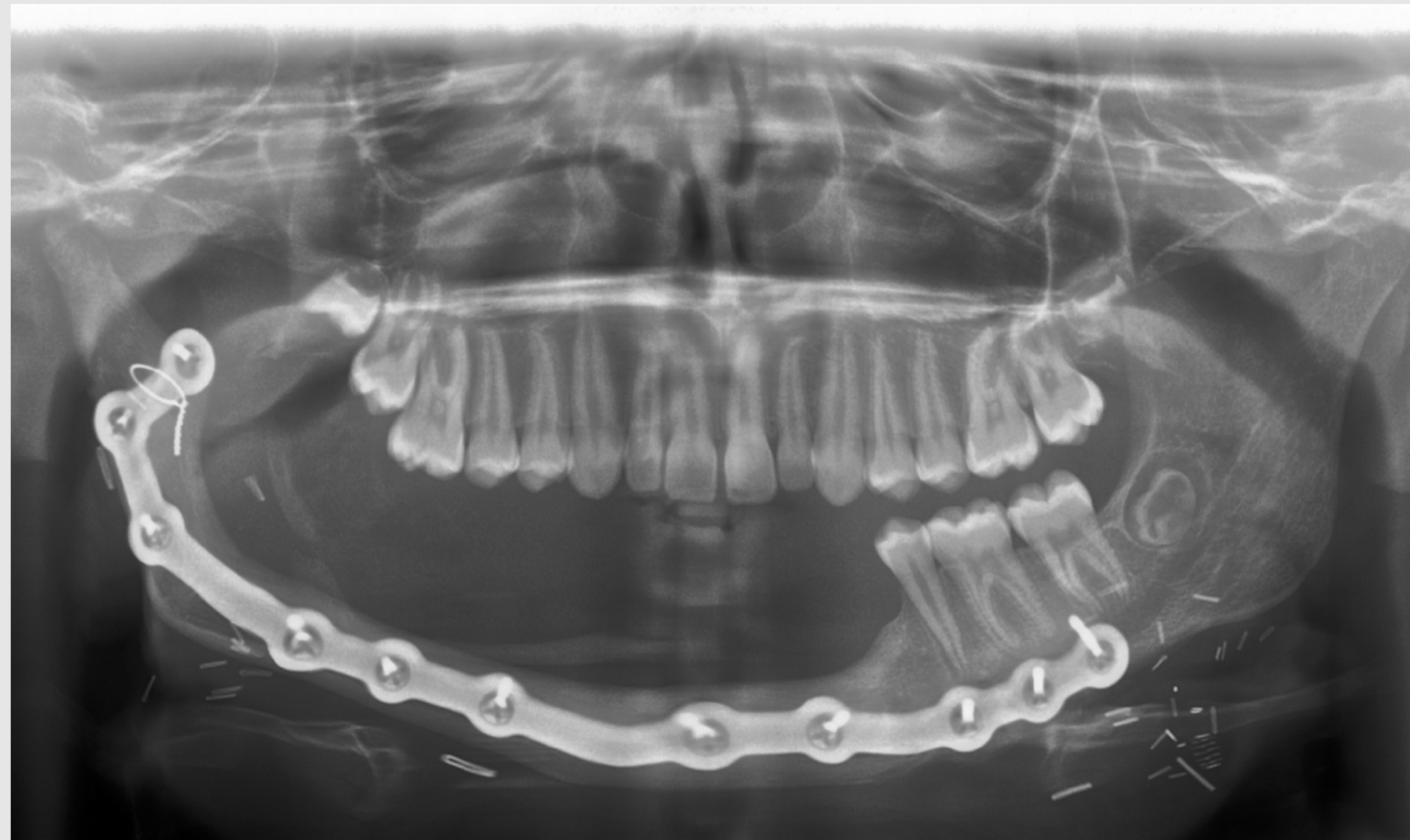


Staged Grafting Techniques to Restore a Large Mandibular Defect

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Introduction

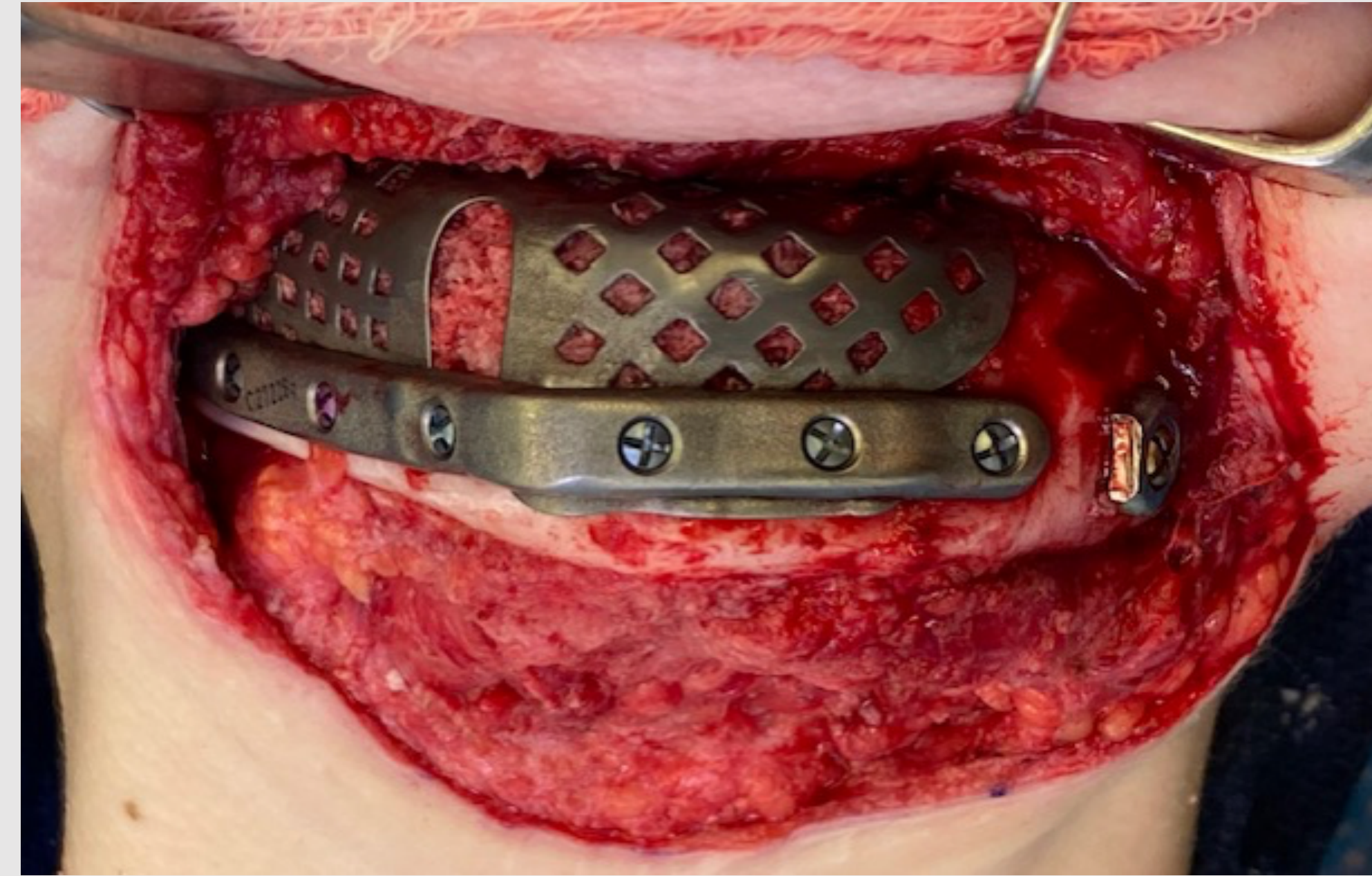
Many grafting techniques for reconstructing large mandibular defects are sufficient for regaining bony continuity however restorability from a prosthetic standpoint is often difficult to achieve. Combining multiple grafting techniques in a staged manner are used improve restorability of mandibular reconstructions. In this case report multiple surgical techniques and procedures are utilized to create a prosthetically pleasing outcome to restoring a large mandibular defect.



