Fractional Radio Frequency for Acne Scar Treatment

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Abstract: Acne scar is formed in teen and early adult life. Several treatment options such as chemical peeling, punch excision, fillers and laser resurfacing.

We used fractional LIFTRON RF system which delivers radio frequency energy *via* needles in the disposable applicator tip in 15 patients with age range of 20-40 years old, the treatment used for 4 sessions with one month interval. Photographic documents before and after sessions were taken and punch biopsy were taken from 5 patients.

Improvement occurred 30%-70%, without any complications as erythema, keloid or hyperpigmentation as occurred with other methods of treatment.

The important point is that patients returned back to work after 2 days.

Keywords: Fractional RF (radio frequency) system, acne scar, facial resurfacing, photothermolysis.

1. INTRODUCTION

Acne is a common skin condition especially in adult age group. Its course varies according to its severity, mishandling and management [1] acne scars are quite common and lead to disfigurement and psychosocial problems. Acne scars are dermal lesions caused by the destruction of collagen. Various procedures like chemical peeling, dermabrasion, punch excision, fillers and laser resurfacing have been used with success [2].

Acne scars are classified as rolling, ice-pick, shallow boxcar and deep boxcar. Rolling scars appear like hills and valleys without sharp borders. Ice-pick scars also known as pitted scars appear as round deep depressions. Boxcar scars have flat-u-shaped base, broader than ice-pick scars they are linear at the skin surface. Shallow boxcar scars are found in the mid-dermis, and deep boxcar scars penetrate to the reticular dermis [3].

Ablative laser therapies with fractional CO2 [4] laser and Er: YAG lasers [5] are accepted treatment for post acne scars for creation of a controlled thermal injury to the dermis with neocollagenesis formation and remodeling of scarred skin. CO_2 laser vaporizes intra- and extracellular water, causing tissue ablation, rapid to limit dermal injury and scarring. Removing the epidermis and dermis stimulates wound remodeling with new collagen and elastin formation [6].

In this study we examined the efficacy and safety of ablative fractional RF system in fifteen patients with moderate and severe acne scars.

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2. PATIENTS AND METHODS

The research ethics comity of National Institute of Laser Science has approved this study.

All the patients had signed a formed consent and fully approved to be part of this study.

Fifteen patients with age ranging from20 years to40 years, skin type III and IV with moderate acne scars , they were treated at dermatology clinic in laser institute of Cairo university from October 2012 to October 2013,pregnancy, active infections, history of keloid or scar formation and recent Accutane drug users were excluded from the study .

The treatment areas were cleansed by using a mild cleanser and 70% isopropyl alchol.2.5% lidocaine cream were applied under close dressing on the face for one hour. Then the anesthetic cream gently removed to obtain completely dry skin and alcohol was used to degrease the skin.

We used fractional RF system for 4 sessions with one month interval. The LIFTRON RF system applicator delivers radio frequency energy *via* a matrix of 25 needles in the disposable applicator tip. The parameters used were; Needle depth 2.0mm, Radio frequency intensity 60%, Conduct time 400ms and manual mode of needle movement as they come out for 1 second when press the foot switch.

Photographic documentation using identical camera Fuji digital fine pix S4000 14 mega pixels 3.0 high resolution LCD wide 24mm 30x before each treatment session and 6 months after the final treatment session. Punch biopsy before and after treatment from five patients were taken. Biopsies were taken by a 3mm

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punch before treatment and after 6 months (the follow up period) of the last session. The biopsies were preserved in 10% formalin solution, embedded in paraffin oil and processed with hematoxylin and eosin.

We had conducted patient satisfaction by asking each patient about being very satisfied (over70%), satisfied (30%-60%) and not satisfied (20%-30%). This was about the scale of clinical improvement fair (20% - 30%), good (30% -60%) and excellent (over70%).

3. RESULTS

Fifteen patients with age ranging from 20-40 years with depressed acne scar. All patients completed the four treatment sessions with one month interval. All patients felt improvement during and after the course of treatment as reduction in the depth and size of scars.

The sessions treatments were well tolerated without need for additional sedation in all patients. Minimized the diameter of needle and shortens RF irradiation time that damages dermis resulting in relieving pain of the patient and returning to daily life on the next day after treatment. Side effects as erythema and edema were limited only for 2-3 days so the patients could return back to work in few days. There were no pigmentation changes, infections or any texture changes were observed. No side effects were observed and improvement continued at the follow up period.

No crust formation after treatment as produced from the deep skin laser resurfacing [7], it is fast, short time and short down time treatment. No pigmentation compared with peeling or other lasers treatment, wearing makeup of cosmetic is ok after the treatment. It is highly hygienic as it uses a disposable tip.

