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Pinwheel flap: a series of two cases

Retalho em cata-vento: série de dois casos

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ABSTRACT

Scalp reconstructions can be challenging for dermatologic surgeons because the site has little elasticity and is located over a convex, rather than flat, area. The pinwheel flap is a type of rotational flap used for the vertex region of the scalp. We describe two cases, one male and one female, using the technique to reconstruct defects after skin cancer excisions in the vertex and the frontal region of the scalp.

Keywords: Scalp; Carcinoma, Basal Cell; Carcinoma, Squamous Cell; Surgical Flaps

RESUMO

Reconstruções em couro cabeludo podem ser desafiadoras para o cirurgião dermatológico, por ser um local de pouca elasticidade e estar sobre uma área convexa e não plana. O retalho em cata-vento é um tipo de retalho em rotação utilizado para a região do vértex do couro cabeludo. Relatamos dois casos, um masculino e um feminino, utilizando a técnica para reconstruir defeitos após excisões de câncer de pele, no vértex e na região frontal do couro cabeludo.

Palavras-chave: Couro Cabeludo; Carcinoma Basocelular; Carcinoma de Células Escamosas; Retalhos Cirúrgicos

Case Report

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INTRODUCTION

Basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) are the two most common types of skin cancer.¹ When located on the scalp, surgical treatment can be challenging because the scalp is a convex, non-flat surface, and even relatively small defects may require flaps or grafts due to poor local tissue elasticity.²

The pinwheel flap was originally developed to correct circular defects on the scalp, specifically to overcome the limited mobility of the scalp skin, but it has also been used in other regions of the face. It consists of three or more flaps that, through rotational movement, allow local defect closure.^{3,4}

We report two cases of patients with SCC and BCC of the scalp for whom the pinwheel flap was selected for reconstructive surgery, achieving satisfactory aesthetic outcomes.

Case reports

Case 1

A 57-year-old male patient presented with a 19-mm plaque in the central region of the scalp. A previous incisional biopsy found SCC on histopathological examination. Excision with 5-mm margins was performed, resulting in a 29-mm defect, followed by reconstruction with a pinwheel flap (Figures 1, 2 and 3).

Case 2

A 47-year-old female patient presented with a 16-mm plaque in the right frontal scalp region. A previous incisional biopsy found BCC on histopathological examination. Excision with 5-mm margins was performed, resulting in a 26-mm defect, followed by reconstruction with a pinwheel flap (Figures 4, 5 and 6).

