



Surgical Manual

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Written By
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The S.T.R. and Ramus blade are manufactured and sold exclusively by:

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Section 1

Introduction to the S.T.R. And Ramus Blade Implant Modalities

Many materials and devices have been utilized as dental implants over the years. The Ramus Blade was first introduced in 1969. At that time it was constructed of surgical stainless steel. The S.T.R. (Single Tooth Replacement) was introduced to the dental profession in 1972, likewise it was first produced in surgical stainless steel. Stainless served these two implant modalities well for many years. It was not until the '80s that titanium and its alloys began showing the industry their unusual compatibility with bone. By 1982, Pacific Implant, Inc., had changed to the use of titanium exclusively in their manufacturing.

Experienced implantologists regard implant surgeries as procedures that require a high level of diagnostic skill, patient management, surgical skill and an understanding of prosthetics. All agree that an in-depth education and hands-on training must be accomplished prior to initial implant surgeries.

The S.T.R. implant is designed to complement the Ramus Blade and other existing implant devices, thus expanding the treatment capabilities of an implantologist.

The S.T.R. is meant to be a root replacement for centrals, laterals, cuspids and bicuspid and can be used in either the maxillary or mandibular arch. It is recommended that the patient has reached his mature growth prior to placement of the S.T.R. This would normally be at 16+ years of age.

The Ramus Blade is designed for one specific area, and is to be used in the mandibular arch only. The blade should be placed in the ramus area, so that the head is positioned in the first through the third molar position.

Both implant types have been passivated and are suitable for use after proper sterilization. Either dry heat or steam autoclave is acceptable. Federal law restricts the sale of these products except to or on the order of a licensed dentist.

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A. DEFINITIONS

1. **Sterilization:** The literal meaning is to make incapable of reproduction. Usually, sterilization is defined as the destruction or removal of all forms of life, with particular reference to micro-organisms. The limiting factor of sterilization is the destruction of bacterial and fungal spores. Agents capable of sterilizing are steam under pressure, high temperature, including an open flame, gases such as Ethylene Oxide, certain types of filters, and possibly certain types of radiation treatment.
2. **Antiseptic:** The literal meaning is "against putrefaction" and is applied to agents that are supposed to inhibit the growth of micro-organisms so long as there is contact between the agent and micro-organism. By custom, the term, antiseptic is reserved for agents applied to the body.
3. **Disinfectant:** This means something that frees from infection and therefore properly refers only to the inhibition or destruction of pathogens. By custom this term is reserved for agents applied to inanimate objects.
4. **Bactericidal:** Causing the death of bacteria. A bactericide is an agent that kills bacteria.
5. **Bacteriostatic:** Inhibition of the growth of bacteria without killing them. The effects of bacteriostatic agents are reversible.
6. **Asepsis:** Denotes the avoidance of pathogenic organisms. In practice, it refers to those techniques that aim to exclude all micro-organisms.

Relationship of definitions to hospital surgery and dental implant surgery environment: Hospital surgery is antiseptic in its attempt to disinfect the site of the operation and the hands of the operator. Sterilization of the air in the operating room by filtration, ultraviolet radiation, and bactericidal aerosols is utilized in some circumstances. Hospital surgery is aseptic in the use of sterile instruments, sutures, implants, dressings and the wearing of sterile masks, caps, gowns, and rubber gloves by the operator. It is our recommendation that this environment be duplicated as closely as possible for in-office dental implant surgery.

B. METHODS OF STERILIZATION: Agents and Materials Utilized.

1. **Autoclave:** A temperature of 121 degrees C. is applied for 15-30 minutes. This temperature corresponds to 15 pounds of pressure at sea level. Direct exposure to saturated steam at 121 degrees C. for 10 minutes normally destroys all forms of life. In practice, additional time must be allowed for thick packages. With few exceptions, a maximum period of 30 minutes is sufficient.

scrub, the surgeon should gown without touching the outer aspects of the gown. He may then apply gloves, making certain that only inside surfaces are touched and further checking to make certain that the wrists are not exposed. The outer surface of the gown sleeves must be at least one and one-half inches down into the inner surface of the gloves. This is an easy area to break the chain of sterility. The assistant then follows the same procedure. Extra surgical gloves should be available to the doctor and to the primary assistant. Completion of the patient drape is achieved with the placement of a sterile surgical drape and a sterile surgical towel over the upper body and beneath the chin.

The wrapped, sterilized instruments are arranged in proper position on the work surface provided. Most offices will utilize a countertop, mayo stand or adjustable tray of some type to station the instruments on. Whatever surface is used should be covered with a sterile linen. By following the preceding procedures and utilizing hospital room sterile technique, a sterile surgical field has now been created. The operation may proceed with improved probability of success.

SPECIAL SURGICAL NOTE:

The surgical protocol(s) described in this manual should be considered general recommendations and guidelines only, and are not to be considered to standard of care for the procedure described. Rather, each surgeon should consider individual experience and qualifications before attempting any procedure reviewed herein. Additionally, the prudent surgeon must be familiar with their local and state regulations regarding the standard of care for the placement for oral implants.

