

*A Bulletin Dealing With Issues For Dental Health Professionals*

## Telescopic Prosthesis- Analysis & Fabrication

### Special Interest Articles:

- Telescopic Prosthesis Analysis and Fabrication
- Attachments, more aesthetic and periodontally stable than clasps

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In 1999 the Chinese Journal of Dental Research published an analysis that compared the stress distribution in over denture supported bar attachments and telescopic crowns. The results of the study showed that both approaches are acceptable in certain treatment plans but that convenience of the restorative procedure also plays an important role. Initially, the telescopic prosthesis was developed to preserve both the maxilla and mandibular where isolated single remaining teeth were present. During mastication, the telescopic prosthesis has the function of directing forces

on the remaining tooth, so that the tooth does not loosen in its socket. The 2° taper of the walls provides friction retention to the denture so that it does not "lift off". This allows for displacement and deformation of the soft tissue when stressed, and returns to the original position when relieved, so that the soft tissues are stimulated but not damaged. The injurious tipping forces arising in chewing are eliminated by design factors which consist of an external and internal telescope separated horizontally and vertically. The internal telescope is shaped with a rounded end in the

anterior region and a bevelled top in the posterior. This prevents a tipping action from occurring since forces are directed vertically to retard the sinking of the denture in order to avoid periodontal damage. The fundamental aspects of the telescopic denture is that the partial denture and the external telescope form a rigid unit; the jaw and tooth, together with the internal telescope form another. The most important component separating the two is the soft tissue. The telescope may be interpreted as a joint connecting the two rigid components. The soft tissue

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## Attachments, More Aesthetic Than Clasps

Partial removable dentures that are retained by plastic to metal attachments are more cosmetic than partials retained by conventional clasps. In the case of facial clasps, food can be trapped, however with attachment retention this embarrassment to the patient is eliminated. Used in conjunction with porcelain fused to metal crowns the partial denture is the most aesthetically removable prosthesis produced today. Often indicated, even when connectors are located in anterior abutments. The patient will appreciate the aesthetic advantage of attachments. However the bio mechanical advantages maybe even more important than the cosmetic appearance.

**The clasp retained partial denture** - If aesthetics are not a major concern and the abutment is strong, a properly engineered clasp (such as a distal occlusal rest and indirect retainer) may

serve the purpose. There are a number of functional drawbacks that can occur with a clasp design. (1) The chrome cobalt clasp can distort slightly during casting. (2) The abutment can display excessive or an inadequate undercut. (3) The movement of the clasp when the patient chews may twist the tooth orthodontically. (4) The periodontal ligament may loosen causing the tooth to drift. (5) Retaining clasps exert forces on the tooth even when the partial denture is at rest.

This constant compression of the sensitive periodontal ligament may affect the abutment and limit proprioception. Clasps have a tendency to abrade the tooth as the clasp's arm slides back and forth over the enamel. If the undercut is large and the retention excessive, insertion may traumatize mobile abutments. Some precision attachments allow us to direct the occlusal forces away

from the retaining abutments and onto the soft tissues to support the prosthesis. The retention and stability are built into the attachment, however a milled lingual arm and stabilizer should provide the needed stress relief. Unlike clasps, attachments don't require undercuts, and can be utilised regardless of tooth contour, and the patient won't damage their teeth trying to engage a deep undercut. In distal bilateral extension cases, these attachments can act both as direct and indirect retainers. They not only retain the partial. but also prevent the prosthesis from rotating around the abutment. Double abuting is recommended when possible since splinting prevents orthodontic drift and may stabilize periodontically involved teeth. There is evidence that under similar loading the precision partial denture shows significantly

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## Telescopic Prosthesis cont'd

works as a shock absorber which determines the extent of freedom of movement of the joint due its deformation and displacement when forces are exerted upon it. Positive forces are permitted to arise between the two rigid components; one component is the denture and telescope, the other component is the jaw, tooth and internal telescope. Only when the soft tissue has become rigid at the end of its deformation and displacement will the extent of the soft tissue become the decisive factor for prescribing this type of prosthesis. A removable denture of this type requires an impression that reproduces the natural, unadulterated shape of the soft tissue because only that shape allows fabrication of a denture base congruent with the soft tissue. Only soft easily flowing impression materials may be used, that do not exert pressure on the soft tissue. A compression impression should be avoided because it would lead to a random force of the tissue which means that when it is moved back to its natural

