Outcomes of Staple Closure of the Donor Area During Hair Transplant by Follicular Unit Transfer

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ABSTRACT

Background: Donor area closure in hair transplantation by follicular unit transfer (FUT) is being done by various techniques. This study aims to assess the outcomes of staple closure for donor area in FUT. **Aim:** To study the outcome, efficacy and complications of staples in donor area closure for FUT. **Materials and Methods:** A total of 50 consecutive patients who underwent staple closure for donor area in FUT were included in the study and their data were collected retrospectively. Patients were followed up one year after the surgery and photographic documentation of the scar at the donor site was done. Objective measurement of the width of the scar was done for all the patients. **Results:** The average length of the donor area was 22 cm. The average width of the scar was 1.82 mm. There was no infection or tissue necrosis at the staple closure site in any of the patients. **Conclusion:** Staple closure resulted in cosmetically acceptable scar, but post operative discomfort was the major limitation. The potential to conserve the hair follicles along the line of closure makes using staples worthwhile if conservation of follicles is the goal.

KEYWORDS: Hair transplantation, Donor area closure, follicular unit transfer, staples

REC Review:

Risk	: 3	0 = maximum risk	5 = least risk
Efficacy	: 4	0 = minimum efficacy	5 = maximum efficacy
Cost	: 2	0 = very expensive	5 = least expensive

INTRODUCTION

The history of wound closure dates back to 5500-3000 BC, the origin of surgery.[1] Early suture devices were made of natural materials such as silk, linen strips, cotton etc. With the development of synthetic polymers and fibres, synthetic suture materials were introduced. The suture material used depends upon the specific site and clinical technique as well as the surgeon's preference.[2] The goal of wound closure is to bring the edges of the wound together not only with sufficient strength to prevent dehiscence, but also with minimal residual tension and compression of the tissue to promote healing with a cosmetically acceptable scar.[2] Staple closure is one of the methods of closure of the donor area.

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Aim

To study the outcome, efficacy and complications of staples for closure of the donor area following follicular unit transfer (FUT) in hair transplantation.

MATERIALS AND METHODS

Fifty consecutive patients who underwent staple closure of the donor area following FUT from January 2012 to October 2012 were included in the study, and their data regarding surgical technique, course during recovery, follow up and complications, if any, were collected retrospectively from the case files. The width of the donor area was kept at 1 cm in all the cases. Dissection of the donor tissue was performed up to the level of subcutaneous fat, leaving a thin layer of fat at the floor of the wound. Wound was closed in single layer using staples without undermining. Ethicon® staples (proximate plus MD 35W) were used. Staples were placed at a distance of approximately 3 mm to 5 mm from the previous one. Staples were removed at the end of 15 days. If there was post-operative discomfort to the patient, alternate staples were removed at the end of

10 days and the rest were removed at the end of 15 days [Figure 1]. Patients were followed up one year after the surgery and photographic documentation of the scar at the donor site was done. Objective measurement of the width of the scar was done for all the patients. The point at which the scar width was the maximum at the centre, at the right half and at the left half along the donor closure line was noted. The average width in mm was taken as the final reading. Institutional ethics committee approval was obtained for the study.

RESULTS

Out of 50 patients, 49 were male and one was female. Age group ranged from 23-58 years. The average length of the donor area was 22 cm. The minimum width of the scar was 1 mm and the maximum was 4 mm [Figures 2 and 3]. The average width of the scar was 1.82 mm [Table 1]. Forty out of 50 (80%) patients had post-operative discomfort due to the staples. One patient had post-operative bleeding from the wound closure site, and suturing was done at that site to arrest the bleeding. Twelve (24%) patients complained of itching at the staple site. Ten (20 %) patients complained of visibility of staple showing through the hair. One patient developed a hypertrophic scar [Figure 4]. There was no infection or tissue necrosis at the staple closure site in any of the patients. The scalp laxity was not the same in all the patients, and no objective measurement of scalp laxity was done in the study group.

DISCUSSION

A number of techniques have been developed to close the donor area in strip excision during FUT. These include the use of undermining, absorbable sutures, buried sutures, staples and trichophytic closures. Suturing has been widely used for donor closure, since sutures provide good control in approximating the wound edges. Staples are an acceptable alternative for linear lacerations through the dermis that have straight, sharp edges located on the scalp, trunk, arms and legs.[3-5]

Staples and sutures wounds demonstrated similar mechanical and histological characteristics in animal models.[6] Contaminated wounds incurred lower infection rate with staples.[7] Other advantages of staples closure

