

The Dent-Liner™

A Bulletin Dealing With Issues For Dental Health Professionals

How to Make Zirconium Restorations Retrievable?



Peter T. Pontsa, RDT has over 39 years of experience in the dental profession. In 1991 he established Dent-Line of Canada Inc. and is currently president of this dental supply company. He is a leader in superior professional techniques in fixed and removable restorations and he shares this knowledge through articles and seminars which he regularly provides. Peter is a past president of the College of Dental Technologists of Ontario and a current member of the Academy of Dental Technology. He is also pleased to be involved as co-publisher of Spectrum Denturism.

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The use of custom screw connections in conjunction with implant supported zirconium oxide restorations is on the increase. This is due to the new CAD/CAM technologies that are emerging with an ever increasing rate. This unprecedented growth has increased the demand to alter existing techniques for adaptation to the new materials. Bredent has added a tool set for zirconium that may be used in combination with the standard 1.4 mm tool set. The zirconium tools used for processing zirconium blanks are 30% larger than the standard ones in order to compensate for the shrinkage which occurs after firing green stage zirconium. This tap and screw technique for retrievable zirconium restorations entails using a hand piece and a milling machine.

To begin with, the implant abutment must be made of either gold alloy or titanium; harder alloys are much more difficult to penetrate and tap. A rich quantity of milling and drilling oil must be applied during each working process to obtain trouble free drilling that prevents tools from getting stuck and jammed and thus creates a predictable result. Use of this oil also ensures a long service life for the drills and taps. To provide a dependable screw connection, the abutment must have a minimum thickness of 1.2 mm at the point where the titanium screw is to be located. The secondary element or in this case the implant abutment must have a

minimum thickness of 0.8 mm. When preparing the implant abutment, using a 2° milling bur will provide a milled conical shape suitable for all ceramic restorations. It should follow the path of insertion and be highly polished. In cases of single tooth restorations the implant abutment must be flattened on one side to provide for anti rotation of the crown.

The coping can be produced using modeling resin such as PI KU Plast HP 36 as the base and then the final shape waxed to the final contour. There should be a short sprue attached to the lingual of the wax up so as to accommodate the screw connection (about 4mm). The completely modelled wax crown is positioned into the cutting frame of the CAD/CAM milling unit. After the milled blank is processed and the zirconium coping is removed from the blank it should be drilled through the sprue area on the lingual. This procedure is done with the Diatit Multidrill Zirkon from the assortment set. Drill through the coping in the direction of the position allocated for the screw, keeping a maximum speed of 5,000 RPM. The drill hole is then enlarged using the tungsten carbide facing cutter. To avoid making the hole too large for the screw head, the drilling process must terminate the instant the carbides blades become visible inside the unsintered zirconium coping. Subsequently the implant abutment is transferred to a milling **continued on page 3**

What is a Diagnostic Wax-up?

A diagnostic wax-up is used for functional and aesthetic treatment planning of a dental restoration and is fabricated on study models or master models in the articulator on different types of frameworks (metal or all-porcelain). The teeth are waxed-up to their final size and shape in white or tooth colored sculpturing wax. The wax-up is normally fabricated by a dental technologist in a private or commercial dental laboratory. Fabricating a diagnostic wax-up on a study model allows precise planning of appropriate treatment plan and

produces a representation of the predicted treatment outcome. A diagnostic wax-up is also used to give the patient an idea of the final restoration. First the patient is provided with a bridge veneered with wax at the frame work try-in stage. The advantage of a wax facing is that it provides the shape of the subsequent porcelain facing at the metal framework try-in stage and allows any adjustments to be made, e.g. removal of high spots at a very early stage so that subsequent grinding of the porcelain is not required. **continued on page 2**

What is a Diagnostic Wax up? cont'd...



opaque

Use Renfert's opaque diagnostic for wax-ups with metal frameworks.



transparent

Renfert's transparent diagnostic wax is best suited for pressable ceramics.



Renfert's Geo Snow White Diagnostic Waxes



Renfert's new Ceramicus brush moistens porcelain perfectly.



Bredent's Zirconium Tool Set, part number 33024324.

The color of the wax is also much closer to the shade of the final facing than the color of conventional sculpturing waxes, providing the patient with a clear representation of the final restoration. If the patient and the dentist are satisfied with the try-in of the restoration, a lab putty overcast that retains the dimensions exactly is fabricated by the dental technologist in the laboratory. In this instance the lab putty overcast is an impression over the wax-up and some adjacent teeth that are used as a template in subsequent working stages for checking dimensions. The wax then has to be removed and the framework cleaned (boiled off and /or steam cleaned). The porcelain is then built up using the standard technique, i.e. the porcelain is mixed and applied with a brush. During porcelain application the technologist checks the dimensions with the aid of the overcast; this technique ensures that final porcelain facing corresponds to the wax try-in shown to the patient.

