



## COMPARATIVE STUDY OF EFFECTIVENESS OF SURGICAL MODALITIES LIKE SUCTION BLISTER GRAFTING VERSUS SPLIT-THICKNESS GRAFTING IN TREATMENT OF STABLE VITILIGO

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**ABSTRACT** **Background:** Vitiligo is a common pigmentary disorder of great cosmetic concern, social embarrassment, psychological distress. Present study was aimed to compare effectiveness of surgical modalities like suction blister grafting versus split-thickness grafting in treatment of stable vitiligo at a tertiary hospital. **Material and Methods:** Present study was single-center, comparative, observational study, conducted in patients of age > 18 years, either gender, with vitiligo stable for 1 year. Patients were randomly for surgical treatment as Group SBG (Suction Blister Grafting) & Group STG (Split Thickness Grafting). **Results:** Among 40 patients of stable vitiligo, group STG & group SBG had 20 patients each. Male to female ratio was 1:1.83. Majority patients were from the age group of 18-25 years (65%). Significant findings were positive family history of vitiligo (17.5%), unmarried patients (67.5%) & leucotrichia (30%). The duration of vitiligo ranged from 2-10 years with a mean duration of  $3.77 \pm 2.36$  years. Common area involved were face and neck (57.5%) followed by lower extremity (20%), trunk (12.5%) and upper limbs (10%). Common type of vitiligo was of localized type (57.5%), followed by acral (30%) and segmental vitiligo (12.5%). Group SBG had excellent, good & fair response in 75%, 20% & 5% patches while group STG had excellent, good & poor response in 60%, 30% & 10% patches. Late complication like hyperpigmentation was seen in 2 patients (10%) of group STG. Among patients of group STG perigranular halo & achromic fissure was seen in 1 patient each. **Conclusion:** Among surgical methods of treatment for stable vitiligo both suction blister grafting & split thickness grafting are comparable techniques as repigmentation obtained was good and long lasting, proves as an important adjuvant to medical therapy.

**KEYWORDS :** surgical treatment, stable vitiligo, suction blister grafting, split thickness grafting

### INTRODUCTION

Vitiligo is a common pigmentary disorder of great cosmetic concern, social embarrassment, psychological distress, and at times, a cause of disruption of familial and social relationship, especially among the dark-skinned individuals like Indians.<sup>1</sup> Noticeably, however it frequently induces emotional distress.<sup>1</sup>

Various theories related to the pathogenesis of vitiligo, such as autoimmunity, self-destructing mechanisms, neural, growth factor defect and genetic influences are taken into consideration while treating the condition.<sup>3,4,5</sup> As such there is no specific treatment for vitiligo that can cure the disease completely, various therapeutic options for repigmentation of vitiligo are available including corticosteroids, calcineurin derivatives, and phototherapy.

Surgical treatment is indicated in stable disease not responding to medical treatment. There are various surgical modalities available for vitiligo, which are based on the idea of restoring melanocytes on the recipient site. They are tissue grafting such as suction blister epidermal grafting, thin and ultrathin split-thickness skin grafting, mini punch grafting and follicular unit extraction.<sup>6</sup> Present study was aimed to compare effectiveness of surgical modalities like suction blister grafting versus split-thickness grafting in treatment of stable vitiligo at a tertiary hospital.

### MATERIAL AND METHODS

Present study was single-center, comparative, observational study, conducted in department of Dermatology, Venereal diseases & Leprosy, at Tertiary care center. Study duration was of 1 years 11 months (August 2020 to July 2022). Study approval was obtained from institutional ethical committee.

#### Inclusion criteria

- Patients of age > 18 years, either gender, with vitiligo stable for 1 year & willing to participate in present study

#### Exclusion criteria

- Patients with history of bleeding disorders or on anti-coagulant medications (aspirin, warfarin, heparin)
- Patients with active infection at the local site
- Patients with keloidal tendency
- Patients with history of recurrent Herpes labialis.
- Patients positive for HIV and HBsAg.

- Pregnancy

Study was explained to patients in local language & written consent was taken for participation & study. Initially, patients were screened at preliminary visit for stability of lesion. Patient related details such as age, sex, address, history (duration, site of onset, no. of lesions, speed of spread, stability: precipitating factor, associated systemic diseases, any H/O spontaneous repigmentation: previously taken treatment, family history/ past history/ personal history/ menstrual history was noted. findings of general & systemic examination, clinical assessment of patient (site, size, leucotrichia, mucosal involvement, Koebner phenomenon, type of vitiligo) were noted.

Hematological and biochemical investigations (complete hemogram, random blood sugar: liver function test, pregnancy test: BT/ CT/ PT, renal function test, HIV, HBsAg) were carried out in all the patients. Informed written consent was obtained from each and every patient after having carefully explained to them the nature of the treatment with possible results, possible side effects and other modalities of treatment available.

The patients were randomly divided into 2 groups by computer generated chits into

1. Group SBG - Suction Blister Grafting
2. Group STG - Split Thickness Grafting

All patients received premedication as a prophylactic course of Capsule Amoxicillin Clavulanic acid (625 mg) thrice daily started 1 day before the procedure till 7-day post-procedure. Tab. Ibuprofen 400 mg BD and Tab. Famotidine 20 mg BD was started from the day of procedure till 7-day post-procedure.

#### 1. Suction blister grafting (SBG):

After the preparation of donor site under proper aseptic conditions, blisters were raised using a 20 ml syringe and three-way cannula. The syringes act as suction cup. Their needle ends were attached to three-way cannula. Suction was attempted by means of other 20 ml syringe which is attached to another end of three way cannula. Vacuum was retained by locking the suction syringe end of three-way cannula. Once the desired pressure of 250 to 300 mm of Hg was attained, the suction syringe end was locked. The graft was harvested using iris scissors which cut blisters at margin. The graft obtained was put on sterile glass slide and washed with normal saline with dermal side upwards. The

donor site was dressed using Mupirocin cream, dry gauze pieces and surgical cannulae. After proper sterilization and anaesthesia of the recipient site, it was dermabraded using manual dermabrader until uniform pinpoint bleeding points were seen all over area. The area was abraded 1 to 2 mm beyond the existing margin. After proper hemostasis, the dermal side of the graft was placed on dermabraded recipient site followed by use of Liquid Paraffin dressing, dry gauze and was pressure dressed using elastic adhesive bandage.

**2. Split thickness grafting (STG):**

After proper sterilisation and anaesthetisation of donor site, skin was stretched and very superficial split thickness skin graft was obtained using sterile razor blade which was held by straight hemostatic forceps. The graft, larger than the area of recipient site, was taken. The donor site was dressed using Mupirocin cream, dry gauze pieces and surgical cannulae. It was placed on sterile glass slide with dermal side facing upwards and was washed with Normal Saline and punctured with 18 Gauge needle to prevent collection underneath the graft after it was placed on the recipient site. After proper sterilization and anaesthesia of the recipient site, it was dermabraded using manual dermabrader until uniform pinpoint bleeding points were seen all over area. Area was abraded 1 to 2 mm beyond the existing margin. After proper hemostasis, the dermal side of the graft was placed on dermabraded recipient site followed by use of Liquid Paraffin dressing, dry gauze pieces and was pressure dressed using elastic adhesive bandage.

The patient was advised to keep the recipient site immobile for the next 72 hrs & to continue oral and topical antibiotics for next 7 days. Topical Mupirocin cream was given after removal of first dressing. Follow up examination was done at 7 days, 15 days, 1 month then every month for 6 months. After 15 days patients were advised to apply topical Mometasone furoate 0.1% cream in the morning and topical tacrolimus 0.03% at night.

Reviews were done every 2 weeks and clinical photographs were taken on preoperative, 2 months and 6 months. The endpoint selected was 6 months post procedure or the repigmentation whichever was earlier. Grades of repigmentation<sup>7</sup> were poor (0-25 %), fair (25-50 %), good (50-75 %) & excellent (76-90 %). Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

**RESULTS**

Among 40 patients of stable vitiligo, group STG & group SBG had 20 patients each. Male to female ratio was 1:1.83. Majority patients were from the age group of 18-25 years (65 %). Mean age of patients was 24.76 ± 6.19 years. Significant findings were positive family history of vitiligo (17.5 %), unmarried patients (67.5 %) & leucotrichia (30 %). The duration of vitiligo ranged from 2-10 years with a mean duration of 3.77 ± 2.36 years.

**Table 1- General characteristics**

Characteristics	No. of patients (n=40)	Percentage
Age groups (in years)		
18-25	26	65 %
26-35	10	25 %
36-45	4	10 %
Mean age (mean ± SD)	24.76 ± 6.19	
Gender		
Male	14	35 %
Female	26	65 %
Other characteristics		
Positive Family history	7	17.5 %
Marital status - Unmarried	27	67.5 %
Leucotrichia present	12	30 %
Duration of vitiligo (years)	3.77 ± 2.36	

In present study, common area involved were face and neck (57.5 %) followed by lower extremity (20 %), trunk (12.5 %) and upper limbs (10%).

**Table 2: Site of involvement**

Site of involvement	Group SBG (n=20)	Group STG (n=20)	Total
Face and neck	13 (65 %)	10 (50 %)	23 (57.5 %)
Trunk	2 (10 %)	3 (15 %)	5 (12.5 %)

Upper extremity	2 (10 %)	2 (10 %)	4 (10 %)
Lower extremity	3 (15 %)	5 (25 %)	8 (20 %)

In present study, common type of vitiligo was of localized type (57.5 %), followed by acral (30 %) and segmental vitiligo (12.5 %).

**Table 3: Type of vitiligo**

Type of vitiligo	No. of patients	Percentage
Focal (Localised)	23	57.5 %
Acral	12	30 %
Segmental	5	12.5 %

In group SBG, 15 patients (75 %) had excellent repigmentation, 10 of which were had patch on face and neck region followed by vitiligo on Upper Limb & lower limb (10 % each) & trunk (5 %). Out of 4 patients (20 %) of good repigmentation, 2 patients had patch on head and face region while 1 each had vitiligo patch on trunk & upper limb. 1 patients (5 %) had fair repigmentation who had patch on face and neck region.

**Table 4: Results in different regions in group SBG**

Site of involvement	Face and neck	Trunk	Lower limb	Upper limb	Total
Excellent (++++)	10 (50 %)	1 (5 %)	2 (10 %)	2 (10 %)	15 (75 %)
Good (++++)	2 (10 %)	1 (5 %)	0	1 (5 %)	4 (20 %)
Fair (++)	1 (5 %)	0	0	0	1 (5 %)

In group STG, 12 patients (60 %) had excellent repigmentation, 3 of which were having patch on lower limb, 2 had vitiligo on Trunk while 7 had patch on face and neck region. 6 patients (30 %) had Good repigmentation out of which 2 patients had patch on Lower Limb region & upper limb region each while 1 had vitiligo on trunk and 1 had on face & neck region. 2 patients (10 %) had Poor repigmentation who had lesions on face and neck region.

**Table 5: Results in different regions in group STG**

Site of involvement	Face and neck	Trunk	Lower limb	Upper limb	Total
Excellent (++++)	7 (35 %)	2 (10 %)	3 (15 %)	0	12 (60 %)
Good (++++)	1 (5 %)	1 (5 %)	2 (10 %)	2 (10 %)	6 (30 %)
Poor (+)	2 (10 %)	0	0	0	2 (10 %)

Group SBG had excellent, good & fair response in 75 %, 20 % & 5 % patches while group STG had excellent, good & poor response in 60 %, 30 % & 10 % patches.

**Table 6: Comparative evaluation in different groups**

	Group SBG	Group STG
Excellent (++++)	15 (75 %)	12 (60 %)
Good (++++)	4 (20 %)	6 (30 %)
Fair (++)	1 (5 %)	0
Poor (+)	0	2 (10 %)

In present study, no immediate complication like secondary infection at donor site was noted in any group. Late complication like hyperpigmentation was seen in 2 patients (10 %) of group STG. Among patients of group STG perigraft halo was seen in 1 patient, achromic fissure was seen in 1 patient.

