



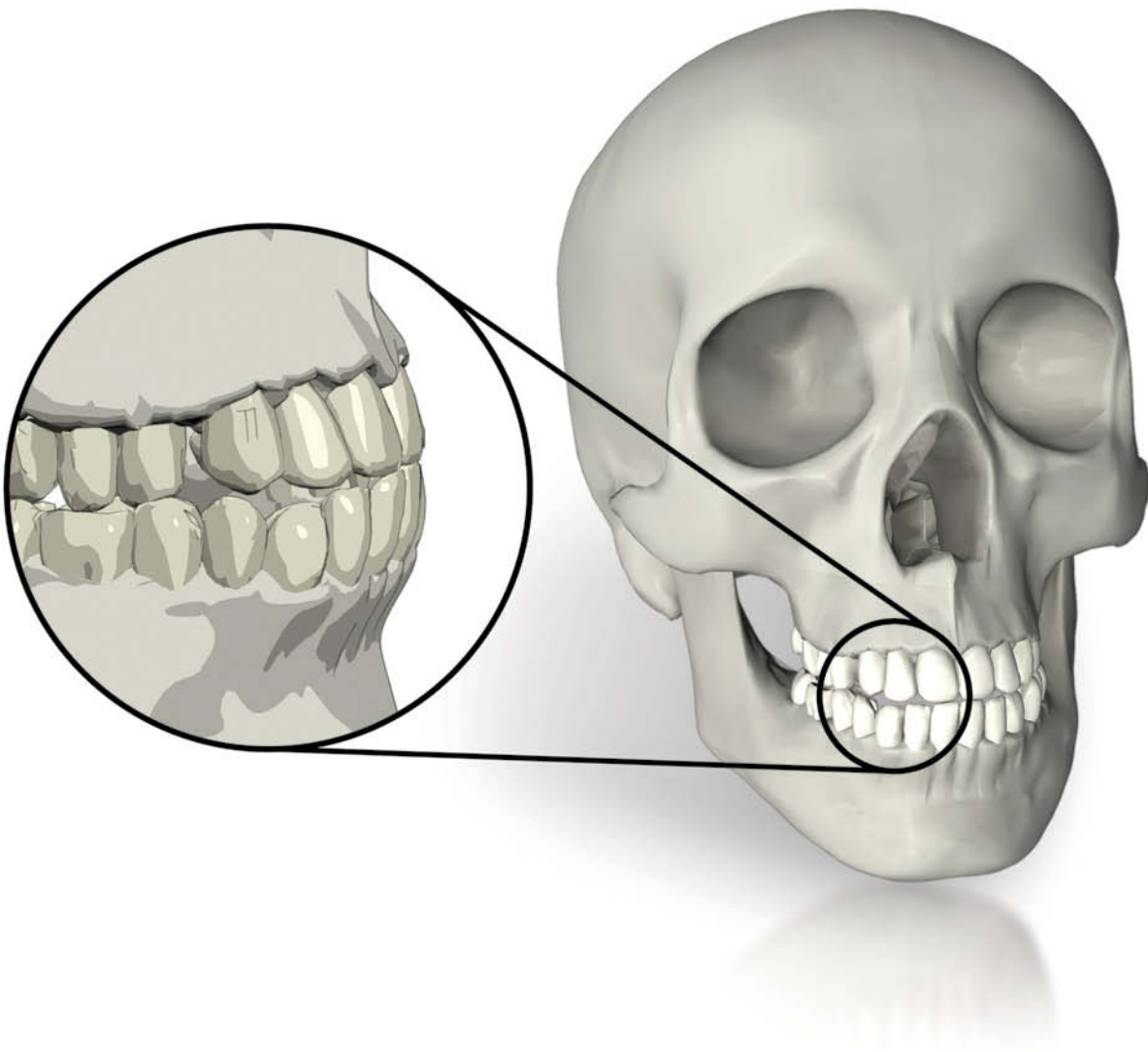
Surgical Manual

Step By Step Techniques

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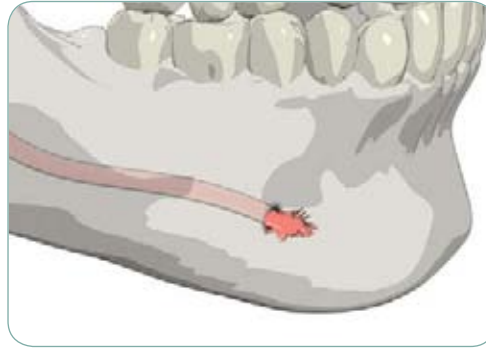
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Pre-Surgical

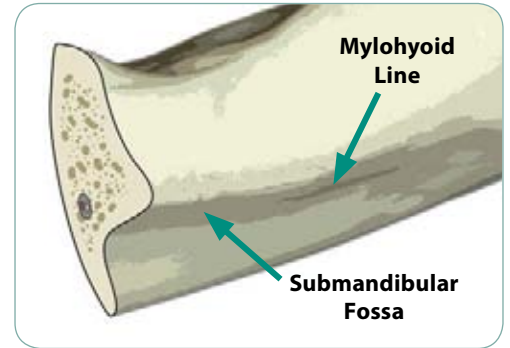


► **Keys to Success**

- Examine patient with mouth closed to ascertain if there is enough inter-occlusal space for the intended prosthesis.
- A frenectomy may be advisable, to improve the soft tissue environment around the intended prosthesis.
- Computer Aided Tomography (CAT scan), although usually not necessary, can be of value in determining the best implant placement sites where there is minimal bone or concern as to the exact location of anatomical structures.



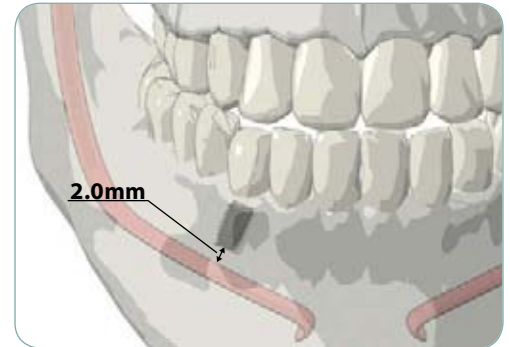
Care must be taken to avoid the inferior alveolar nerve and the mental foramina in the premolar region, since the mandibular nerve is often inclined coronally in this area.




Care must be taken to avoid the penetration of the submandibular fossa which is located below the mylohyoid line, and particularly the sublingual space in the anterior mandible where the sublingual artery is located. Inadvertent penetration of these lingual plates may be avoided by appropriately directing the pilot bur and reamer burs toward the buccal and monitoring the area with digital contact while drilling.



The location of the maxillary sinus and nasal floor must be positively identified to avoid their inadvertent penetration with a reamer or an implant.



In general, 2.0mm of bone should separate the apex of the implant osteotomy and the mandibular canal.

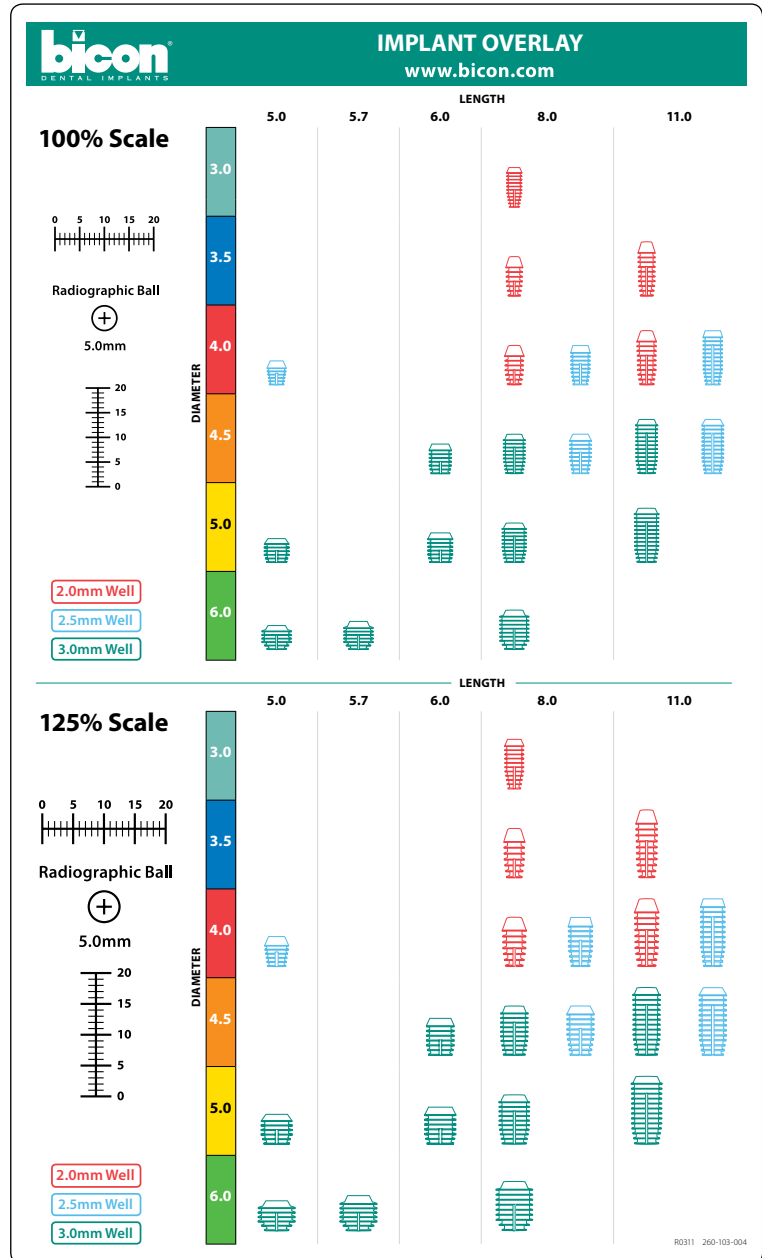
Bone Type	Description	Integration Time
	Type I Dense Cortical Flute of a 3.5mm reamer bur filled with bone and minimal blood	Approximately 16 weeks
	Type II Porous Cortical and Course Trabecular Flute of a 3.5mm reamer bur filled with blood wetted bone	Approximately 10-12 weeks
	Type III Porous Cortical and Fine Trabecular Flute of a 3.5mm reamer bur only partially filled with blood wetted bone	Approximately 12 weeks
	Type IV Fine Trabecular Flute of a 3.5mm reamer bur devoid of bone	Approximately 16-20 weeks

