

Type of the Paper (Article)

The effectiveness of micro-needling in the treatment of stretch marks

Noha E. Mohamed¹, Mohamed H. Mohamed¹, Rasha M. ELgameel^{1*}

¹ Dermatology, STDs and Andrology Department, Faculty of Medicine, Fayoum University, 63511 Fayoum, Egypt.

* Correspondence: Rasha M. ELgameel, rashaelgamilo@gmail.com; Tel: (002) 01147311550.

Abstract

Introduction: Stretch marks, also known as striae distensae (SD), are a fairly common, asymptomatic skin disorder that affects mostly girls between the ages of 5 and 50. It frequently results in substantial distress and cosmetic anxiety. For the treatment of SD, micro-needling has been suggested as an effective strategy.

Aim of the study: The purpose of this study was to assess how well micro-needling works for treating SD.

Subjects and Methods: Dermapen was applied to 30 patients with stretch marks over the course of four sessions, separated by two-week intervals, and followed up one month later.

Results: There was a significant statistical difference between striae's width before and after treatment with dermapen ($P < 0.001$), and there was a significant statistical difference between striae's color before and after treatment with dermapen between striae rubra and striae alba (p value 0.01), with higher values in striae rubra regarding color improvement. The difference between the Atwal score before and after dermapen treatment was highly statistically significant.

Conclusion: stretch marks can be effectively treated by micro-needling.

Key words: Striae distensae; Microneedling; Dermapen.

1. Introduction

Striae distensae (SD) is a common disfiguring cutaneous condition that affects pregnant women and obese people with rapid weight change. Its development is thought to be significantly influenced by a combination of genetic factors, endocrine changes, and mechanical stretching of the skin. A histological analysis of SD revealed fragmentation with collagen and elastic fiber

degradation, flattened rete ridges, and epidermal thinning.

There are many treatment options for striae, including topical tretinoin, microdermoabrasion, IPL, and various lasers like the 308 nm excimer laser, the 577 nm copper bromide laser, the 585 nm PDL, and fractional lasers like the CO₂ laser, the Erbium Glass laser, and the Erbium YAG

laser (10600 nm). Yet there has been some interest in how striae are managed.

The most popular therapeutic methods for the treatment of striae with promising results have been laser therapy and IPL, which has caused frustration for both clinicians and researchers [1].

A recent method of treating scars, particularly stretch marks, is micro-needling [2].

2. Subjects and methods

2.1. Subjects

The current prospective cohort study included 30 patients who were enrolled in this study, which was conducted on them at the Faculty of Medicine, Fayoum University, Department of Dermatology, Sexually Transmitted Diseases (STDs), and Andrology outpatient clinic.

Inclusion criteria

- Presence of striae distensae.
- Age above 18 years.
- Lesions were on both sides.

Exclusion criteria

- Age under 18 years.
- Pregnancy or lactation.
- Patients using any other treatment for striae distensae.
- Patients with unrealistic expectations.
- Patients with vitiligo.
- Patients with a history of hyperpigmentation.
- Patients with connective tissue disease.

Less invasive, non-surgical skin rejuvenation procedures have dramatically increased in popularity. They have little downtime, which increases patient compliance. The fundamental idea behind these treatment techniques is the regulated creation of inflammation in the dermis, which causes fibroblast recruitment and consequent activation of neocollagenesis [3].

The purpose of this study was to assess the effectiveness and safety of micro-needling for treating striae distensae.

2.2. Dermapen administration guidelines:

- a. **Cleaning:** Use a suitable cleansing product to thoroughly cleanse the skin. Remove all cleanser residue before using an appropriate antibacterial toner or wipe.
- b. Apply anaesthetic ointment to the area to be treated; wait 15 to 50 minutes before removing. For the duration of the waiting period, it is best to cover it with plastic wrap.
- c. Apply a sterile needle to the Dermapen tip and plug in the adaptor for the treatment.
- d. (Activate using the speed preset. (Thin, Sensitive skin 1~3>, Body speed:3~4). (Choose the needle depth.).
- e. Cooling, soothing, and moisturising.
- f. **Post-operative treatment:** After the treatment, take precautions against sun exposure. Since the skin's channels are open for a period of time after treatments, it's recommended to use a sunscreen designed for sensitive skin and post-cosmetic procedures.

