

# WHAT LURKS BENEATH

by Dr. Morley S. Rubinoff

## WHAT LURKS BENEATH:

“What lurks beneath” the biomechanical world of implant dentistry is a complex system of give and take. Bone bonds to titanium or zirconium through a process called osseointegration. The process is complex but dependable when there is strict adherence to technique and the health of the region that is to receive dental implants remains status quo. Our patient in this article has fought to save her ailing dentition for many years but she is losing the battle. Will implants work for her when natural teeth have failed?

This is the saga of a wonderful lady that was my patient for over 25 years. Advanced periodontal disease resulted in the loss of many teeth. She fought to keep her own teeth as long as possible for years. Today, she can still sing in her choir, enjoy eating everything and continues to smile and enjoy life. I am sharing this saga with my Denturist friends. This is the kind of patient that you may see in your office. With the help of well-trained Dentists, you may wish to restore a patient with similar needs in a comparable fashion:

### Past Medical History (PMH)

Our patient is an Asian lady with a non-contributory medical history

### Past Dental History (PDH)

Over 20 years ago, this lady attended my office and requested a denture with implants in her lower jaw. All remaining lower teeth were removed at that time. There was advanced bone loss and tooth mobility in all maxillary teeth, but the patient wished to retain these upper teeth for as long as possible. The

original reconstruction in the mandibular anterior region utilized Core Vent implants which were one of the most popular implants available at that time. An implant retained Hader bar anchored a removable complete lower denture (Fig 1). These titanium implants were coated with hydroxyapatite. Reports of delamination of the hydroxyapatite surface on this type of implant was well documented later in the dental literature. About 5 years after insertion of her lower prosthesis, our patient ultimately began to lose bone support around her three implants (Fig 2). The three implants were surgically removed by trephination due to infection and subsequent pain. New implants were inserted into the same implant sites. These new implants were Straumann Tissue Level implants with 2.8mm polished collars with SLA surfaces.



Fig. 1: Original Hader bar with Core Vent implants



Fig. 2: Radiograph illustrating bone loss around implants due to delamination of hydroxyapatite



**Fig. 3:** Master lower arch cast following border molding/ capture of implant positions



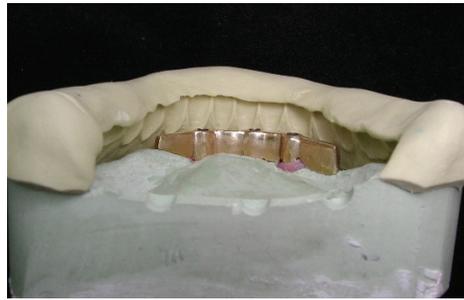
**Fig. 4:** Set up of teeth in wax for the lower arch mounted on the master cast



**Fig. 5:** Occlusal matrix with wax up of lower arch



**Fig. 6:** Buccal matrix with wax up of lower arch



**Fig. 7:** Buccal matrix with Bredent bar on master cast lower arch



**Fig. 8:** Occlusal matrix with Bredent bar on master cast lower arch



**Fig. 9:** Bredent bar on lower master cast



**Fig. 10:** Metal housing with vario stud snaps, internal surface

## TREATMENT PLAN IN THE LOWER ARCH with Straumann Implants

What follows is a step-by-step sequence of chairside and laboratory techniques that are designed to give our patient a predictable result with a fixed Bredent bar attached to a removable overdenture in the lower arch.

**Step One:** Final impression of the three dental implants using splinted impression copings and border molding of all appropriate regions in the lower jaw. (Fig 3).

**Step Two: Fabrication of a lower complete denture** taken to the wax up stage that is mounted on a fully adjustable denture along with a facebow transfer. (Fig.4) “Corner cutting” of mounting on an inappropriate articulator will lead to future occlusal errors and control of the vertical dimension of occlusion.

