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Secondary reconstruction of the orbit and conjunctival sac – a case report

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Summary

The authors present a novel modification of vastus lateralis muscle free flap based orbital reconstruction in a 41-year-old patient, with a secondary defect to an injury with technical oil under high pressure. The patient underwent multiple reconstructive procedures in different medical centers with poor functional and esthetic results including simple local plasty techniques. The patient underwent simultaneous reconstruction of the soft tissues of the orbit, and conjunctival sac based on a prelaminated vastus lateralis free flap. The two-stage reconstruction of these structures is beneficial both for the patient's psychical and mental condition and for health system finances. Therefore, whenever it's possible, we should try to decrease the number of required procedures. The authors believe that their technique can significantly improve the quality of life of patients after exenteration but simultaneously they emphasize the need to carry out more procedures in order to refine it.

Key words

orbital reconstruction – vastus lateralis muscle free flap – exenteration – case report – microsurgery

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Introduction

Complete and comprehensive orbital reconstruction usually requires a two or multi-stage approach [1]. This becomes more evident in secondary reconstructions, in which previous local reconstruction options were used with poor results. In our opinion, multi-stage, reconstructive operations constitute a heavy burden for the patient, both physically and mentally. Therefore, two-stage reconstruction should be considered. We present a novel modification of vastus lateralis muscle (VLM) flap based orbital reconstitution with simultaneous implant placement for conjunctival sac reconstruction.

Case description

A 41-year-old patient, with a secondary defect to an injury with technical oil under high pressure, was admitted to the Plastic Surgery Department. The patient was diagnosed with a complete absence of orbital soft tissues and numerous scars after previous reconstructions with local flaps (Fig. 1), including the forehead flap. The patient underwent simultaneous reconstruction of the soft tissues of the orbit and conjunctival sac based on a prelaminated VLM flap (Fig. 2A). The flap was planned according to the ultrasionographic examination. The volume of the harvested flap was higher than the size of the defect at the recipient site to provide a robust environment around the future implant placement and because of inevitable partial muscle atrophy. Direct closure was performed at the donor site. The conjunctival sac was created utilizing an acrylic conformer implant which was wrapped with a split-thickness skin graft (STSG) from the thigh (Fig. 2B). The conformer was inserted centrally into the middle of the muscle. To create the pocket, muscle fibers were unrolled from each other, and none of them were removed. To obtain a satisfactory cosmetic effect, the flap was covered with a full-thickness skin graft (FTSG) from the retroauricular area (Fig. 2C). Due to the lack of possibility of performing direct closure of the secondary defect in the retroauricular area, it was covered with the STSG from the contralateral thigh (Fig. 2D). All of these steps were performed during one surgery. In the second operation, the eyelids were reconstructed by a simple local plasty technique (Fig. 3A–D). The postoperative course was uneventful. At present, the distant result is aesthetically and functionally pleasing (Fig. 4).

Discussion

Prelaminatied flaps are widely used in the facial plastic surgery [2,3]. Numerous techniques, including prelaminated postauricular pedicled flap, have

Fig. 1. State before the reconstruction in our facility

Fig. 2. (A) Dissection of the vastus lateralis muscle flap; (B) acrylic conformer implant; (C) coverage of the vastus lateralis muscle flap with the full-thickness skin graft from the retroauricular area; (D) closure of the secondary defect in the retroauricular area with the split-thickness skin graft from the contralateral thigh.

been successfully engaged in orbital reconstruction [4]. In the case of secondary reconstructions, when previous reconstructive procedures based on local techniques and pedicle flaps have not been successful, orbital reconstruction is challenging and requires either staged, elaborated techniques [4], or microsurgery. The anterolateral thigh (ALT) flap is considered a workhorse in head and neck reconstructions due to its favorable properties, such as a large amount of skin, sufficiently long vascular pedicle, and convenient vessel diameter [5]. The disadvantages of ALT in head and neck reconstructions are the skin color mismatch [6] and the frequent need for a debulking procedure. Therefore we decided to use the modified, prelaminated ALT made up of vastus lateralis muscle wrapped around a STSG-covered mold, according to Kobus [4]. At the recipient site, we turned the flap upside down, so that the undersurface of the deep fascia faced outwards. We performed anastomoses with the superficial temporal vessels. We covered the surface of the flap with a FTSG from the retroauricular area to provide the most esthetically matching skin for the reconstructed eyelid [7]. No subsequent debulking procedure was needed [8]. The higher volume of muscle was harvested on purpose to obtain a satisfactory final volume after the future partial atrophy.