2.3. Evaluation

Two fixed dermatologists evaluated each patient clinically before and one month after the final treatment. At baseline and following the last treatment, each lesion's widest striae were measured. The width difference was converted to a drop-in percentage from the starting point. A digital camera (Panasonic X9-Japan) was used to take digital pictures of patients before and after their last treatment.

The Atwal score is used to assess SD. (Abdomen, hips, breasts, thigh/buttocks) Six sites were picked. A maximum of six points are given to each site. overall rating out of 24 Score 0-3 for striae (0 no SD, 1–5, 2 5–10 SD, 3>10 SD), and Score 0-3 for erythema (0 no erythema; 1 light red–pink; 2 dark red; 3 purple).

2.4. Ethical consideration

The approval to conduct this study was obtained from the Department of Dermatology, Sexually Transmitted Diseases (STDs), and Andrology, Faculty of Medicine, Fayoum University. Prior to therapy, all patients provided written consent after being informed of the treatment plan. Each participant had the option to decline taking part in the study. All information gathered was kept private. When appropriate,

treatment was recommended, along with an explanation of how to utilize it.

Each participant received a thorough description of the study's nature, risks, and goals. They were cautioned about the possibility of infection and hyperpigmentation following surgery. Any unanticipated danger that surfaces during the research were promptly disclosed to the participants and the ethical committee. There were sufficient safeguards in place to protect participants' confidentiality and privacy through the use a code number for every participant and by taking pictures of the affected site only. The results of the research will be used only for scientific purposes.

2.5. Statistical Procedures

Using the SPSS statistical computer tool version 22 to scientifically arrange, tabulate, and analyze the acquired data (SPSS Inc., USA). The standard deviation (SD), mean, and range of the data were calculated. For numerical data, the standard deviation (SD), mean, and range were calculated. The independent and dependent tests were used to determine significance. For qualitative data presented as numbers, Chi-square (2) was used as a significance test, and a *P-value of 0.05* was used to determine statistical significance.

3. Results

Thirty patients from the outpatient clinic of the Fayoum Hospital for Dermatology and Sexually Transmitted

Diseases (STDs), located in Fayoum, Egypt, participated in this study. Thirteen patients had striae rubra (43.3%) and seventeen had

striae alba (56.6%) when patients were chosen at random.

Patients ranged in age from 18 to 60, with a mean age of 22.77 ± 5.54 . There were 24 female patients (80%) and 6 male patients (20%). These striae were found in the abdomen in 33.3% of patients (10 patients), the legs in 26.6% of patients (8 patients), the buttocks and lower back in 16.6% of patients (5 patients), the thighs in 13.3% of patients (4 patients), the axillae, forearms, and arms in 6.6% of patients (2 patients), and the breast and sub-mammary in 3.3% of patients (one patient).

In this group of patients, there were a number of factors that contributed to the development of striae distensae, including weight gain in 19 patients (63.33%), which was brought on by increased food intake (20%), steroid usage (30%), pregnancy (10%), and early adolescence with weight gain (3.33%). Five patients (16.66%) had weight loss, three (10%) had pregnancy with proportionate weight gain, and three (10%) had steroid use without weight gain (**Table 1**).

Table 1: The frequency and proportion of potential causes of striae distensae.

Variables	Frequency (%)
Weight Gain	6 (20%)
Steroid use and weight gain	9 (30%)
Pregnancy and Weight Increase	3 (10%)
Early Adolescence and Weight Increase	1 (3.33%)
Loss of weight	4 (13.33%)
Excessive Exercise & Weight Loss	1 (3.33%)
dosage of steroids	3 (10%)
Pregnancy	3 (10%)

Thirty participants were included in this study and received dermapen therapy. The study participants received treatment

over the course of four sessions, separated by two-week intervals, with follow-up occurring one month following the final session. There

was a highly significant difference between the widths of the striae in patients treated with dermapen before and after the treatment, according to a comparison. According to the

table, the mean value of the striae's width before dermapen was 2.531.052, and after it was 0.9170.628 (**Table 2**).

Table 2: A comparison of the striae's width before and after Dermapen treatment.

striae width	Mean	N	Test value	r	P-value
Pre dermapen	2.53±0.87 2-5	30			
Postdermapen	1.03±0.57 0.5-3	30	16.128	0.187	< 0.0001

Comparison of the various shades of striae before and after dermapen treatment. We discovered that the striae were different shades of deep red, crimson, light red (pink), and white. Prior to receiving dermapen treatment, patients experienced deep red striae in six patients, red striae in seven patients, and white striae in seventeen patients. We discovered that the dermapen therapy, which consisted of four sessions, significantly altered the striae's color. Six individuals with deep red striae saw a transition to four light red (pink) and two red

striae. However, the striae of seven patients who had red color changed into four patients who had normal color, two patients who had light red (pink), and one patient whose color stayed red as it was prior to dermapen treatment. It should be noted that despite receiving dermapen therapy, the color of the 17 patients with striae alba remained unchanged. Comparing Atwal score before and after treatment with dermapen, we noticed that there was highly significant difference (**Table 3**).

Table 3: A Comparison between Atwal score for SD before and after treatment by dermapen.

Atwal score for SD before treatment (---\24)	Frequency (%)	Atwal score for SD after treatment (---\24)	Frequency (%)
2	12 (40%)	0	1 (3.3%)
3	3 (10%)	1	4 (13.3%)
4	5 (16.6%)	2	16 (53.3%)
8	2 (6.6%)	4	2 (6.6%)
10	2 (6.6%)	6	1 (3.3%)
15	1 (3.3%)	8	5 (16.6%)
16	5 (16.6%)	10	1 (3.3%)

4. Discussion

The objective of the current study was to assess the effectiveness of micro-needling in treating SD patients. These striae were found in the abdomen in 33.3% of the patients (10 patients), the legs in 26.6% of the patients (8 patients), the buttocks and lower back in 16.6% of the patients (5 patients), the thighs in 13.3% of the patients (4 patients), the axillae, forearms, and arms in 6.6% of the patients (2 patients), and the breast and sub-mammary in 3.3% of the patients (one patient).

For pregnancy-related striae, the typical anatomical places to be affected include the belly and breast; for adolescent boys, the outer thighs or lumbosacral regions; and for adolescent girls, the buttocks, thighs,

upper arms, and breast. The belly accounted for 33.3 percent of the striae in this study, the legs for 26.6%, the thighs for 13.3%, the arms for 6.6%, the buttocks for 6.6%, and the breast and sub-mammary for 3.3%. In contrast, Cho and his coworkers' (2006) report on the locations affected by SD differed from those in the current study [4].

where the buttocks, which were the most common location of striae growth and were followed by the thighs and calves, showed SD in 77.1% of 48 Korean girls between the ages of 15 and 17. The discrepancy in regions between the present study and Cho et al. (2006) [4] could be attributed to the patients' different ages, races, and other risk factors such as

pregnancy and steroid usage. In the current study, 25% of patients experienced SD as a result of pregnancy, including 10% with increased weight gain and 15% with proportionate weight gain.

More than 90% of pregnant women who have SD do so as a result of a combination of hormonal variables, including increased lateral stress on connective tissue and hormones such as relaxin, oestrogen, and adrenocortical hormones (Lawley and Yancey, 2003) [5]. According to Maia and her coworkers' [6] 2009 report, striae were more frequently seen in younger women, in women who gained more weight during pregnancy, and/or in women who had babies with higher birth weights, suggesting that maternal age may act as a preventative measure for striae during pregnancy.