**Step Three: Fabrication on the lab bench of putty matrices** that clarify the exact location of the dental implants relative to the denture teeth (Fig 5, 6,7,8). Grooves are placed in the stone on the buccal of the lower master cast to help reseat the matrices in the same place when the denture base has been removed.

**Step Four: Fabrication of a Bredent Bar with Bredent balls and Vario Stud snaps** that are all parallel (as developed on a surveyor rod) in the wax up stage. The metal used for the casting of the bar and balls should have a flexure strength and Vickers micro hardness of 450. This will prevent fatigue failure of the bar or wear of the Bredent balls. (Fig 9,10)

**Step Five: Fabrication of the metal housing that holds the vario stud snaps.** The surface that faces the denture must have spheres of metal designed to engage and entrap the acrylic of the denture base. This outer surface is often coated with a bonding agent that encourages acrylic to adhere to the heat processed denture acrylic. (Fig. 10)



**Fig. 11:** Bredent bar inserted in the mouth



**Fig. 12:** Metal housing inserted in the mouth



**Fig. 13:** Final lower denture inserted in the mouth



**Fig. 14:** Lower complete overdenture in occlusion

**Step Six: Processing the final denture** should follow a try in of both the metal framework and the wax up with the metal housing embedded in the wax up. Often less than all of the stud snaps are embedded in the housings for the wax try in so that the denture can be removed from the metal framework easier during the full wax try in. If there are any undercuts in the tissue or the framework and metal housing to the path of insertion, they should be sealed prior to boiling out the wax in the denture (Fig 11)

### TREATMENT PLAN FOR THE UPPER ARCH with Straumann Implants

Our patient wished to have her loose upper front teeth removed and replaced with implants when they become very loose. She did NOT want a removable upper prosthesis. Rather, she wanted a fixed prosthesis but there were financial constraints. No zirconium made on a CAD|CAM machine and no cast metal bridge with layered porcelain. Just a metal framework with acrylic flange and acrylic teeth. What follows is a deep dive into the treatment including a view of the entire surgery to remove teeth and insert implants. Why the surgery? Is it important for the Denturist to know all about this step. Yes, the success of the final prosthesis hinges on the care and technique during surgery. The Denturist may be making a surgical guide either analogue style or computer guided style. The Denturist needs to know if the Dentist plans to insert implants directly into the sockets or to delay placements of the implants while bone heals. Lastly, there will be a phase during treatment when the patient is either wearing a removable upper denture or a fixed prosthesis inserted on the day of the surgery. Is this patient an ideal candidate for immediate loading or delayed loading due to the quality of bone or the need for bone to osseointegrate with the implants before loading the implants into occlusion.

**Step 1: Pre surgical evaluation of the maxillary dentition, clinical views.** (Fig 15, 16,17,18)

**Step 2: Pre surgical radiographic images** illustrating advanced bone loss in the maxillary anterior region and excellent post implant bone surrounding the lower implants that were placed earlier using Straumann implants. (Fig. 19,20,21,22)

**Step 2: Surgery with tooth extraction and implant placement with moderate sedation** (Fig. 23). *This video runs for just over 30 minutes.* Enjoy! Implant surgery is a team effort.

**Step 3: Post treatment radiographs following surgery.** Note that implants maintain appropriate distance from sinus and adjacent natural teeth. Wire seen on radiographs is the clasps from the upper temporary denture. (Fig.24,25,26)

**Step 4: Post surgery healing of the anterior alveolar ridge.** Note that the healed ridge is robust and there does not appear to be much loss of bone following the extractions.(Fig. 27)

