

**Punch Minigrafts versus Transverse Needling or Combination of
Both in Treatment of Non-Segmental Vitiligo**

INTRODUCTION

Vitiligo is a common pigmentary cutaneous disorder occurring with an incidence of 1-2% worldwide, without predilection for sex or race. ^(1, 2)

The disease is characterized by gradual loss of the normal color of the skin resulting from melanin pigment loss due to the underlying destruction of the melanocyte. ⁽³⁾

Vitiligo is a multifactorial disorder with many theories explaining its pathogenesis such as autoimmunity,⁽⁴⁾ self-destructing mechanisms,⁽⁵⁾ neural mediators,⁽⁶⁾ biochemicals,⁽⁷⁾ an imbalance of epidermal cytokines⁽⁸⁾ and genetic factors.⁽⁹⁾

Vitiligo is not a life-threatening disease, but it may cause a major social and emotional distress with significant impairment in the quality of life. ⁽¹⁰⁾

Clinically; vitiligo is classified into segmental, non-segmental and unclassified vitiligo .Non-segmental includes generalized, acrofacial,universal, mucosal (more than one mucosal site) , mixed (associated with segmental vitiligo) and other rare variants. Segmental vitiligo includes uni- ,bi- or pleuri-segmental subtypes. Unclassified includes focal or mucosal (one site) subtypes. ⁽¹¹⁾

Treatment options for vitiligo include attempting repigmentation of affected areas,

depigmentation of non-involving skin or camouflage if neither is effective. Repigmentation could be attempted using medical therapy, surgical modalities.⁽¹²⁾

Topical medications include corticosteroids or calcineurin inhibitors. Ultraviolet radiation therapy, such as narrow-band ultraviolet B light (NB-UVB), is also widely used. It is minimally invasive, has few adverse effects and provides a good response rate. Excimer laser or light has become available for use recently, and favorable

treatment results have been reported.⁽¹³⁾

When medical treatments are ineffective, surgical treatment is indicated.⁽¹⁴⁾

The basic principle of all surgical methods is transfer of melanocytes from uninvolved skin into a stable vitiliginous lesion not responding to other lines of

treatment, where they function as effective epidermal melanin units.⁽¹⁵⁾

Surgical modalites are divided into two groups, tissue grafting and cellular grafting.

Tissue grafting includes dermoepidermal grafts, split thickness skin grafts, punch

grafts/minigrafts, and epidermal grafts/blister roof grafts. While cellular grafting

includes cultured or non-cultured epidermal suspensions.⁽¹⁶⁾

Transverse needling is a recently described technique in the treatment of stable

vitiligo. It is believed to induce pigmentation in treated areas by physically moving

melanocytes from pigmented edges of the lesions into depigmented marginal areas

using a horizontal needle moving within the skin tangentially between the two zones.^(17, 18)

AIM OF THE WORK

The aim of this study is to evaluate the effectiveness and tolerability of autologous punch minigrafting, transverse needling technique or combination of both followed by narrow band ultraviolet B phototherapy (311 nm) in the treatment of patients with stable non-segmental vitiligo lesions.

PATIENTS

This study will be carried out on twenty patients having non segmental vitiligo recruited from the attendants of the dermatology and phototherapy outpatient clinics of the dermatology, venereology and andrology department, faculty of medicine, Alexandria University.

Approval of the medical ethics committee of Alexandria Faculty of Medicine will be obtained. An informed written consent for participation in the study and photography will be taken from every participant included in the study after full explanation of the study protocol.

❖ Inclusion criteria:

- Adult patients (>16 years old) of either gender having stable non segmental vitiligo, that is resistant to other lines of repigmentation therapy.
- Stability will be defined in terms of ;^(14,19,20)
 - Lack of progression of old lesions with the past 6 months.
 - No development of new lesions within the same period.
 - Absence of history of koebner phenomenon.
 - Absence of confetti lesions or hypopigmented lesions within the past 6 months.
 - Presence of repigmentation of depigmented areas by medications or spontaneously in the past 6 months.

- While resistance to therapy will be judged after receiving standard protocol of NB-UVB together with oral mini pulse dexamethasone at a dose of 2.5 mg on two consecutive weekly days for 3 months.⁽²¹⁾
- Patients having lesions showing absence (0%) or poor (<25% according to VASI score) repigmentation after this regimen will be considered resistant to medical repigmentation and indicated to surgery. ^(22,23)

Exclusion criteria:-

- Cases of active, progressive disease lacking criteria of stability previously mentioned.
- Patients with segmental or universal vitiligo covering more than 70% body surface area.
- Patients with known associated autoimmune diseases, bleeding tendency, current or history of skin neoplasia, photosensitive disorders or any contraindications to corticosteroids therapy.
- Patients with tendency towards hypertrophic scars or keloid formation.
- Pregnant female and lactating mothers.
- Patients with emotional and psychological instability.

