Motorized 0.8-mm micropunch grafting for refractory vitiligo: A retrospective study of 230 cases

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Background: Punch grafting for vitiligo is time-consuming and can result in cobblestone-like appearances. We devised a motorized 0.8-mm micropunch grafting procedure to overcome these limitations.

Objective: To assess the therapeutic effectiveness and adverse events associated with micropunch grafting in refractory vitiligo.

Methods: We retrospectively reviewed 230 cases in 208 patients with stable vitiligo who underwent motorized 0.8-mm micropunch grafting during January 2015-August 2017. Treatment success was defined as ≥75% repigmentation, and factors associated with the outcome were assessed.

Results: Overall, 181 of 230 lesions (78.7%) achieved treatment success after a median of 6 months with postoperative excimer therapy. Lesions on the face and neck, and disease stability of ≥12 months were good prognostic factors for treatment success. Common adverse events were color mismatch (24.8%) and cobblestone appearance (18.3%). Overall, the treatment was tolerable.

Limitations: This was a retrospective study.

Conclusion: Micropunch grafting using a motorized 0.8-mm punch can successfully treat refractory vitiligo with short procedure times and excellent outcomes. This technique could be a rapid and convenient surgical option with acceptable adverse events and is promising for treating refractory vitiligo on an outpatient basis, particularly in patients who are unlikely to tolerate prolonged surgery. (J Am Acad Dermatol 2018;79:720-7.)

Key words: grafting; operation; punch grafting; surgery; transplantation; vitiligo.

Vitiligo is a long-term skin condition characterized by white patches with selective loss of melanocytes.[1] It affects 1% of the population worldwide and can have a profound impact on quality of life.[2,3] Although phototherapy, including

Abbreviations used:

CI: confidence interval
OR: odds ratio
UV: ultraviolet

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narrow-band ultraviolet (UV) B and excimer laser treatments, has been widely used to treat vitiligo, nonsurgical treatments are not always successful.[4] Thus, surgical treatment would be a viable option for patients with refractory vitiligo.[5]

Surgical techniques for vitiligo include punch grafting, suction blister grafting, and cellular grafting.[6] Punch grafting, a method of directly transferring 1−2-mm punch grafts from donor to recipient sites,[7] is easy to perform and does not require any specialized equipment. However, its adoption has been limited as it is time-consuming and can lead in some cases to a cobblestone appearance. Suction blister grafting, ie, taking intact epidermis from the donor site using negative pressure and transplanting it to the recipient site, has been used for the treatment of vitiligo, but this method is also time-consuming, difficult to use when treating large lesions, and associated with adverse events, such as color mismatch and perilesional halo.[8] Cellular grafting using cultured or noncultured suspensions of epidermal cells has the advantage of being able to treat large recipient sites with small amounts of donor tissue.[9] However, this technique requires a long procedure time and special laboratory equipment in addition to a skilled team.

While there are pros and cons for each of these surgical techniques, punch grafting has a number of advantages, particularly for the treatment of small lesions. We developed a micropunch grafting technique involving the application of a motorized 0.8-mm punch to overcome the disadvantages of conventional punch grafting. We performed a retrospective review of vitiligo patients treated with this technique to evaluate its effectiveness and examine factors associated with treatment success and adverse events.

CAPSULE SUMMARY

- Punch grafting for vitiligo is time-consuming and could result in a cobblestone appearance.
- Micropunch grafting using a motorized 0.8-mm punch yields excellent results with a short operation time.
- Micropunch grafting represents a convenient surgical option for refractory vitiligo.

METHODS

Study design and setting

This was a retrospective interventional case-series study. Medical records and photographs of 230 cases in 208 patients with refractory vitiligo who underwent motorized 0.8-mm micropunch grafting during January 2015-August 2017 in our clinics were retrieved and analyzed. Grafting was performed for stable vitiligo lesions that had not improved with nonsurgical treatment for 3 months. The stable vitiligo lesion was defined as no progression for >3 months. We included patients who received excimer laser treatment for at least 3 months after grafting to assess the treatment response. This study was approved by the institutional review board of St. Vincent's Hospital (VC17RESI0108).

0.8-mm motorized micropunch grafting

A stainless-steel punch 0.8 mm in diameter loaded into the handpiece of a micromotor (SST-C1, Ilooda Co, Suwon, Korea) was used for skin grafting from both donor and recipient sites. The micromotor was adjusted to a speed of 900-1200 rotations/min, with a torque-to-speed ratio of 1:8. The donor sites were the back of the ear or the postauricular region. Both recipient and donor sites were cleaned with antiseptic solution followed by injection of 2% lidocaine with epinephrine at a concentration of 1:200,000. At recipient sites, the skin was removed to create chambers for planting grafts at intervals of 4 mm using the motorized micropunch. At donor sites, the grafts were harvested at intervals of 1 mm using the motorized micropunch. The grafts were handled with curved jeweler forceps and then placed in recipient chambers. Hemostasis was achieved on both sites by applying gentle pressure and covering with sterile gauze. Hydrocolloid and Steri-Strip (3M, Maplewood, MN) dressings were applied to the donor and recipient sites, respectively, without suturing for 1 week.

Postsurgery excimer laser treatment

One week after surgery, all patients were treated with a 308-nm xenon chloride excimer laser (E1, Jetema, Seoul, Korea) on 2 nonconsecutive days per week. The dose was initiated at 100 mJ/cm^2 and increased by 50 mJ/cm^2 at subsequent sessions until pink erythema appeared and persisted for 24 h. Topical 0.1% tacrolimus ointment (Protopic, Leo Pharma Inc, Ballerup, Denmark) was applied twice weekly to all surgical sites throughout the laser treatment period.

Covariates

Age, sex, body site, disease duration, size, disease stability, postoperative time, and subtype (focal, segmental, and nonsegmental) were used as