

AIM OF THE WORK

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To compare between the effects of micro needling alone and its effect when combined with platelet rich plasma (PRP) in treatment of stretch marks.

PATIENTS

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20 Patients who are suffering from striae distensae in abdomen and/or thighs will be selected from the out-patient clinic of Dermatology and Venereology department, Main University Hospital, Alex, Egypt.

Exclusion criteria ⁽⁷⁵⁾

1. Use of systemic retinoids or any other scar treatments procedure in the previous 3 months.
2. Presence of skin cancers, warts, solar keratosis or any skin infection.
3. Active acne in the affected area with striae distensae.
4. Patient on anticoagulant therapy.
5. Allergy to local anesthetic agents.
6. Patient on chemotherapy, radiotherapy or high doses of corticosteroids.
7. Patients with uncontrolled diabetes mellitus.
8. Patients with keloid tendency.
9. Patients with uncontrolled hypertension.
10. Patients shouldn't receive salicylates or NSAIDS at least 2 days before the procedure.

METHODS

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Treatment was performed as an office procedure. Twenty female patients aged 15 to 30 years (mean age of 23.6) with skin types II,III, IV and V with striae distensae (18 striae rubra, 2 striae alba) were enrolled. All patients were subjected to the following:

A) Patients' informed consents:

All patients were informed of the purpose and possible risks and expectations of the study, and written consent was obtained from each subject.

B) History:

1. Personal information: name, age, gender and marital status.
2. Present history: cause, onset and duration of striae.
3. Obstetric history: number of pregnancies, twin or multiple pregnancies, lactation, date of last pregnancy and/or abortion.
4. Drug history: e.g. intake of steroids (steroid striae), alcohol, or anticoagulants.
5. Medical illnesses: such as diabetes, liver disease, Cushing's syndrome, blood dyscrasias, skin infection and malignant diseases.

C) Clinical examination

1. General examination.
2. Local examination of striae distensae: including site, size, stage (color), depression or elevation and skin texture.

D) Scoring of stretch marks ⁽⁸⁰⁾:

An assessment was done by clinical scoring using a specific 4-point ordinal scale, this is a score based on a visual and tactile appreciation of the importance of stretch marks (immature, recent progression):

Score 0: no stretch marks

Score 1: presence of stretch marks of slight importance:

- few stretch marks
- and / or thin (≤ 1 mm)
- very pale pink

Score 2: presence of stretch marks of moderate importance:

- numerous stretch marks
- and / or moderate wideness (>1 mm and ≤ 2 mm)
- frank pink

Score 3: presence of stretch marks of severe importance:

- very numerous stretch marks
- and / or important wideness (>2 mm)
- red / purple / lilac

E) Treatment strategy:

Each patient was subjected to 4 treatment sessions, with 2 weeks in between (minimal duration for new natural collagen to form) ⁽⁷⁶⁾.

Topical anesthetic cream (eutectic mixture of local anesthetics ‘Lidocaine 25mg, Prilocaine 25 mg’, AstraZeneca, Wilmington, DE) was applied to the treatment area under occlusion for 1 hour and then completely removed using saline-soaked gauze before treatment ⁽⁸¹⁾.



Figure (7): Dermaroller

The device consists of a plastic body and head part. The head is a sterile plastic cylinder with 1080 titanium needles protruding 2.5 mm from the surface (Figure 7). The treatment was performed under highly strict aseptic technique, by rolling the needling tool over the areas of striae distensae 15-20 times in four directions: horizontally, vertically, and diagonally right and left, ensuring an even density of approximately 1200 to 1500 dots/cm². Patients were instructed to use a moisturizer three times daily for 2 weeks after treatment to promote wound healing and prevent dryness. Petechial or pin point bleeding which occurred was controlled. After treatment, the area was wetted with saline pads.

At each session the striae on the right side was treated with rolling alone, while the left side was treated by microneedling associated with PRP.

Microneedling associated with PRP application was done as follow: ⁽⁷⁷⁻⁷⁹⁾

To create PRP; 10-20 cc of venous blood were collected from the anti-cubital vein under complete aseptic technique. The whole blood sample was collected into tubes containing sodium citrate (10:1) as an anticoagulant (to bind calcium and prevents clotting cascade by preventing conversion of prothrombin into thrombin. Then the citrated whole

blood was subjected to 2 centrifugation steps; the initial centrifugation at 3000 rpm for 7 minutes, to separate the plasma and platelets from the RBCs and WBCs. The resulting plasma supernatant, which contains the suspended platelets was harvested to a second centrifugation step at 4000 rpm for 5 minutes, leading to separation of the plasma into 2 portions:- PPP (platelet poor plasma) in the upper two thirds of the sample, and PRP (platelet rich plasma) in the lower one third. The upper two thirds containing PPP was discarded leaving the PRP sample.

After skin preparation with local anesthetic as mentioned before, the treatment area undergoes nappage, via medical micro needle therapy to produce microscopic channels through the epidermis in order to increase the penetration of the PRP into the dermis and to initiate the immune response in the dermal layer. The activated PRP was applied to the desired area and nappage continued with the roller.

Saline was applied to the area for 30 minutes. To hydrate the skin and infuse the PRP into the micro-channels.

F) Methods of assessment: ⁽⁸²⁾

All patients were photographed at baseline, before each session and 3 months after the last treatment session. Digital photographs of each participant were obtained using identical camera setting, patient positioning, and room lightning

Clinical improvement was assessed by comparing the before and after photos by two independent dermatologists using a quartile grading system as follows:

Grade	Improvement
0	No improvement
1	Mild improvement [<25%]
2	Moderate improvement [26–50]
3	Marked improvement [51–75%]
4	Excellent improvement [76–100%]

In addition, a patient satisfaction score was rated using the following scale:

Grade	Degree of satisfaction
A	Unsatisfied
B	Somewhat satisfied
C	Highly satisfied

Patient was asked to report any side effects of the treatment, including pain, bleeding, oozing, post-therapy dyschromia, scaling ,crusting, erythema, or aggravation of the lesion (figure 8).



Figure (8): A 15 years old female patient showing erythema and pin point bleeding after the session

Scoring of stretch marks was done again 3 months after the last session.

Statistical analysis of the data:

Data were fed to the computer using IBM SPSS software package version 20.0.

Qualitative data were described using number and percent. Comparison between different groups regarding categorical variables was tested using Chi-square test.

Quantitative data were described using mean and standard deviation for normally distributed data while abnormally distributed data was expressed using median, minimum and maximum.

For normally distributed data, comparison between two independent population were done using independent t-test while more than two population were analyzed F-test (ANOVA) to be used and Post Hoc test (Scheffe). Correlations between two quantitative variables were assessed using Pearson coefficient.

Significance test results are quoted as two-tailed probabilities. Significance of the obtained results was judged at the 5% level.

a- Mean value $(\bar{X}) = \frac{X}{n}$.

Where X = the sum of all observations.

n = the number of observations.

b- The standard deviation S.D. $= \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$

Where

$\sum (X_i - \bar{X})^2$ = the sum of squares of differences of observations from the mean.

c- Student (Unpaired-sample) “t” test:

It is used during comparison between the means of different sample groups. The “t” is calculated as follows:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where

X_1 = Mean of first group.

X_2 = Mean of second group.

S_1 = Standard deviation of the first group.

S_2 = Standard deviation of the second group.

n_1 = Sample size of the first group.

n_2 = Sample size of the second group.

d- One way analysis of variance (ANOVA) was performed for comparison between more than two groups

Variance ratio F was computed by the formula.

$$F_{(r-1),(n-1)} = \frac{\text{Means quare between classes}}{\text{Mean square within classes}}$$

Where r = number of groups

n = total sample size

e- Chi-Square test:

It tests the association between qualitative nominal variables, it is performed mainly on frequencies. It determines whether the observed frequencies differ significantly from expected frequencies.

$$\text{Computed } X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where E = expected frequency

O = observed frequency

$$E = \frac{\text{Raw total} \times \text{Column total}}{\text{Grand total}}$$

RESULTS

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Epidemiology:

The study includes 20 patients having striae distensae of the rubra and alba subtypes.

Age: Patient ages vary from 15-30 years with a mean of 23.6 ± 4.50 years, (Table III).

Table (III): Age distribution of patients

Range (years)	15 - 30
Mean	23.6
Standard deviation SD	4.50

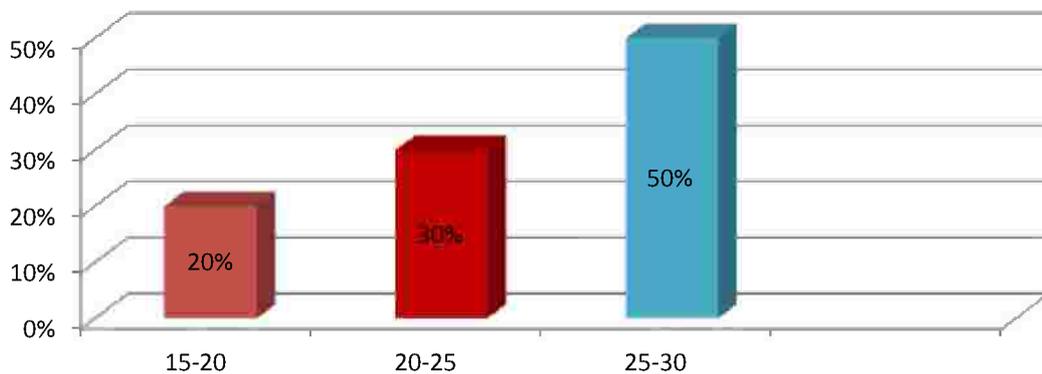


Figure (9): Age distribution of striae distensae patients

Sex: All patients are females (20 patients representing 100%). (Figure 10).

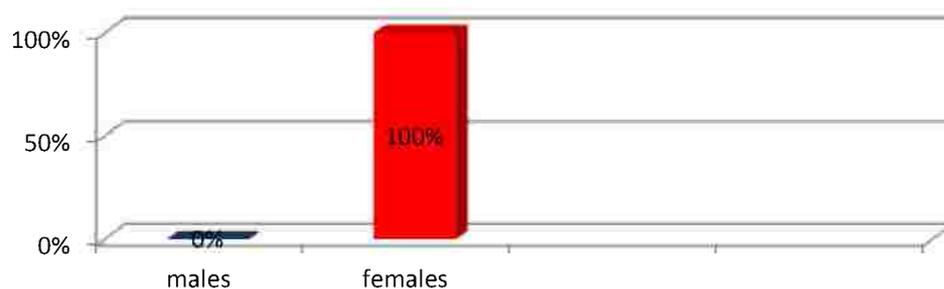


Figure (10): Sex distribution

Skin type: 3 patients (15%) have Fitzpatrick skin type II, 2 patients (10%) have type III, 11 (55%) have type IV, and 4 patients (20%) have type V. (Table IV, Figure 11).

Table (IV): Distribution of patients according to Fitzpatrick skin type

Fitzpatrick skin type	Number	Percentage
I	0	0%
II	3	15%
III	2	10%
IV	11	55%
V	4	20%
Total	20	100%

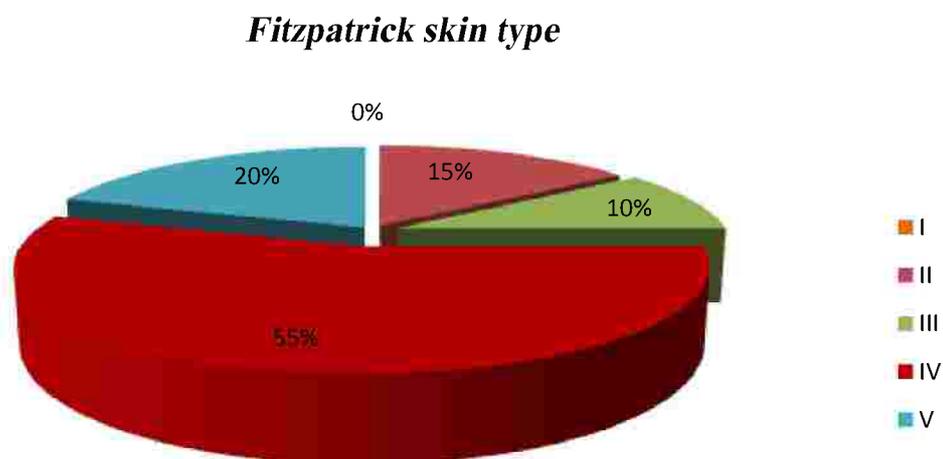


Figure (11): Fitzpatrick skin type distribution

Type of striae distensae: 2 patients are of the alba subtype, and 18 of the rubra. Figure (12).

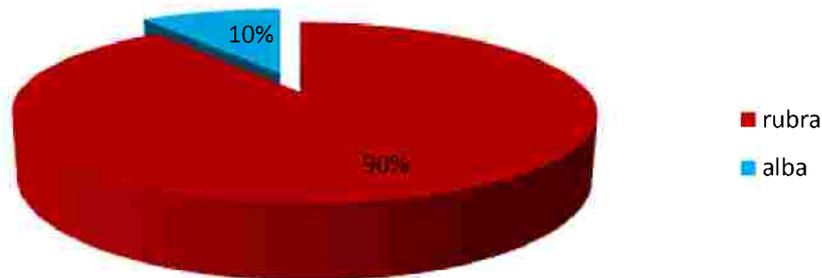


Figure (12): Types of striae distensae

Distribution: 8 patients (40%) have striae distensae located on the abdomen, 6 patients (30%) have striae located on thighs, and 6 patients have striae on flanks (30%). (Table V, Figure 13).

Table (V): Distribution of striae distensae

Striae location	Number	Percentage
Abdomen	8	40%
Thighs	6	30%
Flanks	6	30%
Total	20	100%

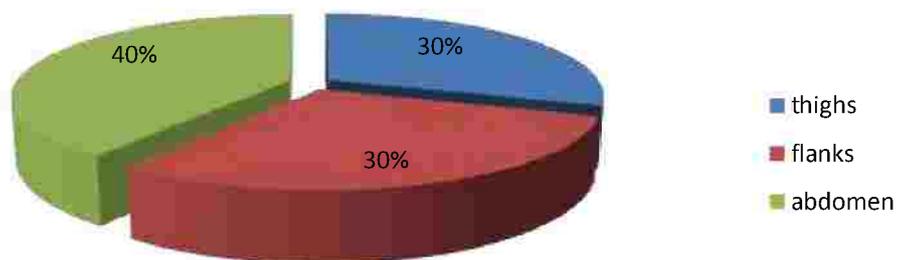


Figure (13): Distribution of striae distensae

Duration of the disease: 4 patients (20 %) have less than 1 year duration of the striae, 11 have duration 1-1.5 years (55%) and more than 1.5 years in 5 patients (25%).

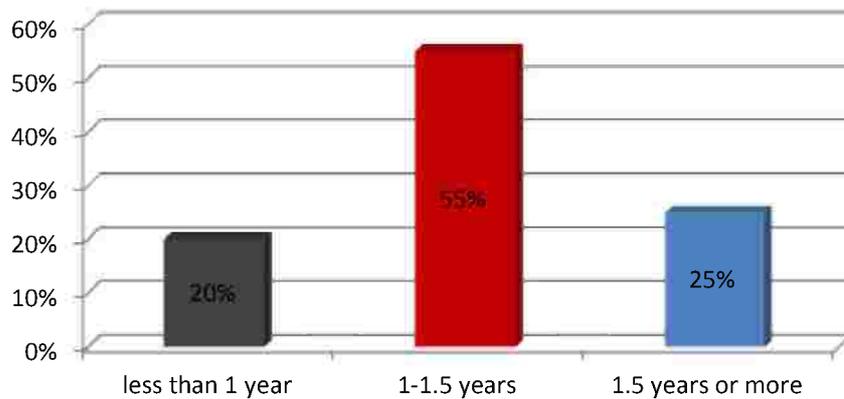


Figure (14): Duration of the disease in years.

Etiology:

As regard the cause, one half of the patients (50%) had striae distensae due to previous pregnancy, and the other half (50%) are due to overweight. (Figure 15).

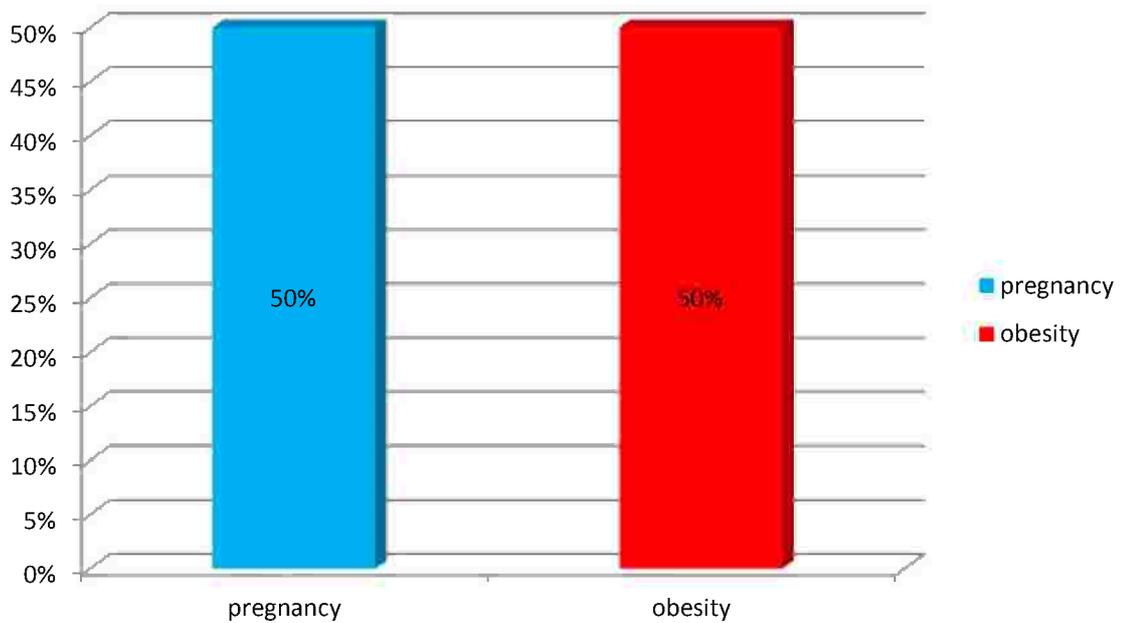


Figure (15): Etiology of striae distensae

Outcome:

Stretch mark clinical score: (table VI): As regard the scoring of stretch marks before the treatment, on the right side, 12 patients had score 2 (60%), and 8 had score 3 (40%). On the left side, 2 (10%), 10 (50%), and 8 patients (40%) had scores of 1, 2, and 3 respectively ($p=0.335$).

After 3 months follow up of treatment with micro-needling alone on the right side and PRP on the left side, score 1 was achieved by 8 patients for the right side (40%), and 14 patients for the left side (70%), score 2 was gained by 8 patients for the right side (40%), and 5 for the left one (25%), and finally score 3 by 4 patients for the right side (20%), and a single one for the left side (5%) ($p=0.043$) (Table VII, figure 16).

Table (VI): Stretch mark clinical scoring

Clinical score	Description
0	no stretch marks
1	presence of stretch marks of slight importance: <ol style="list-style-type: none">1. few stretch marks2. and / or thin (≤ 1 mm)3. very pale pink
2	presence stretch marks of moderate importance: <ol style="list-style-type: none">1. Numerous stretch marks2. And/or of moderate wideness (>1 mm and ≤ 2 mm)3. Frank pink
3	presence stretch marks of severe importance: <ol style="list-style-type: none">1. very numerous stretch marks2. and / or of important wideness (>2 mm)3. red / purple / lilac

Table (VII): Comparison between the right and left side regarding stretch mark clinical score before and after treatment.

	Right side		Left side		P1
	No.	%	No.	%	
Before treatment					
1	0	0.0	2	10.0	0.335
2	12	60.0	10	50.0	
3	8	40.0	8	40.0	
After treatment					
1	8	40.0	14	70.0	0.043*
2	8	40.0	5	25.0	
3	4	20.0	1	5.0	
P2					

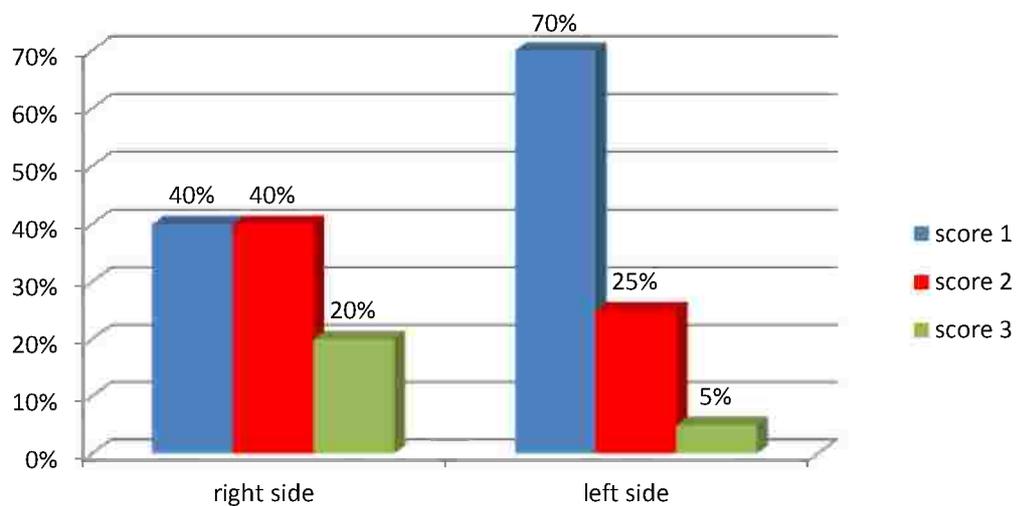


Figure (16): Comparison between the right and left side regarding stretch mark clinical score 3 months after treatment.

Patient satisfaction score: (table VIII)

On the right side, 4 patients were unsatisfied (20%), 6 patients were somewhat satisfied (30%), while 10 patients were highly satisfied (50%). On the other side, 2 patients were unsatisfied (10%), 4 patients were somewhat satisfied (20%), and 14 patients were highly satisfied (70%). ($p=0.107$) (Table IX, figure 17).

Table (VIII): Patient satisfaction score

Grade	Degree of satisfaction
A	Unsatisfied
B	Somewhat satisfied
C	Highly satisfied

Table (IX): Comparison of the 2 sides regarding the patient satisfaction score

Patients satisfaction	Right side		Left side		P1
	No.	%	No.	%	
Unsatisfied	4	20.0	2	10.0	0.107
Somewhat satisfied	6	30.0	4	20.0	
Highly satisfied	10	50.0	14	70.0	

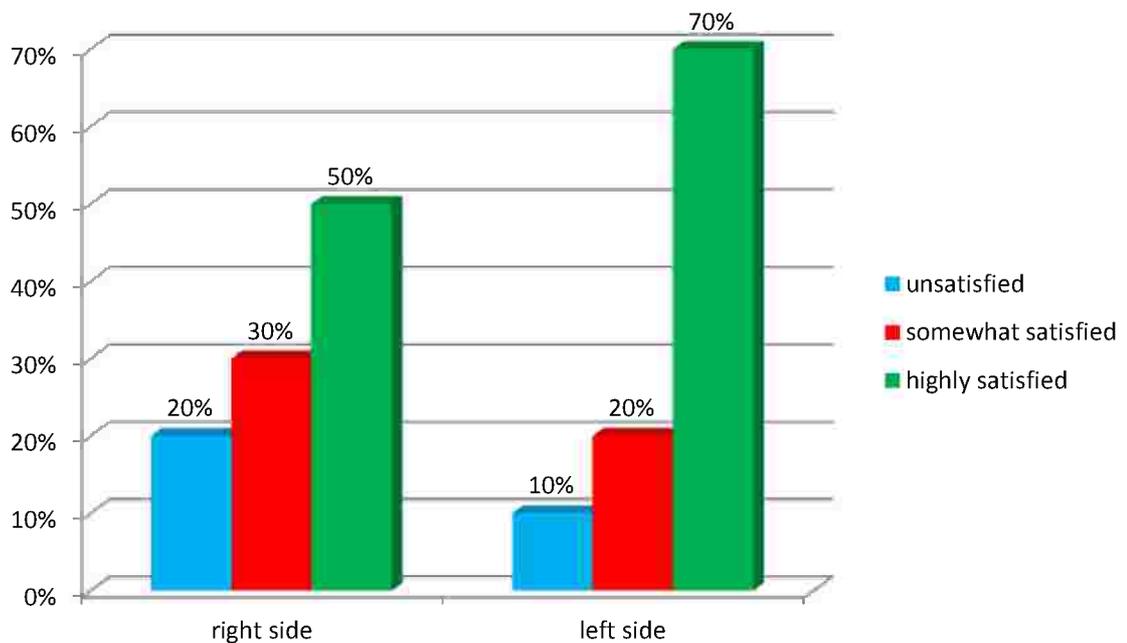


Figure (17): Comparison of 2 sides in view of patient satisfaction score

Quartile grading system:

On the right side, 8 patients showed minimal improvement (40%), and the same number showed moderate improvement, while marked improvement appeared in 4 patients (20%). On the other side, minimal improvement appeared in 3 patients (15%), moderate in 7 ones (35%), and marked in 10 patients (50%). None of the patients included in the study showed excellent improvement ($p=0.011$) (table X, figure 18).

Table (X): Comparison between the two sides regarding quartile grading score

Quartile grading score	Right side		Left side		P1
	No.	%	No.	%	
Minimal improvement (<25%)	8	40.0	3	15.0	0.011*
Moderate 26-50%	8	40.0	7	35.0	
Marked improvement (51-75%)	4	20.0	10	50.0	
Excellent improvement (76-100%)	0	0.0	0	0.0	

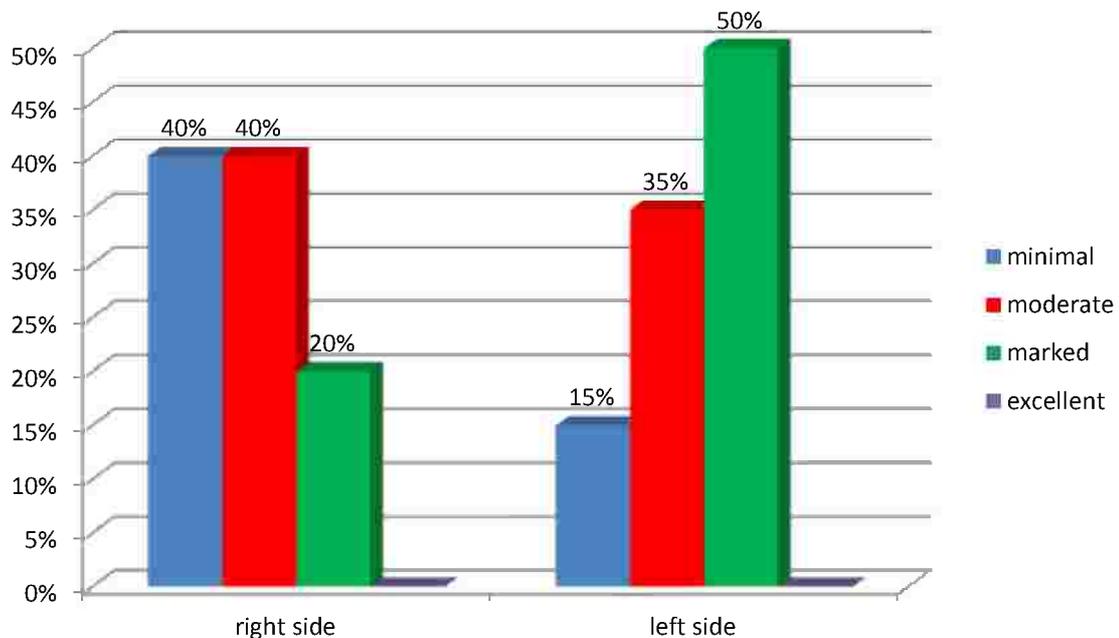


Figure (18): Comparison between right and left sides with Quartile grading system

For the relation of Quartile grading and age; on the right side, marked improvement was noticed more in patients aged less than 20 years (75%), followed by the age group 20-25 years, representing 25%, and no marked improvement was noticed in patients aged 25-30 years ($p=0.012$). On the left side there was increase in the marked improvement towards older age groups; as patients less than 20 years who showed marked improvement represented 30%, while patients of the age groups 25-25 and 25-30 represented 50% and 20% respectively (table XI, figure 19).

Table (XI): Relation between the quartile grading score and age

Age	Right side						Left side					
	Minimal “n=8”		Moderate “n=8”		Marked “n=4”		Minimal “n=3”		Moderate “n=7”		Marked “n=10”	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
< 20	0	0.0	1	12.5	3	75.0	0	0.0	1	14.3	3	30.0
20-25	1	12.5	4	50.0	1	25.0	1	33.3	0	0.0	5	50.0
25-30	7	87.5	3	37.5	0	0.0	2	66.7	6	85.7	2	20.0
X ²	6.98						5.99					
p	0.012*						0.013*					

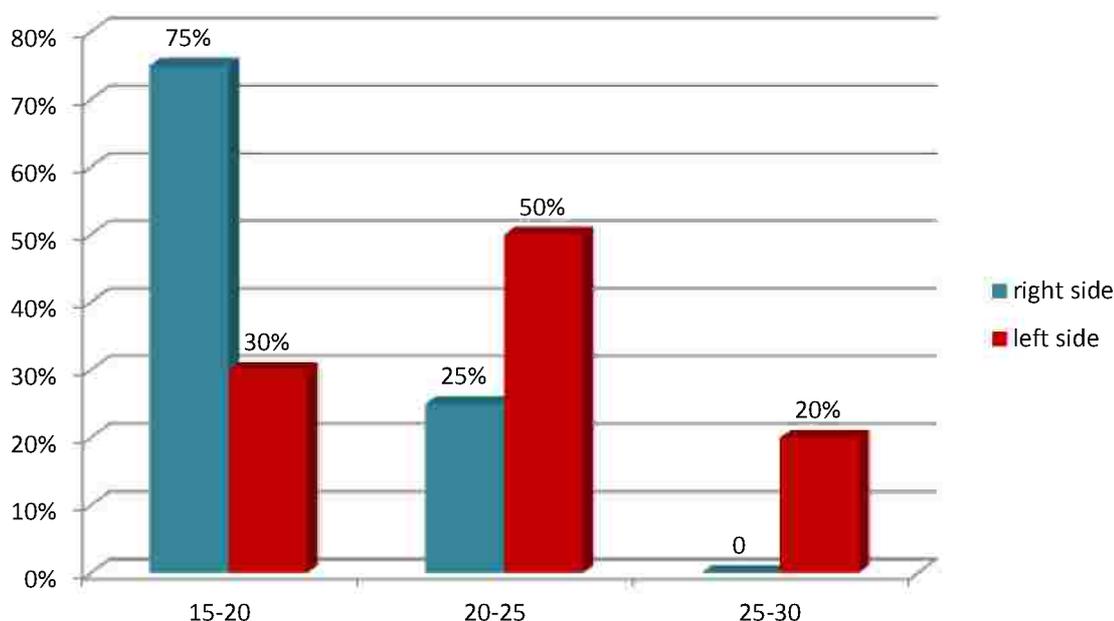


Figure (19): Relation between marked improvements of the Quartile grading and age for both sides

Regarding the relation of the Quartile grading and Fitzpatrick skin type; on the right side, marked improvements were found in skin types II and III only (75% and 25% respectively) ($p=0.001$), while on the left side, the scale expanded to involve skin types II, III and IV with proportions of 20%, 20% and 60% respectively ($p=0.001$) (table XII, figure 20).

