

The Examiner

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- Practice Limited to Periodontics and Dental Implants
- Comprehensive Treatment Planning with Team Approach to Dental and Implant Therapy
- Achieving Excellence in Dentistry

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Implant Placement in the Posterior Maxilla Problems & Solutions

Implant therapy is the standard of care for the replacement of missing dentition. Success rates ranging from 95-98% have been shown in long term studies. Most studies also show that the success rate of dental implants in the maxilla is equal to that in the mandible. The greatest challenge for implant therapy in the posterior maxilla however is alveolar atrophy that takes place after tooth loss and severely reduces the bone volume available for endosseous implant placement. The loss of bone height in the posterior maxilla is the primary obstacle to implant therapy. On the other hand, bone width in the posterior maxilla remains stable especially in the molar region. Ridge height augmentation by grafting the sinus is the method used to overcome this challenge.

2. Bone quality and density are easily determined in Housfield* Units.
3. The anatomy of the sinus cavity, the thickness of the lateral walls and the presence of pathology can be clearly studied.
4. The amount of elevation needed for implant placement can be pre-determined and the volume of bone graft needed to complete the procedure is calculated.

TECHNIQUES FOR SINUS GRAFTS:

Two techniques can be used for sinus grafting based on the height of the residual bone available for implant placement:

1. Residual bone height 5-8 mm: Osteotome Technique with simultaneous implant placement.
2. Residual bone height less than 5 mm: Lateral Window Approach with delayed implant placement.

TREATMENT PLANNING FOR SINUS GRAFTS:

Careful planning is the key to success in implant dentistry. Diagnostic models, wax-up and appropriate radiographs are necessary prior to proceeding with sinus grafts. Computerized tomography (CT Scan) is becoming the standard of care for treatment planning and placing dental implants.

THE ADVANTAGES OF CT SCANS IN SINUS GRAFTING PROCEDURES:

Using the appropriate reformatting software, a wealth of information can be extracted from a CT Scan:

1. The width and height of the residual bone can be calculated.

- **OSTEOTOME TECHNIQUE:** In this approach, an osteotome (figure A-5) is used to implode the floor of the sinus and create access into the sinus cavity. A series of osteotomes with increasing diameter are then used to advance the bone graft into the sinus, tenting the schneiderian membrane and creating space for the placement of the implant. The implant is placed once the desired height of elevation is reached.

- **LATERAL WINDOW APPROACH:** In this technique, an osteotomy is performed on the lateral wall of the sinus after reflecting the alveolar mucosa. Once the membrane is exposed, the interior walls of the sinus are de-

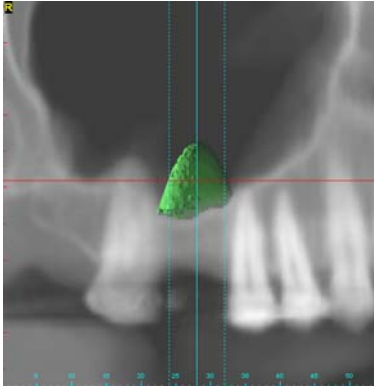


Figure A-1: Panoramic view of the right maxilla showing the residual alveolar bone at site # 3 and the needed bone for implant placement.



Figure A-2: Coronal view showing 5 mm of residual bone height. The height of the planned bone graft is also shown.

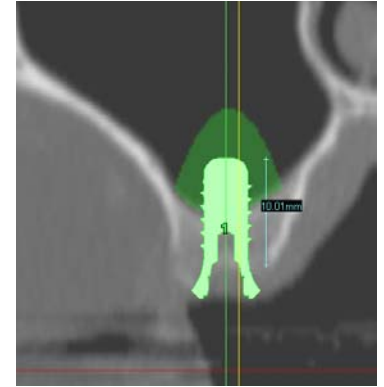


Figure A-3: A 10 mm wide body Straumann® implant is treatment planned for this site using SimPlant® software.

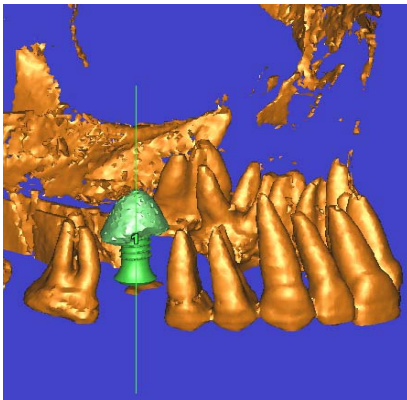


Figure A-4: 3D composite of the CT scan showing the implant and the bone graft in relation to the adjacent teeth.



Figure A-5: Osteotomes used for the Sinus Lift procedure



Figure A-6: A 10 mm wide body and wide neck implant placed on site # 3. Note the bone graft apical to the implant.

nuded and the membrane is elevated. The bone graft is placed in the newly created space. The implant(s) placement is delayed for 3 - 6 months based on the volume and the source of the bone graft.

