The “First Implant”: Protocol for the GP Part 2, Utilizing CT Guides

In part 1 of this 3-part series entitled “The ‘First Implant’: Protocol for the GP,” the authors discussed treatment planning concepts for dentists who want to place their “first implant” in an ideal receptor site. Cone beam computed tomography (CBCT) imaging was utilized to verify abundant bone in the chosen site, ensuring this highly predictable and safe procedure for the placement of a single implant. Part 2 will review, in detail, the protocol of the surgical appointment and the preparation steps for the surgical placement of an implant. Part 3 of this series will then cover the recommended protocol to restore the implant with this “first implant protocol” (FIP). It must be reemphasized that this series of articles describes a protocol that ideally requires and highly recommends an appropriate adjunctive implant protocol (FIP). It must be reemphasized that this series of articles describes a protocol that ideally requires and highly recommends an appropriate adjunctive hands-on course prior to a clinician placing their first implant.

**PREPARING FOR SURGERY: REVIEW OF TREATMENT PLANNING AND SURGICAL APPOINTMENT STEPS**

During the treatment planning phase clinical records were taken and a thorough medical history was completed. Once the patient who exhibited abundant available bone in the recommended sites was selected, a CBCT scan was performed and submitted to an imaging service provider and radiologist. Once the ideal receptor site was identified through the use of interactive treatment planning software, a surgical guide was fabricated, tried in the patient’s mouth to validate fit, and the patient was appointed to have the implant placed. Appropriate prescriptions were provided to the patient for medications to be taken prior to the surgical visit.

To avoid undue stress for the clinician, we advocate that at least 2.5 hours of uninterrupted time be put aside for the surgical appointment. Prior to this implant placement appointment, various background steps have to occur for the implant to be placed successfully. The appropriate armamentarium and implant drilling unit has to be set up and tested, the room should be set up in a sterile/clean protocol, and the required implant components, and ancillary surgical instruments have to be on hand. Many of these steps involve dental team (staff) roles and organization.

**THE SURGICAL APPOINTMENT**

The surgical appointment consists of the following steps:

- Anesthetizing the patient with conventional local agents. (We are not advocating the use of other modalities for the placement of a single implant.)
- Placing the surgical guide in a stable position.
- Creating a bleeding point through the surgical guide.
- Punching the soft tissue to access the bone.
- Preparing the osteotomy site in the bone using the manufacturer’s recommended drilling sequence.
- Placing the implant into the osteotomy.
- Insuring stability and fixation of the implant before moving to the next step.
- Preparing the sinOne abutment (extra- orally) to receive a temporary crown.
- Delivering the provisional restoration on the implant, out of occlusion.

- Checking for any working, protrusive, or lateral occlusal contacts.

The FIP requires that everything is in place prior to the procedure and that the dental team is well prepared and understands all the steps involved. A presurgical review of what will happen during this appointment is highly recommended so that the doctor and team can be as relaxed as possible during the procedure. It is not uncommon for a certain amount of nervousness to be present in the treatment team during this new procedure, so any measures to reduce potential anxiety should be taken.

**UTILIZING A STERILE/CLEAN TECHNIQUE AND STERILE SETUP**

While this FIP is performed without flapping the tissue or using sutures, it will be done in a sterile/clean field (Figure 1). Placing a dental implant involves an open wound into soft tissue and bone. Through the use of a disposable sterile set up kit, any chance of exogenous bacteria entering the implant site is reduced. To enhance overall success and minimize potential complications, as well as from a medical-legal perspective, the authors recommend these steps be integrated as part of the FIP.

Besides the preparation of the osteotomy itself, the clinician will be opening a sterile vial containing the sterile implant to be placed, and within the sterile field, the sterility of the instruments and component parts is maintained.

For ease of use and setup, there are several sterile packages that the authors recommend. Professional sterile systems has customized surgical packs which allow the doctor, assistant, patient, and room to be draped in a fully sterile environment. Anything that needs to be touched, such as the overhead lamp, should be covered with a sterile barrier. There is also a similar sterile drape package available called the Salvin Standard Implant Pack (Salvin Dental Specialties). A hands-on demonstration at an appropriate course will show the proper technique on sterile set-up.
or you can watch an informative video tutorial on the internet at infection-control.salvin.com/Salvin-Standard-Implant-Pack-plus033.html.

**REVIEW OF ARMAMENTARIUM**

In order to prepare the bone at an implant site correctly, there is certain armamentarium needed for the FIP protocol.

**Monitoring equipment**

The FIP implant armamentarium for the patient on every level. The standard of care prior to surgically placing an implant is to record a preoperative blood pressure and take a postoperative reading. An electronic blood pressure cuff is an option to allow periodic automatic blood pressure readings during the procedure. A digital pulse oximeter is recommended, but not required. The pulse oximeter monitors the patient’s oxygen saturation and the patients pulse during the surgical procedure.