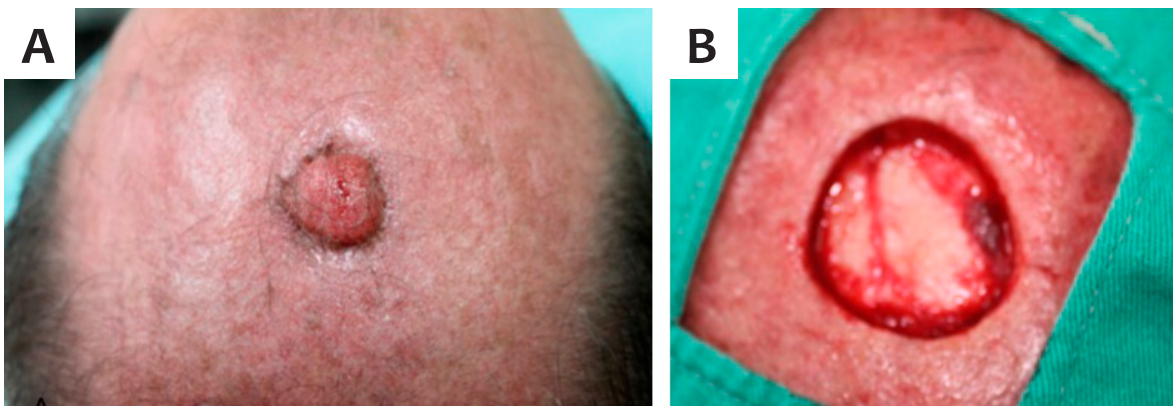


FIGURE 1:
A - SCC. B - Defect



FIGURE 2:
A - Flap incision.
B - Flap elevation.
C - Flap positioned

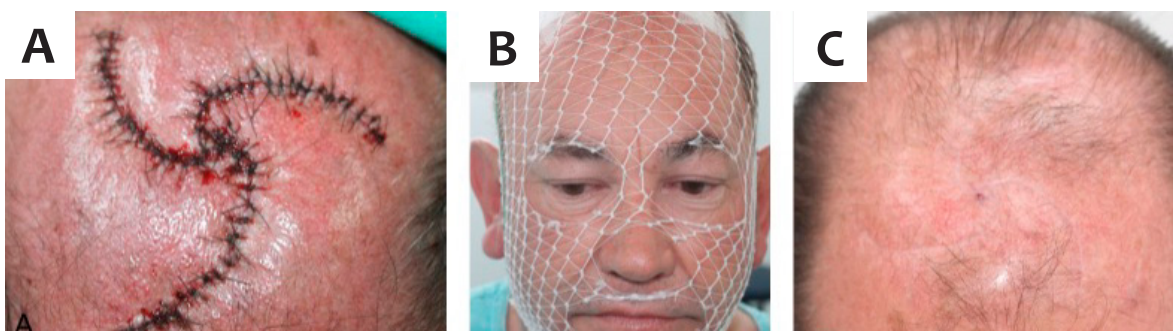


FIGURE 3:
A - Sutured flap.
B - Compressive scalp dressing.
C - Postoperative month 6