Another main area of application apart from fabricating diagnostic wax-ups on bridge frameworks (metal or porcelain) or models is waxing up facings on telescopic partial dentures, in which only the secondary telescopic crowns intended for try-in are veneered. The term diagnostic wax-up also applies in these cases.

Telescopic dentures are removable restorations and usually consist of a CrCo framework and secondary telescopic crowns (primary telescopic crowns are retained intraorally with cement); secondary telescopic crowns are often faced with composite after try-in. The secondary crowns are first faced with wax, i.e. waxed up, so that the patient does not get a false picture of the restoration on seeing the metal of the crowns to be veneered. Renfert has two different types of Geo Snow-white wax, opaque and transparent. The opaque wax has excellent masking properties, even in very thin layers, due to the higher proportion of opaque material, which is essential when fabricating a wax-up on a metal framework. This wax should not be used for waxing up crown patterns for pressable ceramics since this wax contains metal oxides and they do not burn out cleanly, with the result that residue remains in the mould and may subsequently be visible in the porcelain.

The transparent wax on the other hand is ideal for waxing up pressable ceramic restorations (for veneers) as the wax burns out without residue. Metal components are not masked to the same extent by the transparent wax. Both waxes can be used for other crown and bridge wax patterns.

Source; Renfert

Featured Product; Renfert's New Ceramicus Brush

The new Ceramicus Brush is composed of a new type of brush bristle that has properties superior to those of natural hair or synthetic brushes currently in use by ceramists. The brush tip can be immediately reshaped and cleaned; a quick flick or tap on the edge of the bench is sufficient. It is not necessary to continually rinse the brush tip to shape it. Also it does not have to be dipped in water as often to moisten it. Porcelain specialists will like that the brush tip remains perfectly formed and that

there is sufficient tensile force for picking up larger amounts of porcelain. The brush can also be used to build and shape inter dental regions without the use of a metal instrument. The brush tip moistens porcelain perfectly, whether used together with a "Tropicana" mixing palette with its special capillary moistening function or with just a completely normal glass slab. The ceramicus keeps porcelain in its optimum condition. **For pricing and more info contact the dent-line order desk at 1-800-250-5111.**

Featured Product; Bredent's Zirconium Tool Set

Bredent's new Zirconium tool set is an additional assortment to be used in combination with their other existing tap and screw assortment kits. The preparation of screw connections in zirconium restorations are simplified and are easier to prepare because of these oversized burs. They are 30% larger in order to compensate for the shrinkage of zirconium and allow precision fit screw connections. The

tool set contains 3 pieces; a diatit multi-drill, a facing cutter and a positioning pin. Whatever CAD/CAM system is utilised, the zirconium tool set can provide predictable results, especially when retrievability is required on implant supported restorations.

Please call dent-line for availability, information and pricing at 1-800-250-5111.

How to Make Zirconium Restorations Retrievable? cont'd...



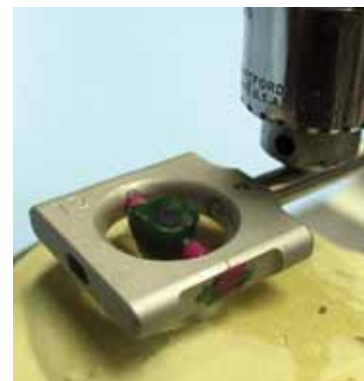
A 2° milling bur is used to create a conical shape of the abutment.



Wax up the secondary part with Pi-Ku-Plast modelling resin.



Wax up with a thickening (4.0 mm wax sprue) for the screw head.



Positioning of the wax up into the cutting frame.



Milled crown made from "Cercon". (Degudent).



Use a 30% larger primary drill to allow for shrinkage.



The countersink should also be 30% larger.



Measuring out the direction of insertion.

model since this ensures free access to the desired drilling point. Place the sintered crown on the abutment and tilt the milling table until the drill hole is in the vertical position. Place the positioning tool into the drill hole and align vertically using the Brenometer locating pin and then fix the position of the milling table. The locating pin in the milling machine is replaced by the positioning tool and is inserted into the conical counter bore of the ZrO₂ crown once more. If the axial direction is correct, the position is fixed mechanically on the milling table and the zirconium crown is removed. The tungsten carbide center drill 1.4 mm is clamped in to the milling machine chuck and a small depression is drilled into the abutment while adding milling and drilling oil. In order for the technique to work the wall thickness should be at least 1.2 mm. The Diatit- Multidril 1.2 x 5 mm is placed in the chuck of the milling machine hand piece and used to drill a hole through the first wall of the abutment. Place the zirconium crown back onto the abutment and then drill into the abutment with the tungsten carbide facing cutter up to a depth of .03 mm. The proper depth is reached when the facing cutter reaches the internal conical wall of the

