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Maximizing patient comfort and optimizing the results of carbon dioxide laser skin resurfacing

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Summary

Considerable clinical experience has been accumulated in recent years demonstrating the clinical efficacy of carbon dioxide laser resurfacing for the treatment of superficial rhytids and scars. However, the ideal method of administering preoperative anesthesia has yet to be determined. In this brief communication, the authors will review their positive experience with an inexpensive and safe combination of topical and intradermal anesthesia that has afforded them the ability to maximize patient comfort in the office setting while optimizing clinical results.

Introduction

David *et al*. were the first to report on the beneficial effects of carbon dioxide laser resurfacing for aesthetic correction of facial actinic damage[1,2]. Since these humble beginnings, carbon dioxide laser resurfacing has evolved into one of the most commonly performed aesthetic facial procedures. The precise control of thermal effect and depth of tissue injury allows for safe amelioration of superficial rhytids and scars. Although the discomfort felt following a single pulse from the laser is transient and mild, these sensations are magnified and can be quite painful when multiple pulses are delivered. Attempts to minimize this discomfort have ranged from the administration of general anesthesia to various combinations of nerve blocks, topical anesthetics and local infiltration. We will briefly outline our method of perioperative management of this patient population with which we have had excellent success. We will highlight a previously unreported method of optimizing the effectiveness of topical anesthesia.

Technique

As with other resurfacing modalities used in our practice (dermabrasion and chemical peel), all patients are pretreated for a minimum of four weeks with tretinoin cream (Retin-A 0.05% or 0.1% depending upon skin type and tolerance; Ortho Pharmaceutical Corp., Raritan, NJ). This has been shown to increase the epidermal turnover rate and help restore collagen type I in photo-aged skin[3]. Presumably, this will speed the recovery of the resurfaced skin from the thermal damage inflicted by the laser. In addition, many patients receive a glycolic acid as well as a topical vitamin C serum preparation to ameliorate the quality of the skin in the preoperative period, and as part of a maintenance program once complete healing has taken place postoperatively. Patients with type III and type IV skin, and patients with severe actinic changes are at an increased risk of developing postin-

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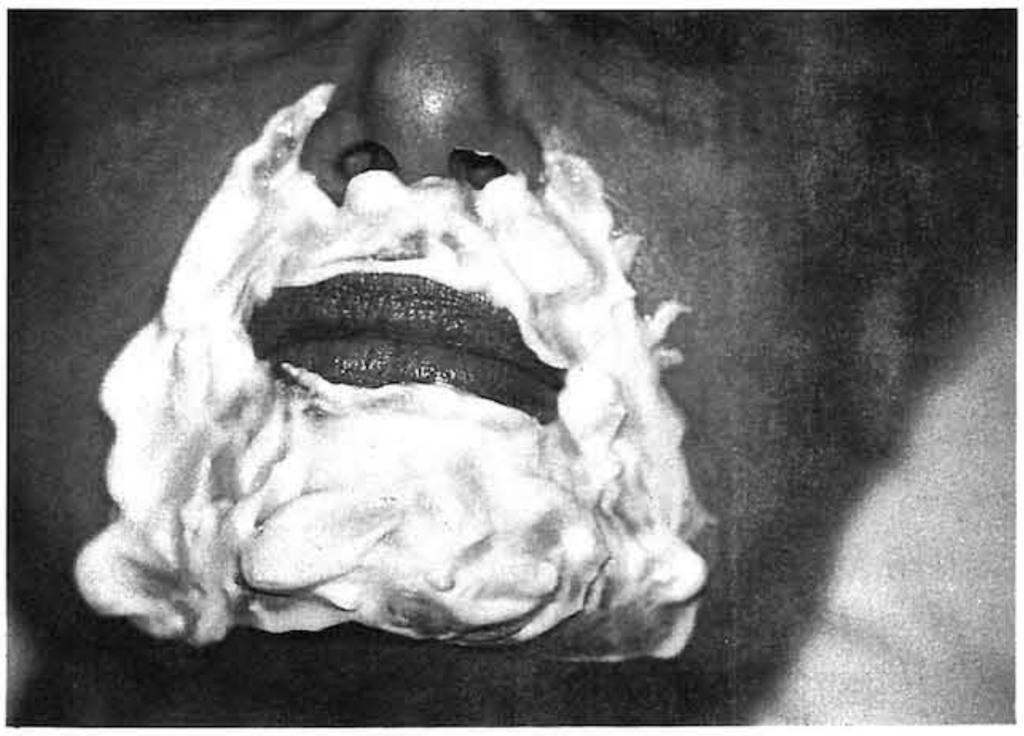

Fig. 1. Perioral area covered with thick layer of EMLA in preparation for perioral laser resurfacing.

