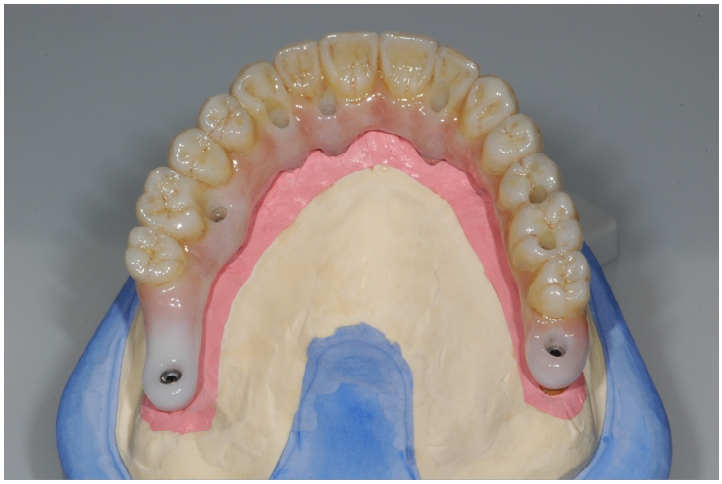
KERENOR Dental Studio Dentaire inc.

Dental Work for Connoisseurs

WHEN ALL ELSE FAILS...

BY DR. SYLVIO CARO, B.A., D.D.S., Dip. Pros.
AND MR. HAIM KEREN, CDT.

CREATING PERFECT FULL CONTOUR ZIRCONIA RESTORATION ON IMPLANTS



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When All Else Fails!!!

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The following article is a case history from the office of Dr. Sylvio Caro, a prosthodontist from Westmount, Canada.

The patient, a 72 year old male, arrived to our clinic with a failing maxillary restoration on implants (hybrid bar on 10 Zimmer implants). When the restoration was removed for evaluation the reason for the failure became apparent. The bar was not passive and there were stress cracks all over the metal structure (see fig.1a,b). Two of the implants were no longer integrated and needed to be removed, however the others were stable and deemed sufficient to support a new maxillary fixed prosthesis. After taking a history, it became clear that it was not the first time this restoration had failed. In the past 10 years the hybrid bar was redone twice and repaired numerous times. The patient is a bruxer and kept fracturing the denture teeth from the bar as well as cracking the metal structure itself.

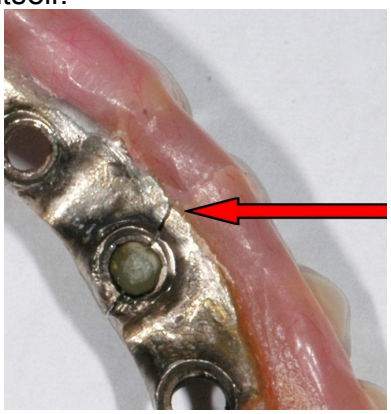
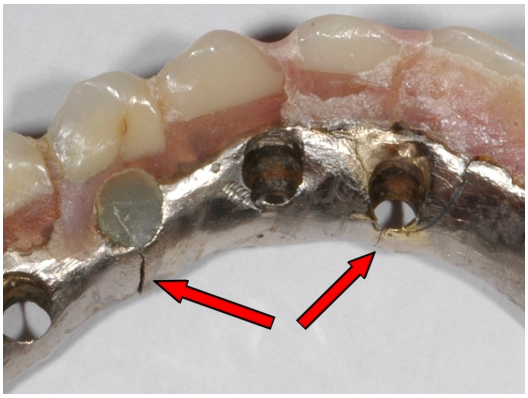


Fig.1a



Broken Hybrid Bar **Fig. 1b**

It was clear that in order to create a successful and long lasting restoration we needed to assure a *complete passivity* of the prosthesis on the implants (eliminating the strain on the bar and the implants) as well as create a one piece restoration (eliminating the failure of acrylic and denture teeth on the hybrid bar). Unfortunately, with ceramo-metallic restorations it is virtually impossible to obtain complete passivity. Even after sectioning and soldering the framework, the metal will always distort, however slightly, during the ceramic bake. In addition, to deal with the bruxism problem we would have had to establish a full metal occlusion to eliminate chipping of the ceramic. As such, a one-piece metal restoration is probably not the ideal solution for this case, however until only couple of years ago it was the only solution available. Today we know that the best material for

this type of restoration is Zirconia. This is the only material that, once processed, is not controlled by the ceramic (that is to say it doesn't distort during the ceramic bake). In addition, this material will give a perfectly aesthetic appearance to the restoration even without a veneering ceramic layer (i.e. a full Zirconia occlusion).

The only system today that enables us to mill such a complex restoration out of Zirconia is manual milling system. In addition, we may use ZirkonZahn's Prettau Zirconia – a new, more translucent Zirconia block that gives us the possibility to create very natural looking full anatomical contour restorations.

Back to our case; the decision was made to use the 8 remaining implants for the restoration (see master model, fig.2).

