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Assessing Patient Outcomes: A Meta-Analysis of Pro Yellow Laser Therapy for Rosacea Symptom Relief

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Abstract: Rosacea is a chronic inflammatory vascular skin disorder characterized, inter alia, by persistent facial erythema, telangiectasia, and inflammatory papules that deplorably affect the quality of life in people found in such circumstances. Considered in such categories under laser treatment, it is the 577-nm pro-yellow laser with claims to fame as an absorber of hemoglobin, allowing selective photothermolysis of abnormal vessels with great efficacy and safety. This meta-analysis systematically reviews 11 clinical studies that evaluate the therapeutic outcomes conferred upon rosacea and related vascular dermatoses by pro-yellow laser treatment. Thus, our paper consists of 11 clinical studies consisting of prospective trials, retrospective case analyses, and randomized comparisons on patient populations diagnosed with erythemotelangiectatic rosacea, post-acne erythema, and other vascular skin lesions. Furthermore, says protocols involved from single-session applications to multiple monthly sessions, with laser parameters usually close to 20 J/cm². Outcome measurement in various studies incorporated assessment of clinical erythema and telangiectasia clearance by dermatological evaluation and photographic imaging, patient-reported symptoms.

Keywords:. Improvements, 577-Nm Pro-Yellow, Rosacea Patients, Lasers, Vessels, Treatments.

INTRODUCTION

Rosacea is more common in people aged 30 to 50, with women more likely to develop it than men (Zhang, H. *et al.*, 2021) However, men are more severely affected and develop the condition earlier where Research reports indicate that individuals with more developed sebaceous glands are more likely to develop the condition (Stingeni, L. *et al.*, 2024) While the exact etiology of rosacea remains multifactorial, involving immune dysfunction, vascular hyperreactivity, and environmental triggers, effective treatment strategies that target vascular components are essential to alleviate symptoms and improve quality of life in addition to conventional medicine has yet to definitively determine the cause of rosacea, it is clear that patients often suffer from significant dysfunctions, necessitating intensive efforts to modify their physique and restore bodily functions (Temiz, S. A. *et al.*, 2022; Mohamed, E. A. *et al.*, 2025) also Similarly, this approach is based on the principles of natural cleansing therapy, using internal conditioning formulas (Wanitphakdeedecha, R. *et al.*, 2020)

According to Most epidemiological reports, most come from Europe, although recent studies have defined rosacea as a health problem in different regions of the world. In addition to the assertion that the disease appears to be global, rather than limited to whites, it is a common feature of various recent publications. (Mohamed, E. E. M. *et al.*, 2019)

Rosacea findings may include several subtypes, progress between subtypes, exhibit variable severity, or even be a disease signature (e.g., pathological forms). A phenotypic system—observable characteristics that may result from genetic and/or environmental influences—provides the means to evaluate and suggest treatments in an individualized manner, according to each patient's presentation (Sarac, G. *et al.*, 2021; Thajeel, S. K. *et al.*, 2024) as well as where One such intervention, the 577nm Pro-Yellow laser, has emerged as a promising treatment option for the vascular symptoms associated with rosacea (Kapicioglu, Y. *et al.*, 2019; Turkmen, D. *et al.*, 2021; Wang, Y. *et al.*, 2022) in addition to found The Pro-Yellow laser specifically targets oxyhemoglobin in blood vessels with high absorption and precision, enabling selective photothermal treatment that reduces redness and capillary dilation with minimal side effects, and according to previous study found This laser's ability to safely treat a variety of skin types while minimizing the risk of post-inflammatory hyperpigmentation and other side effects enhances its clinical applicability (Aktan, I. *et al.*, 2007; Zouboulis, C. C. *et al.*, 2022)

METHODOLOGY

A study was created based on a meta-analysis of a group of studies. The study was dedicated to determining the safety and efficacy of 577-nm pro-yellow laser treatment in patients diagnosed with rosacea or related facial vascular diseases. It included several types of clinical studies and

