Morphological changes of the skin following microdermabrasion and chemical peeling

Eman E Abu-Dief

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EDITORIAL

Dermatologists and plastic surgeons use a variety of skin resurfacing and rejuvenating procedures to improve the skin appearance. Of these, chemical peels and microdermabrasion are simple and non-invasive procedures commonly used to alleviate some disorders such as acne, spots, scars, wrinkles, photo aging, stretch marks and to restore more youthful skin appearance (1,2). These techniques cause skin injury either mechanically through flow of crystals under high pressure or by the use of chemical peeling agents. This injury accelerates exfoliation and stimulates epidermal and dermal repair with normal healthy skin texture and appearance (3). This means that the old damaged skin is removed and replaced by newer one and hence the term skin rejuvenation. This article focuses on the histological changes of the skin following microdermabrasion and chemical peeling.

Microdermabrasion and chemical peeling cause manifestations of skin injury and inflammation. These changes include cytoplasmic vacuolations, increased intercellular spaces, paucity of desmosomes among epidermal cells and increased number of Langerhans cells. Collagen bundles of abnormal periodicity and high micro vessel density and angiogenesis were also demonstrated (4,5).

Both modalities also showed manifestations of wound healing (6-10). previous researches revealed increased epidermal thickness and increased dense regularly arranged collagen and elastic fibers deposition (1,3,4,11-15). There was dermal lymphocytic infiltration, large number of fibroblasts and high cell proliferation index (4,5 and 14).

In general, manifestations of cell injury are minimal while those of wound healing are more pronounced in microdermabrasion (4,6). This is may be attributed to the fact that microdermabrasion is an abrasive technique targeting the superficial layers of the epidermis without affecting the deeper layers and this explains that most effectiveness of this modality is in repairing superficial lesions such as fine lines, superficial scars and early photo aging. The extent of these manifestations depends on the rate and velocity of the movement of the hand piece and the volume flow of the crystals of the micro abrader (16).

Chemical peeling is classified as superficial, medium and deep peels. The depth correlates with the histological changes, being mostly in deep peels (17). The most frequently used peeling agents are salicylic acid, glycolic acid, lactic acid, trichloroacetic acid, Jessner solution and phenol. The morphological changes induced by resurfacing modalities may be explained by that the repetitive injury of these procedures stimulates cytokines and inflammatory mediators secretion by the injured cells and consequently stimulates skin rejuvenation and remodeling (15,18). Also, the induced injury stimulates transcription factors that enhance expression of genes involved in growth, proliferation and differentiation (9,19). The increased proliferative activity of the epidermis can modulate dermal fibroblasts increasing its count and activity (4,20) secreting more collagen and elastic fibers and glycosaminoglycan and decrease matrix degradation (15). The molecular mechanisms of the morphological dermal and epidermal changes following different resurfacing skin modalities need further studies (21).

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CONFLICT OF INTEREST

None.

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Department of Medicine, Sohag University, Sohag, Egypt

Correspondence: Dr Eman E Abu-Dief, MD, Department of Medicine, Sohag University, Sohag, Egypt, Telephone 0020 1229016461, email eman_elmadany@yahoo.com

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