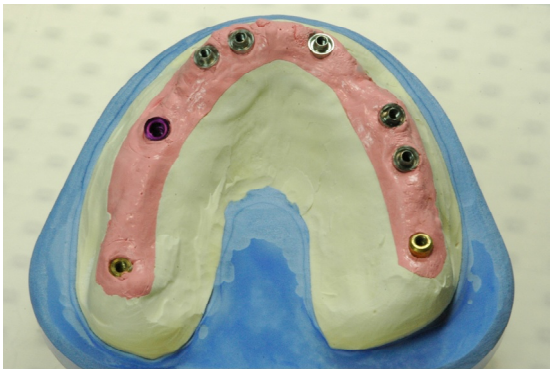


Fig. 2 Master Model

The first step is the denture set-up (fig.3). This is a very important step since it gives us the chance to see the shape and size of the final restoration and make all necessary adjustments prior to milling of the Zirconia.

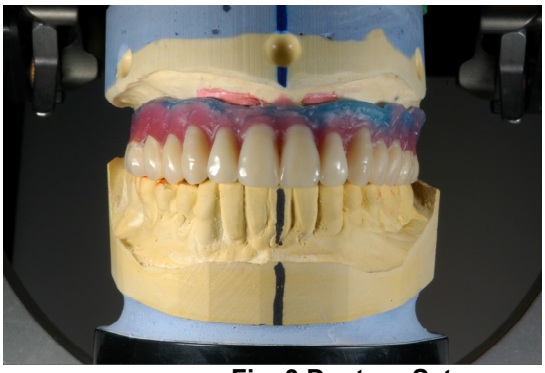


Fig. 3 Denture Set-up

The set up is then duplicated and transformed into an epoxy frame with titanium temporary abutments embedded in it (fig. 4). The epoxy frame is now ready for try-in in the patient's mouth (fig.5).

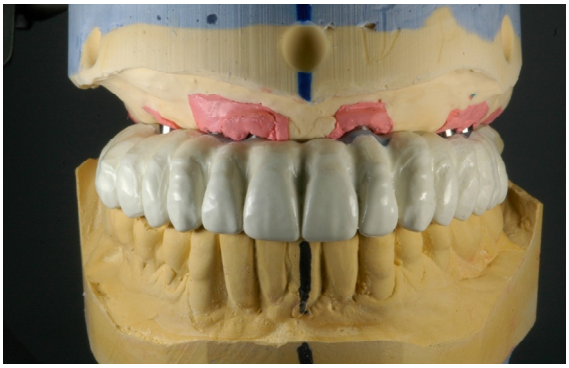


Fig. 4 Epoxy Frame with Temporary Abutments



Fig. 5 Try-in of the Epoxy frame

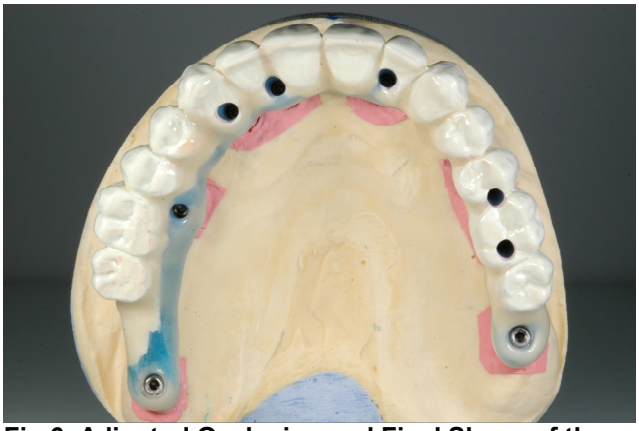


Fig.6 Adjusted Occlusion and Final Shape of the Restoration

During this try-in the dentist can finalize the shape of the teeth as well as establish and confirm the occlusion. Once established, the occlusion will be replicated in the Zirconia restoration; therefore, it is very important to make the necessary adjustments in this stage to minimize working on the sintered Zirconia (fig.6).

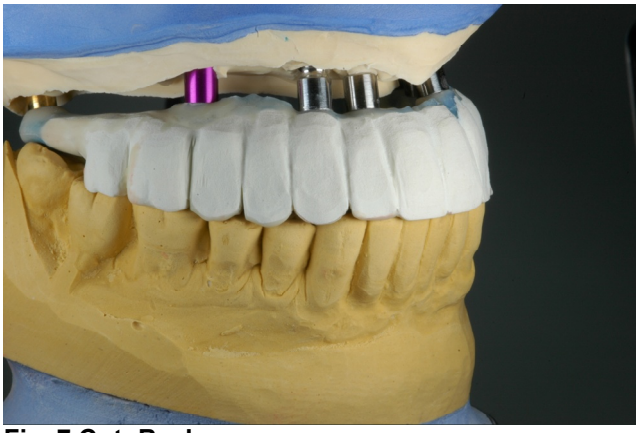


Fig. 7 Cut- Back

After the try-in, the epoxy frame is cut back on the buccal aspect of the teeth to allow space for porcelain veneering. The posterior teeth and the occlusion remain in full anatomical contour and will not have any porcelain added (fig.7). At this stage, the frame is ready for milling.

