

Ensuring Racial and Ethnic Inclusivity in Facial Vascularized Composite Allotransplantation

Martin Kauke-Navarro, MD*
 Leonard Knoedler*†
 Samuel Knoedler‡§
 Fortunay Diatta, MD*
 Lioba Huelsboemer, MD*
 Viola A. Stoenner, MD*
 Vikram G. Mookerjee, MD*
 Adriana C. Panayi, MD§¶
 Paris D. Butler, MD, MPH*
 Bohdan Pomahac, MD*

Background: Facial vascularized composite allotransplantation (fVCA) represents a valuable surgical option for reconstruction of the most devastating facial defects. There is a mounting body of evidence suggesting that healthcare disparities exist for a variety of other surgical and nonsurgical procedures. We aimed to investigate the potential existence of racial and ethnic disparities in the field of fVCA.

Methods: A comprehensive literature review was conducted by the authors of this review on PubMed/MEDLINE, and Embase databases from database inception to December 1, 2022 for studies published in the English and French languages. The search terms were (1) “face” OR “facial” AND (2) “transplant” OR “VCA” OR “vascularized composite allotransplantation” OR “vascularized composite allograft” OR “graft.”

Results: Upon assessment of the racial and ethnic demographics of the 47 global cases of fVCA between 2005 and 2020, 36 were White, 10 were Asian, and one was Black. Sixteen of the 17 fVCA procedures performed in the United States involved White patients. The other patient self-identified as Black, equaling 6% of all US fVCA recipients.

Conclusion: Our analysis showed that the ethnic and racial distribution of fVCA has not proportionally reflected the racial and ethnic demographics of the general US population, underscoring the risk of such healthcare imbalances. Although large-scale studies are needed before drawing definitive conclusions, leaders in the field should take preventive steps to avoid potential disparities. Further investigations into the factors that facilitate or prohibit access to fVCA referral and surgery will be necessary moving forward. (*Plast Reconstr Surg Glob Open* 2023; 11:e5178; doi: 10.1097/GOX.0000000000005178; Published online 11 August 2023.)

INTRODUCTION

Facial vascularized composite allotransplantation (fVCA) has been established as a superior option for

reconstruction of the most devastating (mid)-facial defects. Since the first (partial) face transplantation in 2005, the field of fVCA has evolved, and a total of 23 US institutions have established fVCA programs.^{1,2} Nearly 50 face transplants have been performed globally. Across all medical centers and countries, the majority of facial transplants have been performed on individuals that represented the majority racial and/or ethnic demographic of their respective country. For example, in the United States, 17 transplant procedures have been performed and published in the scientific literature, and sixteen of them were non-Hispanic White patients, which is the country's majority racial and ethnic demographic. The first non-White patient to receive fVCA in the United States was a Black man in Boston in 2019.³ The singularity of this case raises the question and potential concern of the existence of racial and ethnic disparities in fVCA.

*From the *Division of Plastic Surgery, Department of Surgery, Yale New Haven Hospital, Yale School of Medicine, New Haven, Conn.; †Division of Plastic and Reconstructive Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, Mass.; ‡Department of Plastic Surgery and Hand Surgery, Technical University of Munich, Munich, Germany; §Department of Surgery, Division of Plastic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Mass.; and ¶Department of Hand, Plastic and Reconstructive Surgery, BG Trauma Center Ludwigshafen, Burn Center, Microsurgery, University of Heidelberg, Ludwigshafen, Germany.*

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Dr. Kauke-Navarro and Knoedler contributed equally to this work.

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There is a mounting body of evidence suggesting that healthcare disparities exist for a variety of surgical and nonsurgical care and across a wide spectrum of determinants, including sex, race, ethnicity, and sexual orientation.⁴⁻⁷ According to the Institute of Medicine's Unequal Treatment report, racial and ethnic disparities are rooted in numerous causes, including systemic, patient-centered, and provider-specific biases.⁸ The Healthy People Foundation recently reported that such disparities contribute to more than 10,000 annual patient deaths, and that certain racial healthcare gaps (eg, postoperative outcomes in oncologic surgery) have continued to widen in recent decades.^{9,10} In general, Black and Hispanic patients represent the communities most affected by racial and ethnic healthcare disparities in the United States.^{11,12}

Herein, we aim to investigate the potential existence of racial and ethnic disparities in the field of fVCA. It is important to provide guidance on how to increase diversity among fVCA patients and how to ensure that this revolutionary surgical procedure is made equally available to all patients, irrespective of race, ethnicity, gender, or social status.