* *Cidex, Arbrook, Inc., Arlington, Texas 76010*

** *Betadine Surgical Scrub, Purdue Frederick, Yonkers, N.Y. 10701*

*** *Aseptic Thermal Indicator Corp., 11471 Vanowen St., North Hollywood, California.*

Section 3
S.T.R. Surgical Technique

The S.T.R. (single tooth replacement) implant is used for root replacement of centrals, laterals, cuspids and bicuspid; in both the maxillary and the mandibular arches. A sterile pre-surgical preparation as previously described, should be followed.

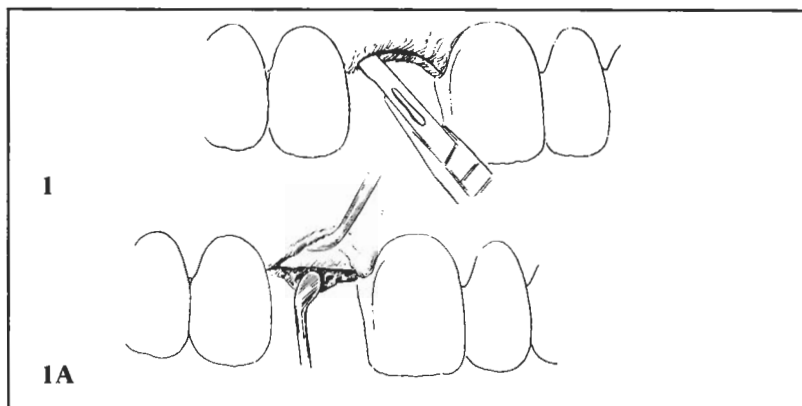


Figure 1 and 1-A. Incise the tissue over the crest of the ridge, and reflect just enough to visualize the width and angulation of the alveolus.

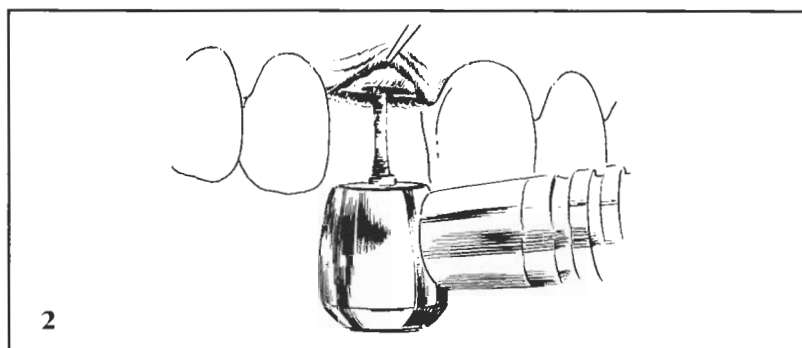


Figure 2. With a 557 surgical XL burr, make an osteotomy the width of the burr or 2mm wide by 5mm long. Depth should be 4 to 6mm. This will provide direction, as well as a starting point for the bone spreading instrument. If the cancellous bone is unusually dense, a deeper osteotomy should be made, thus lessening the amount of force to spread the bone.

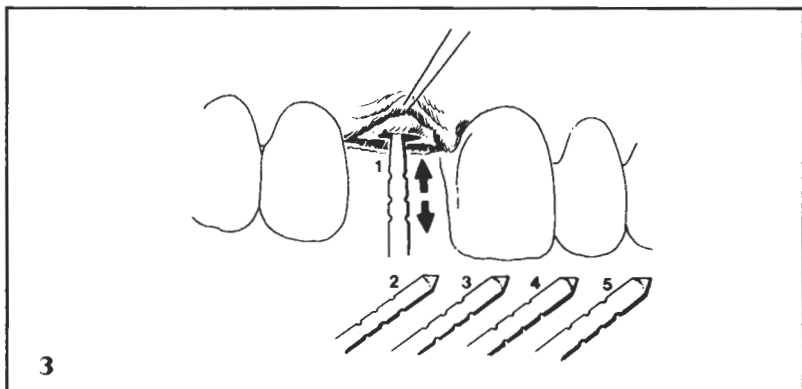


Figure 3. The spreaders come in five progressive sizes. They are used to form the cavity for the implant, by spreading the cancellous bone. Each of the spreaders have three horizontal lines on them, indicating the depth required for each of the three sizes of implants. The line nearest the point is for the two hole implant or 12mm, the middle line is for a three-hole implant or 15mm, and the line nearest the handle is for a four-hole implant or 18mm. (Also refer to Figure 11.)

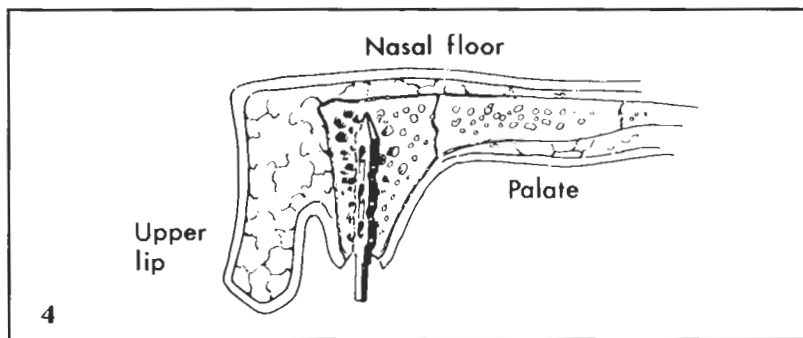


Figure 4. DEPTH: When developing the bony cavity, take advantage of all of the available bone, this means the bone from the alveolar crest to the nasal floor. On an X-ray, the nasal floor is shown as a fine white line. When using the five spreaders, seat the #5 instrument to within two-thirds of its depth. This will allow for a snug fit of the implant.