position, the denture would not have adequate support. In the case of the bar over denture instead of using the telescopic crowns, porcelain fused to metal retainers with a bar joining them are utilised. The objective of the analysis was to determine which one of the over denture retainers was more beneficial to the abutments; the bar or the telescopic crown and whether a tooth could be used as an overdenture abutment, when the supporting bone was decreased to half of the root. The three dimensional finite element method was accomplished by using a specialized machine to investigate the stress distribution. In this study, a mandible with an overdenture supported by the roots of two canines was examined. The two teeth were connected with a bar attachment or restored with telescopic crowns and were completed with an overdenture. For each type of super structure the influence of bone height around the roots was analysed under three loading conditions. The

results were that the most extreme stress values were located at the alveolar ridge crest of the bone around the root of the abutment. In the case of anterior loading, the compressive stress in telescopic crown overdenture was lower than that of the overdenture bar. When loaded posteriorly there was no obvious difference between bar attachment overdenture and the telescopic crown overdenture. At the alveolar ridge crest around the root of the abutment, the stress value in the model with decreased bone level was higher than in the model with normal bone level, but the range was not significant. Also stress increases as the height of bone around the root decreases, therefore, it is important to perform root amputation of those abutments that have bone resorption in order to obtain an acceptable crown root ratio. In the final analysis it is apparent that in terms of stress on the alveolar bone and clinical convenience, **Continued on page 3**



**The objective of the analysis was to determine which one of the overdenture retainers was more beneficial**

*Peter T. Pontsa, RDT*



A soft ceramic brush is used to apply **Ceram-Bond**.

## Featured Product : Bredent's Ceram-Bond

Ceram-Bond is a ready to use micro-fine ceramic layer applied between the dental alloy and porcelain. Ceram-Bond acts like a buffer between the different CTE values of alloy and porcelain. Any stress between the alloy and porcelain can be reduced significantly. The

procedure is to clean the metal surface thoroughly and apply a uniform layer of Ceram-Bond using a soft ceramic brush. After the firing process Ceram-Bond creates a light yellow layer so that a wash bake can be eliminated. Ceram-Bond is particularly suitable for all

dental alloys and can also be fired onto non precious metal and CrCo. partials.

**For further information, contact Dent-line at 1-800-250-5111 or e-mail us at [info@dent-line.com](mailto:info@dent-line.com)**



The **T-Ring's** unique heat sensitive patch prevents early removal of the set investment.

## Featured Product : Ringless Casting System

The T. Ring has a colour coded patch on the outside of the plastic ring. Crown & Bridge investment is at its hottest point at 165° F. This temperature will cause the heat sensitive patch to change colour and indicate to the technician that the investment has arrived at the setting expansion. The heat sensitive patch helps prevent early removal of the set

investment from the plastic ring, thus providing the optimum setting expansion. This expansion is crucial for ensuring precision when casting attachment studs. The cast attachment studs will be at the proper size ensuring accuracy of fit for the retentive element. Wax buttons for the sprue holes are also available. Over time the plastic ring

can deteriorate, since the ammonia in the investment breaks down the plastic. Silicone spray or vaseline will help in the clean up and preservation of the plastic casting ring.

**For further information, contact Dent-line at 1-800-250-5111 or e-mail us at [info@dent-line.com](mailto:info@dent-line.com)**

Telescopic Prosthesis cont'd ... The Fabrication



The primary crowns are prepared with the 2° wax bur F2002W23.



A maximum wall of 0.3 to 0.4 mm must be ensured.



The crowns are milled quickly and efficiently using a 2° bur.



A perfect high shine is achieved by prepolishing & high lustre polishing.



The model is prepared for duplication.



A duplicating flask & Exatosil N17 are used for duplication.



Refractory model.



Secondary crowns are prepared.

the denture with the telescopic crowns can be more beneficial compared to that of the over bar denture.

**The fabrication of a telescopic overdenture** begins in the operator, with radiographs, diagnosis, tooth reduction and impressions. In the laboratory the preparations are surveyed and the primary crowns fabricated and then prepared with a 2° wax bur. The crowns are invested making sure that a wall thickness of 0.3 to 0.4 mm is achieved. Once cast and devested the crowns are milled to completion using a 2° profile bur on the conical surfaces. Final polishing is achieved with prepolysh and high lustre polishing paste. The model

is prepared for duplicating of the external telescopes and partial denture frame work. Once finished the frame is fitted to the internal telescopes ensuring a one piece casting. The external crowns can be prepared with porcelain using Bredent's "Ceram-Bond" to buffer the CTE (coefficient of thermal expansion) and the rest of the denture can be processed with denture teeth and base material. Gliding the denture on to the telescopic retainers results in the soft tissue being held to a minimum through fabrication of a denture base that fits as accurately as possible with precise determination of centric relation and the corresponding vertical dimension. All of the loading

force that arises in response to unilateral forces such as mastication should be transferred to the remaining natural tooth via a wrap around effect. This prevents the sinking of the denture so that periodontal damage can be avoided. Finally it was evident through the publication in the Chinese Journal of Dental Research that the telescopic denture was in some cases more beneficial than the over bar denture.

