Fractional Ablative CO₂ Laser Treatment Versus Scar Subcision and Autologous Fat Transfer in the Treatment of Atrophic Acne Scars

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ABSTRACT

Background: There are different modalities for management of atrophic acne scars including lasers. Ablative fractional CO₂ laser was developed to address the shortcomings of traditional ablative lasers with superior results to non-ablative fractional lasers. Autologous fat transfer has been utilized for nearly a decade for tissue augmentation and reconstruction.

Objective: To compare ablative fractional CO₂ laser treatment with scar subcision and autologous fat transfer in the treatment of atrophic acne scars.

Methods: Twenty patients with atrophic acne scars were included, 10 patients were treated by 3 sessions of ablative fractional CO₂ laser therapy, and 10 patients treated by subcision and autologous fat transfer. All patients were followed-up for 3 months, and were assessed by digital photographs, before and after treatment through the application of Goodman and Baron quantitative and qualitative grading systems in addition to 3 physicians Committee and reports of patients satisfaction.

Results: In both groups, there was significant improvement in all types of atrophic acne scars. The mean percentage of total quantitative improvement was more significant in case of autologous fat transfer regarding icepick and total number of scars.

Conclusions: Scar subcision with autologous fat transfer proved to be as effective as or even more effective ablative fractional CO₂ laser the treatment of atrophic acne scars regarding the total number of scars as well as icepik type.

INTRODUCTION

Acne scars in teens and early adult years is a common cosmetic concern. They are the result of compromised collagen production during the natural wound healing process, resulting in topographical depressions. The desire to prevent scarring is often a reason for treating acne [1].

Atrophic acne scars were classified as rolling, icepick or boxcar. Rolling scars appear like hills or valleys without sharp borders (Fig. 1), while icepick scars appear as rounded deep depressions culminating in a pin point base. On the other hand, boxcar scars are larger in size with sharply defined edge (Figs. 2,3) [2].

Different treatment modalities have been used to ameliorate atrophic scars with varying degrees of success. These include chemical peels [3], subcision [4], surgical excision [5], punch grafting [5], dermabrasion [6], ablative and non-ablative laser resurfacing [7] as well as tissue augmentation with a variety of fillers [8].

Fractional ablative lasers deliver microscopic columns of energy which vaporize myriads of tiny holes covering only a small to moderate percentage of the skin surface. The majority of the epidermis is left intact; allowing these microscopic lesions to heal very quickly and to limit complications. This modality is currently used for treatment of acne scarring, photoaging, and skin laxity, among other indications. In contrast, traditional ablative laser resurfacing (with an ultra-pulsed CO₂ or Er:YAG laser) ablates 100% of the epidermal surface, which is associated with prolonged healing and an increased risk of scarring and infection. In addition, the fractional approach allows much deeper treatment (up to 1,500µm) because of the extremely small beam diameter (100-300µm) [9,10]. This is dramatically different from traditional ablative procedures that ablate the entire surface to approximately 300-350µm. Few complications have been reported with fractional ablative resurfacing [11].

Subcision, also called “subdermal/incisionless undermining”, is indicated for the same types of scars that might be improved with fillers or its appearance is improved with manual stretching of the skin during examination [12]. It appears to work
by breaking up the attachments of these scars under the skin and releasing the surface from deeper structures [13].

Autologous fat transfer has enjoyed a renaissance in the last several years. As other surgical approaches, renewed interest has evolved from refined techniques, enhanced instruments, and knowledge gleaned by new research [14,15]. Understanding fat physiology, stem cells and metabolism has benefited an appreciation of the longevity that is possible with fat transfer [16].

PATIENTS AND METHODS

After approval of the Research Ethics Committee of Tanta Faculty of Medicine (approval code 1700/03/13), this study was conducted on 20 acne scar patients, recruited from the Out-Patient Clinic of Dermatology and Venereology Department, Tanta University Hospitals during the period from April 2012 to October 2013. Inclusion criteria were males and females older than 18 years with atrophic acne scars. Patients younger than 18 years and patients with retinoid use in the past 6 months, systemic disease (diabetes or hypertension), collagen disease, malignancy, photosensitivity, and keloidal tendencies were excluded from the study.

After taking an informed consent, the studied persons were subjected to detailed history taking, thorough general and dermatological examination and assessment of acne scar severity before and after treatment through the application of Goodman and Baron quantitative and qualitative grading systems [17,18] in addition to 3 physicians committee and reports of patients satisfaction. The improvement was graded 0% to 25% (mild), 25% to 50% (moderate), 50% to 75% (marked) and 75% to 100% (excellent). All patients were photographed before and 3 months after the treatment. 10 patients (group A) were treated by autologous fat transfer and 10 Patients (group B) were treated by 3 sessions of F-CO2 laser.