Implant Size Selection

- The appropriate implant length and width depends upon the available bone and the expected occlusal loads.
- In general, choose the widest but not necessarily the longest implant possible.
- Panoramic and periapical radiographs as well as diagnostic models and a clinical examination are used to determine if enough mesio-distal space and vertical bone height exist to place a Bicon implant safely and appropriately in a proposed site.
- A transparent ruler or an implant radiograph overlay, which depict implant outlines of actual size and 125% of actual size, is helpful in selecting an appropriately sized implant. Since radiographs are not necessarily precise representations, knowledge of their magnification must be considered while using them to determine an appropriately sized implant.

► Keys to Success

- The 3.0 x 8.0, 3.5 x 8.0, and the 4.0 x 5.0mm implants are not indicated for use as a single tooth replacement either splinted or unsplinted in the molar region.
- The 3.5mm diameter implants are generally for mandibular anterior teeth. If practical, their use should be avoided for maxillary anterior and all posterior teeth.
- The 5.0 x 6.0mm implant is capable of supporting any tooth in the dental arch.
- From the canine posteriorly, if practical, place one implant per tooth being replaced.
- Consider using Integra-CP™ implants in poor quality or grafted bone.
- It is advisable to have at least 1.0mm of bone around the implant. Therefore, an advisable bone width is 5.5mm to comfortably accommodate a 3.5mm implant, unless ridge splitting or grafting techniques are employed to widen the site.
- In the anterior maxilla, it is advisable to place MAX 2.5™ Implants.
- The width of the alveolar bone may be assessed with a periodontal probe or caliper. It is advisable to have 1.0mm of bone around an implant for a long-term favorable prognosis.
- For maxillary anterior implants, always anticipate the potential need for ridge splitting or bone grafting techniques.



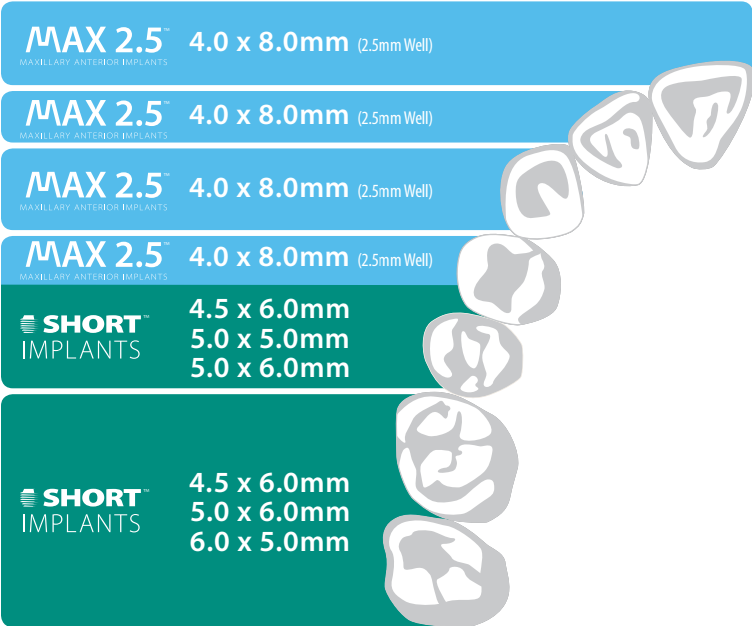
Bicon Implant Overlay

Implant Size Recommendations

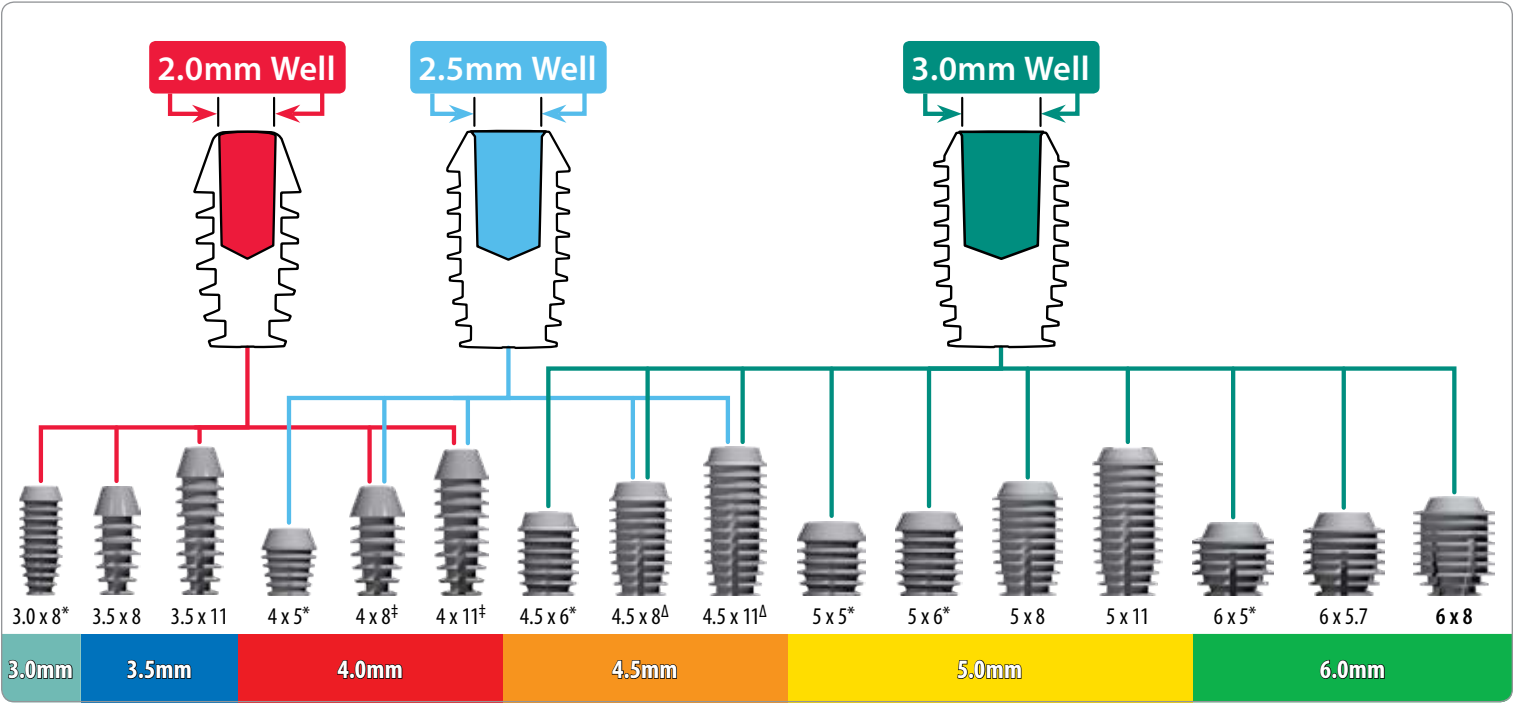
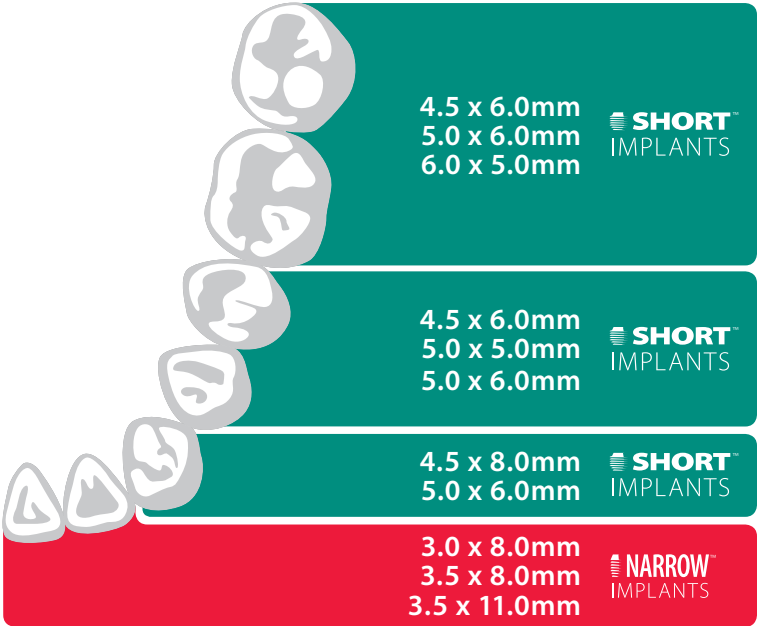
The following chart contains **recommendations only**. Actual clinical conditions and the clinician's assessment of the patient should be the main criteria for choosing the size of an implant for a particular area.



