Non Submerged Implant Surgery for the General Practitioner

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ABSTRACT

Today, far too often, a patient with a missing or non-restorable tooth elects to have a fixed bridge. To opt for an implant, they would be choosing a multi-doctor treatment that involves more time, cost and pain. This discussion will describe an implant technology and surgical protocol that will enable a general dentist to perform conservative implant surgery and prosthetics in a quality and cost-effective manner.

It is important for general dentists to become efficient at a treatment that is now the standard of care in single tooth replacement. Many general practitioners perform surgery in some form, such as surgical extractions, periodontal and endodontic surgery. Given adequate training, general practitioners can perform all aspects of implantology with uncompromised success rates.[1] Advances in surgical techniques and prosthetic components are making implants more cost-effective to both the patient and dentist.

The vast majority of dentists are recommending implants for partial edentulism and denture stabilization. However, very few of these dentists surgically place implants.[2] Thus, unlike all other areas of dentistry, implantology remains largely a multi-discipline treatment. General dentists in Europe and Asia have been successfully performing all aspects of implant dentistry for quite some time now. In North America the coordinated approach to surgery and prosthetics makes implant treatment expensive and time consuming. Perhaps this is part of the reason that over five million bridges were placed in the USA last year.

Seven year survival rates of bridges were found to be notably less than for single tooth implants.[3] Bridge survival rates begin to decline sharply after 10 years.[4,5] The consequences of these failures, though serious and often overlooked, range from caries and pulp disease, to periodontal breakdown and abutment tooth loss. An implant's high survival rate, combined with a low occurrence of prosthetic and adjacent tooth complications, indicates a tooth preserving effect and cost-benefit over the long term.[6] Bone preservation is also a benefit that no other treatment can match.

While we explain to our patients that implants are the best treatment, to them it still means higher fees, more appointments, less insurance benefits, and seeing a special-

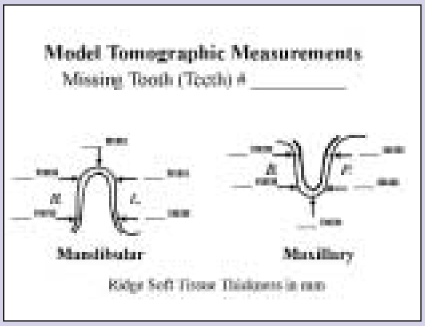

FIGURE 1—Tissue thickness.

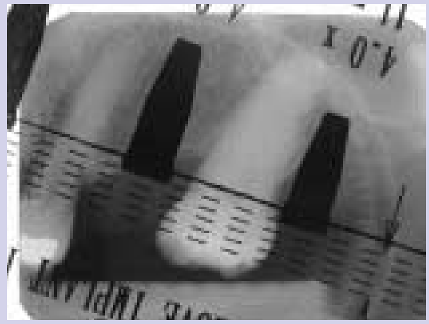

FIGURE 2—P.A. overlay.

FIGURE 3—Model.

FIGURE 4—Model of bone and soft tissue.

FIGURE 5—Pilot channel.

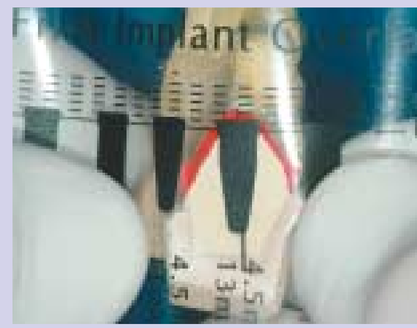

FIGURE 6—Buccal-lingual view.

FIGURE 7—Mesial-distal angle.

FIGURE 8—Triad addition.

FIGURE 9—Stent and pilot drill.

ist who may advise bone grafting. The reality is that for many dentists, a fixed bridge is more profitable than an implant in comparable situations. Here lies the injustice, that is, higher compensation for an inferior treatment.

In general practice, the majority of implant cases we see are non-complicated. Today's root-form implant fixtures are extremely versatile and require less than ideal bony architecture. We can improve the bone health of even moderately resorbed edentulous areas without subjecting the patient to bone augmentation, especially when aesthetic demands are minimal. A streamlined, common sense approach to implantology will make it advantageous for the patient and doctor to choose the healthiest treatment.