A specific sterile instrument kit—should be organized, containing everything necessary for placing an implant. This can be accomplished with either a cartridge type tray or separate autoclavable bag. The authors prefer a hard cassette tray as it reduces the chance of an instrument accidentally puncturing the bag, while allowing for better organization. The benefit of having a separate instrument kit for implant placement is that it guarantees everything needed is in one place, and that during the surgical appointment, staff isn’t running around looking for things. While this FIP is flapsless and incisions are not made with a blade, there are certain instruments that are specific to this procedure (Figure 2) that need to be available.

This FIP kit should ideally have:

- Two Minnesota retractors. These are wide stable surgical retractors that allow for good visibility. One is for the doctor and one is for the surgical assistant.
- Periodontal probe. A periodontal probe will allow measurement of the tissue height after punching the tissue for implant placement. This allows guidance as to how deep the implant platform will be from the free gingival margin. The probe is also used after using the tissue punch to sound the bone buccal and lingual, and verify the targeted position of the osteotomy.
- A fine surgical scissor. This is important to use sometimes after using the tissue punch, to either remove the tissue core, or neaten up any tissue tags around the punched area.
- A dental mirror. This is used at times to visually check into an osteotomy site, and to facilitate access to views of the site from different angles.
- A dental anesthesia syringe and cartridges of appropriate anesthetic agents.
- A double-ended 2/4 mm molot surgical curette. This is used to help remove the keratinized plug above the osteotomy site.
- A college forceps. This is used to hold gauze and cotton rolls and to move smaller items.
- A curved hemostat.
- Clinicians may want to add other instruments as they get more experience, but in the authors’ opinion, this is a core starting point for the FIP.

A few miscellaneous items include the following (Figure 3):

- A sterile 20 cc disposable monojet syringe with a curved tip. This is used to irrigate the osteotomy site with sterile saline, of any possible debris after preparation. This gets dropped sterile on the sterile tray.
- A disposable 4 mm or 5 mm biopsy tissue punch.
- Two medium-sized steel sterile bowls. One is used to put sterile saline in for irrigation of the osteotomy site with a Monojet Syringe, and to occasionally clean an osteotomy bur with. The other has Chlorhexidine Gluconate 0.12% Oral Rinse (Periex [3M ESPE]) to wipe the patient’s mouth prior to implant placement.
- Three Carpules of dental anesthetic and a needle that has been wiped down with a sterile wipe.
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**IMPLANTS**

The “First Implant”...

continued from page xx

handpiece can often be purchased with a minimum order of implants from the various implant manufacturers as a package or bundle. Implant surgical supply companies such as Salvin Dental also supply these instruments, motors, handpieces, etc.

The recommended implant motor and drill utilizes a bag of self-contained sterile saline as irrigation. If you do not have this equipment, you might want to reach out to your local representative. As this is an essential component of the FIP, the surgical motor and handpiece may be available as a loaner from the dental implant manufacturer, for purchase at a later date.

**Required Presurgical Planning Steps for the First Implant Protocol**

Once the clinician has documented all of the required information about the implant patient, and the surgical plan has been formulated, a presurgical consultation visit needs to be scheduled. At this appointment, the patient will be educated about the risks and benefits of dental implant surgery information contained in the required “informed consent form.” The surgical and restorative plan will be reviewed in detail, along with the financial plan, and prescriptions for the surgical appointment will be given. Any questions the patient has will be answered. It is essential that the tooth-supported surgical guide be tried in the mouth to make sure it fits, and that there is adequate interarch clearance for proper utilization. The try-in of the surgical guide also verifies that it will be there for the surgical appointment.

The pharmacological protocol the authors utilize for single flapsless implant placement is to give the patient an 800 mg dose of Ibuprofen one hour prior to the appointment, then twice a day for 3 days; a 2,000 mg dose of Amoxicillin one hour prior to appointment, then 3 times a day for 7 days; Chlorohexidine Gluconate 0.12% oral rinse 3 times a day for 7 days; and 18 tabs of Lortab 7.5mg, as needed, for pain after the appointment. The prescriptions are printed and given to the patient at this presurgical consultation appointment. Home care instructions of a soft diet, bland foods, and not to brush the implant area for 2 weeks is reviewed with the patient.

continued on page xx
The “First Implant”...

The financial plan is reviewed with the patient and payment sequence is established. If a financial company is financing the plan, the terms are reviewed and signed. Informed consent for implant surgery is reviewed with the patient and signed, and the patient is given the opportunity to ask any questions at that time.5 The previously mentioned implant organizations offer informed consent form samples to members.

The patient is now ready to appoint for the surgical placement of the implant. It is recommended that extra time be allotted for the surgical appointment, as this is a new protocol for the clinician. There is no need to rush! Remember to allow for at least 2.5 hours of uninterrupted time, as the doctor and dental team acclimate to this new procedure. (In this part of the series, we will also demonstrate how part of this time will include the fabrication of a provisional nonfunctional restoration on the implant.)

Surgical Appointment Steps
The first step is to seat the patient and record presurgical blood pressure values, set-up the pulse oximeter, take and record the pulse. This is also a good time to see if there are any last minute questions or concerns and to reassure the patient how easy the procedure will be for him or her, and for the patient to focus on relaxing as much as possible.

