

# Efficacy of narrowband ultraviolet B phototherapy with needling in patients of vitiligo

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**Abstract** *Objective* To determine the efficacy of narrowband ultraviolet B therapy (NBUVB) with needling in patients of vitiligo.

*Methods* A total of 100 cases were included in this study. In each patient a patch of 15 to 5 cm diameter skin area was selected as a target lesion for the study. Needling was done on the whole patch with a disposable insulin syringe, from the pigmented margins or the islands in the vitiliginous patch. After the procedure, the whole patch was subjected to NBUVB. The repigmentation was assessed according to 5-grades scale.

*Results* Out of 100 patients of vitiligo, 45% males and 55 % females, treated with NBUVB with needling, 58% patients showed grade 4 response i.e. 75% or more repigmentation.

*Conclusion* Narrowband UVB with needling is an effective, useful and well-tolerated therapy for treatment of vitiligo.

**Keywords**

Narrowband ultraviolet B therapy, needling, vitiligo.

## Introduction

Vitiligo is a multifactorial disorder with a complex pathogenesis. It has a worldwide prevalence ranging from 0.5% to 4%. It has a profound negative psychosocial impact, especially in coloured races.<sup>1</sup> Although exact mechanism is unknown, but due to genetic predisposition, immune-mediated injury or other unidentified toxins, the melanocytes stop their function or physically disappear in the affected epidermis while those in the hair follicle are usually spared.<sup>2</sup> There is frequent association of vitiligo with other autoimmune diseases. HLA types associated with vitiligo include A2, DR4,

DR7, and Cw6.

The treatment of vitiligo is based on the principles of stimulating the existing melanocytes in the affected area or repopulating it with functioning melanocytes.<sup>3</sup> Conservative therapies include photochemotherapy with psoralens and ultraviolet A (PUVA), phototherapy alone with ultraviolet B (UVB) radiation (broadband UVB 290-320 nm, narrowband UVB (NBUVB) 311 nm), topical and systemic steroids and pseudocatalase. The newer therapeutic options include treatment with topical immunomodulators (tacrolimus, pimecrolimus), analogues of vitamin D3, excimer laser and surgery/transplantation.<sup>4-6</sup>

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Repigmentation is best seen on face and neck (60-70%) as compared to trunk and limbs (40-50%). Hands, feet and lips show poor results

while some patches may not respond to any of the modalities. Grafting techniques are also used such as minigrafts and autologous cultured melanocytes.

A simple technique used to treat vitiligo is that of needling which is used as an adjunct to ultraviolet therapy. Needling is the procedure in which melanocytes are pushed by a needle from pigmented margins towards the white area of vitiligo. It has been seen that patients who are treated with needling and phototherapy show better response in terms of repigmentation than those treated with phototherapy alone. Some reports even show complete repigmentation of vitiliginous patches after repeated needling.<sup>7</sup>

Repigmentation of white patches with needling occurs mainly from melanocytes which are physically dragged or pushed by the tip of the needle from coloured margins of the patch or islands of pigment present within the patch. These islands are either already present or are produced during needling and serve as a source of melanocytes available for further spread.<sup>8</sup> In a study conducted in Lahore, Pakistan in 2006 by Ahmed *et al.*<sup>7</sup>, 79 (94%) patches showed good to excellent response after six months of combination therapy of needling and NBUVB.

This clinical study was planned to evaluate needling as an adjunct to NBUVB therapy in patients with vitiligo as there are very few national and international studies available.

## Methods

A total of 100 patients of vitiligo, fulfilling the inclusion criteria were enrolled in this study during the period of one year from July, 2010 to June, 2011 in Dermatology Department, Jinnah Hospital, Lahore. All 100 patients completed the study.

Patients of 15 to 50 years of age, of either sex, with localized patch of vitiligo of 15 x 5cm size and for more than six months duration were included. Patients with bleeding/coagulation disorders (decreased platelet count, prolonged BT, CT, PT, APTT), pregnancy, history of hypertrophic scarring or keloids formation, history of photosensitivity, personal (clinical examination) or family history of skin cancer, lip-tip variety of vitiligo, trichrome vitiligo and leucotrichia were excluded.

After informed consent, demographic data (name, age, gender and contact address) was taken on a standard pre-designed proforma. In each patient a patch of 15 x 5 cm skin area was selected as a target lesion for the study. Needling was done on the whole patch with a disposable insulin syringe, from the pigmented margins or the islands in the vitiliginous patch, by one of the researchers (SB). Position of the needle was kept close to the dermoepidermal junction and movement was from normal skin towards the white centre (**Figure 1**). After the procedure, the whole patch was subjected to NBUVB. Exposure was increased by 20% on every fourth visit. Each patch was subjected to needling and phototherapy three times every week, till complete recovery or for 6 months whichever came first.

Examination for repigmentation was done after every 4 weeks. Target lesion was measured at day 1, after 3 months and then at the end of the study (6 months). Final assessment was made according to a 5-grade scale ranging from G0 to G4 for assessment of efficacy as defined in operational definition.

**Table 1** Grades of repigmentation.

G4	≥75% repigmentation	Excellent
G3	50-75% repigmentation	Very good
G2	25-50% repigmentation	Good

G1	Up to 25% repigmentation	Satisfactory
G0	No repigmentation.	Poor

**Table 2** Distribution of cases by sex and age (n=100).

<i>Sex</i>	
Male	45
Female	55
<i>Age (years)</i>	
Mean	30.9±3.4
15-20	12
21-30	40
31-40	27
41-50	21
<i>Duration (months)</i>	
6	48
7-12	12
13-18	25
19-24	15

**Table 4** Grades of repigmentation in the study patients (n=100).

Grades	Female (n=55)	Male (n=45)	Efficacy
G4	33 (60.0%)	25 (55.6%)	Yes
G3	18 (32.8%)	15 (33.3%)	Yes
G2	2 (3.6%)	3 (6.7%)	No
G1	2 (3.6%)	1 (2.2%)	No
G0	-	1 (2.2%)	

G4=excellent, G3=very good, G2=good, G1=satisfactory, G0=poor.