**Table 7- Complications**

Complications	Group SBG	Group STG
Secondary infection	0	0
Hyperpigmentation	0	2 (10 %)
Perigraft halo	0	1 (5 %)
Achromic fissure	0	1 (5 %)



**Intraoperative photographs in SBG** Photograph showing blisters

**Figure 1 - Suction Blister Grafting Technique**



Pre-Operative



At 2 Months

At 6 Months

Figure 2 - Suction Blister Grafting Technique – Pre-op &amp; Post-op



Pre-Operative

At 2 Months

At 6 Months

Figure 3- Split-thickness Grafting – Pre-op &amp; Post-op

## DISCUSSION

Surgical treatment of vitiligo has evolved over the centuries, even though the etiology and pathogenesis of vitiligo remain elusive. In present study, we compared 2 different surgical modalities (suction blister grafting vs split thickness grafting) in stable vitiligo in 40 patients in the Department of Dermatology, Venerology & Leprosy.

In suction blister grafting technique suction is used to obtain very thin skin grafts by causing a split at the dermo-epidermal junction. These thin grafts are then applied on to dermabraded recipient skin. 35,36 The advantages of are an excellent cosmetic matching and minimal chances of scarring at the recipient or donor sites.<sup>8</sup> Areas like the lips and areolae respond very nicely to suction blister grafting.<sup>8</sup> The main disadvantages are that the procedure is time consuming and can take care of a limited area of skin in a single session. The complications associated are perigraft halo of depigmentation, wrinkling and displacement of the graft and graft rejection.<sup>8,9</sup>

Split thickness grafting (STG) involves transfer of epidermis and often the uppermost part of superficial dermis to achieve transfer of melanocytes and keratinocytes from donor graft to the underlying dermabraded vitiliginous area. The thickness of the graft ranges from 0.1-0.7 mm. Surgical method of choice for stable, non-responding vitiligo. The list of complications includes stuck-on appearance, curling of the graft, displacement of the grafts, cosmetically mismatched pigmentation, milia formation, perigraft halo of depigmentation and scarring at recipient or donor areas.<sup>8,10</sup>

Out of 40 patients, 26 (65 %) patients were from age group of 18-25 years. Similar findings were observed by Kaushik Lahiri et al.,<sup>11</sup> where majority of the patients were in the age group of 16-25 years. In present study, mean age of patients was 24.76 ± 6.19 years, comparable to the study by Shah and Marfatia et al.,<sup>12</sup> where the mean age was 22.8 ± 4.8 years.

In present study, male: female ratio was 1:1.83, female preponderance signifies major cosmetic concerns among females seeking more treatment. The findings regarding sex distribution are in accordance with observation of Shah and Marfatia et al.,<sup>12</sup>

Majority of the patients were unmarried (67.5 %), which implicates that vitiligo is still a social stigma and patients seeking the treatment are majorly eligible bachelors. The leucotrichia was seen in 30 % patients. In Shah H Mehta,<sup>13</sup> leucotrichia was present in 43.5 % patients.

The duration of vitiligo ranged from 2-10 years with a mean duration of 3.77 ± 2.36 years. The duration of the disease had no role in repigmentation once the patient had attained the stable stage over two years of duration.

In present study, common type of vitiligo was of localized type (57.5 %), followed by acral (30 %) and segmental vitiligo (12.5 %). Similar findings were noted by Tawade YU et al.,<sup>14</sup> which showed majority were localized (75.5%).

In present study, 15 patients (75 %) had excellent repigmentation, 10 of which were had patch on face and neck region followed by vitiligo on Upper Limb & lower limb (10 % each) & trunk (5 %). Out of 4 patients (20 %) of good repigmentation, 2 patients had patch on head and face region while 1 each had vitiligo patch on trunk & upper limb. 1 patients (5 %) had fair repigmentation who had patch on face and neck region. Niti Khunger et al.,<sup>8</sup> found that 87% of the patients achieved excellent repigmentation with SBG, our findings were comparable with Niti Khunger et al.,<sup>8</sup> study.

In present study, 12 patients (60 %) had excellent repigmentation, 3 of which were having patch on lower limb, 2 had vitiligo on Trunk while 7 had patch on face and neck region. 6 patients (30 %) had Good repigmentation out of which 2 patients had patch on Lower Limb region & upper limb region each while 1 had vitiligo on trunk and 1 had on face & neck region. 2 patients (10 %) had Poor repigmentation who had lesions on face and neck region. Niti Khunger et al.,<sup>8</sup> found that 87% of the patients achieved excellent repigmentation with split thickness grafting.

