Treatment of Acne Scarring

The latest techniques

KENNETH A. MARK, MD, and DEBORAH S. SARNOFF, MD

ABSTRACT: Acne is the most common cause of facial scars in the world. The technique used for scar correction will be dictated by considerations such as the type(s) of scarring present, the number of scars, and whether the patient can avoid sun exposure. Techniques include dermabrasion; microdermabrasion; laser resurfacing; chemical peeling; subcision; soft tissue augmentation; suture-assisted resurfacing; and punch elevation, punch excision, and punch grafting. It cannot be overstated that the patient and clinician must have realistic expectations. As with most of today's cosmetic procedures, the best results are often obtained by combining several modalities and tailoring the treatment to each individual patient. (*Women Health Primary Care* 2001;4(12):770-773)

Despite the advent of isotretinoin more than 20 years ago, many patients still present with acne scarring. Because of recent technologic advances and the development of creative techniques by today's cosmetic surgeons, there has never been more hope or options for these patients.

This article is designed to inform primary care clinicians about the advances that have been made in the treatment of acne scarring, so that they can better advise patients and provide appropriate referrals. It will begin by reviewing the types of acne scarring patients may have and highlighting important considerations, such as the patient's skin type.

The article will then summarize the different procedures that can be offered to patients: dermabrasion; microdermabrasion; laser resurfacing; chemical peeling; subcision; soft tissue augmentation; suture-assisted resurfacing; and punch elevation, punch excision, and punch grafting. These techniques require advanced dermatologic surgical skill and full knowledge of their risks and benefits, of which types of acne scars respond best to which modality, and of how different skin types may respond.

The authors are affiliated with the Department of Dermatology of New York University School of Medicine. Dr. Mark is a Clinical Instructor. Dr. Sarnoff is a Clinical Assistant Professor.

SCARRING

Acne is the most common cause of facial scar in the world.[1] Patients with acne scars are often frustrated by their attempts to mask their appearance. Makeup may collect around the rim of widened "saucer-like" indentations and actually make the scars more noticeable.[2]

The technique of scar correction will be dictated by the type(s) of scarring present and the patient profile. The three main types of acne scars are[1,2]:

- Indented, relatively deep "ice-pick" scars.
- "Broad-based," atrophic, distended scars.
- Thickened, elevated, or "cord-like" hypertrophic scars.

A patient may have multiple types of acne scars that require various treatment modalities.

Before a cosmetic procedure, the clinician and patient must consider:

- How much recovery time the patient can afford with regard to work and home responsibilities.
- The patient's ability to comply with postoperative instructions.
- Whether the patient can avoid sun exposure in order to minimize the risk of post-inflammatory pigment alterations.

The number of scars is also important. For example, a few atrophic scars may be treated with a local injectable filler substance, whereas a large area of scarring may require a more invasive resurfacing proce-

dure. Additional considerations include the patient's budget, expectations, and Fitzpatrick skin type (Table 1). Patients with Fitzpatrick skin types IV, V, and VI (typically, Asians, Hispanics, and blacks, respectively) may not be good candidates for certain resurfacing procedures, given the risk of post-inflammatory hyperpigmentation.

It cannot be overstated that the patient and clinician must have realistic expectations when considering scar correction techniques. Because of acne scarring, a patient may have been suffering for many years and may often feel tormented, self-conscious, or depressed, or may even be more seriously disturbed. These powerful emotions can result in low self-esteem and unrealistic hopes for the procedure. Any corrective procedure *helps* acne scarring, but it does not give the patient perfectly smooth skin.

Dermabrasion

In dermabrasion, a wire brush or diamond fraise is used to "abrade" the epidermis and papillary dermis. The resulting wound heals with a tighter blanket of collagen. Perhaps the best known and, traditionally, most-often performed modality, dermabrasion has been used for more than seven decades. It is well established and has a predictable healing course.

Disadvantages of dermabrasion include hypopigmentation, bleeding, and, as compared with laser resurfacing, decreased precision. In addition, aerosolization of blood and of viral tissue particles occurs.[3]

Microdermabrasion

This relatively new technique involves the use of aluminum, salt, or diamond microparticles to bombard the skin and a suction apparatus to vacuum away the most superficial layer(s) of the epidermis. There is minimal to no recovery time, but the results are extremely subtle and require many treatment sessions.[4]

Table 1. Fitzpatrick skin classifications

Skin type I
Persons with this skin type have blond or red hair and very fair skin, and they often have freckles and blue eyes. They easily burn, never tan, and are extremely sensitive to ultraviolet light. They are almost always of Irish, Scottish, or Celtic descent.

Skin type II
Persons with this skin type usually have freckled skin, blue or hazel eyes, and red or blonde hair. They typically burn easily and tan slightly or slowly.

Skin type III
Persons with this skin type have fair skin and are blond or brunette. They tan slowly and moderately, gradually turning to a light brown color.

Skin type IV
Persons with this skin type usually have olive-colored skin, dark eyes, and dark hair. They tan easily and burn slightly and seldom. They are usually of Asian, Mediterranean, or Native American descent.

Skin type V
Persons with this skin type are similar to those with skin type IV, but they never burn. They are usually of Hispanic descent.

Skin type VI
Persons with this skin type have dark eyes and hair. They are usually of African descent.