The frame is then copy milled into a Zirconia blank (size 16, 22 mm high) with the manual milling system. The occlusion is given all the characteristics (fig. 8, 9) and the restoration is stained in this pre-sintered stage with special coloring liquids to ensure an even more natural look of the sintered restoration.



Fig. 8 Pre-sintered Restoration Occlusion View



Fig.9 Pre-sintered Restoration – View from Underneath

After sintering (fig. 10), the restoration is placed back on the model. Careful work done previously on the epoxy frame ensures minimal adjustments will be needed in the sintered phase and the bridge should fit perfectly on the model with no rocking or tension. (fig. 11). Since the occlusion was established and adjusted in the epoxy stage, there should be no need to adjust it after sintering. The occlusion will be lightly stained with a special Zirconia stain to give it more natural characteristics.



Fig. 10 Sintered Restoration

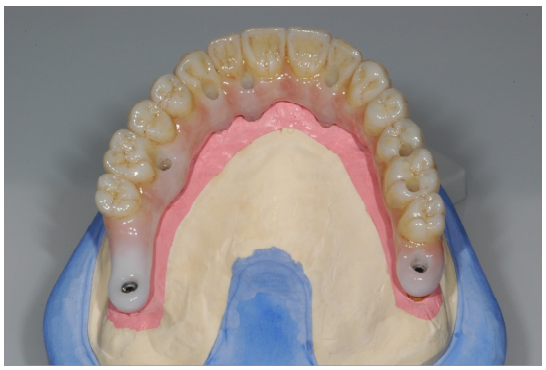


Fig. 11 Sintered Restoration on the Model

The last step is the ceramic veneering. The ceramic is applied to the buccal of the anterior teeth only virtually eliminating the danger of chipping of porcelain, even with heavy bite (fig. 12a,b,c,d).



Fig. 12 a



Ready Restoration

Fig. 12 b



Fig. 12 c



Fig. 12 d

It is very important with large Zirconia structures to be familiar with the technical know-how when firing the porcelain. Restorations like this need to be fired at different temperatures and rates than a single coping or small bridge in order to ensure that there will be no shearing of the porcelain. Finally, the restoration is glazed and polished and ready for delivery.

The final delivery is (unbelievably) the easy part. Since all adjustments were done at the epoxy stage and since there is virtually no dimensional changes in the final product, the restoration is simply screwed into place and we have one very satisfied customer with a very aesthetic and pleasant to wear restoration (fig. 14a,b,c,d). We also are very confident that the restoration will finally last, since it is completely passive and very strong.



Fig 14a



Fig. 14b

Final Delivery



Fig.14c



Fig.14d

Zirconia is repeatedly proving itself a superior material for any type of dental restoration. In cases of great complexity, Zirconia is our closest ally (both for dentists and technicians alike) and it is important to know and understand that the technology exists to make Zirconia work for us where all else has failed.

About the authors:



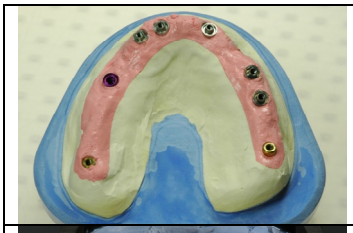
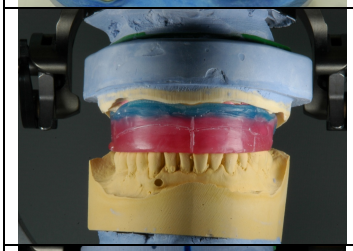
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Dr. Caro presently has private practice in Prosthodontics in Westmount, Quebec. He is as well teaching Prosthodontics and Implant Dentistry, McGill University and training residents in Prosthodontics and Implants in Jewish General Hospital. He is living in Montreal, Canada.



Haim Keren, CDT, is an owner of KerenOr Dental Studio in Montreal, Canada. He is a second generation dental technician and been in the profession for 20 years. He was graduated in Israel as a Certified Dental Technician in 1988. After graduating, he received further two year training and education in Germany. During his professional carrier, Haim took many courses and seminars in order to stay current with all the innovations in dental industry. In 2006 he took training at ZirkonZahn, Italy with manual milling system and at the same year his lab became North America first full service all Zirconia laboratory.

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PROTOCOL FOR CREATING Z-BRIDGE (FULL CONTOUR ZIRCONIA BRIDGE) ON IMPLANTS

	**STAGE 1** Taking impression.
	**STAGE 2** a) Try-in of a base plate with the wax rim. b) Choosing denture teeth that will be closest in shape and size to the final look of the restoration.
 	**STAGE 2** Try in denture set up and verification jig. Correcting denture set-up if necessary and taking x-ray with the jig to verify the fit on the implants.
	**STAGE 3** Try-in of the epoxy mock up of the set-up. Verifying emergence profile; making necessary corrections to the shape of the restoration; balancing and finalizing occlusion.
	**STAGE 4** Delivery of the restoration.