Acral parts like tips of finger and dorsum of hands and feet were found to be less responsive. Complications like secondary infection at donor site, hyperpigmentation, perigraft halo, achromic fissure were seen in STG patients.

In present study, no immediate complication like secondary infection at donor site was noted in any group. Late complication like hyperpigmentation was seen in 2 patients (10 %) of group STG. Among patients of group STG perigraft halo was seen in 1 patient, achromic fissure was seen in 1 patient. Niti Khunger et al.,<sup>8</sup> also noted that hyperpigmentation is commonly seen in STG group of patients particularly on the exposed areas in dark-skinned patients.

## CONCLUSION

Among surgical methods of treatment for stable vitiligo both suction blister grafting & split thickness grafting are comparable techniques as repigmentation obtained was good and long lasting, proves as an important adjuvant to medical therapy. For better results, proper case selection based on the determination of stability of the lesion, patient counselling & follow up are important.

**Conflict of Interest:** None to declare

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## REFERENCES

- Jaiswal, Kailash P., et al. "The Etiological Features and Treatment of Vitiligo: A Pilot Study Prospective to Indian Scenario." *International Journal of Scientific Research in Biological Sciences* 1.01 (2014): 10-17.
- L. Lazzari, R. Colucci, A. Cammi, F. Dragoni, S. Moretti, Adult Onset Vitiligo: Multivariate Analysis Suggests the Need for a Thyroid Screening, *BioMed Research International*, 2016
- S. Vañó-Galván, P. Fernández-Crehuet, R. Grimalt, M.J. Garcia-Hernandez, Alopecia areata totalis and universalis: a multicenter review of 132 patients in Spain, *Journal of the European Academy of Dermatology and Venerology*, 2016
- Misri R, Khopkar U, Shankarkumar U, Ghosh K. Comparative case control study of clinical features and human leukocyte antigen susceptibility between familial and nonfamilial vitiligo. *Indian J Dermatol Venereol Leprol* 2009;75:583-7
- Thody, Anthony J., et al. "Pheomelanin as well as eumelanin is present in human epidermis." *Journal of Investigative Dermatology* 97.2 (1991): 340-344.
- Boissy RE, Dell'Anna ML, Picardo M. On the pathophysiology of vitiligo: Possible treatment options. *Indian J Dermatol Venereol Leprol* 2012;78:24-9
- Parul Thakur, S. Sachchanand A Study of Hair Follicular Transplantation as a Treatment Option for Vitiligo J Cutan Aesthet Surg. 2015 Oct-Dec; 8(4): 211–217.
- Khunger N, Kathuria SD, Ramesh V. TISSUE GRAFTS IN VITILIGO SURGERY – PAST, PRESENT, AND FUTURE. *Indian Journal of Dermatology*. 2009;54(2):150-158.
- Gupta S, Shroff S, Gupta S. Modified technique of suction blistering for epidermal grafting in vitiligo. *Int J Dermatol*. 1999;38:306-9.
- Khunger N. Thin split-thickness skin grafts for vitiligo. In: Gupta S, et al., editors. *In surgical management of vitiligo*. Blackwell Publishing Ltd; 2007. pp. 108–14.
- Lahiri K, Sengupta S R. Treatment of stable and recalcitrant depigmented skin conditions by autologous punch grafting. *Indian J Dermatol Venereol Leprol* [serial online] 1997 [cited 2017 Jan 12];63:11-4
- Shah AN, Marfatia RK, Saikia SS. A study of noncultured extracted hair follicle outer root sheath cell suspension for transplantation in vitiligo. *Int J Trichol* [serial online] 2016 [cited 2017 Jan 12];8:67-72
- Shah H, Mehta A, Astik B. Clinical and sociodemographic study of vitiligo. *Indian J Dermatol Venereol Leprol*. 2008;74:701
- Tawade Y V, Parakh A P, Bharatia P R, Gokhale B B, Ran. Vitiligo : a study of 998 cases attending KEM Hospital in Pune. *Indian J Dermatol Venereol Leprol* 1997;63:95-8