Objectives of this Mini-Implant Presentation

• Overview of Mini-Implants
• Emphasis on Minis for denture stabilization (full or partial denture).
• Review of diagnosis and treatment planning.
• Review of the surgical technique.
• For more “in depth”: Defer to Dr. Gordon Christiansen’s 2-day course or another longer course.

Advantages of Mini Implants

• Cost to the patient is about half of conventional implants.
• Need less bone (as little as 3.5 mm).
  ➢ Determine with cone beam CT, tomograph, caliper, or mini flap.
• Can be less traumatic – minimally invasive.
  ➢ Less time, small flap or flapless, less bone removal, no bone grafting, less postoperative pain and swelling
• More easily done in an unhealthy patient.

The Truth About Small-Diameter Implants

Dr. Gordon Christensen and Dr. Paul Child’s article in Dentistry Today, May, 2010.
Case by Dr. Margaret A. Boone. Oregon AGD patient participation course.

1.6 Pilot drill in #28 area

13 mm X 3.25 mm Zimmer implant

Placing with handpiece

Flap in #28 area

Final pilot drill holes
Final placement with ratchet

All implants fully seated

Suturing

2 DAYS POST OP

Cost to patient for lower denture attached to mini implants (not including the denture):

• Mini implants fee for patient:
  ➢ 4 implants @$500-$900 each
  ➢ Sedation: optional
  ➢ Attachments: included
  ➢ Attach to denture: included
  ➢ Time: 60-90 minutes

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$2000-$3600 (around the country)
(My practice: $3500 + sedation if desired)

Disadvantages

• Success rate slightly less than with conventional implants. (≈ 94% vs. 96%)

• Generally need twice as many minis than conventional implants to do similar things.
  ➢ Example: Usually 4 in the lower anterior to help stabilize a denture vs. 2 conventional implants.

• Some clinicians may overshoot the mark and use them where they shouldn’t.
Examples of “overshooting the mark”.

**Mini-Implants**

- By definition: Mini implants are 2.9 mm in diameter or less.

- By definition: Mini implants are screws – they expand the bone when screwed in.

- Commonly: Drill 1/3 to 1/2 the length with a slow-speed bur (1200 rpm ±) then screw the implant in the rest of the way.

**Mini-Implants**

- For a denture: The standard is 4 in the mandible and 6 in the maxilla. (Fewer if use Zimmer 3.25 “mini”.)

- The most common length is 13 mm.

- For a partial denture, stay at least 3 mm away from a natural tooth.
When would you possibly consider only 4 in the maxillary arch?

- **Good width / length of bone** (at least 13 mm)
- **Dense bone**
- **Opposing denture teeth**
- **3.25 mm implant, if possible**
- **Patient does not brux or clench**
- **Maintain the palate**
  
  (Imtec teaches: With 6, consider removing the palate in 6 mo.)
- **Non-smoker**
Bone density is so important.

Figure 7-11 Four bone densities found in the edentulous regions of the maxilla and mandible. D1 bone is primarily dense cortical bone; D2 bone has dense to thick porous cortical bone on the crest and coarse trabecular bone underneath; D3 bone has a thinner porous cortical crest and fine trabecular bone within; and D4 bone has almost no cortical bone. The fine trabecular bone composes almost all of the total volume of bone.

1 Oak or maple, 2 pine or spruce, 3 balsa, 4 styrofoam.

From Misch’s book.

Type 1
Type 2

Figure 7-12 The four macroscopic bone qualities are, from left to right, D1, D2, D3, and D4. The bone density variance is dependent upon anatomical location and the local strain history of the bone after tooth loss.

A B C D

25 mm vertical

48 mm foramen to foramen

Only about 3 mm of attached gingiva.

Ridge only 1.5 to 2 mm wide.

Ridge had to be lowered about 3 mm with a bur.
3 mm soft tissue collars.