The shoulder of the implant should be seated under the alveolar crest, leaving the polished neck and the seating ledge (Figure 11) above the crestal bone. The space between the crestal bone and the finish line of the crown will permit fibrous connective tissue to form an interphase and seal at this point.

OsteoGen, a resorbable hydroxylapatite, may be used to fill in any bony defects around the implant post. Its use for bone regeneration has been shown to be effective.¹

¹Wagner J.R., Clinical and Histological Study Using the Resorbable HA for Repair of Osseous Defects Prior to Endosseous Implant Surgery. *Journal of Oral Implantology*, Vol. 3, 1989.

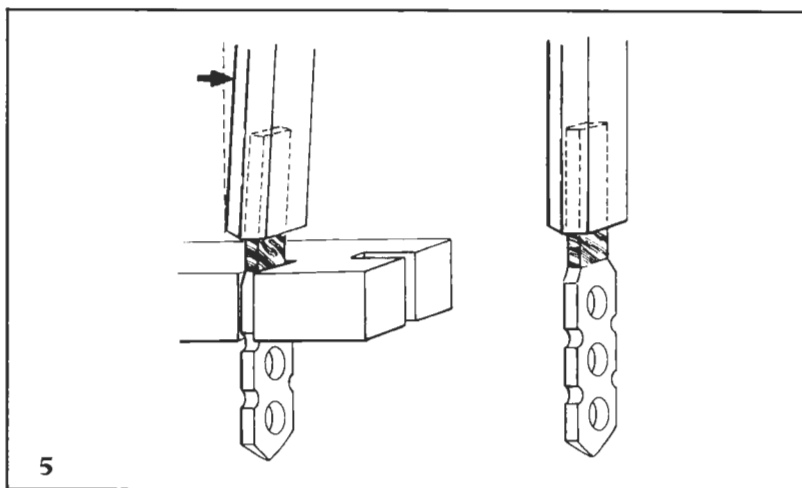


Figure 5. With the aid of sterile gauze or hemostat, place the post portion of the implant into the opening of the seating instrument. Proceed to partially seat the implant into the prepared osteotomy. Next, remove the seater and examine the post for alignment. If the post will not come into proper alignment when seated, then remove the implant with a sterile hemostat and place it in the bending instrument as shown in Figure 5. Bend the post in the desired direction. NOTE: The post may be bent as much as 15 degrees in any one direction. The post should not be bent back and forth, as this will stress harden the metal, and subject it to fracture. Reposition the implant and seat it to its proper depth.

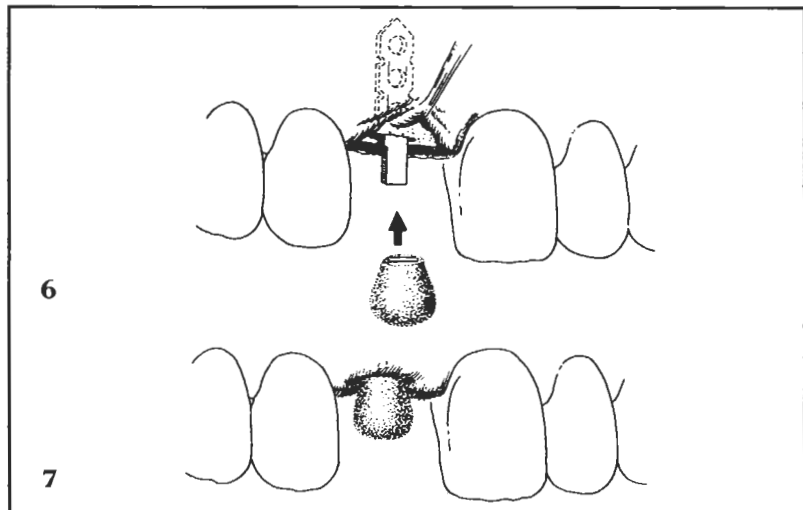


Figure 6 and 7. The pink temporary is seated over the post to within 1mm of the crestal bone. This will allow the soft tissue to form a cuff around the post, and serve as a base for a temporary crown. Two sutures are all that are required to close the tissue flaps.

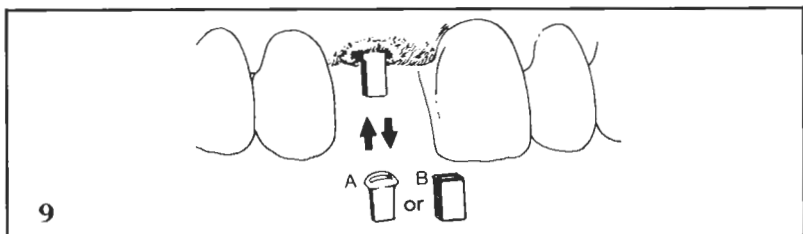


Figure 9. With the healing process completed, examine the implant for rigidity by removing the temporary crown and tapping the top of the post. The implant should ring briskly and resist lateral displacement. If for some reason the implant did not integrate, and there is moderate mobility, you must reflect the tissue, remove the implant, decorticate the area and fill all voids with OsteoGen. The last 2mm should be filled with a mixture of three parts OsteoGen to one part Avitene, to facilitate clotting.

