Dental Implants: A Predictable Solution for Tooth Loss

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What are Dental Implants?

- Titanium posts used to replace missing roots of teeth
- Sterile insertion within the upper and lower jaw bones
- Require time for bone healing/integration = “osseointegration”
- Provide the foundation for crowns, bridges and full arch restorations for patients
- Have an overall success rate of survival > 95% over 20 + years
Basic biology and anatomy

Tooth loss leads to bone loss

Single missing tooth
- Anterior teeth in place
- Missing tooth root leads to bone loss
- Bone resorbs where tooth is missing, leaving a visible defect

Several missing teeth
- Posterior teeth in place
- Bone begins to deteriorate where posterior teeth are missing
- Bone loss over time can be significant
Basic biology and anatomy

Atrophy of the Maxilla After Tooth Loss

Is registered (A-E) according to Lekholm & Zarb (ref)

A = Most of the alveolar ridge is present
B = Moderate residual ridge resorption has occurred
C = Advanced residual ridge resorption has occurred and only basal bone remains
D = Some resorption of the basal bone has started
E = Extreme resorption of the basal bone has taken place

Basic biology and anatomy

Atrophy of the Mandible After Tooth Loss

Is registered (A-E) according to Lekholm & Zarb (ref)

A = Most of the alveolar ridge is present
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Options for Tooth Loss Replacement

Replace the missing tooth with a 3-unit bridge

Average Cost: $3,800 to $4,200

Replace the missing tooth with a single dental Implant.

Average Cost: $4,500- $4,800
Recommended Distances

- Narrow: 3 mm
- Regular: 4 mm
- Wide: 5 mm
Recommended Distances

Allows for good implant to bone contact and avoids dehiscence of bone and soft tissues.
Congenitally Missing Teeth
Bone Volume Deficiency

- Missing Upper lateral incisor
- 3D radiograph – Cone beam CT scan to determine available bone volume
- Implant planning software to plan ideal implant position.
- Determining the need and volume of bone grafting based on implant position in host bone.
- Discuss diagnosis with patient and timeline for overall treatment plan.
Buccal Bone Graft Augmentation

Before Bone Grafting
Patient Assessment

• Review of Medical and Dental History
  • Identify any contraindications to implant surgery
    • IV Bisphosphonates, Anticoagulation, Bone &/or Soft Tissue Pathology
• Perform a thorough clinical and radiographic examination
  • Recommend CBCT imaging for implant surgical planning
  • Allows for treatment planning and fabrication of surgical guides
• Demonstrate implant placement
• Identify any anatomical limitations
  • Including relative position of nerves, sinus and bone volume deficiencies
• Determine source of bone graft
  • Autogenous, Allogeneic, Xenograft (consider religious limitations)
Single Lower Arch Implant

NO Grafting Required
Multiple Lower Arch

Grafting IS Required
Implants and Maxillary Sinus

- Maxillary sinuses located at the apex of posterior teeth
- Implants should NEVER be inserted directly into the sinuses
- Bone grafting of the maxillary sinuses provides increased vertical bone height
- Crestal bone vertical deficiency may result in short implant with large crown
  - 1:1 Implant to crown ratio
Implants and Sinuses

Two techniques:

• Bone grafting prior to implant placement
  • When less than 50% of implant will be in host bone at time of placement.

• Bone grafting at the time of implant placement
  • When at least 80% of implant will be in host bone at time of placement.
Two-Staged Implant Surgery

• When bone grafting is required, implant are sealed with a **coverscrew** and buried under the soft tissues.

• Following an appropriate time for bone healing and implant integration, a second stage surgery is performed.

• Coverscrew is replaced with a **Healing Abutment**.
Implants and Maxillary Sinus
Implants and Inferior Alveolar & Mental Nerves
Immediate Implant Planning

• More complex surgical procedure
  • Accuracy with angulation is crucial
• More predictable in single rooted tooth sockets
• Requires an intact extraction socket
• Not recommended if alveolar bone plate fracture occurs
• Socket preservation recommended with buccal wall defect present post-extraction
Normal Extraction Socket Healing

- Tooth extraction day 1
- Initial angiogenesis day 1 to 3 weeks
- New bone formation 3-4 weeks
- Bone growth 4 to 6 weeks
- Bone reorganization 6 weeks to 4 months
Natural Healing – Atraumatic Extraction

Intact extraction sockets do not require bone grafting
Traumatic Extraction or Pathologic Bone Dehiscence

Extraction of teeth can lead to a buccal wall defect

Buccal concavity may result without bone grafting “socket preservation”
What are the Sources for Bone Grafting

Intraoral:

• Surgical osteotomy site
  • Collection during site preparation
  • 0.2 to 0.5 cc

• Ramus
  • Cortical bone block
  • 1.5 x 1.5 cm

• Chin
  • Cortical bone block
  • 2 to 3 cm x 1 to 1.5 cm
What are the Sources for Bone Grafting

Extraoral:

- Tibia
  - Mainly cancellous bone
  - 5 to 10 cc
- Anterior Hip
  - Cortico-cancellous bone
  - 15 to 20 cc
- Posterior Hip
  - Cortico-cancellous bone
  - 25 to 30 cc
What are the Sources for Bone Grafting

**Allograft:**
- Particulate Bone
- Putty
- Blocks

Main Difference between Bone Graft Types is Ease of Handling and Method of Stabilization
What are the Sources for Bone Grafting

Xenograft:
- Powder/particulate
- Blocks

Issues:
- Longer Healing period
- Final bone quality not like natural bone
- Concern with patient religious beliefs
Thank you !!!

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