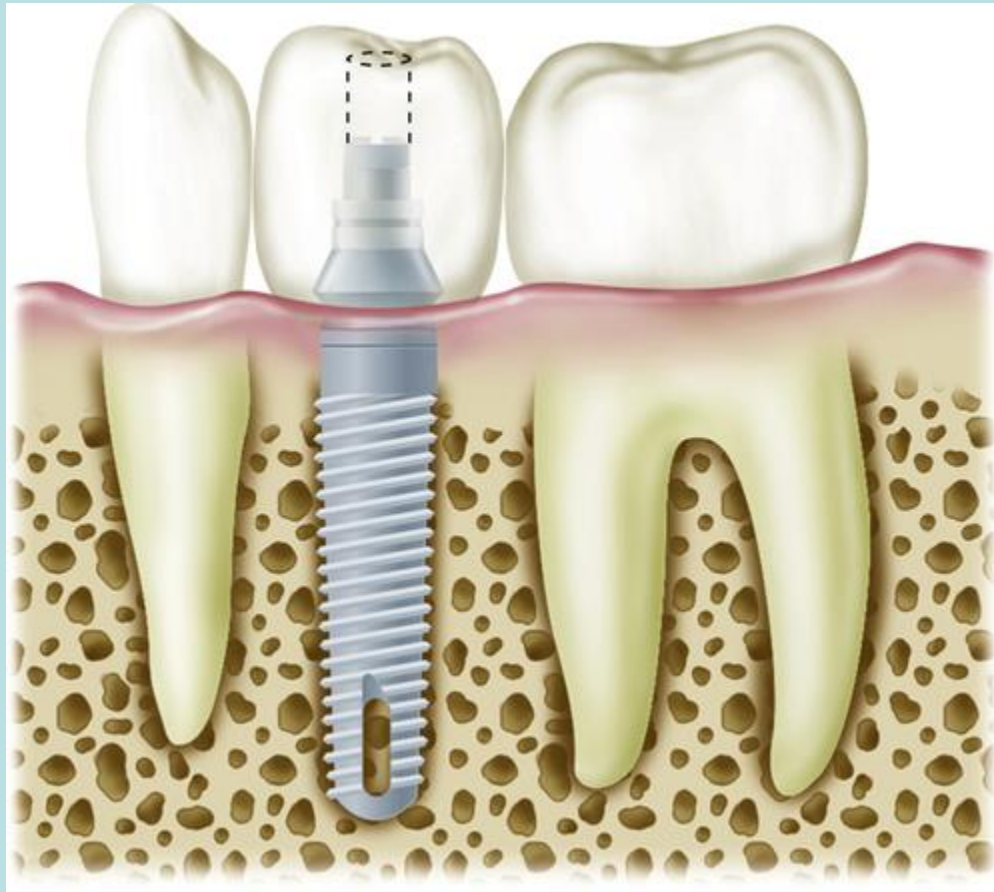


# Dental Implants and the Hygienist



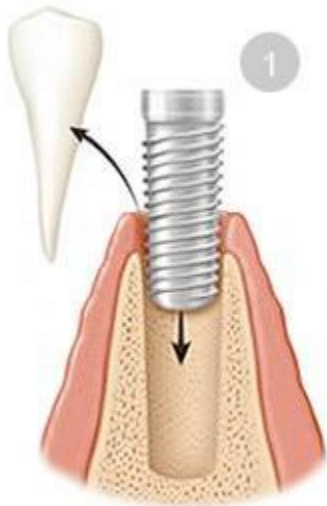
Dental Materials Lecture #5

# Learning Objectives

1. Why Edentulism?
2. Complications of Tooth Loss
3. Disadvantages of Restoring with C&B
4. Disadvantages of Complete Dentures
5. Advantages of Implant
6. Historical Perspective of Implants
7. Who is an Implant candidate
8. Components of Implant
9. Surgical procedures & stages
10. Implant materials
11. Comparison of an Implant vs. a Natural Tooth support structure
12. RDH role in assessment & maintenance of the implant



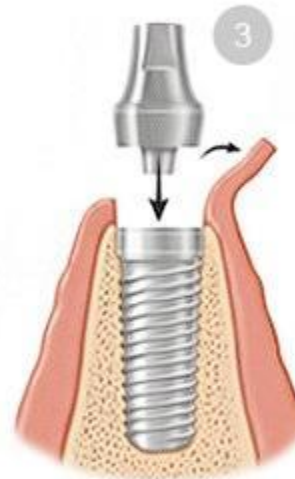
# What is a Dental Implant?



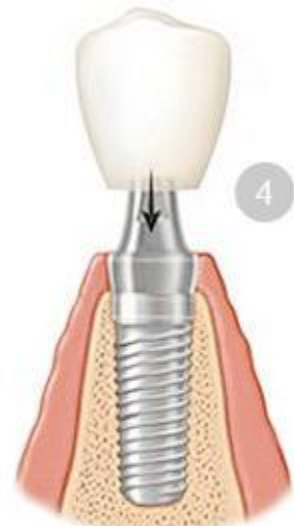
Implant is inserted into the bone



Healing process of the bone (osseointegration)



Dental abutment is placed on the dental implant



Ceramic crown is placed which replaces the real tooth

# Why patients are missing teeth?

- Etiologies of edentulism:
  - » Periodontal Disease
  - » Dental Caries
  - » Fractures/trauma
  - » Anodontia
  - » Periapical pathology (failed RCT)
  - » Dental neglect (fear, financial)

# Complications of Tooth Loss

↓ **Function**

**TMJ issues**

**Remaining  
teeth shift**



**Occlusal  
changes**

↑ **Disease  
(perio &  
caries)**

# If you are Missing Teeth

Traditional Replacement options:

Partial and Full Dentures



Crowns



Bridges



What  
about  
Dentures?



# Disadvantages of Complete Dentures

1. Continued resorption of the alveolar & cortical bone over a life time.
2. Decreased ability to chew
3. Alters the pattern of chewing
4. Acrylic denture base covering the Maxillary palate decreases ability to taste food
5. Loss of vertical dimension
6. Removable partial dentures (RPD)- 44% of teeth which are clasped are extracted within 10 yrs.
7. Higher incidence of candida infection especially when they are not taken out at night.



# Bone Volume after Tooth Loss

Normal anatomy  
(no tooth loss)



Bone begins to recede  
after loss of teeth



Bone loss continues  
without intervention



# Loss of Vertical Dimension



Before



After

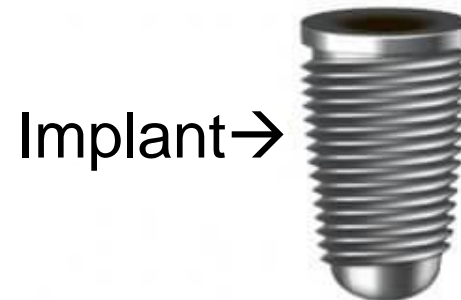
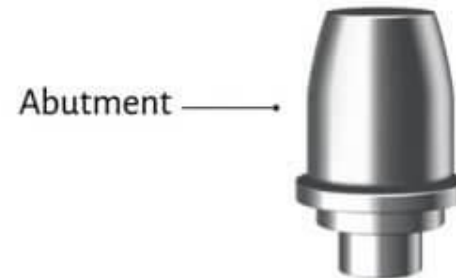


# Benefits of Dental Implants



# For Review:

## STRUCTURE OF THE DENTAL IMPLANT





# Advantages-Clinical Case

Congenitally missing lateral incisors



- 1. No preparation of adjacent teeth**
- 2. Retrievability**
- 3. Bone stabilization & maintenance**
- 4. Improvement of function**
- 5. Psychological improvement**
- 6. Implant shares occlusal load**
- 7. More accessible to clean**
- 8. Implant high success rates**



# Implant Materials

**Biocompatible**

**Osteophilic**

**Scratches  
Easily**

**Titanium**

**Strong**

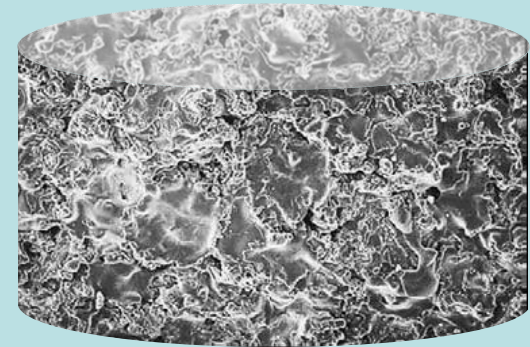
**Non-  
Corroding  
Metal**

**Lightweight**



# Implant surfaces

Titanium & oxygen form titanium oxide, a natural coating



Some manufacturers mechanically roughen or coat utilizing blasting or chemical techniques

Bone cells attach to the coating through **OSSEOINTEGRATION**



# TYPES OF SURFACE TREATMENTS



SMOOTH



MACHINED



ACID ETCHED



COATED



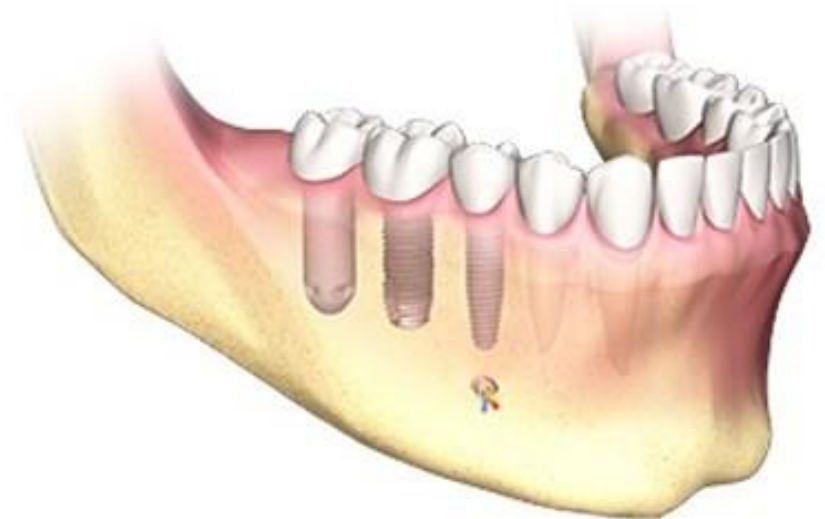
Cylinder  
Dental Implant



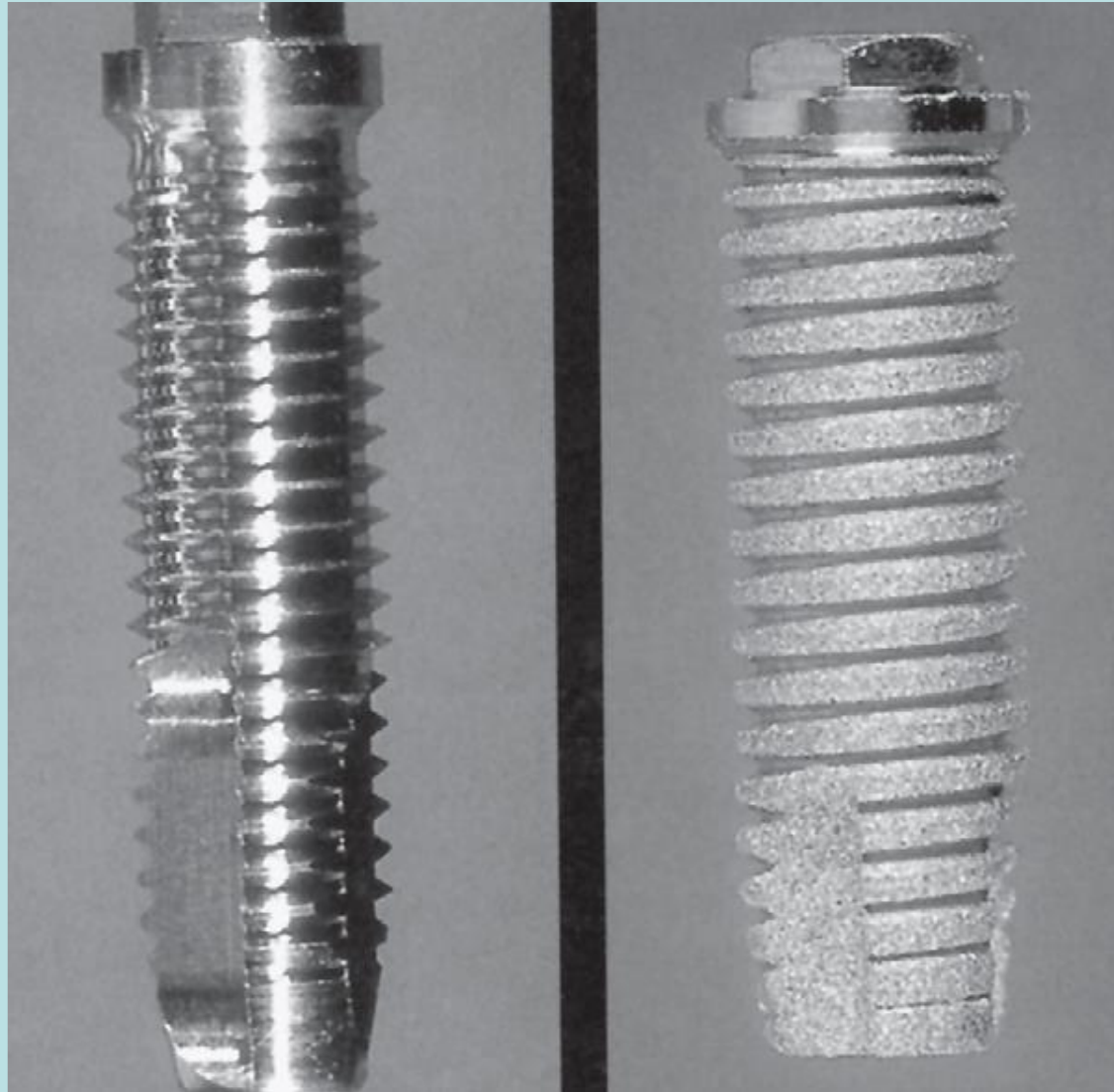
Straight Screw  
Dental Implant



Conical Screw  
Dental Implant



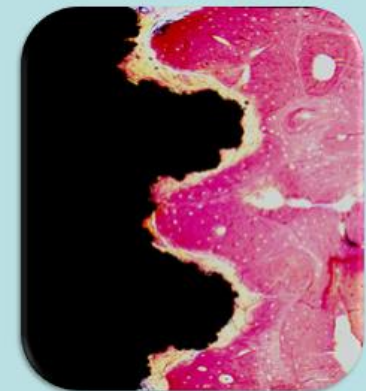




# Endosteal (Endosseous) Implants

- **Osseointegration** – the ‘fusion’ of the surface of a dental implant to the surrounding bone (like an ankylosed tooth), it is secured tightly in the bone and can be used as an anchor for a tooth.
- **This is the most common type of implant used today**
- Once a dental implant is "osseointegrated" or "integrated" it can not be removed from the surrounding bone without fracturing the bone interface.

