Non-cultured epidermal cell suspension and laser resurfacing to improve the appearance of thick post-burn skin graft

Dear Editor,

Non-cultured epidermal cell suspension (NCES) has a variety of indications in pigmentary disorders apart from vitiligo, including post-burn depigmentation, post-herpetic depigmentation, chemical leukoderma and depigmentation in discoid lupus erythematosus patients. In addition to depigmentation, non-cultured epidermal cell suspension has also been found to be useful to treat colour mismatch, variegation and textural changes that occur after surgery in vitiligo patients. Non-cultured epidermal cell suspension is potentially useful to replace any uneven texture formed as a sequela of a disease or its intervention with a more uniform homogenous epidermis. Here, we present a novel use of non-cultured epidermal cell suspension to improve the appearance of post-burn skin graft over the face.

An 18-year-old female presented to us seeking improvement in the appearance of a skin graft. She had severe burns on the left side of the face 10 years ago, for which a large, full-thickness skin graft using the thigh as the donor site was done 6 years ago by a plastic surgeon. At presentation, the thick graft was distinctly noticeable, being hyperpigmented and raised compared to the rest of the face [Figure 1a]. It also had prominent follicles and covered almost the whole of the left side of the face. The graft had a ‘stuck-on’ appearance on the

Figure 1a: A patient with a distinctly noticeable hyperpigmented thick post-burn graft on the face. The graft was elevated compared to the rest of the facial skin, appeared stuck-on and had prominent follicles. A small linear scarred area was present within the graft over the zygomatic ridge.

Figure 1b: Non-cultured epidermal cell suspension (NCES) for thick post-burn graft. The graft epidermis has been dermabraded.

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Mehta, et al. NCES for thick post-burn graft

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The patient was highly dissatisfied with the appearance. She had not shown any significant improvement with the use of modified Kligman’s regimen for 3 months prior to taking up for surgery.

For non-cultured epidermal cell suspension, the cellular suspension was prepared using the standard technique. The skin of the post-burn graft was superficially dermabraded till the level of papillary dermis (indicated by the development of pin-point bleeding) [Figure 1b]. The cell suspension was applied over the dermabraded area and then covered with dry collagen sheet, a transparent film dressing and an adhesive plaster. The dressing was removed after 1 week and the eroded area was allowed to heal spontaneously without any medications. One month after non-cultured epidermal cell suspension, the color of the grafted site matched well with the rest of the face and there was also moderate flattening of the tissue, getting rid of the stuck-on appearance [Figure 1c]. Subsequently, four sessions of fractional CO₂ laser ablation of the raised graft were done, at monthly intervals starting 2 months after the non-cultured epidermal cell suspension. This resulted in homogenisation of colour, further flattening of the graft, merging of the graft margins with the periphery, significant reduction of the follicular prominences and significant improvement in texture. However with time increased pigmentation was noticed in the grafted skin compared to the surrounding skin despite photo protection and sunscreen use [Figure 1d]. Overall, the graft was significantly less noticeable and the patient was moderately satisfied. The resultant graft had a much better aesthetic appearance, rated as 5 out of 10 on an investigator global assessment scale by us. The patient rated the overall improvement in appearance as 7 out of 10 on a visual analogue scale.

There were no immediate post-procedural complications and the patient tolerated the procedure well. A small previously scarred area over the zygomatic arch healed slowly with superficial erosions persisting till a month after procedure. Subsequently, it healed with mild dyspigmentation.

Epidermal cell suspension has been used for the management of burns and non-healing ulcers and wounds as it leads to faster re-epithelialisation. Dermabrasion or ablative CO₂ laser alone without transplanting the non-cultured epidermal cell suspension would have resulted in a longer time to reepithelization for such a large surface area. Non-cultured epidermal cell suspension promoted faster healing and lesser inflammation. Non-cultured epidermal cell suspension combined with dermabrasion is also reported to improve dyspigmentation caused by vitiligo treatments and colour of scars. Therefore, we hypothesise that non-cultured...
epidermal cell suspension helped in achieving relatively homogenous lightening of the graft in this patient.

In conclusion, non-cultured epidermal cell suspension can be useful in alleviating the colour, texture and skin thickness mismatch between the thick skin grafts and the surrounding skin with good patient satisfaction.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent.

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Conflict of interest
There is no conflict of interest.

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