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VACUUM SKIN-ABRASION VERSUS GLYCOLIC ACID PEELING IN THE TREATMENT OF ATROPHIC ACNE SCARS

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Synopsis

Glycolid acid , an alphahydroxyacid, is an natural ingredient derived from sugar-cane. The cosmetic use of AHA dates back to thousands of years ago. Cleopatra was used to taking a bath in the sour milk (lactic acid) and to put the improved red wine (tartaric acid) on her face. This habit made her skin fresh and downy.
The glycolic acid reduces the thickening of the corneum and facilitates the brushing off of the superficial cells, since it weakens the cohesion of corneocytes.
The vacuum dermabrasor avails of the abrasion effect produced by the microcrystals shooted on the epidermis which, delicately and uniformly, peel off the superficial layers.

Riassunto

L'acido glicolico, un alfaidrossiacido, è una sostanza naturale estratta dalla canna da zucchero.
L'uso cosmetico degli AHA risale a migliaia di anni fa. Cleopatra era solita fare il bagno nel latte acido (acido lattico) ed applicare sul viso vino rosso (acido tartarico), al fine di rendere la pelle liscia e vellutata.
Gli effetti dell'acido lattico sull'epidermide sono soprattutto cheratoplastici ed esfolianti dal momento che riduce le coesione cheratinocitaria.
Il dermoabrasore esplica il suo effetto abrasivo attraverso un getto di microcristalli che, colpendo l'epidermide delicatamente ed uniformemente, ne rimuovono gli strati superficiali.

Introduction

Scarring occurs to some degree in about 95 per cent of acne subjects[1,2]. The most common types of post-acne scarring may present as thickened scars (hypertrophic or keloid scarring) or as tissue loss (atrophic ice-pick, macular atrophic and follicular macular atrophic scars)[1-3].
The atrophic scars have a hollow, whitish and persistent appearance which make the skin appear irregular.
These unsightly lesions have induced dermatologists to seek more than one method (table I) to alleviate the problem[4]. Glycolic acid peeling and vacuum skinmicroabrasion are the most popular techniques employed today to treat acne atrophic scarring. Although based on different mechanisms, both of them stimulate epithelial proliferation and raise the depressed surface to the surrounding skin[5-7].
This study compares the two methods by evaluating their beneficial effects as well as their drawbacks.

Patients and methods

Twenty patients, 10 males, 10 females, aged from 20 to 30 years, with atrophic acne scars were enrolled in the study. Ten were treated with vacuum microabrasion, 10 with 70% glycolic acid peeling. All patients had type III Fitzpatrick skin. Scar lesions were no greater than 0,5 cm and persisted for over six months.
We used a vacuum-operated skin abrader type (V.M. - Medicale) that projects a sterile microcrystal flow over the skin, which removes uniform surface layers without causing any heat damage (microabrasion). We operated with a 0,5-0,7 atm vacuum, and a 0,5 cm throw-away head. The handle was first used along the major axis of the lesion to abrade the bottom. After, it was passed perpendicularly from the axis to level the edges to the bottom. It was then rotated to flush the edges and bottom to the surrounding surface. The handle was sometimes pressed to increase the abrasive effect and to use the sharp rim of the head as a chisel[5].
When bleeding appeared, we stopped microabra-

Table 1

MAIN TREATMENTS USED FOR POSTACNE ATROPHIC SCARS

Intralesional therapy	placenta extracts jaluronic acid collagen
Surgery	punches elevation
Physical treatments	cryotherapy dermoabrasion motor-driven - diamond milling cutter - metal brush microabrasion vacuum operating
Chemical peeling	resorcin trichloroacetic acid 70% glycolic acid

sion. Bleeding is necessary because it indicates that the epithelial proliferative layer has been reached, and must not be surpassed to avoid new scarring[5]. Glycolic acid disrupts ionic linking among corneocytes (epidermolysis), stimulates the proliferation of the basal layer and increases penetration of other substances. It also causes the building up of collagen fibres in the papillary dermis, elastic fibres in the reticular dermis and glycosaminoglycine in the dermal matrix[8-10]. Epidermolysis is obtained by applying the acid at a 70% concentration over the skin. It reaches the stratum granulosum after 60 seconds, and the dermo-epidermal junction 5 minutes later[9-12]. Throughout the application, frosting of the treated surface and later erythema, more or less associated with a dotted hemorrhaging, occur. Redness persists for 48 to 90 hours. Crusts appear after 24-48 hours and treated surface re-epithelialization is completed within 5 to 7 days.