Osseointegration – No connective tissue attachment

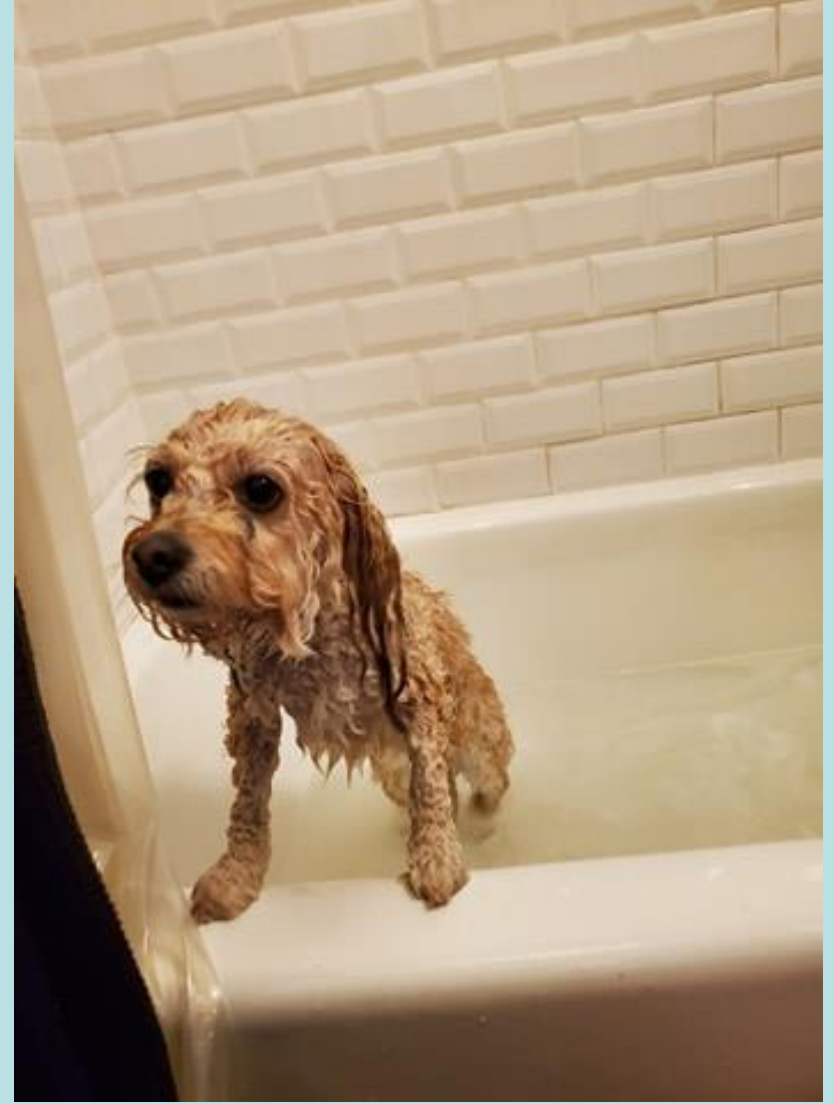


# Endosteal Implants

*This picture is a histologic section of an integrated implant in bone under low magnification. One can see the implant (black) & bone (red) tightly approximating each other. There is no detectable gap between the black outline of the implant and the contacting (red) bone. This implant can be considered **integrated**.*



# Break Slide: Questions?



# *Who is a candidate for Implants?*

## **Physical health status**

- Healing ability

Evaluation Process includes

## **Dental status**

- Adequate bone
- Adequate occlusion
- Periodontal stability



# Physical Health Status: Medical Considerations

***Basically anyone with poor  
healing response is not a  
candidate for Implants***

# American Society of Anesthesiology (ASA) Classification of pre-surgical risk:

- Literature Suggests using the ASA Classification of pre-surgical risk:

**ASA I** includes the clients with no systemic illnesses & a normal lifestyle.

**ASA II** includes the Clients with well-controlled systemic illnesses who are able to engage in normal daily activity.

**Clients in classes ASA I and II are usually considered implant candidates**



American Society of Anesthesiology (ASA)  
Classification of pre-surgical risk:

**ASA III** may be a candidate for implants but will require certain measures prior to surgery to stabilize systemic problems.

Clients in **ASA IV** and **V** have serious medical conditions and are not appropriate implant candidates.



# Medical Conditions that contra-indicate implant placement

- **Bone Diseases/ Bone with less vascularity**
  - Paget's disease
  - Fibrous Dysplasia
  - Histiocytosis X
  - H/N radiation and IV Bisphosphonate therapy
  - Bisphosphonates??? (if greater than 3-5 years)
- **Endocrine Disorders**
  - Diabetes (only poorly controlled)
  - Pituitary & Adrenal Insufficiency
  - Hypothyroidism

# Medical Conditions which contra-indicate implant placement

- **Bleeding Disorders:**
  - Anemia's (generalized)
  - Hemophilia
  - Any coagulation disorder
- **Granulomatous Diseases**
  - Tuberculosis
  - Sarcoidosis
- **Cardiac Diseases:**
  - » Congestive Heart Failure (CHF)
  - » Multiple Myocardial Infarctions (MI)
- **Drug Abuse:** Alcoholism & Intravenous Drug Use



# Smokers

**Have increased Implant failure** (11.3 % failure rate)

Dental professional need to obtain informed consent for smokers who want implants, advising increased risk for failure.

# Who is a candidate for Implants?

Dental evaluation includes:

1. Patient's ability to maintain Oral hygiene
2. **Quality & Quantity** of the bone
3. Medical History
4. Patient's age (Cannot place if still still growing)
5. Occlusal forces/Parafunctional Habits
6. Diagnostic Casts; Photographs; Radiographs
7. Anatomic considerations

*\*\*Implants should not be placed in the patient who cannot demonstrate an effective home-care regimen\*\**

# Who is a candidate for Implants?

- **Diagnostic Tools:**

- Radiographs-periapicals; panoramic;
- **Cone Beam Computed Tomography (CBCT)**
- Intraoral Examination
- Measurement of the bone width & height
  - » Using periodontal probe
  - » Study models

# Diagnostic tools for Assessing Quantity of bone

These images help to decide implant placement:

- Periapical Radiographs
- Panoramic Radiographs
- Cone Beam Computed Tomography (CBCT) important in treatment planning and diagnosis in implant dentistry.
- Computed Tomography (CT) scan-less often used

# Cone Beam Imaging

3D imaging

Multiplanar views

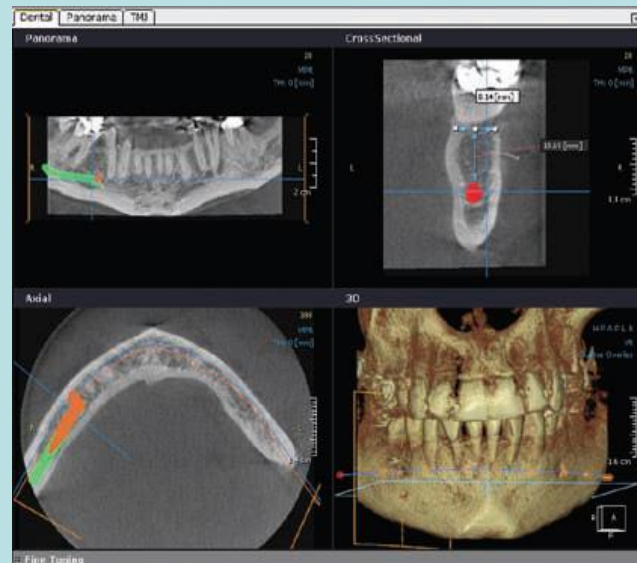
Applications

Reduced exposure vs. CT scan

Implants

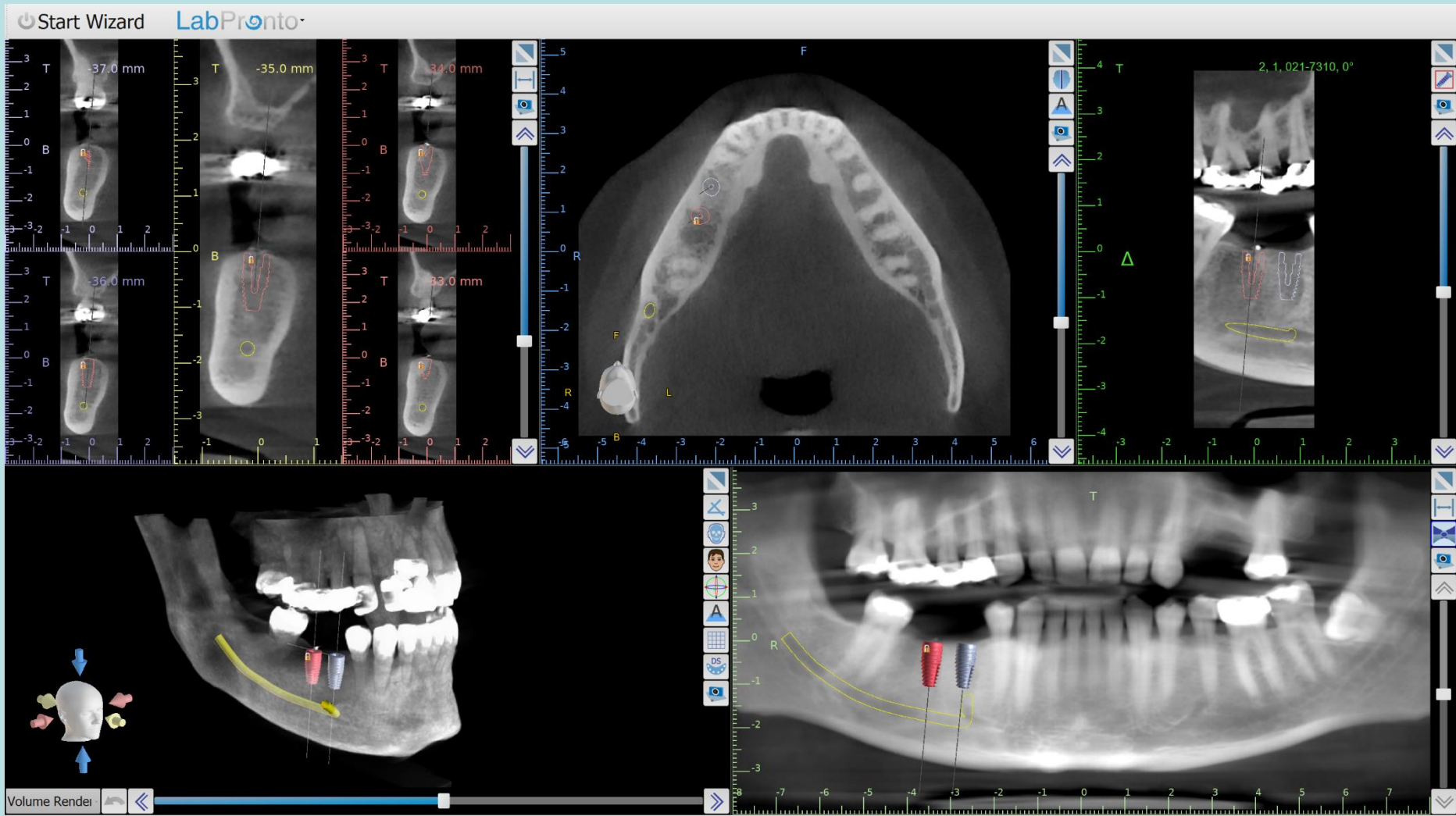
Orthodontics

Impactions





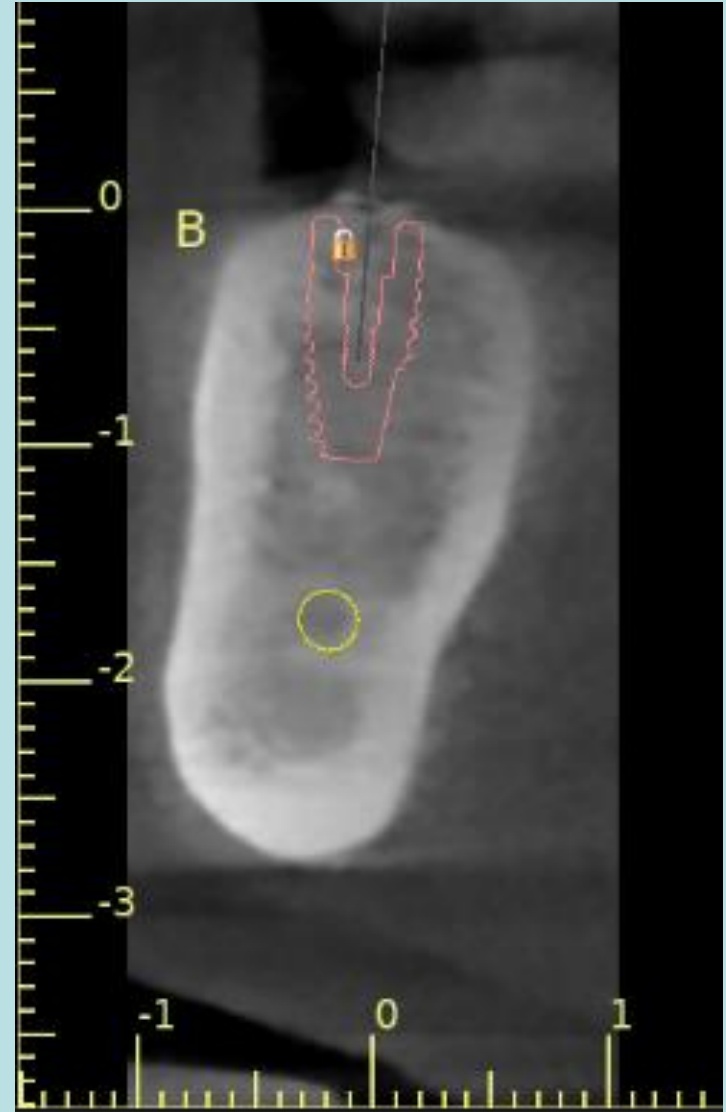
# Cone Beam Imaging





# Assessing Quantity of Bone Includes:

- Height of Bone
- Width of Bone
- Distance from Vital Anatomy
- Angulation/Emergence Profile



# Quantity of Bone

Implants should be surrounded by a minimum of 2mm of bone in all directions around the implant and anatomic structures like the maxillary sinus or the inferior alveolar canal.

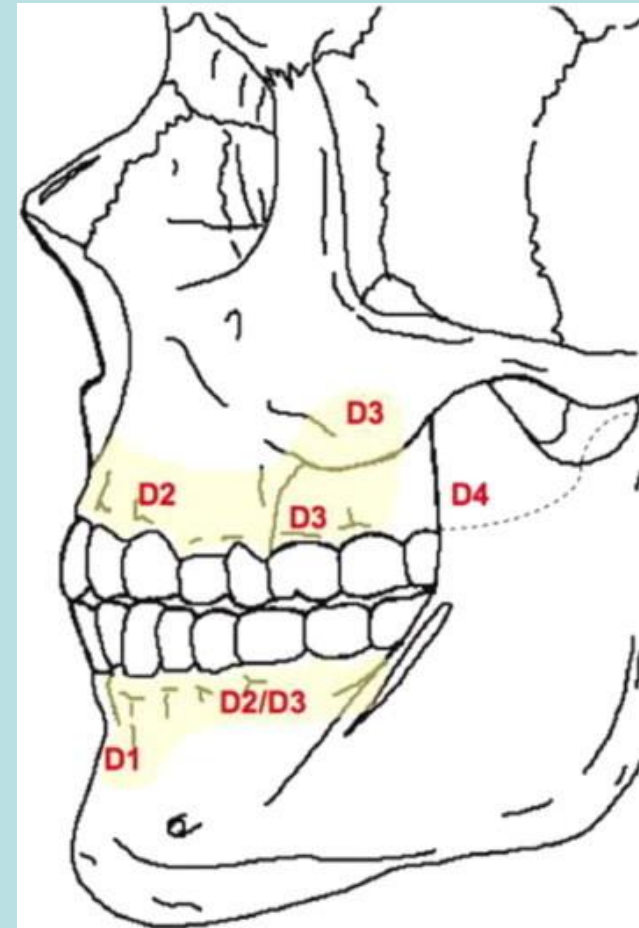
In general for implants:

- Width (facial–lingual): 6 mm minimum
  - Length (mesial-distal): 7mm minimum
  - Height (superior–inferior): 10 mm minimum
- **An ideal radiographic assessment of bone displays quantity of bone in three dimensions and the location of anatomical landmarks.**

# Quality of Bone

- Misch Classification of Bone Density

- » D1= dense compact bone
- » D2= porous compact bone
- » D3= coarse trabecular
- » D4= fine trabecular
- » D5= very soft bone with incomplete mineralization & large trabecular spaces



## Bone Density and Common Locations

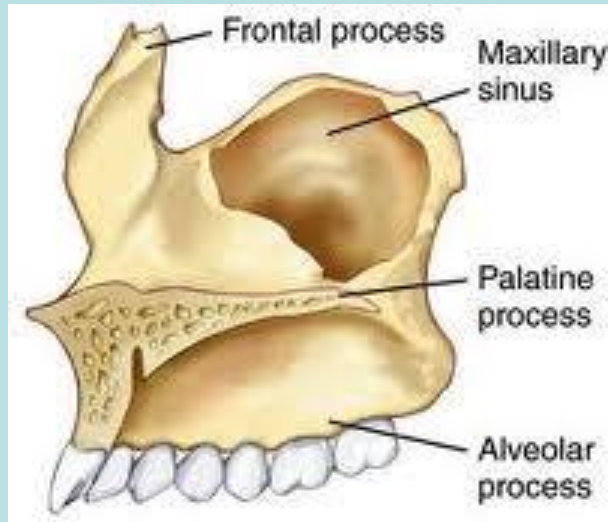
Bone Density	Histology	Location	Tactile sense	Average Osseointegration time
D <sub>1</sub>	Dense compact cortical bone	Anterior mandible (6%), Posterior mandible (3%)	Drilling into oak or maple	3 to 4 months
D <sub>2</sub>	Dense to porous cortical bone and dense trabecular bone	Anterior mandible (66%), Posterior mandible (50%) Anterior Maxilla (25%)	Drilling into pine or spruce	4 to 6 months
D <sub>3</sub>	Porous cortical bone and fine trabecular bone	Anterior Maxilla (65%) Posterior Maxilla (50%)	Drilling into balsa wood	6 months
D <sub>4</sub>	Little cortical bone and fine trabecular bone	Posterior Maxilla (40%)	Drilling into Styrofoam	6 to 8 months