Table (XII): Relation between the quartile grading score and Fitzpatrick skin types

Fitzpartrick skin types	Right side						Left side					
	Minimal		Moderate		Marked		Minimal		Moderate		Marked	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
II	0	0.0	0	0.0	3	75.0	0	0.0	1	14.3	2	20.0
III	0	0.0	1	12.5	1	25.0	0	0.0	0	0.0	2	20.0
IV	4	50.0	7	87.5	0	0.0	0	0.0	5	71.4	6	60.0
V	4	50.0	0	0.0	0	0.0	3	100.0	1	14.3	0	0.0
Total	8		8		4		3		7		10	
X ²	7.25						6.55					
p	0.001*						0.001*					

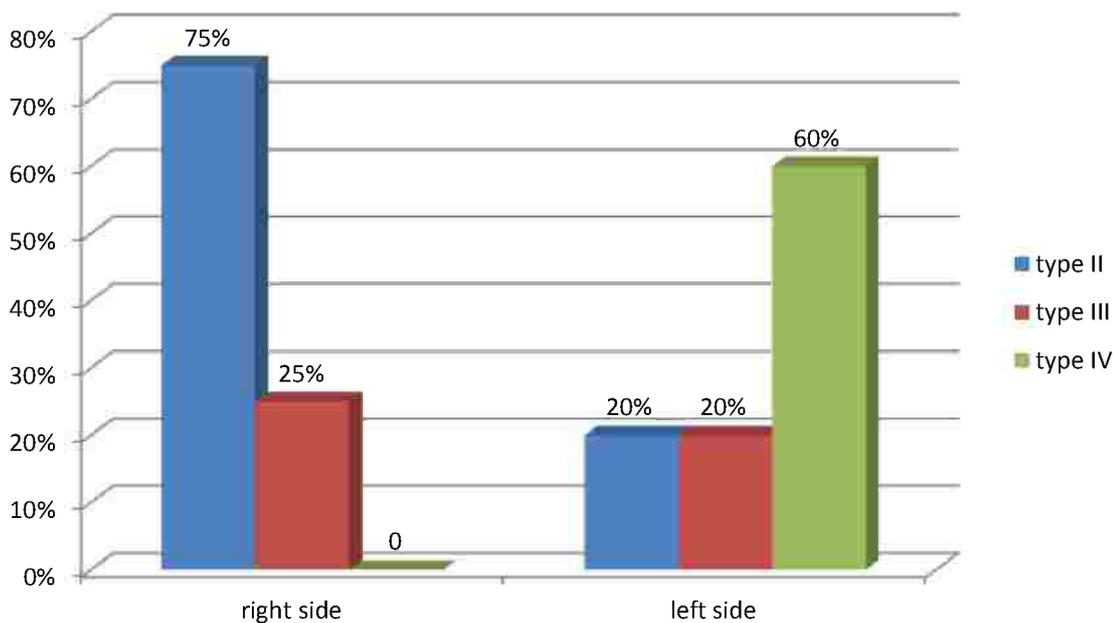


Figure (20): Relation between marked improvement measured by quartile grading and Fitzpatrick skin types on both sides

Regarding the relation between the type of striae distensae and Quartile grading; all marked improvements occurred with striae rubra type on both sides ($p=0.368$ for the right side, and 0.29 for the left side). All data are shown in table (XIII).

Table (XIII): The relation of striae type to Quartile grade on both sides

Type of skin striae distensae	Right side						Left side					
	Minimal		Moderate		Marked		Minimal		Moderate		Marked	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Striae alba	1	12.5	1	12.5	0	0.0	1	33.3	1	14.3	0	0.0
Striae rubra	7	87.5	7	87.5	4	100.0	2	66.7	6	85.7	10	100.0
Total	8		8		4		3		7		10	
X ²	1.65						1.74					
p	0.368						0.29					

For the relation of site to the proportions of improvement using Quartile grading; on the right side, marked improvement was noticed only in the abdomen (100%) ($p=0.001$), while on the left side, marked improvement included abdomen, flanks and thighs with 60%, 20% and 20% respectively ($p=0.011$). All data are included in table XIV, and figure 21.

Table (XIV): Relation between the quartile grading score and site for both sides

Site	Right side						Left side					
	Minimal "n=8"		Moderate "n=8"		Marked "n=4"		Minimal "n=3"		Moderate "n=7"		Marked "n=10"	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Abdomen	1	12.5	3	37.5	4	100.0	0	0.0	2	28.6	6	60.0
Flanks	3	37.5	3	37.5	0	0.0	2	66.7	2	28.6	2	20.0
Thighs	4	50.0	2	25.0	0	0.0	1	33.3	3	42.9	2	20.0
X ²	8.68						6.07					
p	0.001*						0.011*					

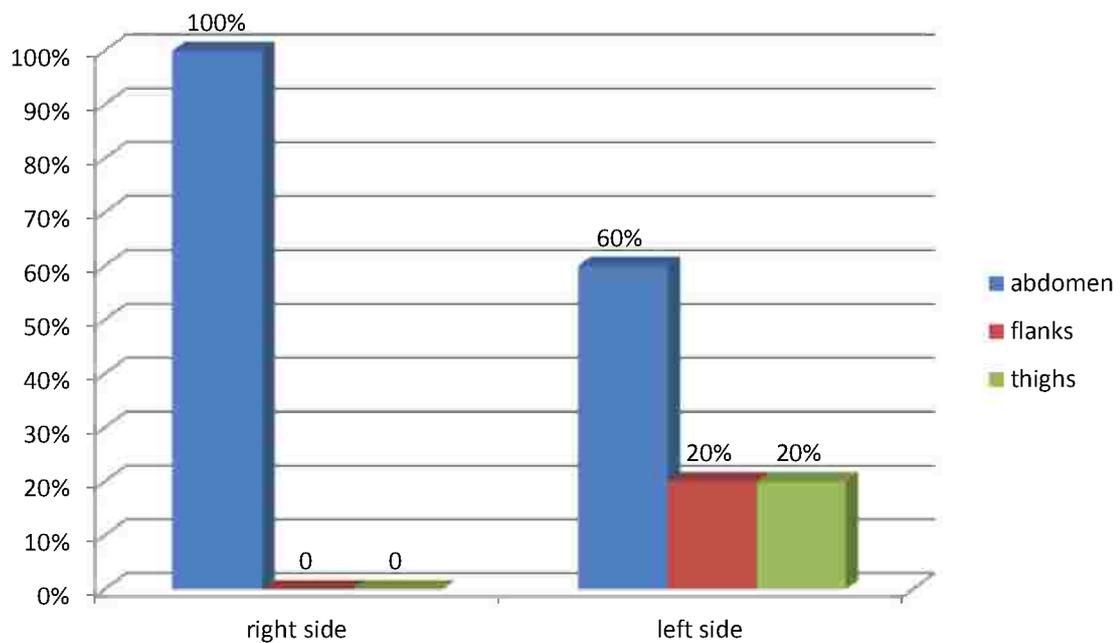


Figure (21): Relation between the marked improvement using quartile grading and site for both sides.

For the relation of the duration of the disease to the Quartile grading; on the right side, all patients who showed marked improvement were complaining for durations less than 1 year ($p=0.013$). While on the other side, marked improvement was distributed among patients who complained for 1.5 years; with 40% for the first year, and 60% for 1-1.5 years ($p=0.002$). No marked improvement occurred on neither right nor left sides for durations more than 1.5 years. All data are included in table (XV) and figure 22.

