

DENTAL IMPLANTS: Definitely in the Realm of Treatment of the General Dentist

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Today's dental implants are no longer considered "experimental," rather have become a reliable treatment modality for replacement of missing teeth. Our patients present to our general dentistry practices to determine options for replacement of one or several missing teeth or to stabilize conventional removable appliances. They become educated on this therapy through the internet or their family and friends. It is not uncommon for them to do a simple search of "missing teeth," "my teeth hurt," or "alternatives to dentures or partials." There is also great interest in permanent replacement of all their teeth and immediate restorations. The design and techniques involved with implants have improved to provide an extremely positive prognosis. Patients often present to our offices with a knowledge of types, brands and procedures involved with dental implants. When teeth are missing there is a definite emotional process that needs to be addressed. In our society the desire to look and feel younger, chew and function better and achieve an elevated quality of life promotes the public to search out dental professionals who are capable to provide them permanent fixed replacement to their failed dentition. The general dentist is often the first professional to be consulted.

There are a myriad of types and brands of dental implants available to us. The dentist needs to become aware of these designs and determine which implant works best within their scope of

treatment. Here I will discuss the use of the Straumann BLT dental implant system, which has a relatively simple surgical protocol. The Straumann Bone Level Tapered (BLT) dental implant, discussed is one that provides essential primary stability in bone throughout the mouth, from the type 1 bone found in the mandibular symphysis area, to type 2 in the posterior mandible to types 3 and 4 in the pre-maxilla and posterior maxilla respectively. The tapered design is intended for immediate placement following extraction of non restorable teeth and even loading when conditions allow. The design of the implants represents the shape of the natural teeth.¹ They are made of a Roxolid material, a titanium-zirconium material, which provides high tensile strength, allowing for the creation of smaller diameter implants with similar clinical performance of larger diameter titanium implants. Osseointegration is accelerated when the SLA active surface technology is used. This process may reduce healing to three or four weeks.² The internal design of the implant is a cross-fit connection which eliminates rotation and potential abutment or crown screw loosening. This implant provides a wide variety of applications that our patients present with.

Our discussion will describe the procedures used to diagnose, surgically place and restore dental implants in the posterior mandible using custom abutments and cement on implant retained crowns and then a screw retained implant crown. Next, guided

surgical protocol will be discussed for implants in the posterior maxilla. Finally, a single posterior implant designed digitally for a custom abutment and implant retained crown will be discussed. These four options dictate various financial ramifications to the practice that will be specifically evaluated.

With any dental implant system there needs to be a clear understanding of anatomy and also competence in the surgical and prosthetic applications of this mode of treatment. It is imperative that the dentist achieve a high level of education in implant dentistry. Competence and confidence comes with frequent treatment. Many dentists pride themselves in their ability to prepare for a proper fitting crown, or fabrication of a well fitting removable appliance. We understand the financial rewards in this routine treatment. Implant dentistry success mandates a high level of education, which results in understanding the benefits and risks involved in the process. Challenges are often present in the anterior smile zone. Here, the smallest miscalculation can result in an unacceptable final prosthesis. Our challenge is to learn the steps involved, create predictability and an excellent functional and esthetic result. Costs to the dentist in materials and time need to be determined. Implant dentistry is certainly one of the most financially rewarding therapies we provide in our practices today. Breaking down the dentist's cost help us better prepare our patients to budget themselves properly.

CBCT analysis is another tool that allows dentists to review all the vital anatomy and potential pitfalls or complications in three dimensions. Being aware of clinical situations that are appropriate to treat, and those that are better referred to a more experienced colleague is important, as important as understanding the surgical steps involved. CBCT allows us to visualize the case finished before ever starting, as the software available provides a means to digitally place the type of implant of our choice in the proper positioning. Anatomic considerations are precisely evaluated.

General dentists are often criticized by our specialists for not comprehending vital anatomy, improperly placing implants resulting in prosthetic failures and not appreciating the periodontal applications of the procedure. Certainly some of these criticisms may be accurate. However, as general dentists we have a unique ability to train ourselves in many aspects of dentistry, including dental implants. Dental implants are no longer experimental or a mystery to the general dentists. With proper advanced education, the GP can certainly master the techniques.

Our patients are aware of dental implants and are requesting these procedures in our general dentistry practices.

Proper preparation of the surgical site is mandatory. Although not precisely discussed here, atraumatic extraction techniques and the ability to provide predictable simple socket procedures is required. Appreciating the fact that attached gingiva must be present around all our implants and realizing that subgingival cement can result in significant bone loss will elevate the general dentist to a higher level of treatment.

