Original Articles

Fractional Laser resurfacing for atrophic acne scars: evaluation in the Brazilian population

Resurfacing com laser fracionado para cicatrizes atróficas de acne: avaliação na população brasileira

ABSTRACT

Introduction: With several treatment options available – including laser – atrophic acne scars are nonetheless difficult to treat. The use of fractional technology results in dermal-epidermal ablation columns, interspersed with intact skin islands, allowing selective thermal damage, effective treatment and faster recovery. The objective of the present study is to demonstrate the efficacy and safety of fractional laser use in the treatment of atrophic acne scars among the Brazilian population.

Methods: An open, prospective, interventional study was carried out with patients with acne scars, without restriction regarding the gender and skin phototype. Exclusion criteria were: pregnancy, breast-feeding, presence of infections or blood dyscrasias and the use of anticoagulants. The evaluation was performed by comparing texture, appearance, and relief as observed in digital photographs.

Results: Of the 30 selected patients, 24 were included in the study. An improvement was noted in the parameters evaluated in the cases that underwent fractional laser (CO2, Erbium-Glass or both). Individuals who underwent multiple treatments showed better results. All those treated with 4 sessions had improvements greater than 50%.

Post-inflammatory hyperpigmentation was detected in 7 of the 24 treated patients.

Conclusion: The present study showed that, when using appropriate parameters and adequate care, fractional laser-assisted resurfacing is an effective and safe method for treating atrophic acne scars in the Brazilian population.

Keywords: acne vulgaris; cicatrix; lasers; chemexfoliation

RESUMO

Introdução: *As cicatrizes atróficas de acne são de difícil tratamento, com várias opções terapêuticas descritas, entre elas o laser. A tecnologia fracionada resulta em colunas de ablação dermoepidérmica, entremeadas por ilhas de pele íntegra, permitindo tratamento eficaz, danos térmicos seletivos e recuperação mais rápida. O objetivo deste estudo foi demonstrar em população brasileira a eficácia e segurança dos lasers fracionados na terapia de cicatrizes atróficas de acne.*

Métodos*: Estudo aberto, prospectivo, intervencional em pacientes com cicatrizes de acne, sem restrição quanto a sexo e fototipo. Foram excluídos: gestantes, lactantes, portadores de infecções ou discrasias sanguíneas e usuários de anticoagulantes. A avaliação foi realizada por fotografia digital comparando textura, aparência e relevo.*

Resultados*: De 30 pacientes selecionados, 24 foram incluídos no estudo. Houve melhora dos parâmetros avaliados nos casos submetidos aos lasers fracionados: CO2, Erbium-Glass ou ambos. Os indivíduos submetidos a múltiplos tratamentos apresentaram melhores resultados. Todos aqueles tratados com quatro sessões obtiveram melhora superior a 50%.*

Hiperpigmentação pós-inflamatória foi detectada em sete dos 24 indivíduos tratados.

Conclusão*: Utilizando parâmetros e cuidados adequados, nosso estudo demonstrou que o resurfacing com laser fracionado constitui método eficaz e seguro para o tratamento de cicatrizes atróficas de acne na população brasileira.*

Palavras-chave: *acne vulgar; cicatriz; laser; abrasão química*

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INTRODUCTION

Acne is a common problem among teenagers and affects up to 5% of adults.[1,2] The scars associated with acne result from the loss of collagen and elastic fibers, whose normal production is impaired during the healing period, due to increased inflammatory activity.[3] Atrophic sequelae are difficult to treat and are classified into distensible and non-distensible scars. The latter can be further sub-classified into superficial, medium, and deep ("ice picks" and "tunnels").[4] Treatment should be individualized according to each scar type. Some of the described treatment options are: chemical peels, surgical excision, dermabrasion, elevation and/or grafting with punches, dermal filling, and laser resurfacing.[1]

Traditional ablative laser removes all of the epidermis and most of the dermis with excellent outcomes, however with long recovery periods.[5] Fractional technology produces total dermal-epidermal ablation columns, interspersed with islands of intact skin, allowing effective treatment, more selective thermal damage and faster recovery,[6] which occurs from the islands of untouched skin.