Panoramic Film post resection and reconstruction with a fibular free flap

Case Summary

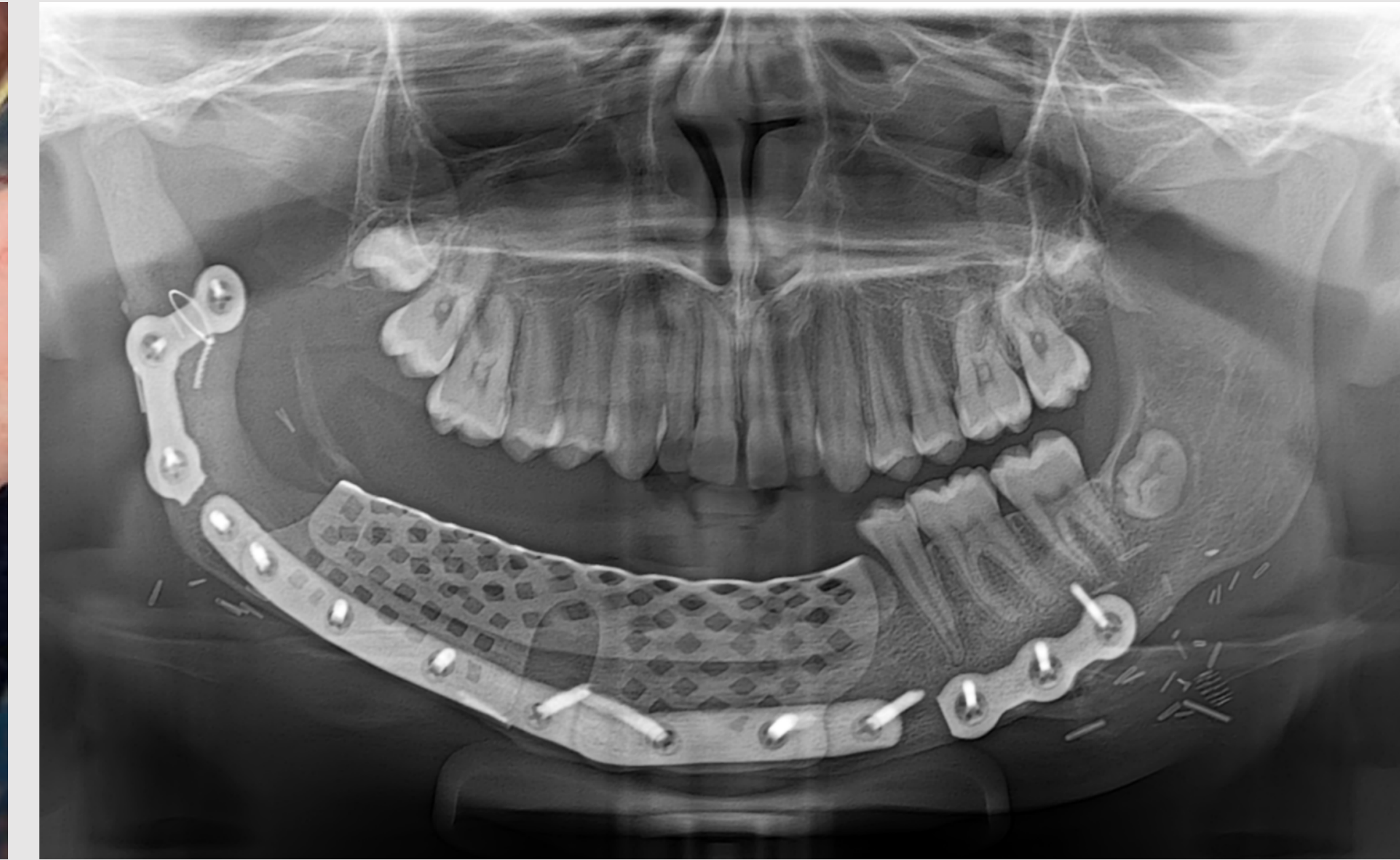
12 year old female presented in October of 2020 with a right mandibular desmoplastic fibroma requiring resection involving Hemi-mandibulectomy and reconstruction. Otolaryngology resected the tumor and reconstructed the mandibular defect with a vascularized free flap using the patient's fibula. The patient was then referred to Oral and Maxillofacial Surgery for further reconstruction. Treatment plan discussion involved the patient, surgeons and prosthodontic staff which lead to a plan involving Anterior Iliac Crest Bone Grafting (AICBG) to the mandible followed by placement of multiple implants. The AICBG was placed overlying the fibula free flap using a custom mesh created by virtual planning systems. The graft was given 5 months to heal. The patient went to the OR to have the mesh removed followed by the placement of 6 endosteal implants to the graft site. The patient was taken back to the operating room at a later date where a free gingival graft was harvested from the palate and placed overlying the grafted ridge in order to recreate attached tissue. Healing abutments were placed to the 6 implants and will begin having the final restoration fabricated by the consulted prosthodontist.