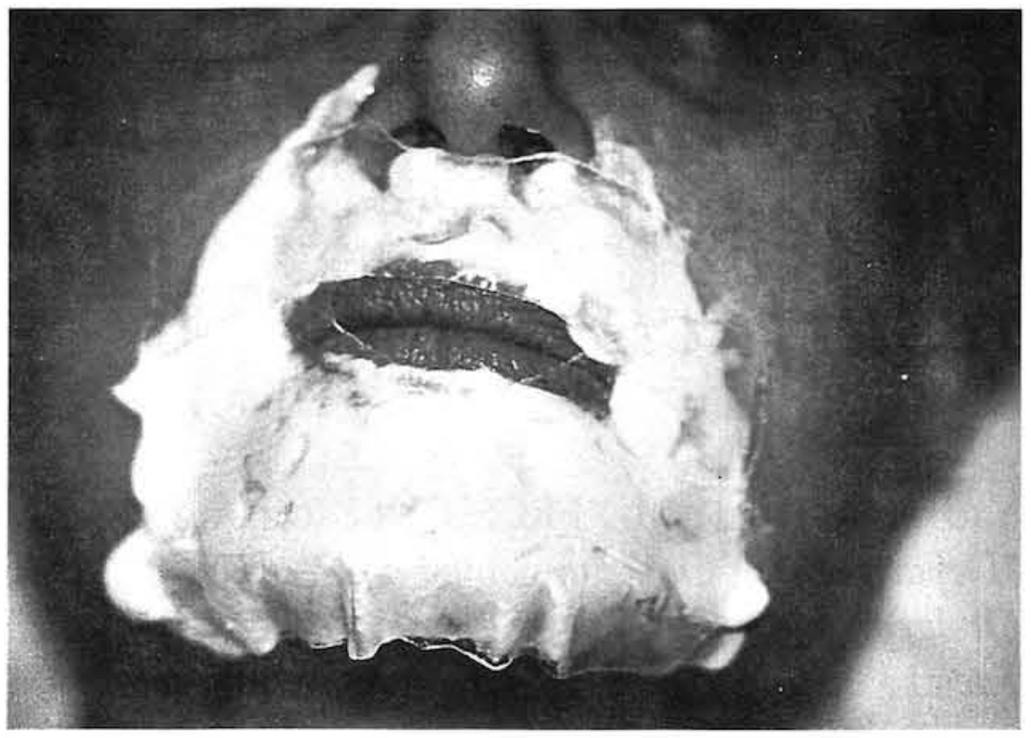

Fig. 2. Polyethylene oxide gel covering EMLA.

Fig. 3. Materials required for topical skin anesthesia.

flammatory hyperpigmentation[4]. For this subset of patients, preoperative treatment with a bleaching agent, *e.g.*, topical hydroquinone for two to four weeks preoperatively is recommended. Sun blocking agents in addition to sun avoidance are mandatory for at least six months postoperatively in order to decrease the chance of hyperpigmentation. Preoperative sun avoidance is also recommended. Perioperative administration of both antibiotics (providing coverage for common skin commensals) and antivirals (acyclovir 400 mg twice daily or equivalent) is prudent as bacterial or viral infection of freshly lasered skin may transform the wound into a full thickness injury, resulting in permanent scarring. We feel that the addition of a small amount of antibacterial ointment intranasally at the time of the procedure is also helpful in decreasing the risk of infection in the freshly lasered skin.

