

# The Dent-Liner™

*A Bulletin Dealing With Issues For Dental Health Professionals*

## Functional Occlusal Morphology: Made Easy



Peter T. Pontsa, RDT is president of Dent-Line of Canada Inc. with over 38 years of experience in the dental profession as a laboratory owner and a technician. 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. He is also a past president of the College of Dental Technologists of Ontario. Currently he is a member of the Academy of Dental Technology.

The art of preparation and waxing technique for creating functional occlusal morphology by the adaptive waxing method requires mastery of human anatomical features. The dental technologist understands the relationship of occlusal morphology to mandibular movements and should be able to discuss how differences in mandibular movements affect occlusal form. They recognize, and are able to solve clinical interactions like the concepts of centric relations and centric occlusion. They also should be able to define occlusal contacts, functional occlusal morphology, mandibular elements and movements, sagittal and horizontal pathways of occlusion, frontal excursions, and categories of articulators. When re-establishing functional cusp to fossae occlusion, centric occlusion is frequently incorporated into fixed prosthodontic restorations. This reinstatement of function starts as wax patterns shaped as natural tooth surfaces. A dental technologist usually has some discretion in deciding how these patterns are

shaped based on their experience and training in occlusal wax techniques. Within limits, this means that stamp cusps (lingual of upper and buccal of the lower) can be deliberately waxed into the fossae and that cusp arms can be notched for better lateral excursion clearance. When a dental technologist places shearing cusps on a wax pattern they are positioned to avoid collision with maxillary stamp cusps on a working excursion. The idea is to reproduce cusp to fossae contacts as they originally occurred. It also may be possible to change cusp-embasement contacts over to the more desirable cusp fossae range, by appropriate carving of wax patterns. When a dental technologist fabricates chewing surfaces for a prosthesis in an articulator, the alignment of occlusal ridges and grooves will be determined by the lateral movements of stamp cusps in and out of centric occlusion. If the ridge and groove alignments as

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## Hollow Pontics: Comparisons Between Feldspar & Pressibles

The hollow pontic technique was developed to eliminate the inconsistencies and problems associated with conventional crown and bridge fabrication. Some of these are contraction cavities, non-homogeneous stresses, cracked connectors, instability and differences in thermo expansion during firing between crown and pontic because of excessive weight when using precious metals. The object of this technique is primarily to produce crowns and pontics with "balanced" volumes after casting. In order to achieve this, the pontics were designed to be hollow. During solidification of solid pontics, a contraction process is initiated which leads to metal being drawn away from the thin sectioned, adjacent crown to the centres of the solid pontic. Therefore, in cases involving large pontic construction surface defects such as porosities and contraction cavities can be caused around the connection of the sprue to the pontic. What will occur in any case is that

the cast structure of the connectors between the separate pontics will not be homogeneous. This together with micro-fine or even visible cracks can lead to a cumbersome loss of stability. Another development to counter act porosity and improve micro grain structure of the metal is a "square" sided spruing wax called "Quadro Spool Wax". Research confirms that round conventional sprues create turbulence in the metal as it spins through the sprue channel. The square sided Quadro sprue prevents circumferential spinning and forces the metal to flow into the center as the gas air flows into the square corners and escapes freely reducing turbulence in the sprue channel. The result is a finer and more condensed micro grain structure of the metal. Hollow pontic wax units provide contraction and stress free metal sub frameworks.

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### Special Interest Articles:

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- Hollow Pontics: Comparisons Between Feldspar & Pressibles

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## Hollow Pontics - cont'd...



Hollow Pontic Blocks hpbl - top view of anteriors.



Hollow Pontic Blocks hpbl - side view of posteriors.



Hollow Pontic Blocks hpbl - top view of posteriors.