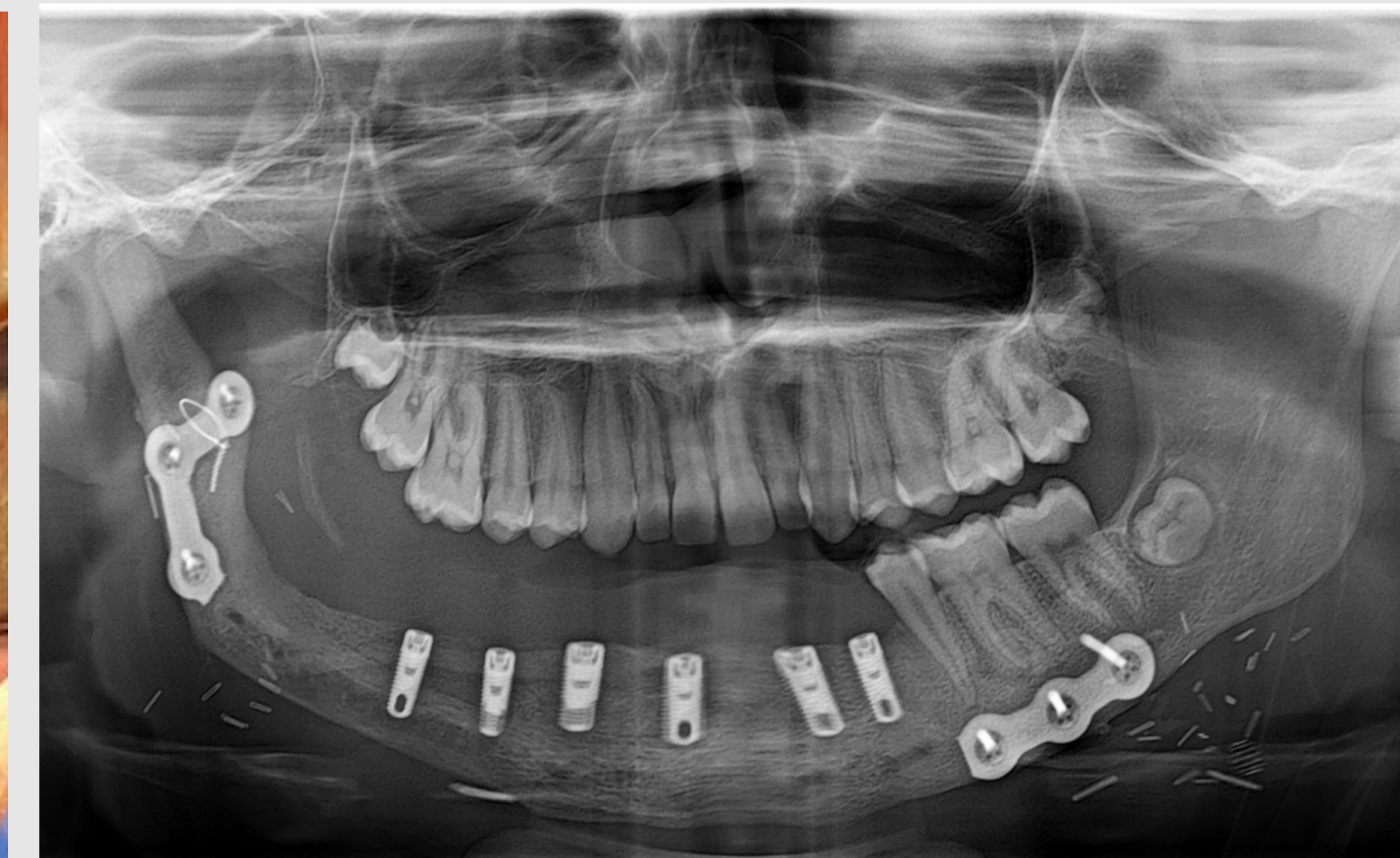
Intraoral Photo after sectioning the FFF and placement of the custom plate and crib encompassing the harvested AICBG



