

Additional Relaxing Suturing Using Absorbable Symmetric Barbed Sutures to Help Close Scalp Defects

Kento Hosomi, MD
Shunsuke Yuzuriha, PhD
Fumio Nagai, MD
Daisuke Yanagisawa, MD

Summary: Closing a scalp wound with skin defects is challenging because the scalp skin lacks extensibility and closing it tends to result in a remarkable, widespread, hairless scar. Absorbable symmetric barbed suture device (Stratafix Symmetric; Ethicon, USA) allows wound closure using a pulling motion alone and provides a strong and secure closure for the high-tension area. We used this device to close wide scalp defects easily without tension and with minimized sequential scalp alopecia. The aim of this study was to show our experiences with using this technique. From January 2017 to March 2019, our relaxing suture technique was performed in 7 pediatric patients with scalp alopecia due to various lesions that ranged 23.0 ± 6.5 mm. After resecting the lesions, the galea was sutured using the 3-0 absorbable symmetric barbed suture via a running subcutaneous suture technique. The widespread wound edges were approximated by pulling the suture device. Wound closure was completed with galeal suturing and a superficial suture. We evaluated the width of the postoperative hairless scar at the final follow-up. In all 7 patients, we could approximate the widespread wound edges by pulling alone. Subsequently, the wounds could be closed without tension or difficulty. The mean width of the postoperative hairless scar was 3.3 ± 0.8 mm (range: 1.9–4.3 mm), and no complication was detected during the follow-up period. Our new relaxing suture technique using an absorbable barbed suture with symmetric anchors is a supportive and additional way to help close scalp defects. (*Plast Reconstr Surg Glob Open* 2020;8:e2658; doi: [10.1097/GOX.0000000000002658](https://doi.org/10.1097/GOX.0000000000002658); Published online 17 March 2020.)

INTRODUCTION

Closing a scalp wound with skin defects is challenging because scalp skin lacks extensibility and closing a scalp wound tends to result in a remarkable, widespread, hairless scar.¹⁻³

The symmetric barbed suture device (Stratafix Symmetric, Ethicon, USA) uses absorbable barbed suture materials. This device has a series of unidirectional symmetric anchors at every 2 mm and a fixation tab anchor at the distal end. This device allows wound closure with only a pulling motion and provides a strong and secure closure for the high-tension area.^{4,5} By eliminating the need for surgical knots, this device can reduce suturing difficulty and be used for high-tension areas.⁶ We used this device

with our usual technique to close wide scalp defects easily without tension and with minimized sequential scalp alopecia. The aim of this study was to show our experiences in using this suturing technique.

PATIENTS AND METHODS

This study was approved by the Shinshu University Hospital institutional review board. All patients provided informed written consent.

From January 2017 to March 2019, at our institution, our relaxing suture technique was performed in 7 patients with scalp alopecia due to various lesions.

After the resection of the lesions, we undermined the galea around the wound by 30–50 mm without galeal scoring. The galea was sutured using the 3-0 absorbable symmetric barbed suture via the running subcutaneous suturing technique (Fig. 1). A fixation tab anchor was placed under the galea at the proximal end, and it was looped through the galea and the subcutaneous tissue by passing through the opposite sides of the wound. This suture was terminated at the distal end of the wound, and widespread wound edges were approximated by pulling the suture device. Wound closure was completed with

From the Department of Plastic and Reconstructive Surgery, Shinshu University School of Medicine, Nagano, Japan.

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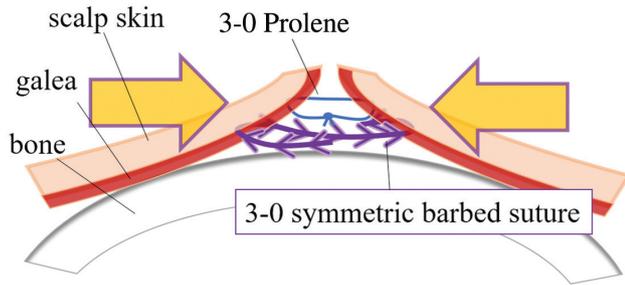


Fig. 1. Schematic demonstration of the surgical technique. The wound edges were approximated using the 3-0 symmetric barbed suture. The barbed suture was looped through the galea and subcutaneous tissue using the running subcutaneous suture technique.

ordinal galeal suturing and a superficial suture using a 3-0 monofilament polypropylene suture (Prolene; Ethicon, USA) and the 5-0 Prolene, respectively. We evaluated the width of the postoperative scar with cicatricial alopecia using a photograph with a size-matching sticker (Casmatch; Bear Medic, Tokyo, Japan) at the final follow-up.

RESULTS

Two patients were male and 5 patients were female, with a mean age of 6.6 ± 3.5 years (range: 1–11 years). The causes of alopecia were nevus sebaceus in 6 patients and congenital alopecia in 1 patient. The mean width of the lesions that we could resect was 23.0 ± 6.5 mm (range: 10.8–32.9 mm). In all 7 patients, we could approximate widespread wound edges by pulling alone (Fig. 2). After approximating the edges, the originally wide wounds could be closed without tension or difficulty. The mean width of the postoperative hairless scar was 3.3 ± 0.8 mm (range: 1.9–4.3 mm). No complication was noted during the follow-up period (Table 1).