Laser resurfacing

Today, more acne scars are treated with laser resurfacing than with any other method. Laser resurfacing allows for more precise ablative control than do traditional techniques. A beam of light that is attracted to water in the skin is used to vaporize the top layers of the skin. The tissue is selectively heated, which tightens existing collagen and promotes new broad bands of collagen to form as healing takes place. Multiple passes with the laser are required for deeper scars. The two main lasers employed for this technique are the pulsed carbon dioxide (CO_2) and the erbium:YAG. In general, the CO_2 laser allows greater correction with fewer passes, but it requires more recovery time than does the erbium:YAG. A distinct advantage of the CO_2 laser is that it produces a bloodless surgical field.[5]

Risks of laser resurfacing include hypertrophic scarring; depigmentation; hypopigmentation; and herpes simplex, bacterial, or yeast infections. However, it remains the procedure of choice for patients with severe scarring.

Chemical peeling

The main chemical peeling agent used today is trichloroacetic acid. Other common acid agents, such as α-hydroxy acids, fruit acid/glycolic acid, and salicylic acid, effectively treat acne, fine lines, and wrinkles, but they are too weak to improve acne scars. The lower the pH and the greater the acid concentration, the greater the inflammation, risks, and benefits. Potential negative outcomes include pigmentary alterations and scarring. This method has been largely replaced by laser techniques, although some advocate its use when only a few atrophic scars are present.[6]

Subcision

This technique is valuable for widened, distended, atrophic scars, particularly when they are relatively few in number. A 22-gauge hypodermic needle is inserted under the skin through a needle puncture and used to cut the tethered fibrous bands that anchor the scar. This procedure also stimulates the formation of the body's own collagen,

Figure 1. Numerous atrophic acne scars *are evident on this patient's left cheek.*

which will aid in further correction of the defect.[7]

The risks of subcision include bruising, lack of response, overcorrection, and epidermal tearing.

Soft tissue augmentation

Various filling agents can be used to "build-up" depressed scars. For more than 20 years, bovine collagen has been used.[8] Newer options include human cadaver collagen, collagen from the actual patient that is obtained prior to re-implantation, and fibroblasts from the patient that are grown in tissue culture and reinjected into the patient to "produce a constant supply of new collagen."[9]

Soft tissue augmentation is appropriate for treating atrophic scars that are relatively few. The technique requires minimal recovery time, but its results are temporary. Risks include allergic dermatitis, lack of response, and, rarely, overcorrection. One of the latest trends, hyaluronic acid injections, is perhaps more appropriate for the aging face than for acne scars. This technique is widely used in Europe and Canada, but it awaits approval by the Food and Drug Administration in the United States.[10]

Autologous fat transfer is another increasingly popular technique.[9] The first filling agent was free silicone, injected in microdroplets. It was very effective, but the Food and Drug Administration banned it.

Figure 2. Dramatic improvement *is seen in the same patient, three and a half months after she underwent suture-assisted resurfacing.*

Suture-assisted resurfacing

A new, innovative technique, suture-assisted resurfacing combines two modalities in one treatment session. It is ideal for patients who had miliary acne, which leaves scarring that consists of numerous tiny pits less than 2 mm in depth. The CO_2 laser is used to resurface the entire face or affected area with two passes. Afterward, each miliary scar is incised with a triple bevel 18-gauge needle. A single 7-0 nylon or polypropylene suture is then meticulously placed to oppose the wound edges. The sutures are removed in approximately six days.[11] Figure 1 shows a patient with typical numerous atrophic acne scars on her left cheek. Figure 2 shows the same patient three and a half months after suture-assisted resurfacing with the CO_2 laser.

Risks of suture-assisted resurfacing are similar to those of laser resurfacing. In addition, sutured areas may dehisce, or the wound edges may not oppose perfectly.

Punch elevation, punch excision, and punch grafting

These methods also work well for tiny, deep, "ice-pick" scars. The

depressed scars may be cut and elevated; cut out, and their wound edges sutured together; and/or cut out and filled with a skin graft (often obtained from behind the patient's ear).[1,2] Laser resurfacing can later be performed.[2]

Punch procedures may fail to work, however. Other risks of these methods include insufficient correction, dyspigmentation, graft necrosis, additional scarring, and lack of textural uniformity.

Elevated or hypertrophic forms of acne

The above techniques are most applicable for the correction of indented and/or atrophic acne scarring. The elevated or hypertrophic forms of acne scarring that most commonly occur on the chest, shoulders, back, or mandible are best treated with topical corticosteroids, intralesional corticosteroids, silicone gels/sheets, the pulsed-dye laser, or other vascular-specific lasers.

Tailoring treatment

As with most of today's cosmetic procedures, clinicians and patients are discovering that the best results are often obtained by combining several modalities and tailoring the treatment to each individual patient. Perhaps the best example of this approach is the suture-assisted resurfacing procedure, in which two separate strategies are employed on the same day. Other examples include subcision, fat transfer, or punch grafting months before laser resurfacing.

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PRIMARY POINTS

- Dermabrasion has been performed for more than seven decades. It is well established and has a predictable healing course.
- Microdermabrasion is a relatively new technique that involves the use of aluminum, salt, or diamond microparticles to bombard the skin and a suction apparatus to vacuum away the most superficial layer(s) of the epidermis. The results are extremely subtle and require many treatment sessions.
- Today, more acne scars are treated with laser resurfacing than with any other method. Laser resurfacing allows for more precise ablative control than do traditional techniques.
- Chemical peeling has been largely replaced by laser techniques, although some advocate its use when only a few atrophic scars are present.
- Subcision is valuable for widened, distended, atrophic scars, particularly when they are relatively few in number.
- Suture-assisted resurfacing is ideal for patients who had miliary acne, which leaves scarring that consists of numerous tiny, deep pits. Punch elevation, punch excision, and punch grafting also work well for tiny, deep, "ice-pick" scars.