It is our opinion that very anxious patients or patients undergoing full face laser resurfacing should be offered the opportunity to have their procedure performed under general anesthesia. All others may easily have their procedure performed under local anesthesia. Our routine is as follows: we generally premedicate the patient with a single dose of sublingual or oral lorazepam (1.0 mg) or equivalent in a comfortable environment with relaxing background music and dimmed lights. After degreasing the skin with alcohol, a thick layer of EMLA cream (Astra, Westborough, MD) is applied to the aesthetic units being treated (Fig. 1). Next, in order to provide for occlusion as well as to maximize the effect of the EMLA cream, the area is covered with a polyethylene oxide gel (Second Skin, Bionet Inc., Little Rock, Arkansas). This is left in place for a minimum of one to one-and-a-half hours in order for topical anesthesia to achieve its maximal effect (Figs. 2 and 3). Once an adequate period of time has elapsed, the topical anesthesia is removed. Transoral nerve blocks (1% lidocaine with 1 in 100,000 epinephrine solution) of the infraorbital and mental nerves are next performed if the periorbital/

Fig. 4. Preoperative photograph of a patient with fine facial rhytids and signs of actinic damage.

Fig. 5. Postoperative photograph of the same patient. Note the significant improvement in facial skin quality and appearance.

cheek/upper lip and lower lip areas are to be treated. Supraorbital nerve blocks are added in the case of forehead treatment. At least ten minutes should be allowed to pass before adding very limited intradermal injections (1% lidocaine with 1 in 100.000 epinephrine solution) to any residual incompletely anesthetized areas. Generally, very little additional intradermal injection is required and the discomfort associated with these injections is small.

The carbon dioxide laser is then utilized in a standard fashion to treat actinically damaged, or scarred areas in eshetic units, as formalized by Gonzalez-Ulloa[5]. The specific settings utilized and the number of passes performed will depend on the thickness and quality of the skin being treated. There exists significant variability between different areas of the face and between different individuals. 'Cookbook' settings are at best considered only as poor guides, and should never replace sound judgment based on clinical experience. Visual endpoints serve as important surgical checkpoints preventing excess depth of treatment and hence, scarring. A useful guide is the appearance of a yellow, 'chamois cloth' color, signifying penetration to the level of the superficial reticular dermis. Further thermal damage beyond this level is not recommended. Once an adequate depth of resurfacing has been achieved, the skin is covered with petroleum jelly or an equivalent non-allergenic, inexpensive dressing. Postoperative care is performed at home by the patient four to six times daily until complete re-epithelialization has occurred (usually seven to ten days). This consists of cleansing the treated areas with white vinegar solution soaks (one tablespoon of vinegar in one cup of cool water) and liberally reapplying petroleum jelly. Most patients find the home care to be quite comfortable and indeed, soothing.

Discussion

Utilizing the outlined methods, we have been able to achieve very rewarding results for our patients, while maintaining their comfort level throughout the entire process at a maximum (Figs. 4 and 5). A previously unreported aspect of maintaining this comfort level is the application of EMLA cream with polyethylene oxide gel. EMLA cream is an oil based emulsion of lidocaine 2.5% and prilocaine 2.5%. An occlusive dressing is required to expedite the process of epidermal and dermal analgesia achieved with the use of this cream. A number of authors have found excellent responses to EMLA as compared to local infiltration of anesthetics alone[6,7]. Encouraged by such reports, we tried using EMLA with various types of 'occlusive' dressings. All these dressings were in reality difficult to maintain in position and nonocclusive by virtue of their application to a multicontoured, moving, breathing face. Polyethylene oxide gel is composed of 96% sterile water and polyethylene oxide. It has been utilized for a number of years as a postoperative dressing for open wounds after surgical excision, surface burns, dermabrasion and laser resurfacing[8]. It can be cut into any shape and, as a result of its gel quality, will maintain its position when applied to the contours of the face. A thin polyethylene film present on its outside surface will allow for occlusion to be achieved. We have noted a significant amelioration in the effectiveness of EMLA when applied to the face after it is covered with this dressing material as compared to all previous 'occlusive' dressings that we have tried in the past. The combination of EMLA and polethylene oxide gel is an inexpensive, effective method of administering topical anesthesia to the facial skin.

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