Scalp reconstruction with expanded flap

Reconstrução de couro cabeludo com retalho expandido

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Case Report

Introduction:
The presence of extensive scalp defects is a major reconstructive challenge for the plastic surgeon. These defects have a vast etiology, such as traumatic, thermal or electrical burns, benign and malignant or congenital tumor resections, radiotherapy treatments sequelae, and infections. Noting that injuries such as scalping and burns (thermal or electrical), generate significant repercussions such as severe tissue loss, chronic osteomyelitis or minor sequelae such as scar alopecia. This study aims to report a case of late scalp reconstruction with a tissue expander and posterior advancement flap, due to cicatricial alopecia, in an 11-year-old female, victim of scalding by hot water in the right frontotemporal region. Methods: It was performed a retrospective analysis of the patient’s medical record. The present work follows the standards of the Helsinki ethics committee. Conclusion: The scalp tissue expansion technique by stages and subsequent scalp advancement flap performing proved to be effective in restoring the patient’s hair structure and hairline with minimal local distortion, restoring the scalp’s shape and aesthetics of the patient.

Keywords: Burns; Tissue expansion devices; Plastic surgery; Surgical procedures.

ABSTRACT

Introduction: The presence of extensive scalp defects is a major reconstructive challenge for the plastic surgeon. These defects have a vast etiology, such as traumatic, thermal or electrical burns, benign and malignant or congenital tumor resections, radiotherapy treatments sequelae, and infections. Noting that injuries such as scalping and burns (thermal or electrical), generate significant repercussions such as severe tissue loss, chronic osteomyelitis or minor sequelae such as scar alopecia. This study aims to report a case of late scalp reconstruction with a tissue expander and posterior advancement flap, due to cicatricial alopecia, in an 11-year-old female, victim of scalding by hot water in the right frontotemporal region. Methods: It was performed a retrospective analysis of the patient’s medical record. The present work follows the standards of the Helsinki ethics committee. Conclusion: The scalp tissue expansion technique by stages and subsequent scalp advancement flap performing proved to be effective in restoring the patient’s hair structure and hairline with minimal local distortion, restoring the scalp’s shape and aesthetics of the patient.

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Scalp reconstruction with expanded flap

The plastic surgeon can decide between numerous techniques with varying degrees of complexity, such as skin grafts, tissue expanders, local or free flaps, among others. In the case of late scalp reconstruction for scarring alopecia, the use of tissue expander with scalp advancement flap is an excellent alternative to restore the hair area in alopecia topography. Developed in 1976 by Radovan et al. and improved by Manders from 1980, tissue expanders' placement made it possible to treat regions of alopecia through the expansion and advancement of the adjacent hairy scalp regions. The tissues, once expanded, are repositioned in the form of rotation or advancement flaps to cover the defect region.

This study aims to report a case of late scalp reconstruction with a tissue expander and posterior advancement flap due to scar alopecia in an 11-year-old female, victim of scalding by hot water in the right frontotemporal region.

CASE REPORT

Female patient, white, 11 years old, without comorbidities, a victim of thermal burn by scalding with boiling water, thermal injury of deep second degree with approximately 2% of burned body surface, affecting the right frontal-temporal region. During the patient's hospitalization, a dressing with 1% silver sulfadiazine...
was applied without local grafting. The patient in question evolved with good local epithelialization and scar alopecia due to scalding injury.

At the age of 13, the patient comes to the doctor’s office with the desire to improve the area of scar alopecia (Figure 1). In the first surgery, a 200cc (ml) semi-lunar silicone tissue expander was implanted under the scalp in the subgaleal plane (width 14.6cm x height 7.6cm x projection 4.3cm) for tissue expansion with 40ml of sf 0.9% already placed in this surgical act.

In the second week after surgery, 20 ml was instilled weekly for ten weeks until the volume of 240 ml of the expander was reached (Figure 2). After maximum expansion, the patient underwent a new surgical procedure after ten weeks in which the expander was removed, and an advancement flap was made for the region with scarring alopecia (Figure 3). A trichophytic incision was made in the scalp to place the flap on the topography of the hair’s cutlet and contour in the frontal-parietal region. The patient evolved well in the early and late postoperative periods without complications (Figures 4 and 5).

The current methodology was the retrospective analysis of the patient’s medical record. This paper follows the standards of the Helsinki ethics committee and CEP approval.

**DISCUSSION**

As in the case report in question, the patient desired to have hair in an area of scar alopecia (chronic defect due to thermal scalding burns) in the right parietal and temporal region, it was decided to use gradual tissue expansion with subsequent confection of advancement flap seen to the desired area for local capillary restoration.

The use of tissue expansion is a powerful resource because it allows the surgeon to replace tissue with a similar one. The technique increases the amount of tissue available locally, preserves sensitivity, and maintains hair follicles and attached structures. Defects of up to 50% of the scalp can be reconstructed with minimal distortion of the hairline.

Before inserting a tissue expander, care must be taken to mark the vascular territories on the scalp. Expander placement is not random. In this case, the occipital vessels’ vascularization was preserved, and the contralateral vessels were used to make the flap (supratrochlear, supraorbital, superficial temporal, and posterior auricular).
The main indications for tissue expansion in the scalp are chronic injuries, such as scar alopecia, consistent with our patient’s condition. We can also highlight some contraindications to the method, such as acute traumatic injuries or active infectious processes, due to the risk of contamination of the expander and, consequently, its extrusion and loss of result. It is also contraindicated in children under three years of age, as there is the immaturity of the skullcap, which may, during expansion, cause deformities in the bone structure by an external pressure mechanism.

Tissue expansion can be performed intraoperatively or in stages. In the intraoperative period, 3 to 4 cycles of inflation and disinflation of the expander are performed 3 to 5 minutes after placing the device, then, it is removed, and the wound is closed primarily.

A device is placed in the subcutaneous or subgaleal position in the staged technique and connected to a one-way valve. Expansion begins two weeks after placement. The device is expanded weekly or biweekly. The expansion must be continued until the expanded flap is 20% larger than the size of the defect (so that the skull’s curvature and the primary contracture of the flap during insertion are taken into account) 1. This technique was used in the surgical procedure with subsequent removal of the expanding device and making an advancement flap to cover the area of scar alopecia.

There were no early or late surgical complications in this case. The patient evolved well in the tissue expansion procedure, with weekly returns to the doctor’s office. After three months, a new surgical procedure was performed to remove the scalp expander, and the advancement flap was made.

CONCLUSION

The scalp scaling tissue expansion technique and subsequent scalp advancement flap preparation proved to be effective in restoring the patient’s hair structure and hairline with minimal local distortion, restoring the shape and aesthetics of the patient’s scalp.

REFERENCES


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