Intraoral photo after removal of custom crib exposing the healed AICBG 5 months post placement.



Panoramic film 5 months post op of placement of the custom plate and crib encompassing the harvested AICBG



Panoramic film immediately after placement of 6 endosteal implants into the AICBG



Intraoral photo of healing abutment placement after the implants were given adequate time to osseointegrate .

Discussion

Desmoplastic Fibroma is a benign, locally aggressive lesion that can result in significant bone destruction. The lesion has a high recurrence rate and treatment requires surgical resection. It is unclear whether radiation therapy or chemotherapy are effective. Surgical resection can be as minor as aggressive curettage to degrees of mandibulectomies. A hemi-mandibulectomy was performed due to the extensive nature of the individual's lesion. Reconstruction consisted of a fibula free flap retained by a reconstruction plate. If endosteal implant planning is not included in the free flap planning, this can create difficulties and result in unnecessary compromises in restoration. The free flap was placed at the inferior border of the mandible leaving a significant deficiency in vertical ridge height. Bone augmentation can be done to improve ridge height however soft tissue limits the amount that can be achieved. Tissue expansion was discussed however the elasticity of the young patient's tissue would allow adequate bony augmentation. Many different techniques for bone augmentation can be utilized from autografts, allografts, xenografts and combinations. Autograft was chosen to be used due to the large size of the defect. Autograft harvest sites vary widely depending on amount of bone stock required, cortical vs cancellous bone and surgeon's preference. An Anterior Iliac Crest donor site was utilized. A Custom 3D printed titanium mesh crib was created to retain the graft and create adequate ridge height and form. The crib was retained by a custom titanium reconstruction plate. Multiple approaches to the mandible are available depending on the nature of the surgery being performed, esthetic concerns and surgeon preference. An extraoral, submandibular approach was utilized to ensure adequate exposure and reduce bacteria exposure to the bone graft. The AICBG was harvested by the Oral and Maxillofacial Surgery team and the mandible was exposed in combination with OMS and ENT with the expectation of altered anatomy from the previous reconstruction. The AICBG was placed within the custom mesh which was secured to the mandible after sectioning the previous reconstruction plate. Care was taken to protect the mucosa overlying the mandible as to not have exposure to the oral cavity. The patient was followed closely, and the bone graft was given 5 months to heal before exposure. A cone beam CT was taken and multiple endosteal implants were planned. The patient went to the OR to place 6 endosteal implants. The mesh was exposed intraorally and removed. Using standard implant site preparation, the implants were placed to a torque >35Ncm. In order to properly restore and prevent bacterial invasion of the implants, attached gingiva is required. At this point only mucosal ridge coverage was present. The implants were given adequate time to osseointegrate and the patient was taken to the operating room for free palatal tissue graft to the right mandibular alveolar ridge overlying the implant sites. Once grafted soft tissue healed implant healing abutments were placed leaving attached gingiva to the buccal and lingual aspects of the abutments. The patient is currently following up with the prosthodontist for final restoration.