**Step 5: Fabrication of fixed bridge made of metal and acrylic that is screw retained** (Fig 28)

## Photo gallery synopsis (Fig 15 through Fig 38)



**Fig. 15:** Frontal view of maxillary natural teeth pre surgery



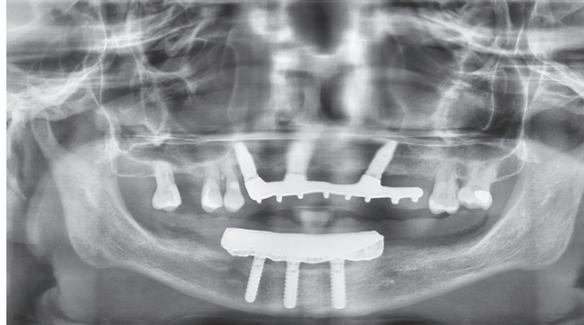
**Fig. 16:** Right lateral view of maxillary natural teeth pre surgery



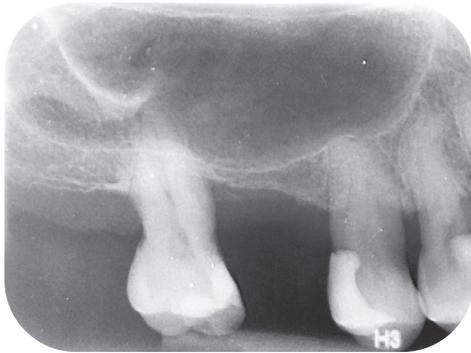
**Fig. 17:** Left lateral view of maxillary natural teeth pre surgery



**Fig. 18:** Occlusal view of maxillary teeth supported by wire and resin to decrease tooth mobility pre surgery



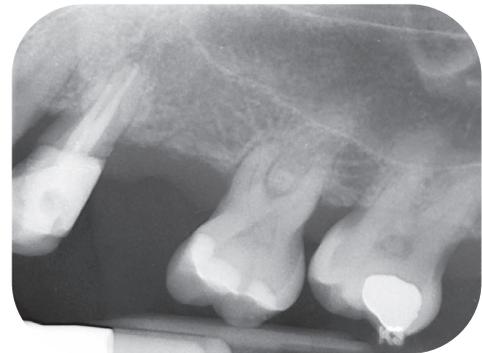
**Fig. 19:** Panoramic radiograph illustrating maxillary teeth and the Straumann implants in the mandible with the fixed Breddent Bar.



**Fig. 20:** Upper right posterior periapical radiograph illustrating horizontal, vertical bone loss

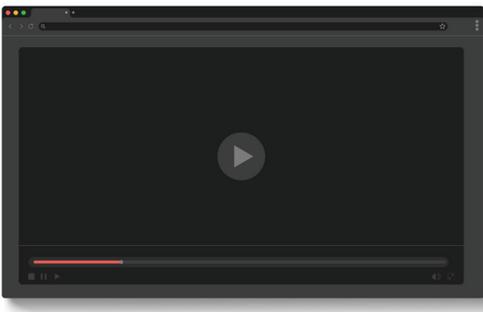


**Fig. 21:** Upper anterior periapical radiograph illustrating advanced bone loss

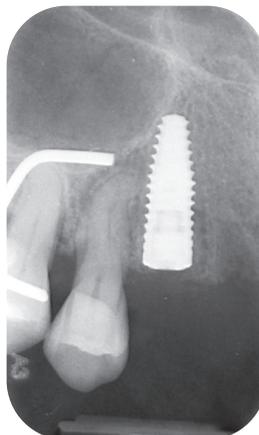


**Fig. 22:** Upper left posterior periapical radiograph illustrating horizontal, vertical bone loss

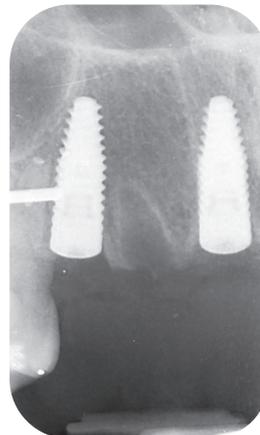
### [Click Here to Watch The Video](#)



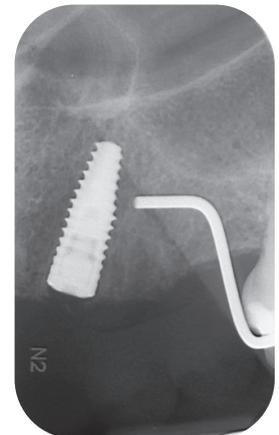
**Fig. 23:** Surgical video for removal of anterior maxillary teeth and simultaneous placement of dental implants under mild sedation.