During the same procedure, we reconstructed the conjunctival sac. We placed the implant, which distinguishes this case from those described in the literature, in which it is usually reconstructed in the next stages [9]. Performing a one-stage reconstruction is associated with numerous benefits, such as lower mental and physical burden for the patient, lower costs [10], and less burden on the healthcare system. To improve the cosmetic condition, hair transplantation may be considered to reconstruct the eyelashes. We believe that future amendments to this technique will allow us to provide innervation to the flap by the connection of the motor nerve of the flap with the facial nerve to restore functionality in this area of the face.

Conclusion

To sum up, simultaneous reconstruction of the soft tissues of the orbit and the conjunctival sac is a novel technic that significantly improves the quality of life of patients after exenteration. It provokes minimal morbidity at the donor site and can also become a starting point for modifications that will allow the reconstruction of adjacent structures such as maxillary sinus, orbital innervation, or eyelashes reconstruction. At the same time, we emphasize the need to carry out more procedures to refine this method.

Conflict of interest: Authors declare no conflict of interest. All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional committee and with the 1964 Hel-

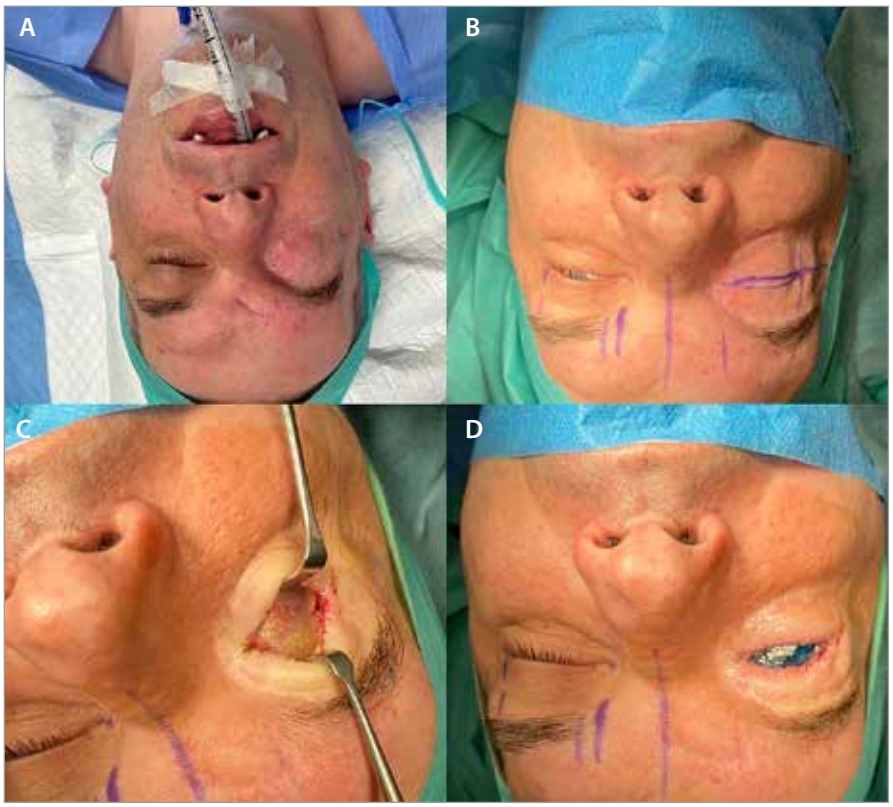

Fig. 3. (A) State before the eyelids reconstruction; (B) surgical markings; (C) opening of the conjuctival sac; (D) temporary eye prosthesis.

sinki declaration and its later amendments or comparable ethical standards.

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Roles of authors

Piotr Drozdowski – conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, writing review and editing;
Aleksander Piotr Jaworski – visualization, writing – original draft;
Łukasz Łątkowski, Karolina Brzuszkiewicz – data curation, methodology;
Krzysztof Mildner – data curation, visualization;
Aneta Drozdowska, Katarzyna Kott – data curation;
Ireneusz Łątkowski – project administration, supervision, writing review and editing;
Agnieszka Burkacka, Władysław Lisovski – visualization;
Marta Handziak – writing review and editing.
All co-authors have reviewed and approved of the manuscript prior to submission.

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Fig. 4. Appearance of the whole patient's face with final eye's prosthesis 6 months after the first operation at our department.

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