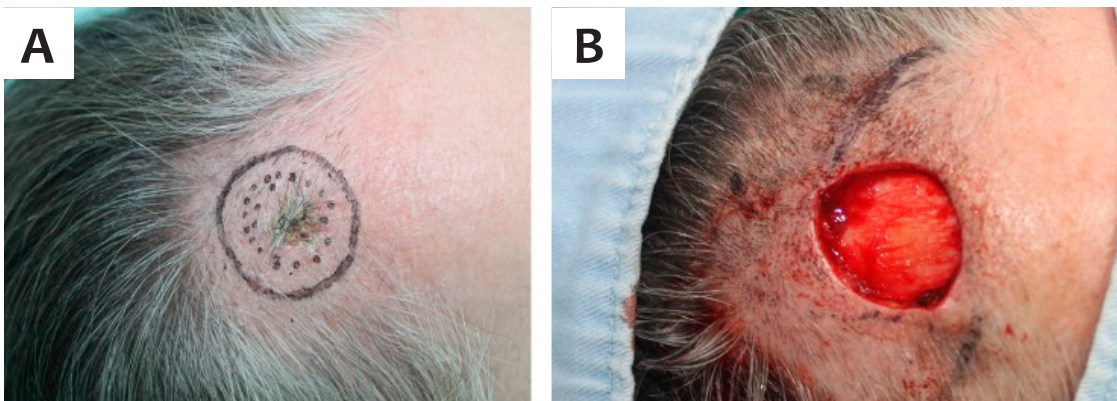


FIGURE 4:
A - BCC.
B - Defect

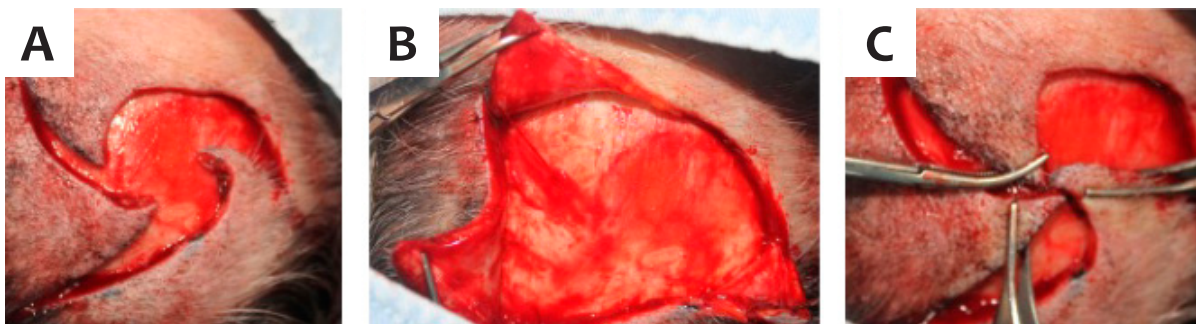


FIGURE 5:
A - Flap incision.
B - Flap elevation.
C - Flaps positioned

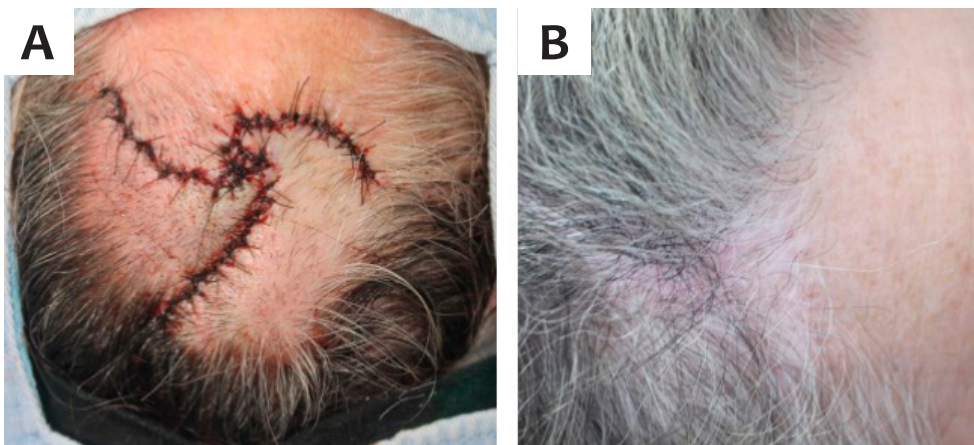


FIGURE 6:
A - Sutured flap.
B - Postoperative month 6

Description of the technique

- a) Patient in horizontal supine position;
- b) Antisepsis with topical 10% polyvinyl iodine;
- c) Placement of surgical drapes;
- d) Infiltrative anesthesia with 2% lidocaine with vasoconstrictor;
- e) Incision with a 15-blade and en bloc circular excision of the lesion (Figures 1B and 4B);
- f) Incisions and creation of rotational flaps (Figures 2A, 2B, 5A, and 5B);
- g) Positioning of the rotational flaps (Figures 2C and 5C);
- h) Simple suture with 4-0 monofilament nylon (Figures 3A and 6A);
- i) Cleaning with saline;
- j) Occlusive dressing with gauze and compressive scalp dressing (Figure 3B).

RESULTS

The patients were followed at 1, 3, 6, and 12 months. Histopathological examination found tumor-free margins for SCC and BCC, respectively. Both patients showed good wound healing, with no signs of recurrence and satisfactory aesthetic outcomes (Figures 3C and 6B).

DISCUSSION

Skin flaps or grafts may be necessary for closure following excision of scalp skin tumors.² Because they preserve adjacent skin with similar characteristics,³ flaps are generally preferred over grafts, particularly to avoid alopecia in female patients, as in Case 2.²

In 1978, Vecchione and Griffith used three-part flaps rotated in the same direction to close a circular scalp defect, creating a pinwheel-like design (Figures 3A and 6A). It became a classic for use on the scalp vertex and was later extended to other scalp regions. Currently, the pinwheel flap is also used beyond the scalp, including non-hair-bearing nasal and temporal regions.^{3,4}

One advantage of the pinwheel flap is that it can be performed in a single surgical time, unlike interpolation flaps. Because it does not require tie-over pressure dressing, as skin grafts do, it is also more comfortable for the patient.²

One option for maintaining compressive dressing for 24 hours, while preventing hemorrhage or hematoma without the need for technically demanding elastic bandages, is the Kondo compressive scalp dressing (Figure 3B).⁵

In Case 2, unlike Case 1, reconstruction was somewhat more challenging because the patient was female, had no androgenetic alopecia, and the lesion was located in the frontal scalp region. The flaps were designed to allow adequate rotation and defect closure while preventing the scars from extending beyond the hairline.

Single- or double-rotation flaps are also reconstructive options; however, the pinwheel flap design was chosen because it produces less cutaneous redundancy (dog-ears). This technique avoids additional tissue excision and allows application in small- to medium-sized circular defects, with excellent adaptability to the recipient area.⁶

Both cases progressed to favorable outcomes, with no signs of recurrence and satisfactory aesthetic and functional results.

CONCLUSION

The pinwheel flap remains a valuable surgical option for reconstruction of scalp defects, regardless of lesion location or patient sex. ●

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