Reconstruction of a Traumatic Maxillary Defect With a Scapular Flap and Dental Implants

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Initial Presentation

A 68-year-old male suffered a right sided comminuted Lefort I/II/III fractures as well as avulsion of all right maxillary teeth. The injury was secondary to a gun-shot wound after he dropped a loaded rifle while cleaning it. The patient underwent right sided craniectomy as well as open reduction and internal fixation (ORIF) of his right sided facial fractures (Pic 1). Although his orbital floor was reconstructed with good projection of his zygoma, he was left with what mimicked a right maxillectomy defect.

Pic 1. Three quarters view of 3-D reconstruction of patient status post ORIF of multiple facial fractures

Scapula Flap

The patient then underwent secondary reconstruction of his maxillary defect with a scapular tip free flap (STFF). The STFF was tunneled lateral to the mandible and the thoracodorsal artery vessels were anastomosed to the facial vessels. The patient healed nicely but predictably had bulky vestibular vestibular soft tissue. This tissue occluded with his mandibular ridge prematurely leaving him with deficient occlusal space for a fixed partial denture (Pic 2).

Pic 1. Frontal photo showing traumatic occlusion into scapular tip free flap soft tissue pedicle

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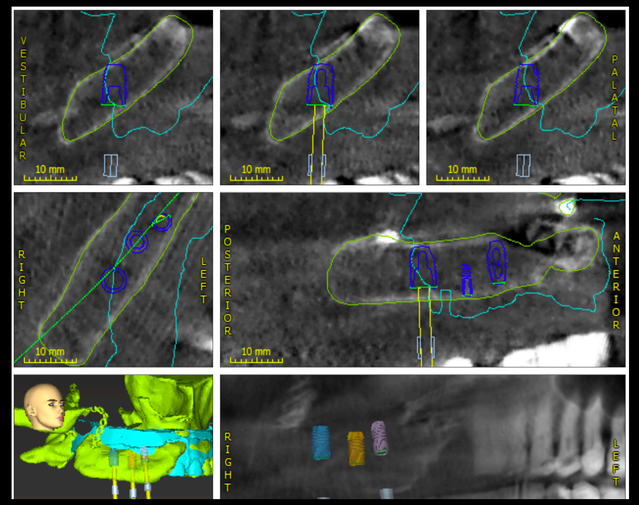
Treatment Planning

Cone beam computed topography (CBCT) was then obtained and utilized for virtual surgical planning (VSP) in preparation for implant placement to support the final prosthesis (Pic 1). Three-dimensional (3-D) printed models and a surgical guide for implant placement into areas of maximally dense bone were printed from the CBCT (Pic 2). The guide was also used to make markings for buccal bone reduction that would allow for seating of the final prosthesis

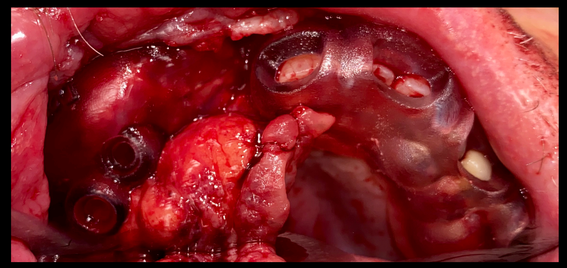


Pic 1. Virtual surgical planning of implant placement

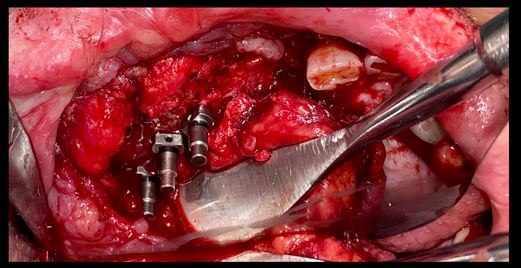
Pic 1. 3-D printed model and implant guide

Surgical Technique

Three 3.6x8mm implants were then placed in the operating room at the same time as soft tissue debulking (Pic 3-5). The was done making sure at least 10 mm of occlusal clearance was present at all aspects of the ridge (Pic 6).

