

A comparative study of the mini-punch grafting and hair follicle transplantation in the treatment of refractory and stable vitiligo

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Background: Some vitiligo lesions are resistant to all medical treatments.

Objective: We sought to compare the efficacy of hair follicle transplantation and mini-punch grafting for the treatment of refractory vitiligo lesions.

Methods: A total of 25 patients with stable and resistant vitiligo participated in the study. In each patient, a resistant vitiligo patch was divided into 2 equal parts. One part was treated with hair follicle transplantation and the other part with mini-punch grafting. Postsurgically, the recipient areas were exposed to narrowband ultraviolet B twice a week for 6 months. The diameter of the repigmentation around each graft was measured monthly.

Results: At the end of the sixth month, 68% of follicle grafts, and 72% of mini-punch grafts, had repigmentation. The mean diameter of repigmentation around follicle grafts was 5 ± 1.7 mm and around punch grafts was 5.3 ± 1.6 mm. There was no significant difference between the 2 groups statistically ($P = .18$).

Limitations: Small sample size and short time of follow-up are limitations.

Conclusions: Because the results of the 2 methods are not statistically different and mini-punch grafting is much easier to do than follicular transplantation, we recommend mini-punch grafting to treat drug-resistant vitiligo. (J Am Acad Dermatol [10.1016/j.jaad.2013.11.044](https://doi.org/10.1016/j.jaad.2013.11.044).)

Key words: Ahvaz; grafting; hair follicle; punch; resistant; transplantation; vitiligo.

Vitiligo is an acquired skin pigmentary disorder characterized by circumscribed white macules and patches. Affected individuals have a vast reduction of quality of life, and psychological problems.¹⁻³ Treatment of vitiligo is often difficult and prolonged. Many treatments have been suggested.

The disease is primarily treated by medical therapies but complete repigmentation is rare. Most vitiliginous lesions respond well to medication, however, a few of them may not repigment in spite

of long-term therapy and even with a combination of several medical therapeutic regimens. A surgical technique may be necessary to obtain an optimal result for such refractory lesions. Several surgical methods have been developed including mini-punch grafting,^{4,5} hair follicle transplantation,⁶ suction blister epidermal grafting,^{4,7} split-thickness grafting,⁸ transplantation of cultured autologous melanocytes,⁹ and noncultured melanocytes grafting.^{10,11} This study was designed to compare the efficacy of 2 surgical techniques (mini-punch

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Conflicts of interest: None declared.

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grafting and hair follicle transplantation) in the treatment of resistant and stable vitiligo patches. To our knowledge, there is no study comparing these 2 surgical techniques simultaneously in the same patient for the treatment of refractory and stable vitiligo.

METHODS

This prospective comparative trial was conducted from May 2012 to May 2013 in the outpatient department of Imam Khomeini Hospital, Ahvaz, Iran. The ethics committee of Jundishapur University of Medical Sciences, Ahvaz, Iran, approved the protocol of the study (eth-436, 1391.2.2). Vitiligo was considered resistant when it had not responded to standard medical treatments during the past 2 years. Stable vitiligo was defined when no progression of the old lesions and no development of new lesion was observed in a patient during the past year. Exclusion criteria included ages younger than 12 or older than 60 years, pregnancy, lactation, hepatitis, HIV infection, history of photosensitivity or skin cancer, or a tendency to keloid formation. All patients with vitiligo who have been under treatment in previous years but left with some resistant patches that did not respond to any treatment were allowed to participate in the study, if they fulfilled the defined criteria and signed the consent form.

Skin lesions on different anatomic regions of the body may show different response to treatments. Therefore, we decided to apply the treatments on the exact same lesion, rather than trying to spot totally symmetric lesions on the opposite sides of the body. In this way we made sure the conditions for both methods were as similar as possible.

One resistant patch in each patient was selected according to the patient's preference. The lesion was divided into 2 equal parts with a straight line passing in the middle of the lesion. A random number table was used to randomly assign the treatments to each half. One half of the lesion was treated with single hair follicle transplantations and the other half with mini-punch grafts. On each side, grafts were implanted 1 cm apart from each other. Follicular isolation technique was used for follicle grafting. Hair follicle donor site was occiput. Unlike most previous trials, we transplanted complete hair follicles and did not cut a third lower part of it. It

was explained to the participants that some unwanted hairs may grow on their lesions.

The nearest anatomic site of normal pigmented skin to the recipient patch was chosen as the donor for mini-punch grafting. This decision was taken to assure the highest similarity of texture and color of the donor to the recipient site. We used 1-mm

punches both for donor and recipient sites. Dressing was removed after 1 week, and then the recipient areas were exposed to narrowband ultraviolet B twice a week for 6 months. Patients were treated initially with an irradiation dose of 0.2 J/cm² followed by 20% increments at each visit if tolerated. The diameter of the repigmentation around each graft was measured monthly by a ruler in millimeters. The data were

analyzed using software (SPSS, Version 19.0, IBM Corp, Armonk, NY). We used K² and *t* test to compare the data. Statistical significance was assumed at *P* less than .05.

RESULTS

A total of 25 patients (21 women and 4 men) with nonsegmental vitiligo participated and all completed the study. Their mean age was 26.7 years (range, 20–47 years). In all, 20% had Fitzpatrick skin type II, 52% type III, and 28% type IV. The most common site of grafting was the wrist (40%) then the elbow (16%). In 44% of the patients, the hair color on the vitiligo lesions was white (Table I). A family history of vitiligo was positive in 20% of the patients.

The transplanted hairs grew in black in all lesions and did not change color in the course of the treatment. One month into the treatment, follicular isolation technique was more effective than mini-punch grafting statistically, with 2 ± 0.6 mm of repigmentation relative to 1.6 ± 0.4 mm ($P < .03$). Nevertheless, there was no statistical difference between the efficacies of the 2 techniques in the following months. At the end of the study, the follicular grafts in 68% of the patients and the mini-punch grafts in the 72% of the patients showed repigmentation (Figs 1 to 4). The mean diameter of repigmentation was 5 ± 1.7 mm around follicular grafts and 5.3 ± 1.6 mm around mini-punch grafts ($P < .18$) (Table II). No complications such as Koebner phenomenon, scar formation, and cobblestoning were observed in our patients.

CAPSULE SUMMARY

- Hair follicle transplantation and mini-punch grafting are useful surgical methods for the treatment of drug-resistant vitiligo.
- The efficacy of the 2 techniques was not significantly different but mini-punch grafting is much easier to do.
- We recommend mini-punch grafting to treat drug-resistant vitiligo.

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