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analyses that were retrospectively evaluated. The patient population primarily consisted of adults with erythematous exophthalmic rosacea, post-acne erythema, or other vascular skin lesions associated with rosacea. According to the therapeutic intervention, a 577-nm pro-yellow laser was used, administered at varying frequencies and session doses, typically around 20 J/cm² In addition, outcomes were identified, focusing on symptom relief, reducing patient redness, and improving telangiectasia. Our current study extracted the demographic data found in Table 1, including sample size, age, and gender distribution, as well as treatment parameters such as the number of sessions, ranging from single sessions to multiple sessions also Multiple monthly follow-up periods were used to measure the final efficacy outcome based on clinical investigation and side effects while in our meta-analysis study The statistical analysis includes a pooled evaluation of percentage symptom improvement, erythema reduction, and demodex density changes where applicable furthermore Subgroup analyses will compare the efficacy of single-session versus multiple-session treatments and assess the pro-yellow laser in relation to other treatment options.

RESULTS

According to the meta-analysis conducted in this study, a group of studies and research related to the role of the yellow laser with a wavelength of 577 nanometers were identified. The results showed the effectiveness and safety of this laser and considered it an effective therapeutic option for improving the symptoms of rosacea, especially the results related to red. In addition, the expansion of blood vessels and the removal of vascular lesions were also shown. Several confidential studies, including retrospective trials, showed significant relief of these symptoms and clinical improvement for patients. Table One highlighted the diversity of studies contributing to this analysis, in addition to the research objectives that effectively focused on treatment outcomes, safety features, and mechanical effects.

Table 1: Indicates the table summarizes the authors, titles, and aims of each included study.

Authors	Year	Aim
H Zhang et al.	2020	To review the effectiveness and safety of 577-nm pro-yellow laser in rosacea treatment
D Piccolo et al.	2024	To evaluate vascular lesion improvement resistant to laser therapy
SA Temiz et al.	2022	To investigate the effect of a pro-yellow laser on demodex mite density in rosacea
EA Mohamed et al.	2024	Compare the safety and efficacy of the pro-yellow laser and topical brimonidine gel.
R Wanitphakdeedecha et al.	2020	To assess the efficacy and safety of 577-nm pro-yellow laser for rosacea
EEM Mohamed et al.	2019	To evaluate the clinical improvement of rosacea after 577-nm pro-yellow laser treatment
G Sarac et al.	2021	To evaluate the effectiveness of a single-session pro-yellow laser in erythema
G Aksoy Sarac et al.	2024	To assess the pro-yellow laser in vascular skin lesions, including rosacea
Y Kapicioglu et al.	2019	To evaluate the effectiveness and tolerability of the pro-yellow laser in rosacea
D Turkmen et al.	2021	To evaluate the safety and efficacy of a single-session pro-yellow laser for vascular lesions
Y Wang et al.	2022	

Table 2 reveals the methods and sample group where A generally consistent approach to treatment management was used, based on the patient population and Patient ages were identified, as were patients with rosacea or other vascular skin lesions so Most studies used laser sessions lasting up to several weeks Furthermore, the total number of treatment sessions varied, ranging from a single session to several sessions per month, and depending on sample sizes, variations in size were identified. However, these were usually sufficient to support statistical analysis of treatment efficacy and tolerability, as shown in Table 2.

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Table 2: Study Design and Participant Demographics

Authors	Method	Sample Population
H Zhang et al.	Clinical study using 577-nm pro-yellow laser treatments in rosacea patients	40 patients with rosacea
D Piccolo et al.	A laser treatment device used on vascular lesions resistant to other laser therapies	Patients with refractory vascular lesions
SA Temiz et al.	Retrospective study; pro-yellow laser at 20 J/cm^2; evaluations before and 4 weeks after	34 rosacea patients (27 females, seven males)
EA Mohamed et al.	Comparative trial: topical brimonidine gel vs 577-nm pro-yellow laser	30 patients were divided into two treatment groups
R Wanitphakdeedecha et al.	Prospective case series; several sessions of 577-nm laser for erythematotelangiectatic rosacea	Rosacea patients, sample size not specified.
EEM Mohamed et al.	Monthly sessions of 577-nm laser; photo assessments before and after treatment	22 rosacea patients and other vascular conditions
G Sarac et al.	Single-session 577-nm laser treatment; evaluation of clinical response	Postacne erythema patients; specifics not stated
G Aksoy Sarac et al.	Retrospective analysis of laser treatments on vascular lesions (including rosacea)	74 patients with diverse vascular lesions, including rosacea
Y Kapicioglu et al.	Case series applying multiple sessions of the pro-yellow laser	30 patients with erythematotelangiectatic rosacea and related conditions
D Turkmen et al.	Single intervention: pro-yellow laser treatment, clinical assessments	Patients with spider angioma and facial telangiectasia (size not specified)
Y Wang et al.	Literature review and clinical study analysis on pro-yellow laser therapy in rosacea	Review with clinical data, patient numbers unspecified

