

Cross-Sex Face Transplantation: Expanding the Facial Allograft Donor Pool

Presenter: Michael Sosin, MD

Co-Authors: Isabel S Robinson, MD; Gustave K Diep, MD; Allyson R Alfonso, BS, BA
Samantha G. Maliha, MD; J. Rodrigo Diaz-Siso, MD; Kimberly S. Khouri, MD
Ian T Nolan, BM; Daniel J. Ceradini, MD; Alexes Hazen, MD; Jamie P Levine,
MD; David A. Staffenberg, MD, DSc (Honoris causa); Eduardo D Rodriguez,
MD, DDS

Affiliation: NYU Langone Health

BACKGROUND:

A major challenge in face transplantation (FT) remains the shortage of donor facial allografts. The purpose of this study was to investigate the feasibility of cross-sex FT (CSFT) as a means to expand the donor pool by: (1) comparing craniomaxillofacial metrics following CSFT versus same-sex FT (SSFT); (2) evaluating the public and medical professionals' perception of CSFT.

METHODS:

First, a cadaveric study was conducted with 7 en bloc total face and scalp transplants. Specimens (n=14) were randomly selected and paired, resulting in both CSFT and SSFT. Computerized surgical planning was used for optimal osteotomy selection. Cephalometric data were obtained pre- and post-operatively via cadaver CT scans, and soft tissue measurements were performed by the operating surgeons. Fidelity of the virtual surgical plans compared to the actual transplantation was assessed by overlay technology. Precision of bony and soft tissues elements following allograft inset was evaluated via anthropometric and cephalometric analyses. Second, surveys were administered to medical professionals, medical students, and the general population. Participants were asked about their willingness to donate and receive CSFT, and to rate outcomes of cadaveric CSFT and SSFT. Paired t-tests and McNemar's tests were used for statistical analysis where appropriate.

RESULTS:

Five CSFTs (4 female-to-male, 1 male-to-female) and 2 SSFTs (2 male-to-male) were performed, with no significant difference in operative time. On anthropometric and cephalometric analyses, there were no significant difference between the donors and recipients, with a few exceptions. When comparing recipients to the post-transplant outcomes, no significant difference in both soft and hard tissues parameters was seen, with the exception of bigonial (less precise in CSFT, p=0.012) and medial intercanthal distances (more precise in CFST, p=0.010) (Table 1). A total of 213 participants were

surveyed. Participants were more willing to donate for and undergo SSFT, compared to CSFT (Donate: 59.6% vs. 53.0%, $p=0.001$; Receive: 79.5% vs. 52.3%, $p<0.001$). If supported by research, willingness to receive a CSFT significantly increased to 65.6% ($p<0.001$) (Figure 1). When non-blinded, 62.9% rated the CSFT superior or equal to SSFT (scores: 3.16 for both cases, $p>0.05$). The blinded ratings were 3.79 (CSFT) and 3.13 (SSFT) ($p<0.001$), with 79% rating CSFT superior or equal to SSFT (Figure 2).

CONCLUSIONS:

Our study demonstrates similar anthropometric and cephalometric outcomes for CSFT and SSFT. Participants were more reticent to undergo CSFT, with increased willingness if supported by research. CSFT may represent a viable option for expansion of the donor pool.