The objective of the present study is to demonstrate the efficacy and safety of using fractionated lasers in the treatment of atrophic acne scars in the Brazilian population.

METHODS

An open, prospective, interventional study was carried out at the Hospital do Servidor Público Municipal de São Paulo (HSPM), in 2011. Patients bearing atrophic acne scars, older than 18, without restriction regarding gender and skin phototype, and being treated at the HSPM's Dermatology ambulatory, were selected for the analysis. Exclusion criteria were: pregnancy, breast-feeding, blood dyscrasias or infection, use of anticoagulant medications or isotretinoin, and a tendency towards keloid formation. Patients who had a history of herpes infection were prophylactically treated with 200 mg acyclovir five times per day for five days. Treatment: 30 minutes before the procedure, cleansing and disinfection with aqueous chlorhexidine solution and topical anesthesia with 4% lidocaine (Dermomax®, Laboratório Aché, São Paulo, Brazil) were performed. The technique consisted of a pass of fractional CO_2 laser (Sellas, LGM lasers, São Paulo, Brazil) or Erbium-Glass laser (Sellas Evo LGM lasers, São Paulo, Brazil) per session, in the affected areas, with a minimum overlap of 10%. An immediate post-operative example can be seen in Figure 1, showing the micro thermal zones (MTZ), erythema, edema, and slight exudation in the treated areas. Each session was carried out with an average interval of 60 days. In the post-operative period, the following substances were used: mild soap associated with moisturizing cream for two or three days, sunscreen after the fourth day and whitening cream containing 0.05% tretinoin, 4% hydroquinone, and 0.01% fluocinolone acetonide from the tenth day.

The clinical response was documented with digital photographs using the same camera and patient positioning parameters. The evaluation was performed by three dermatologists who compared photographs from before and after the procedures.

Figure 1: Presence of erythema, edema, and exudation immediately after the procedure with fractional CO2 laser

The parameters analyzed were: texture, appearance, and relief. A rating method described in the literature was employed – values from 0 to 3, according to the degree of improvement: 0) less than 25%, 1) 25-50%, 2) 51-75%[7], and 3) greater than 75%.[7]

RESULTS

Table 1 presents data from all the patients, the parameters used, the number of sessions and the degree of improvement.

Of the 30 selected individuals, 24 were included (21 women and 3 men). The mean age was 44.5 years (29 to 60

Table 1: Number of patients, age, skin phototype, number of sessions, parameters and degree of improvement. AE = adverse effects; DI = Degree of improvement, rating: zero) less than 25%, 1) 25-50%, 2) 51-75%, and 3) greater than 75%.7 Eryt = erythema; PIHP = post-inflammatory hyperpigmentation; E = Erbium- Glass

Cases	Age	phototype	Session 1	Session 2	Session 3	Session 4	AE	DI
1	42	IV	144/80	144/60	144/60	169/60 E		2
2	44	III	144/60	144/60	144/60		Eryt	3
3	38	IV	169/55 E	169/55 E				1
4	30	IV	144/60					3
5	29	V	144/80	144/40	144/35		PIHP	3
6	46	IV	144/60	144/60	144/40	169/60 E	PIHP	3
7	33	III	144/25	169/60 E				3
8	40	III	144/80	144/40	169/60 E			2
9	30	IV	144/80	144/65			PIHP	1
10	48	III	144/85	144/40	144/35	169/60 E		2
11	34	IV	144/35					1
12	37	IV	144/80	144/60	169/55 E		PIHP	1
13	47	V	144/80	144/65			PIHP	0
14	34	II	169/55 E	144/35	169/65 E		PIHP	2
15	52	II	144/80	144/60				1
16	30	III	144/60				Eryt	1
17	40	V	144/60					2
18	32	V	144/80					3
19	34	IV	144/80	144/35	169/55 E		Eryt	3
20	39	III	169/55 E				Eryt	1
21	60	V	169/80 E					2
22	40	III	144/80	144/60	144/60	144/40		3
23	30	III	144/80	144/60	144/40			3
24	29	IV	144/60				PIHP	1