**Group A (subcision and autologous fat transfer):**

Ten patients were subjected to subcision and fat grafting. The procedure was done under local anesthesia in Tanta University Plastic Surgery Unit under complete aseptic precautions. Fat was harvested using tumescent anesthesia (20cc lidocaine 2%+50cc saline+0.25mg 1/200,000 adrenaline) that was injected at the lower hemi-abdominal iliac crest region using 20cc syringes. Ten minutes were allowed to pass for the adrenaline to be effective. A 0.5cm stab incision was made at the donor site to introduce a 3mm liposuction cannula connected to 60cc syringe with screw lock, the fat was aspirated by steady to and fro movements in subcutaneous tissues, till the desired amount was aspirated (Fig. 4). The syringe of aspirated fat was held with its nozzle downwards for 15 minutes so that the solution was settled by gravity and supernatant fat layer was separated then the remaining fluids were discarded (Fig. 5). The aspirated fat was then placed on a sterile piece of gauze to be filtered and concentrated by gentle shaking (Fig. 6). Fat was then placed in 3cc syringes (Fig. 7).

Infraorbital nerve block was done using 1cc (lidocaine 2% and 1/200,000 adrenaline) through buccal mucosa to provide anesthesia without causing tissue distortion. A successful infraorbital nerve block provides anesthesia for the area between the lower eyelid and the upper lip. This was helped by applying local anesthetic cream (Emla) on the involved area 20 minutes before the procedure. Fan-shaped subcision of the scars was done by 18 Gauge needle, creating tracts for fat placement in subdermal regions. Fat was placed using the 3mm syringes during cannula retraction in its bed created by the subcision tracts. Molding was done against the zygoma and maxilla (Fig. 8).

**Group B (fractional-CO2 laser):**

Each patient attended 3 sessions of Fractional ablative CO2 laser system MX7000 scanner type, manufactured by DAESHIN ENTERPRISE CO., LTD (Seoul Korea) spaced 4 weeks apart. Each session was performed with a single pass at the following parameters: power 12mj, scan scale 15x15mm, depth level 2µm, density level 3 MTZ/ cm3, repeat time off and mode selection microxel scanner.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 13. For qualitative data, comparison between two groups and more was done using Chi-square test (X2). For comparison between means of two groups, parametric analysis (t-test) and non-parametric analysis (Z-value of Mann-Whitney U-test) were used. For comparison between means of the same group before and after treatment, parametric analysis (paired t-test) and non-parametric analysis (Z-value of Wilcoxon Signed Ranks test) were used. Comparison was done between percent of change after treatment than pretreatment of the two groups using testing of proportions or Z-test. Correlation between variables was evaluated using Pearson’s correlation coefficient. Significance was adopted at p<0.05 for interpretation of results of tests of significance.
Fig. (1): Rolling acne scars.

Fig. (2): Icepick and boxcar acne scars.

Fig. (3): Boxcar acne scars.

Fig. (4): Introduction of cannula connected to 60cc syringe with screw lock for liposuction.

Fig. (5): The syringe of aspirated fat was held with its nozzle downwards for 15 minutes so that the supernatant fat layer was separated.

Fig. (6): Filtration of the aspirated fat on a piece of gauze.

Fig. (7): The aspirated fat after filtration in asyringe connected to 18 Gauge needle.

Fig. (8): Acne scar subcision with fat injection under the scar.
RESULTS

No statistically significant difference was found between both groups regarding age and sex and duration of the disease.

Qualitative grading system of acne scars before and after treatment of the studied patients with different types of acne scars showed significant improvement in both groups. Comparison between the two groups before treatment showed no significant difference (p=0.361). Comparison between the two groups after treatment showed no significant difference (p=0.060) (Table 1).

Quantitative assessment of acne scars in group A showed statistically significant improvement in icepick (p=0.0001*), rolling (p=0.004*), boxcar scars (p=0.0001*) and the total number of scars (p=0.0001*) (Figs. 9-12). Similarly group B showed statistically significant improvement in icepick (p=0.001*), rolling (p=0.002*), boxcar scars (p=0.004*) and the total number of scars (p=0.0001*) (Figs. 13-16).

Comparison between both groups (A&B) showed statistically significant improvement in group A over group B in icepick scars (p=0.028*) and boxcar scars (p=0.002*) but not in rolling scars (p=0.421) and the total number of the scars (p=.0278) (Table 2).