Next, a portion of sterile Surgicel is placed over the entire area and tucked under the tissue edges. Finally the flap is closed and sutures placed. This area must heal for at least four months before a re-implantation is attempted.

Figure 9 illustrates two copings that may be used. Coping A is a tapered coping with a prepared finish line. The second coping, B, is an unfinished coping that can be seated and then prepared by reduction as one would a natural tooth. Either coping should be tried in and checked for sub-gingival margins. If there is a need to seat the coping deeper, reduce the gingival rest on the side of the post, thus allowing the coping to seat closer to the bone and further into the soft tissue. With all corrections made, cement the coping into place and proceed with standard impression taking.

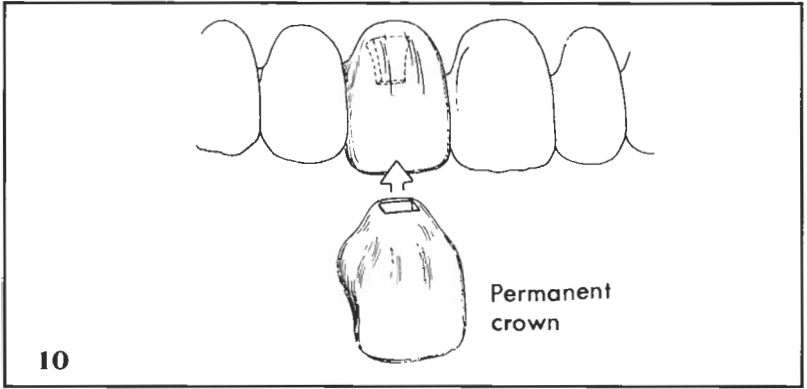


Figure 10. The crown fabrication is done the same as for a natural tooth. The margins should be seated sub gingival.

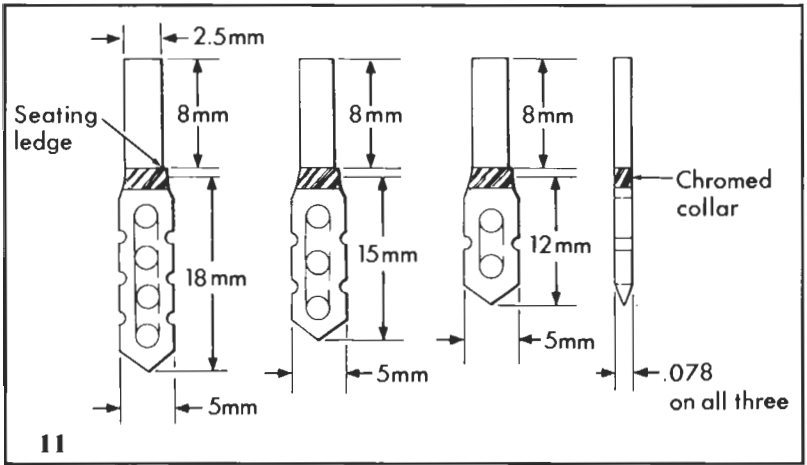


Figure 11. In Figure 11, all of the technical dimensions are listed.

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Q. If infection occurs and the implant becomes loose, will it tighten again?

A. This most likely will not happen. It will remain mobile and become fibro-encapsulated.

Q. When is infection most likely to occur?

A. Within the first three weeks after surgery.

Q. Are antibiotics necessary?

A. With all implantations, this author finds the use of antibiotics to be a major factor in achieving success.

Q. What treatment plan is advised for a mobile implant, if due to premature contact or trauma?

- A.**
1. Adjust the occlusion.
 2. Stabilize and allow to heal for six to eight weeks. Then re-evaluate. If trauma has been ruled out, it must be assumed a fibrosis union has occurred.
 3. Remove the implant, decorticate the area and fill the void with OsteoGen. Close the crestal portion with a mixture of one-quarter Avitene and three-quarters OsteoGen, then overlay this with a strip of Surgicel, tuck it under the tissue flaps, and close the flaps by suturing.

Q. How long should you wait to re-implant in this site?

A. Post extraction sites should heal three to five months before placing or replacing the implant.

Q. How do I know the implant has ankylosed?

A. After a three-month period, remove the temporary crown. With the aid of a metal object, strike the head of the implant. There should be a very distinct, solid ring to the post.

Q. How long after implantation do you wait to place the final prosthesis?

A. The final seating should not be attempted for at least three months after the surgery. Since trauma can cause failure, keep the temporary out of occlusion for these three months. THIS IS A MUST FOR A SUCCESSFUL IMPLANT.

Section 4

The Ramus Blade Surgical Technique

INTRODUCTION

The Ramus blade implant has been specifically designed to function in the Ramus area of the mandible. It can be used effectively in atrophic mandibles with as little as 3mm of bone above the inferior alveolar canal.

