

Prognostic Factors Associated with Clinical Improvement Following Energy-Based Device Treatment in Thai Patients with Atrophic Acne Scars: A Retrospective Study

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Supplementary Table S1. Devices used in the study

Device	Key Parameters
Fractional Laser	
Er:YAG Laser (SP Dynamis, Fotona, Slovenia)	Pulse duration: 350 μ s, Energy: 14 mJ, Pattern: 11×11 mm
CO ₂ Laser (AcuPulse®, Lumenis, Israel)	Pulse duration: 950 μ s, Energy: 12.5–15 mJ, Scan size: 10×10 mm
Picosecond Laser (Enlighten™, Cutera Inc., USA)	8-mm spot, Fluence: 1.0 J/cm ² , 2–4 passes, ~10 J/cm ² microbeam
Fractional CO ₂ (Ellipse Juvia, Ellipse A/S, Denmark)	Pulse width: 6 ms, Energy: 75–105 mJ, Coverage: 9.6%, 49 MTZ/cm ²
Fractional CO ₂ (AcuPulse®, Lumenis, Israel)	Pulse duration: 950 μ s, Energy: 12.5 mJ, Coverage: 5%
1064-nm Picosecond Laser (Enlighten™, Cutera Inc., USA)	Fluence: 1 J/cm ² , 10 Hz, 15–20% overlap, microbeam diameter: 200 μ m
Fractional radiofrequency	
Fractora™ (InMode Ltd., Israel)	Energy: 25–30 mJ/pin, Endpoint: mild petechiae
eMatrix™ (Syneron Medical Ltd., Israel)	Energy: 60–100 mJ/pin, Split-face application
Venus Viva™ (Venus Concept, Canada)	160 pins, Max energy: 62 mJ/pin, Voltage: 260 V, Pulse: 30 ms
INTRAcel™ (Jeisys Medical Inc., South Korea)	49 microneedles, Length: 1.5 mm, Tip: 0.3 mm, uninsulated

Supplement Table S2. The Effects of Treatment Completion on Clinical Improvement

Scar Severity	mOR	95% CI	P-value
Mild-Moderate (1–2)			
Treatment completion (≥ 3 sessions)	1.68	0.36 – 7.74	0.506
Severe-Very Severe (3–4)			
Treatment completion (≥ 3 sessions)	1.33	1.16 – 1.53	<0.001

Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

Supplementary Table S3. Clinical Characteristics and Univariable Analysis of Factors Associated Clinical Improvement in Acne Scar Treatment with Fractional Lasers and Fractional Radiofrequency (N = 397) Using Unimputed Data

Clinical Characteristics	<25% clinical improvement (n=108)	25-50% clinical improvement (n=108)	51-75% clinical improvement (n=115)	>75% clinical improvement (n=66)	Missing data	uOR (95% CI)	P value
	n (%) or mean $\pm$ SD	n (%) or mean $\pm$ SD	n (%) or mean $\pm$ SD	n (%) or mean $\pm$ SD			
Demographic factors							
Age (year)	32.51 $\pm$ 7.86	34.19 $\pm$ 7.46	34.10 $\pm$ 9.74	32.98 $\pm$ 10.14	4.79%	1.01 (0.99-1.02)	0.474
Gender					5.04%		
Female	45 (42.86)	41 (42.27)	31 (28.18)	32 (32.31)		-	-
Male	60 (57.14)	56 (57.73)	79 (71.82)	44 (67.69)		1.53 (1.43-1.64)	<0.001
Skin phototypes					6.05%		
III	24 (23.76)	20 (20.62)	28 (25.45)	21 (32.31)		-	
IV	64 (63.37)	59 (60.82)	70 (63.64)	39 (60.00)		0.80 (0.62-1.03)	0.081
V	13 (12.87)	18 (18.56)	12 (10.91)	5 (7.69)		0.61 (0.36-1.01)	0.055
Clinical factors of acne scar							
Scar age (year)	17.24 $\pm$ 6.97	16.59 $\pm$ 8.59	9.67 $\pm$ 4.78	8.10 $\pm$ 3.75	15.11%	0.85 (0.77-0.95)	0.003
Severity of acne					6.55%		
Mild	11 (10.89)	16 (16.49)	5 (4.63)	2 (3.08)		-	-
Moderate	50 (49.50)	39 (39.18)	37 (34.26)	27 (41.54)		1.62 (0.54-4.87)	0.390
Severe	28 (27.72)	33 (34.02)	53 (49.07)	35 (53.85)		3.11 (1.49-6.49)	0.003
Very severe	12 (11.88)	10 (10.31)	13 (12.04)	1 (1.54)		1.26 (0.95-1.66)	0.106
Scar type					6.55%		
1	15 (14.85)	25 (25.77)	40 (37.04)	18 (27.69)		-	-
>1	86 (85.15)	72 (74.23)	69 (62.96)	47 (72.31)		0.56 (0.25-1.26)	0.163
Energy-based device factors							
Treatment session (times)					0.00%		
≥ 3	64 (59.26)	8 (7.41)	67 (58.26)	66 (100.00)		-	-
<3	44 (40.74)	100 (92.59)	48 (41.74)	0 (0.00)		0.32 (0.01-7.52)	0.477

