Retrieval of a Full Facial Allograft Based on the Maxillary Artery: Indications and Technique

Bahar Bassiri Gharb, MD, PhD; Gaby Doumit, MD, MSc; Antonio Rampazzo, MD, PhD; Francis Papay, MD

Abstract

Background: Maxillary artery has been traditionally considered the main blood supply of the facial skeleton(1). However, the deep and concealed location of the artery in the infratemporal and pterygopalatine fossae enclosed by the cranial base, mandible and maxilla makes the harvest of facial allografts based on this artery challenging and preference has been given to the facial artery to vascularize the facial allografts(2,3). The purpose of this study was to investigate the vascular territories of the maxillary artery and vein and modify the available craniofacial techniques in order to allow reliable harvest of a facial osteomyocutaneous allograft based on the maxillary vessels.

Methods: Eighteen fresh cadaver heads were used in this study. Ten full facial allografts containing mandible, maxilla, zygomatic and nasal bones were harvested through a traditional Le Fort III approach. In 6 cadaver heads, maxillary artery and internal jugular vein were injected with red and blue latex respectively. In two cadaver heads colored lead oxide gel was injected in the maxillary artery (1) or internal jugular vein (1). A modified Le Fort III approach was designed: the orbital floor osteotomy was performed at the posterior-most aspect of the orbit. The zygomatic arch and mandibular condyle were osteotomized and removed. The pterygomaxillary disjunction was performed under direct vision after excising the temporalis and lateral pterygoid muscles. Eight full facial allografts were harvested through the modified

approach. Maxillary artery and vein were dissected to assess for damage during the procurement. CT scans were performed of the 2 specimen injected with lead oxide.

Results: When the traditional Le Fort III approach was used to harvest the facial allograft, the terminal branches of the maxillary artery (the infraorbital and the sphenopalatine arteries) and the pterygoid plexus were injured constantly. The modified approach preserved these branches and allowed the dissection of the maxillary artery and vein under direct vision.

Conclusions: Maxillary artery should be considered as the main blood supply of the facial allograft when a major portion of the facial bones is to be harvested along with limited amount of facial soft tissues. The described modified Le Fort III approach allowed the safe dissection of the maxillary artery and vein, preserving the main blood supply to the facial skeleton.

References

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