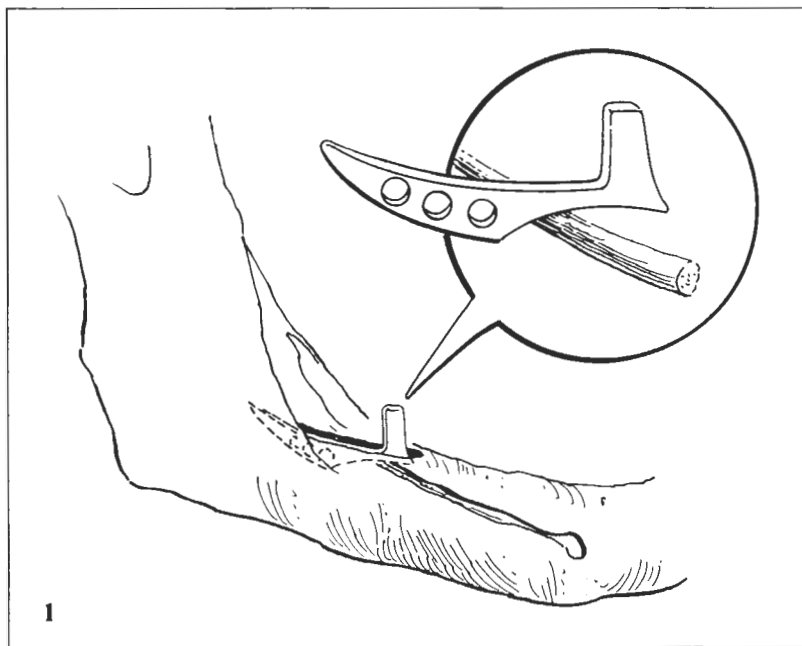


Figure 1. The Ramus blade comes in a standard and relieved design. The relieved design is shown above and is used for mandibles with minimal bone above the nerve canal. The relieved design is made in three lengths; 5mm \times 30mm, 5mm \times 35mm, and 5mm \times 40mm. The standard design is manufactured in the following sizes; 5mm \times 30mm and 4mm \times 30mm.

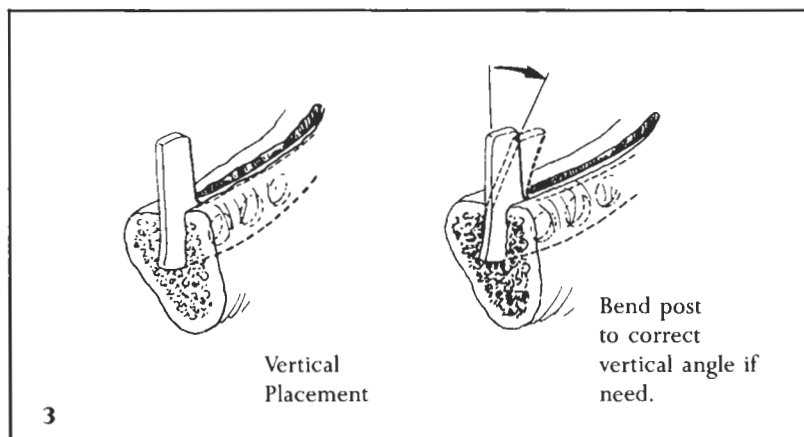
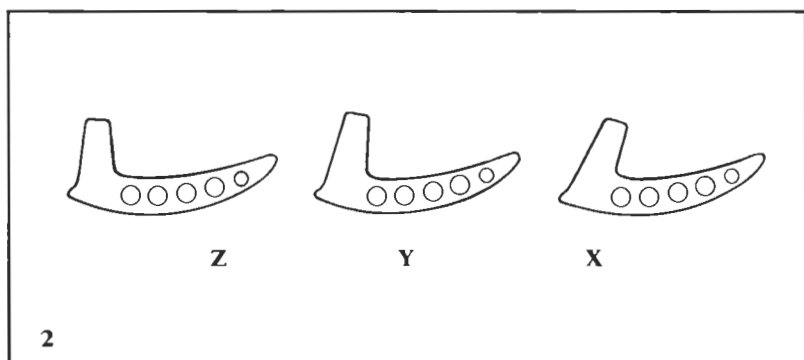
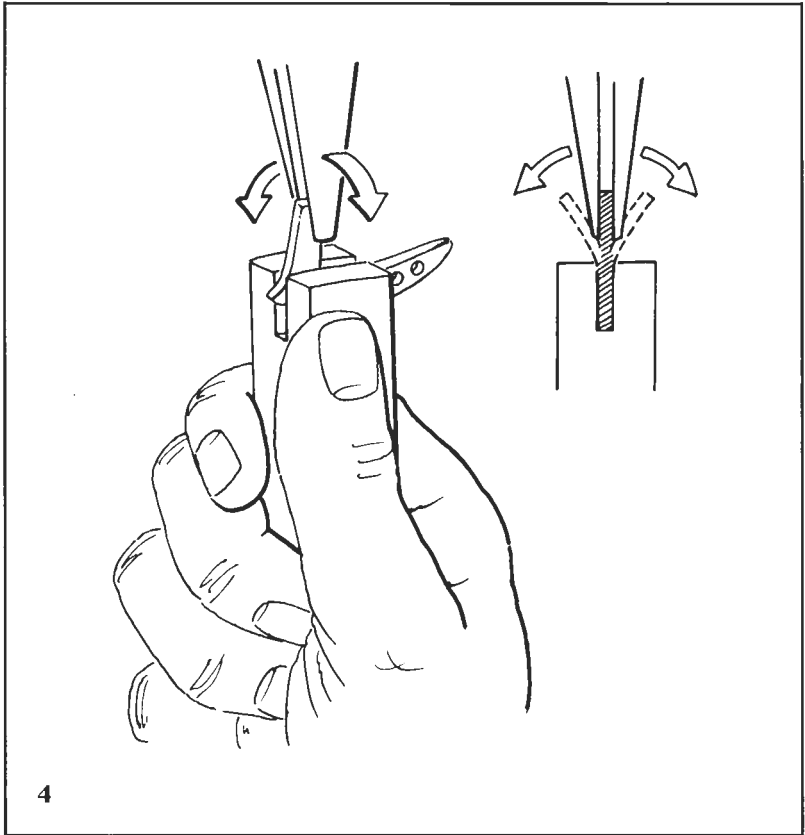


Figure 2. The head of the implant comes in three different degrees of angulation, which will compensate for the different degree of placement in the ascending rami, and also permit the post to align with the long axis of the abutting natural teeth.

Figure 3. Labial lingual inclinations are corrected by bending the post in the desired direction.



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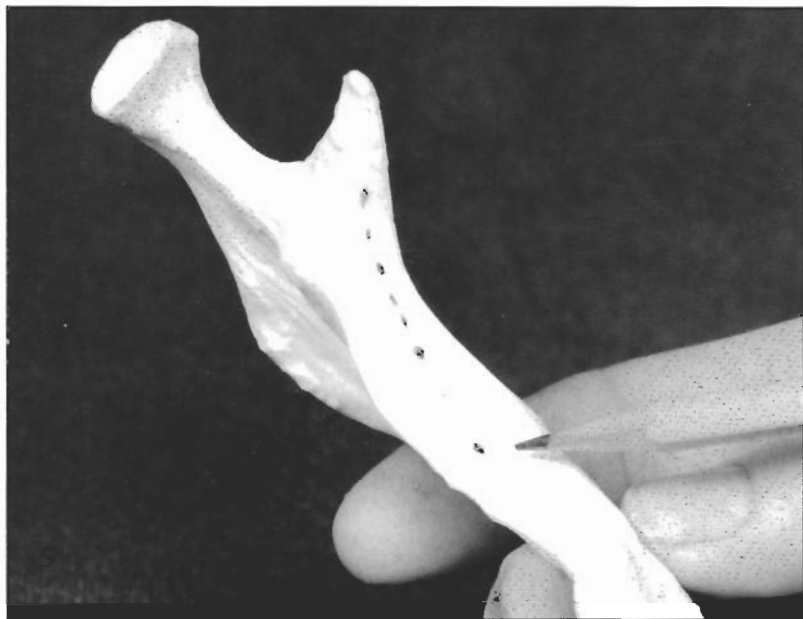
Figure 4. Bending is done by inserting the base of the implant in the slot of a bending jig, and using titanium pliers to bend the post.

The implant can be positioned in the lower first molar area, when there is sufficient bone, however the more routine position is the second or third molar area.

Ramus blades are constructed of titanium and should never be connected to other implants of dissimilar metals within the same arch.

Blade selection is made by superimposing a template or ramus blade over the X-ray of the area to be implanted. Align the post of the implant or template with the long axis of the abutment teeth. The desired implant is then readily selected.

This type of blade implant has served the dental community since 1969.



SURGICAL PROCEDURE

Figure 5. The soft tissue incision begins 3 to 5mm above, and 3mm lateral to the retro molar pad. When making the incision, extend it down and past the retro molar pad, angling toward the crest of the ridge. Continue forward with the incision as needed. Reflect the soft tissue, exposing the bone. The osteotomy is to be prepared on a tangent line to the mandible. When completed, the body of the implant will be traversing the ascending portion of the cornoid process.