With advanced design and surface treatments, our modern implants

integrate well and insure a long-term stabilization and function. Implants have become a primary treatment option today resulting in esthetic restorations. This treatment has actually become a more conservative procedure, as opposed to preparing healthy natural teeth. Stabilizing removable appliances has become a godsend to many patients struggling with conventional dentures. We even have



the ability to create full arch, permanent prostheses to restore a more natural function. Costs have been controlled as our armamentarium, implants and laboratory costs have been reduced.

Intraoral scanners allow us to capture final impressions of the internal design of our implants and eliminate the need for conventional impressions. This results in CAD/CAM designed and created crowns which are better fitting and done in less time. The digital impression scanners are just another tool that make us better practitioners. Computer generated models replicate the hard and soft tissues. Stone model fabrication is eliminated along with errors that occur with that process.

Here I will present four clinical cases

which provided dental implant therapy to my patients. They are examples of situations that general dentists, with proper training and experience, can provide within their practices. Education is the key to long term success with any procedure, including dental implant treatment. The protocols are evident and with the use of high quality products and proper surgical and prosthetic techniques will provide excellent long-term prognoses.

Average fees for surgical and prosthetic construction over implants vary depending on several factors. These include the dentist's overhead, competency and time needed to perform the procedures, implant cost, prosthetic component cost, laboratory charges and any credit responsibilities to the dentist when the patient decides to take a loan to pay for treatment.

There is also a significant investment in purchasing the surgical tools needed to perform this therapy. This includes a surgical motor, surgical kit, saline and a inventory of dental implants. Often this may be in the \$10,000 range. You will see below, however, that this initial investment is paid for after only a few cases.

Let's evaluate some examples.

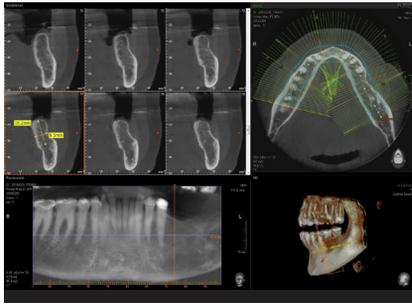
In these case presentations the Straumann BLT SLA Roxolid dental implant may have an approximate cost of \$350-\$385 to the dentist

The impression coping used adds another \$40-50.

Lab charges for custom abutments in titanium or zirconia are around \$300.

Zirconia crowns (Bruxzir) discussed in these cases range from \$115-\$155 each.

Soft tissue model work and articulation may add another \$90 or so to the lab bill.



CASE #1

Figure 1: The pre-operative CBCT (Vatech America Green Imaging System, Fort Lee, NJ) illustrates the amount of available bone in the edentulous posterior mandible. In the first molar site there is approximately 16.2mm of vertical bone from the crest of the ridge to 2mm above the mandibular canal and 8.5mm of horizontal width.

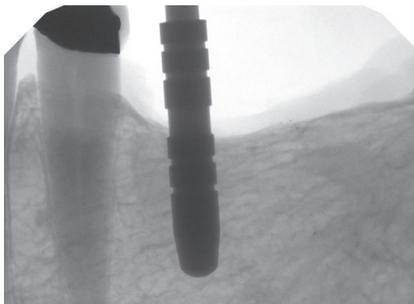


Figure 2: Following proper osteotomy preparation, the precise angulation of depth of the subsequent implant can be checked using a measuring guide. Here a 10mm long implant can be safely placed.

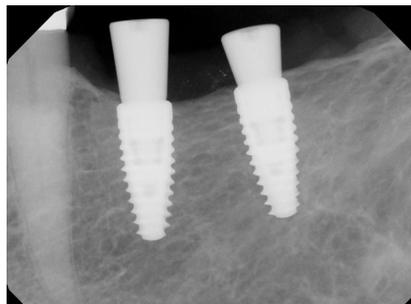


Figure 3: Two Straumann BLT dental implants (Straumann, Boston, MA) are ideally positioned and torqued to 35Ncm, allowing immediate placement of 3.5mm tall healing abutments. These allow tissue contouring around the abutments and eliminates the need for uncovering surgical procedures.



Figure 4: In this flapless surgical technique, the tissue heals well around the healing abutments.



Figure 5: Prior to final impression of the internal design of the implants, the healing abutments are removed and the healthy tissue response observed.



Figure 6: The dental laboratory uses CAD/CAM technology to fabricate the custom titanium abutments with margins at or just slightly subgingival providing outstanding periodontal health around these cement on crowns.