METHODS

A comprehensive literature review was conducted by the authors of this review on PubMed/MEDLINE and Embase databases from database inception to December 1, 2022, for studies published in the English and French languages. The search terms were (1) "face" OR "facial" AND (2) "transplant" OR "VCA" OR "vascularized composite allotransplantation" OR "vascularized composite allograft" OR "graft." The search format was tailored to the appropriate syntax of each database. In addition, the reference list of each retrieved article and systematic review was manually searched for relevant literature.

RESULTS

A chronological list of the patients' demographics and clinical case details of all literature reported face transplants performed globally is provided in Supplemental Digital Content 1 (See table, Supplemental Digital Content 1, which displays overview of patient demographics and clinical case details for facial transplantations performed worldwide. Adapted and modified from Diep et al.² Identified cases of face transplantations. MC, maxillo-cranial complex; N/A, not available; OMC, oromaxillo-cranial complex; QoL, quality of Life, <http://links.lww.com/PRSGO/C708>).

Upon assessment of the racial and ethnic demographics of the 47 global cases of fVCA between 2005 and 2020, 36 were White, 10 were Asian, and one was Black. No Latino or patients from other racial and ethnic backgrounds were identified. Sixteen of the 17 fVCA procedures performed in the United States involved White patients. The other patient self-identified as Black. A compilation of pre- and postoperative fVCA patients from our group is shown in Figures 1 and 2.

Takeaways

Question: We aimed to investigate the potential existence of racial and ethnic disparities in the field of fVCA.

Findings: Among the 47 global cases of fVCA between 2005 and 2020, 36 were White, 10 were Asian, and one was Black. Sixteen of the 17 fVCA procedures performed in the United States involved White patients. The other patient self-identified as Black, equaling 6% of all US fVCA recipients.

Meaning: Our analysis showed that the ethnic and racial distribution of fVCA has not proportionally reflected the demographics of the general US population. Although further large-scale studies are needed, leaders in the field should take preventive steps to avoid potential disparities.

DISCUSSION

Racial and Ethnic Disparities in fVCA and SOT Surgery

When interpreting Supplemental Digital Content 1, <http://links.lww.com/PRSGO/C708>, it is essential to differentiate between race-specific considerations and disparities in fVCA surgery. Overall, Black people represent 12%–13% of the US population but only 6% of the fVCA recipients.¹⁴ Notably, the Black patient showed mid-term outcomes (ie, functional recovery, infections, and the number of rejection episodes) comparable to fVCA cases in White US patients. Furthermore, race-specific considerations help individualize patient treatment and advance healthcare, whereas disparities represent a persisting socio-structural burden.¹⁵ fVCA is a highly complex surgical procedure that necessitates precise and comprehensive candidate selection. For example, the Cleveland Clinic FACE Score includes cardiovascular, hematological, hepatic, and renal diseases to establish a comprehensive scoring system and critically evaluate the patient's eligibility for fVCA.¹⁶ Accordingly, fVCA candidates with multiple comorbidities and known perioperative risk factors are less likely to be selected for surgery in anticipation of worse outcomes and more frequent adverse events.^{17,18} Of note, Black Americans have a higher risk of developing type 2 diabetes, kidney diseases, cardiovascular strokes, and atherosclerosis.¹⁹ Such race-related risk predisposition may fundamentally limit the patient's operative eligibility.

In addition, accurate matching of donor and recipient skin color is essential for optimal aesthetic results. Due to a broader color range in patients with dark skin tones, the donor pool for Black fVCA candidates is limited in that skin matching is colorimetrically more difficult. In the only Black fVCA case, the attending surgeons identified a compatible donor based on a skin complexion scale with 18 finely graded skin shades. The persisting challenge of achieving patient satisfaction with the proposed donor skin tone is reflected in the fact that the Black patient had initially declined multiple potential donors due to non-matching skin tones. Typically, in the United States, skin tone mismatch is less of an obstacle to transplantation in White fVCA patients.^{3,20} Furthermore, the clinical monitoring to identify cutaneous changes, including pink or



Fig. 1. Compilation of pre- and postoperative fVCA patients from our group.¹³ Permission for use was granted by Massachusetts Medical Society.



Fig. 2. Postoperative outcome in the first Black fVCA patient. These illustrate (A) the preoperative status and (B) the postoperative result.³ Permission for use was granted by Massachusetts Medical Society.

erythematous macules, erythema, and clinical lesions of the face, can be more challenging in Black patients due to leveling color differences, and more frankly, a lack of experience.^{21,22} In this context, Mofikoya et al have highlighted the limited validity of clinical inspection in dark-skinned patients undergoing free flap surgery, with the

risk of missing subtle skin changes during the perioperative surveillance period.²³

Furthermore, it is important to determine the varying need for fVCA across different races. More specifically, Diep et al revealed that facial trauma was the most prevalent indication of fVCA (45% of cases) distributed

according to the aforementioned racial pattern.² In the general population, however, the facial trauma caseload is more balanced, including approximately 15% of White, Asian, and Black patients, respectively.²⁴ This pattern differs from the general race distribution with White US Americans accounting for more than 50%.²⁵ Thus, White patients might have a relatively lower need for fVCA. However, the concrete race-specific need for fVCA remains to be determined in future prospective studies.

