

## Case Report

# Split Thickness Skin Graft Versus Suction Blister Epidermal Graft in Treatment of Stable Vitiligo

Yasser Helmy\*

Plastic and Reconstructive Surgery Department, Faculty of Medicine AL-Azhar University, Cairo, Egypt

\*Corresponding author: Yasser Helmy, Plastic and Reconstructive Surgery Department, Faculty of Medicine AL Azhar University, Cairo, Egypt. Tel: + 20104406331; Email: dryasserhelmy@gmail.com

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### Abstract

**Background:** Vitiligo one of the most common skin disease, which is still a therapeutic problem.

**Objective:** To compare the clinical efficacy of split thickness epidermal grafts versus suction epidermal grafting in the treatment of stable vitiligo.

**Patients and Methods:** Thirty-nine patients with stable vitiligo were enrolled in this comparative study. Two vitiligo patches were selected in every patient, one patch was treated by suction epidermal grafting and the other patch was treated by split thickness epidermal grafts, while patient containing only one patch, it was divided into two halves. Assessment of re-pigmentation was done by two independent dermatologists.

**Results:** After split thickness epidermal grafts, there was excellent improvement ( $\geq 90\%$ ) in 30 (76.9%) lesions, while in suction epidermal grafting, there was excellent improvement ( $\geq 90\%$ ) in 21 (53.6%) lesions. The mean  $\pm$  SD percentage of improvement was significantly higher in lesions treated with STG than lesions treated with split thickness epidermal grafts ( $92.3 \pm 2.14$  versus  $82.7 \pm 4.3$ ) ( $p < 0.05$ ).

**Conclusion:** Split Thickness epidermal grafts and suction epidermal grafting are an effective procedure in the treatment of stable vitiligo. Despite that the effectiveness of split thickness epidermal grafts, but suction epidermal grafting is safer and easier to use.

**Keywords:** Suction Blister Epidermal; Split-Thickness Skin Graft; Vitiligo

### Introduction

Vitiligo is a common pigmentary skin disorder, characterized by total or partial loss of melanocytes from the epidermis and other tissues. Different therapeutic agents for vitiligo are available [1]. Surgical treatment is an alternative option for stable recalcitrant lesions [2]. Surgical techniques for vitiligo can be divided into tissue and cellular grafting. In tissue grafting, donor skin is transplanted into vitiliginous areas in the form of punch grafts, Split Thickness Skin Grafts (STG), and Suction Epidermal Grafting (SBEG) [3].

Cellular grafts include cultured pure melanocytes suspension and non-cultured epidermal cellular suspensions (a mixture of melanocytes and keratinocytes) [4].

STG involves the transfer of epidermis and the uppermost part of the superficial dermis to achieve the transfer of melanocytes and keratinocytes from donor graft to the underlying dermis which abraded in vitiliginous area [5]. SBEG is associated with an excellent cosmetic and color matching at the recipient site and it does not cause donor site scarring, but the procedure is lengthy and can only treat smaller areas in one sitting [6].

The aim of this study is to compare STG versus SBEG in the

treatment of stable vitiligo.

## Patients and Methods

Thirty-nine patients with stable vitiligo (No progression of existing lesions and no appearance of new lesions in the last one year) were enrolled in this prospective monocentric comparative study; they were selected from the attendants of the Dermatology department, at Al-Azhar University Hospital in Assiut from October 2014 to July 2016. The Ethical committee of Al-Azhar University approved the study protocol and an informed consent was taken from all patients. Patients with active vitiligo, history of the Koerner phenomenon, negative micro punch graft test, patients with keloid or hypertrophic scar or history of bleeding tendency were excluded.

Two vitiligo patches were selected in every patient, one patch was treated by STG and the other patch was treated by SBEG, while patient containing only one patch, it was divided into two halves, one half was treated by STG and the other half was treated by SBEG.

### Technique of STG

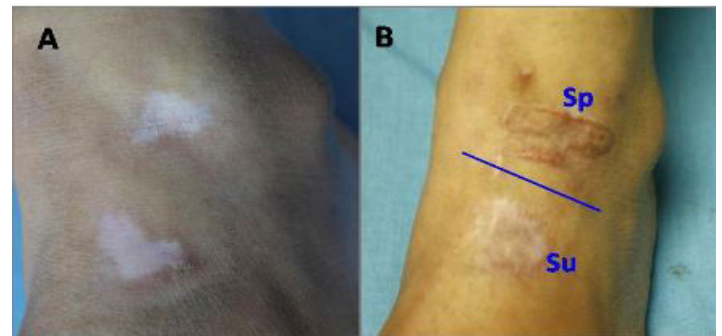
The selected donor site (At the middle 1/3 of the medial aspect of the thigh), was anesthetized with 2% of xylocaine with a maximum dose of 5mg/kg which was not reached with any case. Local anesthesia was injected into the subcutaneous tissue and in the dermis to raise a wheal. Traction and counter traction was applied on either side of the wheal with the non-dominant hand, harvesting of a thin graft of skin by a steady sawing motion with the dominant hand catching a sterilized surgical knife blade, so there was minimal punctate bleeding from the base of the donor site. Donor site closure by Vaseline gauze "Sufratull" and dressing with crepe bandage applied till complete donor healing. The donor specimen was then laid on sterile gauze and soaked with normal saline since the very thin graft tends to curl in on itself, we flattened it using two pairs of fine non-toothed forceps [7].

