SKIN DISEASE CAN have a major impact on one’s quality of life. Overall quality of life is an all-inclusive concept incorporating all factors that impact upon an individual life. The concept can be divided into several components, including psychological, social and physical domains. The impact of acne on a particular patient is not always easy to judge clinically. It was found that both women and men find the effects of acne on appearance to be the most bothersome aspect of their disease, and the negative effects of acne occur in both older and younger patients. Even mild acne can pose a significant problem for some patients, diminishing their quality of life and in some cases their social functioning.

Acneiform Scars: The Origin
Acneiform scars are the result of severe acne in teen and early adult years, and it is a common cosmetic concern with psychological impact. Acne vulgaris is the most common dermatological condition encountered in adolescence. It affects almost 85% of people from 12 to 24 years of age. Moderate to severe acne affects around 20% of young people and severity correlates with pubertal maturity. Acne persists up to the age of 30 years around 40% of individuals affected. The heritability of acne is almost 80% in first degree relative and is more severe in those with a positive family history.

Suicidal ideation is more common in those with severe compared with mild acne.

The origin of the acneiform scars is the compromised collagen production during the natural wound healing process, resulting in the topographical depressions. Given the dermal pathology present with acne scarring, especially in ice pick scars, this condition can be difficult to treat without utilizing treatment modalities capable of affecting dermal remodeling at least 1 mm below the skin surface. A variety of modalities have been employed with this purpose, including punch excision, dermabrasion, chemical peels and traditional ablative and non-ablative lasers treatments, each of them with varying degrees of success and side effects.

Treatment Options for Acneiform Scars
CO2 and Er:Yag lasers, while effective (ablates 100% of the epidermal surface), are associated with prolonged healing time and significant risks, prolonged postoperative erythema and transient hyperpigmentation or late hypopigmentation. The concept of fractional photothermolysis (FP) was introduced in 2006, as this pattern of injury heals, it promotes an improvement in the tone and texture of the skin, in fine to moderate rhytids, in pigmented concerns including melasma, and in scars, especially acne and traumatic scars.

Although the safety of the technique improved considerably, patients generally require multiple treatments to achieve significant results, and sometimes can be insufficient to improve severe solar elastosis or severe acne scarring. These factors led the industry to launch other technologies.

The Birth of Fractional Lasers
Ablative fractional lasers (AFR) were introduced in 2006. The goal was to develop a technique as efficient as traditional CO2 lasers and safe as non-ablative resurfacing. Ablative fractional resurfacing induces epidermal and dermal remodeling, which raises new possibilities for the treatment of a variety of skin conditions like acne scars. More recently, these technologies were classified in two types – Micro-ablative FP laser systems, which produces epidermal and dermal damage to a depth less than 750µm, and Deep dermal ablative FP laser systems, which produces damage beyond 750µm in the skin.

The treatment of acne scars with fractional CO2 lasers is increasing in impact. Moderate to severe atrophic acne scars can be safely improved by ablative fractional CO2 laser resurfacing. From the first publication on fractional laser6 resurfacing, in 2004, fractional photothermolysis had the advantage over ablative laser resurfacing owing to a shorter recovery, lack of general anesthesia and lower risk of scarring, depigmentation and infection. Initially for rejuvenation of the face, this procedure was applied for the treatment of acne scarring. In 2008, Mahmoud and collaborators first demonstrated the effectiveness of fractional photothermolysis treatment for moderate to severe acne scarring, with 26% to 30% improvement in texture, atrophy, and overall improvement of scarring. Mahmoud and collaborators, in 2010, showed improvement of 50% to 75% in acne scarring after five treatments over a one month period in 80% of the patients using fractionated 1550nm erbium-doped laser.

The use of hydroquinone for patients with altered pigmentation can be considered. Sun exposure must be avoided 30 days before and after the laser procedure. Oral antiviral prophylaxis (valacyclovir hydrochloride – Valtrex) is given for the patients starting a day prior to treatment until five days. The patient should have prescriptions for all products to be used after the procedure in hand, as well as written instructions.
Procedure Protocol

The procedure protocol should be personalized for each patient. Nevertheless, there are some common and important rules for all. Patients with atrophic acne scars and Fitzpatrick skin types I-IV are ideal candidates for this procedure (Figures 1 and 2). Fitzpatrick skin types IV can be treated, but less aggressive approaches should be considered. It is important to obtain a detailed clinical history – active infections, recent use of isotretinoin, history of keloid scar formation, known allergies to lidocaine, smoking and pregnancy. Pretreatment cares include the use of sunscreen SPF 30 and aminosalicylic acid. The use of hydroquinone for patients with altered pigmentation can be considered. Sun exposure must be avoided 30 days before and after the procedure.

Post-procedure CO2 Laser

The procedure protocol should be personalized for each patient. Nevertheless, there are some common and important rules for all. Patients with atrophic acne scars and Fitzpatrick skin types I-IV are ideal candidates for this procedure (Figures 1 and 2). Fitzpatrick skin types IV can be treated, but less aggressive approaches should be considered. It is important to obtain a detailed clinical history – active infections, recent use of isotretinoin, history of keloid scar formation, known allergies to lidocaine, smoking and pregnancy. Pretreatment cares include the use of sunscreen SPF 30 and aminosalicylic acid. The use of hydroquinone for patients with altered pigmentation can be considered. Sun exposure must be avoided 30 days before and after the procedure. The face should be carefully washed. For pain management and to enhance the tolerability of the procedure, a 4% lidocaine topical cream is then spread and the most intense phase occurring between the second and third day after the procedure (Figure 4). The posttreatment ointment is applied and the patient is recommended to use them for the next two to seven days. Sunscreen and sun avoidance is advocated during the first several months postoperatively.

Normal expected side effects are erythema, edema, petechiae, crusting and pruritus. Less common adverse effects are milia and dyschromia.

Postoperative edema varies from light to moderate and the most intense phase occurring between the second and third day after the procedure (Figure 4). For the most critical cases, oral prednisone (40 mg/day, for two to four days) can be used. Thermal bags, thermal water spray or cool chamomile tea compresses can also relieve the discomfort. Temporary erythema is present in all patients after treatment with fractional CO2 laser, and the intensity and durability of the redness depends on the depth of resurfacing (the levels of energy and density used). As mentioned above, hyperpigmentation, that is a very common side effect of traditional CO2 laser, has decreased with fractioning. Hyperpigmentation can occur after the first month of the treatment and is often triggered by sun or heat exposure. It can be treated with whitening creams (hydroquinone or azelaic acid). Scars (hypertrophic or atrophic) are less common with fractional lasers, but they still can occur spontaneously or following very aggressive procedures. Scars are more common in areas of thinner skin (neck or periorbital regions).

Conclusion

Advances in technology have provided doctors with new devices, such as fractional CO2 lasers. It enables to treat scarring and photodamage with a more predictable, efficacious and safer manner. As present, ablative, fractionated resurfacing has significantly better results than the nonablative technologies and dramatically reduced the downtime as well as the side effect profile when compared with standard CO2 resurfacing.

Acknowledgments

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References