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Post Burn Injury Face Transplantation

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ABSTRACT
Facial transplantation has emerged in recent years as a promising treatment option for patients with severe facial burns especially to those who are suffering crushing injuries and result in various physical and psychosocial effects. Structures affected, for example, the nose and teeth might get twisted because of irregular outside strengths brought about by contractures. Genuine inconveniences, for example, impediment amblyopia and microstomia must be expected and desperately tended to deflect lasting results, though other reconstructive techniques can be postponed until scar development happens. Reconstruct complex facial injuries is still a challenge regardless of the development of microsurgical techniques. The reconstructive options for conditions such as facial burns are very limited. But it's very important since it might be a surgical intercession with the possibility to lessen the psychiatric suffering connected with individuals suffering burns injuries. This study comes to evaluate and discuss the success and safety of face reconstruction transplantation after burn accidents. To do this we have conducted systemic review search for similar previous studies mainly in Medline (PubMed), the studies were included which are concerning Facial transplantation after burn injuries.

Keywords: *Allograft, Burn, Face, Microsurgery, Reconstruction, Transplant*

I. INTRODUCTION

The human face gives us a glimpse of one's characters and feelings. Extremely harmed patients with crushing facial injuries, distortion in appearance and function; endure a gigantic everlasting physical disability, as well as mental and social sequelae. [1] The face is one of the most critical parts for the human life, it assumes a notable part in essential physical activities and passionate expressions; such as swallowing, breathing, seeing, hearing, smelling, smiling, etc. [3] Although conventional procedures in plastic and reconstructive surgery might incompletely cure those staggering injuries [2], More than half of the burn injuries to the head and neck region can be brought on by various offending agents such as electrical current, flame or corrosives. The reproduction of a practical facial unit after such incapacitating injuries still harbors unpredictable challenges.

Surgery as a tool for managing complications of facial burns can be a great challenge to plastic surgeons. As the reconstructive surgeon, should consider multiple levels of complexity in when forming a surgical strategy in regard to reconstruction; as one might consider using "The Reconstructive Elevator" rather than using "The Reconstructive Ladder". Those techniques, growing recently to include extra strategies to achieve good outcomes from the facial reconstruction transplant, which in combination can greatly expand the possibility of options for treatment of the incapacitated face [4], the challenge in reconstruction is less concerned with the technical aspects of the surgery and more with the decision-making process to satisfy both the patient needs and surgical advances available at present time.
Facial transplantation is a very complex operation in the reconstructive procedures field that is intended to transform severely deformed features to near-normal appearance and function of the face affected by burn injuries with the use of different techniques.

The first facial transplantation reconstructive surgery was performed in 2005 [9], that consisted of mucosal repair of oral and nasal vestibules, revascularization of right and left facial arteries and veins, bilateral anastomoses of infraorbital and mental sensitive nerves, regaining facial expressions by providing facial expression muscles with motor supply via attachment to the mandibular branch of the left facial nerve, and skin closure. Fortunately, no surgical complication occurred.

Recently, more developments have been achieved in the field of facial transplantation using composite tissue allografts. As a very recent event in the field of reconstructive plastic surgery, the autologous bipedicled, scapular and parascapular flaps; these operations are confronting extensive scrutiny in regards to their defense from a therapeutic, moral and
societal point of view. Moreover, while without a doubt requiring colossally innovative and talented surgical procedure, facial allograft transplantation (FAT) operations show the entire multidisciplinary group with novel patient management challenges, and development of best practice in this area is ongoing. [21]

Especially in extremely burned patients, with facial burn injuries especially at the perioral and periorbital areas, and when neighboring skin is not suitable as a donor site and where free flaps tend to prompt an unacceptable corrective appearance and absence of outward appearance, the facial transplantation using composite tissue allografts based not on so much hypothetical but rather on more genuine remedial surgical technique, ready to help numerous seriously distorted patients where different methodologies have failed. [8]

Based on previous studies, composite tissue allografts have been performed in many countries in regards to human facial transplantation, the first four facial composite tissue allotransplantations were performed in four different centers in three different countries. The first one was performed in France 2005. The second one was performed in China in 2006, the third facial transplant was performed at 2007 in the United States in Cleveland [13], the fourth one in 2008 in Boston in.

II. Facial Transplantation Techniques

The ultimate goal of facial transplantation is to restore both the feel and functional capacity of the human face has provoked the advancement and utilization of various surgical and alloplastic components, for example, skin graft, nearby flaps, free tissue transfer and the use prostheses. Facial composite tissue allotransplantations have been the most valuable procedure in this domain with more than 19 face transplant surgeries following the first face transplantation in 2005, this brave endeavor hastened the advancement in this field as it marked the possible difficulties and complications to be anticipated when embarking such a complex yet innovative surgical procedure. Composite tissue allotransplantation (CTA) is currently being performed with increasing frequency. (Table 1.)