The depigmented patch was anesthetized in the same manner as the donor site to raise a wheal all over the area. A very thin layer of the skin was taken from the whole depigmented area and the graft was placed over the freshly prepared recipient site, so that the dermis of the graft should be in contact with the dermis of the recipient site, and spread it over the bed without having any wrinkles or folds. OPSITE spray (moisture water permeable spray dressing) was applied to fix the graft without sutures, and after it dries, it makes a very thin film, then Sufratull gauze was placed very carefully and slowly over the entire graft and extending 1 cm beyond it [8].

### Technique of SBEG

On the first day, cryotherapy was done in the recipient site affected by vitiligo with liquid nitrogen through two cycles of 15-20 seconds with 20-second intervals. On the second day, blister

induction in donor sites was done by a vacuum device. The donor site was cleaned with povidone-iodine and then washed with normal saline, after local anesthesia, the site was attached to the vacuum device and the patient was recommended to pull the device piston regularly to produce high negative pressure. After about 3-5 hours, the blister was ready and was taken by scalpel or scissor and was put in a normal saline containing dish and the donor site was dressed in antibiotic ointment and Vaseline gauze. The graft was placed in the recipient site and fixed by OPSITE spray then antibiotic ointment and vaseline gauze were put on it. Wet sterile cotton was applied to prevent disposition of the graft and then with sterile gauze and compressive bandage, dressing of recipient site was performed to prevent any extra movement of the graft.



**Figure 1(A-B):** Female patient 18 years old show two vitiligo patches on the dorsum of the left foot, the upper one was treated by Split thickness graft (STG) and lower one was treated by suction blister epidermal graft (SBEG) with excellent improvement in both (A) Before treatment, (B) After treatment.

### Postoperative care

The patients were asked to avoid friction or water on this area and not to remove the dressing before the seventh day of operation [9]. Patients were followed up at monthly intervals for 6 months. Assessment of re-pigmentation was done by two independent dermatologists. The re-pigmentation response was expressed qualitatively as Excellent > 90%, very good 75 - 90%, good 50 - 75% and poor response ≤ 50%.

### Statistical analysis

Data were statistically analyzed by the Statistical Package for Social Sciences (SPSS), version 21.0 (SPSS Inc., Chicago, IL, USA). Results of the study were expressed in a simple percentage with a qualitative description of comments. Chi-square and Fisher's exact tests were used to compare each categorical variable. The statistical significance differences between the collected data of both groups and both mean and standard deviations were used t-test. While p-value of 0.05 or less was considered significant.

## Results

The final study cohort was made up of thirty-nine patients (34 females and 5 males) with stable vitiligo. As shown in Table 1

the mean ± SD patient's age was 18.9 ± 3.9 years and the mean ± SD vitiligo duration was 3.35 ± 1.13 years. Positive family history of vitiligo was present in 4 (10.3 %) patients. 24 (61.5%) patients were focal vitiligo and 15(38.5%) patients were vitiligo Vulgaris. 8(20.5%) lesions were in the trunk, 22 (56.5%) lesions in upper limb and 9(23%) lesions in the lower limb. According to Fitzpatrick skin prototype, patients were classified as follows: 3(7.7%) patient were type II, 11(28.2%) patient type III and 25(64.1%) patient type IV.

	STG (n=39)	SBEG (n=39)	P-value
Excellent(n=51)	30(76.9%)	21(53.6%)	
Very good (n=15)	0(0.0%)	15(38.7%)	
Poor (n=12)	9(23.1%)	3(7.7%)	
Mean ± SD % of improvement	92.3 ± 2.14	82.7 ± 4.3	<0.05

**Table 1:** Improvement (%) of vitiligo lesions after both treatments.

After STG, there was excellent improvement (≥90 %) in 30 (76.9%) lesions, and poor improvement (<50 %) in 9 (23.1%) lesions, while in SBEG, there was excellent improvement (≥90 %) in 21 (53.6%) lesions, very good improvement (≥75-90%) in 15(38.7) lesions and poor improvement (<50 %) in 3 (7.7%) lesions. The mean ± SD percentage of improvement was significantly higher in lesions treated with STG than lesions treated with SBEG (92.3 ± 2.14 versus 82.7 ± 4.3) (p<0.05) (Table 2)