Secondary to the relatively small number of operations performed nationally and internationally, along with mindfully acknowledging the distinction between disparity and race-specific considerations, we cannot definitively say that racial and ethnic disparities exist in fVCA surgery. However, our data suggest that in the United States, there is a trend toward the procedure occurring in a fairly homogenous racial demographic. There is a precedent for this in other forms of transplantation surgery.

In solid organ transplantation (SOT), there have been numerous studies revealing an incongruence between Black patients on various SOT transplant waiting lists compared to the number of Black patients who receive deceased and living donor transplants.^{26–28} For example, Black people comprise 12%–13% of the US population and 34% of patients on the kidney waiting list; however, they only represent 14% of deceased and 12% of living donor kidney transplant recipients, respectively.²⁶ Barriers to SOT donation in the Black community are widespread. Some of these include rates of prohibitive medical comorbid conditions, general distrust of medical institutions due to historical wrongdoing, limited awareness of the various types of donor programs, and fear of racially driven donation coercion or unintended use of their organs.²⁹ It is foreseeable that the same challenges that inhibit equitable SOT could also translate to limitations of fVCA becoming more broadly performed. However, it is crucial to preserve the integrity of both specialties to identify specialty-specific challenges (eg, skin matching in fVCA patients versus organ-specific considerations in SOT procedures) and provide targeted solution strategies. Therefore, VCA surgeons should critically reflect SOT-deduced strategies to address racial and ethnic disparities in VCA.

Potential Preventive Strategies to Ensure Equity and Guard against Racial Disparities in fVCA Surgery

Basic recommendations known to be effective in mitigating healthcare disparities include strengthening patient-provider relationships and increasing the awareness of racial and ethnic disparities in healthcare and among healthcare professions and the public at large.³⁰ Our discipline should first openly acknowledge the root of the distrust and then implement strategies to rebuild confidence in the healthcare system within minoritized communities. If successful, and then taken to scale, a conceivable result would be a broadening of the ethnic and racial minority SOT and fVCA donor pools and subsequent mitigation of inequities in the totality of transplantation surgery.

Targeted education campaigns on fVCA should emphasize the need for an increased number of Black,

Latino, and Indigenous fVCA donors as well as the benefits it could bring to their respective communities. Additionally, in trauma and rehabilitation centers, severely injured racial and ethnic minority patients should be informed about the availability of facial transplantation. A referral to an fVCA center should be made for all patients, agnostic of their race and ethnicity, who have extreme midface deformities, to allow for proper evaluation and consideration of fVCA appropriateness. Financially, more comprehensive insurance coverage plans and funding strategies for fVCA may also aid in promoting equal access to surgery to those without significant financial means.

In regard to the more challenging visual identification of rejection episodes in Black fVCA patients, we have proposed the implementation of mucosal inspection and standardized mucosal biopsies in addition to routine skin biopsies.^{31,32} Previous studies suggested that fVCA allograft rejection commonly shows mucosal involvement. Therefore, adding close clinical and biopsy-based surveillance of mucosal tissues in Black patients may allow for comparably accurate screening and routine monitoring as in White patients.^{3,33}

CONCLUSIONS

Our investigation into the ethnic and racial distribution of fVCA and identification that the US recipients of the procedure have not proportionally reflected the racial and ethnic demographics of the general population underscores the risk of such healthcare imbalances. Although the number of fVCA cases performed in the United States is still too small to draw definitive conclusions, leaders in the field should take preventive steps to avoid potential disparities that have plagued the institution of medicine. This should prove beneficial as we target our ultimate goal of making this revolutionary biotechnology available to everyone in need, irrespective of race and ethnicity. Further investigations into the factors that either dissuade or prohibit access to fVCA referral and, ultimately, surgery among racial and ethnic minorities will be necessary moving forward.

Bohdan Pomahac, MD

Frank F. Kanthak Professor of Surgery
Department of Surgery,
Division of Plastic and Reconstructive Surgery
Yale New Haven Hospital, Yale School of Medicine
New Haven, CT
E-mail: bohdan.pomahac@yale.edu

DISCLOSURES

Dr. Butler is immediate past chair of the American Society of Plastic Surgeons's (ASPS) Diversity and Inclusion (D&I) Committee. All the authors have no financial interest to declare in relation to the content of this article.

PATIENT CONSENT STATEMENT

Patients provided written consent for the use of their images.

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