MAXILLA



MANDIBLE

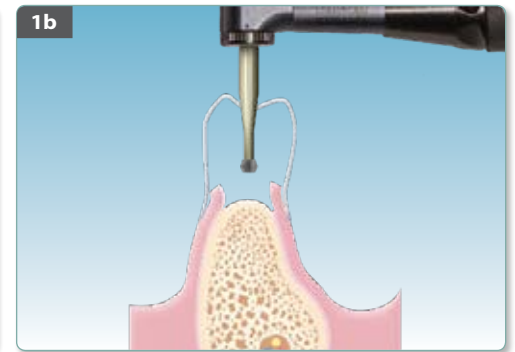
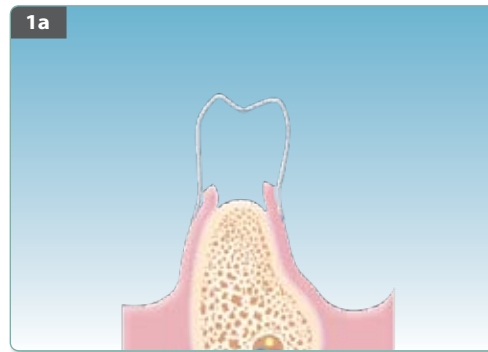


† Available with a 2.0mm or a 2.5mm well. ‡ Available with a 2.5mm or a 3.0mm well.
* Recommended for two stage surgical procedure.

Surgical Template

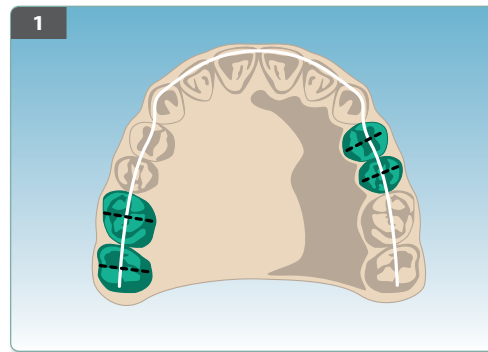
Accurate placement of any implant requires the awareness of its intended prosthetic restoration. Mounted study casts and a diagnostic wax-up of the teeth to be replaced are usually necessary for the fabrication of a surgical template that will aid the dentist in the appropriate placement of multiple implants. Although the location and availability of bone will dictate the ultimate trajectory of the pilot drill, clinicians should strive to stay within the center of the intended tooth and within 10° of the trajectory of the intended prosthesis.

Vacuum-Formed Template

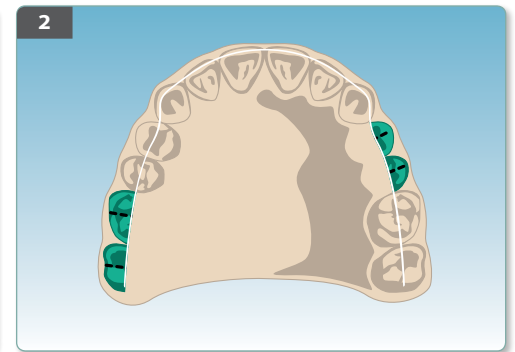


After making an impression and subsequent cast of the diagnostic wax-up of the intended restoration, a vacuum-formed template is prepared on the cast from thin template stock which is commonly used for the chairside fabrication of transitional restorations. A hole is drilled in the middle of the incisal or occlusal surface of the template in the location of the intended tooth. The vacuum-formed template, if possible, is trimmed to include at least one tooth distal and three or four teeth mesial to the area of the intended replacement.

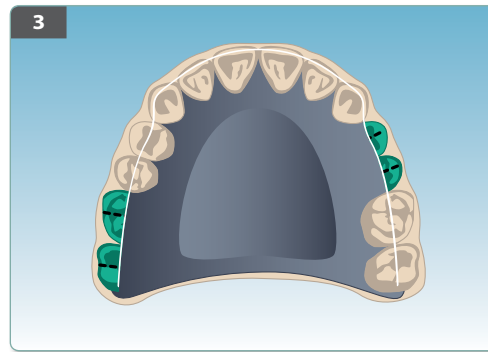
Template from Stone Model



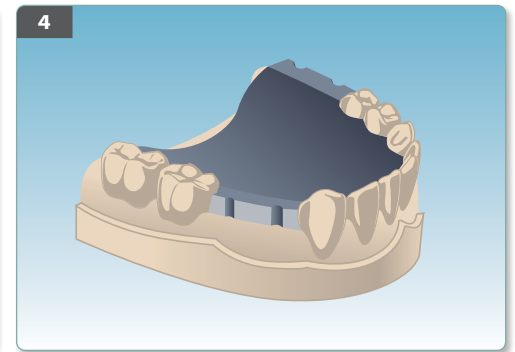
Using a duplicated stone model of the diagnostic wax-up, draw a line through the incisal edge and occlusal surfaces of the teeth and another line in the center of each tooth to be replaced, intersecting the incisal or occlusal line.



Remove the lingual half of the teeth to be replaced.



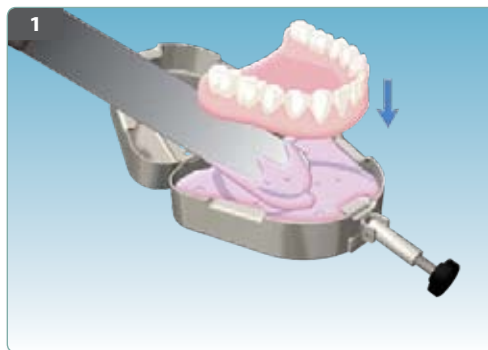
Mold acrylic onto the lingual aspect of the model up to the level of the central fossa or incisal edge of the teeth to be restored.



Cut a 2.5mm wide groove in the acrylic corresponding to the middle of each intended tooth to be replaced.

Fabrication of Palatal Template from Existing Prosthesis

For larger edentulous areas, fabricate a palatal template by using an existing removable prosthesis. When fabricating the palatal template, the buccal aspect is inclined from the incisal edge or central fossa of the proposed teeth back to the crest of the alveolar ridge, which is represented on a duplicated prosthesis as the greatest concavity on the alveolar ridge side of the prosthesis.



Insert denture into alginate in denture duplicator.



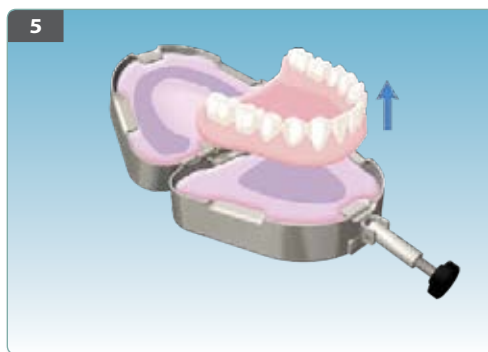
Apply separating medium.



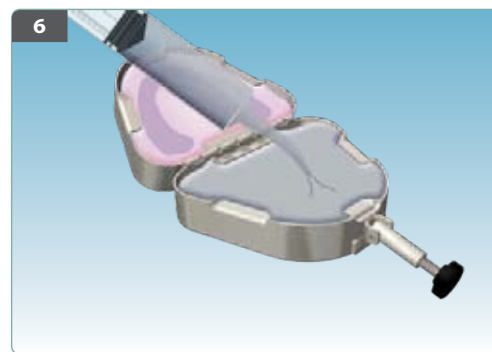
Fill other side with alginate.



Close and allow alginate to set.



Open and remove denture.



Fill alginate mold with acrylic.