The Mean percentage of improvement of after than before treatment scores of quantitative assessment showed that the number of icepick scars was decreased after treatment with scar subcision and autologous fat transfer by 59.85% and decreased after F-CO2 laser by 39.76% with significant difference between both groups (p=0.011*), the total number of scars was decreased after treatment with autologous fat transfer by 57.78% and decreased after fractional CO2 laser by 41.97% with significant difference between both groups (p=0.020*). While Mean percentage of improvement of rolling and boxcar scars were decreased after treatment with autologous fat transfer by 58.31%, 46.37% respectively and decreased after fractional CO2 laser by 42.21%, 42.28% respectively. There were no significant difference between both groups regarding rolling and boxcar scars (p=0.251, p=0.713 respectively) (Table 3).

No significant difference was found between patients and physicians committee opinions about the improvement of different types of acne scars in the studied patients (p=0.656) (p=0.0371) (Table 4).

Group A patients tolerated the procedure well. Mild oedema was temporary and faded in one week. Pain relieved by analgesics and the patients were able to attend their daily duties.

Group B patients tolerated the procedure well. They were not able to attend their daily duties as all of them were advised to avoid sun for two days after the session and all patients experienced a grainy crust that resolved after a maximum of 5 days, which increased the downtime post session.

Table (1): Qualitative grading system of Goodman and Baron for acne scars before and after treatment (by scar subcision and autologous fat transfer vs Fractional CO2 laser).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Group A (n=10)</th>
<th>Group B (n=10)</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Grade 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grade 2</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Grade 3</td>
<td>5</td>
<td>50.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grade 4</td>
<td>5</td>
<td>50.0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

\( \chi^2 \) = 20.00
p = 0.0001*
\( \chi^2 \) = 14.00
p = 0.001*
Table (2): Quantitative acne scars assessment scores of Goodman and Baron before and after treatment by subcision with autologous fat transfer vs fractional ablative CO$_2$ laser.

<table>
<thead>
<tr>
<th>Scar type</th>
<th>Group A (n=10)</th>
<th>Group B (n=10)</th>
<th>Before</th>
<th>After</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icepick:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>70-100</td>
<td>17-45</td>
<td>45-158</td>
<td>20-94</td>
<td>0.603</td>
<td>0.028*</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>81.80±11.67</td>
<td>32.80±9.61</td>
<td>87.50±31.99</td>
<td>52.40±24.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>80.50</td>
<td>34.00</td>
<td>85.00</td>
<td>54.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paired t-test</td>
<td>14.819</td>
<td></td>
<td></td>
<td></td>
<td>4.650</td>
<td>4.50</td>
</tr>
<tr>
<td>p</td>
<td>0.0001*</td>
<td></td>
<td>0.001*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolling:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>6-45</td>
<td>2-14</td>
<td>1-24</td>
<td>0-12</td>
<td>1.064</td>
<td>0.805</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>18.50±15.73</td>
<td>7.10±4.91</td>
<td>9.40±6.38</td>
<td>4.60±3.31</td>
<td>0.288</td>
<td>0.421</td>
</tr>
<tr>
<td>Median</td>
<td>9.00</td>
<td>5.00</td>
<td>8.00</td>
<td>4.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z-value**</td>
<td>2.873</td>
<td></td>
<td>4.474</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>0.004*</td>
<td></td>
<td>0.002*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boxcar:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>12-27</td>
<td>6-15</td>
<td>1-17</td>
<td>0-11</td>
<td>5.397</td>
<td>3.615</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>20.70±5.25</td>
<td>10.60±4.09</td>
<td>7.70±5.52</td>
<td>4.40±3.56</td>
<td>0.0001*</td>
<td>0.002*</td>
</tr>
<tr>
<td>Median</td>
<td>21.50</td>
<td>11.00</td>
<td>8.00</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paired t-test</td>
<td>5.779</td>
<td></td>
<td>3.851</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>0.0001*</td>
<td></td>
<td>0.004*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total scars number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>96-172</td>
<td>36-74</td>
<td>55-167</td>
<td>23-107</td>
<td>1.232</td>
<td>1.119</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>121.00±28.41</td>
<td>50.50±13.75</td>
<td>104.60±31.05</td>
<td>61.10±26.61</td>
<td>0.234</td>
<td>0.278</td>
</tr>
<tr>
<td>Median</td>
<td>115.00</td>
<td>47.50</td>
<td>107.50</td>
<td>62.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paired t-test</td>
<td>10.936</td>
<td>5.905</td>
<td>0.0001*</td>
<td>0.0001*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Table (3): Mean percentage of change before treatment scores of quantitative assessment of icepick, rolling, boxcar and total number of scars treated by subcision with autologous fat transfer vs fractional ablative CO$_2$ laser.