DISCUSSION

We could approximate wound edges with scalp defects using the symmetric barbed suture without tension or difficulty. Although there are various types of barbed sutures, eg, Stratafix Spiral (Ethicon, USA), V-Loc (Medtronic, USA), and the absorbable symmetric barbed suture (Stratafix

Symmetric) is different from the others in the size of the barbs. Further, the symmetric barbed suture has a series of unidirectional symmetric anchors, which are bigger and longer than those of other barbed sutures. There are reports of cases where the symmetric barbed suture was used for inframammary fold recreation,⁴ abdominal wall repair,⁵ and soft tissue approximation.⁶ These reports suggested that the big anchors securely gripped the wound edges even in areas with high tension.^{4–6} The suture device with big anchors was considered appropriate for the patients in this study because it was expected that the resection of the lesions would lead to increased wound tension in the area. Although there is a report of effective scalp closure without skin defect using an intradermal barbed monocril suture with small barbs,⁷ there is no report of scalp closure with skin defect using the symmetric barbed suture.

Some authors^{1–3,8} reported that relaxation suture of the galea to reduce wound tension was effective in the prevention of wide scar formation on the scalp because the scalp skin lacks extensibility. However, conventional techniques require sequential suturing, and there is always the risk of suture breakage and looseness of the knot during wound closure. Moreover, if the suture thread falls out, the process cannot be repeated. To reduce these risks, in this procedure, approximation of scalp wound edges was completed by continuous pulling of the barbed suture device before ordinal galeal suturing. Our technique can be a supportive and additional step for easier and safer conventional procedures. Conventional suturing procedures should not be omitted even if the symmetric barbed suture is used.

From our experiences, we found that the following precautionary measures should be followed in applying this technique: a the gentle pull with appropriate assistance of the opposite hand is important to avoid suture breakage in the high-tension area. This technique should be applied to cases wherein the patients have a stable galea, because there is a risk of shearing of the galea. Although the maximum width of the skin defect was 32.9 mm, careful operative observation of each case is necessary to estimate the maximum width for this technique.

There were limitations in this study. Since all cases involved pediatric patients, to determine the adaptability of this technique, further studies involving adult patients

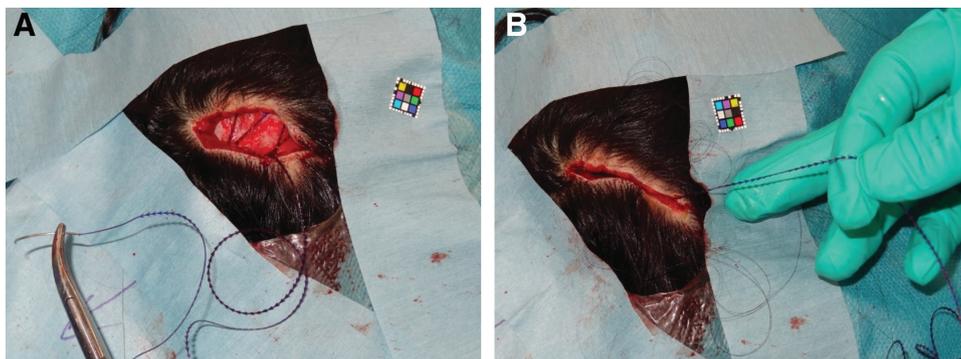


Fig. 2. A 5-year-old girl with nevus sebaceus at the temporal area. After resection of the lesion, the galea was sutured using the 3-0 symmetric barbed suture (A). Wound edges were approximated by pulling (B).

Table 1. Patients' Data and Outcome

Case	Age (years)	Sex	Cause	Lesion Width (mm)	Lesion Size (mm ²)	Lesion Site	Scar Width (mm)	Follow-up (months)	Wound Dehiscence
1	5	Female	Nevus sebaceus	19.8	476	Parietal	3.6	10	None
2	10	Male	Congenital alopecia	32.9	1036	Temporal	4.3	9	None
3	4	Female	Nevus sebaceus	19.7	603	Occipital	3.8	7	None
4	1	Female	Nevus sebaceus	26.4	623	Parietal	2.5	7	None
5	11	Male	Nevus sebaceus	27.4	555	Parietal	4.1	10	None
6	5	Female	Nevus sebaceus	10.8	160	Parietal	1.9	7	None
7	10	Female	Nevus sebaceus	24.0	533	Temporal	2.9	7	None

are required. Moreover, since this study employed only one technique and the number of cases was limited, comparisons between this technique and conventional suture techniques and more experience of cases are required to demonstrate the effectiveness of this technique. Although this single-arm study does not have validated data regarding noninferiority, this suture should be considered in cases of scalp closure because it can be an additional way to help close scalp defects.

CONCLUSION

Our new relaxing suture technique using the absorbable symmetric barbed suture with big anchors should be considered in cases of scalp closure because it can be a supportive and additional way to approximate the wound edges in scalp defects.

Kento Hosomi, MD

Department of Plastic and Reconstructive Surgery
Shinshu University School of Medicine
3-1-1 Asahi Matsumoto
Nagano 390-8621 Japan
E-mail: hosomi@shinshu-prs.jp

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