•Sources: Mish<sup>14</sup> and Mish<sup>16</sup>

\*\* D1: Dense Cortical bone. D2: Dense-to-porous cortical bone and dense trabecular bone. D3: Porous cortical bone and fine trabecular bone D4: Little cortical bone and fine trabecular bone

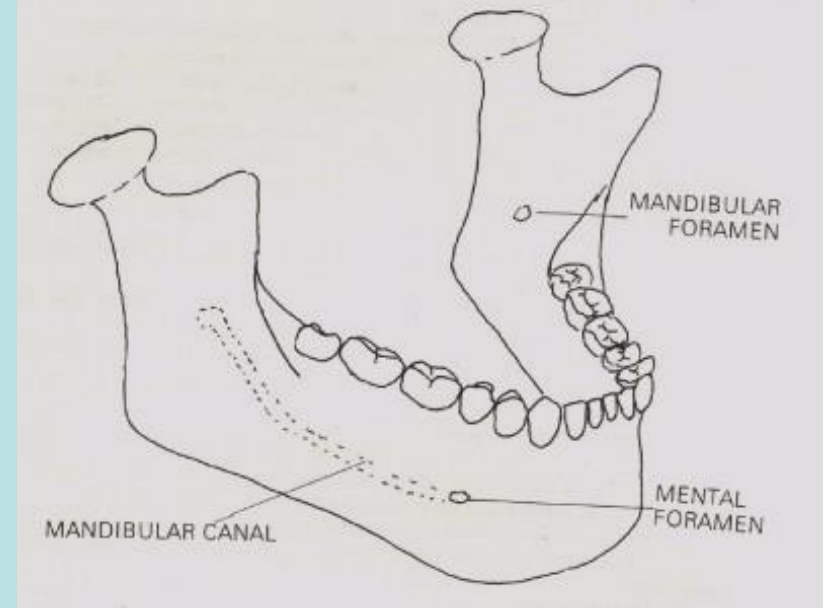
## Maxillary anatomic considerations:

Nasal Fossa  
Incisive Canal  
Maxillary Sinus



## Mandibular Anatomic Considerations:

Inferior Alveolar Canal  
Mental Foramen & anterior loop of the nerve  
Inferior border of the mandible



# Break Slide: Questions?



# Next Section

- Methods for Implant Placement
- Methods for Implant Restoration
- Single Stage **vs** Two Stage
- Bone Grafting/Socket Preservation
- Types of Bone Grafting Materials
- Other types of Grafting Procedures

# Methods for Implant Placement & Restoration

## Surgical Placement:

- Immediate Implant Placement
- Delayed Implant Placement

## Restorative

- Immediate Loading
- Delayed Implant Loading

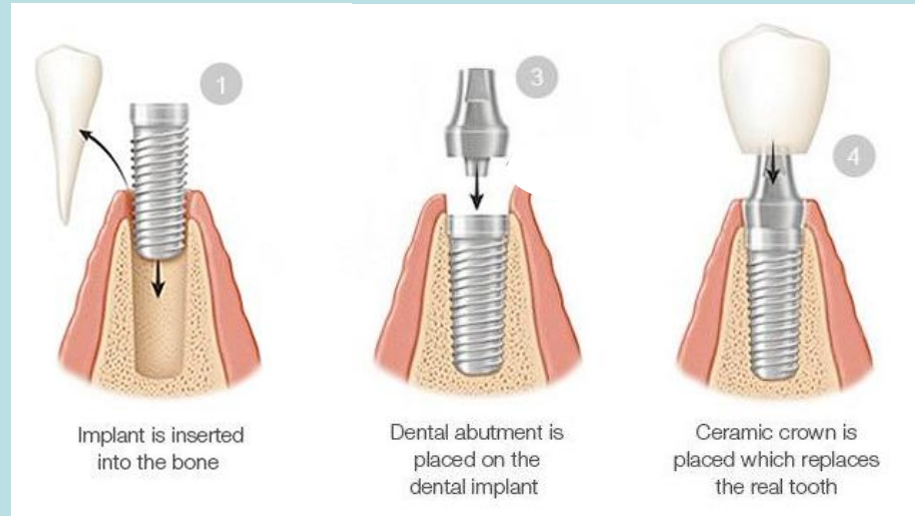


# Implant Crown Loading Options

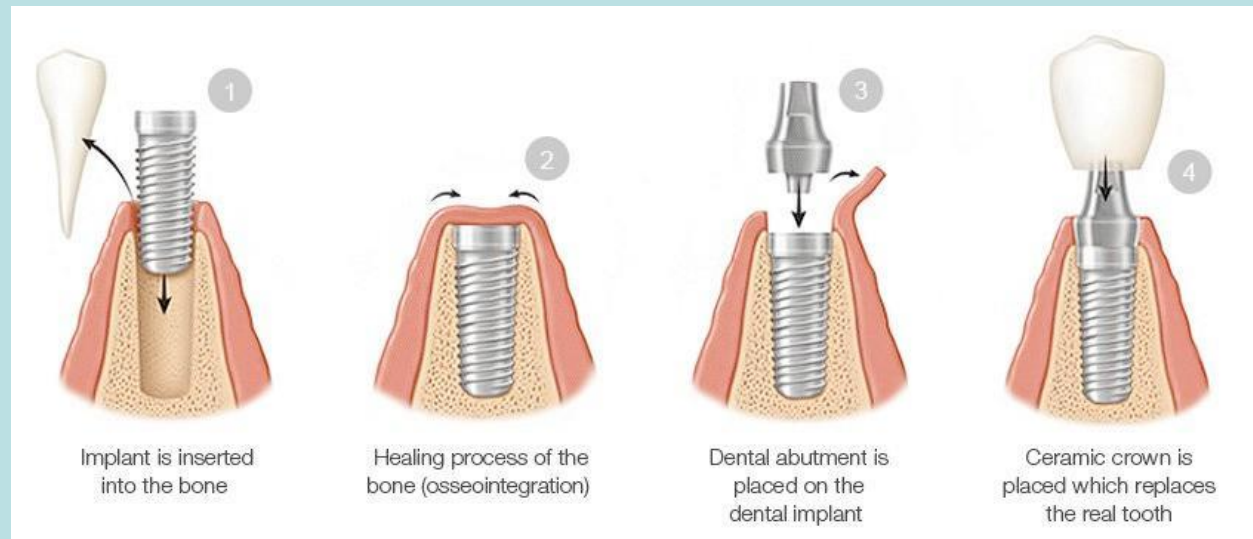
- Immediate Loading: The Implant Abutment and Implant Crown are placed the same day as the implant placement
- Delayed Loading: The implant abutment and implant crown are placed after 3-6 months of healing.

# Immediate Loading vs Delayed Loading

## Immediate Loading

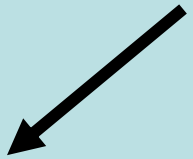


## Delayed Loading



(3-6 months healing)

Extract Tooth



Bone Graft

Place Immediate Implant

(sometimes requires simultaneous bone graft)



Place Implant

Immediate Loading



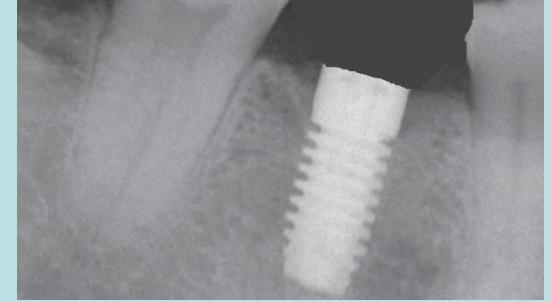
Immediate Loading

Delayed Loading

Delayed Loading

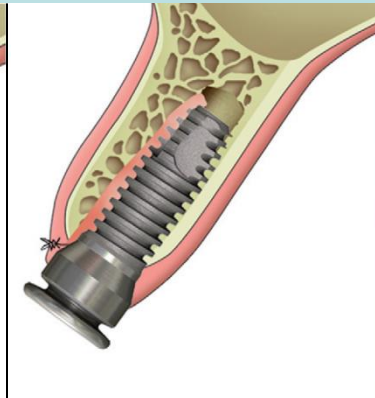
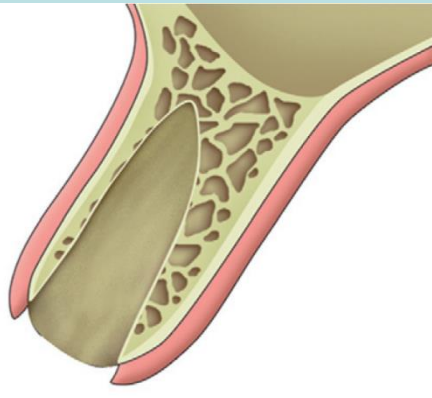
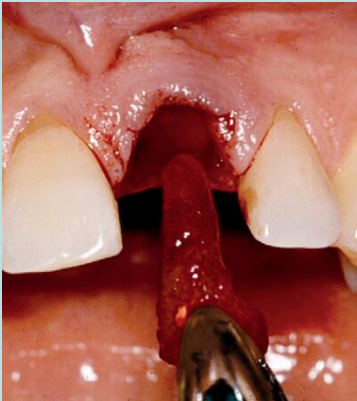
# Surgical Placement

Delayed Implant Placement: Extraction site has fully healed prior to implant placement

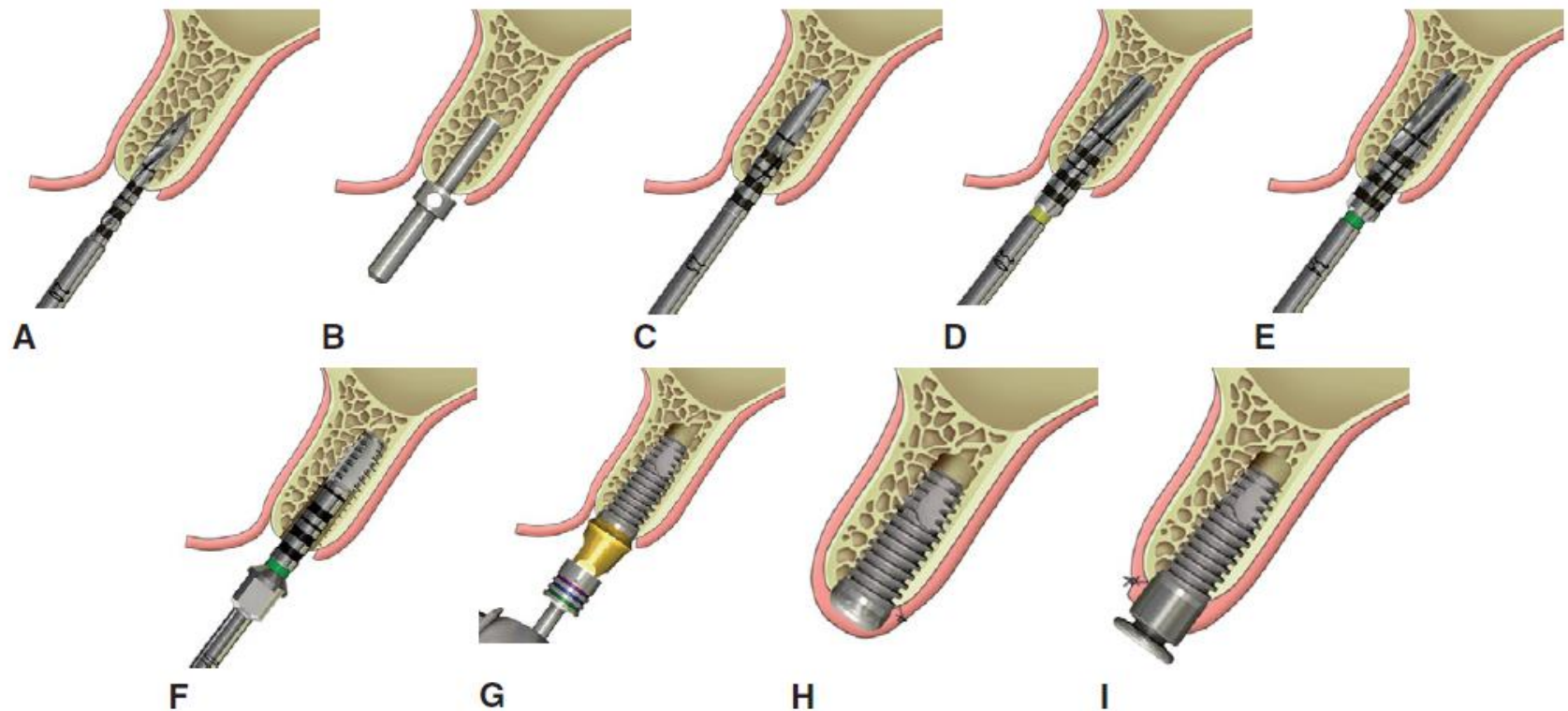


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Immediate Implant Placement: Implant Placed at the same time the tooth is extracted



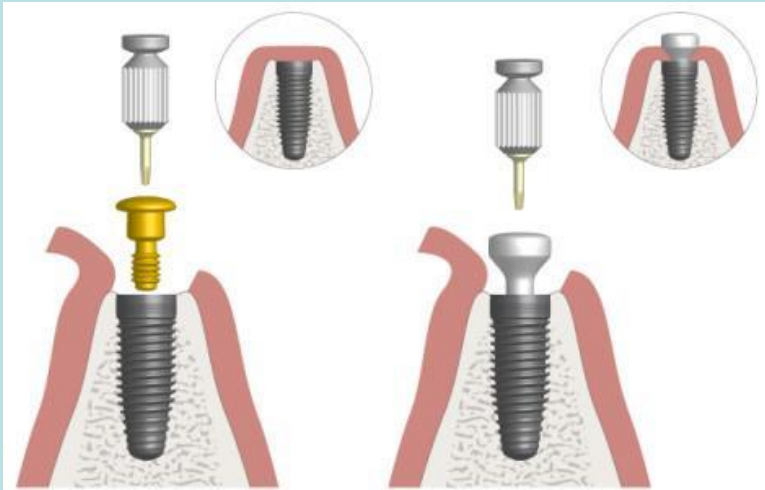
# Implant Surgery for Edentulous Site



**Figure 33-29** A 2-mm-diameter pilot drill is positioned in the midmesiodistal and faciopalatal aspect of the ridge and proceeds 9 mm within the bone under copious cooled sterile saline. **A**, A 9-mm-long force direction indicator is positioned into the site for evaluation. **B**, The 2-mm-diameter drill is reinserted to the final depth position. Most often, the drill prepares the bone 1 to 2 mm deeper than the length of the implants (when the opposing landmark permits). **C**, A 2.5-mm end-cutting twist drill, rotating at 2500 rpm under copious amount of cooled sterile saline, is then used to beyond the final depth. The drill is removed from the hand piece and reinserted into the osteotomy to evaluate the implant site angulation. **D**, A 3.0- and then a 3.4-mm-diameter end-cutting drill then prepare the site for a 4.0-mm-diameter implant (the final drill of each implant system may be a slightly different dimension). **E**, Once the final osteotomy diameter and depth is prepared, a bone tap is used in a low-speed, high-torque hand piece (i.e., 30 rpm 70 N-cm) to form the threads within the bone for the implant. **F**, The threaded implant is inserted with a hand piece at 30 rpm. **G**, The soft tissue is approximated and sutured with a resorbable material (4-0 or 5-0) around the permucosal extension or over the cover screw, depending on whether the tissue is at the right position or is being augmented (**H** and **I**).