<table>
<thead>
<tr>
<th>Quantitative assessment of acne scars</th>
<th>Group A (n=10)</th>
<th>Group B (n=10)</th>
<th>Z-test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icepick assessment</td>
<td>↓77.33%–↓48.57%</td>
<td>↓71.83%–↓18.57%</td>
<td>2.854</td>
<td>0.011*</td>
</tr>
<tr>
<td></td>
<td>↓59.87±10.88</td>
<td></td>
<td>39.76±19.45</td>
<td></td>
</tr>
<tr>
<td>Rolling assessment</td>
<td>↓68.89%–↓44.44%</td>
<td>↓100%–↓60.00%</td>
<td>1.185</td>
<td>0.251</td>
</tr>
<tr>
<td></td>
<td>↓58.31±10.65</td>
<td></td>
<td>42.21±41.62</td>
<td></td>
</tr>
<tr>
<td>Boxcar assessment</td>
<td>↓73.91%–↓30.00%</td>
<td>↓100%–0.00%</td>
<td>0.373</td>
<td>0.713</td>
</tr>
<tr>
<td></td>
<td>↓46.73±19.51</td>
<td></td>
<td>42.28±32.23</td>
<td></td>
</tr>
<tr>
<td>Total number of scars</td>
<td>↓67.59%–↓45.83%</td>
<td>↓71.59%–↓20.15%</td>
<td>2.548</td>
<td>0.020*</td>
</tr>
<tr>
<td></td>
<td>↓57.78±9.02</td>
<td></td>
<td>41.97±17.42</td>
<td></td>
</tr>
</tbody>
</table>
Table (4): Physicians’ committee opinion versus patients’ opinions regarding improvement of acne scars of the studied patients treated by subcision with autologous fat transfer vs fractional ablative CO\textsubscript{2} laser.

<table>
<thead>
<tr>
<th>Degree of improvement of acne scars</th>
<th>Physicians committee</th>
<th>Patients opinions</th>
<th>Physicians committee</th>
<th>Patients opinions</th>
<th>(\chi^2)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild (0–&lt;25%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.986</td>
<td>0.843</td>
</tr>
<tr>
<td>Moderate (25–&lt;50%)</td>
<td>3</td>
<td>30.0</td>
<td>2</td>
<td>20.0</td>
<td>0.371</td>
<td>0.656</td>
</tr>
<tr>
<td>Marked (50–&lt;75%)</td>
<td>5</td>
<td>50.0</td>
<td>3</td>
<td>30.0</td>
<td>0.843</td>
<td>0.656</td>
</tr>
<tr>
<td>Excellent (75–100%)</td>
<td>2</td>
<td>20.0</td>
<td>5</td>
<td>50.0</td>
<td>0.56</td>
<td>0.062</td>
</tr>
</tbody>
</table>

Fig. (9-A): Right side of the face of female patient with mixed atrophic acne scars.

Fig. (10-A): Left side of the face of male patient with mixed atrophic acne scars.

Fig. (9-B): The same patient 3 months after scar subcision with autologous fat.

Fig. (10-B): The same patient 3 months after scar subcision with autologous fat transfer.
Fig. (11-A): Left side of the face of female patient with mixed atrophic acne scars.

Fig. (11-B): The same patient 3 months after scar subcision with autologous fat transfer.

Fig. (12-A): Right side of the face of female patient with mixed atrophic acne scars.

Fig. (12-B): The same patient 3 months after scar subcision with autologous fat transfer.

Fig. (13-A): Left side of the face of female patient with mixed atrophic acne scars.

Fig. (13-B): The same patient 3 months after the last session of fractional ablative CO₂ laser.
Fig. (14-A): Right side of the face of female patient with mixed atrophic acne scars.

Fig. (14-B): The same patient 3 months after the last session of fractional ablative CO₂ laser.

Fig. (15-A): Left side of the face of patient with mixed atrophic acne scars.

Fig. (15-B): The same patient 3 months after the last session of fractional ablative CO₂ laser.

Fig. (16-A): Right side of the face of female patient with mixed atrophic acne scars.