As for Table 3, which showed the main and sub-results for patients suffering from rosacea, a clinical improvement in rosacea symptoms was observed in all the studies discussed. In addition, multiple reports indicate a significant decrease in the percentage of facial redness and dilated blood vessels. Previous studies have confirmed the superior effectiveness of laser interventions in contributing to reducing the existing heat and alleviating symptoms. These results are consistent with the well-documented interactions between laser and tissue.

Table 3: Assessment outcomes according to emphasizes the presentation of efficacy and results of the laser treatments.

Authors	Results
H Zhang et al.	The 577-nm laser is effective and safe for rosacea treatment, improvement in erythema, and telangiectasia.
D Piccolo et al.	Significant vascular lesion improvement; device effective in resistant cases
SA Temiz et al.	Significant reduction in demodex density after treatment (p=0.001); no correlation between demodex density and clinical success
EA Mohamed et al.	577-nm laser more effective than brimonidine gel in erythema reduction and symptom relief (p<0.001)
R Wanitphakdeedecha et al.	Significant improvement in erythema and telangiectasia with multiple sessions; treatment well tolerated
EEM Mohamed et al.	>60% patients had significant improvement (>50%) in rosacea symptoms after monthly laser sessions
G Sarac et al.	Single laser session led too good to excellent improvement in post-acne erythema; mild to moderate effects noted
G Aksoy Sarac et al.	High rates of “excellent” or “very good” improvement in rosacea and vascular skin lesions
Y Kapicioglu et al.	The pro-yellow laser was very effective and well tolerated, with significant

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	symptom relief.
D Turkmen et al.	Single-session laser improved facial telangiectasia and spider angioma symptoms effectively.
Y Wang et al.	Pro-yellow laser provides significant vascular lesion reduction and symptomatic improvements.

Table 4- Reflects the summary of conclusions drawn and relevance for practice.

Authors	**Conclusion**
H Zhang et al.	Pro-yellow laser is an effective, safe treatment for erythematotelangiectatic rosacea.
D Piccolo et al.	The laser device improves vascular lesions resistant to other treatments.
SA Temiz et al.	Pro-yellow laser significantly reduces demodex mite density, but the reduction doesn't predict treatment success.
EA Mohamed et al.	The 577-nm laser is superior to topical brimonidine in reducing rosacea erythema.
R Wanitphakdeedecha et al.	Pro-yellow laser is safe and effective with good patient tolerability.
EEM Mohamed et al.	Monthly 577-nm laser sessions yield significant symptomatic improvement for rosacea.
G Sarac et al.	A single session of a 577-nm laser is effective for mild to moderate post-acne erythema.
G Aksoy Sarac et al.	Pro-yellow laser is safe and efficient for various vascular skin conditions, including rosacea.
Y Kapicioglu et al.	Pro-yellow laser demonstrated strong efficacy and good patient tolerance in rosacea.
D Turkmen et al.	Single-session pro-yellow laser is an effective and safe treatment option for vascular lesions.
Y Wang et al.	Pro-yellow laser represents an advanced, effective treatment modality for rosacea.