We limited the number of microabrasion and glycolic acid applications to ten and the interval between two treatments ranged from 10 to 15 days. The patients were advised to clean the skin with an abrasive substabce for about 5 minutes once a day to detach the crust and prolong the therapeutic effect. They were also instructed to apply antibiotic and non-steroid antinflammatory creams and to avoid photoexposure or to shelter from it by using total block screens. The reduction in the number of lesions was evaluated by a macrophotographic fieldmetre. Two field samples, measuring 4 x 4 cm in diameter, with the greatest number of lesions were considered in each photograph. A simple millimetric probe provided the depth and the diameter of the lesions. Four lesions were sampled. Measurements at the beginning and the end of the therapeutic cycle were expressed in percentages.

Table 2

MICROABRASION VERSUS GLYCOLIC ACID PEELING
IN THE TREATMENT OF POSTACNE ATROPHIC SCARS

	Skin-abrader (microabrasion)	*70% glycolic acid peeling*
action	mechanical	chemical
preoperative treatment	not needed	topic keratolytic for 15 days
square area treated each time	< 10 cm^2	whole face
time for each treatment	10'-15'	3'-5'
interval between treatments	10 -15 days	10 -15 days
postoperative treatment	abrasive detergent	gentle topical remover
post-treatment clinical features	erythema	erythema
	exudation	slight exudation
	bleeding	frost
	pain	burning
	moderate oedema	possible crusting
	crusting	
clinical improvement (means)	79,16%	75,70%
number	75,24%	70,80%
depth	80,15%	77,60%
diameter	82,10%	78,70%
manegeability	good	excellent
cost	considerable	low

Furthemore the presence of erythema and hyperpigmentation together with their intensity were measured by a chromameter at the beginning and at the end of therapy.

Results

For both techniques , the results were based on the decline in number, in depth and in diameter of the lesions and on a whole evaluation of side effects, cure time and operating costs. The results are summarized in table II.

Discussion

The mechanical action of microabrasion causes hemorrhage. This gives us an indication of the depth reached during an application. Glycolic acid, on the other hand, produces epidemolysis which appears like frost. This can only give us a rough estimate of the depth reached.
Microabrasion brought about a 79,16% recovery of the lesions. This was 4% higher than the 75,6% produced by glycolic acid . The better result was from its mechanical action. The head of the microabrasor acted on the lesion surface alone, while the acid had to be spread on the entire skin surface to be treated. Glycolic acid peeling gave us a wider treatment surface, one covering the whole face, within five minutes. Microabrasion, instead, called for a more limited treatment surface (<10 cm^2) and took an average of 10-15 minutes to perform. The well-tollerated burning sensation caused by the acid started about 2 minutes after an application and was maximum at 5 minutes. The pain incurred from microabrasion was immediate and increased as the application went on. It was, however, reduced by a topical anaesthetic.
In contrast to traditional dermoabrasion with milling cutters, persistent erythema, oedema and hyperpigmentation were rarer side effects. There was only one case of conjunctivitis as a result of acid application. Since microabrasion works with inert crystal, it could not cause irritant chemical dermatitis.
The microabrasor is a simple, though expensive, instrument. It requires routine maintenance of a pnemautic circuit and the purchase of steril crystals. Glycolic acid is a one time expense which is more or less the same as microcrystals alone.
Regardless of the technique, the resolution of the scar tissue and adverse effects, depend on patient age and phototype, the site and the age at onset. The younger the patient is, the quicker and the better the healing occurs[5]. When scars are old they call for longer treatment schedules, while those of recent onset require fewer application[5]. Moreover, since IV and V skin phototypes have more frequent hyperpigmentations, we dealt with Fitzpatrick type III subjects.

Conclusions

As previously described[5] microabrader is a handy tool for the operator. Furthemore, its closed circuit does not damage the environment. The throw away heads and inhert sterile crystal make it preferable to peeling with glycolic acid. However, to treat wide surfaces it requires more time and many therapeutic applications. A single treatment lasts 10 minutes, and intervals between applications take 10-15 days.
Peeling treatment with 70% glycolic acid is simple to carry out. Its evaporation however may cause conjuctivitis and it is not available in sterile packs. The entire face can be treated quickly but it also calls for numerous applications.
Both tecniques can be carried out in an out patient therapeutic application and although neither can fully heal the scars, they at least give the patient relief. These therapies have no major influence whatever on lifestyle. When erythema and edema occur, no special treatment is normally needed.
Furthemore patients can interrupt or return to treatment at any given time.
We recommend microabrasion for deep and wide atrophic macular scars. In contrast, we prefer glycolic acid peeling for follicular and ice-pick atrophic acne scars, which are generally smaller and shallower.

For the best results we suggest that both techniques be used on altenative way.

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