*The Hollow Pontic Technique eliminates contraction of cavities, non-homogeneous stresses, cracked connectors, instability and differences in thermo expansion during firing between the crown and pontic.*

*This technique produces crowns and pontics with balanced volumes after casting.*  
Source; Peter T. Pontsa, RDT

As the volumes of the cast crowns and pontics are well balanced, thermo expansion and many other problems disappear as well as reducing 58% of the metal used for pontics. Hollow pontics are an excellent candidate for the pressible ceramic technique. In a situation where a metal sub frame is going to be used as in the (PFM) technique certain precautions should be taken. The finish line should be placed at the joint of the axial walls with the shoulder. This allows for butt joint ceramic margins, and prevents metal showing through and contacting the oral tissues. Semi-precious, precious alloys and non precious metals can be used with pressible ceramics, however we must respect the coefficient of the thermal expansion and make sure that there is a compatible factor at work in order for success. Normally the framework is opaqued including the area inside the hollow pontic: Using the adaptive wax technique apply ash free wax and replicate the finished porcelain. Ash free wax leaves no residue in the mould after burn out. The wax up can be done in the cut back method or for full contour. This depends on the ensuing technique of layering or external staining. The lost wax method incorporating hollow pontics ensures absolutely no porosities and zero shrinkage of the pressed ceramic restoration. In the traditional method the hollow pontic usually is filled and baked before applying the opaque. There is also a

method where rods of varying size of ceramic, using opaque and dentine are baked before and inserted into the hollow pontic at the wax up stage and cast directly to the metal. This saves time for the ceramist to fill the hollow. The pressible ceramic technique is far more superior in regards to filling the pontic in the immediate pressing of the ingot. Also a study "Comparison of Tensile Bond Strength of a Pressible Ceramic to Metal" has shown that the tensile bond strength of the pressible ceramic to the metal sub frame has been measured and found to be equivalent to that of feldspathic porcelain. Another use for hollow pontics is implant related. When waxing up single units or bridges over plastic cylinders, like the UCLA abutment, just slip a suitable sized hollow pontic over the cylinder and fill any voids between the wax pontic and the cylinder wall. This will cut waxing time considerably and is cost effective. The hollow pontics are available as a mini kit or in larger assortments. They come in 1x4 blocks while the Quadro wax sprues are in rolls and come in three sizes.

Source: Peter T. Pontsa, RDT

Reference: Comparison of Tensile Bond Strength of Press Ceramic to Metal vs. Feldspathic Porcelain Fused to Metal.

D.M.Schweiter, G.R. Golstein, N.R.F.A.

DaSilva, J. Legeros, E.L. Hittelman. J. Dent.

RES. 82, B-181-2003



Bredent's new cross cut milling burs include a new one degree taper bur for easier fit of a shear distributor on the lingual of a crown.

## Product Show Case; Bredent's New Cross Cut Milling Burs

Bredent is pleased to introduce seven new cross cut milling burs with ranges of zero, two, four and six degrees. These new millers have triple the service life compared to the conventional bredent cut. During the manufacturing process, the millers are provided a relief and a cross cut, which allows an optimization of the machining angle so that an excellent cutting performance can be achieved. There is also

a new shape which has a one degree taper. Some master technicians in Germany find it easier to fit a shear distributor on the lingual of the crown by producing a one degree taper angle. Bredent manufacturers this special bur for this very reason. There is also a one degree wax bur to complement the system. For more information concerning these cutting edge milling burs, contact Dent-line of Canada at 1-800-250-5111.

## Featured Product; Bredent's FG Zirconium Diamonds



The FG Diablo is a first class Friction Grip Diamond Grinder.

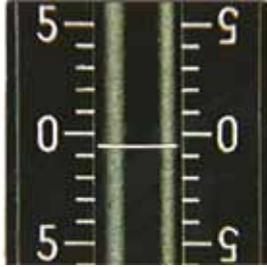
Bredent's FG Diablo Sintered Diamond grinders are made in a special production process which enables them to cut and trim all new generation ceramics such as sintered zirconium oxide, pressible ceramics and CAD/CAM ceramic materials. The Diablos should be used with hand pieces, with spray cooling. This superior diamond grinder cuts

effectively down to the last layer with razor sharp efficiently. The Diablo FG is a very economical system with self regenerating diamond grit and extended durability. There are six different shapes available for various applications. For a brochure or pricing contact our order desk at 1-800-250-5111.