**Source: Peter T. Pontsa, RDT**

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*The external crowns can be prepared with porcelain using bredent's Ceram-Bond to buffer the CTE.*

*Peter T. Pontsa, RDT*



**Bredent's BF-1 Milling Machine ensures perfect milling and drilling results.**



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## Attachments, More Aesthetic Than Clasps cont'd

lower stress on abutments  
than a fixed cantilevered  
bridge.

**Intra coronal or extra coronal?** - Some attachments connect the partial denture at a point inside the abutment crown contour. These attachments are intra coronal and are of a dove tailed or a slotted design. The VKS attachment systems are all basically extra coronally designed. Is one better than the other? There are varying opinions on which may be better. In recent years, studies have indicated that metal to metal attachments don't wear as well as plastic to metal ones do. The intra coronal attachments are primarily a metal to metal type. This point of connection is deep within the abutment which

means that if the mesio distal dimension is too small, or the pulp chamber too large it shouldn't be used as a retaining abutment. The deep slotted attachment may very well be a food trap which will make seating the removable partial difficult at best. Whereas all the VKS attachments are extra coronal which means the point of connection will be outside the crown since the abutment tooth is easier to prepare.

**Rigid or Resilient** - Rigid attachments transfer a significant portion of the occlusal load to the abutment tooth. Resilient attachments permit a slight vertical movement or hinging action as the patient bites. The vertical movement brings the saddle area into heavier

contact with the mucosa, so the tissue bears much more of the occlusal load. The lingual arm transfers stresses to further reduce the load on the abutment. Attachments have been a treatment modality for many years, usually because they look better than clasps. Attachments are not only cosmetic, but they can spare abutments by redirecting unwanted forces, and by spreading the occlusal load between the saddle area and the tooth's periodontal ligaments. Finally it is important that the patient understand how to care for the new partial. With proper care the prosthesis will last with proper maintenance.

**Source: Peter T. Pontsa, RDT**

### Trade News:

**The Manitoba Dental Lab Association** will be hosting a seminar entitled "Dynamics of Dental Attachments" presented by Mr. Peter T. Pontsa RDT. to be held September 2nd, 2004 at the Villa Nova located at 1035 Wilkes ave. in Winnipeg starting at 6:00 PM. A sandwich buffet will be served. Dental technologists, Dentists and Denturists are all welcome. Contact Mr.

Arnold Ottenbreit of The Manitoba Dental Lab Association at 204-257-8446 for more details.

**The 4th World Denturism Symposium** will be held in Montreal October the 11th to the 17th at the Palais des Congres de Montreal. Please come and visit our booth to see the latest in dental products. for more information please call 514-252-0270 .

**Den-Technica du Quebec** is the only dental technical trade show to be held in the province of Quebec. It will be held at the Sandman Hotel in Longueuil on November the 4th & 5th of 2004. Please come and visit our both for the latest development in dental materials. For more information please contact Mr. Jean Compagna at 514-728-5352

### Special Announcement:



Dr. Brian Schottlander



We are very pleased to announce that, for the second time in four years, Schottlander has received the **2004 Queen's Award for Enterprise**, awarded in the Innovation category. On this occasion Schottlander is being recognized for the Enigma teeth and denture system.

**For further information on the Enigma System, please contact Dent-line of Canada at 1-800-250-5111 or e-mail us at info@dent-line.com**

### Special Announcement:



Seminar at Casino Lac Leamy, Hull, Québec

We are pleased to announce that on May 14th, 2004, Mr. Peter T. Pontsa, RDT of Dent-Line of Canada and members of the 3i company were invited by **Milident Dental Laboratory** to provide seminars for their Ottawa area dentists and prosthodontists.

Mr. Pontsa provided a 3 hour morning seminar, and 3i provided a lecture in the afternoon. The location of the seminar was at the beautiful Casino located on Lac Leamy in Hull, Québec. Our thanks are extended to Mr. Pierre Rozon of Milident.