

Dermabrasion for Acne Scars During Treatment with Oral Isotretinoin

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BACKGROUND Oral isotretinoin is the criterion standard treatment for severe inflammatory acne associated with scar development. Atypical or exaggerated cicatrization related to oral isotretinoin was reported throughout the 1980s and 1990s. Dermabrasion for atrophic acne scar revision is not recommended 6 to 12 months from the end of oral isotretinoin treatment.

OBJECTIVE To evaluate wound healing after localized dermabrasion in patients receiving oral isotretinoin.

MATERIALS & METHODS Interventional, prospective study involving seven patients taking oral isotretinoin to treat acne and with atrophic acne scars on the face. Manual dermabrasion was performed on all patients in an area of approximately 1 cm², and a 6-month reepithelization follow-up by clinical evaluation was conducted.

RESULTS All patients presented normal cicatrization evolution; hypertrophic scarring or keloid as a result of localized abrasion was not observed, and atrophic acne scar revision result was excellent.

CONCLUSION The current recommendation to wait 6 to 12 months after treatment with oral isotretinoin for acne scar revision using dermabrasion should be re-evaluated. Abrasion of a small test area may be a useful predictor of wound healing, enabling earlier acne scar treatment using this procedure.

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Acne is a multifactorial inflammatory disease of pilosebaceous follicles related to four etiopathogenic factors (follicular hyperkeratinization, increase in sebum production, colonization by propionibacteria, and innate and acquired immune response initiated by toll-like receptors 2 and 4) culminating with the release of inflammatory mediators such as interleukin (IL)-1 α , tumor necrosis factor α , IL-8, IL-12, and granulocyte macrophage colony-stimulating factor.¹⁻⁵ Prevalence of acne is 85% or higher in adolescents and increases with age.⁶ Severity may be associated with immunologic response, positive family history, and onset age.⁷

Clinical features are noninflammatory (whitehead and blackhead comedones), superficial (papules and pustules), or deeper (nodules and cysts) inflammatory lesions and scars. These lesions are located

mainly on the face, trunk, and back.⁸ Risk of atrophic or hypertrophic scars has been associated with the degree of immunologic and inflammatory response.^{3,4}

Acne is not a serious disease in most cases, although it might negatively affect quality of life, which sometimes is more devastating than the effect of alopecia areata, psoriasis, atopic dermatitis, asthma, and epilepsy.^{9,10}

Acne treatment aims to control pathogenic factors and should be initiated as early as possible to avoid permanent scars. Topical treatments with retinoids, benzoyl peroxide, or their combination with antibiotics (clindamycin or erythromycin) are indicated in early phases. If inflammation worsens, oral antibiotic administration is required. Severe and even

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moderate inflammatory forms may be treated as soon as possible with oral isotretinoin when they are unresponsive, tend to leave scars, and have a negative emotional affect.^{11,12} This is the only drug that acts against all etiopathogenic factors, enabling prolonged remission or disease cure. In adult women, association with oral contraceptives or other anti-androgenic drugs (cyproterone, spironolactone, insulin-sensitizing agents) may be necessary.¹³ Isotretinoin side effects, such as mucocutaneous manifestations (e.g., cheilitis and systemic reactions) demand careful clinical and laboratory monitoring (liver function, lipid profile, blood count).^{14,15} Use of two secure contraceptive methods is mandatory because the drug is teratogenic.^{16,17}

Occurrence of keloids and hypertrophic scars associated with oral isotretinoin use were reported in the 1980s and 1990s. The first reported cases were keloids, which appeared after mechanical dermabrasion¹⁸ and argon laser use.¹⁹ Atypical cicatrization on the face and keloids were also reported after administration of oral isotretinoin to patients who had previously undergone dermabrasion²⁰ or even spontaneously.²¹

