# Smile Awards 2009 case study

**Simon Caxton from Amdecc Laboratories demonstrates how he solved a patient's problem with seven IPS e.max pressed porcelain veneers and one IPS e.max pressed ceramic crown. This case was shortlisted for The Smile Awards Aesthetic Technician Award**

## Introduction

There are many porcelain systems available, both pressed, and layered, that could accomplish this same goal. Communication between the laboratory and the dentist is very important, as is the desires of the patient. It is down to the ceramist to use all the information available to match the restoration to the natural dentition.

## History

In July 2008 Mike went along to The Smile Spa to see Dr Simon Andrews as he was unhappy with his smile. The UL1 was rotated distally by approximately 70-80˚s. UL2 had an old PFM Crown with a metal post and core. Mike was also concerned about the small gap that he had between the lower centrals. He also wanted the lowers to be a little straighter as the LL2 was slightly rotated mesially. Mike was looking for Dr Andrews to achieve a nicer, straighter, brighter smile with the minimal amount of work necessary to fit in with the existing dentition.

## Treatment plan

After a discussion with Dr Andrews, it was decided that seven pressed porcelain veneers and one pressed ceramic crown would be used to restore the upper right lateral to upper left lateral with the Crown being on the upper left lateral. A High Opacity Coping would be used to mask the dark metal post and core. The lower right lateral to lower left lateral would all be veneers. I used a pressed material to restore this case as I required a material that was going to be strong because of the minimal preparations. E.max press has a flexural strength of 400MPa compared to Feldspathic Porcelain that is around 110MPa.

Mike also requested his teeth to be brighter, so some bleaching was carried out using The Brite Smile system.

After a further conversation with Dr Andrews, a full anatomical diagnostic wax up was made of UL2 to UR2 and LL2 to LR2 and a trial preparation model showing the ideal preparations for pressed ceramic restorations was provided. The teeth were prepared for veneers with a labial reduction of about 0.8mm. The mesial and distal contacts were broken on the uppers to allow the restorations to be made to a better alignment with no rotation and a better width to height ratio that fitted in with the rest of the dentition. With the aid of the Optident Trueshade Shade Light, the foundation shade of the preparations for the veneers was recorded at ND2 using an Ivoclar Vivadent Natural Die Material Shade Guide. The finished temporaries were then made using a putty matrix taken from the diagnostic wax up. Luxatemp Shade A1 was used to do this. Minimal preparations were carried out on the lowers with no breaking of the contacts apart from the mesial contacts of the Centrals. These were finished more lingually in order to close the small dark triangle.

The UL2 which had the post and core was reduced by another 0.5mm labially and the margin finished sub gingival to allow for the High Opacity Coping. The IPS e.max High Opacity Ingots are available in one shade and, due to their higher opacity, are ideal for the fabrication of frameworks on devitalized or severely discoloured preparations, as well as to partially cover metal core build ups. The higher opacity adequately masks the

Simon qualified from Lambeth college in 1997 obtaining a BTEC National Diploma in Dental Technology, joining Amdecc in 1999 as a Metal-Work Technician. With a willingness to progress to the highest standards in dentistry, in 2003 he made the transition to full-time ceramist specialising in pressed ceramics and CAD/CAM. Simon has a full function knowledge of all the smile design principles which he applies to all his work. Having used IPS e.max since Sept 2006 Simon has attended courses in Europe and the UK with master ceramists Gerard Ubassy and Oliver Brix, learning to get the most from IPS e.max.