Functional Occlusal Morphology - cont'd...



The copings are prepared as usual, using wax or acrylic.



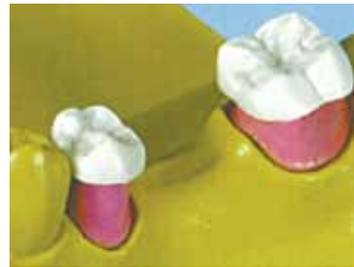
The bite is raised by 0.5 mm in order to compensate for the thickness of the Gnathoflex.



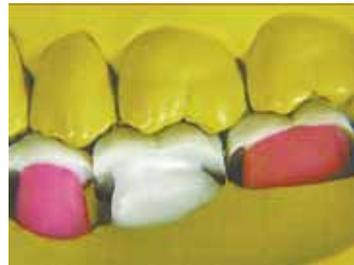
Fill the Gnathoflex with wax and wait until the wax begins to gel.



Once the wax has hardened, place the Gnathoflex occlusal onto the coping.



Close the articulator in the position of the maximal inter cuspidation and attach the occlusal to the coping using a drop of wax. Depending on the situation, two or more Gnathoflex occlusals can be placed simultaneously or one after the other. The contact can be varied by raising or lowering the opposing occlusion.

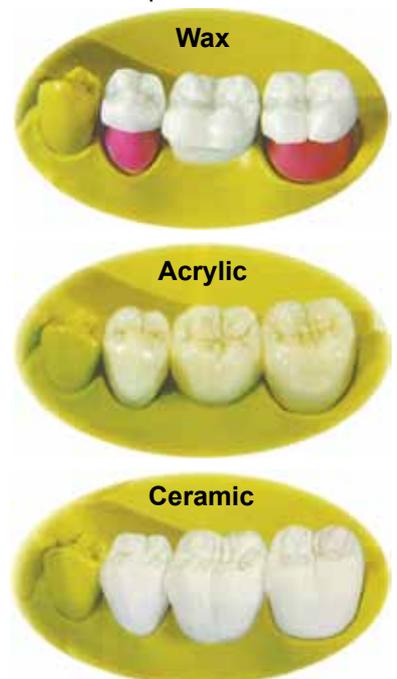


High-lustre, gnathologically shaped wax occlusals with perfect contact to the opposing occlusion are the perfect basis for smooth and precise fitting casting. Gnathoflex Premium helps to save time during the preparation of the wax model as well as during finishing of crowns and bridges.

developed by the articulator conflict with the patient's true lateral movements after the prosthesis is delivered, unpredictable cuspal impacts may occur. This is why the technologist must understand and know the principals of Gothic Arch patterns, since there is a relationship between occlusion and the temporomandibular joint. Peter E. Dawson mentions the difference between properly aligned condyle disk assemblies and those that are structurally deformed temporomandibular joints as "adapted centric posture". Verification of this condition rules out structure intracapsular disarray as a foundation of orofacial pain and creates an accountable course of action for the beginning of occlusal treatment. Static and active occlusal interference frequently needs to be connected by selective rotational axis of the mandible during closure and the

arc of closure on an articulator has been reported to produce occlusal discrepancies. These inconsistencies can alter diagnostic treatments and the occlusal interactions of restorative work being done. When the dental technologist has to reproduce occlusal contacts using the adaptive wax technique the process is time consuming and labour intensive, especially when creating a balanced occlusion (see Renfert's waxing up booklet). In recent years a system known as Aesthetic Gnathoflex was developed to improve the fabrication of occlusal anatomy without much effort and with high occlusal precision. The most redeeming factor to consider is that a junior or semi experienced dental technologist without the knowledge of human oral anatomy will be able to produce accurate balanced occlusions immediately

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### About Our Organization...