Our result revealed that there was a high statistically significant improvement ($P < 0.001$) concerning the width and score of the erythema after treatment with dermapen. There was a statistically significant difference ($P < 0.05$) in regards to the Atwal score of the striae after treatment with dermapen. While there was a high statistically significant difference ($P < 0.01$) between striae rubra and striae alba in regards to colour improvement in striae rubra patients after treatment with dermapen,

Our findings showed that after using Dermapen, there was a very statistically significant improvement with respect to erythema width and score ($P < 0.001$). After receiving dermapen treatment, there was a statistically significant difference ($P < 0.05$) in the Atwal score of the striae.

The color improvement in striae rubra patients treated with dermapen was statistically significantly different ($P < 0.01$) from that in striae alba patients.

Our research supports the findings of Mohamed Ali et al. (2017) study [7], which included 30 patients divided into two groups; the first group received micro-needling treatment, and the second group received microdermabrasion treatment. They discovered that micro-needling significantly improves SD.

Fifteen patients who underwent micro-needling and another 15 patients who underwent microdermabrasion participated in a study by Ali et al. They discovered that micro-needling significantly outperformed microdermabrasion in terms of clinical improvement ($P = 0.005$) [8].

Conclusions

Striae distensae (SD) is a common skin disorder that can be quite upsetting without posing any health risks. By collagen stimulation, Dermapen can improve the clinical picture, including striae breadth, color, and texture. When treated with dermapen, striae rubra responded better than striae alba, according to a clinical evaluation. Dermapen appears to be a promising therapeutic approach for striae distensae. More sessions, more sample size, using control groups and long-term follow-up are advised for proper study, according to the recommendation. Also advised are histopathologic and clinical connection.

Ethical considerations: The research project was approved by Fayoum University's medical school's ethics board. Subjects gave their consent after being fully briefed on the study's purpose, their role in the research, and their right to decline participation.

Funding: This research is not funded.

Conflicts of Interest: All authors declare no conflict of interest.

References

1. Hernández-Pérez E, Colombo-Charrier E, Valencia-Ibieta E. Intense pulsed light in the treatment of striae distensae. *Dermatol Surg.* 2002;28(12):1124-1130. doi: 10.1046/j.1524-4725.2002.02111.x.
2. Doddaballapur S. Microneedling with dermaroller. *J Cutan Aesthet Surg.* 2009;2(2):110-111. doi: 10.4103/0974-2077.58529.
3. McCrudden MT, McAlister E, Courtenay AJ, González-Vázquez P, Singh TR, Donnelly RF. Microneedle applications in improving skin appearance. *Exp Dermatol.* 2015;24(8):561-566. doi: 10.1111/exd.12723.
4. Cho S, Park ES, Lee DH, Li K, Chung JH. Clinical features and risk factors for striae distensae in Korean adolescents. *J Eur Acad Dermatol Venereol.* 2006;20(9):1108-1113. doi: 10.1111/j.1468-3083.2006.01747.x
5. Lawley TJ, Yancey KB. Skin changes and diseases in pregnancy. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI, editors. *Fitzpatrick's Dermatology in general medicine.* 6th edn. New York: McGraw-Hill; 2003, p. 1362.
6. Maia M, Marcon CR, Rodrigues SB, Aoki T. Estrias de distensão na gravidez: fatores de risco em primíparas [Striae distensae in pregnancy: risk factors in primiparous women]. *An Bras Dermatol.* 2009;84(6):599-605. Portuguese. doi: 10.1590/s0365-05962009000600005.
7. Mohamed Ali, BM, El-Tatawy RA, Elfar NN, Mohammed Ali DA. A comparative clinical and histopathological study of microneedling versus microdermabrasion (aluminum oxide crystals) in the treatment of striae distensae. *J Egypt women Dermatol Soc.* 2017;14 (2):92- 99.
8. Ali BMM, El-Tatawy RA, Eifar NN, Ali DAM. A comparative clinical and histopathological study of microneedling versus microdermabrasion in the treatment of striae distensae. *J Egypt women Dermatol Soc.* 2017; 14:92-99.