### Treatment list

- Upper Left Lateral to Upper Right Lateral
- Lower Left Lateral to Lower Right Lateral

### Restorative material

- IPS e.max Press Layering Technique
- IPS e.max Ceram
- IPS e.max Press Ingot HTA1
- IPS e.max Press Ingot HO

### Adhesive system

- Acid Etch
- Optibond Solo
- Variolink – Clear

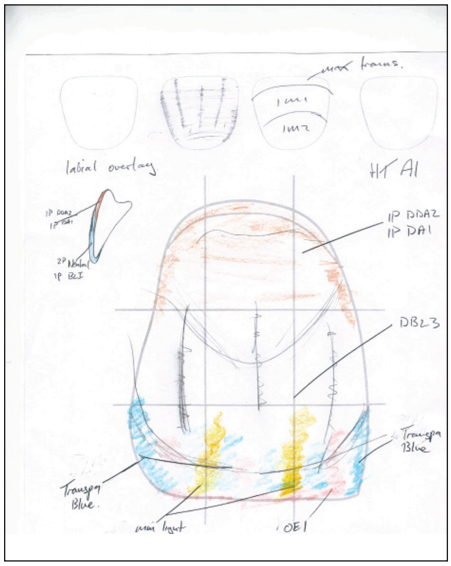


Figure 1: Matching shade to photo and dentist prescription

Figure 2: Pre-op

Figure 3: Taking the stump shade

Figure 4: Temps in place

substructure and enables the fabrication of lifelike restorations even in situations with difficult or very dark preparations.

Although it is possible to build the Ceram material onto the High Opacity material, I was using the HT A1 Ingot on the other frameworks and was looking for a more uniform colour. In my experience I would not have been able to achieve this by building the Ceram material directly onto the HO Ingot.

## Laboratory procedure

The coping was placed over the metal post and core to ensure that any darkness of the core would not shine through the new all ceramic restoration. This was carried out by waxing a coping slightly bigger than the core to a thickness of approximately 0.7mm. This was finished to the bottom of the core and inside the prepared margin, leaving a 360° shoulder of approximately 0.5mm. The coping was shaded using Ivoclar Shade No.2 to make it a similar shade to ND2 on the shade guide. This then ensured that all the upper preparations were the same colour.

Once the models were prepared and mounted on a Denar Articulator using the records provided, all the restorations were waxed up to 60-70% of the final size of the restoration, including the UL2 which had a Crown framework waxed over the High Opacity Coping.

The framework was chosen to be pressed into an e.max High Translucency A1. We chose this shade of ingot as the shade given by Dr Andrews was a 3D shade 1M2 neck and 1M1 body with maximum translucency. The shade A1 is slightly darker than 1M1 and slightly lighter than 1M2.

The High Translucency Ingot will pick up some of the underlying foundation shade and this can be used to give the final restoration its natural look. The ingot restorations were fitted down to their individual dies. The sprues were then removed and reshaped in preparation for the e.max Ceram layering material. Before the first build up of the porcelain, the frameworks were fitted onto dies made from Natural Die Material. This is a light curing composite that simulates the shade of the prepared tooth. In this case it was ND2. This allowed us to check the shade of the restorations throughout the build up. Once the framework had been checked on the Natural Die Material Dies, the pre-op photographs that had been provided by Dr Andrews were studied.

This allowed us to pick out the finer details in the incisal translucency and the texture of dentition that was not to be restored. A drawing was made of the interpretation of this and it was noted which effect porcelains had to be used. Please see Figure 1.

The final part of the build up is to do a wash coat of porcelain in order to give a good bond between the layering ceramic and the framework. The drawing was then referred to, to start the build up of the different dentine, enamels and translucent effects. A small amount of e.max Shade Paste No.2 was used in the cervical area to give a greater depth of colour and to slightly mask the A1 framework, as the desired shade in this area was 1M2, which as mentioned earlier is slightly darker than A1. In the cervical area one part Deep Dentine A2 and one part Dentine A1 was used. Deep Dentine A2 was used to enhance the chroma and reduce the brightness value of the A1. Dentine BL3 was then used, which is a bleach shade that is roughly two shades lighter than A1. This was used because I still wanted to pick up the A1 shade from the framework and the colour from the preparation, but I also wanted to increase the value in this area. By using this shade we were able to achieve this.