The Dent-Liner; Vol. 10 No. 4  
Publisher; Peter T. Pontsa RDT  
Editor; A. van Breemen, BA

Subscription Rates:  
Canada 1 Year \$ 6.00  
USA 1 Year \$ 8.00  
International 1 Year \$16.00

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## Functional Occlusal Morphology - cont'd...

by using this system. The assortments provide all upper and lower anatomical occlusal shapes in three sizes. Gnathoflex are made of teflon silicone and with a thickness of 0.5 mm are quite flexible. They are heat resistant with usage up to 250° C for full contour anatomical wax ups, which are required for pressible ceramics or full metal crowns. They are also ideal for use with composites and porcelain. The articulator has to be adjusted open by 0.5 mm to compensate for the form in order to duplicate the balanced occlusion. The Gnathoflex form will follow the contours of the opposing occlusal arch and no matter what the shape, it will always leave anatomical cusps and fissures that are in group function. The system only has to be bought once since the Gnathoflex moulds can be re-used over and over again. There are various assortments of Gnathoflex

available to suit the dental laboratory's needs.

**Source Peter T. Pontsa;**

**References; (1) New definition for relating occlusion to varying conditions of the temporomandibular joint. P.E. Dawson, Journal of Prosthetic Dentistry Vol. 74, Issue 6 pages 619-627 Dec. 1995. (2) Pattern of occlusal contacts in lateral positions: Canine protection and group function validity in classifying guidance patterns. T. Ogawa, T. Ogimoto, K. Koyano, Journal of Prosthetic Dentistry Vol. 80, Issue 1 pages 67-74 July 1998.**

**(3) Generated paths for ceramometal restorations. S.R. Curtis, Journal of Prosthetic Dentistry Vol. 81, Issue 1 pages 33-36 Jan.1999. Occlusal plane discrepancies generated by transverse horizontal deviations. J.F. Bowley, S.M. Morgano, Journal of Prosthetic Dentistry Vol. 86, Issue 1 pages 67-73 July 2001.**

## Special Announcement: Donation to George Brown

Dent-Line of Canada Inc. is pleased to announce an equipment donation to the Dental Technology Program at George Brown College. On October 4th, Peter T. Pontsa, RDT, President of Dent-Line of Canada Inc. and Angela van Breemen, BA, Vice-President, were at George Brown College to donate a Renfert Silent Dust Extractor unit and also a Dustex Master Dust Box with extraction port. On hand to receive the gifts were Mr. Bernie Mullen, RDT, the Dental Health Coordinator and a group of very enthusiastic dental technology students. In the past, Peter and Angela have donated microscopes, waxing units and other equipment to enhance the knowledge base of the students and to help prepare them for dental laboratory life by incorporating state of the art

equipment to facilitate their learning experience. Dent-Line of Canada Inc. is proud to support our dental technology programs and schools.



Angela van Breemen and Peter T. Pontsa, RDT present the Silent to Mr. Bernie Mullen, RDT

## Trade News: Inaugural Opening of the Spectrum Learning Centre

Dent-Line of Canada Inc. would like to thank Mr. Ettore Palmeri for the opportunity to participate in the opening of the Spectrum Learning Centre. On October 19th, 2006, Peter T. Pontsa, RDT, presented his seminar "Demystifying Attachments". The seminar commenced after the opening ceremonies and the champagne reception. Participants mingled and enjoyed gourmet food prior to the ribbon cutting. The power point presentation focused on Bredent's new Stud Fixator, a plunger style of attachment, and also discussed tap and screw techniques. After the seminar, Peter presented a practical application and demonstration of tapping a milled implant bar. Participants reviewed and discussed various study and case models. We would like to thank the participants for attending the launch of the Spectrum Learning

Centre and we wish Ettore great success with his new educational centre and we look forward to further exciting seminars and lectures.



Mr. Ettore Palmeri, MBA, publisher of Spectrum, cuts the inaugural ribbon, while Peter T. Pontsa, RDT holds it steady.