

Assessing the Histological Credibility and Clinical Efficacy of Fractional Laser Therapy for Acne Scar Management

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Abstract

Acne scars are a common dermatological concern that can significantly impact the quality of life for affected individuals. Fractional laser therapy has emerged as a promising treatment modality for acne scar management, but its histological credibility and clinical efficacy remain subjects of investigation. This study aims to assess the histological changes induced by fractional laser therapy in acne scar tissue and evaluate its clinical efficacy in improving scar appearance. A comprehensive review of existing literature, coupled with a clinical trial, will be conducted to analyze the effects of fractional laser therapy on collagen remodeling, epidermal thickness and scar texture. The study will also investigate patient-reported outcomes and assess any adverse effects associated with the treatment. Through a combination of histological analysis and clinical assessment, this research seeks to provide a robust evaluation of the credibility and efficacy of fractional laser therapy as a viable option for acne scar management.

Keywords: Acne scars • Fractional laser therapy • Histological changes

Introduction

Acne scars are a common cosmetic concern, often causing discomfort due to their appearance. While various treatment options, such as dermabrasion, chemical peels and fillers, have been available, the advent of laser technology has revolutionized the management of acne scars. Despite the availability of multiple laser systems, limited research has compared their effectiveness. Acne scars can be broadly categorized as hypertrophic or atrophic, with atrophic scars being the most frequently targeted by fractional laser therapies. The depth of laser penetration plays a crucial role in treating these scars, particularly in cases of rolling scars, where subcuticular fat destruction leads to abnormal fibrous anchoring between the dermis and subcutis. Clinical evidence suggests that lasers reaching the papillary dermis are particularly effective in addressing this issue [1,2].

Description

Fractional lasers are typically divided into two main types: Non-Ablative Fractional Lasers (NAFL) and Ablative Fractional Lasers (AFL). In this discussion, we will focus on three commonly used lasers: Er:glass (1550 nm, 1540 nm), Er:YAG (2940 nm) and CO₂ (10,600 nm). Although comprehensive comparative studies are lacking, there is a general assumption that AFL lasers outperform NAFL lasers for treating acne scars. Fractional laser treatments, both ablative and non-ablative, are built on the concept of creating controlled micro-injuries in the skin, allowing for quicker healing compared to traditional ablative lasers, where the entire surface is affected. Additionally, fractional lasers trigger dermal remodeling beyond the area of coagulation [3].

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Despite the widespread use of fractional lasers for acne scar treatment, there is a scarcity of clinical and histological data that objectively assesses the depth of laser penetration and its impact on in vivo facial tissue. Since acne scars often comprise a combination of ice pick, boxcar and rolling scars, the choice of fractional laser and its effectiveness can be influenced by the predominant scar types. The depth-width ratio (DWR) of most fractional lasers typically falls within the range of 4-5. As the DWR increases, more dermal volume can be thermally damaged. However, achieving an optimal balance of wound healing, neo-collagenesis, coagulation and remodeling with fractional technology necessitates further research. Higher density settings at low microbeam energies and low microbeam energies at high densities can both lead to bulk damage, making dose/microbeam adjustment a critical factor [4].

Clinicohistological correlations based on the type of laser used exhibit several limitations and require standardization in terms of histological assessment and laser parameter consistency. Moreover, not all laser brands are supported by empirical studies. The heterogeneity in AFL lasers (10600 nm, 2940 nm) concerning spot sizes, pulse durations and intensity ranges complicates the comparison of histological data. Extrapolating ex vivo data to standard clinical settings is challenging due to varying tissue responses, especially on facial skin [5].

Conclusion

In conclusion, while fractional laser technology holds promise for treating acne scars, there is a pressing need for further research and standardization to optimize its efficacy and ensure consistent clinical outcomes.

Acknowledgement

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Conflict of Interest

None.

References

1. Huzaira, Misbah, Anderson R.R, Sink K and Manstein D. "Intradermal focusing

- of near-infrared optical pulses: A new approach for non-ablative laser therapy." In *Lasers in Surgery and Medicine* (2003): 21-21.
2. Khan, Misbah Huzaira, Kehl Sink R, Dieter Manstein and David Eimerl, et al. "Intradermally focused infrared laser pulses: Thermal effects at defined tissue depths." *Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery* 36 (2005): 270-280.
 3. Manstein, Dieter, Scott Herron, Kehl Sink G and Heather Tanner R, et al. "Fractional photothermolysis: A new concept for cutaneous remodeling using microscopic patterns of thermal injury." *Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery* 34 (2004): 426-438.
 4. Laubach, Hans-Joachim, Zeina Tannous, Rox Anderson R and Dieter Manstein. "Skin responses to fractional photothermolysis." *Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery* 38 (2006): 142-149.
 5. Hantash, Basil M, Vikramaditya P. Bedi, Vasanthi Sudireddy and Steven K. Struck, et al. "Laser-induced transepidermal elimination of dermal content by fractional photothermolysis." *J Biomed Opt* 11 (2006): 041115.

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