Figure 2: Before and after a session

Figure 4: Patient 6 before and after four sessions

Figure 3: Patient 7 before and after two sessions

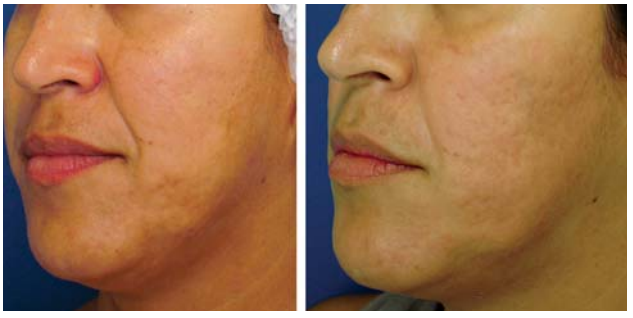

Figure 5: Patient 19 before and after three sessions

years old), and there was a prevalence of skin phototypes III and IV (17 of the 24 cases, corresponding to 70.8%). Eight patients (33.3%) underwent one session, 5 (20.8%) underwent two sessions, 7 (29.2%) underwent three sessions, and 4 (16.7%) completed all four applications. The average number of sessions was 2 sessions per patient. The mean interval between sessions was 2 months. Most cases (13 cases, 54.2%) were treated with CO_2 laser, 3 cases (12.5%) were treated only with Erbium laser, and 8 cases (33.3%) were treated with both devices at different times, with an average interval of 60 days.

The used densities (number of micro thermal zones - MTZ) varied according to the device (CO_2 laser: 144MTZ, Erbium-Glass laser: 169MTZ), while fluences ranged from 25mJ to 85mJ for CO_2 lasers and from 55mJ to 80mJ for Erbium-Glass Lasers), depending on the severity and depth of the scars.

Using the parameters above, the authors obtained improvement of the skin's relief, texture, and appearance in individuals subjected to CO_2, Erbium-Glass, or both lasers. (Figures 2 to 5).

Post-inflammatory hyperpigmentation (PIHP) occurred in 29.2% of cases. No infection, herpes, hypopigmentation or hypertrophic scars were observed. As expected, all patients had mild erythema and edema after the procedure that resolved within three to five days.

DISCUSSION

The present study demonstrated the effectiveness and safety of fractional resurfacing (CO_2 and Erbium-Glass lasers) in the correction of atrophic acne scars. The objective was not to evaluate the difference in response between the devices, but the improvement and safety of fractional technology for the correction of scars in Brazilian patients.

Outcomes were better in patients who received multiple treatments. All patients who underwent four sessions showed improvement in excess of 50%, both in texture, appearance, and skin relief. In some cases there was perceptible skin tightening, leading to the improvement of the sagging and fine wrinkles, though the study was not aimed at assessing this outcome. The superior improvement after multiple sessions is also described in the literature.[8, 9] The recovery was fast and ranged from five to seven days with both lasers, however no comparative data between them have been evaluated. Complications such as infections, hypertrophic scars or hypochromia did not occur. Post-inflammatory hyperpigmentation is a continual concern when procedures are performed in patients with pigmented skin, as is the case for most of the Brazilian population. Despite the fact that most patients in the present study had skin phototypes III and IV, that occurrence was observed in only seven (29.2%) of the 24 patients treated. This response resulted from the careful application of the technique and the decision to perform only one pass per session, which reduced the inflammatory response during the re-epithelization period – an outcome already described by Alster et al.[7] The use of a whitening agent during the intervals between sessions also contributes to this result.

CONCLUSION

Using appropriate parameters and application techniques, the present study has demonstrated that fractional resurfacing is an effective and safe method for the treatment of atrophic acne scars in the Brazilian population. ●

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