Melanocyte transplantation – a variation of the micrografting technique

Transplante de melanócitos – Variação da técnica de microenxertia

DOI: http://www.dx.doi.org/10.5935/scd1984-8773.2018102907

ABSTRACT
Vitiligo is an acquired pigmentation disorder characterized by the development of well-defined achromic macules in the skin. It is deemed stable when no new lesion emerges or when pre-existing lesions do not undergo changes for at least one year. In these cases, surgical treatment is an important therapeutic option. Punch micrografting is the most commonly performed melanocyte transplantation technique, resulting in excellent repigmentation. The authors describe a variation of this technique using even smaller and finer grafts (consisting of epidermis and thin dermis), in order to achieve aesthetical outcomes that are better than those obtained with the traditional technique, especially when treating areas with significant aesthetic impairment.

Keywords: Melanocytes; Transplantation; Vitiligo

INTRODUCTION
Vitiligo is an acquired pigmentation disorder, characterized by well-defined achromic macules on the skin with loss of epidermal melanocytes. Lesions are localized or generalized, and may coalesce into large depigmented areas. Given the contrast between the affected areas and normal skin, it is more disfiguring in high phototypes and has a profound impact on the patients’ quality of life.1

Incidence of vitiligo is 1-2% in the world population, affecting genders equally, and all ethnic groups. Several theories have been proposed aimed at explaining its pathogenesis, including biochemical, neural and autoimmune hypotheses. A multifactorial etiology, known as convergence theory, is currently proposed.2 Vitiligo is classified into two main clinical groups: segmental and non-segmental. According to its activity level, it can be stable or unstable. It is considered stable when no new lesion appears or when preexisting lesions do not change over at
least one year. This fact is relevant since surgical treatment is a therapeutic option reserved for stable vitiligo. Patients with segmental vitiligo, unlike those with the non-segmental variant, are more resistant to treatment, despite the fact they present good response to surgical treatment.

There are two important pre-requisites for surgical treatment with melanocyte transplantation: i) the vitiligo must be stable and ii) there must be lack of response to other modalities of clinical treatments available. In those cases, patients may benefit from surgical treatments, which correspond to the transplantation of melanocytes, and can be performed using two main techniques: transplantation of cutaneous tissue or cell suspension to the affected areas.

Punch micrografting – a method for transplantation of cutaneous tissue – is the most frequently performed surgical technique. For its execution, the recipient area is prepared by performing multiple holes using punches that are 0.25 or 0.5mm smaller in diameter than the grafts harvested from the donor area, which measure up to 1mm for facial areas and up to 1.2mm for other regions. Larger grafts may lead to a cosmetically undesirable effect, known as cobblestoning (the appearance of). Punch micrografting assures an excellent repigmentation, with around 75% of treated patients reaching between 90 and 100% pigmentation.

In the present study, the authors describe a variation of the punch micrografting technique, using even smaller and thinner grafts, aimed at achieving better aesthetic outcomes when compared to those obtained with the traditional technique in cases of stable vitiligo without response to clinical treatments.

METHODS

Two female patients bearing stable facial segmental vitiligo for more than two years without response to clinical treatment were selected (Figures 1 and 2). Both had been clinically treated with 1% hydrocortisone cream for 3 months and subsequently with 0.03% tacrolimus for another 3 months, totaling 6 months of treatment, during which they also underwent 2 weekly phototherapy sessions.

The selected donor area was the retroauricular region, from where fragments were harvested with 2mm punches, after local anesthesia (Figure 3). Donor fragments are composed of epidermis, dermis and subcutaneous layers. After the removal, shaving was performed aimed at carefully separating the papillary dermis and epidermis from the reticular dermis and subcutaneous layer. Next, with the assistance of a magnifying glass, the grafts consisting only of dermis and epidermis were cut into smaller fragments (Figure 4).

After anesthetizing the recipient area, one of these small fragments was placed on the tip of an 18G needle and the anesthetized area pierced with the needle’s bevel. With the aid of a forceps, the fragment was pushed into the orifice using the needle, which was carefully removed so as to leave the fragment at the perforated site (Figures 5 and 6). All the harvested fragments are implanted in the recipient area in this way, with an average distance of 1cm between them.
After the procedure, no local dressing was performed, as usual. Patients were instructed not to wash their face on the same day, not to remove hematic crusts nor rub with towels for 7 days. It is not necessary to use sunscreen, since the crusts themselves protect the micrografts. The treated patients underwent 2 weekly sessions of UVB phototherapy after the surgical stage: 27 sessions for the one who received the graft in the left upper eyelid region and 20 sessions for the other, who was treated in the regions of the glabella, cheek, upper lip’s skin, right lateral nasal region and right mandibular region.

**RESULTS**

Both patients experienced repigmentation in the treated area. The one who was treated in the left upper eyelid region underwent 3 surgical procedures, with an interval of 6 months between them, achieving 90% of repigmentation in the eyelid in the period of 6 months after the last surgery session (Figure 7). The other patient, who had vitiligo lesions in the regions of glabella, cheek, upper lip’s skin, right lateral nasal wall and right mandibular region, underwent 2 surgical procedures with a 6-month interval between them, experiencing repigmentation in roughly 60% to 70% of the lesion up until 3 months after the last transplant of melanocytes (Figure 8).

With this technique, it was possible to observe that the donor fragment adapted to the recipient area in a simple and complete way, avoiding differences in the skin’s surface that would otherwise evidence the grafted areas. The appearance of the treated area became smooth and aesthetically acceptable after the procedure, with repigmentation beginning close to the mini-grafts and spreading around. All implanted grafts promoted pigmentation. Both patients were satisfied with the treatment. There was no side effect in these cases.

**DISCUSSION**

Melanocyte transplantation is an important therapeutic option for patients with a stable disease that does not respond to classical treatment. The surgical treatments available to treat vitiligo are aimed at promoting a reserve of melanocytes in order to stimulate repigmentation in refractory lesions. In this manner, the authors used a variation of the micrografting technique of melanocyte transplantation to treat two female patients with facial lesions and suffering considerable psychological impact.
Given that these are lesions affecting the face of women, it is crucial to take into account the aesthetic involvement. Therefore, the authors of the present article developed this technique, aiming at achieving better aesthetical outcomes than those obtained with the traditional punch micrografting technique, which may be associated with some adverse effects – such as static grafting (absence of spreading of the pigment), cobblestone effect, postinflammatory hyperpigmentation, graft failure and scar formation – considering it a variation of the traditional.7,12

By removing the subcutaneous layer and deep dermis from the graft, its possible to obtain a better fitting into the recipient area, preventing the graft from being more elevated than the surrounding skin. In addition, smaller fragments are associated with fewer local side effects and stimulate pigmentation as much as the traditional punch micrografting technique.

CONCLUSION
This variation of punch micrografting technique has proven effective in the repigmentation of two patients with stable vitiligo on the face. No side effects were observed, and there was good acceptance of the recipient area to the mini-grafts. The authors conclude that this variation of the traditional technique is promising in the treatment of stable vitiligo, in delicate areas that require considerable aesthetic concern. In addition, the technique is straightforward and inexpensive. Further studies are needed in order to verify these outcomes in a greater numbers of patients.

REFERENCES

DECLARATION OF PARTICIPATION:
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