

Case Report

Orticochea flap for a massive scalp defect closure in a pediatric patient: literature review and case report

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ABSTRACT

Scalp defects are still challenging to the surgeon because of the poor elasticity of the soft tissue overlying the calvarium. Defect size, location, and skin characteristics rule the reconstructive options available. Orticochea flap is an excellent option for scalp defects reconstruction. We present a case of a pediatric patient with a massive occipital scalp defect following an animal aggression that was successfully reconstructed with an Orticochea modified flap.

Keywords: Orticochea flap, Scalp reconstruction, Scalp defect, Case report

INTRODUCTION

Reconstruction of scalp and forehead defects are a complex field with a broad variety of reconstructive options. To define the initial goals of reconstruction, we have to evaluate size and location of the defect; etiology and depth of the defect or injury; surrounding tissue quality and exposure of vital structures. We have to land the patients to realistic expectations, family and surgeon, as well as material and surgical limitations that may preclude obtaining initial goals. The anatomy of the scalp and that of the forehead are very similar and, therefore, both are often considered a single unit.¹

The scalp has the thickest skin in the body, approximately 3–8 mm thick and is connected to the deeper layers due to vertical septae.¹

A detailed understanding of the anatomy is key to planning a successful reconstruction. The layers of the scalp are frequently described by the mnemonic “SCALP.” This stands for Skin, subcutaneous tissue, galea aponeurotica, Loose areolar tissue, and Pericranium (Figure 1).^{1,2,9}

The blood supply to the scalp is divided into four vascular territories: anterior, lateral, posterior, and posterolateral.

The vessels travel in the subcutaneous tissue, which allows for large regional flaps to be safely elevated in the subgaleal plane.²

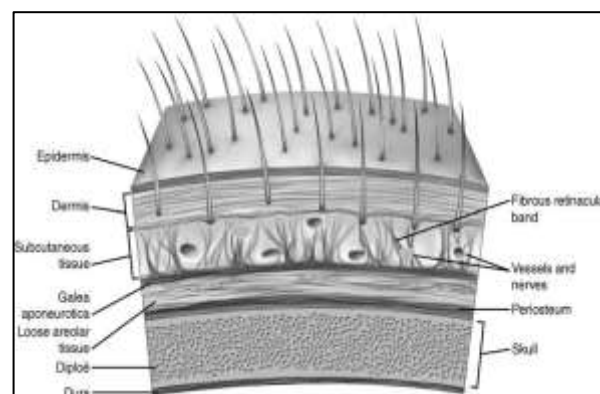


Figure 1: Layers of the scalp.¹³

The scalp is a highly vascular organ supplied by cutaneous arteries arising from 4 separate systems from both the internal and external carotid arteries.^{1,2} Local flaps for scalp reconstruction should be designed to incorporate at least one of these major scalp arteries to maintain an axial blood supply. The scalp is innervated by branches of the

three divisions of the trigeminal nerve, cervical spinal nerves, and branches from the cervical plexus.

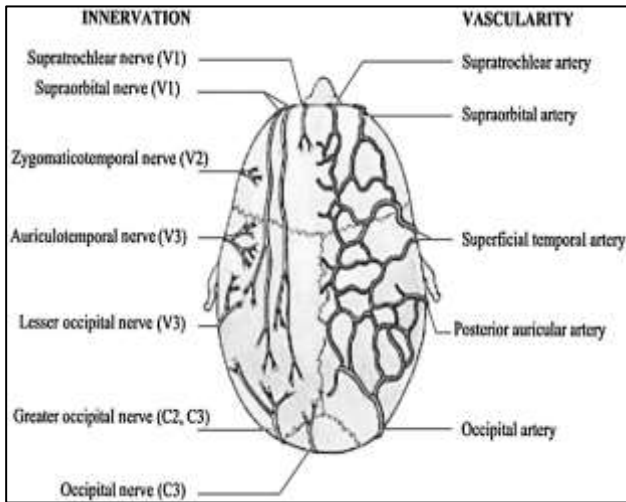


Figure 2: Scalp vascularity and innervation.¹⁰

Defect size, location, and skin characteristics heavily influence the reconstructive options available to the surgeon. Reconstruction options for scalp defects range from simple direct closure, to skin grafting, to adjacent tissue transfer with local flaps, and ultimately to free tissue transfer.³

Up to 40% of the forehead can be closed with a rotation-advancement flap based on the supratrochlear and supraorbital vessels providing a good aesthetic result.^{1,11} Dependent on the defect location and skin laxity, as well as the presence or absence of facial lines, V-Y advancement flaps or H-flaps can provide good results as well. Rocha described a frontalis-based V-Y musculocutaneous flap for forehead defects up to 5.5 cm in diameter.¹

The Orticochea flap, is an excellent option for scalp reconstruction as it decreases operative time, may provide hair-bearing skin, and potentially great results.³

CASE REPORT

A nine-year-old male presented with his family in the emergency room, the mother referred he has no allergies or any associated disease, she referred to us that he suffered a dog aggression in their house when they were playing, at the exploration he was conscious, alert and his mayor symptom was pain, he presented a defect in the occipital scalp, with loss tissue, bone exposure, without active bleeding signs at the time he arrived at the hospital.

The defects had a size of 14 x 12 cm. (Figure 3)

We did a surgical cleaning of the zone and was hospitalized previous acceptance of his parents, with intravenous antibiotics, pain relief, and hydration for 24

hours and the surgery staff of the hospital decided to make the defect repair with an Orticochea flap.



Figure 1: Defect localization and size.



Figure 4: Three flap were cut according to the original defect for coverture.