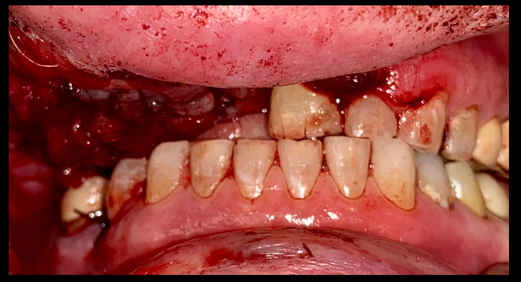


Pic 3. Implant guide in place after soft tissue elevation



Pic 4. Implants in place with angulation verification

Pic 5. Soft tissue removed during debulking



Pic 6. Patient in occlusion demonstrating adequate restorative space

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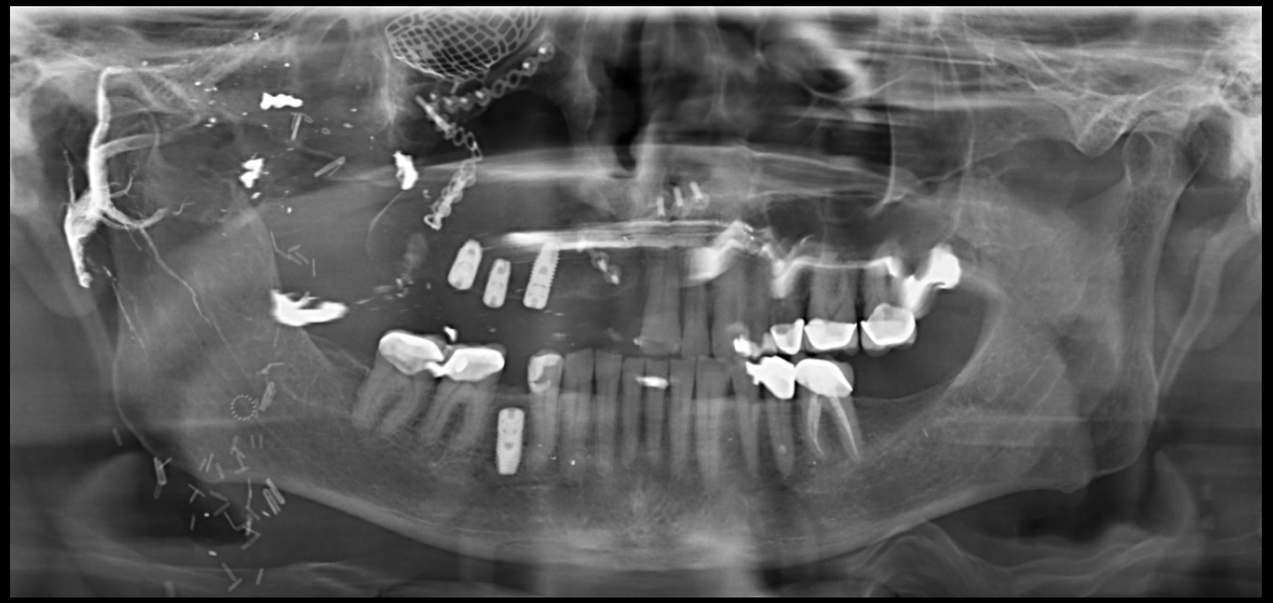
Restorative Plan

The three implants were uncovered six months later and were found to have obtained osseointegration (Pic 1-2). The patient will be restored with a fixed prosthesis



Pic 1. Post operative panoramic radiograph

Conclusion

Although the STFF has been described to reconstruct GSWs and there is now increasing literature supporting implant placement in the STFF, there has not been a case presented that combines the two methods. The consistent anatomy provides the ability to harvest cutaneous, muscular and bony components. The 3-D morphology of the distal tip closely resembles that of the native hard palate. The STFF provided adequate facial projection and a maxillary ridge . It acted nicely as reconstruction for a defect that mimicked a hemimaxillectomy for our patient. Careful planning using VSP and soft tissue recontouring created the space needed for him to be rehabilitated with a FPD and avoid requiring an obturator.

Pic 2. Healing abutments in place