The dentine core is layered to full size with various dentine materials and subsequently reduced according to the form that was required, so that it represents around two thirds of the total layer thickness. The incisal area was lengthened which consisted of the various incisal and Transpa effect materials. The materials that were used were Transpa Blue, which has a translucent blue/grey effect. This was used in each corner along the mesial and distal ridges and in small amounts along the incisal edge. I also used MM Light, which is a pale yellow colour and enabled me to produce a mamelon effect.

This was also used along the incisal edge, along with Opal Effect No.1, which has a slightly cloudy, clear/grey effect. Whilst building these effects I continuously refer to the drawings that I made and the pre op photographs that were provided. Finally a thin layer of one part BLI Incisal and two parts Transpa Neutral was added to cover the labial aspect of the restorations and a small amount of the Deep Dentine A2 and Dentine A1 was added in the cervical area to improve the final contour. This first build of Ceram material was fired at 750°C.

After the first firing the restorations were once again checked on the Natural Die Material Dies to see if the shade matched that of the prescribed shade. The 3D shade guide tabs of 1M1 and 1M2 were also referred to, ensure the correct colour saturation in the areas required.

The restorations were then fitted to the working model and an uncut solid model to check the interproximal contact points and that the black triangle between the two lower Centrals had been closed. Following the corrective firings (at 740°C) that were made using the relevant materials e.g. dentine or enamel, the shape of the restorations were adjusted and the surface texture was created. Once the final shape and texture of the restorations were satisfactory, they were checked on the

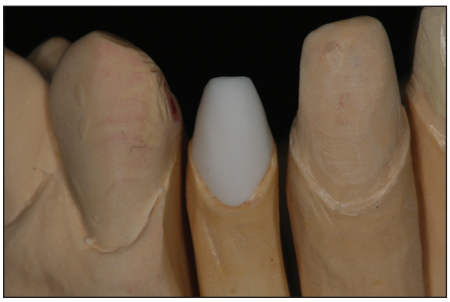

Figure 5: HO Ingot before staining

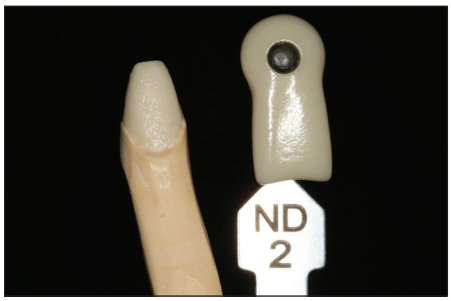


Figure 6: Matching HO ingot to shade guide

Figure 7: HO ingot after staining

Figure 8: Fitted veneers labial view

Figure 9: Fitted veneers right lateral

Figure 10: Fitted veneers left lateral

articulator making sure all excursive and protrusive movements and all other contours were satisfactory.

They were also checked once more on the Natural Die Material Dies and a light layer of stain liquid was painted on the labial surface to mimic the final glazed appearance. This showed the incisal effects and the final shade. When I was happy that the shade was correct cleaned the restorations were cleaned and the final glaze was carried out using a diluted mixture of Glaze Paste and Stain Liquid, in order to prevent a high glaze. This was fired at 725˚C. Finally I achieved the degree of lustre that I required by mechanically polishing with rubber wheels and finishing with diamond polishing paste. After thoroughly checking to ensure all criteria had been met, they were cleaned and etched.

I was delighted with the end result and was very happy with the effect accomplished and was pleased to be able to send it onto Dr Andrews for fitting.

## Conclusion

Seven pressed ceramic veneers and one crown were used to restore Mike's smile and improve aesthetics. The strength and lifelike attributes of IPS e.max Press and IPS e.max Ceram blended well with the existing dentition. Mike was very pleased with the end result.

Figure 11: Restorations on model

Figure 12: Pre-op


Figure 13: Simon Caxton at the Smile Awards

Figure 14: Fitted restorations post op

## Acknowledgements

I would like to thank Dr Simon Andrews for his support and help during my work on this case and for the positive feedback given.

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