Composite tissue allotransplantation (CTA) involves simultaneous transplantation of the skin, muscle, nerves, bones, ligament and veins. At the point when compared with the ordinary system that uses autologous tissue exchange, the CTA gives more significant favorable circumstances to the seriously damaged patient, giving complete anatomic compensation, repairing the skin affectability with palatable useful and tasteful results. [9]

The facial allotransplantation which was performed in China in 2006 was not only face skin transplant but also contained bone, besides skin and other soft tissues. A disfigurement happening because of compressions in the interface between the graft tissue and skin is another restriction of the surgical method. Thus CTA made it conceivable to lessen the immunosuppression. [13]

New grafts are regularly performed to repair the deformation; yet this can prompt inconsistency of the adjoining tissues giving a "fold appearance" of the restored face. So as to decrease

this danger and expand the style, numerous experts join the surgical strategies with maxillofacial prostheses. [15]

Table 1. Chronological History of CTA Transplants.

Author	Year of Publication	type	Long-Term Evaluation	Success
Thomas et al.	1994	Facial tissue and scalp transplants	……..	yes
Devauchelle et al.	2006	Facial transplant	4 months	yes
Guo et al.	2006	Facial transplat	2 year	yes
Dubernard et al.	2007	Facial transplant	18 months	yes
Lantieri et al.	2008	Facial transplant	12 months	yes
Siemionow et al.	2009	Facial transplant	6 months	yes
Pomahac et al.	2011	Facial transplant	……..	yes

The second facial transplant in the United States and the first one on a burn patient in America was performed in April 2009, the patient was a 59-year-old male with a complex bony and soft tissue mid-facial defect caused by high-voltage electrical burn damage and he was previously treated by a free anterolateral thigh free flap. The patient was still not able to inhale and still had enormous disabilities. The allograft incorporated the maxilla and zygomatic bones and the delicate tissues of the midface, with facial, buccal, and infraorbital nerves.

III. Preservation of Functional Units in Facial Allograft Transplantation

Disappointment regarding the procedure's outcome might be intense because many various reasons including but not limited to the vascularity or optionally because of intense or persistent rejection. Dissatisfaction of the facial allograft would necessitate the surgical removal of the transplant. Removal would be crucial to protect the patient's life, and if done it might prompt the same post-harm, pre-transplant condition of functional disability. [16] Clinical application of facial composite tissue allograft transplants opened discussion on the restoration of facial burns injuries by allotransplantation, which was the most successful technique in all face transplants. It was stated that most of face transplantation is an elective operation went for improving personal satisfaction and conceivably taking extremely deformed patients back to a close typical appearance and practical status, beneficial lives, and dynamic support in family and society. The clinical volume of face transplantations to date is little, and it is just anticipated that would rise if the consideration criteria can be securely widened. [17]

A published review which discussed the longest follow-up available on face transplantation that was up to 5 years after the transplantation was performed, and this follow up discuss some manageable complications that showed at the end very great results such as an excellent function, patient satisfaction and social reintegration. In spite of these encouraging results, the long-term

outcomes of face transplantation remain unknown, also, even though far-fetched, allograft misfortune is constantly possible. The rescue arrangement must address safe scope of the imperfection left after loss of the allograft, and it ordinarily includes autologous skin graft or fold remaking. [18] [19] They designed a full face allograft where the useful musculature of the temple, cheeks, and eyelids were saved, yet the whole face was resurfaced, and the muscles and nerves that give full functional capacity to the lips were restored.

IV. Anticipated Adverse Outcomes after Facial Transplant surgery

The limitation due to the complication of the Facial transplant especially after burns injuries is still a leading factor that many authors and researchers try to resolve to overcome the limitations of the conventional techniques, an alternative treatment has been developed to treat patients with facial burn injuries. The immunosuppressive state after transplant is one of the most stressful complications in Facial transplant reconstruction; therefore high immunogenicity of the skin tissue did not allow this type of transplantation without the use of immunosuppressive drugs.

Another complication in face transplants operations after burn injuries In case of complex transplants, which is the psychological acceptance of the graft by the patient, is very complicated and it may be considered as a deciding element for the transplantation achievement. Psychological issues are identified with the patient's, the trouble of re-insertion in the general public, non-verbal correspondence deficits, uneasiness, apprehension and hyper vigilance connected with graft disappointment. [20] Nevertheless, to comprehend the mental ramifications of facial transplants, psychosocial sequelae of the patients who have endured facial mutilation must be considered. The mutilated patients lose their original personality, leading to social isolation, unhappiness, depression, stress and an increased risk of suicide. In the second worldwide face transplant, there were no intra-operative complications, Post-operative complications included: venous anastomoses thrombosis, acute orocutaneous fistula and two acute rejection episodes, which were resolved by surgical revision of the anastomosis, profuse irrigation, and immunotherapy adjustment (bolus administration of prednisone). The patient was discharged from the hospital at 4 months post-transplant with near-total sensation and partial-motor recovery, no psychological complications, and excellent acceptance of his new facial appearance. Psychological and physical therapy has continuously been provided.

V. CONCLUSION

Different complex surgical techniques are used aiming to restore the function and appearance of a burn victim face to a near normal state. Facial transplantation is the emerging new surgical technique that is being currently investigated to achieve such desirable outcomes. The reconstruction of more than one aesthetic and functional facial unit still represents a complex challenge. The aforementioned techniques involve multiple surgeries and have a burden of increasing morbidity due to the involvement of donor areas and usually offer poor aesthetic and functional outcomes, e.g. color and thickness mismatch and potential residual scar contractures.

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