Figure 1: Staple removal at the donor site

Figure 2: Scar at the donor site

Figure 3: Scar at the donor site

Figure 4: Hypertrophic scar at the donor site

include that they are easy and faster to apply, they form an incomplete loop with decreased strangulation and they lack residual cross mark. They provide an alternative if a patient is allergic to suture material.[8,9] Staples carry no risk of accidental needle-stick injury. Staple closure is reported to shorten duration of surgery by five times as compared with the suturing technique.[10,11]

The advantage of using staples in FUT is that of all the donor closures, staples conserve the most hair.[12] There are two main reasons for this. The first is that stainless steel staples are inert. Unlike sutures, the body tissues do not react to them and therefore, staples cause minimal inflammation (which has the potential to damage hair follicles). The second advantage of staples is that they are interrupted, in contrast to sutures which are used in a long running loop stitch. A running stitch had a tendency to strangle hair follicles, particularly if there is any swelling after the surgery. The use of interrupted staples avoids this potential damage to hair follicles.[12] The advantage of sutures is that the control in approximating (closing together) the wound edges is better. However, with new stapling techniques and increasing the time that the staples are left in the scalp, excellent wound edge approximation can be achieved.[12]

Table 1: Patient data

Age	Sex	Average width of scar in mm	Post op discomfort
28	M	3	+
31	M	2	+
34	M	1	+
38	M	1	+
26	M	3	+
27	M	2	+
30	M	2	–
23	M	3	+
29	M	2	+
34	M	2	+
41	M	1	+
27	M	2	–
26	M	2	+
29	M	4	+
28	M	2	+
32	M	1	+
33	M	1	+
30	M	3	+
42	M	1	+
33	M	2	+
31	M	2	–
30	M	1	+
32	M	1	+
28	M	3	+
29	M	3	+
26	M	2	–
31	M	1	+
45	M	1	+
35	M	1	+
33	M	2	+
29	M	2	+
31	M	1	–
30	M	4	+
34	M	1	–
38	M	1	+
29	M	2	+
44	M	1	+
31	M	2	+
36	F	1	–
34	M	2	+
37	M	1	+
27	M	3	+
37	M	1	+
41	M	1	–
28	M	3	+
58	M	1	–
26	M	2	+
25	M	3	+
31	M	1	+
30	M	1	–
		1.82	

Bernstein *et al*., in their bilateral comparison study of suturing with Poliglecaprone 25 versus staples documented that the scar width on the staple site was 1.72 mm compared to 1.42 mm on the suture site.[13] In our study, the average width of the scar was 1.82 mm at the end of one year post-surgery. The scar was cosmetically acceptable in majority of the cases [Figures 5 and 6]. The staple closure scar is more defined and often easily identifiable through the hair; this is due to the small amount of stretch on the wound edges (as the wound edges are not well-opposed during the staple closure when compared to suturing).[12] Focal hair loss along the suture line, which is due to the strangulation and destruction of hair follicles, is not observed in staple closure.[12] In our study, we observed no focal hair loss along the staple closure line, which can be harvested for future surgery. Israr *et al*. in their prospective study comparing staples, silk, Prolene®, and Vicryl® for scalp closure, reported no difference in healing in all the four groups.[2] Stapling was reported to be cosmetically acceptable alternative to suturing for simple paediatric scalp lacerations.[14]

Figure 5: Fine scar at the donor site

Figure 6: Fine scar at the donor site

We observed in our study group that it is difficult to have a good control on the edges of the wound while closing with staples. A good haemostasis was not observed, and one patient had an episode of bleeding at the staple site later, on the same day of surgery, which was treated with a simple suture at that site. Staples at times get displaced from the original site along the line of closure while the patient lies supine during the implantation process; this could be due to the pressure on the occipit while lying supine. This migration of staple did not lead to wound dehiscence or bleeding. Majority (80%) of the patients complained of post operative discomfort at the staple site which lasted for a week; however, they later get accustomed to the staples. Removing the alternate staples made the patients tolerate the staples better. Twelve (24%) patients complained of itching at the staple site from day three after the surgery. This may be due to the crusting along the line of closure. Ten patients complained of visible staples at the back of their head. Keeping the hair length longer prior to the surgery would prevent the see through effect of staples. One patient had hypertrophic scar at the staple site by the end of 4 months which was treated with topical steroids. None of the patients had infection or tissue necrosis along the line of closure. Occasional pain was experienced by the patients while removing the staples. However, this was not a major problem in our study group.

CONCLUSION

Every technique followed in donor closure for FUT has benefits and limitations with respect to healing, comfort, avoiding the damage to the follicles, cosmetic outcome and convenience for the patient. No one technique possesses all the desirable characteristics. Staple closure results in a wider scar when compared to sutures and leads to more post-operative discomfort. The potential to conserve the hair follicles along the line of closure outweighs these disadvantages and makes using staples worthwhile if conservation of follicles is the goal.

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