Microabrasion: An Epidermal Abrasion

Microabrasion, which abrades the epidermis but does not extend into the dermis, is a mild level of injury that is useful in treating dull, rough texture; dyschromias; comedonal acne; keratosis pilaris; distensible acne scars; and fine lines. Results vary with the use of positive or negative pressure, choice of abrasive crystals, and operator technique. (Aesthetic Surg J 2003;23:137-139.)

In microabrasion, a vacuum-driven machine with a handpiece is used to bombard the skin surface with abrasive aluminum oxide crystals. These angular crystals, usually measuring about 100 microns, create a microtrauma in which cells are gently abraded from the skin surface. In effect, the skin surface is “blasted away” by the abrasive particles. However, it is notable that unlike industrial sandblasting, which uses positive pressure to propel its abrasive crystals, all microabrasion machines, with the exception of one, use negative pressure to suck the abrasive particles across the skin surface. This vacuum effect may contribute to the efficacy of the procedure.

The depth of abrasion is variable. Most commonly, microabrasion is used to strip off the stratum corneum (dead-cell layer) from the skin surface. Classic microabrasion, also described as “microepidermabrasion,” abrades the epidermis and does not extend down into the dermis. Therefore, I use the term “microabrasion” as opposed to “microdermabrasion.” This mild level of injury makes for treatment with no downtime, frequently referred to as a “lunchtime peel.” Microabrasion may be successfully used to create a deeper abrasion, extending all the way down to the dermis. However, it is no more effective at doing this than other previously used modalities such as chemical peeling and ablative lasers.

The depth of abrasion depends on the size of the abrasive particle, the intensity of vacuum applied to the skin, and the number of passes of the handpiece over the skin surface. The more passes of the handpiece over the skin, the deeper the resulting abrasion.

A few articles have documented the clinical and histologic changes associated with microabrasion therapy. Not only are many different microabrasion machines in use, but they are used differently. Variables such as vacuum intensity and different abrasive crystals of varying sizes influence results. Although a pattern of clinical and histologic changes is demonstrated with all microabraders, the effects of one type of microabrader cannot be generalized to apply to all microabrasion machines. Additionally, some operators achieve better results than others because of their technique. Therefore microabrasion treatments and clinical outcomes differ.

When microabrasion was first brought to the United States, several years ago, many physicians dismissed it as a gimmick. Why would a superficial abrasion of the stratum corneum have any positive effect on the skin? The answer lies in the histology of the wound that is created. In several clinical studies, microabrasion has been shown to increase epidermal and dermal thickness in addition to increasing blood supply in the treatment area. Much of this is a physical response to the removal of the stratum corneum. It has been demonstrated that stripping off the stratum corneum with tape, acne scrubs, or glycolic acid peels produces reactive thickening of the epidermis and, in many cases, the dermis. In addition, removing the protective barrier of the skin increases penetration by topical agents. This enhanced penetration is one of the more significant effects of microabrasion. Now that we have more effective topical agents, including growth factor agents and topical vitamins, enhanced skin penetration permits improved efficacy. Therefore we can also consider microabrasion a drug-delivery device. After observing the results of microabrasion, I have found the following conditions to be appropriate indications for its use: dull,

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rough texture; dyschromias; comedonal acne; keratosis pilaris; distensible acne scars; and fine lines. However, the degree of improvement with distensible acne scars and fine lines is highly variable.

Microabrasion is performed as part of a treatment series. I usually perform 4 to 6 treatments, 2 or 3 weeks apart. I insist that patients use topical skin-care products during their treatment series. Products are chosen on the basis of the patient’s clinical needs, such as bleachers for dyschromias and retinoids and growth factors for fine wrinkling. Figures 1 and 2 demonstrate the clinical effectiveness of microabrasion.

**Treatment Technique**

Cleanse the patient’s face first with soap and water and then with alcohol, and allow it to dry. Place the patient in a semireclining position with a towel tucked around the neck and a hair cap as protection from the aluminum oxide crystals. Instruct the patient to keep his or her eyes closed during the procedure. Some physicians advocate the use of protective eyewear, but if you are using a negative-pressure machine and the patient is instructed to keep the eyes closed, there should be no risk of ocular injury. As a precaution, have some saline eye drops ready to flush any crystals from the eye.

Make several passes with the microabrader over the patient’s entire face. Continue treatment until overall erythema is visible in the treatment area. Treatment may also be extended to the neck, chest, arms, hands, and back.

In my experience with a Dermagenesis microabrader (Genesis Biosystems, Lewisville, TX), the resulting erythema correlates with biopsy-proven removal of the stratum corneum. Fair-skinned, ruddy patients may demonstrate erythema after just one pass only, which obviously does not penetrate deeply enough to remove the stratum corneum. Therefore, for safety, it is important to stop the first treatment at the point of erythema and then to question the patient on the next visit about his or her post-treatment experience. If the patient experienced erythema, swelling, or sensitivity for 12 to 24 hours, the

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**Figure 1.** A, Pretreatment view of a 31-year-old woman with discernible scars. B, Posttreatment view after 5 treatments with superficial microabrasion that removed the stratum corneum. Note that this level of improvement is significantly better than that achieved in most patients.

**Figure 2.** A, Photodamaged facial skin biopsy specimen before treatment. B, After 5 superficial microabrasion treatments. Note the increased thickness of the epidermis and increased collagen deposition in the papillary dermis.
treatment was as aggressive as possible, and I would be tempted to try another type of superficial peel, such as Jessner’s.

Normally I use a vacuum setting of about 4 to 5 on our machine, but the millimeters of mercury that this equals is not shown. The vacuum level may be turned up or down, depending on the patient’s comfort and skin thickness. Patients with thin skin and significant photodamage need a lower vacuum setting, or linear areas of purpura may result from the handpiece suction.

On completion of therapy, dust off the abrasive crystals and apply a hydrating mask. After the mask is removed, I apply a chemical-free sunscreen and send the patient home with instructions to use bland cleansers and moisturizers for 1 or 2 days. Remember, any procedure that removes the stratum corneum will increase transepidermal water loss, making the skin surface temporarily drier. Therefore hydrating the skin is very important for the first few days, and failure to do so will lead to irritation and dehydration, creating an appearance of increased fine lines. After 24 to 48 hours, the patient can resume a normal skin-care regimen.

Over the course of a microabrasion series in conjunction with the use of appropriate skin care products, patients should be able to appreciate a softer texture and more uniform skin color. They may also note improvement in acne, superficial acne scars, or fine lines.

Microabrasion is an effective form of superficial “peeling.” It improves the color and texture of skin but usually has only minimal effects on scars and wrinkles. Results are not just operator-dependent; they also depend on the machine type, particle size, and degree of vacuum. There is no question that this therapy is “real” and creates reproducible histologic and clinical changes. Additionally, patients like the immediate gratification of smoother skin rather than having to wait a few days for a chemical peel to heal.

The most interesting but still unanswered question about microabrasion is why removal of the stratum corneum should cause changes in the dermis. Presumably this is due to some type of wound-healing response and activation of growth factors. It may be that the use of suction temporarily dilates the superficial dermal plexus, allowing the increased delivery of “nutrients” and growth factors. Histologic studies comparing positive-pressure and negative-pressure microabrasion should help answer this question.

Bibliography


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