) and it is also recommended to take detailed notes of our impressions, because a photo can't fully reproduce everything as seen. Due to the two-dimensional nature of photographs, many details stay hidden and the correct reproduction of colour is also limited because of technical issues (white balance, quality of the displaying monitor, etc). It is also paramount for the clinician to give the technician information regarding the shade of the stump for every all-ceramic restoration.

**Tip:** *Manipulating some of the photos is worthwhile in order to get more information (see: the last image in Figure 1 where the contrast and gamma value have been modified).*

## Step 2: Preparation of the prototype

Based on the situation samples and functional requirements, we create an anatomical sample (Figure 2a-b). Although it is a question of detail and desire, I like to map out the morphologic surface at this point.

**Tip:** *Premade wax facets can be used, but they have to be shaped to the character of the patient's teeth.*

Next we model the wax-up with a refractory silicone block material (Klasse 4 Fifty-Fifty). It must be refractory because the Ivocron provisional material (Ivoclar Vivadent) I use has a polymerization temperature of 100°C. The material also has a cold curing version. I mostly recommend this one for smaller corrections or relines, because its physical features are less suitable for a long-term provisional. After isolating the model, the dentin material is applied with the help of the putty impression. After polymerization, the dentin material is reduced to a suitable form. For creating the inner effects, I usually use the Adoro composite covering material (Ivoclar Vivadent). The incisal edge can be realistically visualized with Opal Effect and Mamelon materials (Figure 3a-c).

**Tip:** The monomer liquid can be used on the surface of the dentin to check the transparency.

This step is followed by the construction of the enamel surface. By mixing the edge and the dentin materials, we can produce higher and lower transparency enamel (Figure 4a-c).



Figure 1. Photos for the definition of colour and accentuating the inner effects.



Figure 2a-b. The wax-up.



Figure 3a-c. The dentin core and the creation of incisal inside effects.



Figure 4a-c. The enamel layer.



*Figure 5a-b.  
The provisional  
ready for try-in.*

After the pressing, I work out and set the anterior guidance and make the necessary corrections. To improve the edge closure, we can also use a liquid composite (Adoro Incisal Liner, Ivoclar Vivadent). If not content with the colour, we can modify the provisional's colour with a light-cure lacquer. The lacquer's colour can easily be changed with ceramic stains (e.max Ceram Essences, Ivoclar

Vivadent). The excellent qualities of the Ivocron material permit us to develop a surface that is similar to ceramic. It keeps its polished surface and its shine for an extended period of time (Figure 5a-b).

The try-in shows if my intuitions worked well. Having been wrong at some point isn't a problem at this stage, because now everything can still be easily corrected. Hence it is important to use a

provisional, because with its help the smallest claims of the patient can be addressed and problems prevented from occurring later. In this case, I had to alter the provisional because the patient found it overdimensioned (Figure 6a-b). At another review appointment, the patient and dentist decided that the mamelon structure should be less dominant on the final prosthetic.



*Figure 6a-b.  
Try-in of the  
provisional.*

### Step 3: Final prosthetic

The first task is to choose the material for the frame. According to aesthetic and mechanical considerations, I make my decision based on the following:

**Option 1.** Ceramic veneer or crown fired on refractory die:

- No or minimal discolouration in the prepared stump, and not near the gingiva.

**Option 2.** Ceramic layered on pressed ceramic frame:

- Moderate or heavier discolouration on the stumps.
- Single or smaller restoration (up to 3 units) in the anterior region.

**Option 3.** Ceramic layered on zirconium-dioxide frame:

- Heavy discolouration or stump with metal core.
- Larger span bridge in the front region.

As I felt the need to test between the firings and a moderate discolouration was present on stump 21, in this case I chose to use e.max Press pressed ceramic (Ivoclar Vivadent). The ingot transparency of the MO 1 press is comparable to the e.max Ceram Deep Dentin material. This means that the discolouration can be



Figure 7a-d. Layering of the porcelain.

appropriately masked with the frame and at the same time we get a strong (400Mpa), stable base.

It is a great advantage of the IPS e.max System that whichever option we chose,

the layering ceramic will be the same in all three cases. After preparing the press frame, I begin layering for the first try-in with the help of the silicone model based on the provisional (Figure 7a-d).





Figure 8a-b. The try-in of the layered ceramic.



Figure 9a-d. The finished case.

During the try-in of the first firing, I check if the dentin colour equals the colour of the adjacent teeth. If a small correction is needed, I correct the difference with IPS e.max Essence. I use a try-in paste (Ivoclar Vivadent, Variolink Try-In Medium Value 0) in order to get a realistic image of the colour. At the second try-in, I try the fully layered and contoured crowns, again with the try-in material containing glycerin (Figure 8a-b).

**Tip:** *Don't let the teeth dry during the try-in! The adjacent teeth should be constantly moisturized.*

After the glaze firing, I modify the brightness level of the dental surface by mechanically polishing. If I find that the colour is not perfect, then I can modify the restoration's colour with different try-in pastes varying in lightness value. When both technician and patient are happy with the result, the information relating to the try-in pastes can be relayed to the clinician (Figure 9a-d).

## Conclusion

Conscious planning, preparation and implementation always lead to a rewarding outcome. Creating the restorations in a well thought out way and using trustworthy materials causes less headaches and far more predictable results.

## Acknowledgement

Special thanks to Dr Attila Bodrogi for the excellent clinical work.

## About the author

*Szabolcs Hant has recently migrated from Hungary to Perth. He has a wealth of experience and knowledge relating to aesthetic all-ceramic cases. If you are interested in any of the techniques or theory's outlined in this article, contact Core Dental Ceramics on (08) 9315-9411 or coredentalceramics@inet.net.au*