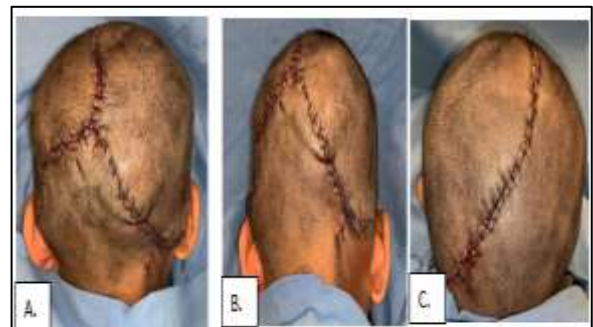


Figure 5: A, B and C represent the immediate postoperative result. A-B: occipital view, C: parietal view.

He had normal laboratory findings, as well as the imaging preoperative test.

The option of an Orticochea three flap for the reconstruction of the defect was reviewed with the patient parents and they agree to the surgery, he was taken to the operation room and because of the localization, the size of the scalp defect we proceed to repair the defect with an Orticochea flap as we comment before.

During the surgery the patient required galeotomies and one back-cut because of the tightness of the scalp (Figure 4); however, once the flaps were advanced, skin grafts was not necessary as primary closure was achieved in the surgery room. (Figure 5)

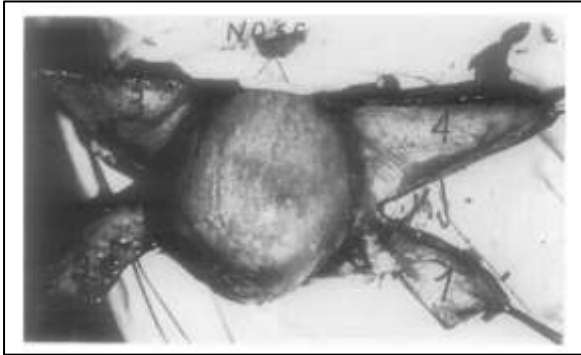


Figure 6: Orticochea four flaps technique.⁷

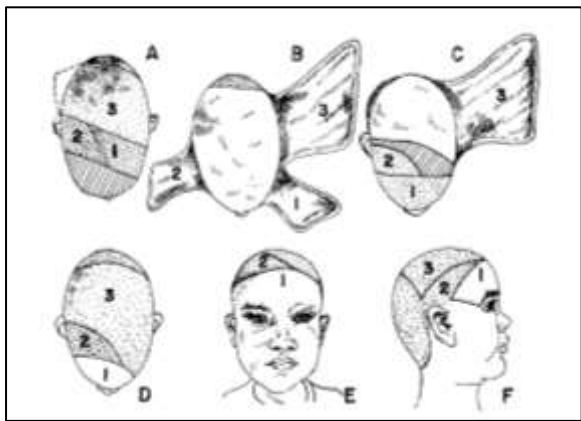


Figure 7: Orticochea three flap technique.⁸

DISCUSSION

The main goals in scalp reconstruction are: functional and cosmetic. Functional considerations include protection of the calvarium to prevent desiccation and infection by providing an adequate blood supply via vascularized tissue.⁴

Primary wound closure is always the simplest and preferred reconstruction option if possible, but in the scalp, this is not often the case.⁵ There are numerous local flaps that can be used in scalp reconstruction, including advancement, rotation, and transposition flaps. Local flaps are safe and have complication rates as low as 3.4%.⁶

Two classically described flaps include the O-to-Z or “pinwheel” flap for small to medium vertex defects as well as the 3 or 4 flap Orticochea technique for repair of medium to large frontal and occipital defects.^{7,8}

With the scalp reconstructive algorithm introduced by Desai et al, the Orticochea flap plays the best role when

there is a large (>30 cm²) frontal or vertex defect, no history of radiation, and no hairline distortion.⁹

Orticochea described the four scalp flaps reconstruction in the Surgery Department of the National Cancer Institute of the Republic of Colombia, a series of 170 patients were treated for scalp tumors between 1954 and 1964. (Figure 6).⁷

In cases of not very large scalp loss in the frontal and occipital regions, Orticochea reconstructed the defect by mobilizing three large flaps that contain the whole remaining scalp. The technique of using only three large flaps instead of the original four-flap technique (Orticochea, 1967, 1969) has two advantages: the reconstruction becomes easier and the blood supply of the flaps is better since their pedicles are wider. (Figure 7).⁸

Several algorithms for scalp reconstruction have been proposed in the literature based either on location, size, and etiology of the defect, quality of tissue and/or wound environment, structures exposed, and hairline distortion.⁹ Leedy et al described 4 separate algorithms based on location: anterior, parietal, occipital, or vertex.

Utilizing another algorithm approach coined by Leedy et al, the Orticochea flap has a role within occipital and anterior defects, specifically those in which the defect cannot be closed primarily without distortion of the respective hairlines.¹⁰

Newman et al described a simpler method of reconstruction first based on size: small (<10 cm²), medium (10-50 cm²), or large (>50 cm²).^{9,12}

Although there have not been large scale studies on the Orticochea flap in recent literature, it remains a viable option in the scalp reconstructive ladder.³

The Orticochea flap is an excellent option in plastic surgery for large scalp defect.

CONCLUSION

Scalp defects are still a challenge, at the same time we have to recognize the importance of a good knowledge of the scalp anatomy as well as a preoperative planning that's going to lead us to make the best reconstruction in scalp defects. There is not enough literature of the Orticochea flap and with the time it has become less popular, but this case demonstrate that is an excellent option for large defects in the occipital scalp, with good results for both functional and cosmetic.

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