Individual factors influence wound healing, which is a dynamic process involving the sequential stages of coagulation, immediate inflammation, reepithelization, fibroblast and new vessel proliferation beginning 3 to 4 days after the injury, and maturation with collagen remodelling. The reepithelization starts 24 hours after injury, when mediators, such as fibronectin, are released, producing a matrix that stimulates keratinocyte movement at the bottom of the wound and cellular proliferation at the wound edges. When complication occurs, reepithelization time is prolonged, with risks of scarring.²² Hypertrophic scars and keloids represent an excessive proliferative response. In addition to the aesthetic aspect, they may cause pain, itching, and contractures, with a negative effect on quality of life.²³ These scars frequently occur after burns, traumatic lesions, and sometimes excessive tension in sutures, wound

infections or hypoxia, and carbon dioxide (CO₂) laser resurfacing.²⁴ It was recently demonstrated that fibroblasts in hypertrophic scars and keloids are similar to those from the deeper dermis,²⁵ so concerning dermabrasion, hypertrophic scars and keloids may occur when a much deeper level is achieved. Their treatment always requires technique combinations such as pressure, topical use or intralesional injection of high-potency corticosteroids, silicon gel sheeting, polyurethane dressing, imiquimod 5% cream, cryotherapy,²⁶ and careful application of pulsed-dye, erbium-doped yttrium aluminum garnet and CO₂ lasers.²⁷

Some authors consider that exaggerated cicatrization related to oral isotretinoin might be related to angiogenesis stimulation or production of collagenase inhibitor resulting in collagen accumulation.²² The real mechanism is unknown. In spite of being controversial, the idea that oral isotretinoin increases the risk for hypertrophic scars and keloids persists. As a consequence, depressed acne scar revision using aggressive procedures has not been indicated until 6 to 12 months after drug use ends.²⁸

Because there are no specific studies to confirm the relationship between oral isotretinoin and atypical reepithelization, wound healing was observed for 6 months after localized dermabrasion in seven patients using oral isotretinoin for whom acne treatment was conducted.

Materials and Methods

This was an interventional, prospective study of an ambulatory surgical procedure. Seven patients from the Dermatology Sector of the Hospital Sao Paulo/Universidade Federal de São Paulo-UNIFESP using oral isotretinoin for acne treatment were selected and signed informed consent to participate in the study and for photograph use. The UNIFESP Ethics Review Board approved the protocol.

Patients' demographic data and details about oral isotretinoin treatment and areas selected for the

procedure for each patient are described in Table 1. They are also represented in Figure 1. There were six women and one man aged 15 to 35 (mean 21.7), five white and two black, all taking oral isotretinoin for 1 to 6 months (mean 3 months), with daily doses ranging from 10 to 40 mg (mean 25.7).

Hypertrophic scars on the face as a consequence of acne were found only in a white male patient.

At the time of clinical examination, an area of approximately 1 cm² with depressed scars on the face and indication for dermabrasion was selected and photographed.

The procedure consisted of asepsis, infiltrative anesthesia with 10% lidocaine, and manual dermabrasion using a diamond fraise (Figure 2) not connected to a rotation engine as in deeper procedures but with strong and controlled pressure. Our routine for acne scars is to perform manual dermabrasion to avoid deeper skin injuries and complications even if that means more sessions to achieve the desired result. With regard to the procedure end point, we believe that it is safe to sand until superficial, uniform bleeding occurs (Figure 3). Subsequently, a dressing patch (DuoDERM, ConvaTec, Princeton, NJ) was made and applied for 48 hours. After

removal, patients were instructed to clean the wound with soap and water and to keep it open and avoid sun exposure. Use of sunscreen was allowed only after skin reepithelization was complete.

Clinical evaluation and photographic documentation were completed after 7, 30, 60, 90, and 180 days. On day 30, if intense erythema was observed, it was treated with a corticosteroid cream. Also, if any sign of hypertrophic scar or keloid was observed on days 90 or 180, an intralesional infiltration with triamcinolone was used.

Results

All patients had a similar wound healing evolution, including the patient who had previous hypertrophic acne scars as a consequence of the disease. There were no complications during or immediately after dermabrasion. After 48 hours, the dressings were removed, and the wounds presented a normal aspect. On day 7, there was a slight crust and surrounding erythema, as expected. On day 30, the skin showed complete reepithelization and slight erythema. On days 90 and 180, there was complete resolution with no complication and the treated areas showed satisfactory results of acne scar revision.