METHODS

All included patients will be subjected to:

- History taking focusing on duration of the disease, age at onset , progression, site of lesions, number ,date and site of last activity of the affected lesions.
- Family history , previous medications and response to them and general medical history
- General clinical examination and determination of skin phototype.
- Dermatological examination for confirmation of the diagnosis.
- Base line VASI scoring.
- VETF scoring using wood's light examination.
- Base line standardized photography for the lesions.

For each included patient in the study, three main lines of surgical treatment will be used in different areas and compared to a non-surgically treated areas as control.

LINE 1; Autologous punch mini grafts:⁽²⁴⁾

Under local anesthesia, multiple 1mm holes will be made in the depigmented treatment area using 1mm punch graft instrument inserted to a depth of 2-4 mm to remove a small column of depigmented skin that is to be discarded. The punches will be situated at or very close to the border of the lesion to avoid leaving an achromic fissure and will be separated by 5-8 mm distance from each other.

On the donor area mostly is the gluteal area, punches will be harvested using the same sized punches very close to each other so that maximum number of grafts can be taken from a small area.

Then the harvested-punch minigrafts will be inserted into the recipient chambers, pressed firmly by saline soaked gauge for hemostasis and secured by sterile strips or a compression bandage if applicable.

LINE 2; Transverse needling technique: (17, 18)

Needling will be done for selected treatment patch using a 30 G disposable insulin syringe, going from the pigmented margins of the lesion into the vitiliginous patch, Position of the needle will be kept close to the dermoepidermal junction and movement will be from normal skin towards the lesion. Needle pricks may lead to oozing of a small drop of blood which will be managed by physical pressure. No dressings will be needed. The procedure will be repeated for selected lesions weekly for a duration of 3 months.

LINE 3;Punch minigrafts followed by transverse needling:

In a third lesion, punch minigrafts will be done as mentioned in line 1 and will be left to stabilize for 3 months then transverse needling will be done weekly for the margins of the lesion as well as the areas of the punch grafts toward the vitiliginous area.

- A fourth lesion will be chosen as a control lesion, to which no surgical treatment will be attempted.
- All lesions will receive NB-UVB therapy according to standard protocol twice weekly and the patients will continue on the oral mini pulse dexamethasone at 2.5 mg dose for two consecutive days weekly all through the study period.
- All included patients will be followed up for a duration of 6 months following interventions.⁽²⁵⁾
- Follow up will be done by clinical examination, wood's light and serial photography at each follow up visit.
- Clinical assessment of disease severity initially , after 3 months and at end of 6 months using **Vitiligo Area Scoring Index (VASI);**⁽²⁶⁾
For each body region, the VASI will be determined by the product of the area of vitiligo in hand units (which was set at 1% per unit) and the extent of depigmentation within each hand unit–measured patch (possible values of 0, 10%, 25%, 50%, 75%, 90%, or 100%).
The total body VASI will be calculated using the following formula by considering the contributions of all body regions (possible range, 0-100):

$$\text{VASI} = \sum_{\text{All Body Sites}} [\text{Hand Units}] \times [\text{Residual Depigmentation}]$$

- Serial photography will be done to evaluate type, pattern and extent of repigmentation.
- Assessments of repigmentation will be performed by two blinded dermatologists using a 5-point scale; grade 0 (no repigmentation), grade 1

(1%-5%), grade 2 (6%-25%), grade 3 (26%-50%), grade 4 (51%-75%) and grade 5 (76%-100%).⁽²⁷⁾

- Extent of peri punch repigmentation in mm using a ruler.
- Digital assessment of the size of the lesion and of the depigmented versus repigmented area using Adobe photoshop software.
- Patient satisfaction assessment using visual analogue scale (VAS) after treatment period grading as (VAS, 0-10; 0 grade will be defined as “Not satisfied at all” while grade 10 will be defined as “completely satisfied”).⁽²⁷⁾
- Time till appearance of repigmentation will be calculated for each procedure.
- Possible side effects of the NB-UVB (erythema , itching and burning) , of the systemic steroids (weight gain, increase in blood pressure, insomnia ,acne ,agitation or menstrual disturbances) or of surgery (ecchymosis , scaring , cobble stoning or color mismatching) will be reported.⁽²⁸⁾

ETHICS OF RESEARCH

Research on human or human products:

- ✓ Prospective study: Informed consent will be taken from patients. In case of incompetent patients, the informed consent will be taken from the guardians.
- Retrospective study: Confidentiality of records will be considered
- DNA / genomic material: Informed consent for DNA / genomic test and for research will be taken from patients. No further tests will be carried out except with further approval of committee and patients. If the samples will travel outside Egypt the researcher will be responsible for transportation and security approval.
- All drugs used in the research are approved by the Egyptian Ministry of Health

Research on animal:

- The animal species are appropriate for the test.
- After test, if the animal will suffer, it will be euthanized and properly disposed.
- After operation, it will have a proper postoperative care.

RESULTS

The results of the study will be tabulated and analyzed with the use of appropriate statistical methods and appropriate figures and diagrams in order to fulfill the aim of the work.

DISCUSSION

The results will be discussed in view of achievement of the aim, their significance and their comparison with previous related studies in literature.

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