Table (XV): Relation between the quartile grading score and duration of the disease

Duration of disease	Right side						Left side					
	Minimal		Moderate		Marked		Minimal		Moderate		Marked	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
< 1 year	0	0.0	0	0.0	4	100.0	0	0.0	0	0.0	4	40.0
1.0-<1.5	4	50.0	7	87.5	0	0.0	0	0.0	5	71.4	6	60.0
1.5 or more	4	50.0	1	12.5	0	0.0	3	100.0	2	28.6	0	0.0
Total	8		8		4		3		7		10	
X ²	6.98						7.11					
p	0.013*						0.002*					

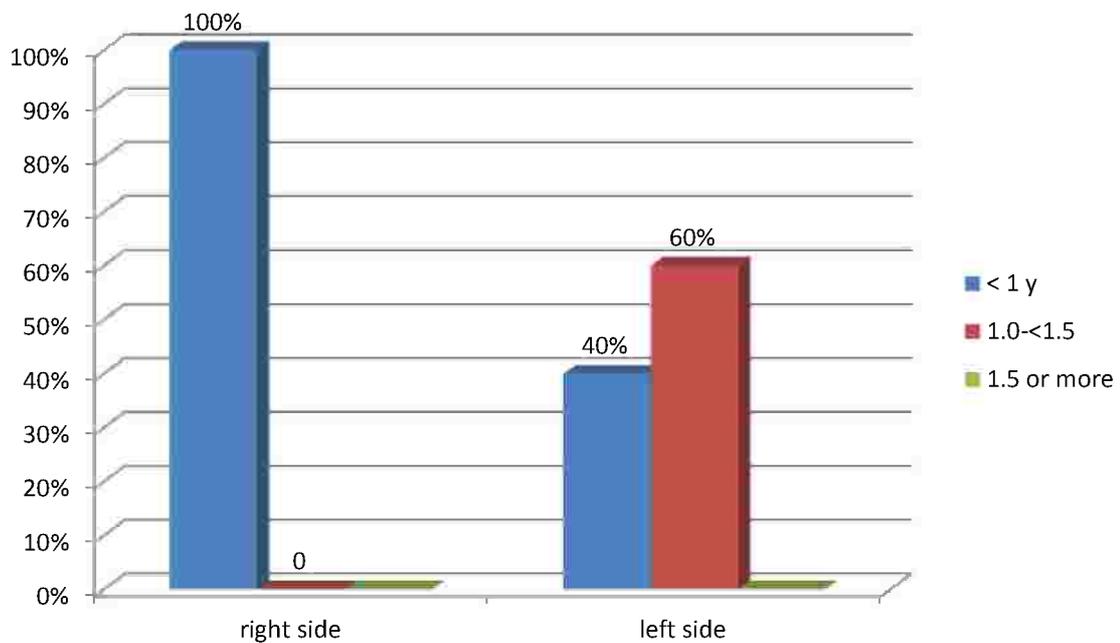


Figure (22): Relation between marked improvements using the quartile grading and duration of the disease for both sides.

Regarding the relation between etiology and marked improvement measured using Quartile grading; on the right side, both of the two major causes; namely obesity and pregnancy, had the same percentage of marked improvement (50%) denoting insignificant relation ($p=0.321$). the same for the left side, with different proportions for obesity and pregnancy with 60% and 40% respectively, which also denote an insignificant relation ($p=0.41$). all data are included in table XVI.

Table (XVI): Relation between the quartile grading score and etiology

Etiology	Right side						Left side					
	Minimal		Moderate		Marked		Minimal		Moderate		Marked	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Obesity	3	37.5	5	62.5	2	50.0	1	33.3	3	42.9	6	60.0
Pregnancy	5	62.5	3	37.5	2	50.0	2	66.7	4	57.1	4	40.0
Total	8		8		4		3		7		10	
X ²	1.69						1.22					
p	0.321						0.41					

On description of the relation between the Quartile grading and patient satisfaction; it was found that on the right side, all unsatisfied patients had minimal improvement. While 66.7% of somewhat satisfied patients had minimal improvement, 33.3% showed moderate improvement, and none of them experienced marked score. Last but not the least, none of the highly satisfied patients had minimal improvement, although 60% of them showed moderate and 40% showed marked improvement ($p=0.001$). On the other side, similarly; all of the unsatisfied patients had minimal improvement. For the somewhat satisfied category, 25% showed minimal, and 75% showed marked improvement. Finally, 28.6% of highly satisfied patients had moderate, and 71.4% showed marked improvement ($p=0.002$). See table (XVII) and figures (23) and (24).

Table (XVII): Relation between quartile score and patient satisfaction score in a table

Quartile grading score	Right side						Left side					
	Unsatisfied		Somewhat satisfied		Highly satisfied		Unsatisfied		Somewhat satisfied		Highly satisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minimal improvement (<25.0%)	4	100.0	4	66.7	0	0.0	2	100.0	1	25.0	0	0.0
Moderate (26-50%)	0	0.0	2	33.3	6	60.0	0	0.0	3	75.0	4	28.6
Marked improvement (51-75%)	0	0.0	0	0.0	4	40.0	0	0.0	0	0.0	10	71.4
p	0.001*						0.002*					

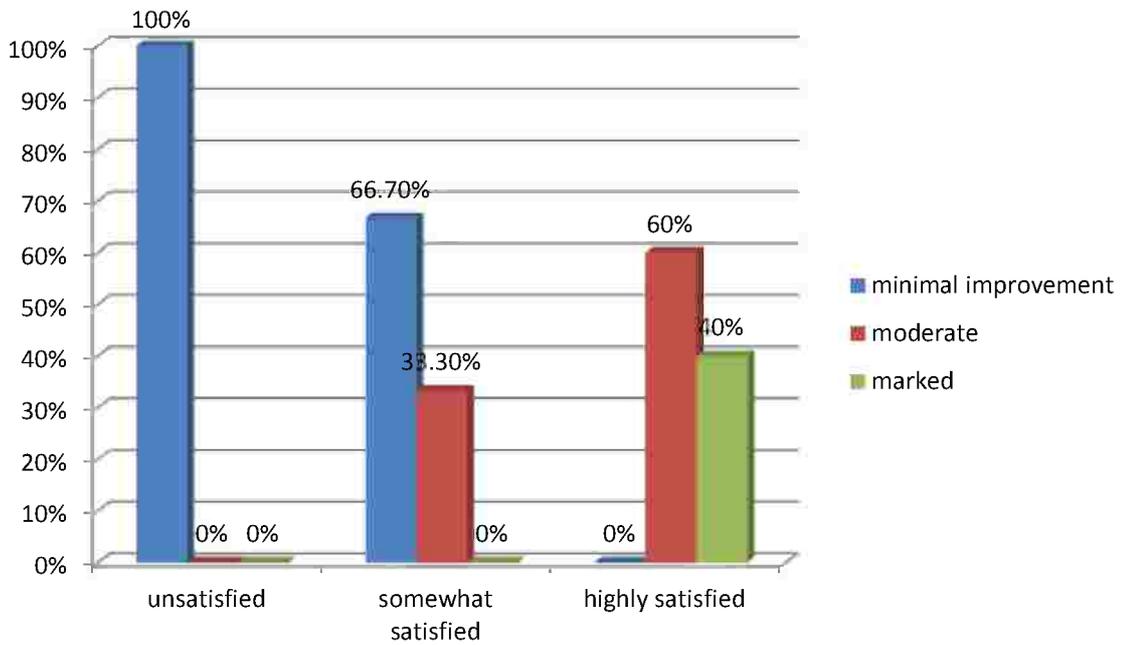


Figure (23): Relation between Quartile grading and patient satisfaction score for the right side

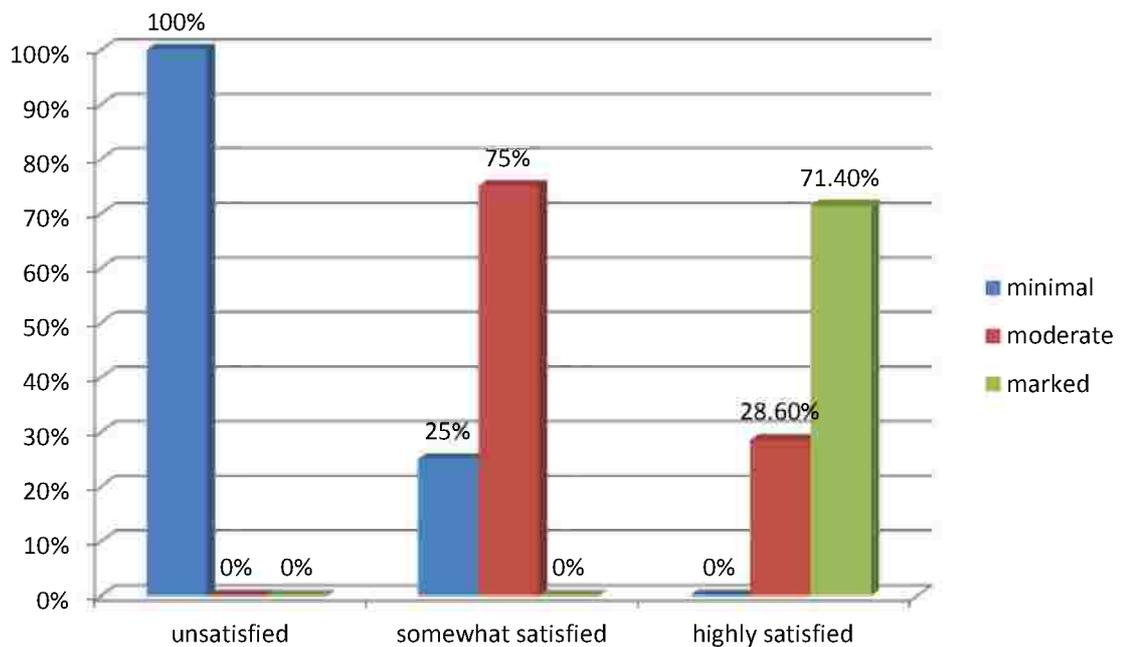


Figure (24): Relation between Quartile grading and patient satisfaction score for the left side

Complications:

Pain occurred in all patients with different degrees; 9 patients (45%) complained of mild pain, 10 patients (50%) of moderate degree and the remaining one patient (5%) suffered from severe pain. All patients suffered from bleeding during the session and erythema 1-2 days after. 11 patients (55%) showed a single day erythema, and 9 patients (45%) continued for 2 days. 30 % noticed post rolling crusting (table XVIII, figures 25-27).

Table (XVIII): Distribution of the studied patients regarding side effects

	Number	Percent
Pain degree		
Mild	9	45.0
Moderate	10	50.0
Severe	1	5.0
Bleeding	20	100.0
Crusting	6	30.0
Erythema in days		
1	11	55.0
2	9	45.0