drill hole in the zirconium crown. It is important after counter boring to remove the zirconium crown and insert the titanium screw into the counter bore. The screw head must fit through the counter bore. The screw head must fit through the zirconium crown and the tip of the screw should reach 0.3 mm inside the crown. Any shear stresses between the abutment and the secondary element will not be transferred to the thread of the screw but to the screw head which features much more stability because of the 8° Morse taper. After that, fasten the first tap in the tap holder and cut the thread into the implant abutment by hand (clockwise rotation) without exerting pressure, while applying plenty of milling oil. Two right turns and one left turn (counter clockwise). Continue this process until the first tap penetrates the abutment wall. Remove the first tap by turning anti clockwise (one turn) and clean the hole with compressed air. Fasten the second tap in the tap holder and cut the tap using the same method as for the first tap. After cutting the thread, remove the chips and oil residues carefully from the drill hole. The zirconium crown or bridge is now ready for porcelain build up.

cont'd on page 4



Drilling the hole before cutting the thread.



Veneered coping with the bredent screw.

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How to Make Zirconium Restorations Retrievable? cont'd...

When the crown or bridge is finished to the specifications it can be placed in position on the abutment and the titanium screw turned into place with the hand screwdriver or the hand piece ratchet driver. The screw head is ground flush to the lingual contour of the crown or bridge and can then be polished with the titanium polishing assortment. Ceramic Frame works prepared by CAD/CAM have the highest probable precision known to date and this can not be duplicated with a traditional cast metal restoration. For this reason, it makes ZrO2 a reliable source for offering full ceramic restorations in all formats. Whichever CAD/CAM system is utilized, the zirconium tool set can provide predictable results especially

Special Announcement: Bi-Annual Celebration at George Brown

Every two years George Brown College has a day of celebration for the dental technology students in all three years of the program. The event is sponsored by the dental suppliers, manufacturers and our dental association, the ADTO. This occasion was held on Friday, April 20th 2007 at the dental technology facilities at George Brown. Moderator Bob Mior from Ivoclar introduced numerous speakers throughout the day. They all related their own experiences and described their vision for the future of our profession. Various awards and prizes were presented to the students and staff during the day. Mr. Rick King, RDT an early graduate and his son Lucas a recent graduate and now RDT both spoke about the values of being registered dental technologists. Major prizes were given to the model students of the first, second and third year program. The first year model student was Jen Bateman, who received an IPOD courtesy of Denstply. The second year prize was a Renfert Waxlectric I Spatula which was presented to Mia Park by Peter T. Pontsa, RDT and Angela van Breemen, BA of Dent-Line of Canada Inc. Mia Pak

Special Announcement: Visit to COMPRU

After a busy week at the International Dental show in Köln Germany, Peter and Angela flew to Edmonton on Friday March 30th to visit COMPRU at Misericordia Community Hospital. The Craniofacial Osseointegration and Maxillofacial Prosthetic Rehabilitation Unit was the focus of their visit. We met with Raymond Giguere RDT, CDT and Fari-Karimi Boushehri RDT, CAPPD, CDT two of the technologists that make up part of the unit. We were given a grand tour of the facilities and also enjoyed a power point presentation on some of the cases they have completed. COMPRU is a highly specialized unit that reconstructs the features of patients with head or neck defects. This team includes specialists in surgery, jaw and face prosthetics, hearing, speech, dermatology, pathology and radiology. Their mission is to continuously improve their contribution to patient care, research and education. We thoroughly

now that retrievability is also available.

Source; Peter T. Pontsa, RDT

Bredent products featured in the article:

Milling & Drilling Oil	55000008
Tap & Screw Tool Set	33000600
Zirkon Tool Set	33024324
Piku Plast Modelling Resin HP 36	540002**

**available in blue, red, yellow, orange and transparent.

Brenomenter Locating Pin	31000003
Titanium Polishing Set	35000890

For further details on the product or for price information, contact our friendly staff at dent-line of canada Inc. at 1-800-250-5111 or email us at info@dent-line.com.

averaged an amazing 97% score in her studies! The third year model student was Victoria Wong who received a Kavvo Foot Control and Hand Piece courtesy of Kavvo Canada for achieving the highest grade on the written final. We would like to thank Mr. Bernie Mullen, RDT the Health Coordinator and his dedicated staff for a wonderful day and for organising such an important event.



Model 2nd year student, Mia Park accepts the award from Angela and Peter for her outstanding score of 97%.

enjoyed our visit and came away with a genuine respect for this aspect of our profession.



COMPRU is a world leading rehabilitation facility helping patients regain self-esteem and productive lives.