SURGICAL TECHNIQUE

Case selection is paramount to successful treatment. This is accomplished by recognizing cases with favourable bone. Diagnostic information required for this surgical protocol include the following: study models, radiographs (p.a., and panoramic), and 5-7 bone soundings of the surgical site. These measurements of soft tissue thickness are acquired by using an anaesthetic syringe and endo file stopper, acting as a depth gauge. Soundings are made at the ridge crest and 2-3 locations on each buccal and lingual aspect, 90 degrees to the surface, depositing anaesthetic ahead of the needle tip and stopping at bone. Soft tissue thickness is measured and recorded on the form (Fig. 1). These records are sent to a certified lab for construction of a "Model Tomographic" p.p., t.m. by B.A.S.I.C. Dental Implants. The


FIGURE 10—Guide sleeve.


FIGURE 11—Pre-op.

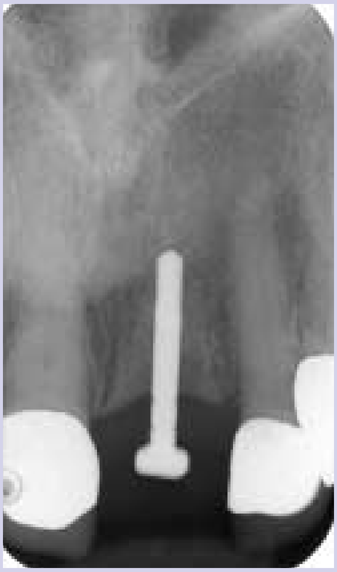
FIGURE 12—Pilot hole verification.


FIGURE 13—Soft tissue trephine.


FIGURE 14—Trephine cutting.

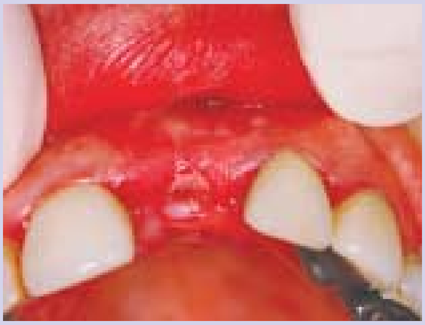
FIGURE 15—Soft tissue incision.

doctor will also utilize a " periapical x-ray overlay", (or template) for implant size selection. This is an actual size silhouette of the different implants available (Fig. 2). It acts as a convenient diagnostic aid for initial case planning to assess available bone mesial-distally, and vertically with respect to mandibular canal or maxillary sinus. While at the lab, the technician makes a cross-sectional cut on the model, slightly distal to the surgical site and parallel to the mesial-distal root angulation of the neighbouring teeth (Fig. 3). Model tomographic measurements are transferred onto the model to map out the bone and soft tissue (Fig. 4). A pilot channel is then made at the best buccal-lingual direction that would encompass the middle of the bone (Fig. 5). A Periapical Implant Overlay is held up to the model (Fig. 6). A buccal-lingual view of the implant in bone is very helpful in avoiding difficult cases. When the doctor receives the model tomographic from the lab, acceptable bone is easily determined by viewing the implant position in all three dimensions (Figs. 2 & 6).

The Model Tomographic determines the best position and direction of the implant body for healing, bone support and crown position. However, equally important is that it is also the basis for construction of the "3-D Pilot/Osteotomy Drill Guide Stent "pp. t.m. by B.A.S.I.C. Dental Implants. Figure 7 shows a guide sleeve placed on an index pin, which occupies the pilot channel that has been created to reflect the ideal mesial-distal and buccal-lingual direction. Triad acrylic is formed around the guide sleeve (Fig. 8). The height of the sleeve is adjusted to control the pre-determined cutting depth as calculated from the pilot drill length, implant length and position with respect to the soft tissue crest. The pilot drill has a collar stop which allows the stent to precisely control cutting depth according to the height of the guide sleeve (Fig. 9). Actually, the guide sleeve is a double cylinder featuring a narrow inner sleeve for the pilot drill that is removed to create a wider diameter outer sleeve for the larger osteotomy burrs (Fig. 10). Through the use of the Model


FIGURE 16—Soft tissue prep.


FIGURE 17—Osteotomy drill.


FIGURE 18—Implant driven in.


FIGURE 19—Implant at proper depth.


FIGURE 20—Healing cap and tissue former.


FIGURE 21—Pre-cement try-in.


FIGURE 22—Final crown two months after cementation.


FIGURE 23—Fifteen months after surgery.


FIGURE 24—Fifteen months final.