**Fig. 24:** Radiograph of Straumann tissue level implant with a 2.8mm collar placed in the #13 site



**Fig. 25:** Radiograph of Straumann tissue level implant with a 2.8mm collar placed in the #11 site



**Fig. 26:** Radiograph of Straumann tissue level implant with a 2.8mm collar placed in the #23 site



**Fig. 27:** Anterior view of the healing in the maxillary anterior region following tissue healing after extraction and implant placement.



**Fig. 28:** Buccal labial view of the final prosthesis fabricated out of acrylic base and acrylic teeth on a cast metal base from abutment #13 to abutment #25



**Fig. 29:** Smile view of the upper anterior teeth on final upper prosthesis



**Fig. 30:** Right lateral view of the upper fixed implant retained prosthesis



**Fig. 31:** Left lateral view of the upper fixed implant retained prosthesis



**Fig. 32:** Occlusal view of the upper fixed implant retained prosthesis



**Fig. 33:** View of anterior soft tissues with implant bridge removed for cleaning. Notice the bleeding tissues and pressure points on the soft tissues.



**Fig. 34:** View of the base of the upper implant prosthesis with significant food entrapment



**Fig. 35:** Pencil line on the labial flange indicates the area of the flange that will be removed for improved ease of cleaning the prosthesis when it is screw retained



**Fig. 36:** View of base of upper implant prosthesis following the alteration to the labial flange. Tissue health is improving.



**Fig. 37:** View of chlorhexidine used to brush against and around the prosthesis on a daily basis

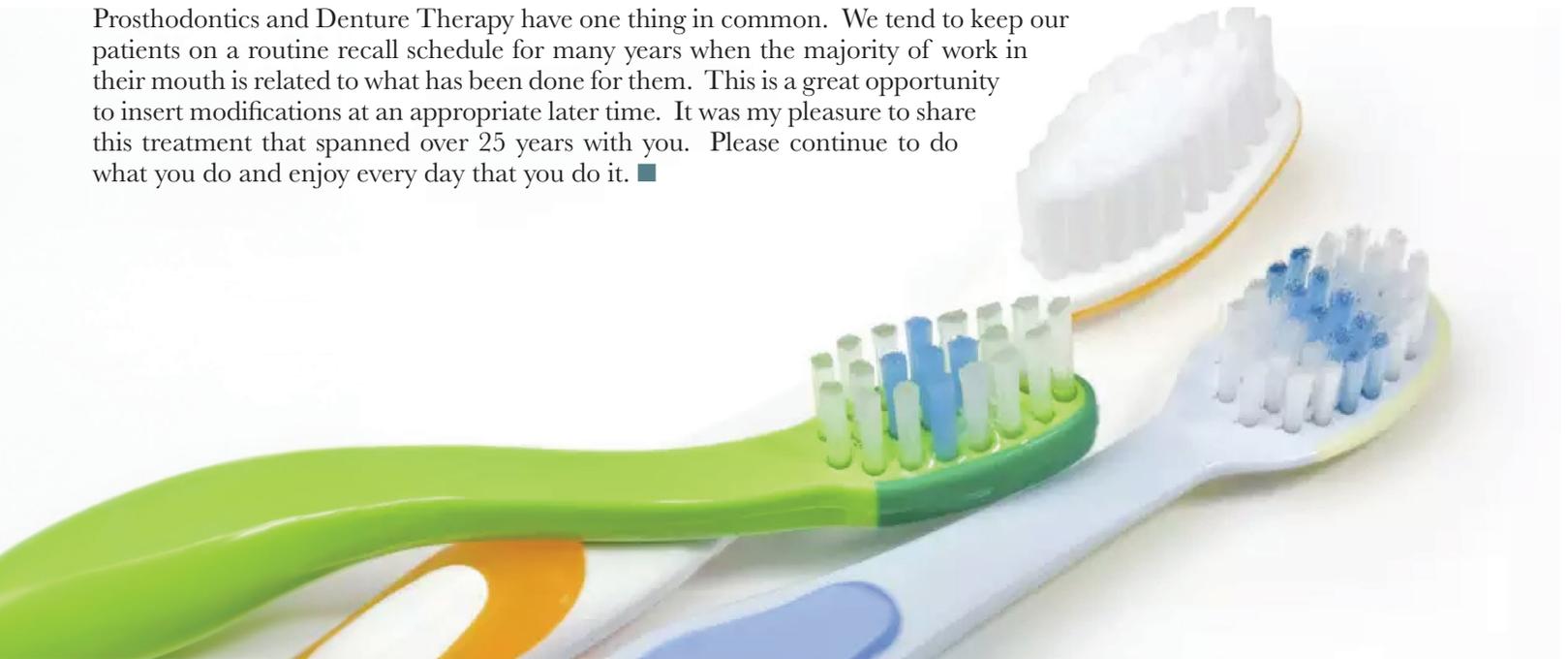
## CONCLUSIONS:

Every patient is different and every treatment plan comes with a myriad of alternative treatment plans. Often, patients will opt for a surgical, prosthetic or laboratory treatment that is motivated by financial burden. The treating dentist is mandated by his or her college to provide the patient with alternative treatment plans, their associated fees and the risks vs benefits of each treatment approach. I have to assume that Denturists are governed by the same parameters.

Personally, I would have opted for a fixed upper prosthesis that is either a zirconium base or a cast metal base with layered conventional porcelain. This individual has trouble with oral hygiene and she will benefit from a prosthesis that is easier to maintain. The removal of part of her labial acrylic flange greatly improved her access to the implant bases and the oral hygiene improved. The daily use of chlorhexidine significantly assisted with home care but as we know, chlorhexidine leaves a dark stain on teeth if not removed efficiently on a daily basis.

The discussion of why the upper posterior teeth was not treated at the same time as the maxillary anterior region is relevant. Our patient hated to part with the remaining solid upper posterior teeth in her mouth. The risks\ benefits strongly supported removal of upper posterior teeth with the placement of 6 implants and an upper prosthesis fixed with 12 teeth.

Prosthodontics and Denture Therapy have one thing in common. We tend to keep our patients on a routine recall schedule for many years when the majority of work in their mouth is related to what has been done for them. This is a great opportunity to insert modifications at an appropriate later time. It was my pleasure to share this treatment that spanned over 25 years with you. Please continue to do what you do and enjoy every day that you do it. ■



**Fig. 38:** View of soft brushes that must be used with the chlorhexidine.



### ABOUT MY RDT: Masoud Niknejad

Every prosthodontist and general dentist is supported by the amazing work of their laboratory team. I would like to share the name of my long-time laboratory technician, Masoud Niknejad of Da Vinci Dental Studio in Richmond Hill, Ontario.

## About the author

**Dr. Morley S. Rubinoff** is a graduate of the Faculty of Dentistry, University of Toronto, (1974). Dr. Rubinoff completed a post-doctoral program in Prosthodontics from the State University of New York at Buffalo in 1984. Dr. Rubinoff has served as the President of the Association of Prosthodontists of Ontario, the President of the Association of the Prosthodontists of Canada and is the founding President of the Canadian Dental Protective Association. He has been awarded the Certificate of Merit by the Canadian Dental Association and received a fellowship from the Academy of Dentistry International. Dr. Rubinoff was an instructor/ mentor at the Faculty of Dentistry, University of Toronto in the Graduate Department of Prosthodontics. Dr. Rubinoff is a Senior Fellow of the International Team for Implantology (ITI)