Fig. (16-B): The same patient 3 months after the last session of fractional ablative CO₂ laser.
DISCUSSION

Facial scarring has always been a challenge to treat. There are different modalities for the management of these scars including various types of resurfacing which have the disadvantages of either being too mild and ineffective or being too aggressive and complicated [19].

Autologous fat transfer has enjoyed a renaissance in the last several years. In particular, the micro droplet approach offers the surgeon an opportunity to address superficial skin problems such as acne scars and relatively shallow rhytids [20].

Ablative fractional CO$_2$ laser has been developed to address the shortcomings of traditional ablative lasers and non-ablative fractional resurfacing (NAFR) treatments. With the ability to achieve deep dermal ablation and coagulation, clinical results superior to non-ablative fractional lasers could be obtained [21,22].

To our knowledge, this study was the first to perform subcision for atrophic facial acne scars with fat injection directly under the scars to act as filler and a source of stem cells at the same time. This showed significant improvement in acne scars; icepik type in particular; which were evaluated 3 months after the procedure.

This differs from results of Azzam, et al., [23] which showed no improvement of icepick scars after the fat grafting and they recommended punch excision or chemical reconstruction techniques to treat icepick scars. This can be attributed to different technique in which autologous fat transfer was done through 0.5cm stab incision pre-auricular in the hair line or in an already existing scar for cheek augmentation, followed by a fan-shaped subcision of atrophic acne scars. Rohrich et al., [24], also considered that fat transfer alone was not generally effective for individual bound down icepick scars.

On the other hand, Goodman et al., [13] observed that once the scar is freed, fat may be satisfactorily injected. Moreover, Donofrio [25], focused on lipocyte stem cells rather than mature adipocytes as the driving force in long term clinical benefit for post radiation depressed scars. He stated that adipose tissue contains a clonogenic pool of stromal cells having the same functional and immunophenotypic properties of bone marrow mesenchymal stem cells.

Longevity of fat transplants has been extensively studied although consistent results in the literature vary [26,27]. Theories include replacement fibrosis, neovascularization of transplanted fat, and differentiation of lipocyte stem cells into mature adipocytes [14,28,29].

Duration has not been specifically studied in acne scars. However one study of depressed postsurgical scars in 30 patients utilizing a subcision technique followed by autologous fat grafting through 4-mm cannula, revealed 27 patients with very good results at 3 years. Two patients required an additional treatment at 6 months due to partial recurrence [30].

Adipose derived stem cells (ADSCs) are considered a powerful source of skin regeneration because of their capability to provide cellular elements and cytokines. It seems that autologous ADSCs have great promise for applications in wound healing and scar remodeling [6]. Stem cell therapy can improve the quality of the skin, reduce the formation of scars and re-establish the normal function of the skin and its appendages [31].

In the present study, it was found that three sessions of ablative fractional CO$_2$ laser showed significant qualitative and quantitative improvement of atrophic acne scars which was consistent with previous reports of Chapas et al., [32], Manuskiatti et al., [33] and Cho et al., [34]. However, Azzam et al., [23], reported that patients with boxcar scars showed no improvement using (15mj) power by fractional CO$_2$ laser with appearance of pixilated pattern and acne activation in some cases. This can be attributed to different power used in current work (12mj).

On comparing the results of both groups, both methods were equally effective in improving atrophic acne scars quality and quantity. The mean percentage of scar improvement between before and after treatment quantitative assessment showed that autologous fat transfer is more effective in improving icepick and total number of scars and it didn’t differ significantly from fractional CO$_2$ laser in case of rolling and boxcar scars.

Previous histologic and immunohistologic studies demonstrated a large difference in results between fat grafting and fractional ablative CO$_2$ laser for the treatment of acne scars, and favor fat grafting. Histologic and immunohistologic experimental study compared biopsies taken from nude mice before and after fat graft, and showed an increased density of extracellular matrix surrounding the fatty tissue and between the fatty tissue and the dermis [35]. In another study on mice, the skin
changes with fat grafting were investigated in skin biopsies 8 weeks after the graft, which revealed that the fat graft caused increased collagen fibers neosynthesis at the recipient site and thickened the dermis. Regarding skin color and scar quality, marked improvement could be seen after fat graft [36].

The current study concluded that a single session of acne scar subcision with autologous fat transfer proved to be as effective as or even more effective than 3 sessions of ablative fractional CO₂ laser one month apart in the treatment of atrophic acne scars regarding the total number of scars as well as icepik type; which is considered in general the most difficult type in its treatment; with minimal downtime and almost no complications when done in the proper setting, technique, and patient selection and is also considered non-expensive technique which can be done with few equipments.

REFERENCES