# Single Stage vs Two Stage



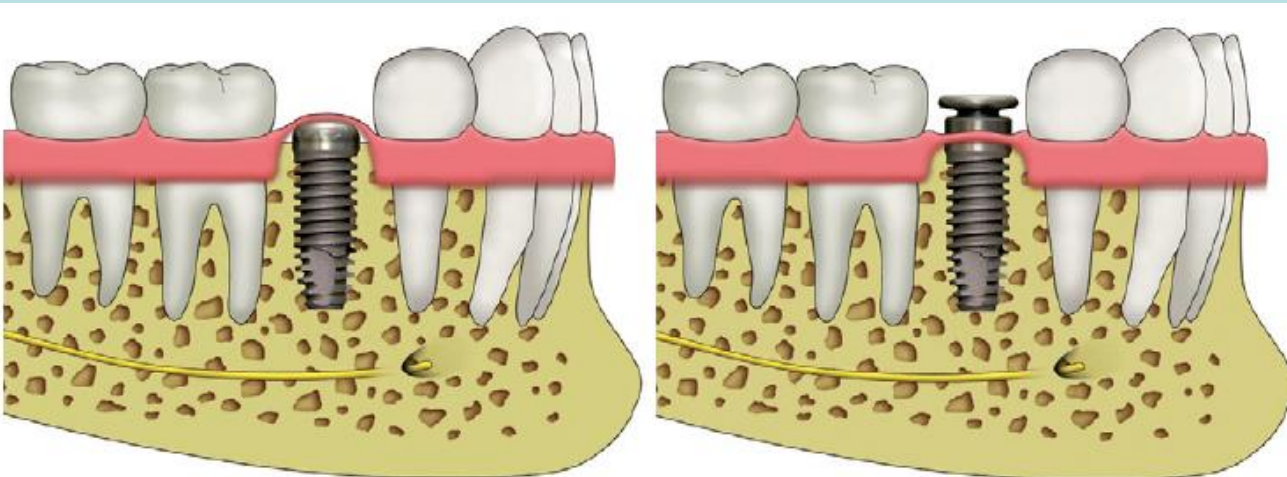
Cover Screw

Healing Abutment



Cover Screw

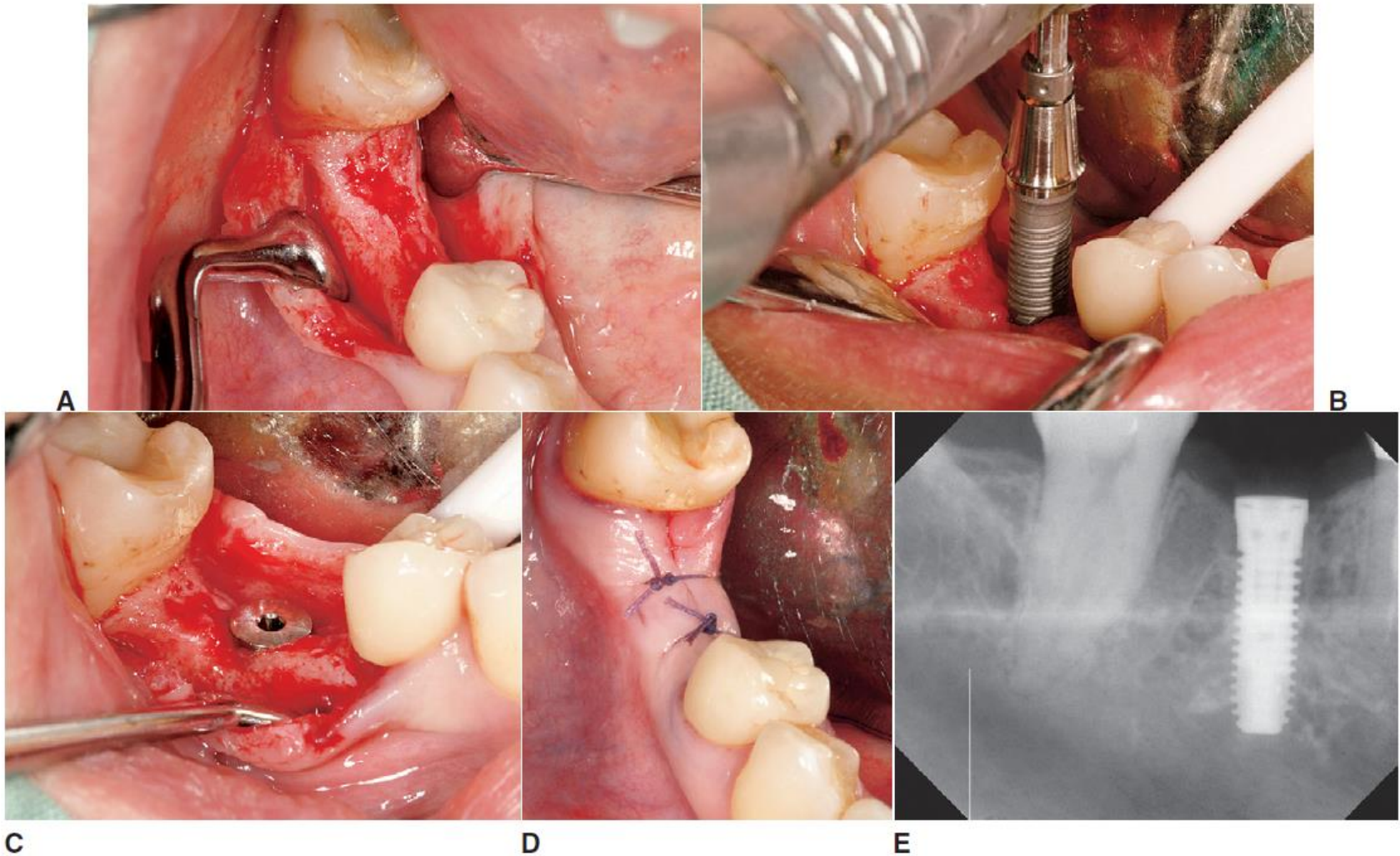
Healing Abutment



Cover Screw

Healing Abutment

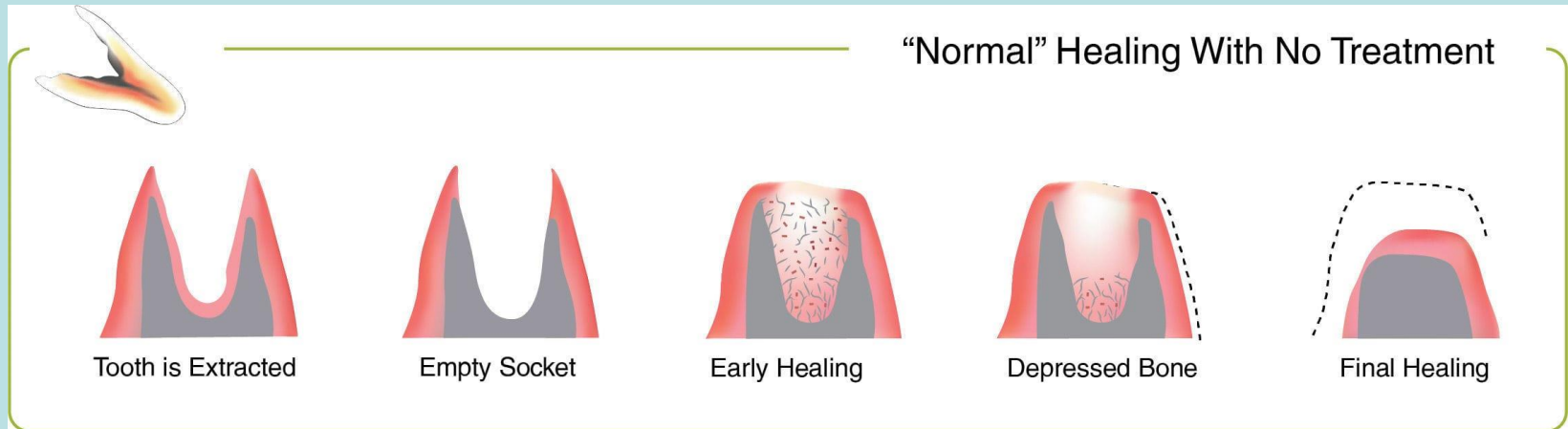
# Implant Surgery for Edentulous Site



**Figure 30-7** **A**, A two-stage surgery reflects the soft tissue and directly observes the underlying bone. **B**, A single-tooth implant is threaded into the osteotomy (BioHorizons Internal Dental Implant) for a posterior single-tooth replacement. **C**, A low-profile cover screw is inserted into the implant body. **D**, The first-stage surgery uses primary closure over the implant site during initial bone healing. **E**, A periapical radiograph of the implant in position to replace a single molar.



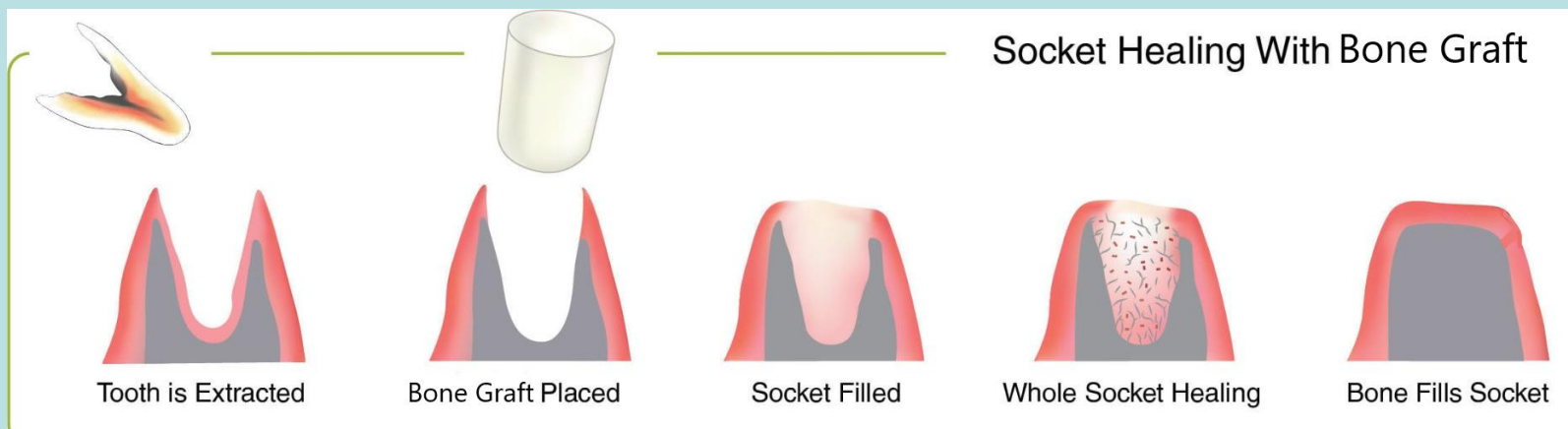
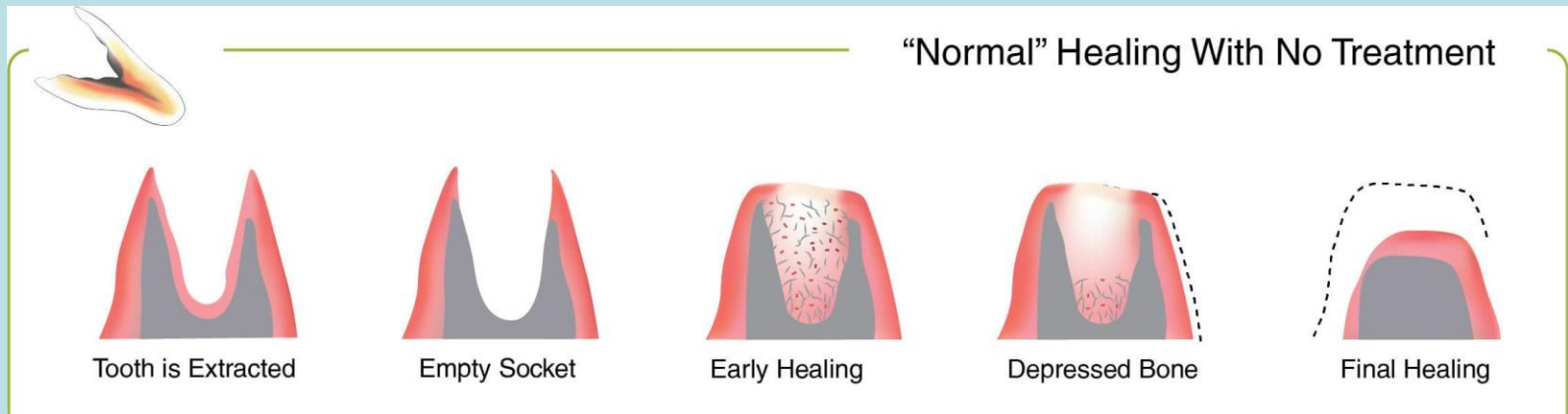
# What Happens when a Tooth is Extracted?



- Within 24 Hours → Fibrin Clot
- 1 week → Granulation Tissue  
(fibroblasts and capillaries)
- 4 weeks → Immature Woven Bone
- 6-24 weeks → Bone is Reorganized into Mature Lamellar Bone

**If nothing is done at the time of tooth extraction, the extraction site will lose bone, predominantly in the buccal-lingual dimension, but also in the inciso-apical dimension as well.**

# A Bone Graft can prevent the Extraction Site/Alveolar Ridge from resorbing.



# Bone Grafting Materials

Type of Graft	Description	Examples
<b>Autograft</b> (autogenous) <b>*Gold Standard</b>	patient's own bone harvested from a donor site to be used for grafting purposes	Mandibular tori, hip
<b>Allograft</b> (allogenic)	Bone harvested from same species source (human to human)	bone must be processed & sterilized Cadaver bone
<b>Xenograft</b> (xenogenic)	Bone harvested from other species (animal to human)	common sources: pig, cow or horse bone must be processed & sterilized
<b>Alloplast</b> (alloplastic)	Synthetic bone derived from Calcium salts	
<b>Growth Factors</b>	Stimulate the division & differentiation of particular types of cells for true regeneration of bone & tissue	Emdogain (Straumann) Infuse/Medtronic (BioHorizon)

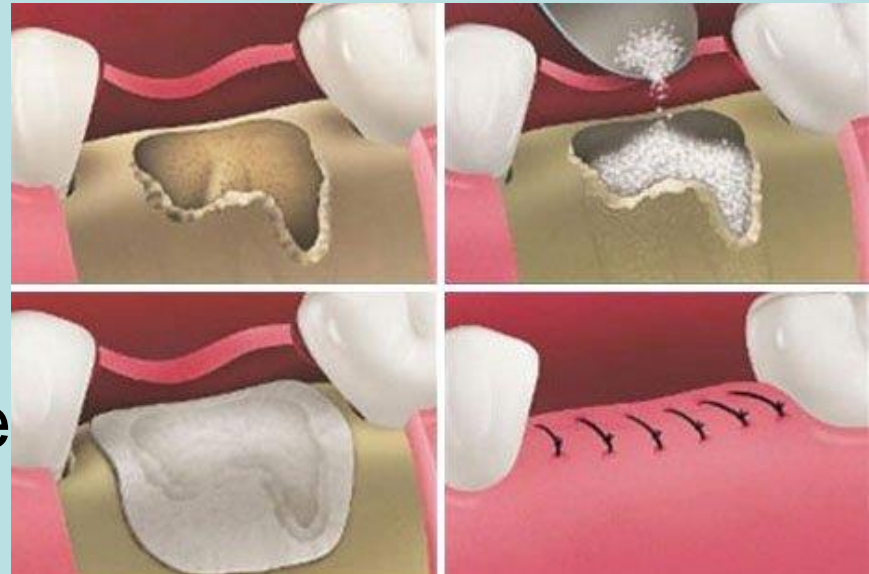
Source: Table 3.4 Peri-implant therapy for the Dental Hygienist \_Wingrove

# What can be done if inadequate Quantity of Bone Exists?

- Bone grafting is necessary when there is a lack of bone. To achieve an adequate width and height of bone, various bone grafting can be used.
- Guided Bone Regeneration (GBR):
  - Grafting materials
    - » Autografts
    - » Allografts
    - » Xenografts
    - » Alloplasts

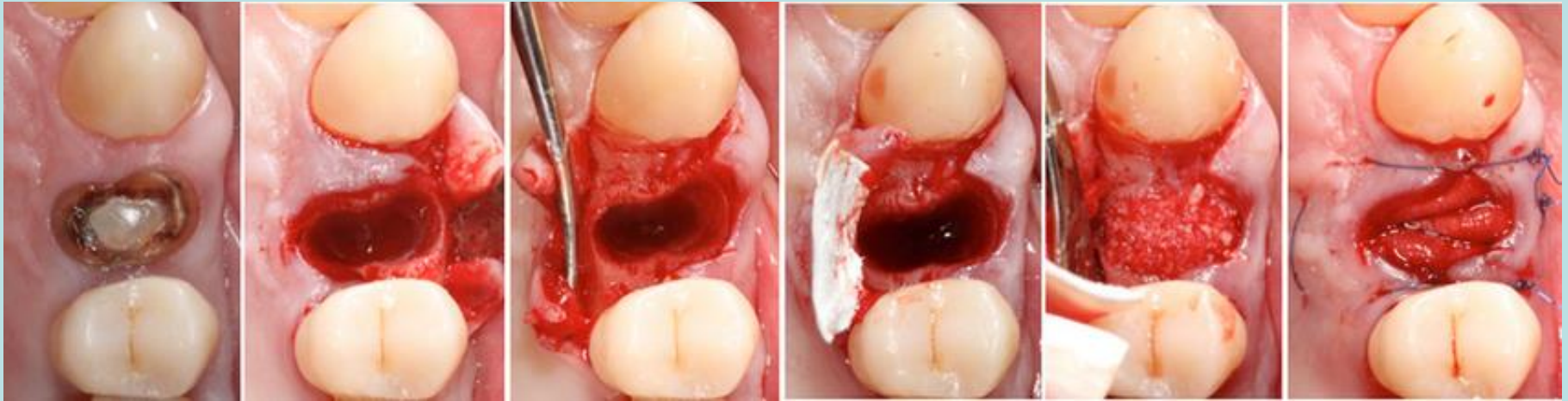
# Barrier Membranes

- Membranes can be resorbable or non-resorbable
- **Used to protect bonegraft from fibrous ingrowth**
- Resorbable membranes are made out of collagen