DISCUSSION

Rosacea treatment remains challenging for dermatologists, especially in refractory cases. The pathogenesis of rosacea is not well understood, but it may be caused by immune dysfunction, Demodex, ultraviolet radiation exposure, and vascular hyperreactivity. Further exploration is needed to develop more etiological treatment modalities. Rosacea is also related to psychiatric disorders like anxiety and depression. Dermatologists should focus on patient experience and education, and schedule regular follow-ups. The evolution of rosacea classification from subtyping to phenotyping may make treatment selection more rational, aligning with the "patient-centric approach." Researchers should expand and verify treatment options, focusing on large-scale clinical research based on the phenotype approach.

Recent developments in rosacea treatment, such as phenotype-based therapies, skin care products, and cosmetics, are covered in this review. In addition to highlighting the necessity of extensive clinical research, it highlights the need for additional study and the creation of more accurate treatment modalities.

A 577-nm pro-yellow laser effectively treated 20 patients with PPR and 22 with facial telangiectasia, with a 90% effective rate and a symptom improvement rate of over 75%. The treatment required 3.1 sessions for PPR and 1.8 sessions for facial telangiectasia, with only tolerable skin irritations and immediate erythema (Lee, H. J., & Kim, M. 2022; Layton, A. M. *et al.*, 2023)

Following treatment with the 577-nm pro-yellow laser, clinical studies consistently demonstrate improvement in vascular symptoms, including a decrease in the density of demodex mites while This is consistent with the multifactorial pathophysiology of rosacea, in which microbial factors and vascular hyper-reactivity both contribute to the severity of the disease and According to comparative analyses, topical brimonidine gel is not as effective as pro-yellow laser therapy in reducing post-acne erythema however Future research might provide complementary advantages as well as Studies show pro-yellow laser treatment is versatile and effective in treating various vascular skin disorders, including rosacea (Rao, M. *et al.*, 2023; Huynh, T. T. 2013; Dall'Oglio, F. 2021) where

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However, treatment protocols vary, with single-session treatments showing improvement, while multifaceted regimens often yield better results so Optimal treatment algorithms are yet to be established, and patient-related factors like Fitzpatrick skin type do not affect treatment success rates additionally Pro-yellow laser therapy is a safe and effective treatment for rosacea and related vascular skin disorders, with significant improvements in erythema, telangiectasia, and overall vascular lesion burden but Studies show minimal adverse events and minimal interruption of treatment, making it a patient-centric therapeutic strategy where research should focus on optimizing treatment parameters, exploring combined modalities, and understanding underlying mechanisms to maximize clinical benefits while maintaining safety more ever This advancement in dermatologic care significantly enhances patient quality of life (Choe, J., & Barbieri, J. S. 2023; Galluccio, G. *et al.*, 2024) according previous studies with 80% being adolescents. Post-acne erythema, scarring, or hyperpigmentation are common consequences of severe inflammatory lesions. Post-acne erythema can negatively impact self-esteem and anxiety. Lasers and pulsed light are used to treat post-acne erythema but may cause dyspigmentation and scarring. Pro yellow laser is a cheaper, safer option due to its minimal consumable nature, good safety profile, and high affinity for oxyheamoglobin absorption.

A study using two laser sessions showed that PAE improved in 70% of patients after the second session. The parameters used were spot size, photo type-specific flounce, and pulse duration. Despite high doses, no patients suffered long-term adverse events. Another study found significant improvement in erythema and telangiectasia after three sessions. Another study found no significant link between Fitzpatrick skin type and treatment success. A study using a single session with 22 J/cm2 yellow laser for Fitzpatrick skin types II and III also showed improvement.

CONCLUSION

This procedure treats one of the most important features of rosacea: dilated blood vessels on the skin's surface (telangiectasia). Both laser devices emit light that is absorbed by the hemoglobin in the blood, effectively and safely destroying the blood vessels, significantly reducing redness.

This treatment has a significant advantage over other rosacea treatments: it selectively destroys blood vessels without damaging peripheral tissue, significantly reducing the sudden hot flashes or severe burns experienced by rosacea patients. Lasers have been found to be the most effective technique for treating the skin redness and dilated blood vessels associated with rosacea, and their results last longer than traditional drug treatments. The choice of laser depends on the needs of each skin type and the recovery time available to each patient.

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