	STG n(%)	SBEG n(%)
Hyperpigmentation	30(76.9)	36(92.3)
Pain	0(0)	39(100)
Hypertrophic scar	6(15.4)	0(0)
Keloid	2(5.1)	0(0)
peri-graft	0(0)	12(30.8)

**Table 2:** Complications occurred in vitiligo patches occurred after both treatments.

Post inflammatory hyperpigmentation was the most common complication occurred after STG, while; after SBEG, pain during treatment was the most common complications followed by Post inflammatory hyperpigmentation and peri-graft halo.

## Discussion

Several surgical procedures have been used to treat stable vitiligo with varying success rates. Although the use of both STG and SBEG in the treatment of vitiligo is in abundance and since a long time, however; comparative trials between the two methods are lacking in the literature. In the present study, an attempt was made to compare between STG versus SBG in 39 patients with stable vitiligo. In the present study, significant improvement (≥50%) was seen in 92.3% patches treated by STG method and 82.7%patches treated by SBEG.

Comparing both treatments, the mean percentage of re-pigmentation was higher in STG than SBEG. The decrease in re-pigmentation in SBEG than STG may be attributable firstly to peri-graft halo occurred commonly after SBEG which results from retraction of the graft. Secondly, the accurate size of STG while the size used in SBEG depends on the size of the cup used which may be unfit for the size of the recipient area. Thirdly, the fixation in STG is better than SBEG.

However, better re-pigmentation occurred in STG, but SBEG carries many advantages. SBEG can be done easily and does not need experience as STG. Also, suction from the same donor site can be done more than one time with no donor site scarring, however, STG carries more potentiality for donor scarring.

In our study, according to the age of the patients, the best result in both treatments was achieved in a patient with younger age less than 20 years. The better outcome in younger individuals may be explained by a stronger cytokine response and growth factor expression after injury and the proliferation of cultured melanocytes from younger age was better than from older age [10,11,12].

In our study, certain anatomic sites responded better than others in both STG and SBEG, the best response was achieved with lesions located on the lower limb followed by upper limb and trunk. This was similar to that reported in Gupta, et al. [13] and Gupta and Kumar. [12] they explained that the better response as the trunk and extensors of upper limbs and lower limb are hairy areas.

According to type of vitiligo in this study the results was better in focal vitiligo than vitiligo Vulgaris and this had been explained by the pathogenesis of vitiligo Vulgaris which is presumed to involve mainly immunological factors, while focal vitiligo is considered to be caused by a neurogenic sympathetic disturbance and possibly also a genetic anomaly restricted to the segment [13,14,15]. Li, et al. [16] reported that 282 patients with segmental vitiligo achieved a success rate of 89.7%, and 473 patients with focal vitiligo achieved a success rate of 76.5%. Treatment of segmental and focal vitiligo was more effective than of the acrofacial and scattered types.

In the present study, sex of the patient and family history had no significant impact on the outcome as was also observed by Gupta and Kumar [12].

No serious complications as regard wound sepsis, complete graft loss, or blood transmitted infections were observed in the present study. The most common complication observed at the recipient in lesions treated with STG was hyper pigmentation and wound edge irregularities in 5 cases, these irregularities are attributed in our opinion to the shearing movements at wound edges due to less care from the patients or during first dressing, they improved by time and local silicon creams application. They weren't complicated by hypertrophic scars as we rolled out, in exclusion

criteria, patients who carry the risk of hypertrophic scars and keloids. Babu, et al. [11] Also reported hyper pigmentation as the main complication at the recipient areas, and this totally agrees with our results.

While in the lesions treated by SBEG the most common complication was hyper pigmentation and hypo pigmented rim (peri-graft halo) at the periphery of recipient areas in. Sobhy, et al. [17] had been reported this halo and explained it by graft contracture after harvesting under the effect of elastin fibers sliding. These two lead to achromic fissures and peri-graft halo. Overlapping of graft edges at the recipient site can prevent these complications.

Complications described in the case of split-thickness skin grafting at the recipient site are hyperpigmentation, but there is neither curling of the graft, nor milia formation, but little graft contracture and some depigmentation with irregularities at the margins. Although theoretically, there are chances of hypertrophic scarring and hyper- or hypo-pigmentation at the donor site, but we didn't record any possible duo to the of ultrathin grafts in our study that had no big dermal tissue harvesting.

We concluded from our study that both STG and SBSG have highly effective in the treatment of stable vitiligo; however, the effectiveness of STG is more superior to SBEG but need more experience while SBEG more simple, easy and does not require highly experienced skin surgeon.

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