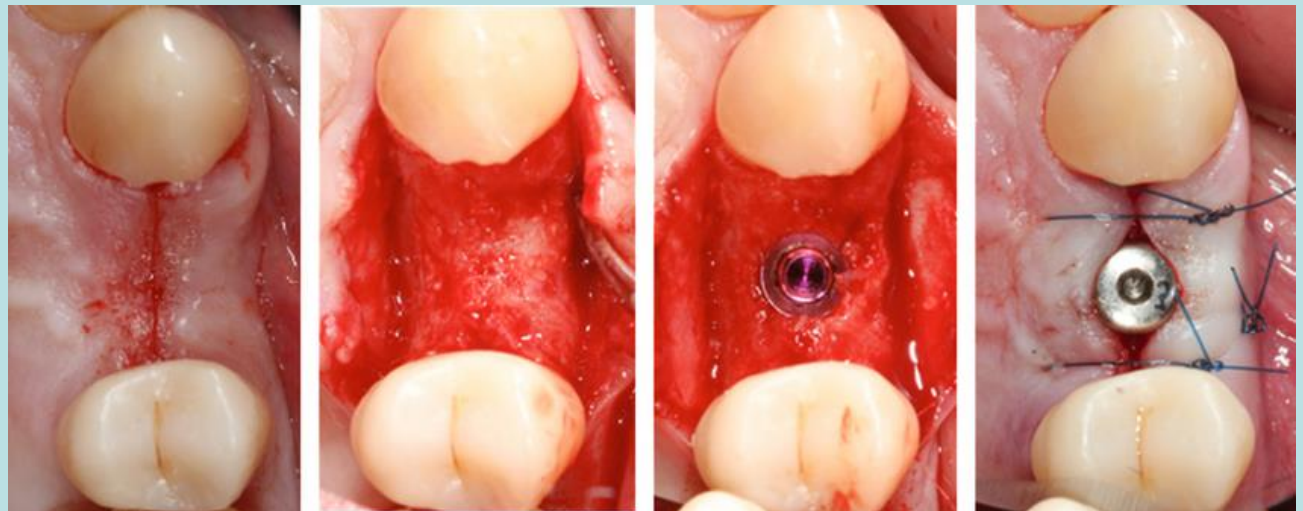


Epithelial/Gingival tissue grows faster than bone.  
The membrane prevents fibrous invagination of the graft site so that bone can grow uninterrupted.

# Bone Graft and Healing followed by Delayed Implant Placement



**After 6 months of healing, re-entered site and Implant was placed.**





# Platelet Rich Fibrin

- **Platelet-rich fibrin (PRF)**: comprised of autologous platelets and leukocytes present in a complex fibrin matrix to accelerate the healing of soft and hard tissue.
- Used for various periodontal and oral surgery procedures, such as treating periodontal defects, extractions, bone grafting, sinus lifts, implant placement, etc.



# PRF



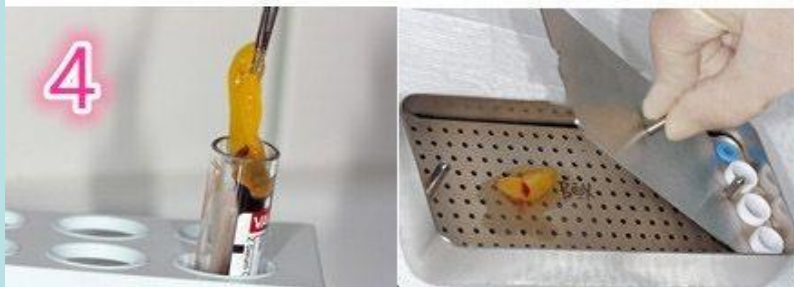
**1**  
Extract blood



**2**  
Use prf centrifuge



**3**  
Prf tube after separation



**4**  
Use prf box take prf part



**5**  
For dental treatment

## Platelet-Rich Fibrin: Choosing the Right Formulation for Optimal Results

Andrew T. Moshman, DMD

Autologous blood concentrates are rich sources of bioactive molecules derived from a patient's own blood that have gained popularity for their use in medical and dental procedures.<sup>1</sup> The introduction of high concentrations of platelets and growth factors to surgical sites speeds hard- and soft-tissue healing and helps achieve positive, predictable treatment outcomes.<sup>2</sup> One such concentrate, platelet-rich fibrin (PRF), has broad applications in dentistry, but a vast array of product variations can make it difficult for clinicians to know whether they are utilizing the most optimal PRF protocol and corresponding centrifuge.

The first-generation blood platelet concentrate, platelet-rich plasma (PRP), was initially reported used in oral surgery procedures in 1997.<sup>3</sup> Following venous blood draw, whole blood is treated with an anticoagulant (usually sodium citrate or anticoagulant citrate dextrose solution A) and undergoes two centrifugation steps.<sup>4</sup> The centrifuge separates the individual cell types found in whole blood between separate layers (platelet-poor plasma, PRP, red blood cell layer), which can then be used during treatment. A separate platelet activator/agonist (bovine thrombin and calcium chloride) must be applied just before clinical use.<sup>5</sup> Although PRP is an autologous biomaterial, the anticoagulant has been shown to compromise wound healing,<sup>6</sup> while the coagulant may trigger antibody development to factors V, XI, and thrombin, possibly leading to life-threatening coagulopathies.<sup>7,8</sup>

In 2001 Choukroun introduced the second-generation blood platelet concentrate, platelet-rich fibrin (L-PRF).<sup>9</sup> Because PRF is derived from a patient's own blood without the use of anticoagulants, there is no risk of immunologic rejection. After centrifugation, three layers are present: platelet-poor plasma, the PRF clot, and red blood cell layer. A "buffy coat" layer is located at the base of the PRF clot, just above the red corpuscle layer. While the terms "autologous blood concentrate" and "blood platelet concentrate" can be used to describe both PRP and PRF, PRF also contains concentrations of leukocytes (white blood cells), which are not present in PRP.<sup>10</sup> White blood cells provide the additional benefits of increased immune response, angiogenesis, and promotion of hard-tissue formation at surgical sites.<sup>11,12</sup> PRF has been shown to contain CD34+ stem cells that are found in peripheral blood<sup>13</sup> and which aid in the process of tissue regeneration.<sup>14</sup> The fibrin matrix serves as a scaffold and contains rich concentrations of platelets, growth factors, and leukocytes. The solid PRF clot exists in a thick, gel-like state and can be compressed into a flat membrane or a plug as desired for optimal utilization during treatment. The fibrin matrix may act as a cell-occlusive barrier against soft-tissue invagination into surgical sites.<sup>2,15</sup>



Platelet-Rich Fibrin by  
Andrew T. Moshman, DMD

# Anatomy can be modified

Three common procedures are:

1. Maxillary sinus lift
2. Lateral alveolar augmentation (increase in the width of a site)
3. Vertical alveolar augmentation (increase in the height of a site) (less predictable)

# Why Does a Hygienist Have to Know about Implants and Bone Grafting?

- The patients will ask you!!!!
- Patient's often forget how long their treatment will take.
- Patient's don't understand the difference between an implant, an implant abutment and an implant crown
- Patient's often will confuse a dental implant with a "post" (used following endodontic therapy). It is important to help them understand the difference.

# Why do you have to know what a Healing Abutment is?

- You will see them during your hygiene visits!
- You must know how to treat them!
- If they covered with biofilm:
  - Plastic or graphite cures/scalers
  - **Avoid Using Cavitron**

# Why do you have to know about Barrier Membranes?

- If you see sutures or a barrier membrane,  
**do not touch them!!**

# Review

- Implants placed in the mandible usually require 3-4 months before they can be restored.
- Implants placed in the maxilla usually require 6 months before they can be restored.
- Bone Grafts in Extraction Sites: require 3-4 months in the mandible and 6 months in the maxilla before an implant can be placed
- Often when placing an immediate implant, a bone graft will be performed at the same time.



# Break Slide



End of Part 1

# Next Section

- Implant Impression Process
- Abutments
- Screw Retained Crowns
- Cement Retained Crown

# After Implant Osseointegration

A) If the implant is buried under the gums with a cover screw, we will first need to schedule a Stage II uncovering to remove the cover screw and Place a Healing Abutment. Usually we wait 2 weeks after uncovering to take the final impression

B) If there is already a Healing Abutment, proceed straight to the final impression

# Restoring the Implant

## 1<sup>st</sup> Visit:

- Remove the Healing Abutment
- Place a impression (transfer) coping
- Take an impression (analogue or digital), take a counter impression, bite registration
- Replace the Healing Abutment

## 2<sup>nd</sup> Visit:

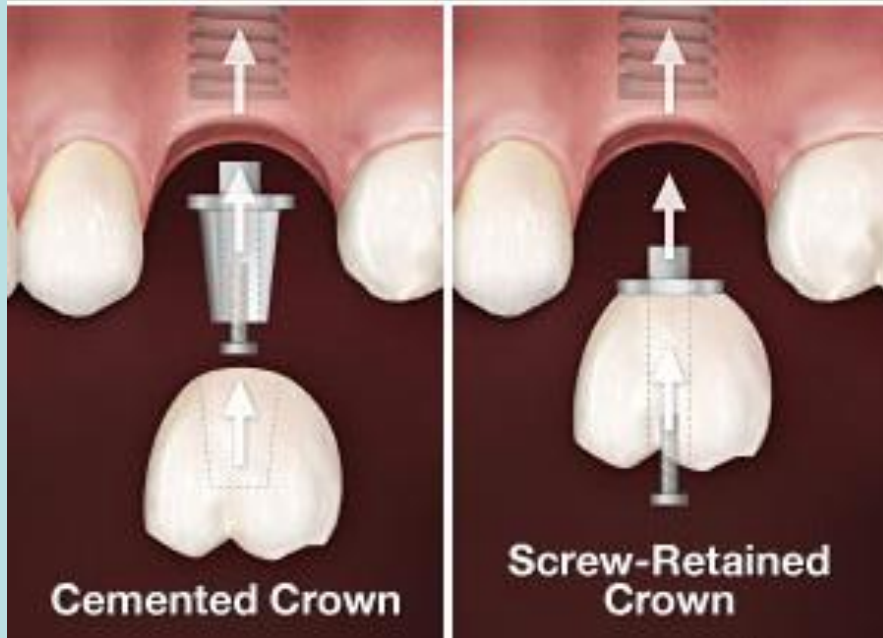
- Place the Implant Abutment + Crown



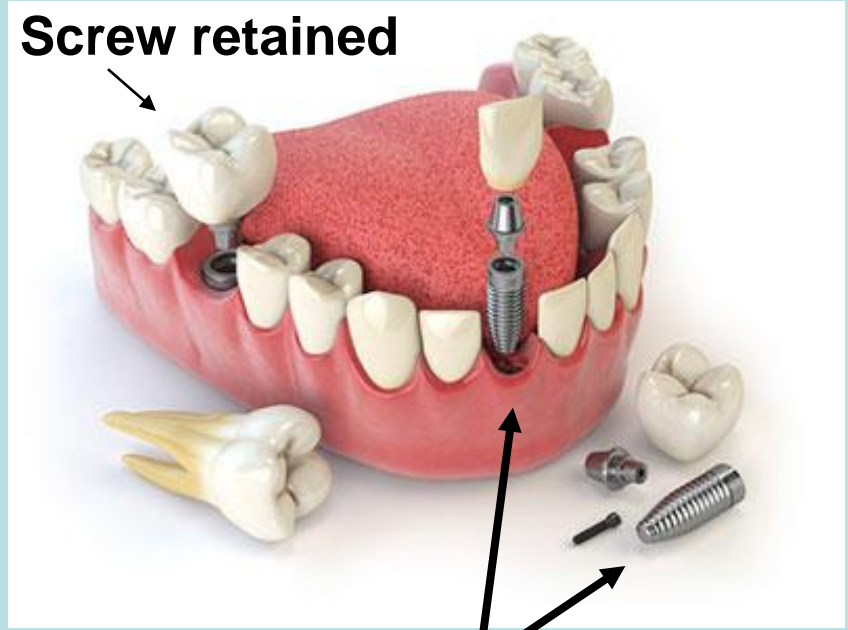
# There are two type of Implant Crowns:

- 1) Cement Retained Implant Crown
- 2) Screw Retained Implant Crown

## How Crowns Attach to Implants



**\*It is very easy to retrieve a screw retained Implant**

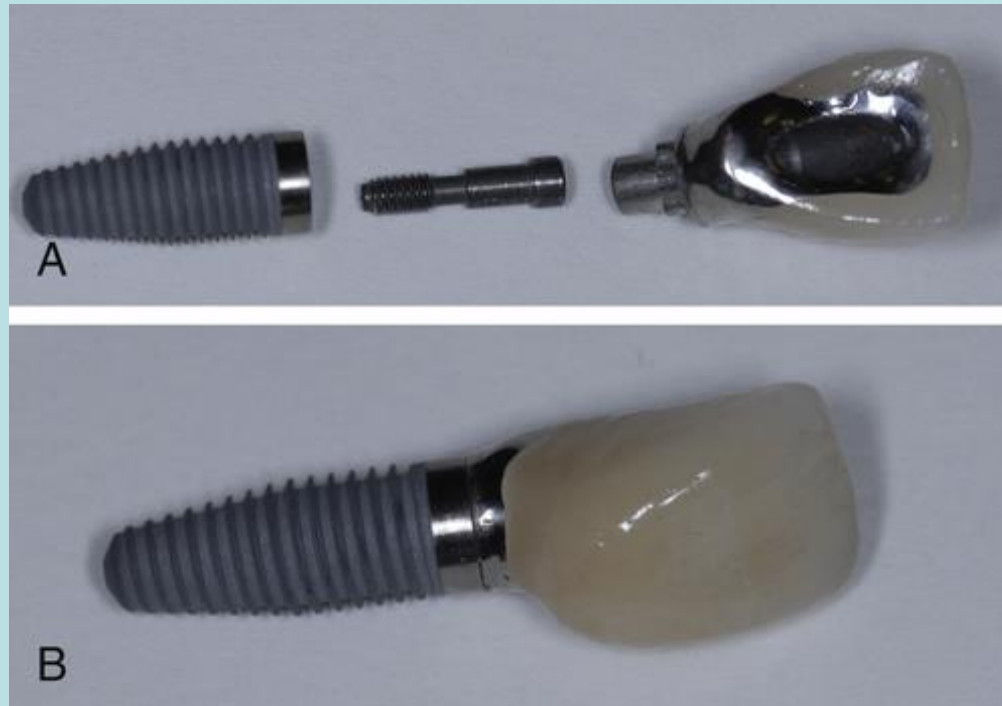


Cement  
Retained

- The #1 Complications for implants are screw loosening.
- At the recall visit, check the implant crowns for mobility. Sometimes the screws become loose.
- Usually a new screw will be placed and tightened (torqued) in these places.



# Extraoral Example of Screw Retained Crown



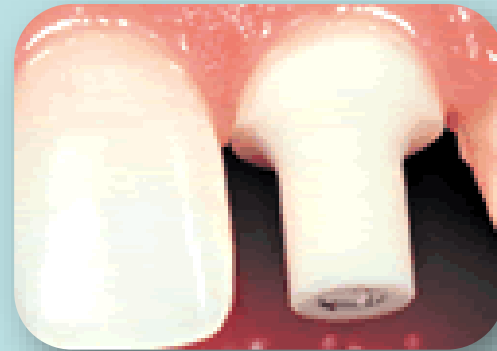
A major advantage of screw retained crowns is no cement is needed. The Cement from cement retained implant crowns can lead to bone loss and/or implant failure.

Abutment **is** the portion that joins the body of the implant with the prosthetic.

Screws into body

Attaches prosthetic to implant

Fabricated from variety of materials



# Abutment

Fabricated  
from variety  
of materials

Titanium, Aluminum  
Oxide, Ceramic, &  
Zirconia.