The patient, doctor, assistant, and operator are scrubbed and draped in a sterile fashion. Next, the patient rinses for 30 seconds with Chlorhexidine Gluconate 0.12% Oral Rinse and the patient’s mouth is also wiped with this disinfectant solution. Local anesthesia is then given. The authors use buccal and palatal infiltration on the maxillary arch, and a block and long buccal infiltration on the mandible. Usually 2% Lidocaine HCL with 1/100,000 epinephrine is used, unless the patient’s physician has recommended Carbo-caine without epinephrine.

Surgical Intervention Steps for the First Implant Protocol
The FIP implant osteotomy drilling sequence is designed with simplicity and safety on every level. This protocol allows the clinician that has never placed an implant to prepare the initial implant site with guided depth control, and all subsequent preparation to be done with implant drills that allow for controlled preparation.

The surgical implant drilling kit the authors recommend for the FIP is the Internal Surgical Kit (BioHorizons) (Figure 5). However, as we will require the use of a CT-derived template, the actual preparation starts with a separate initial surgical template drill kit (BioHorizons).

After the patient has been adequately anesthetized, the clinician securely positions the Compu-Guide intraorally, the surgical template with embedded stainless steel cylinder that will guide the placement of the single implant (Figure 6). The clinician then uses the initial 2 mm pilot drill to create a bleeding point in the attached gingiva. This bleeding point will mark where the tissue punch will remove a core of tissue. The clinician then removes the Compu-Guide from the mouth and using a 4 mm or 5 mm (depending on the implant size) disposable tissue punch (Figure 7), a core of tissue around the bleeding point is removed utilizing a 2/4 moln curette (Figure 8). The recommended sterile Surgical Guided Surgery Drill Kit (BioHorizons) consists of four 2-mm initial prep burs with incorporated stops to control depth. The stops are at 17, 21, 24, and 28 mm (Figure 9). The extra length of the specialized drills is nec-
The “First Implant”...
continued from page 00

essay to compensate for the vertical height of the stainless steel cylinders within the surgical template. The specific drills to be used will be indicated on the “Drill Sequence Report” that will come with the Compu-Guide. Once the Compu-Guide is placed back in the mouth, the appropriate 2-mm pilot drill is used to create the initial penetration through the crestal bone and establish the depth of the implant osteotomy site based upon the length of the implant to be used. The drilling unit should be set at 2,500 rpm for the most efficient cutting without overheating the bone. The drill should be used in a straight up and down direction to facilitate irrigation and particle removal.

Once the initial depth cut has been made, the Internal Implant Surgical Kit will be used. Utilizing the recommended sequencing, the 2.5 mm depth cutting drills (BioHorizons) will be used next to widen the osteotomy. This will be accomplished without the Compu-Guide, following exactly within the path of the initial 2 mm depth cut to guide the wider 2.5 mm drills. Care must be taken to go slowly, and with a direct up and down parallel, vertical movement of the drill to avoid deviating from the original path. If the wrists rotate facial or lingual during drilling, there is a danger of creating an ovoid osteotomy. The 2.5 mm burs incorporate definitive “stops” that correlate to the predetermined planned implant depth. They are available in 9 mm, 10.5 mm, 12 mm, and 15 mm lengths providing the clinician with the comfort of knowing that there is a definite safety stop. The clinician simply inserts the 2.5 mm bur in to the initial site that corresponds to the implant length being placed and drills until the bur stops at the controlled depth (Figure 10). A 2-mm radiographic check pin, also found in the BioHorizons surgical kit is used after the implant placement to verify the correct position relative to the adjacent teeth (Figure 18).

CONCLUSION
The steps that are needed to prepare for placement of a dentist’s “first implant” has been established. The presurgical prosthetic steps required for the surgical procedure and rationalization of each step has been discussed in this article. The use of CT or CBCT and incorporation of sophisticated 3-dimensional planning concepts have been reviewed, along with the steps required to fabricate a surgical guide or template. The surgical setup, supplies, protocols, and various essential parts and pieces of the dental implant procedure have been explained. The exact steps it takes to precisely prepare an osteotomy using a CT-derived preplanned surgical template has been described in detail.

The fabrication of a patient’s provisional restoration in a nonfunctional manner will be the next step. After a recommended healing period of 3 months, it will be time to restore this “first implant.” The final article in this series, part 3, will clearly describe the steps to restore a single dental implant and the laboratory communication involved with that process. Once again, it must be emphasized that while this 3-part series of articles show a protocol for a dentist to place and restore his or her “first implant,” a hands-on course and interactive instruction is highly recommended prior actually performing these procedures.

References

Disclosure: Dr. Tischler lectures for BioHorizons and is compensated at times for speaking.

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Disclosure: Dr. Ganz is a lecturer for BioHorizons, Imaging Sciences, and Materialise Dental.

Other articles linked in this series can be found on dentistrytoday.com

IMPLANTS

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