Tomographic and 3-D Pilot/Osteotomy Drill Guide Stent, implants are placed accurately and three-dimensionally by addressing three planes simultaneously, that is buccal-lingual, mesial-distal and vertical. The diagnostic procedures performed thus far demand a minimum of time, effort and expense but yield valuable information and a precision drill guide. Implant surgery may now proceed safely and predictably.

Figure 11 shows the pre-op site for a missing upper left central incisor. A 1.8mm diameter stent-assisted pilot hole is made at ⅔ – ¾ of the pre-determined depth. Pilot hole position is then verified by placing a guide pin into the prep and x-raying it (Fig. 12) The pilot hole can then be safely taken to ideal depth and verified with another x-ray. Figures 13 to 16 depict the circular incision made with a trephine-like soft tissue-cutting tool. The fact that we have established the presence of favourable bone and that it can be precisely accessed, makes flapping unnecessary. This means we can expect a quick, minimally invasive procedure with much less bleeding, trauma and post-op pain, while enabling rapid healing and more predictable soft tissue position as vascularity is preserved.

The bone is then enlarged with a series of side cutting osteotomy drills (Fig. 17). Bone preparation can all be done through the guide stent, which adapts for the larger diameter cutting tools. All rotary tools are used with a slow speed contra-angle with reduction sheath or rotary endo handpiece. A 4.5 mm wide x 15mm length Omni-Tight fixture by B.A.S.I.C. Dental Implants is placed 1-2mm below the labial soft tissue crest, (Figs. 18 & 19) much like determining the position of a labial margin for crown & bridge. Since the implant is solidly fixed in the bone and the surgical field is clean and dry, a final impression can be taken immediately after placement. A transfer device is easily pushed all the way into the implant and is picked up with an ordinary polyvinyl-siloxane impression. A low profile healing cap is coupled with a white delrin tissue former, used for widening the soft tissue emergence profile (Fig. 20). This can be trimmed even lower to fit under a removable interim denture.

Research-based evidence in a one-stage, non-submerged implant placement is resoundingly clear. There is no difference in osseointegration, soft tissue health, or survival rates when compared to a traditional two-stage, submerged technique.[7-9] The patient returns for a brief appointment in two months to check for progressive osseointegration, after which prosthetic fabrication begins. Post and crown cementation is done very simply, usually without anaesthetic, as if restoring an endodontically treated root with a cast post/core and crown. Prior to cementation, a periapical radiograph is taken to check the marginal fit (Fig. 21). Resin cements have proven extremely reliable for post and crown cementation with this system. Figure 22 shows the restoration two months after final cementation. Figures 23 & 24 are a radiograph and photo at fifteen months after surgery.

In cases where bone volume is questionable, it may be necessary to flap the tissue or augment the bone. Oral surgeons, and periodontists should be considered in these situations. However, the majority of cases encountered in general practice should qualify for non-flapped, non-submerged surgery. In summary, this single tooth implant treatment was completed in essentially two working appointments with a post-op in between. The cost of the implant, together with all components and lab expense was slightly higher than a 3-unit bridge lab bill. However, the chair-time is considerably less for this treatment than for similar bridge cases.

Our profession is obligated to promote a more efficient means of delivery, allowing a greater number of patients access to this benefit.

CONCLUSION

One of our main responsibilities to patients is the preservation of teeth and associated oral structures. Using natural teeth as abutments by amputating enamel and increasing occlusal forces, undoubtedly shortens the lifespan of these teeth while allowing continued loss of alveolar bone. General dentists whose involvement with implants is limited to prosthetic restoration would receive tremendous satisfaction and considerably higher profits by implementing a conservative, one- stage, non-flap implant surgery. With careful case selection this is certainly within the realm of capabilities of a general practitioner, providing they have proper training and technique. Advances in bone regeneration technology, combined with an increased awareness and enthusiasm of front-line general dentists, should provide oral surgeons and periodontists more opportunities in implantology. Our profession is obligated to promote a more efficient means of delivery, allowing a greater number of patients access to this benefit. **OH**

Dr. Bohunicky was born and raised in Winnipeg, graduating from the University of Manitoba Faculty of Dentistry in 1984. While presently involved with full time general practice, he has been placing and restoring implants through the use of a minimally invasive non-flap, non-submerged technique since 1996. He is one of the pioneer users of the B.A.S.I.C. Dental Implant System, and is actively involved in teaching this technology to other dentists.

Oral Health welcomes this original article.

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