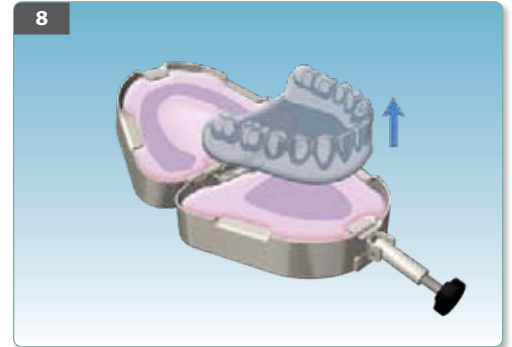
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► Keys to Success

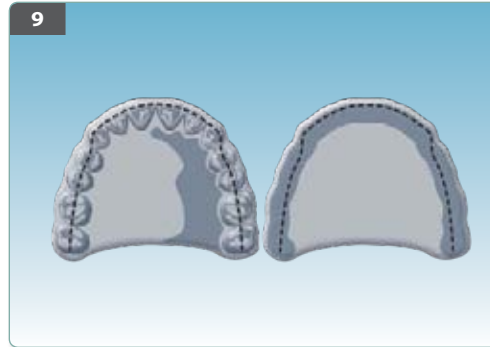
- The trajectory of the pilot bur will be the trajectory of the implant and the trajectory of a straight abutment.
- The final implant osteotomy, to the extent possible, should be centered in the middle of the intended prosthetic tooth.
- An appropriate mesio-distal positioning of a pilot osteotomy is more critical than a slightly off-axis trajectory.
- Both the vacuum-formed and palatal templates are placed in cold sterilization prior to their being used to facilitate achieving an appropriate trajectory for the pilot bur.



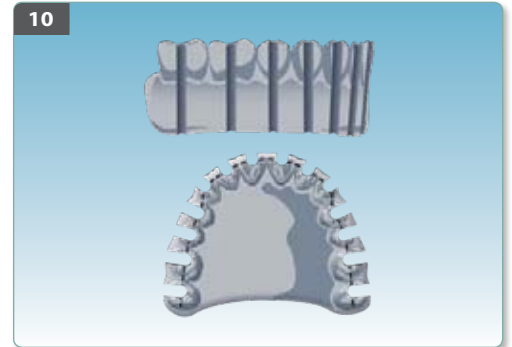
Close and allow acrylic to set.



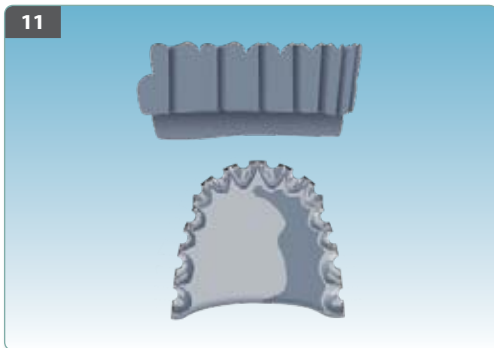
Open and remove duplicated denture.



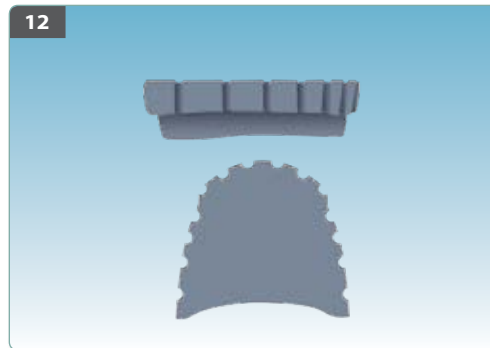
Draw a line in the middle of each tooth and a line representing greatest concavity on the tissue side.



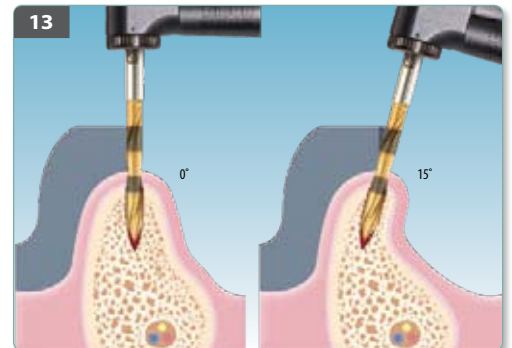
Cut a 2.0mm wide groove in center of each tooth joining the lines representing the middle of each tooth and greatest concavity of the tissue side.



Remove the buccal acrylic along the slope joining the two lines representing the middle of each tooth and greatest concavity of the tissue side.



Trim excess incisal length to prevent interference with head of handpiece.



Template determines mesio-distal positioning. Availability of bone determines final bucco-lingual angulation.

Instrumentation



Comprehensive Surgical Kit

1 Shoulder Depth Gauge

Designed to facilitate the proper abutment height when using the Brevis or Stealth shouldered Abutments. It may be attached to the handle depicted in #3.


2 Removal Wrench

The removal wrench is designed to loosen hand reamers, osteotomes, chisels and bone expanders from a threaded straight handle or a threaded knob.


3 Double Ended Osteotomy Depth Gauge

The double ended osteotomy depth gauge is designed to facilitate the measuring of the osteotomy's depth.


4 Threaded Straight Handle

The straight handle is designed to be used with all threaded instrumentation: hand reamers, sulcus reamers, inserters/retrievers, tissue punches, osteotomes, chisels, bone expanders, seating tips and impression reamers.


5 Implant Inserters / Retrievers

The inserters/retrievers are designed for use with either a threaded knob or a threaded straight handle to assist in the placement and retrieval of certain implants depending upon the clinical situation. It is essential for a clinician to understand how an implant is disengaged from the inserter/retriever instrument prior to using it intra-orally.



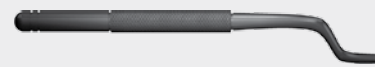
2.0mm

2.5mm

3.0mm

6 Threaded Offset Handle

The offset handle is designed for use with implant and abutment seating tips when direct access is not possible.



7 Latch Reamers

The latch reamers are designed to prepare an osteotomy and to harvest autogenous graft material without irrigation at a maximum speed of 50RPM. Two lengths are available to accommodate a variety of clinical situations. Markings are placed at 6.0, 8.0, 11.0, and 14.0mm.



8 Latch Reamer Extension

The latch reamer extension is designed to lengthen a latch reamer to facilitate access when adjacent teeth interfere with the handpiece head. If the latch reamer is not fully engaged in the latch extension prior to being used, the latch reamer may become stuck or permanently damaged in the latch reamer extension.



9 Pilot Drills

The pilot drill is available in two different lengths depending upon the access to the osteotomy. They are designed to prepare the initial pilot osteotomy at 1000 RPM and to establish the osteotomy's trajectory. Markings are placed at 6.0, 8.0, 11.0, and 14.0mm. They may be used for 15–20 surgeries.



Standard



Extended

10 Healing Plug Removal Instruments

The removal instruments are designed to facilitate the removal of the healing plug from the implant's well during the second stage surgical procedure.



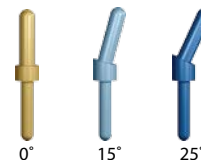
Latch



Manual

11 Paralleling Pins

The paralleling pins are designed as an aid to properly align pilot osteotomies and subsequently the implants. The Comprehensive and Advanced Surgical Kits contain (2) 0° pins, and (1 each) 15° and 25° pins. The Introductory Surgical Kit contains one of each paralleling pin.



12 Osteotomes

The Bicon Osteotomes are available in 5 diameters corresponding to Bicon implant diameters. They may be placed on either a threaded straight handle or an offset handle and are used for internal sinus lifting procedures.



13 Implant / Abutment Seating Tips

The seating tips are designed for use with a threaded straight or offset handle to facilitate the proper seating of an implant or an abutment. When using the implant seating tips, it is imperative that the seating tips be fully seated into the well of the implant.



14 Hand Reamer Extension

The hand reamer extension allows hand reamers to be used with a contra-angle handpiece.



15 Hand Reamers

The hand reamers are designed to be used with a threaded straight handle to manually prepare an osteotomy.



16 Guide Pins

The standard guide pins are designed to be used as a guide for the sulcus reamers. They are available in three sizes corresponding to the diameters of the internal connections of Bicon's implants. They may also be used to assess the trajectory of an implant as well as to check for how well an implant has osseointegrated.



17 Sulcus Reamers

The sulcus reamers are designed to remove any soft tissue or bone above the implant that could prevent the locking taper engagement of an abutment into the well of the implant. They are used in conjunction with the guide pins in #16 above.



18 Threaded Knob

The threaded knob is designed to be used with threaded instrumentation: sulcus reamers, inserters/retrievers, tissue punches, and hand reamers.