## **Cement Retained Restorations**



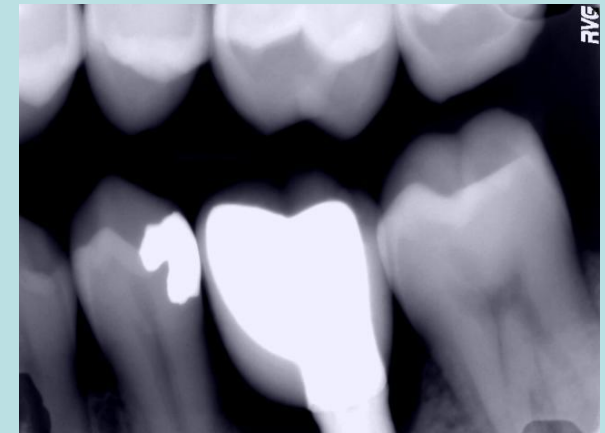
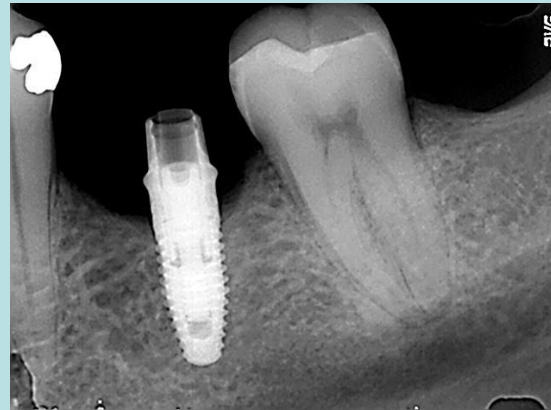
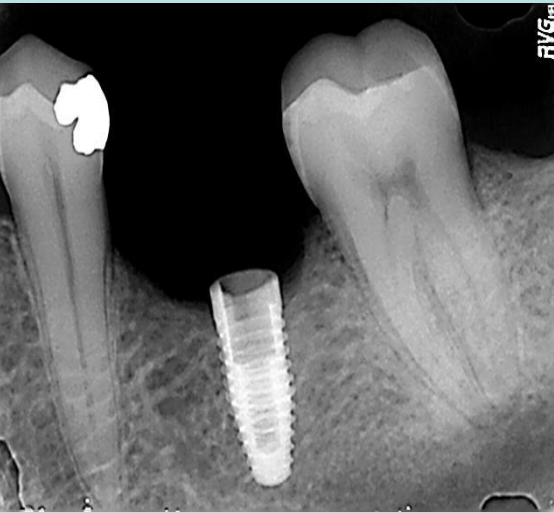




## Screw Retained Restorations



# Clinical case & Implant stages



Step 1: implant body

Step 2: Implant uncovered & abutment attached

Step 3: final prosthesis



# Types of Implant Prostheses

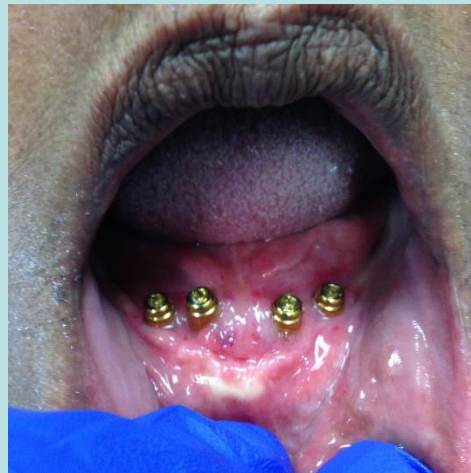
- Implant Retained Removable Prosthesis
  - A) With locator abutments
  - B) With Titanium Bar
- Implant Retained Fixed Prosthesis.

# Implant Overdenture



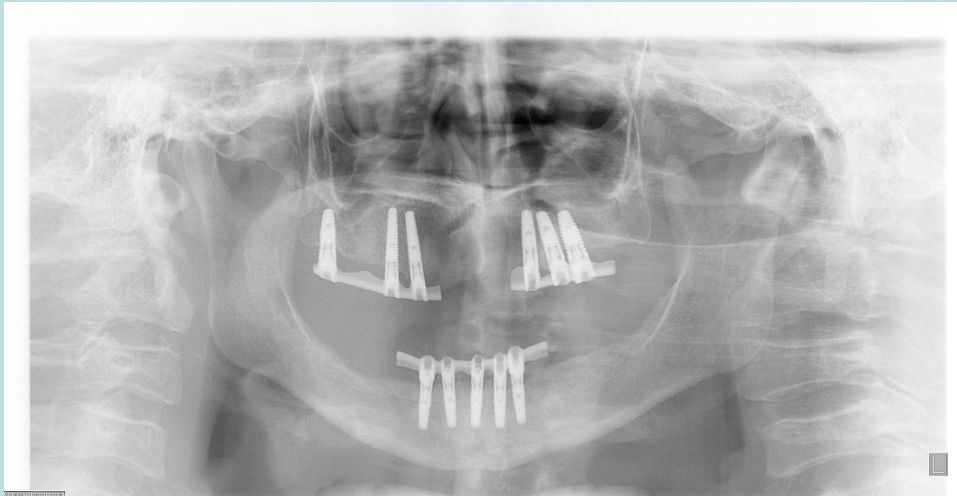
# Implant Overdenture

- Implant supported overdentures significantly improve retention. This is especially helpful in patients with atrophied alveolar ridges.
- In this case, four mandibular implants were placed with locator abutments that attach to the mandibular denture and improve retention.



# Implant Overdenture

- In this case, several implants were placed and connected by a milled titanium bar.
- The removable prosthesis attaches to the bar for improved retention.

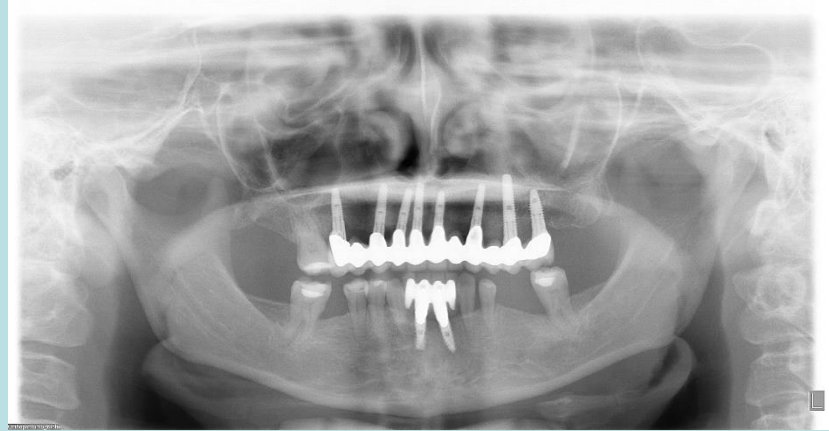


# Implant Overdenture





# Fixed Implant Bridge





# Endosteal Implants

1. Come in standard lengths and “mini’s”
2. Come in different widths (diameter)
  - Standard implant diameter ( 3.75 or 4mm)
  - Mini’s = diameter 1.8 to 2.4

# Mini Implants-Limited Clinical Indications

1.8 to 2.4 mm width

Denture stabilization

Less expensive

FDA approved for long-term use in 2004



# Clinical Case–Maxillary Arch



Mini implants

# Clinical Case—Mandibular Arch



Mini implants

# AAP Classification of Perio Implant Disease

<b>Implant health category</b>	Inflammation/soft tissue, probing depth (PD), bleeding on probing (BOP) suppuration (exudate)	Bone Loss (BL)	<b>Notes/clinical application</b> All implant categories: recommend Baseline probing depth and radiograph at placement, restoration, and at one-year post load of implant-borne restoration/prosthesis
<b>Peri-implant health</b>	Absence of inflammation, BOP, swelling, and suppuration	No BL < 2.0 mm	Absence of BL beyond the crestal bone level changes from remodeling at one year. Monitor and <b>recall at least every six month.</b>
<b>Peri-implant mucositis</b>	Inflammation, BOP, plaque pathological factor	No BL < 2.0 mm	<b>Record Gingival Index 1-3:</b> Mild, moderate, severe <b>Treat, reevaluate, and recall in three Months.</b>
<b>Peri-implantitis</b>	Inflammation, BOP, plaque pathological factor; note any increase in PD from previous exam	Subsequent Progressive BL > 2.0 mm	<b>Early:</b> PD > 4 mm, BL < 25% of Implant length <b>Moderate:</b> PD > 6 mm, BL 25%-50% Of implant length <b>Advanced:</b> PD > 8mm, BL > 50% of implant length <b>Treat and recall in three months</b>
<b>Peri-implantitis in absence of previous examination</b>	Inflammation, BOP, and/or Any suppuration; PD ≥ 6mm and/or recession	Radiographic BL ≥ 3.0 mm	Make baseline PD and radiograph, Diagnosis of peri-implantitis. <b>Treat and recall three months</b>

\*Based on the AAP/EFP Proceedings of the World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions<sup>7</sup> 19 review papers and four consensus reports from 2017 (1,4-6)



# Break





# Comparison of Implant vs a Natural Tooth



# Peri-Implant Tissues

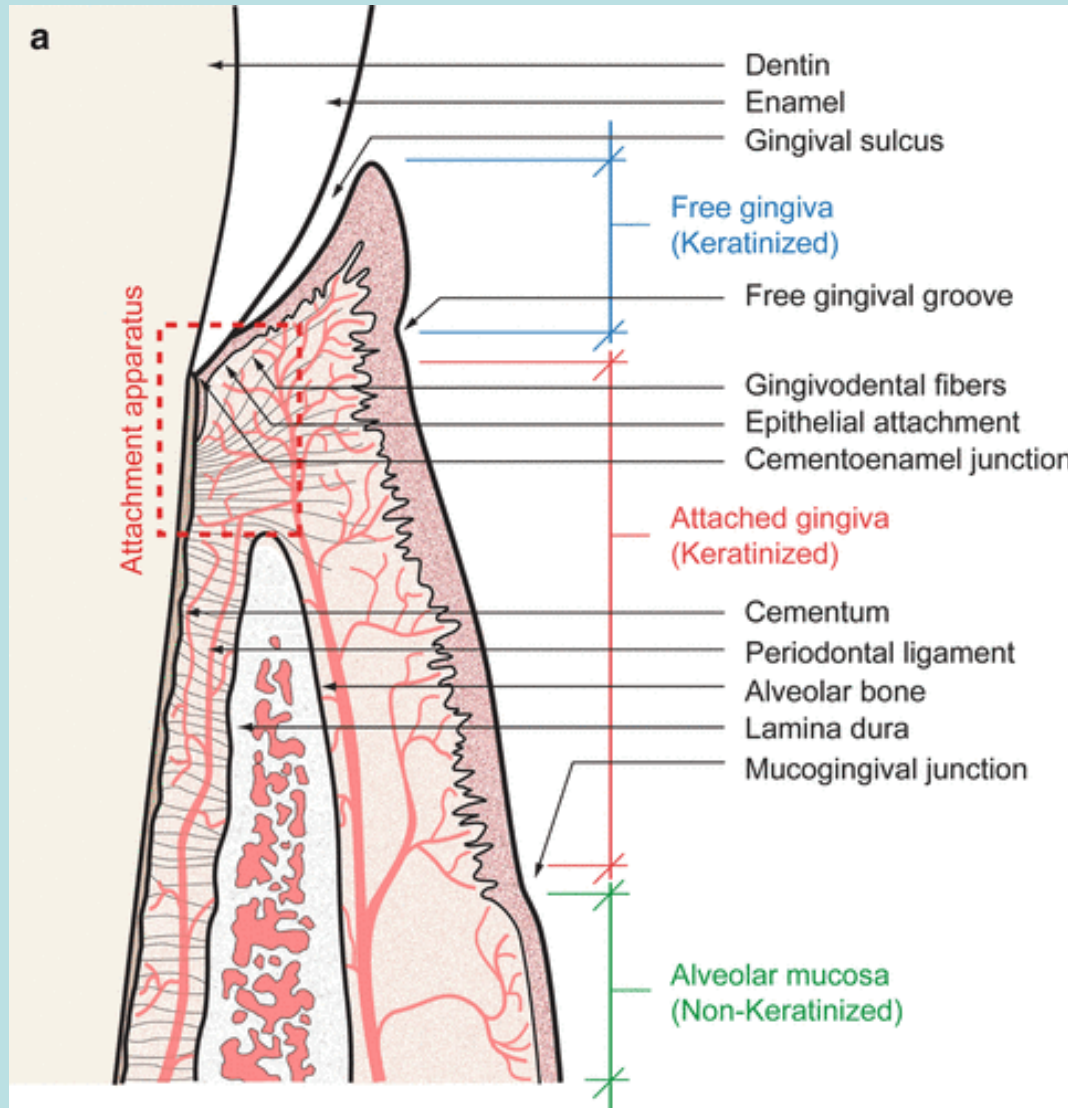
- **Peri-implant tissues**: the tissues that surround the dental implant
- **Peri-mucosal seal**: is the gingival tissue which surrounds the abutment collar and is a type of junctional epithelium. It functions as a barrier to prevent microorganisms from attaching to the implant fixture.
- Similar in many ways to the periodontium of a natural tooth, **but there are important differences**

# AAP Classification of Perio Implant Disease

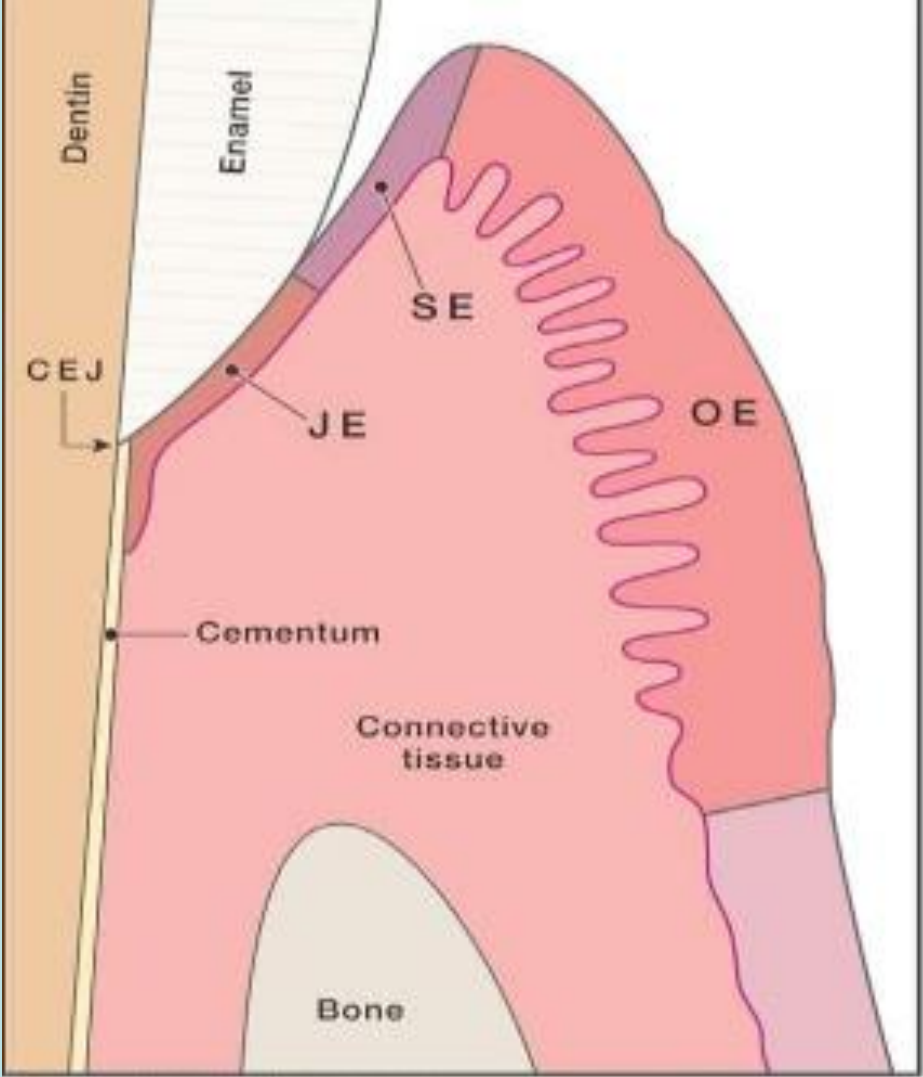
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# Natural Tooth