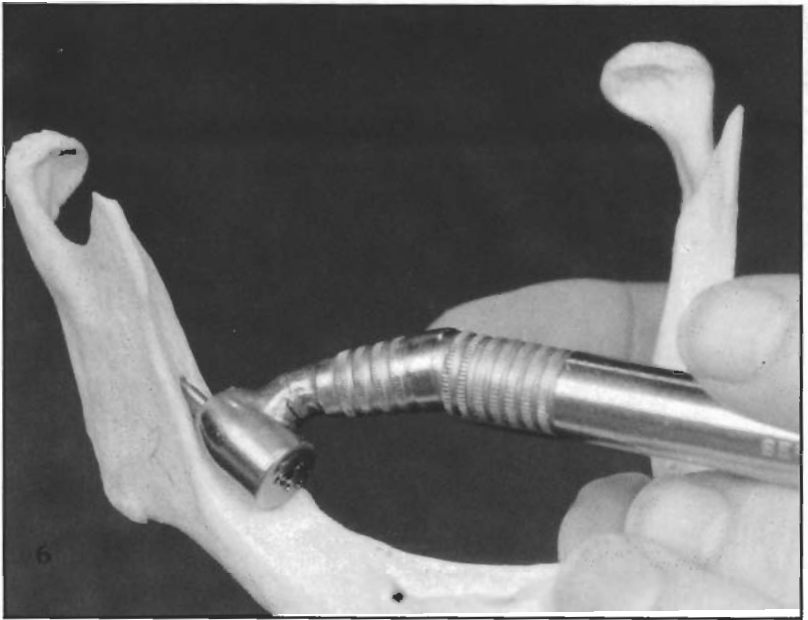


Figure 6. The next step involved is locating the position of the post. This is dictated by the following three factors: (A) the amount of available bone (B) the opposing teeth (C) the depth of the mylohyoid fossa. It is best not to position the blade closer than 2mm from the crest of the mylohyoid ridge. With the dental burr rotating, penetrate the bone to a depth of 6mm. If the lingual fossa is fenestrated, move to the buccal by 1-2mm and repeat the procedure. Make the next penetration some 15-18mm distally as shown in Figure 5. Continue by making a series of connecting penetrations. Then join them and widen to approximately 2mm, with a depth of 6mm. It is more convenient to begin the osteotomy with a conventional handpiece and then change to a surgical handpiece as illustrated in Figure 6, to finish the distal portion of the osteotomy.

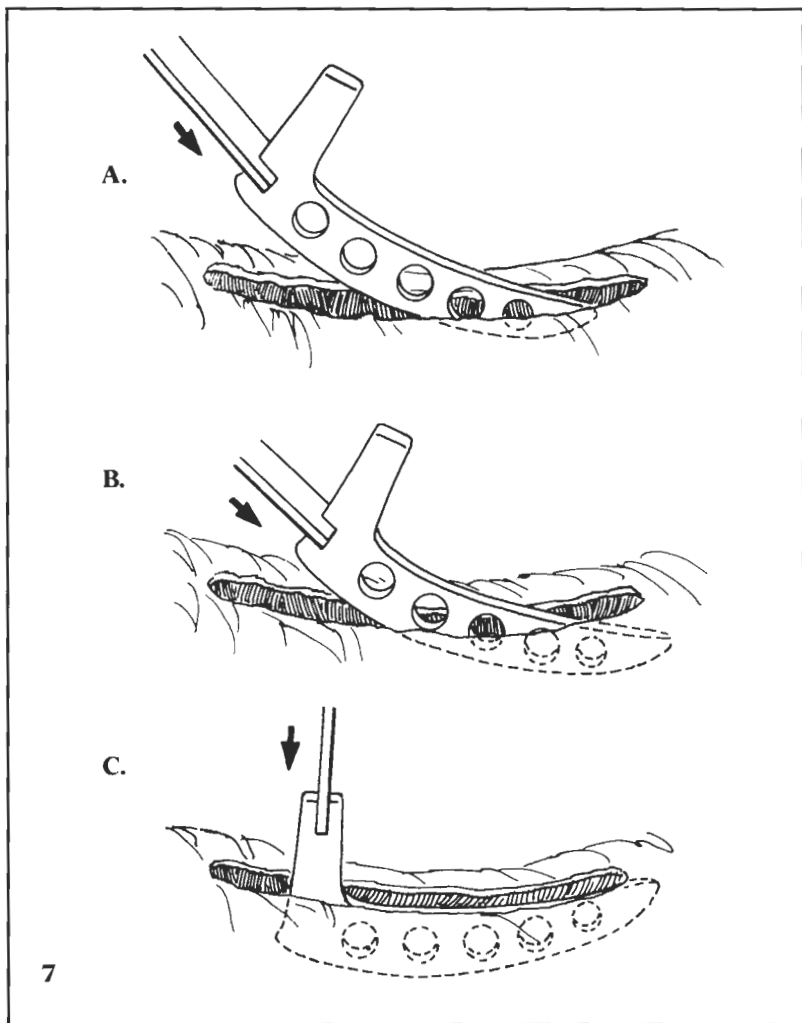


Figure 7. The three steps of blade placement are illustrated here. Grasp the implant with a hemostat. Place the point in the distal of the osteotomy. A titanium seating chisel is then used to drive the body of the implant past the mesial wall of the osteotomy. The angle of force is placed over the head of the implant, seating it down into its receptor site. When correctly seated, the implant should be firmly in position, with its upper surface even with, or below the cortex of the bone. A surgical mallet is an adjunct to this procedure.

Currently, the Ramus blade implant is being manufactured with two head designs. 1. The standard tapered head
2. A milled post with a cast metal coping.

The copings come uncemented with each implant. It is recommended that the coping be fitted and aligned during the surgical placement of the implant. Then cement the coping to the post with a hard cement.

IMPRESSION TAKING

Tapered Post — Immediate: This method is preferred by the author. After the abutment teeth have been prepared, the field is cleansed and the patient is draped and prepped for the surgery, with the face and chin being thoroughly scrubbed. When surgical placement of the implant is completed then a full tray impression is taken, before the tissue is closed. An index is taken, the temporary coping is seated on the post and the tissue is sutured.