Cone Beam CT Cross Section

- 13 mm

Tells you:
1. Width at crest of bone
2. Nature of trabeculation
3. Depth of nerve
4. Location of foramen
5. Orientation of lingual surface

Look for a case like this:

Preferred: Get a cone beam CT and
a.) measure from foramen to foramen

20.2 mm width span (to outside edges of the implants, 2 mm between housings)
Measure 7 mm from the mental foramen (taking into account a possible anterior loop of 5 mm).

Angulation

22 degrees off-angle with each other.

(Change inserts every ...?)

Inner part of the ERA attachment only touches when in function. Less force than O-ring, Locator, or Hader bar.*

Place cold cure material on the metal housings of the implants.

Passively seat the denture in the mouth.

Drilling Protocol

2 mm soft tissue collar. Desirable to have hex showing from the side.
Surgical Technique

Drilling protocol according to different densities of bone:
1. Access with tissue punch or flap.
2. Make a divot in the bone with a round bur.
3. Use the “countersink” bur to flatten the area.

Shortcut: Go from the round bur right to the appropriate (10, 13, 15 mm) countersink.

Countersink drill: Why??
1) Make a flat surface
2) Pilot hole 3 mm from final length

Using the countersink bur video.

Access too big??

3 ways to insert a Zimmer mini implant.
Sheared because forces exceeded 55 Ncm on insertion.

Pressure necrosis can occur when over 60 Ncm of force.

(1.8 mm implant breaks at 35-40 Ncm.)

Use the ERA Angle Gauges to determine if a 0° one-piece implant will be used or to choose which angulation correction female should be used with a two-piece implant.

Angle by accident, angle on purpose.

Appreciate Maxillary Anterior Anatomy

(2-piece implant and 11 or 17 degree angulation.)

How Important are Antibiotics?
Implants and Antibiotics

Prophylactic Antibiotic Regimens in Oral Implantology: Rationale and Protocol

Amoxicillin, start pre-op, use loading dose.

The use of antimicrobials reduces the incidence of surgical wound infection in oral implantology. Antimicrobial prophylaxis is indicated in all Class 2 (clean-contaminated) surgical procedures, which include sufficient blood levels at the time of bacterial contamination of dental implant and bone graft procedures. Timing and dosage are critical to the efficacy of antibiotics. Internal antibiotic selection is determined mainly by the bacteria which must be killed to cause an infection from the specific procedure. The authors have developed a classification and protocol that allows the dental practitioner to properly preoperative and surgical factors.

Principle 3: Tissue Concentration

The minimum inhibitory concentration in the lowest antibiotic concentration needed to destroy a specific bacteria. A sufficient tissue concentration of antibiotic should be present at the time of bacterial invasion. To accomplish this goal, a dose that will achieve the therapeutic level at least 1 hour before surgery. The bone concentration, the antibiotic must be given in a dose that will reach bacterial levels at the time of bacterial contamination of the expected bacteria. It has been shown that normal therapeutic blood levels are ineffective to counteract bacterial invasion. Most often, to achieve this tissue concentration, the antibiotic must be given at twice the therapeutic dose and at least 1 hour before surgery. If antibiotic administration occurs after bacterial contamination, no preventive influence occurs and similar clinical results are reported with taking no preoperative antibiotic.

For implant surgery:

- Give twice the therapeutic dose at least 1 hour before surgery.

Pre-op antibiotics:

- Result in half the failure rate.

Comparison

Strengths of Zimmer:
- 2.2 is 50% stronger than 1.8
- An ERA has 20% less force than a ball
- Ability to angulate a prosthetic head (2-piece)
- Shorter housing (2.2 mm)
- Can tap threads for dense bone

Weaknesses:
- No abutment for C&B

Strengths of IMTEC:
- Smallest mini (1.8 mm) (breaks at 35-40 Ncm)
- 2.5 mini also
- Has abutment for crown and bridge

Weaknesses:
- No angulation capability
- Taller housing
- More force on attachment
- No bone tap capability