TABLE 1. Demographic Data and Details of Oral Isotretinoin Treatment for the Seven Study Subjects

| <i>Patient</i> | <i>Age (Mean 21.7)</i> | <i>Sex</i> | <i>Race</i> | <i>Presence of Hypertrophic Scar or Keloid on First Examination</i> | <i>Period of Treatment with Oral Isotretinoin at Selection (Months) Mean 3 Months</i> | <i>Daily Dose (mg) (Mean 25.7)</i> | <i>Facial Areas Selected for Abrasion</i> |
|----------------|------------------------|------------|-------------|---|---|------------------------------------|---|
| 1 | 35 | F | White | No | 6 | 20 | Nose |
| 2 | 15 | M | White | Yes | 6 | 30 | Right forehead |
| 3 | 19 | F | Black | No | 3 | 20 | Left cheek |
| 4 | 22 | F | White | No | 2 | 40 | Left temporal area |
| 5 | 20 | F | White | No | 1 | 10 | Left forehead |
| 6 | 20 | F | White | No | 1 | 20 | Left cheek |
| 7 | 21 | F | Black | No | 2 | 40 | Left cheek |

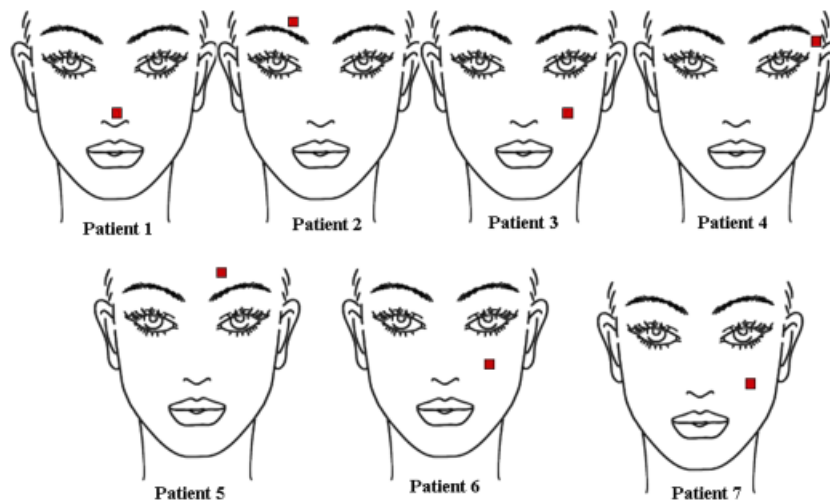


Figure 1. Facial areas with depressed acne scars selected for abrasion for each patient.

Use of corticosteroids was not necessary. Wound healing evolution was normal with complete reepithelization. There was no difference in cicatrization between seven patients using oral isotretinoin and what is currently seen in patients undergoing dermabrasion for acne scars who have not been treated or had discontinued drug use 6 months before. Suggestive signs or development of hypertrophic scars or keloids as a result of the abrasion test on depressed acne scars was not observed (Figures 4 and 5A–C).

Comment

The cases reported in the literature about abnormal cicatrization associated with oral isotretinoin are sparse and refer to distinct situations.

The article from Rubenstein and colleagues reported on six patients with keloids in atypical areas, especially the cheeks, 1 to 3 months after undergoing standard dermabrasion with a diamond fraise and wire brush during or soon after the end of treatment with oral isotretinoin. They suggested that the



Figure 2. Manual dermabrasion with diamond fraise in nasal area of 1 cm² with depressed acne scars.



Figure 3. Dermabrasion end point (superficial and uniform bleeding).



Figure 4. Patient 2. Frontal area of 1 cm² selected for dermabrasion before (A), right after (B), and 6 months after (C). This patient was on the sixth month of oral isotretinoin treatment. The thin atrophic area on the left temporal region was marked to be excised.

possible mechanism might be related to a suppressive effect on collagenase during the proliferative healing phase induced by retinoid.¹⁸ Our pilot study was conducted using a manual diamond fraise for controlled and safe dermabrasion to verify the possibil-

ity of doing it sooner, considering the negative effect of acne scars for selected patients, even if that means more sessions to achieve the desired result. It is possible to achieve a deeper level using a diamond fraise connected to an engine (regular dermabrasion)