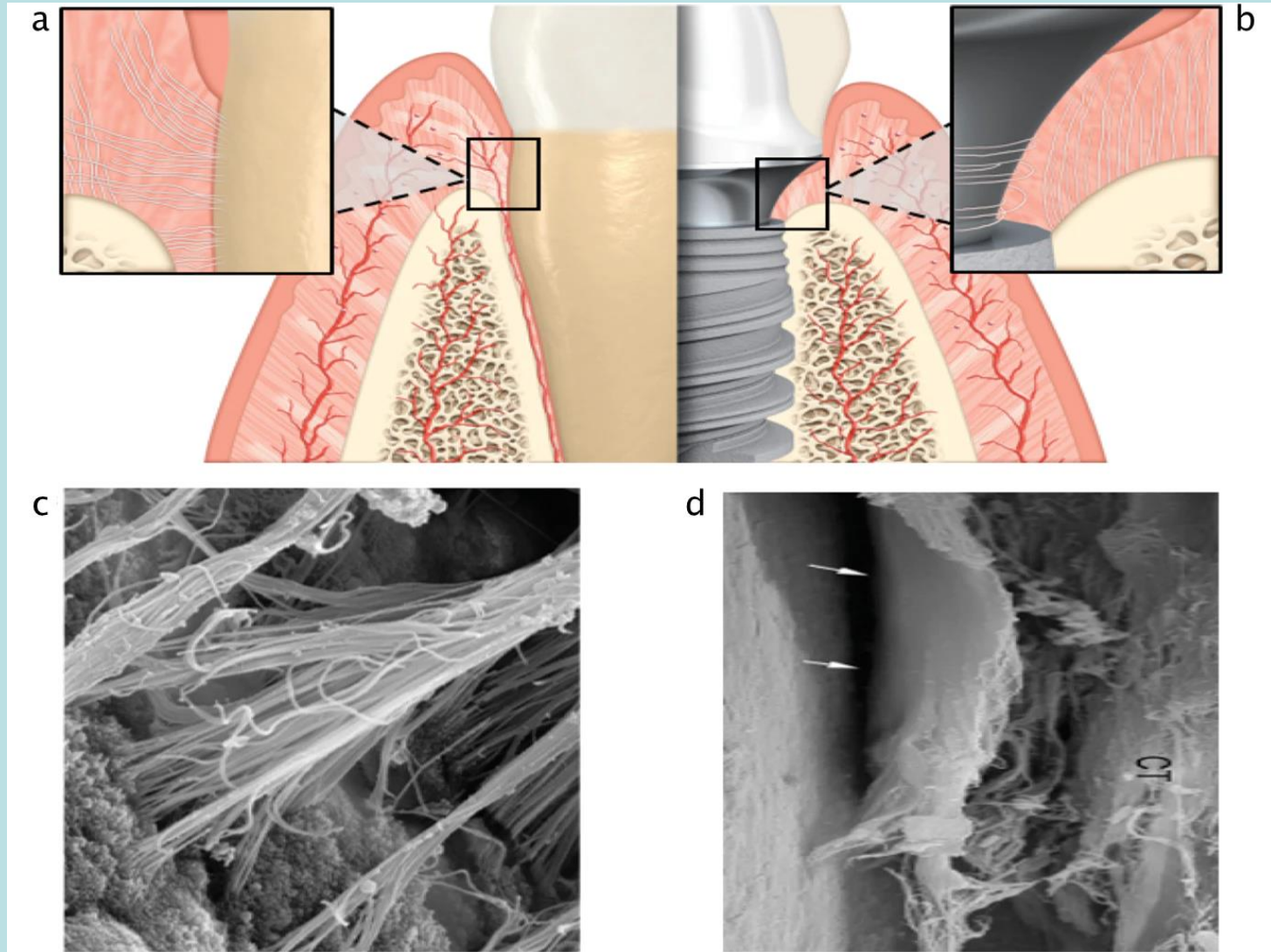


# Natural Tooth



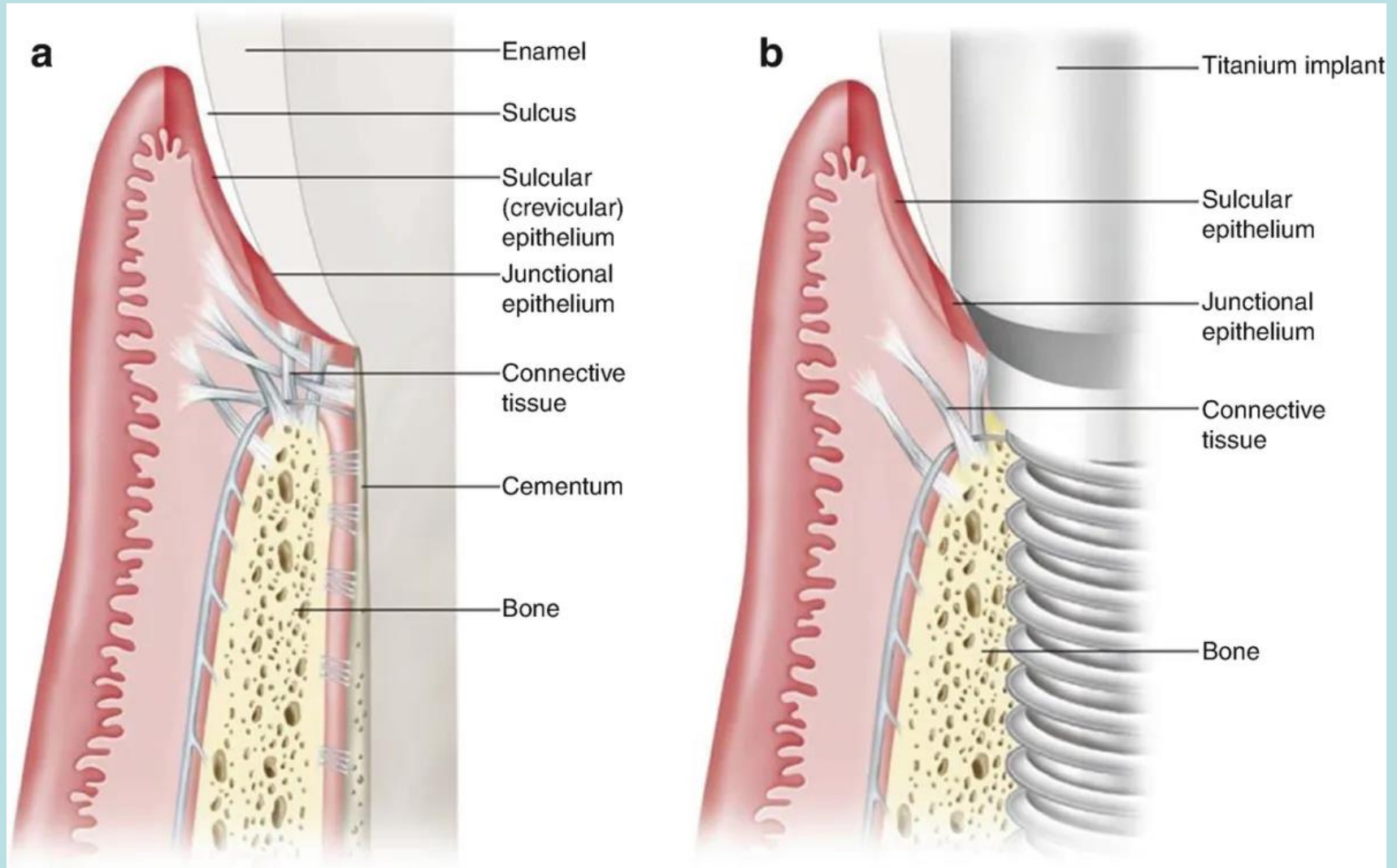


# Natural Tooth vs Implant





# Natural Tooth vs Implant



Multi-directional fibers & cementum



Only parallel fibers



	TOOTH	IMPLANT
Junctional Epithelium	On cementum, dentin, or enamel	On titanium
Sulcus Depth	1-3 mm when healthy	Determined by abutment & margin location
Gingival Fibers	Multi-directional cementum - bone	Only parallel fibers
Connective Tissue Attachment	Sharpey's fibers	Osseointegration
Movement	PDL allows adaptation from occlusal forces	No adaptive capability-ankylosed
Proprioception	Receptors in PDL	No receptors

# Implant-to-Epithelial Tissue Interface

- The epithelium adapts to the titanium abutment, creating a **biological seal** (peri-mucosal seal).
- The biological seal functions as a barrier between the implant and the oral cavity.
- The sulcular epithelium surrounds the implant abutment.

# Implant to Connective Tissue Interface

- *Significantly different than that of a natural tooth*
- Implant surface lacks cementum
- Gingival fibers **cannot insert into the titanium surface.**
- Periodontal pathogens can destroy bone faster along a dental implant long junctional epithelium as compared to a natural tooth.

# Perimucosal seal

- Zone between implant and soft tissue
- Seal is around the abutment portion of the implant
- This is biological seal that prevents microorganisms from entering the tissue surrounding the implant.
- Composed of junctional epithelium





# Peri-implant Mucositis vs Peri-implantitis

- **Peri-implant mucositis** when a biofilm inflammatory process of the soft tissues surrounding a dental **implant** is present without additional bone loss.
- **Peri-implantitis** is a destructive biofilm inflammatory process affecting the soft and hard tissues surrounding dental implants.

# Residual Excess Cement

Can  
Cause

- Local Inflammation
- Peri-implant disease



Possible  
Etiology

- Bacterial colonization of the foreign material



# Implant Survival vs Implant Success

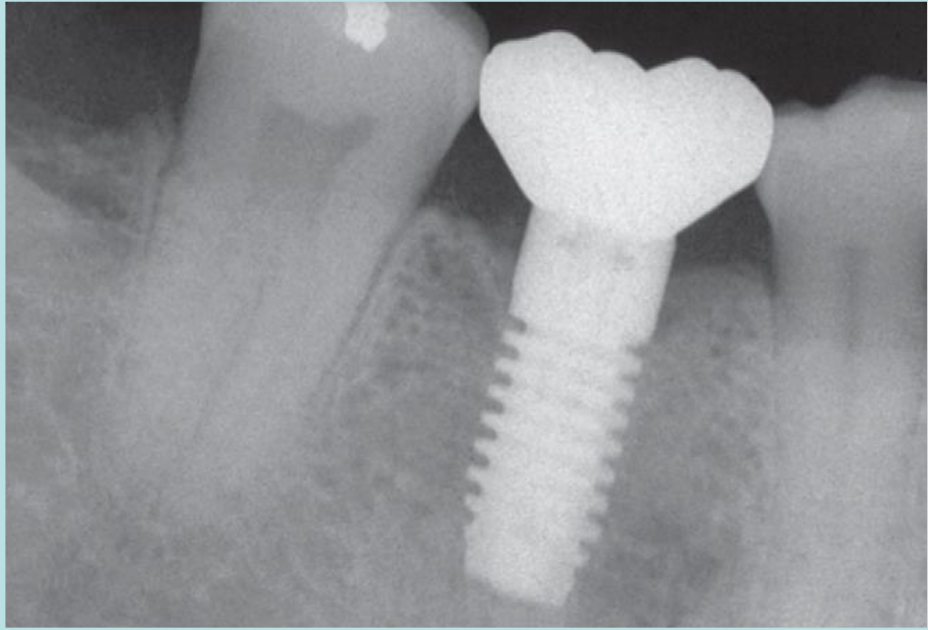
Implant survival means that implants are still in the mouth at the time of examination, regardless of the state of the prosthesis or patient satisfaction. A nonfunctional implant requiring additional treatment is counted in the surviving group

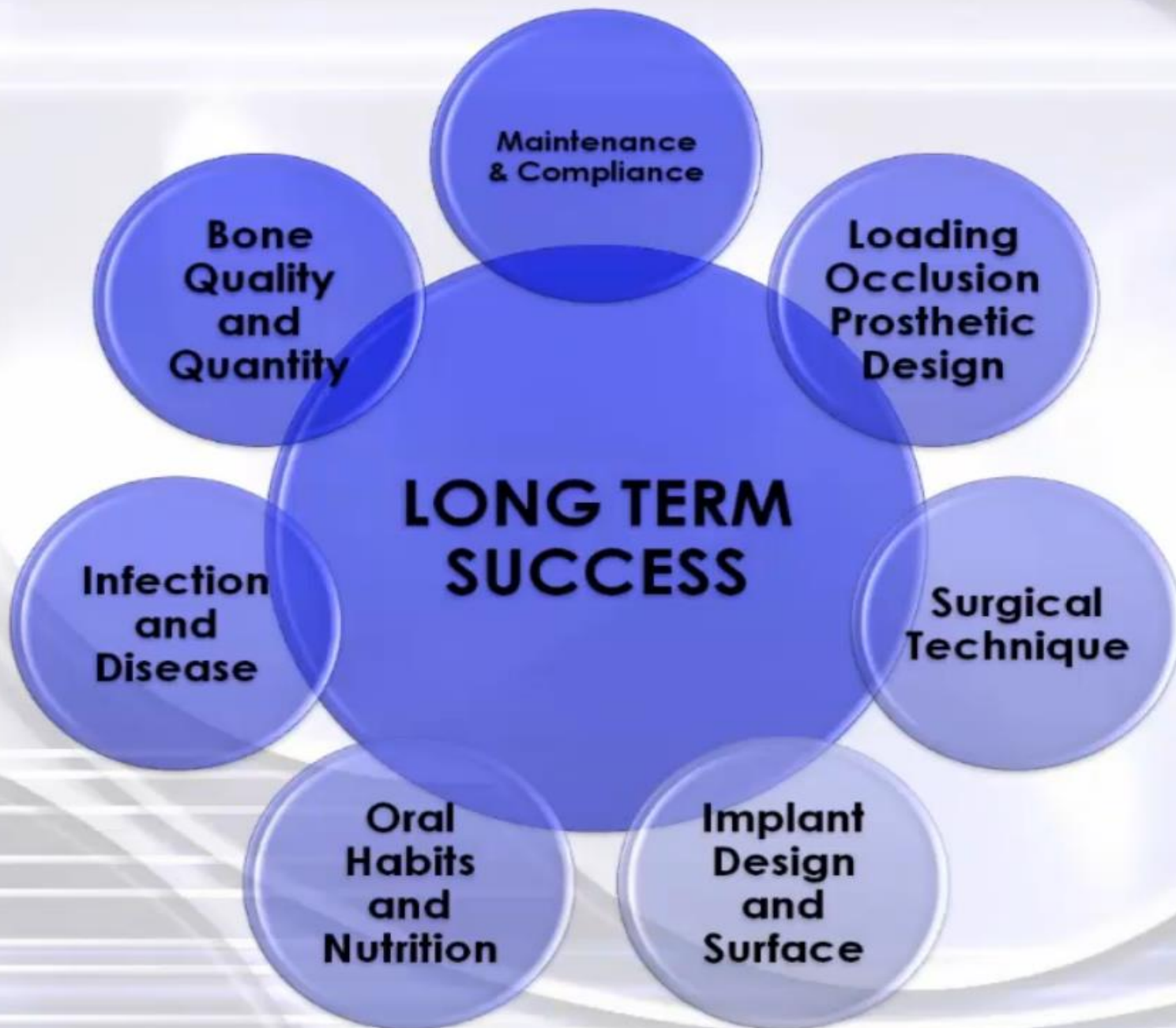
Implant success means that implants are not only in the mouth, but are also functional and satisfactory

