Discussion: Watershed Areas in Face Transplantation

Natalie M. Plana, B.A.
J. Rodrigo Diaz-Siso, M.D.
Eduardo D. Rodriguez, M.D., D.D.S.

Growing experience in facial transplantation has allowed for successful reconstruction of increasingly complex facial defects, with nearly half of the allografts transplanted to date (18 of 37) including a maxillary component.[1] Dr. Gharb et al. summarize international experience in maxilla-containing facial transplantation, correlating vessel choice to palatal fistula/necrosis and propose a modified dissection technique that aims to prevent these complications. Several facial transplantation teams have performed detailed cadaver exercises[2–5] as preparation for the clinical implementation of novel surgical techniques[6–8]; this has been a hallmark of the cautious approach prevalent in the facial transplantation field. We commend this team for such an extensive technical and anatomical exploration of facial transplantation allograft procurement, which may be of benefit to facial transplantation centers and patients around the world.

Without a doubt, ensuring adequate perfusion to every corner of the facial allograft is critical to success in facial transplantation. No two facial defects are equal; thus, careful study of a candidate's pretransplant vascular anatomy is necessary for the precise design of the donor allograft and accurate selection of its feeding vessels. Specifically, adequate perfusion to the soft palate by the candidate's internal maxillary arterial system can be confirmed with angiography; intraoperative verification of adequate perfusion of the donor hard palate by the facial vessels must also be performed before allograft inset. In numerous recipients, the development of a collateral vascular network between these vessels has been observed within the first posttransplant year.[9,10] However, this network grows across a healing wound on the junction of the hard and soft palate, a known watershed area and common site of soft-tissue incision and complex Le Fort III osteotomy in maxilla-containing facial transplantation. In the traditional Le Fort III advancement experience, palatal fistulas are an exceedingly rare complication,[11] precisely because there are no deliberate incisions made on the palatal soft tissues. Furthermore, in a patient receiving an immunosuppression regimen that includes high-dose steroids, wound healing complications are not unexpected.

During research allograft procurement and clinical application of a maxilla-containing facial transplantation performed by the senior author (E.D.R.), adequate perfusion of mucosal tissues was confirmed after complex Le Fort III osteotomy on the donor allograft,[12] and on removal of remaining recipient midface bone to prepare the defect for allograft inset.[6] In the clinical facial transplantation, emphasis was made to procure sufficient donor tissue to allow for a tension-free but watertight closure of the palatal junction. Close postoperative follow-up was particularly beneficial; weekly intraoperative inspections ensured timely débridement of any compromised regions and repair of any visible wound dehiscence. Despite these cautious measures, the patient presented with a small (2 × 2 mm) palatal fistula at the hard and soft palate junction in the early postoperative period. At that time, fistula development was attributed to poor healing at the incision site where donor and recipient palatal structures were approximated. Six months after transplantation, a Le Fort III advancement osteotomy was performed to correct severe class III malocclusion[10]; the soft tissues of the palate were not reincised. At 9 months after transplantation, the fistula was repaired with a nasal mucosal flap and overlying palatal mucosal rotational flap. At 4 years, the patient's palatal perfusion remains adequate and there is no open communication between the oral and nasal cavities.

Facial transplantation teams should continuously refine surgical technique to improve results and prevent common complications reported to date. Cadaveric anatomical exercises are the first

From the Hansjörg Wyss Department of Plastic Surgery, New York University Langone Medical Center.
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step in these improvements, and in the case of the donor operation, the success of technical innovation can be confirmed during research allograft procurement exercises in brain-dead organ donors.[13] Although vessel choice and dissection approach can be crucial to full allograft viability, complications in these unique patients are often multifactorial. Solutions have been elusive, but we should continue to focus our efforts on the difficult problems. For example, minimization of immunosuppression and its detrimental effect on wound healing may potentially improve surgical outcomes. Provided that our surgical innovations hold true to reconstructive principles, our attempts to reduce the rate of surgical complications will allow facial transplantation to continue to effectively treat the most severe forms of facial disfigurement.

Eduardo D. Rodriguez, M.D., D.D.S.
Hansjorg Wyss Department of Plastic Surgery
305 East 33rd Street
New York, N.Y. 10016
eduardo.rodriguez@nyumc.org

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