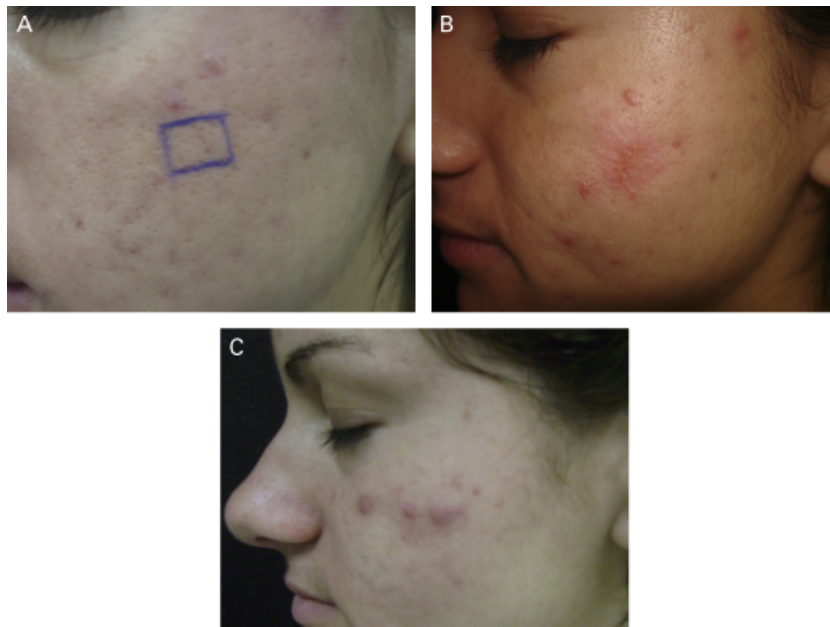


Figure 5. Patient 6. Area on left cheek submitted to dermabrasion before (A), 1 week after (B), and 6 months after with new papules and nodules because the patient had completed only 1 month of oral isotretinoin use (C).

with potential risks of poor healing or keloids, mainly in bony prominence areas. Nevertheless, comparison between regular and manual dermabrasion with sandpaper did not demonstrate variation in reepithelization velocity, postoperative erythema, pigmentary changes, pain, infection, or cosmetic results. Spot dermabrasion may be used as an evaluation method before treatment of full-face acne scars using dermabrasion.²⁹ Manual dermabrasion may produce similar results depending on technical ability.³⁰ Furthermore, the advantages of manual dermabrasion are low cost and safety, because it is easier to control the depth of abrasion, preventing complications.

Occurrence of many exuberant keloids with bad response to corticosteroid infiltration in the dorsal area of a 16-year-old male patient without personal or family history was associated with the use of oral isotretinoin.²¹ Another report presented nine patients using oral isotretinoin who developed keloids after dermabrasion or laser.^{19,25}

Some authors have considered that such cases may represent idiosyncratic response to oral isotretinoin, such as the interpretation currently accepted for adverse effects such as depression and liver and lipid metabolism alterations.^{13,14} Recent studies on acne etiology suggest that immunologic and inflammatory responses seem to be responsible for the various types and degrees of unpredictable scars, independent of the treatment used.⁵ Consequently, the exaggerated cicatrization observed in the reported patients might have occurred even if another therapeutic option was adopted. These considerations may explain normal cicatrization after localized manual abrasion performed during treatment with oral isotretinoin in our patients, as well as the excellent results of depressed acne scar revision using dermabrasion as expected.

Conclusion

In spite of the limitation represented by the small number of patients in this study, our observations

may help to illustrate that the possible influence of oral isotretinoin on the wound healing process, with greater risk for keloids or hypertrophic scars, should not be generalized. Therefore, further studies including full-face dermabrasion are necessary to re-evaluate the recommendation for waiting 6 to 12 months after treatment with oral isotretinoin to revise depressed acne scars. This is an important concern because acne scars are a common problem that may negatively affect quality of life.

We suggest a manual diamond fraise dermabrasion test with strong but controlled pressure to be performed on a small facial area. This may be a useful predictor of abnormal wound healing risk, enabling earlier treatment of acne scars. On the other hand, if a suggestive sign of exaggerated cicatrization is observed, immediate treatment with corticosteroids should be made and no further aggressive procedure should be attempted.

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