Figure 7: The final Bruxzir solid zirconia (Glidewell lab, Irvine, CA) are seated.

Case #1 treatment has hard costs to the dentist of around \$950, using the previously estimated fees above.

If the patient elects to get credit to pay for this process, the dentist is paid up front but is charged around 6% of the loan amount of \$4000 or less, or an additional \$57. Lending Club and Care Credit are two sources for patients to receive credit for dental treatment.

Our new total is about \$1000 per single implant crown.

Other costs to the dentist include overhead to perform the procedures, which must be determined by the individual office. These include staff time, impression materials, transitional appliances. A full arch impression today may run in the \$20-40 range. Let's use the number of \$400 to cover these expenses.

Our new total is around \$1,400 per surgical and prosthetics of a single dental implant

Average fees today for a single dental implant/abutment/crown vary significantly from location to location but when we consider the cost for an oral exam, full mouth series of radiographs, the implant itself, the charges for the abutment and implant retained crown may range from \$3,500 to \$4,500 in many situations. Extractions, grafting, membranes, CBCT and surgical guide fabrication may add an additional \$1,500 to the charges made to the patient, with additional material/overhead/laboratory costs to the dentist being in the \$550-600 range.

Just using these values superficially created as an example, the profit margins to the dentist are approximately 60-68%, depending on the dentist's fees for the procedures. There are not many treatments provided in dentistry that provide this type financial success.

CASE #2

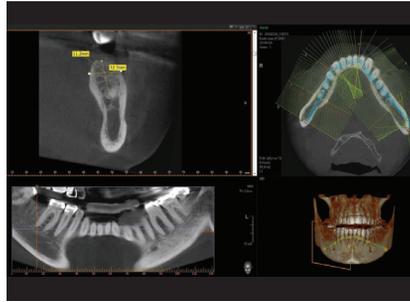


Figure 8: The CBCT analysis of the edentulous mandibular second molar site illustrates a significant lingual concavity, which must be understood, but adequate bone for safe placement of a dental implant.



Figure 9: The Straumann implant is ideally positioned buccal-lingually and mesial-distally allowing for fabrication of a stable functional and esthetic final implant retained crown.

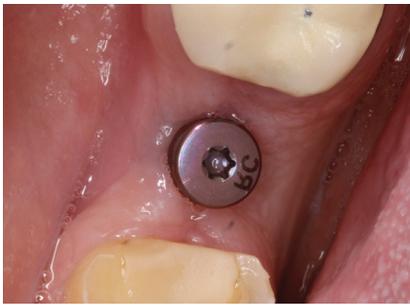


Figure 10: After uncovering, a taller healing abutment is placed to provide tissue control



Figure 11: The healthy tissue cuff is observed providing a healthy periodontal condition.



Figure 12: Here a screw retained Bruxzir crown is torqued to position. The conical internal design within the implant provides outstanding long term retention.

When creating a screw retained implant retained crown as shown in Case #2 (above), our lab fees are reduced about \$100 per unit, but then there is chair time and composite material cost to cover the occlusal access hole.

When deciding to follow a “guided surgery” protocol in Case demonstration #3, there are indeed additional cost to the dentist, but the patient is also being charged for these procedures that may provide a more accurate final result. Using the numbers listed above the profit margin in performing a guided surgical procedure is still in the 60-65% range, depending on the cost of the surgical guide created and the charges to the patient. Guided surgery may shorten the surgical treatment time and provide a virtual creation of the final prosthesis prior to any surgical intervention.

80% of GPs produce less than \$375 an

hour.^{3,4,5} Even with 1.5 hours scheduled for surgical placement and 1.5 hours scheduled for restorative appointments to complete 1 dental implant the hourly production, using this generalized fee analysis, is more than 3x the highest hourly production treatment. Essentially with placement of one dental implant, a dentist will be generating the comparative of 9 hours of their normal highest production per appointment hours. Dentists could work less hours to achieve the same financial goals, or increase revenues by maintaining the same volume of patient hours.

Finally when the dentist chooses to make a digital impression, as illustrated in Case #4, over the conventional one with impression materials, the lab costs may decrease by \$150 or so and the turnover is faster. There is no need for model work in the dental laboratory.

Investment in the newest technology

such as digital scanners and CBCT equipment not only makes us more efficient, but potentially pay for themselves over time. Of course competency in providing quality care comes with a cost too. High quality dental continuing education is a critical part of the GP performing both the surgical and prosthetic aspects of implant dentistry. Becoming proficient comes with a price.