Abbreviation: SD, standard deviation; uOR, univariable odds ratio. Statistically significant P-value associations are shown in bold characters

Supplement Table S4. Multivariable Analysis of Individual Factors Associated with Clinical Improvement in Treating Acne-Scarring with both Fraction Lasers and Fractional Radiofrequency (N=397) From Unimputed Data Set

Clinical Characteristics	mOR (95% CI)	P value
Age (5 years)	1.37 (0.57–3.32)	0.485
Male	1.59 (1.38-1.84)	<0.001
Skin phototypes		
III	-	-
IV	1.15 (0.94-1.40)	0.179
V	0.88 (0.58-1.33)	0.534
Scar age (5 years)	0.39 (0.37-0.42)	<0.001
Severity of acne		
Mild	-	-
Moderate	1.98 (1.02-3.80)	0.042
Severe	3.24 (2.28-4.59)	<0.001
Very severe	1.44 (0.81-2.54)	0.210
Scar type		
1	-	-
>1	0.45 (0.18-1.09)	0.079

Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

Supplement Table S5. Subgroup Multivariable Analysis of Individual Factors Associated with Clinical Improvement in Treating Acne-Scarring with Fraction Lasers (N=254) and Fractional Radiofrequency (N=143) from Unimputed Data Set

Clinical Characteristics	mOR (95% CI)	P value
Fraction Lasers		
Age (year)	2.93 (1.93-4.44)	<0.001
Male	1.49 (0.80-2.78)	0.213
Skin phototypes		
III	-	-
IV	0.85 (0.43-1.69)	0.644
V	0.75 (0.23-2.39)	0.621
Scar age (year)	0.28 (0.18-0.43)	<0.001
Severity of acne		
Mild	-	-
Moderate	1.75 (0.60-5.07)	0.306
Severe	2.57 (0.85-7.76)	0.095
Very severe	2.22 (0.56-8.70)	0.254
Scar type		
1	-	-
>1	0.36 (0.18-0.73)	0.004
Fractional Radiofrequency		
Age (5 years)	0.89 (0.74-1.07)	0.218
Male	0.96 (0.43-2.15)	0.917
Skin phototypes		
III	-	-
IV	0.67 (0.28-1.57)	0.354
V	0.32 (0.08-1.24)	0.099
Scar age (5 years)	0.76 (0.47-1.24)	0.275
Severity of acne		
Mild	-	-

Clinical Characteristics	mOR (95% CI)	P value
Moderate	2.83 (0.47-17.04)	0.257
Severe	2.15 (0.35-13.10)	0.405
Very severe	0.23 (0.01-3.63)	0.297
Scar type		
1	-	-
>1	1.64 (0.73-3.70)	0.230

Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

Supplement Table S6. Subgroup Multivariable Analysis of Factors Associated with Treatment Failure in Acne Scar Improvement with Median Regression on Imputed Data

Clinical Characteristics	β coefficients (95% CI)	P value
Fractional Laser (N=254)		
Age (5 years)	9.37 (3.48-15.27)	0.002
Male	-0.25 (-12.26-11.76)	0.967
Skin phototypes		
III	-	-
IV	-7.25 (-19.51-5.01)	0.245
V	0.15 (-17.48-17.18)	0.987
Scar age (5 years)	-10.88 (-16.44- -5.31)	<0.001
Severity of acne		
Mild	-	-
Moderate	-13.93 (-33.09-5.24)	0.154
Severe	-9.43 (29.10-10.25)	0.346
Very severe	-4.82 (-29.40-19.75)	0.699
Scar type		
1	-	-
>1	-19.25 (-33.84- -4.66)	0.010
Fractional Radiofrequency (N=143)		
Age (5 years)	1.35 (-1.72-4.42)	0.385
Male	2.70 (-7.76-13.16)	0.610
Skin phototypes		
III	-	-
IV	-14.66 (-26.47- -4.86)	0.004
V	-24.53 (-55.72-6.66)	0.122
Scar age (5 years)	3.04 (-4.44-10.52)	0.422
Severity of acne		
Mild	-	-

Clinical Characteristics	β coefficients (95% CI)	P value
Moderate	-0.47 (-30.81-29.86)	0.975
Severe	-11.35 (-45.31-22.61)	0.509
Very severe	-3.11 (-38.84-31.62)	0.860
Scar type		
1	-	-
>1	1.15 (-9.80-12.09)	0.836

Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

Supplement Table S7. Multivariable Analysis of Individual Factors Associated with Clinical Improvement in Treating Acne-Scarring with Fractional Laser and Fractional Radiofrequency from Complete-Case Analysis (N=329)

