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ORIGINAL ARTICLE

Effect of Dermabrasion and ReCell® on Large Superficial Facial Scars Caused by Burn, Trauma and Acnes△

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Key words: dermabrasion; ReCell®; scars; Patient and Observer Scar Assessment Scale

Objective To explore the effects of dermabrasion combined with ReCell® on large superficial facial scars caused by burn, trauma and acnes.

Methods Nineteen patients with large superficial facial scars were treated by the same surgeon with dermabrasion combined with ReCell®. According to the etiology, patients were classified into post-burning group (n=5), post-traumatic group (n=7) and post-acne group (n=7). Fifteen patients completed the follow-ups, 5 patients in each group. Healing time, complication rate, the preoperative and 18-month-post-operative assessments using Patient Satisfaction Score (PSS), Vancouver Scar Scale (VSS), and Patient and Observer Scar Assessment Scale (POSAS) of each group were analyzed to compare the effect of the combined therapy on outcomes.

Results The healing time of post-burning group (19.6±4.0 days), post-traumatic group (15.8±2.6 days), and post-acne group (11.4±3.1 days) varied remarkably (F=7.701, P=0.007). The complication rates were 60%, 20%, and 0 respectively. The post-operative POSAS improved significantly in all groups (P<0.05), where the most significant improvement was shown in the post-acne group (P<0.05). The post-operative PSS and VSS improved only in the post-traumatic group and post-acne group (all P<0.05), where the more significant improvement was also shown in the post-acne group (P<0.05).

Conclusions The combined treatment of dermabrasion and ReCell® has remarkable effect on acne scars, moderate effect on traumatic scars and is not suggested for burn scars. POSAS should be applied to assess the therapeutic effects of treatments for large irregular scars.

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SKIN injuries such as burning, laceration and acne infection represent a major health care burden and inevitably heal with some extend of scars. Unaesthetic scarring is associated with physical and psychosocial consequences, and nowhere is this truer than large ones in the face. Revision of large facial scars is difficult, yet the superficial ones might be relatively more curable since their therapeutic goal is basically to improve the appearance instead of function.

Dermabrasion is widely used to reduce skin lesion, and has been increasingly applied with skin grafts or biomaterials to cover the post-braded defects.[1, 2] However, they are not appropriate to cover large defects. ReCell® has been repeatedly reported to facilitate epithelialization of large skin defects.[3-5] The combination of ReCell® and dermabrasion were used in the treatments of scars or nevus.[6,7] With the increasing popularity of ReCell® application, clinical indications of the combined therapy should be well addressed, especially when it comes to the treatment of large scars in face. To our knowledge this is the first study to attest and compare the effect of dermabrasion combined with ReCell® on the treatment of different types of large superficial facial scars.

PATIENTS AND METHODS

Patients' selection

Since January 2012 to December 2012, patients who came to Plastic Surgery Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College for scar revision were recruited in the study based on the predetermined inclusion and exclusion criteria. The inclusion criteria were: (1) the Han nationality people at the age of 15-30. (2) Superficial scars that were defined as those with the height or depth less than 2 mm from the surrounding normal skin depending on the clinician's experience. (3) Stable scars that occurred more than 12 months, without progressive tendency and sensation of pain and itches. (4) Facial scars with size ≥8 cm in length or ≥25 cm^2 in area. (5) Scars caused by burning, trauma or acnes. The exclusion criteria were: (1) Patients unable to take care of wounds themselves. (2) Patients unable to give informed consent. (3) Patients unavailable for follow-up. (4) Patients with a history of hypertrophic scar or keloid or any other past history that might affect the treatment directly or delay wound healing.

This study was approval by the Institutional Ethics Board of Plastic Surgery Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College. Informed consent was signed before treatment. Photographs in the paper were released with the permission of the patients.

Pre-operative assessment

Three types of assessment scales were used, including Patient Satisfaction Score (PSS), Vancouver Scar Scale (VSS, Table 1), and Patient and Observer Scar Assessment Scale (POSAS, Fig. 1). POSAS consists of Patient Scar Assessment Scale (PSAS) and Observer Scar Assessment Scale (OSAS).[8] Each patient was trained to evaluate PSS and PSAS before operation. Three trained clinicians assessed VSS and OSAS blindly to the grouping. The average score of VSS and OSAS was taken for further statistical analysis.

Operation

For each patient, the operation was conducted by the same plastic surgeon. After general anesthesia, scars were gently abraded by mechanical dermabrasion (Medtronic Inc., MN, USA) until pinpoint bleeding was observed. Hemostasis of the abraded area was achieved with topical application of 1% lidocaine and epinephrine. A thin split-thickness cutaneous biopsy (0.2-0.3 mm) was performed at post-auricular area and the tissue specimen was used to produce cellular suspension through ReCell® devices (Avita, Australia). The harvested ReCell® suspension was sprayed directly onto the post-dermabraded area. Non-adherent dressings were then placed on the operated area.

Table 1. Numerical scale of Vancouver Scar Scale

1. Vascularity	Score
Normal	0
Pink	1
Red	2
Purple	3
2. Pigmentation	
Normal	0
Hypo-pigmentation	1
Mixed	2
Hyper-pigmentation	3
3. Pliability	
Normal	0
Supple	1
Yielding	2
Firm	3
Ropes	4
Contracture	5
4. Height	
Flat	0
<2 mm	1
2-5 mm	2
>5 mm	3