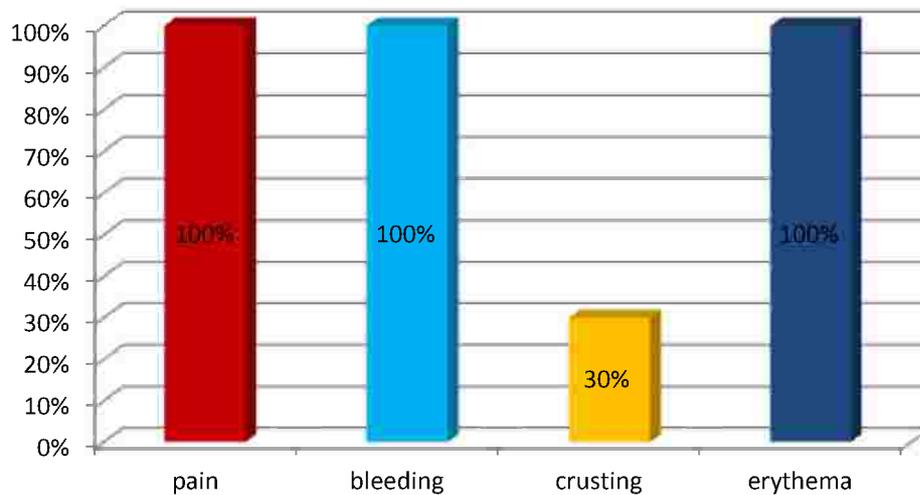


Figure (25): Distribution of the studied patients regarding side effects

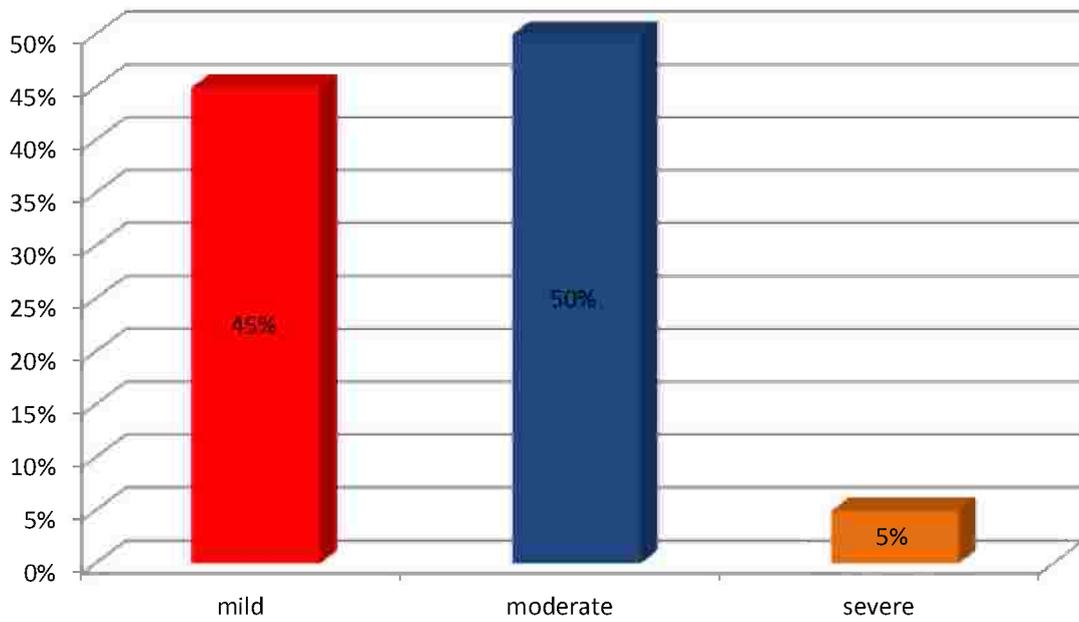


Figure (26): Distribution of the studied patients regarding the severity of pain

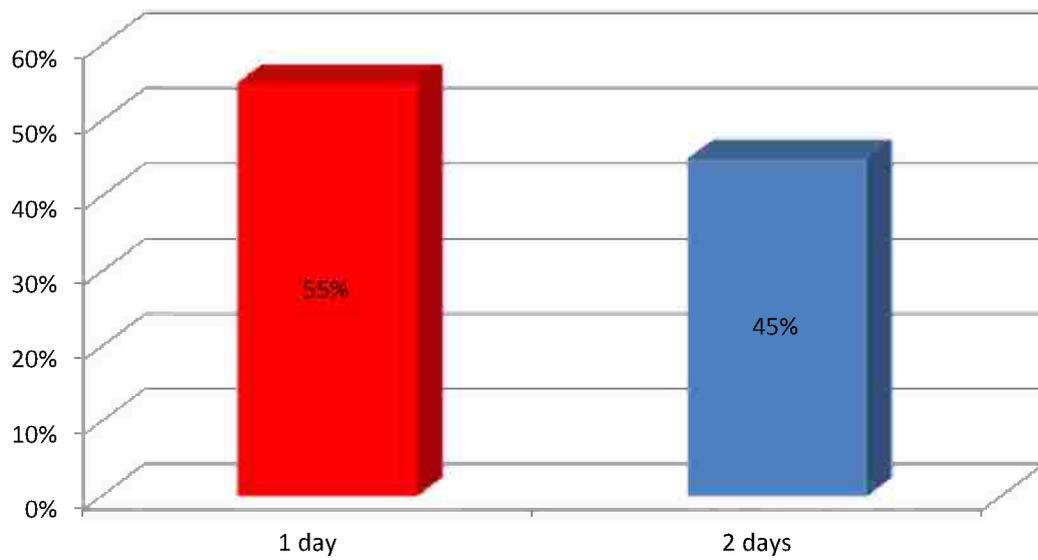
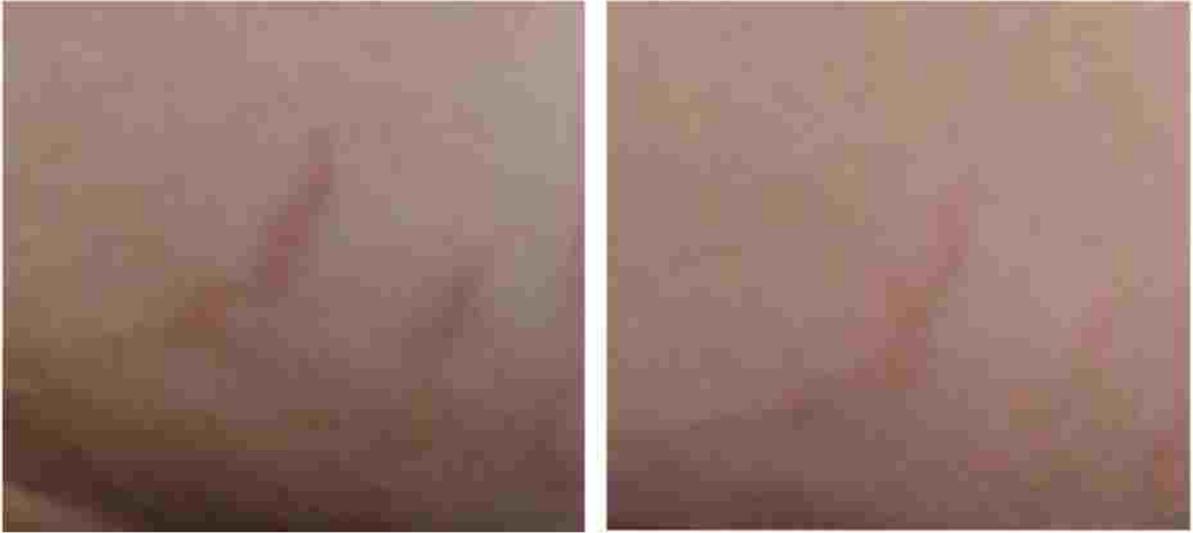


Figure (27): Distribution of the studied patients regarding the duration of erythema

CASES

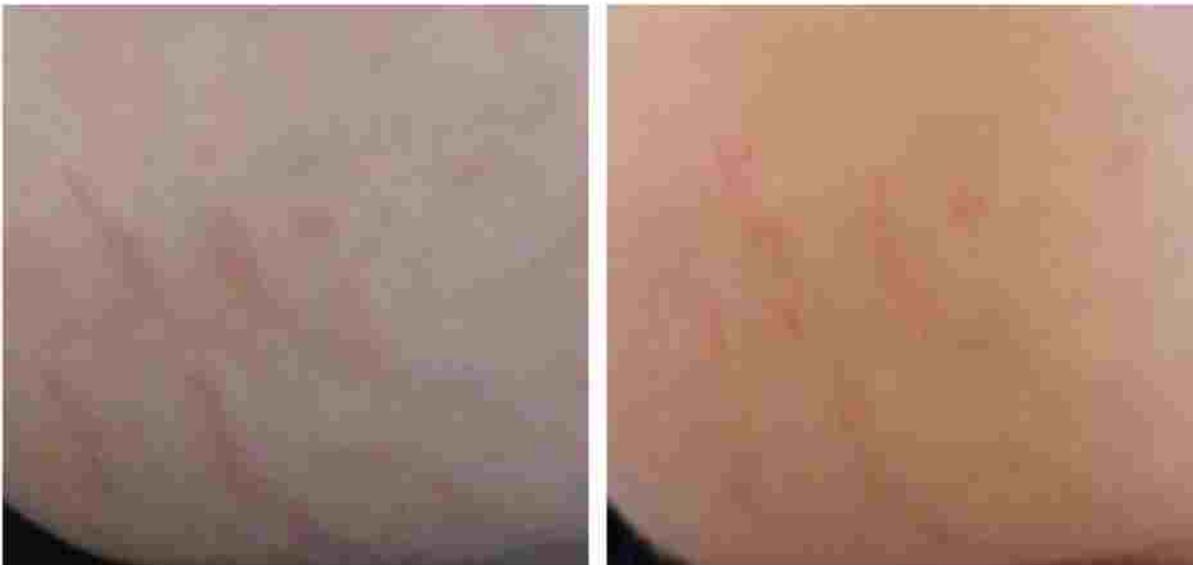
CASES



(A)

(B)

Figures (28A and B): A 15 years old female patient has striae distensae of 1 year duration on the right side of the abdomen before and 3 months after micro-needling treatment showing moderat improvement



(C)

(D)

Figures (28 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left side showing marked improvement



(A)



(B)

Figures (29 A and B): A 17 years old female patient has striae distensae of 1 year duration on the right side of the abdomen before and 3 months after micro-needling treatment showing minimal improvement



(C)



(D)

Figures (29 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left side showing marked improvement



(A)



(B)

Figures (30 A and B): A 28 years old female patient has striae distensae of 1.5 year duration on the right side of the abdomen before and 3 months after micro-needling treatment showing minimal improvement



(C)



(D)

Figures (30 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left side showing moderate improvement



(A)

(B)

Figures (31 A and B): A 21 years old female patient has striae distensae of 1 year duration on the right side of the abdomen before and 3 months after micro-needling treatment showing poor improvement



(C)

(D)

Figures (31 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left side showing minimal improvement



(A)



(B)

Figures (32 A and B): A 25 years old female patient has striae distensae of 6 months duration on the right side of the abdomen before and 3 months after micro-needling treatment showing moderate improvement

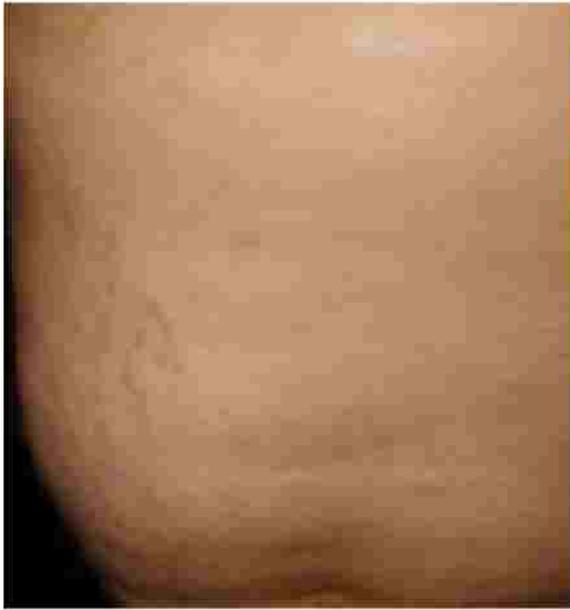


(C)



(D)

Figures (32 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left side showing marked improvement



(A)



(B)

Figures (33 A and B): A 21 years old female patient has striae distensae of 1 year duration on the right thigh before and 3 months after micro-needling treatment showing minimal improvement



(C)



(D)

Figures (33 C and D): The same patient before (the left one) and 3 months after PRP and micro-needling therapy (the right photo) for the left thigh showing moderate improvement