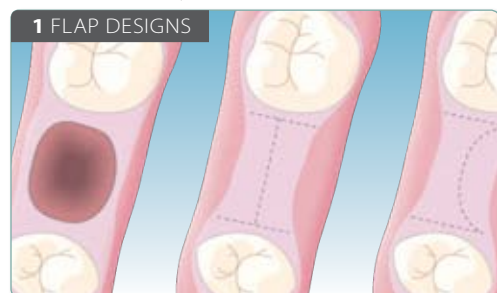


Surgical Placement

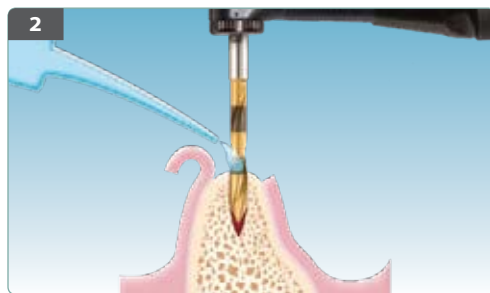


Two Stage Surgical Technique | Implant Placement

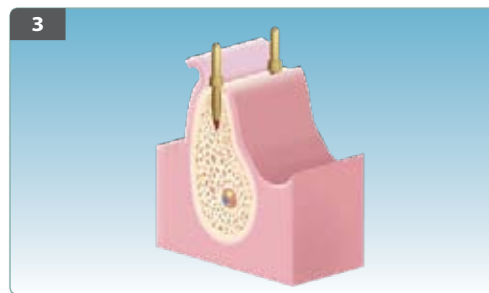
Two Stage Surgery Implant Insertion Technique



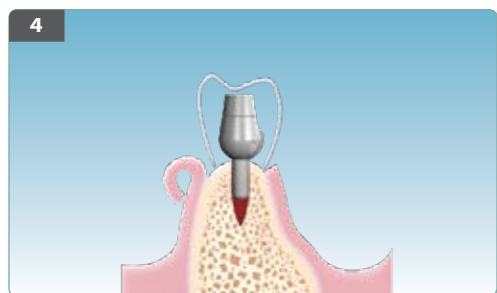
Extraction site Envelope Scalloped



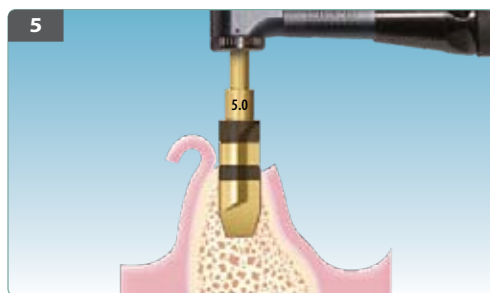
Drill 2.0mm pilot hole with external irrigation to a depth 2.0mm–3.0mm deeper than chosen implant when practical.



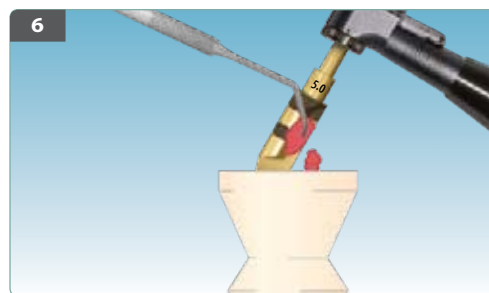
Use paralleling pins to facilitate alignment when placing multiple implants.



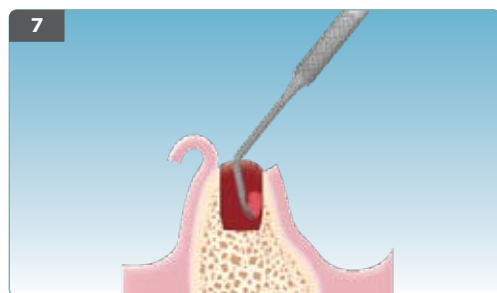
Place an abutment with a 2.0mm post into pilot hole and confirm appropriateness with a vacu-pressure template.



Widen socket with sequentially larger reamers **without irrigation** at a maximum of 50 RPM. In this case, a 5.0 x 6.0mm implant has been chosen so the final bur used also has a diameter of 5.0mm.



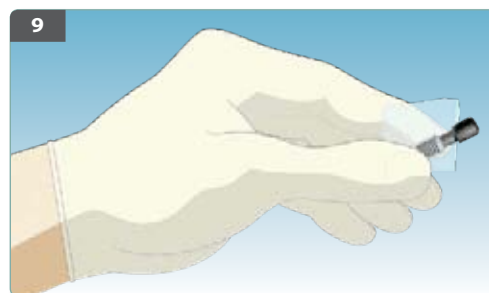
Place harvested autogenous bone, intermittently removed from the flutes of the reamer burs, into a silicone dish for later use.



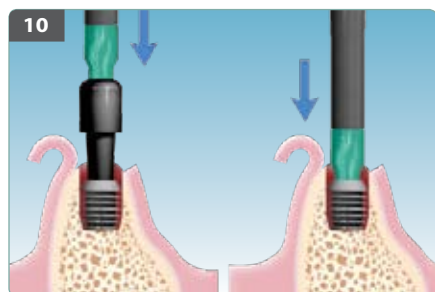
Harvest bone debris from reamer flutes and socket.



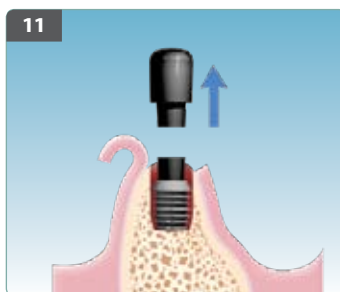
The implant's sterile blister pack is dropped onto a sterile tray prior to removing its Tyvek® backing before the implant's inner packaging is cut with a pair of scissors.



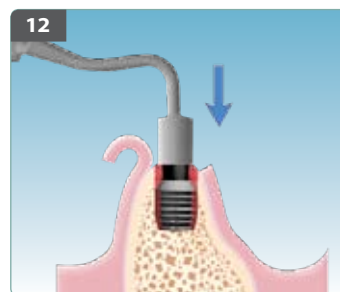
Remove implant from poly bag.



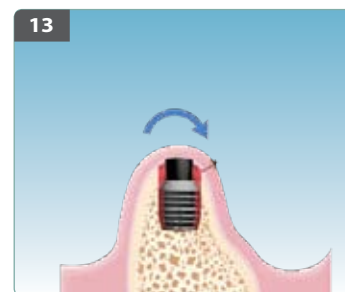
Seat implant by tapping gently on healing plug or directly into the implant well with an appropriate seating tip.



Cut healing plug. Ensure that no sharp edges remain that could irritate soft tissue.

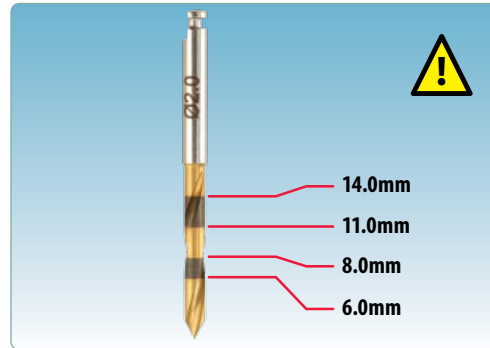


Place harvested bone graft over shoulder of implant. See Step #6 above.



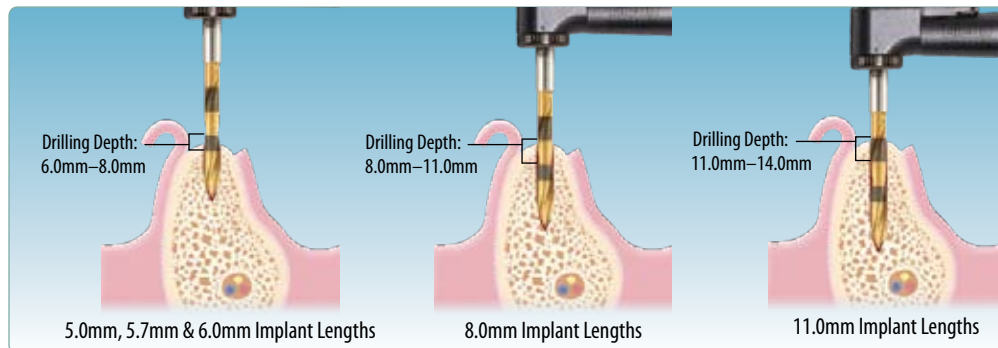
Close and wait a minimum of ten to twelve weeks for osseointegration.

Pilot Drill



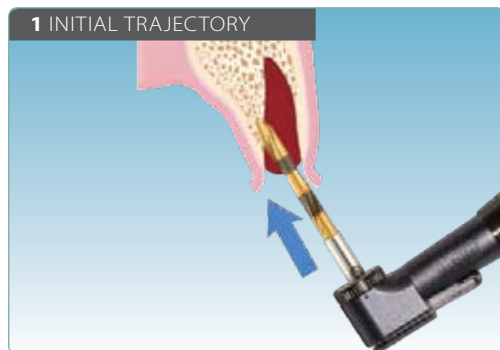
Prior to using a pilot drill, it is imperative that its markings are identified and understood. No assumption should be made about the height of the first marking.