Clinical Characteristics	mOR (95% CI)	P value
Age (5 years)	1.37 (0.57-3.32)	0.485
Male	1.59 (1.38-1.84)	<0.001
Skin phototypes		
III	-	-
IV	1.15 (0.94-1.40)	0.179
V	0.88 (0.58-1.33)	0.534
Scar age (5 years)	0.39 (0.037-0.42)	<0.001
Severity of acne		
Mild	-	-
Moderate	1.97 (1.02-3.80)	0.042
Severe	3.24 (2.28-4.59)	<0.001
Very severe	1.44 (0.81-2.54)	0.210
Scar type		
1	-	-
>1	0.45 (0.18-1.09)	0.076

Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

Supplement Table S8. Subgroup Multivariable Analysis of Individual Factors Associated with Clinical Improvement in Treating Acne-Scarring with Fractional Laser and Fractional Radiofrequency from Complete-Case Analysis

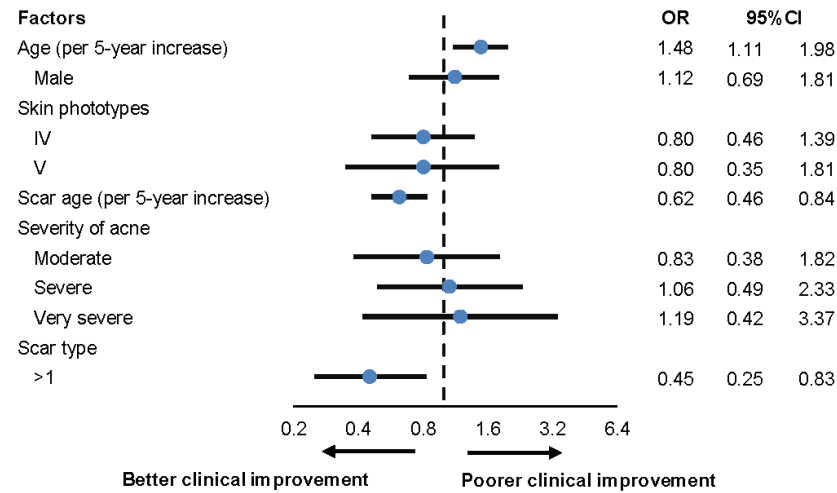
Clinical Characteristics	mOR (95% CI)	P value
Fractional Laser (N=194)		
Age (5 years)	2.93 (1.93-4.44)	<0.001
Male	1.49 (0.80-0.78)	0.213
Skin phototypes		
III	-	-
IV	0.85 (0.43-1.69)	0.644
V	0.75 (0.23-2.39)	0.621
Scar age (5 years)	0.28 (0.18-0.43)	<0.001
Severity of acne		
Mild	-	-
Moderate	1.75 (0.60-5.07)	0.306
Severe	2.57 (0.85-7.76)	0.095
Very severe	2.21 (0.56-8.70)	0.254
Scar type		
1	-	-
>1	0.36 (0.18-0.73)	0.004
Fractional Radiofrequency (N=135)		
Age (5 years)	0.89 (0.74-1.07)	0.218
Male	0.96 (0.43-2.15)	0.917
Skin phototypes		
III	-	-
IV	0.67 (0.28-1.57)	0.354
V	0.32 (0.08-1.24)	0.099
Scar age (5 years)	0.76 (0.47-1.24)	0.275
Severity of acne		
Mild	-	-

Clinical Characteristics	mOR (95% CI)	P value
Moderate	2.83 (0.47-17.04)	0.257
Severe	2.15 (0.35-13.10)	0.405
Very severe	0.23 (0.01-3.63)	0.297
Scar type		
1	-	-
>1	1.64 (0.73-3.70)	0.230

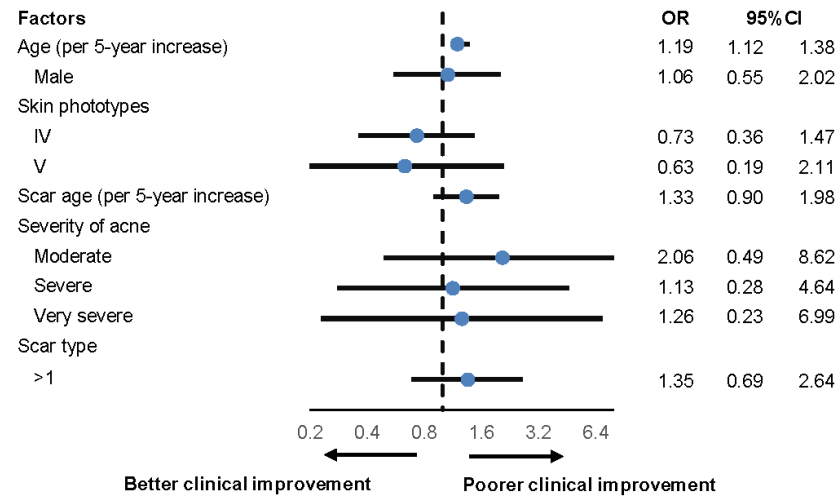
Abbreviation: SD, standard deviation; mOR, multivariable odds ratio.

Statistically significant P-value associations are shown in bold characters

A



B



Supplementary Figure S1. Forest Plot of Prognostic Factors Associated with Clinical Improvement in The Subgroup of Patients Treated with Fractional Laser (A) And Fractional Radiofrequency (B).