Discussion: First Lower Two-Thirds Osteomyocutaneous Facial Allograft Perfused by a Unilateral Facial Artery: Outcomes and Vascularization at 1 Year after Transplantation

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Editor's note: This invited Discussion is commentary on the May 2017 Plastic and Reconstructive Surgery *article "First Lower Two-Thirds Osteomyocutaneous Facial Allograft Perfused by a Unilateral Facial Artery: Outcomes and Vascularization at 1 Year after Transplantation" by Fischer et al. (*Plast Reconstr Surg. *139: 1175e, 2017).*

For more than a decade, facial transplantation has matured into a feasible reconstructive option for severe facial disfigurement. With almost 40 transplants performed to date,[1] facial transplantation centers continue to push the boundaries of success. In the May 2017 issue of *Plastic and Reconstructive Surgery*, Fischer et al.[2] reported on their seventh successful face transplant, which involved an osteomyocutaneous facial allograft perfused by a single facial artery. In doing so, this experienced group challenged the creed that bilateral arterial supply is required to ensure the viability of a large facial allograft. They should be commended for their success.

Facial transplantation remains an experimental procedure, and extensive preparation and planning are paramount to reduce the risk of unforeseen complications. The face transplant team at Brigham and Women's Hospital has contributed substantially to surgical technique,[3] vessel selection,[4] and preoperative vascular imaging studies.[5] In this case, computed tomographic angiography was performed preoperatively, and a detailed plan was followed until the unexpected identification of a proximally clipped left facial artery during allograft inset. Vascular assessments by computed tomographic angiography are highly comprehensive, and their use in face transplantation is well documented.[6] However, recipient vascular and soft-tissue anatomy can be significantly distorted as a result of their initial injury or numerous reconstructive attempts, posing a greater challenge for transplant planning. In these scenarios, the real-time flow analysis provided by conventional angiography has proven beneficial.[6] In the senior author's (E.D.R.) experience, conventional angiography has been instrumental in identifying compromise of the left-sided arterial supply to the tongue of a face transplant recipient, resulting in adjustment of the surgical approach.

For this patient, the surgical team noted satisfactory perfusion across the midline intraoperatively, a finding consistent with previous face transplant reports.[4] Subsequently, the mapping of collateral vasculature from the facial artery to contralateral tissues through the nasal and submental networks was confirmed postoperatively, another consistent finding among face transplant recipients.[7] Although this patient experienced favorable outcomes at 1 year after transplantation, one-sided perfusion may not be optimal. The high-risk nature of facial transplantation is not limited to surgical factors, and face transplant teams must maximize patient safety and minimize devastating complications. The first case of partial facial allograft loss due to unilateral arterial compromise associated with chronic rejection was recently presented.[8] This complication highlights the importance of redundant systems, such as bilateral arterial supply and dual venous outflow, as the allograft's second supplying artery was not affected, which prevented total allograft loss.

As reports of long-term outcomes of facial transplantation become available, we continue to learn from the triumphs and challenges faced by face transplant teams around the world. As surgical innovators, our novel contributions must be

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balanced with our commitment to patient safety and sustained improvements to their function and quality of life. We commend the authors' response to an unforeseen finding; faced with a game-time decision, they trusted their clinical appreciation of adequate allograft perfusion, and identified and addressed the need for dual vein outflow. While the patient's positive 1-year outcomes confirm allograft viability, we would advocate for a cautious approach to facial transplantation with increasingly complex allograft design and encourage comprehensive preoperative surgical planning when possible. Furthermore, it may be early to consider deliberately selecting unilateral arterial perfusion when performing a complex procedure for which many unknowns remain.

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