Ideal Drilling Depth for Different Implant Lengths

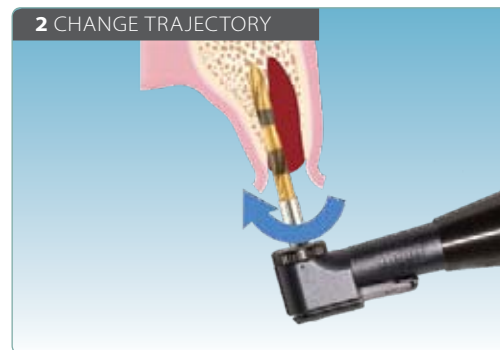


If the trajectory is appropriate, continue drilling with the pilot drill to the depth marking, which will allow for the chosen implant to be seated below the bone. For aesthetic areas, the implant should be placed 5.0mm below the buccal gingiva. In non aesthetic areas, implants may be placed at the crest of bone level.

Maxillary Anterior Extraction Site

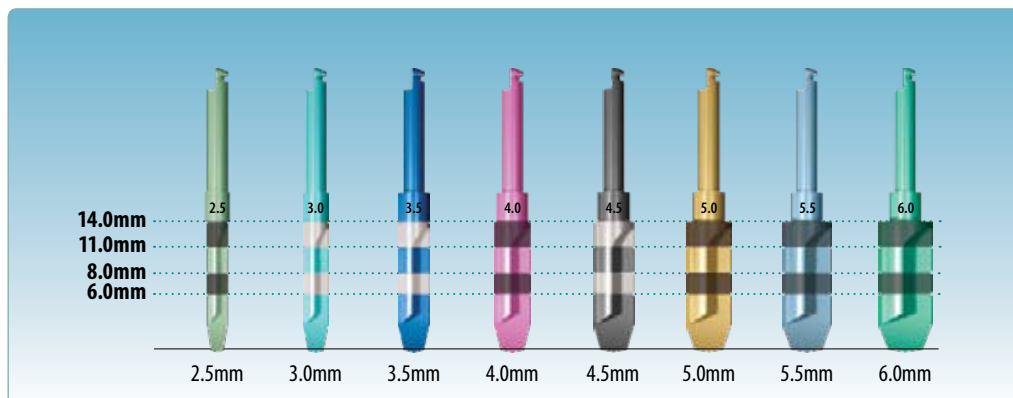


Initially drill into the palatal wall of the socket more perpendicularly than the proposed trajectory of the intended restoration.



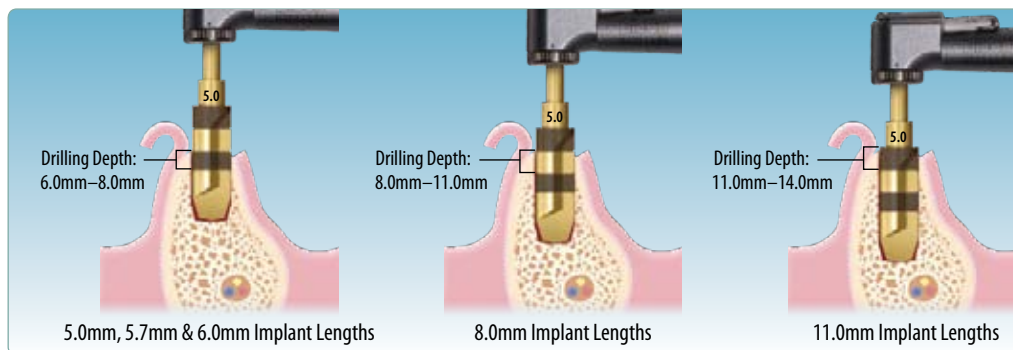
Immediately upon the pilot drill's engagement of the bone, change the drill's trajectory to be more parallel with the adjacent teeth and the proposed restoration.

Latch Reamer Markings



The reamers are used sequentially beginning with a 2.5mm diameter and ending with the diameter of the intended implant. Reamers have horizontal markings at 6.0, 8.0, 11 and 14mm, whereas older reamers may have different markings. It is imperative that the depth indicators on the latch reamers are known prior to surgery. No assumptions should be made about the height of the first marking on any latch reamer. If there is any doubt about the markings on any drill or reamer, take a measurement **prior** to using the reamer.

Ideal Drilling Depth for Different Implant Lengths

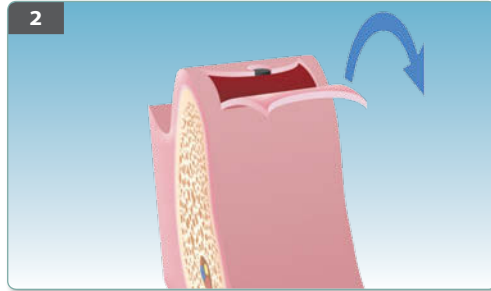


Drill to the depth that will allow the chosen implant to be seated 1.0–3.0mm below the crest of bone. For optimal aesthetics in the anterior region, the implant should be placed 5.0mm below the buccal gingiva.

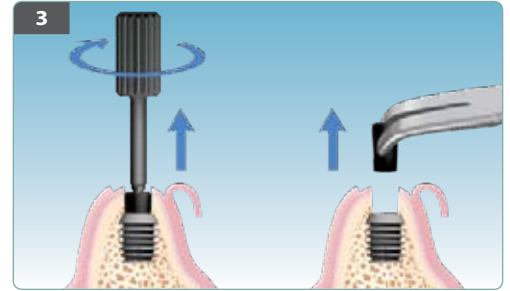
Implant Uncovering Technique and Placement of Abutment



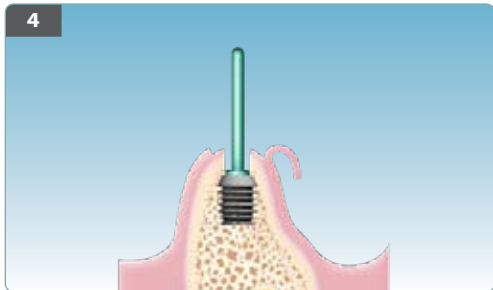
Expose the implant in aesthetic areas with a semilunar crestral incision.



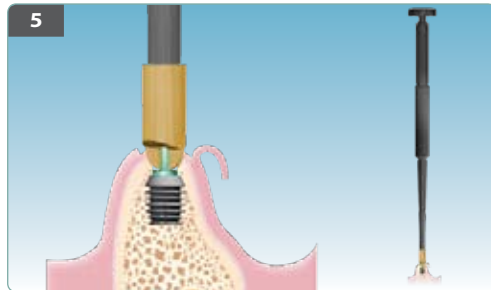
Make split-thickness buccal flap.



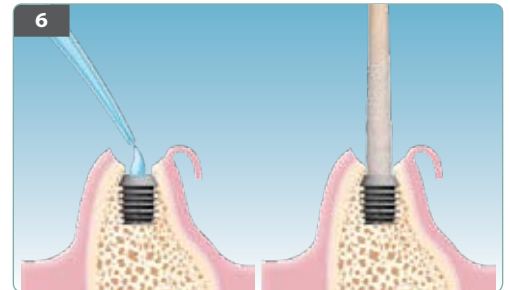
Remove healing plug with a healing plug removal instrument.



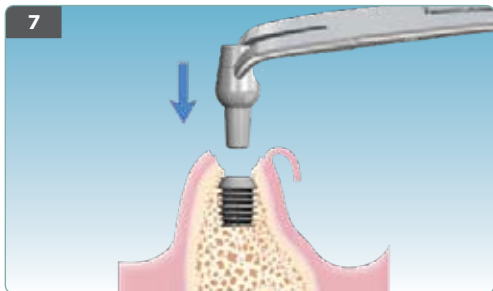
Place appropriate guide pin to check integration and angulation.



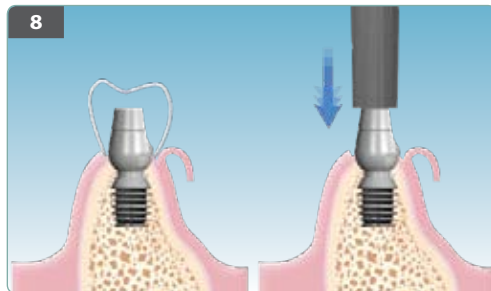
Remove excess bone with sulcus reamer corresponding to the chosen abutment with either threaded knob or straight handle.



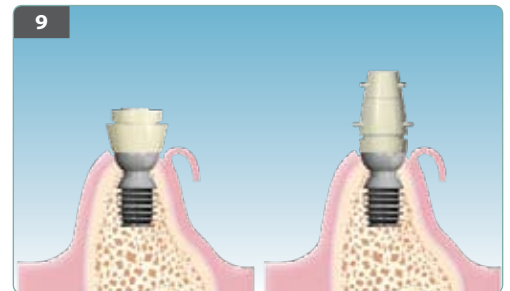
Flush and dry implant well with a cotton tip.