Tapered Post — Post Surgical:

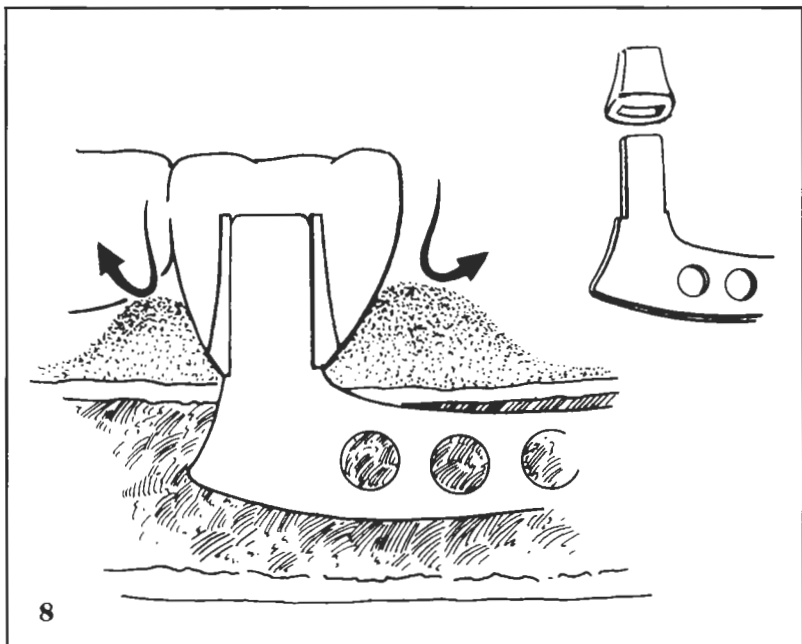
This can be done anytime post-surgically, after the first week of healing is completed. Both of the abutment teeth are prepared, followed by removing the temporary coping from the implant post and taking a full arch impression. An index is taken and the temporaries are replaced until final seating takes place.

Milled Post:

Abutment preparations may be performed 10 to 14 days after the surgical procedure has been completed. Then employ standard crown and bridge impression taking techniques.

IMPRESSION HANDLING

The impression is cleansed and dried. The implant post cavity is filled with Duralay or Resin Cap acrylic. Add slowly to avoid bubbles. As the acrylic begins to set, an additional amount of material is added to the post area, and then a dowel pin is seated in this mass, if so desired. After the acrylic has fully set, pour the entire impression with dye stone.



IMPLANT ABUTMENT DESIGN

Tapered Post:

Figure 8. Design the abutment crowns with an infra bulge, extending to within 1 to 1½mm from the crestal bone. A metal finish margin is recommended. When the bridge is completed, it should be seated with a hard cement. The soft tissue will form a cuff around the infra bulge of the crown on the implant.

Milled Post:

Design the abutment crown with an infra bulge, extending the margin to the finish line of the coping.

POST HEIGHT

In some cases, where the vertical dimension is limited, the opposing teeth and/or the post can be reduced in height. The post may be reduced mesial distally for parallelism, if so desired also.

In conclusion, it is recommended that the final bridge be seated within two to four weeks post-op, as is done in normal crown and bridge procedure.



I authorize photographs, x-rays, or other viewing of my care and treatment during its progress to be used for the advancement of implant dentistry.

I have read and fully understand the above consent for dental treatment. I read and understand the English language.

Date of Surgery _____

Patient's Name _____ Date _____

Signature _____ Date _____

Witness' Name _____ Date _____

Signature _____ Date _____

CONSENT TO DENTAL IMPLANT

To All Prospective Implant Patients:

One of my responsibilities, as your dentist, is to provide you with sufficient information regarding dental implants in order that you may make an intelligent decision, and should you so desire, give your informed consent to such implant procedures. I have attempted to explain fully the advantages and disadvantages of implant procedures. Before consenting to the procedure, you must understand that each individual reacts differently and that dentistry, as medicine, is not an exact science and therefore, no guarantee can be made or implied as to the success of the implant. Before proceeding, I will ask you to read this statement by me and to read, understand and sign the consent form which follows.

D.D.S.

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I understand that placement of the implant involves one or more oral surgeries. I have been informed of the possible complications of the surgery, the anesthesia and the necessary drugs which are used. I am aware that there may be pain, swelling, infection, discoloration and numbness. The exact duration of which may not be determinable. It has been again explained that all questions in this regard have been answered.

Dr. _____ has advised me that if I have other questions they will be answered by him or an associate dentist involved with him.

It has been explained that it will be my responsibility to report to Dr. _____ office every six months or at any other times he may recommend to carefully check the status of my implant treatment. A reasonable fee will be made for these follow-up examinations subsequent to the first year anniversary date of the placement of the implant.

Considering myself to be fully informed, I authorize Dr. _____ and his associates to perform dental service for me consisting of dental implants together with reasonable necessary surgery, X-rays, administration of local or general anesthetic, sedation, analgesia, administration of drugs and such other related procedures as are reasonably necessary for the completion of the implant procedure.

I authorize Dr. _____ and his associates to use all photos, slides, X-rays and models (but not my name) in teaching other doctors for the advancement of implant dentistry.

Because of the continual progress being made in implantology, I authorize any modification in design, materials, or care, if in Dr. _____ experience and professional judgment he feels it to be in my best interests.

All questions regarding my implant and its surgical procedure have been answered to my satisfaction by Dr. _____

I have read and fully understand the above consent for dental treatment. I read and understand the English language.

Date of Surgery _____

Patient's Name _____ Date _____

Signature _____ Date _____

Witness' Name _____ Date _____

Signature _____ Date _____