Dr. Timothy Kosinski is an Affiliated Adjunct Clinical Professor at the University of Detroit Mercy School of Dentistry and serves on the editorial review board of Reality, the information source for esthetic dentistry, the Michigan Dental Association Journal, and is the past editor of the Michigan Academy of General Dentistry and currently Associate Editor of the AGD journals. He is a Past-President of the Michigan Academy of General Dentistry. Dr. Kosinski received his DDS from the University of Detroit Mercy Dental School and his Mastership

CASE #3

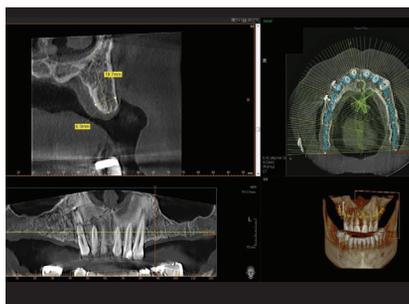


Figure 13: The CBCT analysis illustrates adequate maxillary bone for implant placement. Also note the horizontal fracture of the maxillary right cuspid tooth as a result of trauma. This will be subsequently addressed.

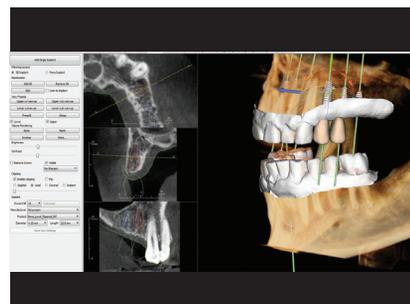


Figure 14: Utilizing design software from Anatomage, (Anatomage Inc, San Jose, CA) implant position can be virtually determined prior to any surgical intervention. This tool, along with the CBCT, provides the dentist the opportunity to evaluate vital anatomy, tooth contours, available bone and implant position.



Figure 15: A surgical guide is then created which provides a precise method for ideal dental implant placement. The Straumann implant is positioned through the surgical guide for outstanding accuracy.



Figure 16: The radiograph illustrates the three implants placed in the posterior maxilla using a surgical guide. This tool provides confidence in proper implant placement and subsequent prosthetic design.

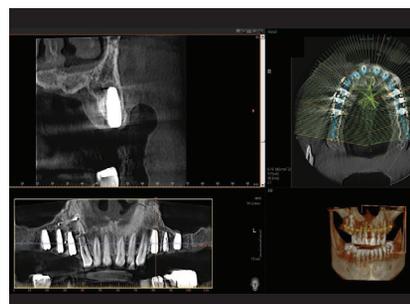
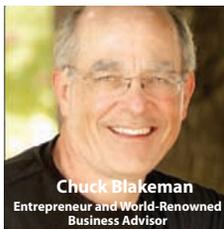


Figure 17: The post operative CBCT illustrates how effective the guided surgical procedure can be.

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CASE #4



Figure 18: The mandibular second molar is deemed non restorable.

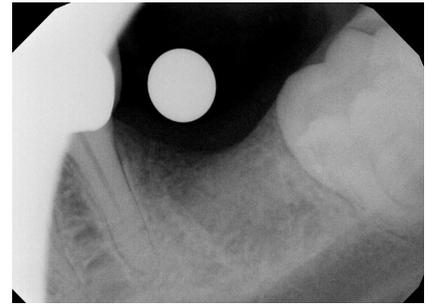


Figure 19: The tooth was atraumatically removed and the site grafted with an allograft and membrane. The site was allowed to heal for 5 months.

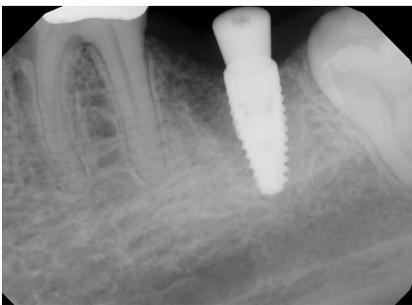


Figure 20: A Straumann implant is torqued to 35Ncm allowing for an immediate placement of a 3.5mm tall healing abutment.



Figure 21: Using the 3M True digital scanner, as digital impression is made and immediately sent to the dental laboratory electronically.



Figure 22: The healing abutment illustrates a healthy tissue response and adequate attached gingiva.



Figure 23: When the healing abutment is removed, the soft tissue cuff indicates a healthy periodontal condition.



Figure 24: A custom titanium abutment, with margins at the gingiva level is seated.



Figure 25: The final Bruxzir crown is cemented into position.

“To handle yourself,
use your head;
to handle others,
use your heart.”

– Eleanor Roosevelt