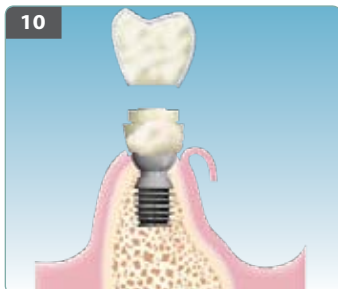
Insert chosen abutment.



Use a template to confirm appropriateness of abutment prior to engagement of locking taper connection, then tap on abutment in long axis of abutment post to engage locking taper.



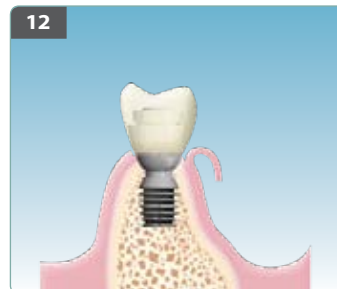
Place an emergence cuff or temporization sleeve onto abutment and modify, if necessary.



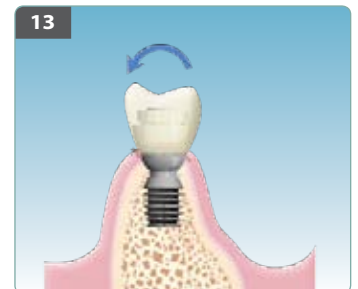
Inject acrylic around emergence cuff or temporization sleeve and into the vacu-press template.



Place template to form temporary crown.

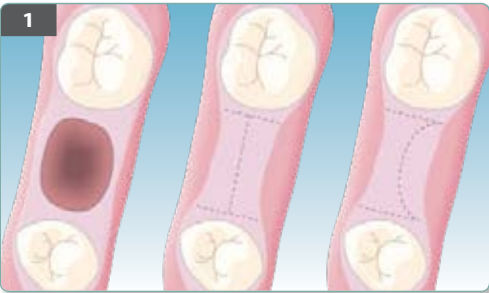


Remove and polish acrylic confluent with emergence cuff or temporization sleeve to help form the gingival sulcus.

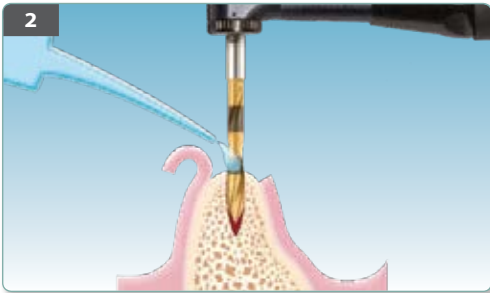


Wait for soft tissue healing prior to taking final impression.

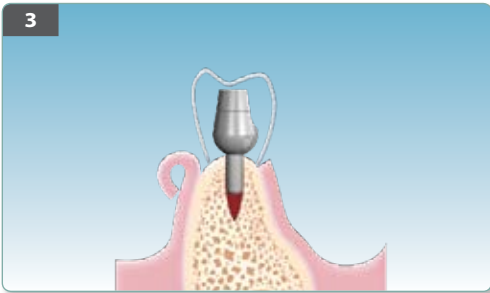
One Stage Surgery Implant Insertion Technique



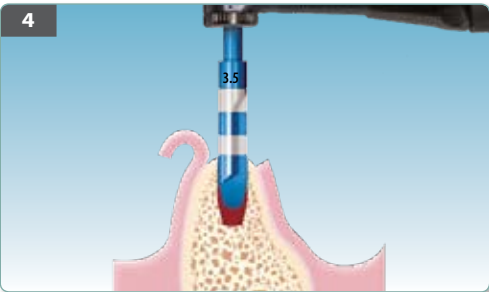
Extraction site Envelope Scalloped



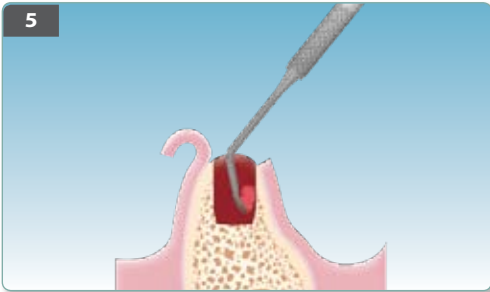
Drill 2.0mm pilot hole with external irrigation to a depth 2.0mm–3.0mm deeper than chosen implant when practical. See page 14.



Place an abutment with a 2.0mm post into pilot hole and confirm appropriateness with a vacu-press template.



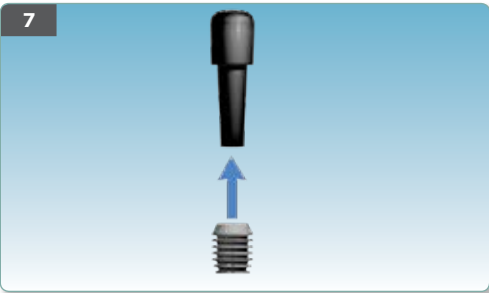
Widen socket with successively wider reamer burs without irrigation at a maximum of 50 RPM. See page 15.



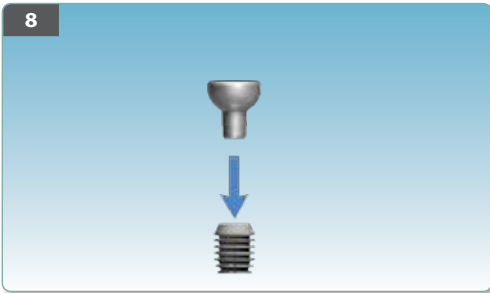
Harvest bone debris from reamer flutes and socket.



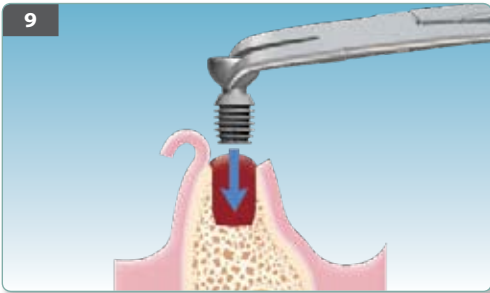
The implant's sterile blister pack is dropped onto a sterile tray prior to removing its Tyvek® backing before the implant's inner packaging is cut with a pair of scissors.



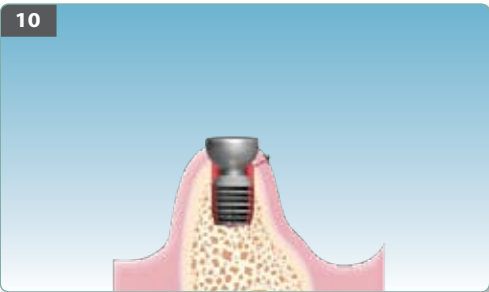
Remove black healing plug.



Replace black healing plug with appropriate temporary abutment.

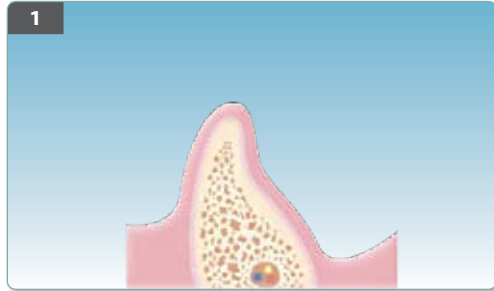


Insert implant with abutment into socket.

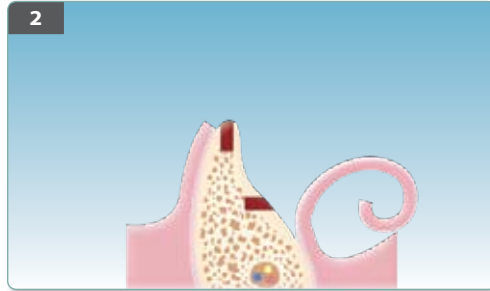


Trim tissue if necessary. Wait for a minimum of 10–12 weeks for osseointegration before removing temporary abutment.

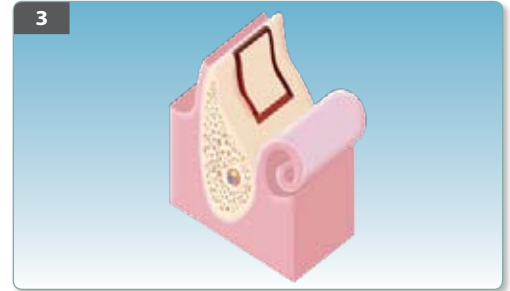
Two Stage Mandibular Ridge Split Technique



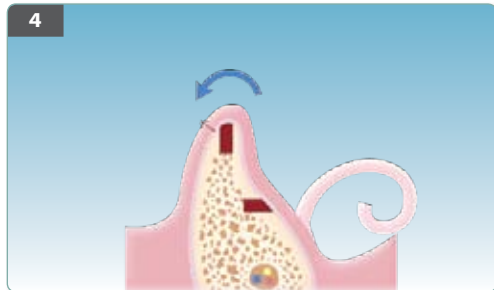
Coronal view of mandible.