CASE STUDY 1:

The patient presented for the replacement of tooth # 3 (Figure A-1) that was lost due to severe chronic periodontitis. A Ct radiograph was taken and analyzed using SimPlant® Software. The study indicated the presence of an average of 5 mm of residual bone height (Figure A-2). It was determined that adequate bone was available for performing the Osteotome Technique and simultaneous implant placement. The volume of bone graft needed to place a 10 mm implant was determined (Figure A-3). The SimPlant® study showed adequate bone width for the placement of a wide body Straumann® implant. The treatment was completed and the implant was placed and integrated successfully (Figure A-6).

CASE STUDY 2:

The patient presented for the replacement of teeth # 13 and 14 (Figure B-1). The initial examination revealed a pneumatized sinus with very thin residual alveolar bone (Figure B-2). A CT scan was taken and the volume of bone graft needed for the sinus augmentation was determined (Figure B-4). The Lateral Window and delayed placement technique was chosen (Figure B-5). The surgery was uneventful and adequate bone height was added to accommodate the placement of two 10 mm Straumann® implants (Figure B-6). The use of SimPlant® Software allowed for the careful planning for the sinus graft procedure and the implants placement.

*Housfield Unit: Is object density measuring unit where air is -1000 HU, water is 0 HU and cortical bone is 900-1800 HU.

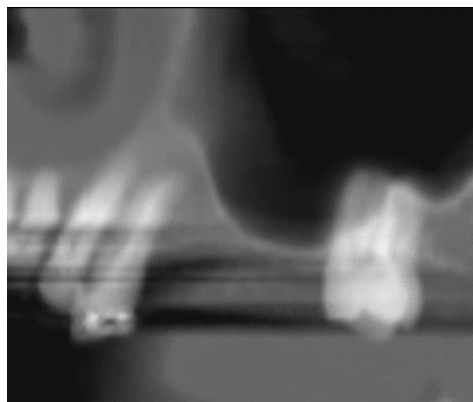


Figure B-1: A panoramic view of the left maxilla showing the loss of teeth # 13 and 14.

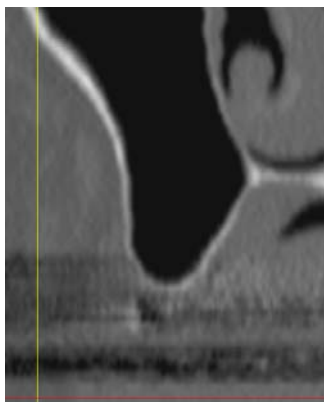


Figure B-2: Coronal view showing very thin residual alveolar bone and pneumatized maxillary sinus cavity.

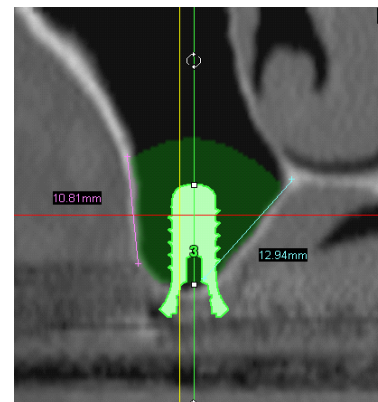


Figure B-3: A 10 mm wide body Straumann® implant is treatment planned for this site using SimPlant® software. The height of the sinus elevation is determined.

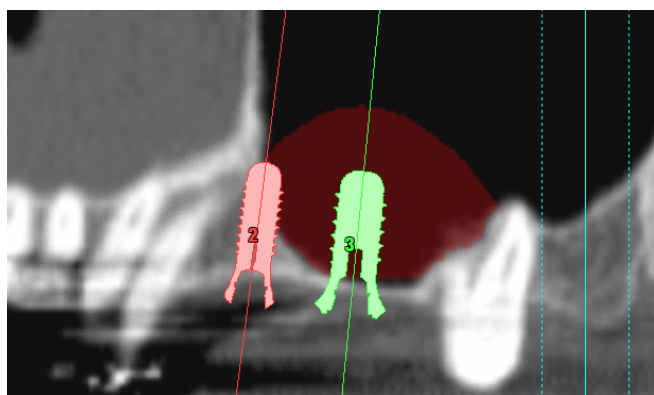


Figure B-4: A panoramic view showing the treatment plan for the implants and the bone graft.



Figure B-5: The Lateral Window Technique for sinus elevation. An osteotomy is performed on the lateral wall of the sinus to gain access to the sinus cavity.



Figure B-6: Post operative radiograph shows the bone graft in place. Four to six months of healing are needed prior to placing the implants.



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**Brandy Hammons and Shelly Crist joined our team in
December of 2004. Brandy is our Front Desk Manager and
Shelly is our Treatment Coordinator.**