**Table 5** Efficacy of narrowband ultraviolet B therapy with needling.

Efficacy	N (%)
Yes	91
No	09

The data were entered and analyzed in a SPSS version 16.0. Numerical variables like age presented as mean ± standard deviation. Frequency table was generated for nominal variables like gender and efficacy.



## Results

Out of 100 cases, 45 (45.0%) patients were male

**Figure 1** The process of needling on vitiliginous patches.



**Figure 2** Grade 4 (>75% improvement) with needling and narrowband UVB therapy.

while 55 (55.0%) patients were female (**Table 2**). Distribution of cases by age showed that the majority of the patients i.e. 40 (40.0%) were between 21-30 year and minimum 12 (12.0%) patients were 15-20 years old with mean age of 30.9±3.4 years (**Table 2**).

Duration of vitiligo was as follows: 48 (48.0%) patients had duration of 6 months, 12 (12.0%) patients had 7 months, 25 (25.0%) patients had 13-18 months and 15 (15.0%) patients had 19-24 months duration of vitiligo (**Table 2**).

Out of 100 cases, 58 (58.0%) patients showed excellent grade of repigmentation (G4) at the end of six months (**Figure 2**), majority were females and age range was 20-30, 33 (33.0%) patients showed very good grade (G3), 5 (5.0%) patients showed good grade (G2), 3 (3.0%) patients showed satisfactory grade (G1) and 1 (1.0%) showed poor grade (**Table 3**)

Narrowband ultraviolet B therapy with needling was found to be efficacious i.e. very good to excellent grades (G3-G4) of repigmentation in 91% patients (**Table 4**).

In our study most patients showing efficacious response were females with age range 21-30 years, most of the patches of vitiligo started repigmentation from periphery and fewer patches showed the perifollicular pattern of repigmentation. Patches of vitiligo on hairy areas showed better response as compared to nonhairy areas. There was no effect of duration of vitiligo or site (photoexposed/ covered skin).

### **Discussion**

Current treatment modalities for vitiligo suppress the immune response and /or stimulate the proliferation of melanocytes with UV radiation.<sup>9</sup>

Phototherapeutic options require long term treatment on a twice weekly or thrice weekly basis over many months or years. Response rates for the standard modalities, including systemic and topical PUVA, and broadband and narrowband UVB radiation are highly variable, averaging approximately 51% for PUVA, 57% for UVB and 63% for NBUVB. Although narrowband UVB radiation has been shown to be most efficacious with an optimal side-effect profile, reported treatment series require 6-12 months of treatment before optimal results are seen.<sup>10</sup>

In 1997, Westerhof and Nieuweboer-Krobotova<sup>11</sup> first reported the use of NBUVB phototherapy for the treatment of vitiligo. In their comparative study, 67% of patients undergoing NBUVB phototherapy showed repigmentation, compared with 46% of patients receiving topical PUVA, after 4 months of therapy. The authors concluded that NBUVB was slightly, but not significantly, more effective than topical PUVA. The lower cumulative dose and fewer side-effects were significant advantages with the use of NBUVB as compared to PUVA.<sup>12</sup>

Yones *et al.*<sup>13</sup> demonstrated that at the end of therapy, 64% of patients treated by narrowband ultraviolet B (NB-UVB) showed greater than 50% improvement in body surface area affected.

Scherschun *et al.*<sup>14</sup> retrospectively analyzed their experience of treating vitiligo with NBUVB administered as monotherapy three times a week. Five of their seven patients achieved more than 71% repigmentation with a mean of 19 treatments, whereas the remaining two patients showed 50% and 40% repigmentation after 46 and 48 treatments, respectively.

In a meta-analysis of nonsurgical therapies in generalized vitiligo by Njoo *et al.*<sup>15</sup> higher success rates were observed with NBUVB (63%) than oral PUVA (51%). In an important attempt to develop evidence-based guidelines for the treatment of vitiligo, NBUVB therapy was recommended as the most effective and safe therapy for generalized vitiligo.<sup>16</sup>

In 2008 Ahmed *et al.*<sup>7</sup> reported that needling is an adjunct to NBUVB therapy in localized vitiligo and concluded that 94% patients showed good to excellent response after six months of needling with NBUVB exposure. Needling is a safe, effective and promising adjunct treatment to NBUVB for repigmentation of non responding vitiligo.

In 2012, Mohaghegh *et al.*<sup>17</sup> reported that as their patients tolerated the needling procedure well, it was a quite simple and easy method for the physician, and there was also no reported long-lasting side effect, it could simply be added to the routine NBUVB therapy.

In 2013 Cindy *et al.*<sup>18</sup> reported that patients treated with the needling method yielded favorable results, with repigmentation rates ranging from 25-50%, with one patient having 90% repigmentation

In present study, the efficacy of narrowband ultraviolet B therapy with needling was 91%.

Results of the study done by Ahmed *et al.*<sup>7</sup> are also comparable (94%) with our (91%) results, in terms of efficacy of needling with NBUVB in treatment of patients of vitiligo.

### Conclusion

Needling combined with NBUVB phototherapy is a useful addition to therapeutic options in the treatment of vitiligo.

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