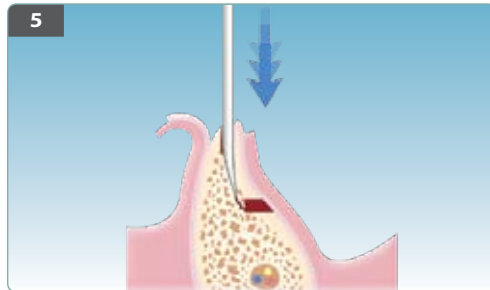
Make a full-thickness flap and a narrow crestal osteotomy. Make a wider horizontal osteotomy 3.0mm above the mandibular canal.



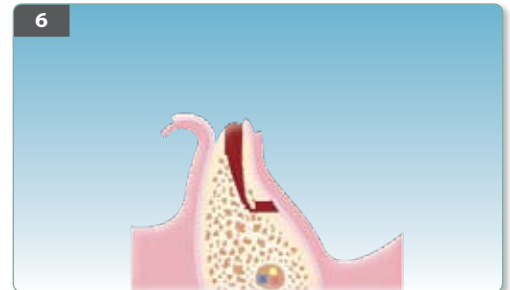
Lateral view of two thin vertical osteotomies and a wider horizontal osteotomy.



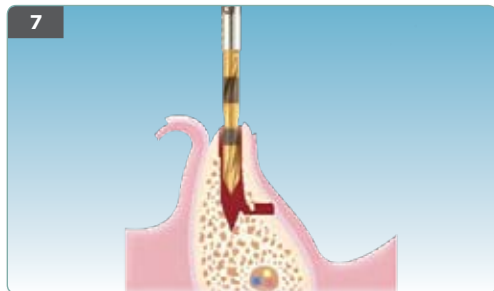
Close for three or four weeks to re-establish blood supply to the cortical bone.



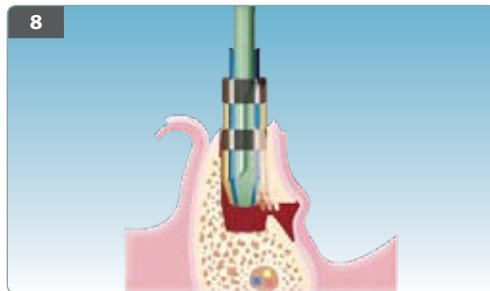
A Curved Cottle chisel is used to separate the buccal plate.



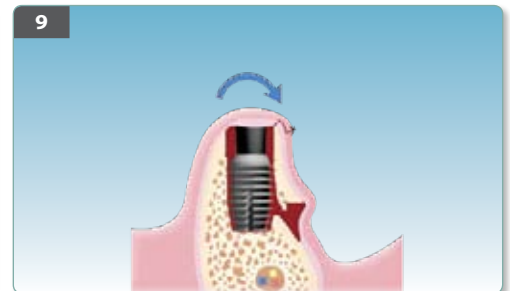
Buccal plate separated, but remains attached to the buccal periosteum.



Without reflecting the buccal periosteum, drill a 2.0mm pilot hole to a depth below the horizontal osteotomy.

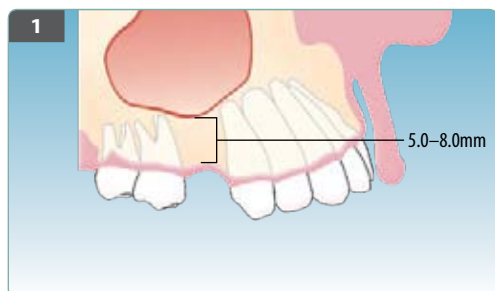


Buccal cortex is outfractured as wider reamers are used.



Insert implant into a widened osteotomy apical to the horizontal cut. Allow a minimum of four months for osseointegration.

Internal Sinus Lift Technique



Note the minimal residual bone depth of 5.0–8.0mm.



Prepare osteotomy beginning with the 2.0mm Pilot Drill. Pilot hole may penetrate sinus floor and membrane.



Continue to prepare osteotomy with successively larger reamers to the extent that 1.0–2.0mm of undisturbed bone remains below the sinus floor. A 5.0mm diameter implant has been chosen for this case.



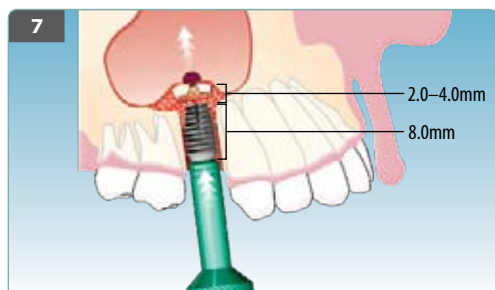
Place a 5.0mm Bicon sinus lift osteotome into the osteotomy and engage the area slightly below the sinus floor.



Gently tap the osteotome and create a hairline fracture around the floor of the osteotomy.



Place a bone graft material such as SynthoGraft™ into the socket using Bicon's Bone Graft Syringe.



Introduce the implant into the osteotomy site with the implant inserter and use the implant to raise the sinus floor.



Disengage the implant inserter from the implant. Insert and cut the healing plug.

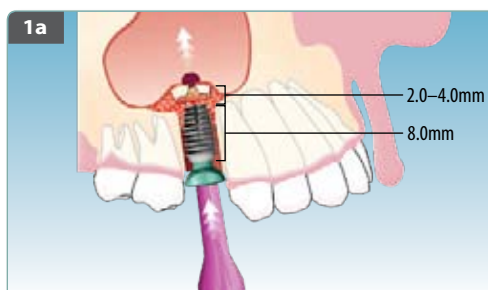


Place bone graft material over the shoulder of the implant.

Internal Sinus Lift with Sinus Lift Temporary Abutment



Suture and wait a minimum of 14-16 weeks prior to uncovering.



Alternatively, a Bicon sinus lift temporary abutment may be inserted into the implant to prevent the implant from migrating into the sinus.



Either suture around or over the sinus lift abutment.

Temporization Options

OPTION ONE: TRANSITIONAL RESTORATION WITH SLEEVE



1 Insert appropriate non-shouldered or stealth shouldered abutment. The diameter of the abutment is dictated by the anatomy of the interdental papillae. The abutment should support the papillae without encroaching upon them.



2 Tap the abutment in the long axis of the abutment post and implant well.



3 Orientate the internal flat(s) of the appropriate temporization sleeve with the external flat(s) of the abutment prior to snapping it onto the abutment.



4 Confirm the appropriateness of the temporization sleeve with a vacuum formed template. Adjust the sleeve as necessary.



5 Inject transitional crown material around the temporization sleeve.



6 Inject transitional material into the vacuum-formed template prior to re-inserting it over the temporization sleeve to form a transitional prosthesis.

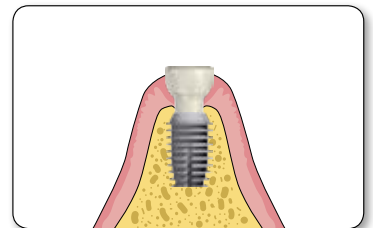
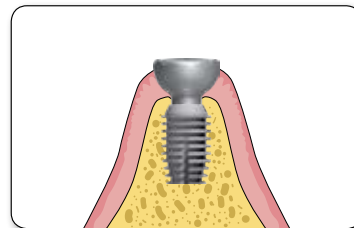


7 Remove transitional prosthesis for polishing.



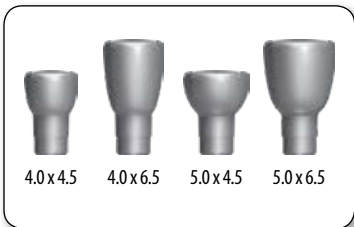
8 Snap the completed transitional prosthesis onto the abutment to facilitate the formation and preservation of an aesthetic soft tissue emergence profile.

OPTION TWO: TEMPORIZATION WITH A TEMPORARY ABUTMENT



At time of uncovering, place a temporary abutment. The abutment will support the soft tissue and assist in the formation of the gingival sulcus. The abutment may be modified to achieve the desired contour. Transitional crowns should not be placed on temporary abutments. See Bicon catalogs for a complete listing of abutment sizes and shapes that are available.

OPTION THREE: A TRANSITIONAL PROSTHESIS IN THE AESTHETIC ZONE



1 Choose appropriately sized temporary abutment. See Option #2 above.



2 Insert temporary abutment into the implant well and gently seat the abutment by tapping on the head of the abutment. Removal of the abutment may be achieved with a variety of extraction forceps.



3 In aesthetic areas, a flipper may be inserted for aesthetics and function while tissue is healing around the temporary abutments. See reverse side for the different types of impressions that may be made after the tissue has healed.



4 View of inserted provisional restoration.





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