# Implant Survival



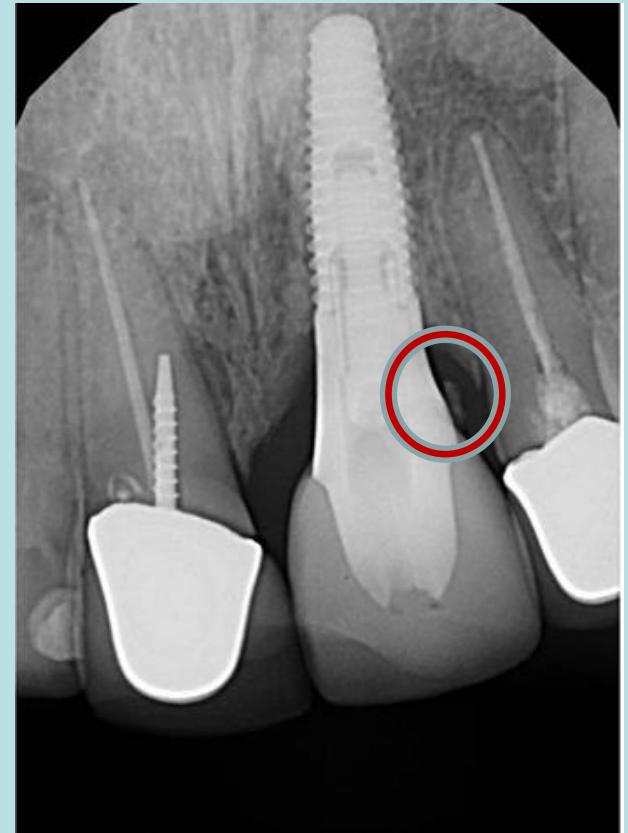
# Implant Success





# Calculus and/or Cement

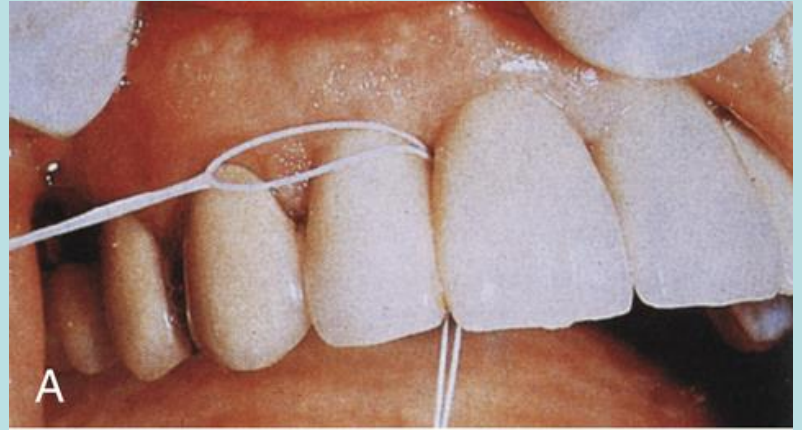
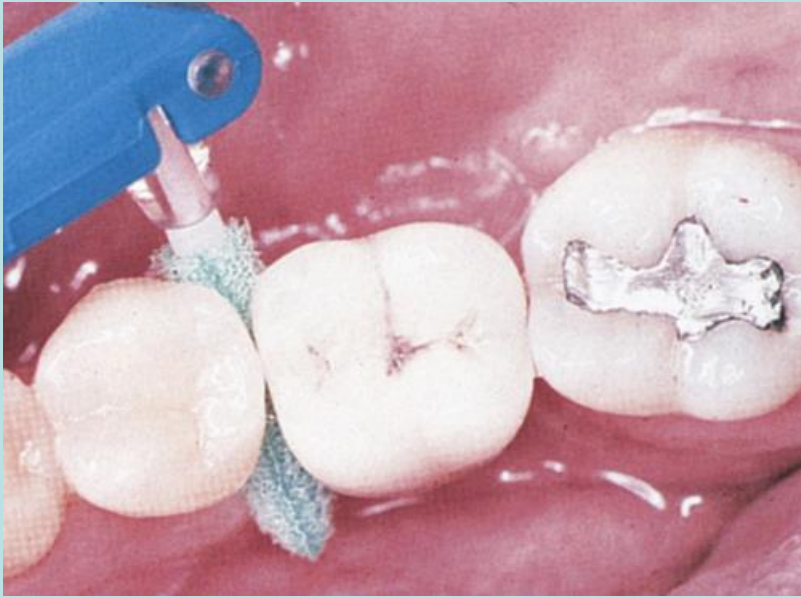
- Not Easy to Differentiate
- Use Dental Tape (no Teflon/slippy floss)
  - Criss-Cross with “shoe shine -motion”
  - Frayed or Roughened Floss = calculus/cement
- Radiographs = “saucer like shape”
  - Not Always Evident



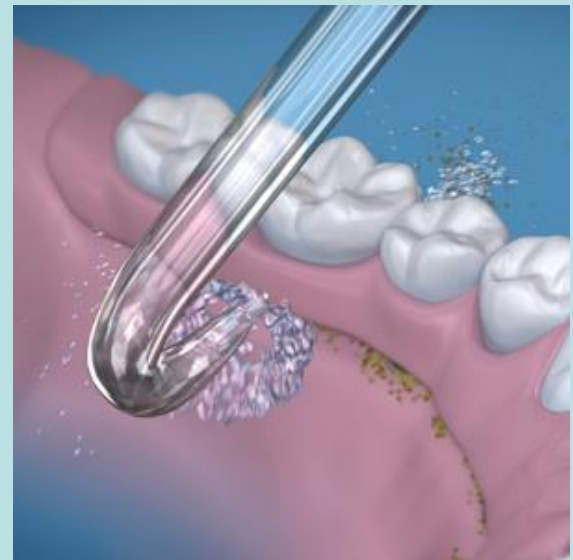


# Dental Implants and Home Care

- Patients should thoroughly clean the implant surfaces no less than once a day.
- If the patient has an implant-supported complete or partial denture, the prosthesis should be removed to facilitate cleaning of the implant and the prosthesis.
- Brushes
- Flosses
- Antibacterial agents (Chlorohexidine)

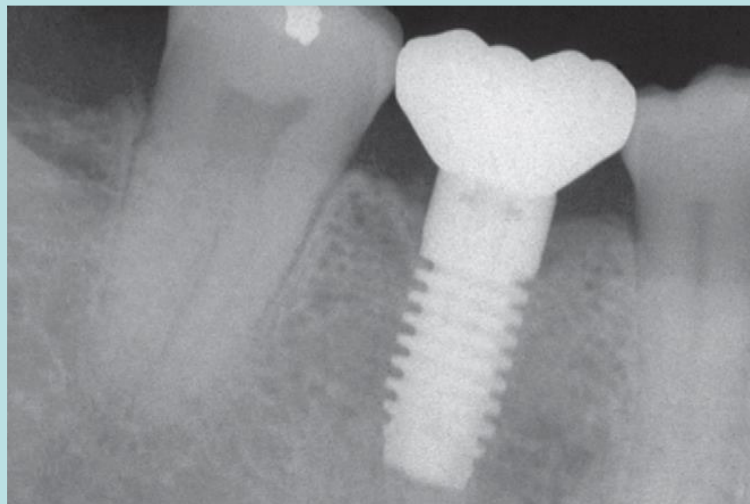


# Water Pik



# Flossing

- As dental implants often have more pronounced contour than natural teeth and can extend much further apically, it is important to show patients how to “hug” the surface of the tooth when flossing.



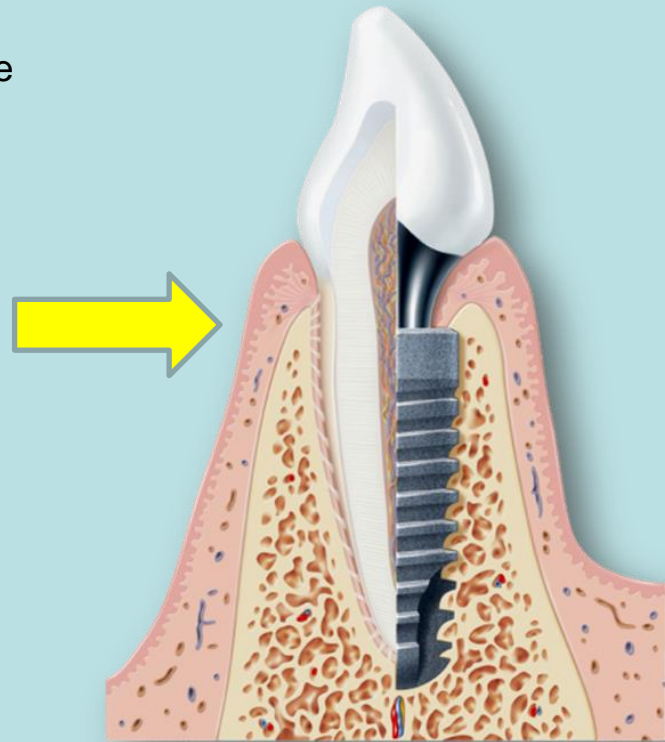
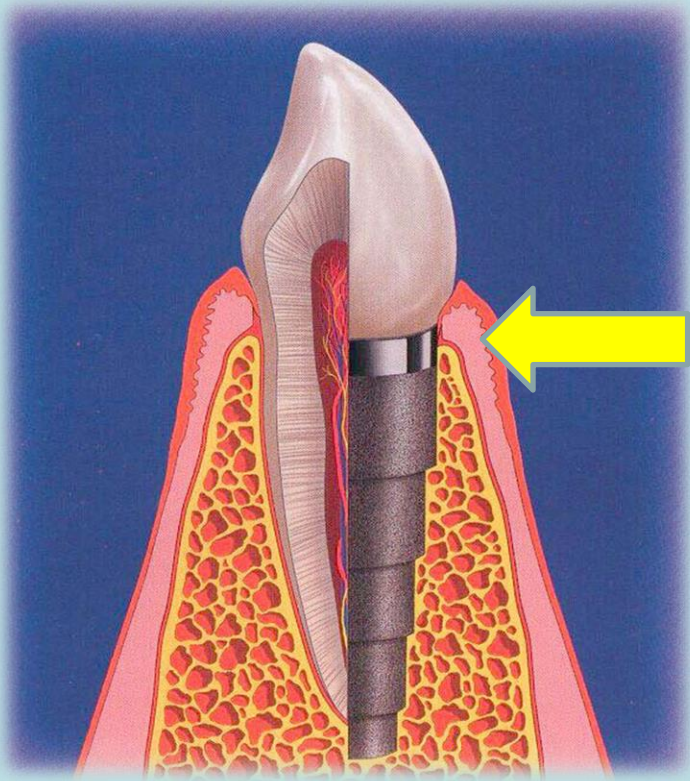
# Hygiene Appointments: Radiographs

- Periodic radiographs are taken to monitor bone levels around the implant.
- 1mm of bone loss during the first year of function is normal.
- Often the bone height will settle and stabilize at the first thread of the implant



# Crestal vs. Subcrestal Placement

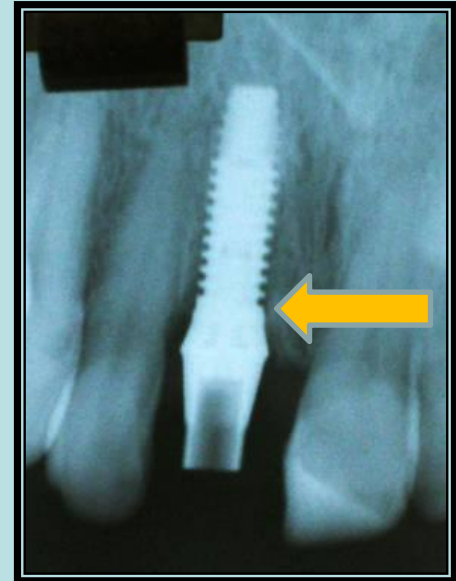
Height of Bone





## Radiographic Assessment

- Bone is at top of or 2mm below implant fixture
- No radiolucency surrounding the implant
- Bone loss = Normal
- 1.0 mm of Bone Loss 1<sup>st</sup> Year
- 0.1 mm Each Year
- Up to 1.5 mm (total)



*Greater bone loss may be observed in Maxilla*

# Hygiene Appointments: Probing

- Probing should be performed during hygiene visits
- Areas of deep pocketing, bleeding on probing (BOP), exudate, etc. should be noted.
- Probing should be performed with a plastic probe. Metal probes can scratch the implant surfaces.
- A scratched implant or abutment surface makes it easier for biofilm to adhere.

# Hygiene Appointments: Probing



# Visual Inspection

## Color, Contour, Consistency

- ✓ Pink, firm & keratinized
- ✓ Tissue is well adapted
- ✓ Contour --- Implant Shape
- ✓ Margin --- Bone Height
- ✓ Evidence attached gingiva



## Presence of Plaque Biofilm?

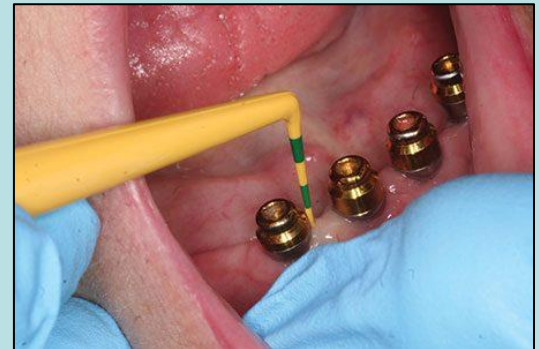


# Probe & Palpate

## GUIDELINES:

- » Use 0.15N (15 grams) of pressure
- » 6 months after implant restored
- » Use a smooth plastic probe or flexible probe, move probe circumferentially around the implant
- » Maintain a zero degree angulation

These guidelines were adopted from a Peri-Implant therapy for the Dental Hygienist, S. Wingrove (2013)



# Palpate

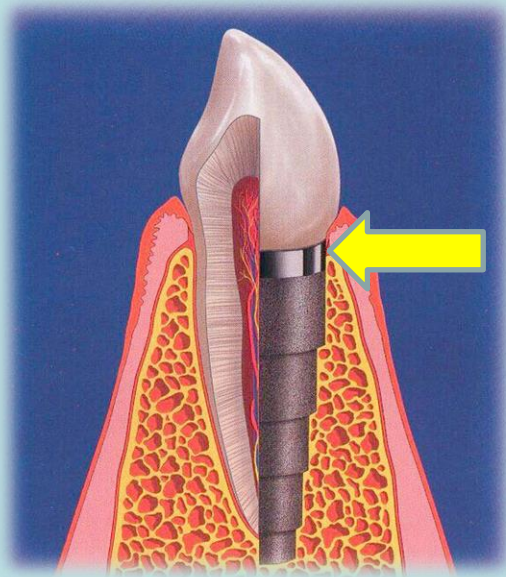
## GUIDELINES:

1. Palpate implant by placing finger on both sides of alveolar bone
2. Starting at apex– draw upward/downward
3. Infection = exudate from sulcus

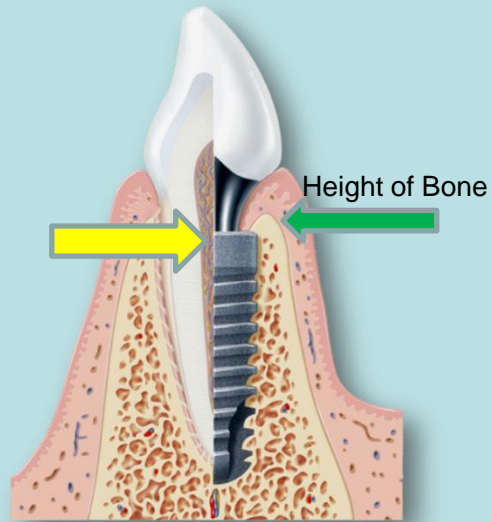
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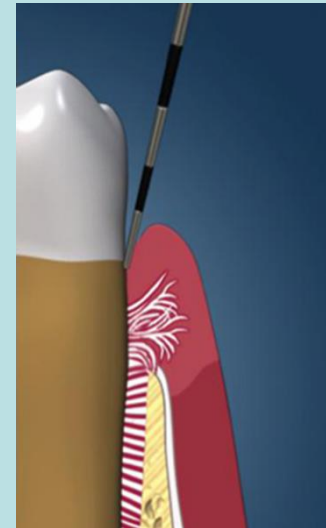
# Where is your probe?



Crestal implant



Sub Crestal implant



Natural Tooth

# Mobility

## Determine:

- Mobility of Implant
  - Progressive bone loss
- Mobility of restoration/prostheses

“Bubbling Saliva”  
a sign of internal loose screw



# Hygiene Appointments: Cleaning

If a patient has implants, special scaling instruments are required:

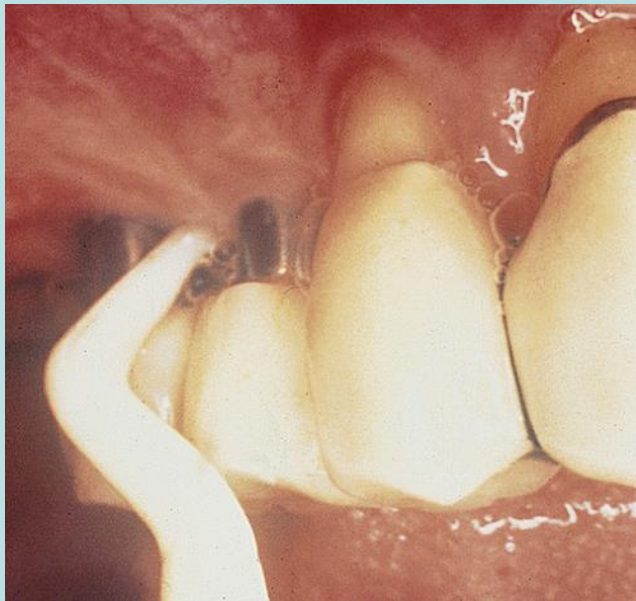
- Plastic or graphite or Titanium curettes/scalers
- Polish with non-abrasive prophylaxis paste
- Implant+abutment safe tip for ultrasonic on low power setting

Ideally, evaluate radiographs PRIOR to cleaning to make sure that you aren't accidentally using a ultrasonic or metal scaler on an implant by accident

# Frequency of Hygiene Visits

- It is not uncommon to see implant patients more frequently than the standard every six months
- This applies not only to implant patients, but anybody with increased caries risk, history of perio disease, or significant history of restorative work

# Hygiene Appointments: Cleaning





## Cavitron softip ultrasonic implant insert

- Removes plaque and calculus around titanium implants and abutments
- Benefit of ultrasonic lavage delivery during implant maintenance
- Compatible with 30 kHz Cavitron ultrasonic scalers
- Tip Tool (wrench) Used for the installation and removal of the Softip
- Softip Disposable Prophy Tips Single use, plastic tip that is safe for implant maintenance





**THE END!!**