INTRODUCTION:

The microvascular fibula free flap, popularized by Hidalgo, has been one of the greatest milestones in reconstruction of the mandible and maxilla after tumor surgery. Although fibula free flap reconstruction allows for immediate functional and aesthetic reconstruction, dental rehabilitation usually requires 6-12 months before it is complete. This can be a source of inconvenience, and can affect the patients psychologically as they go without a denture during this time frame.

We present 2 cases in which tumor resection and complete jaw reconstruction with immediate dental rehabilitation were performed all in one surgery. To our knowledge, we are the second institution in the United States to report on this technique. The first group to report on this technique was a team out of New York University led by David Hinch.

Case 1:

A 75 year old African American male was referred for a biopsy proven Ameloblastoma of the right mandible. History was significant for pain and discomfort involving the right jaw area with transient paralysis of the right lower lip. On physical exam there was no gross facial asymmetry or any palpable lymphadenopathy (Fig 1). Intrarally, the patient had bony expansion of the right posterior mandible extending from canine region posteriorly to the retromolar fossa. The mucosa overlying this area was intact with no ulcerations (figure 2). Computed Tomography (CT) Imaging showed a 4x 5 cm multilocular expansile destructive bony lesion involving the right posterior mandible, with perforation of the buccal cortex (fig 3). CT angiogram of the lower extremities showed good 3 vessel runoff to the ankles bilaterally.

Virtual planning for the surgery was performed using Materialise Pro Plan software (Plymouth, MI). (figure 4). Stone models of the patient’s upper and lower dentition were scanned and superimposed on the CT data in order to produce more accurate medical models, and for the fabrication of an occlusal splint. During the virtual planning, the positioning of the fibula segments and implants in space were driven by the anticipated final occlusion (fig 5). Following production of the medical models as well as the opposing dentition. (figure 6)

During surgery, resection of the tumor proceeded in the usual fashion. A cutting guide for the mandibular osteotomies was used according to the virtual plan, and the tumor was resected (figure 7). A cutting guide for the fibula with a built in dental implant guide allowed for placement of the dental implants at leg prior to transfer to the head. (Figure 8). This guide was also used to make osteotomies, shaping the fibular segments exactly as planned for the mandibular reconstruction. The prosthesis was secured to the implants at the leg, and then the whole complex was transferred up to the head (figure 9). The fibula-prosthesis complex was then adjusted to fit the adjacent mandible and opposing occlusion, and secured with a prebent reconstruction bar (figure 10). Primary closure over the fibula bone was obtained introrally.

The rest of the hospital course was uneventful. The patient was placed on pureed non-chew diet for 3 months after surgery to allow for bony union without complications. Before and after photos at 1 month are shown in (figure 11). A CT scan obtained at 4 month post operatively showed good bony union between the fibular segments and the native mandible (Figure 12). The patient is currently 10 months postoperatively.

Conclusion:

In conclusion, according to early post-operative data, the “fibula jaw in a day” procedure seems to be a viable option in the immediate reconstruction of the mandible and associated dentition after tumor ablation. Collaboration between the reconstructive surgeon and maxillofacial prosthodontist is crucial. Long term follow up data is needed to validate these findings.

References: