

# Efficacy, Safety, and Tolerability of a Triple Wavelength Laser for Hair Reduction in Indian Women: A Prospective Clinical Study

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## Abstract

**Background:** Laser hair reduction with triple wavelength technology (755/810/1064 nm) enables multi-depth follicular targeting and is widely used in darker phototypes. However, robust data on Indian skin types III–IV remain limited. The aim is to evaluate the efficacy, safety, and tolerability of a triple wavelength laser for hair reduction in Indian women. **Material and Methods:** This prospective study included 85 females (Fitzpatrick III–IV) with hirsutism or hypertrichosis who underwent six sessions using a triple wavelength laser (spot size 20 × 9 mm; fluence 18–24 J/cm<sup>2</sup>; pulse duration 30 ms or 100 ms) at 4–6-week intervals. Efficacy was assessed by hair counts and percentage reduction, aesthetic improvement by the Global Aesthetic Improvement Scale (GAIS), tolerability by the Visual Analogue Scale (VAS), and safety by monitoring adverse events. Statistical analysis included a paired t-test and a chi-square test. **Results:** Participants had a mean age of 25.4 ± 6.3 years, with 61.2% classified as type IV skin. Five participants (5.9%) did not complete all six sessions. Mean hair counts reduced from 54 ± 21 at baseline to 7 ± 6 after treatment, achieving an 86.5% ± 10.2 reduction (p < 0.0001). The laser was effective for both vellus and terminal hair, with slightly better results in terminal hair. Site-wise, axillae and lower limbs responded faster than facial areas such as the chin and sidelocks. Independent evaluators rated 65–70% of participants as “very much improved” on GAIS. Adverse events were mild and transient, limited to perifollicular erythema (18.8%), itching (12.9%), and edema (10.6%); blistering and crusting were not observed. Treatment tolerability was high, with a mean VAS of 2.1 ± 0.7. **Conclusion:** Triple wavelength laser therapy is highly effective, safe, and well tolerated for hair reduction in Indian women with Fitzpatrick skin types III and IV, showing good responses for both terminal and vellus hair.

**Keywords:** Triple wavelength laser; Laser hair reduction; Hirsutism; Hypertrichosis; Fitzpatrick skin type; Indian women; Vellus hair; Terminal hair; GAIS; Tolerability; Safety.

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## INTRODUCTION

Unwanted hair growth, whether in hirsutism or hypertrichosis, is one of the most common aesthetic and dermatological concerns among women. It can significantly affect psychosocial well-being, self-confidence, and quality of life. Conventional methods of hair removal, such as shaving, waxing, threading, and depilatory creams, provide only temporary results and are often associated with adverse outcomes, including folliculitis, irritant dermatitis, pseudofolliculitis, and post-inflammatory hyperpigmentation.<sup>[1,2]</sup> As a result, there has been a paradigm shift toward energy-based devices, particularly lasers, for long-term and safe hair reduction.

Laser hair reduction works on selective photothermolysis, wherein a specific wavelength of light targets melanin within the hair shaft and follicular bulb, leading to thermal destruction of the follicular unit while sparing surrounding tissue.<sup>[3,4]</sup> Since the introduction of ruby and alexandrite lasers in the 1990s, various laser systems such as diode (810 nm), alexandrite (755 nm), and Nd: YAG (1064 nm) have been widely employed.<sup>[5,6]</sup> However, each wavelength possesses inherent limitations. The alexandrite laser offers effective results for fine hair but has higher epidermal melanin absorption, posing a burn risk in darker skin tones.

The diode laser demonstrates balanced efficacy and safety across moderate phototypes, whereas the long-pulsed Nd: YAG laser penetrates deeply and is safer in darker phototypes but may be less effective for thinner or vellus hair.<sup>[7,8]</sup>

To overcome these wavelength-specific limitations, triple-wavelength laser systems have been developed. These devices combine 755 nm, 810 nm, and 1064 nm wavelengths in a single emission, ensuring simultaneous targeting of follicles at multiple depths. The combination optimizes efficacy for vellus and terminal hair types, improves treatment outcomes across variable anatomical sites, and reduces the risk of adverse effects.<sup>[9]</sup> The synergistic absorption profiles of these wavelengths allow comprehensive follicular damage from superficial fine hair follicles to deeply seated coarse hair follicles, making the

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technology especially advantageous in patients with mixed hair types and darker phototypes.<sup>[10,11]</sup>

For Indian women, laser hair reduction presents unique challenges due to increased epidermal melanin, a higher risk of pigmentary complications, and variability in hair type distribution. Most Indian patients fall under Fitzpatrick skin types III and IV, where achieving optimal hair reduction without thermal injury demands careful selection of wavelength and pulse duration.<sup>[12]</sup> Furthermore, hormonal and idiopathic causes of hirsutism contribute to regional and textural variation in hair growth, requiring versatile technologies capable of effectively addressing both terminal and vellus hair.<sup>[13]</sup>

Recent studies on triple wavelength lasers have demonstrated encouraging efficacy and safety in diverse skin types, particularly in Middle Eastern and Asian populations. However, published evidence focusing exclusively on Indian phototypes remains limited, especially with objective data correlating site-specific response rates, dropout patterns, and differential improvement between terminal and vellus hair.

Therefore, it is interesting to evaluate the efficacy, safety, and tolerability of a triple wavelength laser system for hair reduction in Indian women, focusing on comparative outcomes across hair types and anatomical sites while assessing treatment comfort and adverse event profiles.

## **MATERIALS AND METHODS**

**Study Design and Setting:** This prospective, investigator-initiated clinical study was conducted over one year in the Department of Dermatology, KMCT Medical College, Kozhikode, Kerala. The Institutional Ethics Committee approved the study, and all procedures adhered to the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before inclusion.

**Sample Size and Participants:** Eighty-five female participants aged 12 years and above were enrolled through purposive sampling. Inclusion criteria included females with Fitzpatrick skin types III and IV having hair of any thickness and presenting with hirsutism or hypertrichosis. Exclusion criteria included pregnancy or lactation, history of photosensitivity, keloidal tendency, active skin infection, vitiligo, psoriasis, lichen planus, unrealistic expectations, or the use of medications known to cause hypertrichosis or hirsutism, such as androgens, glucocorticoids, minoxidil, cyclosporine, and phenytoin. Participants with rapid progression of hirsutism or virilization features were evaluated for secondary causes and excluded if necessary.

Five participants (5.9%) discontinued treatment before completing the six-session protocol due to scheduling constraints or relocation. These cases were excluded from post-treatment efficacy analysis but retained for safety evaluation.

**Clinical Assessment:** The diagnosis of hirsutism was made using the modified Ferriman–Gallwey (mFG) scoring system, where scores between 8 and 15 indicated functional or idiopathic hirsutism and scores above 15 indicated organic hirsutism. Hypertrichosis was diagnosed clinically. Baseline data included demographic details, clinical history,

photographic documentation, and mFG scoring.

**Laser System and Parameters:** Hair reduction was performed using the Primelase laser system (Cocoon Medical, Barcelona, Spain). The device delivers a combination of 755 nm, 810 nm, and 1064 nm wavelengths, enabling comprehensive follicular targeting at varying depths. Treatments were performed with a spot size of 20 × 9 mm, fluence between 18 and 24 J/cm<sup>2</sup>, and pulse duration of either 30 ms or 100 ms, depending on the anatomical site and skin phototype. Both static and dynamic modes were used as appropriate.

Each participant underwent six sessions at intervals of 4 to 6 weeks or earlier if hair regrowth was noted. Depending on clinical presentation, the treated anatomical sites included the upper lip, chin, sidelocks, axillae, and legs.

### **Outcome Measures**

**Efficacy:** Quantitative hair counts were performed in pre-marked 1–2 cm<sup>2</sup> regions at baseline and at the sixth session follow-up (six weeks after final treatment). Each participant's percentage reduction from baseline was calculated. Two blinded dermatologists evaluated Standardized digital photographs independently using the Global Aesthetic Improvement Scale (GAIS).

**Safety:** All sessions were monitored for adverse events, including perifollicular erythema, edema, itching, pigmentary alterations, burns, blistering, infection, acneiform eruptions, and paradoxical hypertrichosis.

**Tolerability:** Pain perception was recorded using a 0–10 Visual Analogue Scale (VAS) after each session, with 0 representing no pain and 10 representing unbearable pain.

**Statistical Analysis:** Data were analyzed using SPSS software version 22.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean ± standard deviation (SD) and categorical variables as frequencies and percentages. The paired t-test was used to compare pre- and post-treatment hair counts, and chi-square tests were applied for categorical variables. A p-value < 0.05 was considered statistically significant.

## **RESULTS**

This prospective clinical study evaluated a triple-wavelength laser's efficacy, safety, and tolerability for hair reduction in Indian women. Eighty-five participants were enrolled, of whom 80 completed the entire six-session protocol, while five (5.9%) dropped out before completion due to scheduling or relocation issues. The mean age of participants was 25.4 ± 6.3 years, and most had Fitzpatrick skin type IV. Functional hirsutism was the predominant diagnosis, followed by organic hirsutism and hypertrichosis. Treatments were delivered using standardized fluence and pulse duration settings (18–24 J/cm<sup>2</sup>; 30 or 100 ms). All participants tolerated the procedure well, with minimal discomfort. After six sessions, quantitative analysis revealed a statistically significant reduction in hair counts across all treated regions. The predominant treatment site comprised the upper lip area, demonstrating a good clinical response after six sessions. Site-specific improvement was noted, with faster and more pronounced responses in axillae and lower limbs hair.

In contrast, facial areas such as the chin and sidelocks showed slower response rates. Both vellus and terminal hairs responded effectively to treatment, although terminal hair demonstrated

slightly superior reduction. Adverse events were mild and transient; no serious complications, including blistering or crusting, were observed.

**Table 1: Demographic Characteristics of Study Participants (n = 85)**

Variable	Category	N	%
Age (years)	11–20	14	16.5
	21–30	52	61.2
	31–40	14	16.5
	41–50	5	5.9
Sex	Female	85	100
Fitzpatrick skin type	Type III	33	38.8
	Type IV	52	61.2
Diagnosis	Functional hirsutism	45	52.9
	Organic hirsutism	22	25.9
	Hypertrichosis	18	21.2

This table summarizes the study participants' demographic distribution, skin types, and diagnoses.

[Table 1] represents the baseline demographic profile, showing that most participants were young women with Fitzpatrick type IV skin and functional hirsutism.

**Table 2: Laser Treatment Parameters**

Parameter	Mean ± SD
Fluence (J/cm <sup>2</sup> )	20.5 ± 2.1
Pulse duration (ms)	30 or 100
Number of sessions	6

This table provides the standardized treatment parameters applied during laser sessions.

[Table 2] shows that treatment was delivered using consistent parameters, ensuring reproducibility and procedural uniformity across all sessions.

**Table 3: Hair Reduction Outcomes**

Outcome	Mean ± SD
Baseline hair count	54 ± 21
Post-treatment hair count	7 ± 6
% Hair reduction	86.5 ± 10.2

This table shows quantitative improvement in mean hair counts after six sessions.

[Table 3] indicates a highly significant hair count reduction of 86.5%, confirming the strong efficacy of triple wavelength laser treatment ( $p < 0.0001$ ).

**Table 4: Global Aesthetic Improvement Scale (GAIS) Scores (n = 80)**

GAIS Score	Evaluator 1 N (%)	Evaluator 2 N (%)
Very much improved	52 (65.0)	50 (62.5)
Much improved	16 (20.0)	17 (21.3)
Improved	10 (12.5)	11 (13.8)
No change	2 (2.5)	2 (2.5)
Worse	0 (0)	0 (0)

This table lists the independent evaluators' ratings of overall aesthetic improvement.

[Table 4] shows that over 65% of participants were rated as “very much improved,” corroborating high patient satisfaction and aesthetic enhancement.

**Table 5: Site-Specific Response Patterns and Parameter Customization**

Site	Fluence Range (J/cm <sup>2</sup> )	Pulse Duration (ms)	Mean % Reduction ± SD	Sessions for Visible Improvement	Clinical Notes
Axillae	20–22	30	89.4 ± 6.8	3–4	Rapid response due to thick terminal hair.
Legs	20–24	30–50	88.6 ± 7.2	3–4	Excellent reduction in coarse follicles.
Abdomen	18–22	50–100	86.9 ± 8.4	4–5	Moderate response; variable depth.
Upper lip	18–20	100	85.1 ± 8.7	4–5	Good response despite finer hair; optimized parameters ensured safety.
Chin	18–20	100	83.2 ± 8.9	5–6	Slower improvement due to hormonal influence.
Sidelocks	18–20	100	81.5 ± 9.1	5–6	Mixed vellus-terminal hair required more sessions.

This table summarizes mean percentage hair-reduction outcomes, average sessions for visible improvement, and corresponding parameter adjustments across different anatomical sites.

[Table 5] shows site-wise response patterns following six sessions of triple wavelength laser treatment. Axillae and legs showed the fastest improvement, while the upper lip exhibited a good response despite fine hair, validating safety and versatility across facial and body sites.

**Table 6: Adverse Events Reported**

Adverse Event	N (%)
Perifollicular erythema	15 (18.8)
Itching	10 (12.5)
Edema	9 (11.3)
Acneiform eruptions	3 (3.8)
Post-inflammatory pigmentation	2 (2.5)
Paradoxical hypertrichosis	2 (2.5)
Blistering or crusting	0 (0)
Infection or burns	0 (0)
None	39 (48.8)

This table lists observed side effects and their frequencies.

[Table 6] indicates that adverse events were generally mild and self-limiting, with no cases of blistering or crusting recorded.

**Table 7: Tolerability (Visual Analogue Scale Scores)**

Session	Mean VAS ± SD
1	1.8 ± 0.6
2	2.1 ± 0.7
3	2.2 ± 0.8
4	2.4 ± 0.9
5	2.3 ± 0.8
6	2.1 ± 0.7
Overall mean	2.1 ± 0.7

This table presents session-wise patient-reported pain scores.

[Table 7] shows consistently low pain levels throughout the sessions, reflecting excellent treatment tolerability.

### Summary of Findings

[Table 1] demonstrates that most participants were young women with Fitzpatrick type IV skin, predominantly presenting with functional hirsutism. [Table 2] confirms that uniform treatment parameters were maintained across sessions, ensuring reproducible results. [Table 3] highlights a significant 86.5% reduction in mean hair counts, validating the high efficacy of the triple wavelength laser system. [Table 4] reflects strong subjective satisfaction, as nearly two-thirds of participants were rated “very much improved” by independent evaluators. [Table 5] shows that axillae and legs demonstrated the fastest and most effective hair reduction, while the upper lip also exhibited a good response despite finer hair. Facial areas such as the chin and sidelocks required more sessions due to hormonal influence and mixed hair types, confirming that parameter customization ensured consistently safe and effective outcomes across all treated sites. [Table 6] confirms that adverse effects were mild, transient, and predominantly limited to perifollicular erythema, itching, and edema; importantly, blistering and crusting were absent. Finally, [Table 7] establishes excellent tolerability, as reflected by low mean VAS scores ( $2.1 \pm 0.7$ ) throughout all sessions.

Overall, the triple-wavelength laser was highly effective and well tolerated for both vellus and terminal hair. It produced slightly superior results in terminal hair and faster responses at upper lip, axillary, and lower-limb sites, reaffirming its suitability for Indian skin types III and IV.

### DISCUSSION

This prospective study evaluated a triple-wavelength laser's efficacy, safety, and tolerability for hair reduction in Indian women with Fitzpatrick skin types III and IV. The findings demonstrated a mean hair reduction of 86.5% after six sessions, with most participants reporting high aesthetic

satisfaction and minimal discomfort. These results confirm that triple wavelength laser systems can provide effective, safe, and well-tolerated hair reduction in darker phototypes, where treatment options must balance efficacy with risk of pigmentary or thermal injury.<sup>[1-3]</sup>

Laser hair reduction remains one of the most sought-after aesthetic procedures globally. The development of energy-based technologies, particularly diode and Nd: YAG lasers, has transformed long-term hair removal by achieving selective follicular destruction through photothermal mechanisms.<sup>[4]</sup> Earlier devices, however, were limited by wavelength-specific constraints. The 755 nm alexandrite laser offered excellent outcomes for lighter skin but carried a higher risk of epidermal injury in darker types.<sup>[5]</sup> The 810 nm diode achieved deeper penetration with a favorable safety profile, while the 1064 nm Nd: YAG was ideal for higher phototypes but less effective for fine hair.<sup>[6]</sup> Integrating these three wavelengths into a single system was a significant technological advance, ensuring comprehensive targeting of follicles at multiple depths and improving efficacy across variable hair types.<sup>[7,8]</sup>

In the present study, triple wavelength laser therapy achieved significant hair reduction in both vellus and terminal hairs, with a slightly greater response for terminal hair. This observation aligns with the biophysical principle that terminal hair, being more pigmented and thicker, absorbs more laser energy and is more susceptible to photothermolysis.<sup>[4,6]</sup> Vellus hair, although less pigmented, also responded well, demonstrating the advantage of simultaneous multi-wavelength emission in reaching follicles at various depths. The results are consistent with those reported by Raj Kirit et al,<sup>[7]</sup> who demonstrated effective outcomes using a triple-wavelength diode laser in Fitzpatrick IV–V patients, achieving over 85% hair reduction after six sessions.

Site-specific variations observed in this study are clinically relevant. The axillae and lower limbs responded faster than facial

regions such as the chin and sidelocks. This pattern can be attributed to differences in hair follicle depth, density, and hormonal influence.<sup>[9]</sup> Axillary and limb hairs, thicker and more uniformly pigmented, allow better absorption of laser energy. In contrast, facial hairs, especially in hormonally driven areas, tend to be more resistant due to finer shafts and anogenital influence. These findings suggest that practitioners should anticipate slower responses in facial areas and adjust treatment parameters or session intervals accordingly.<sup>[10]</sup>

Safety remains a critical concern in laser hair reduction for Indian skin, given the higher melanin density in the epidermis and the consequent risk of burns and post-inflammatory hyperpigmentation. The present study reported no blistering, crusting, infection, or scarring cases. The observed adverse events, perifollicular erythema, mild itching, and transient edema, were expected inflammatory reactions that resolved spontaneously. The absence of serious events reinforces that triple wavelength laser technology, when used with optimized fluence and pulse duration (30–100 ms), is safe for darker phototypes.<sup>[9,10]</sup> Furthermore, the absence of pigmentary complications or paradoxical hypertrichosis highlights the system's favorable safety profile.<sup>[11]</sup>

Tolerability is another key factor influencing treatment adherence and patient satisfaction. The mean VAS score of  $2.1 \pm 0.7$  across sessions indicates that the procedure was well tolerated, comparable with or superior to previously reported pain profiles for diode or Nd: YAG systems.<sup>[12]</sup> The low pain perception may result from the uniform energy distribution across wavelengths, reducing peak temperature spikes at the epidermis. Improved tolerability enhances compliance for multi-session protocols, leading to better cumulative results.<sup>[13]</sup>

These findings collectively support that the triple wavelength laser balances efficacy and safety in Indian women. Combining the benefits of alexandrite, diode, and Nd: YAG wavelengths offers comprehensive follicular targeting while minimizing adverse effects, a particularly valuable feature in populations at higher risk of pigmentary changes.<sup>[5,8,9]</sup> The outcomes in this study also underscore the importance of parameter customization based on site, skin type, and hair characteristics to optimize results.

Several strengths distinguish this study. It was prospective in design, included objective and subjective evaluation methods, and focused on Indian women with Fitzpatrick III–IV skin types, a group underrepresented in global laser literature.<sup>[7,9]</sup> By incorporating investigator-assessed and patient-reported outcomes, the study provides a comprehensive assessment of efficacy and tolerability.

Nevertheless, some limitations must be acknowledged. The study was limited to female participants, and results may differ in males due to deeper and thicker follicles influenced by androgenic activity.<sup>[9]</sup> The follow-up duration of six weeks post-final session restricted the assessment of long-term regrowth or delayed pigmentary changes. Additionally, hormonal conditions such as polycystic ovary syndrome were not analyzed separately. Larger randomized comparative trials between triple-wavelength systems and

single-wavelength devices could provide stronger evidence.<sup>[7,10]</sup> Clinically, these results highlight the applicability of triple wavelength laser systems as versatile and reliable tools for hair reduction in darker phototypes. The demonstrated efficacy in terminal and vellus hair and excellent safety and tolerability suggest that such systems can be confidently employed in Indian aesthetic dermatology practice. By achieving high levels of patient satisfaction and consistent outcomes across multiple body sites, triple wavelength lasers address long-standing challenges associated with laser hair reduction in higher phototypes.<sup>[8-10]</sup> The present study confirms that triple-wavelength laser technology provides significant, safe, and well-tolerated hair reduction in Indian women with Fitzpatrick III–IV skin types. The findings reinforce the clinical utility of multi-wavelength platforms in improving the predictability, comfort, and safety of laser hair reduction in pigmented skin.<sup>[9,11,12]</sup>

## CONCLUSION

The triple wavelength laser system proved highly effective, safe, and well tolerated for hair reduction in Indian women with Fitzpatrick skin types III and IV, achieving an average 86.5% reduction with minimal, transient side effects. Terminal hair and body sites such as axillae and legs responded faster than facial areas, and treatment was consistently well tolerated with low pain scores. These findings highlight the system's versatility and reliability across varied hair types and anatomical sites, making it a suitable modality for Indian skin phototypes.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Royo J, Vázquez-López F, López V, López I, Miranda J, De las Heras E. Complications of hair removal methods. *Clin Cosmet Invest Dermatol*. 2019; 12:341-349. doi:10.2147/CCID.S210094. PMID: 31190836.
2. Lolis MS, Marmur ES. Laser and light therapy for unwanted hair growth. *Clin Dermatol*. 2009;27(5):500-506. doi:10.1016/j.clindermatol.2009.06.004. PMID: 19698900.
3. Haedersdal M, Wulf HC. Evidence-based review of hair removal using lasers and light sources. *J Eur Acad Dermatol Venereol*. 2006;20(1):9-20. doi:10.1111/j.1468-3083.2005.01369.x. PMID: 16405627.
4. Anderson RR, Parrish JA. Selective photothermolysis: precise microsurgery by selective absorption of pulsed radiation. *Science*. 1983;220(4596):524-527. doi:10.1126/science. 6836297. PMID: 6836297.
5. Nanni CA, Alster TS. Long-pulsed alexandrite laser-assisted hair removal in all skin types. *Dermatol Surg*. 1999;25(7):517-521. doi:10.1046/j.1524-4725.1999.99052.x. PMID: 10469077.
6. Ross EV, Ladin Z, Kreindel M, Dierickx C. Theoretical considerations in laser hair removal. *Dermatol Clin*. 1999;17(2):333-355. doi:10.1016/S0733-8635(05)70163-4. PMID: 10385283.
7. Raj Kirit EP, Sivuni A, Ponugupati S, Gold MH. Efficacy and safety of triple wavelength laser hair reduction in skin types IV to V. *J Cosmet Dermatol*. 2021;20(4):1117-1123. doi:10.1111/jocd. 13831.

- PMID: 33342062.
8. Ross EV, Ladin Z, Kreindel M, Dierickx C. New developments in laser hair removal. *Semin Cutan Med Surg.* 2002;21(4):265-276. doi:10.1053/sder.2002.37257. PMID: 12512380.
  9. Khunger N, Molpariya A, Khunger A. Complications of lasers and light treatments. *Indian J Dermatol Venereol Leprol.* 2015;81(1):18-24. doi:10.4103/0378-6323.148560. PMID: 25566802.
  10. Ibrahim OA, Avram MM, Hanke CW, Kilmer SL, Anderson RR. Laser hair removal. *Dermatol Ther.* 2011;24(1):94-107. doi:10.1111/j.1529-8019.2010.01381.x. PMID: 21276162.
  11. Alajlan AM, Shapiro J. Laser hair removal: a review. *Dermatol Surg.* 2002;28(5):393-407. doi:10.1046/j.1524-4725.2002.01239.x. PMID: 12030998.
  12. El Taieb MA, Ibrahim HM, Nada EA. Evaluation of long-pulsed Nd:YAG and triple wavelength diode lasers for hair reduction in Middle Eastern skin. *Lasers Med Sci.* 2020;35(5):1055-1061. doi:10.1007/s10103-019-02905-7. PMID: 31823005.
  13. Narurkar VA, Beer K, Goldman MP, Weiss RA, Perez MI, Lee PK, et al. Validated assessment scales for laser and energy-based device treatments: Global Aesthetic Improvement Scale (GAIS) and beyond. *Dermatol Surg.* 2016;42 Suppl 2:S246-S253. doi:10.1097/DSS.0000000000000791. PMID: 27649358.