This study demonstrated the efficacy of fractional RF treatments for moderate acne scarring. Final results in patients and dermatologist evaluation were 30% - 70%. As shown in Figure **1a** for a 35 years age female patient before laser treatment and Figure **1b** after follow up period of laser treatment (excellent results) while in Figure **2a** for a 25 years age female patient before laser treatment and Figure **2b** after follow up period of laser treatment (good results). In Figure **3a** which show pathological picture of skin biopsy before laser treatment it shows thin epidermis, thin cell layer and thin smudged collagen. In Figure **3b** it shows pathological picture of skin biopsy after laser treatment with increased epidermal thickness, thickened granular cell layer, restoration of rete ridge pattern, superficial perivascular lymphohistocytes infiltrate are clear and collagen fibers have increased in amount and thickness.

4. DISCUSSION

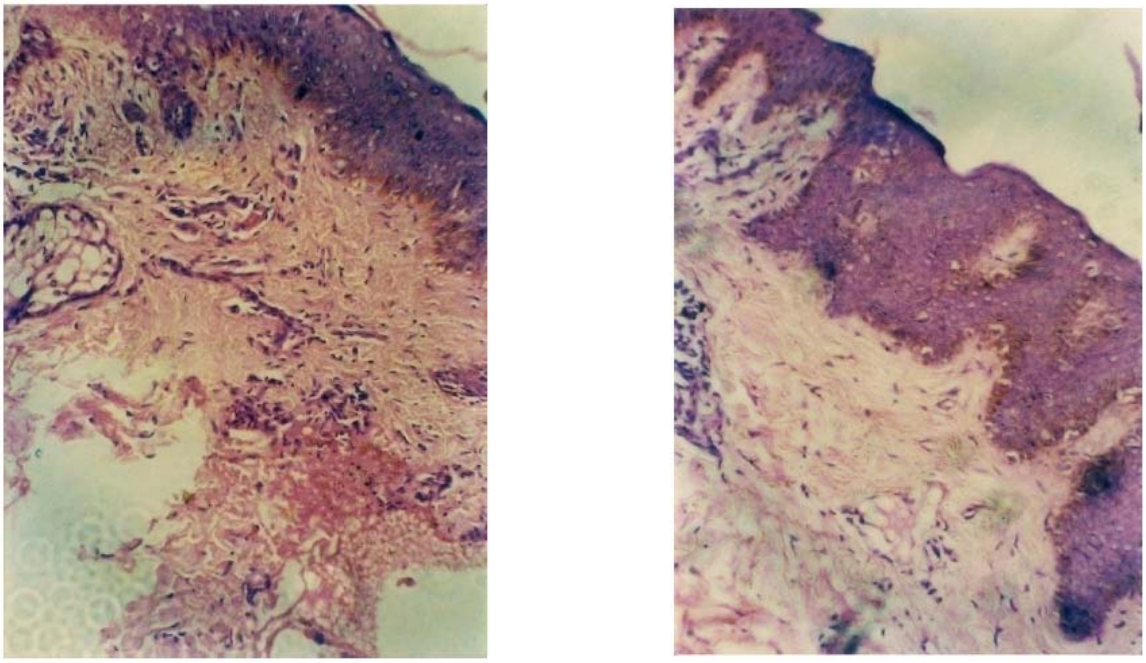
LIFTRON treatment method is the newest technology of minimal fractional RF needling induces protein denaturalization and selective coagulation without giving thermal damages of skin surface, it penetrates into the skin, builds columns for healing and produces thermal damages by high tensioned radio frequency [8,9] waves. Skin is wounded by micro – needling which brings the natural wound healing

(**a**) (**b**)

Figure 1: Acne scars in a 35 years old woman before treatment, (**a**) and after four months treatment sessions (excellent result), (**b**).

(**a**) (**b**)

Figure 2: Acne scars in 25 years old girl before treatment, (**a**), and after four months treatment sessions (good result), (**b**).



(**a**) (**b**)

Figure 3: Pathological picture of skin biopsy, (**a**) before treatment and (**b**) after six months follow up period.

process and induces development of growth factors of the cell. Immediate collagen shrinkage and dermal collagen remodeling result in epidermal regeneration which results in improvement of scar and skin texture [10,11].

LIFTRON system proves the sound efficacy with short down time and safety from the side effect, some studies using ablative CO2 and erbium lasers have similar improvement, but with longer recovery time and greater side effect [12-14]. The RF energy generates fractional deep dermal heating in the region of the electrode matrix to induce skin injury, and producing wound healing response. Skin texture becomes more smooth and elastic as a result of increased levels of collagen and new healthy skin cells which are produced during and after the sessions, treatment is safe and effective for all skin types [15,16].

During treatment many patients feel prickly sensation as energy enters their skin, so topical anesthetic ointment is applied for half an hour before

the treatment session. After treatment a red sunburn appearance and slight discomfort feeling is lasted with mild inflammation for 2 days only, in comparison with CO2 laser resurfacing which cause high risk of post inflammatory hyperpigmentation [17-19]. Topical anesthetic ointment is applied for one hour after the session to reduce discomfort. After each session edema and erythema disappeared after only 2 days.

CONCLUSION

This study demonstrates that fractional RF provides a safe and effective treatment of moderate facial acne scarring it is a study that outlines the clinical benefit and longevity of multiple treatment sessions in patients with various skin photo types.

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