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Advancements in non-invasive facial rejuvenation: A review of Endolift and related technologies

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ABSTRACT

Endolift is an innovative laser technology that stands out in aesthetics for its effective and minimally invasive facial rejuvenation. By utilizing low-intensity laser, Endolift targets the dermal layer of the skin, promoting collagen production and offering various aesthetic benefits. The technology operates through microfibers inserted into the skin, creating a localized thermal effect that triggers a crucial biological process for rejuvenation. The increased temperature in dermal tissues induces a controlled inflammatory response, activating fibroblasts responsible for collagen synthesis. This leads to enhanced production of collagen types I and III, resulting in thicker dermis and improved skin texture. Additionally, Endolift benefits elastin, enhancing skin elasticity and resilience. The laser's thermal effect also boosts local blood circulation, aiding in cell regeneration and toxin removal. Recent studies, including those by da Silva, Moura, and da Silva (2024), Júnior et al. (2023), Borges et al. (2023), Benar and Benar (2024), Nilforoushzadeh et al. (2022), and Dell'Avanzato (2022), provide a comprehensive evaluation of Endolift's applications, advantages, and associated complications. These studies indicate that Endolift effectively reduces facial wrinkles, enhances skin texture, and offers a non-surgical lifting effect. However, challenges such as potential complications, including peripheral neuropathies and infections, highlight the need for proper technique and adherence to safety protocols. The technology's non-invasive nature and the ability to achieve visible results with minimal recovery time make it a promising alternative to traditional methods. Future research is necessary to further refine these techniques and ensure their long-term efficacy and safety.

Keywords: Endolift, Facial Rejuvenation, Non-Invasive Treatment, Collagen Stimulation, Laser Technology.

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INTRODUCTION

Endolift is an advanced laser technology that has gained prominence in the field of aesthetics for its effective and minimally invasive approach to facial rejuvenation. This technique utilizes a low-intensity laser to target the dermal layer of the skin directly, offering various aesthetic benefits through collagen stimulation. By emitting light through microfibers inserted into the skin, Endolift creates a localized thermal effect that triggers a crucial biological process for rejuvenation. The increase in temperature within the dermal tissues initiates a controlled inflammatory response, activating fibroblasts responsible for collagen synthesis. This activation leads to increased production of collagen types I and III, which results in a thicker dermis and improved skin texture. The neocollagenesis process is essential for skin renewal, providing a firmer and more voluminous appearance. Additionally, Endolift also benefits elastin, a protein critical for skin elasticity. The strengthening and reorganization of existing elastin fibers, facilitated by increased collagen production, result in more flexible and resilient skin. The thermal effect of the laser further enhances local blood circulation, delivering essential nutrients for cellular regeneration and aiding in toxin removal, contributing to overall skin health. Notably, Endolift offers visible improvements such as firmer, more elastic skin, reduced sagging, and diminished lines and wrinkles. It also provides a non-surgical lifting effect that enhances facial contours, delivering a youthful and revitalized appearance. Most patients experience minimal discomfort and a swift recovery.

Figure 1: The study patients before and 3 months after the Endolift treatment. Source: Nilforoushzadeh et al. (2022).

A study by da Silva, Moura, and da Silva (2024) examines the application of endolaser in orofacial harmonization, a continually evolving field aimed at enhancing both aesthetic and functional aspects of the oral and facial regions. Endolaser, a low-power laser technology, emerges as a promising tool in this domain, offering multiple benefits for skin and facial tissues. Its primary mechanisms include stimulating collagen production, improving blood circulation, and providing anti-inflammatory and analgesic effects, as well as promoting tissue regeneration. The authors conducted a literature review using databases such as SciELO, PubMED, and Google Scholar to evaluate the benefits of endolaser. Findings suggest that this technology is a non-invasive, effective option for aesthetics and facial health professionals, enhancing collagen formation and increasing dermal thickness, leading to firmer skin.

In another study, Júnior et al. (2023) assessed the use, advantages, and disadvantages of endolaser technology in facial rejuvenation through an integrative review. This review analyzed various online database sources, focusing on scientific articles published between 2017 and 2022 in Portuguese, English, and Spanish. Initially, 123 citations were identified, with 61 retained after duplicate removal. Following an analysis of titles and abstracts, 40 citations were excluded, leaving 31 for detailed reading. Of these, 10 did not meet the review criteria, resulting in 20 articles included in the final review. The results indicate that endolaser, a non-invasive laser technique, effectively reduces facial wrinkles and expression lines, improves skin texture and tone, stimulates collagen formation, increases dermal thickness, and enhances skin firmness.

The research conducted by Borges et al. (2023) explores the use and complications associated with the endolift or endolaser technique in Brazil. This method uses a laser beam with wavelengths of 1470 nm or 980 nm delivered through an optical fiber inserted into subdermal tissue, aiming to reduce subcutaneous fat and tone the skin via neocollagenesis. While the technique, also known as endolaser or endolift laser, has become popular in Brazil, recent reports indicate an increase in severe complications such as peripheral neuropathies, burns, local infections, and steatonecrosis. The study included an exploratory narrative review of scientific articles from MEDLINE, PubMed, SCIELO, LILACS, and Google Scholar, along with case reports of complications in Brazil. The results emphasize that improper antisepsis, dosimetry, and skin temperature control can lead to significant injuries during and after the procedure. Although global reports are limited, the study highlights the rising incidence of severe complications in Brazil, underscoring the importance of rigorous application techniques, dosimetric control, appropriate skin temperature management tools, and strict biosafety measures to mitigate these risks.

Benar and Benar (2024) present and evaluate a novel non-surgical skin tightening and remodeling technique called Endoskin. This method combines internal laser therapy (1470 nm Diode laser) with injectable poly-L-lactic acid (PLLA). The internal laser targets the superficial fat layer to stimulate collagen production and cellular rejuvenation, leading to gradual skin tightening and enhanced elasticity. Concurrently, PLLA promotes collagen synthesis, strengthening the skin's foundation and restoring volume. The study involved 234 participants divided into two groups: Group A received only internal laser treatment, while Group B received the combined Endoskin treatment. Results showed significantly higher patient satisfaction in Group B and greater satisfaction from dermatologists who were blinded to the treatment details. The discussion highlights the synergistic effects of combining internal laser therapy with PLLA, noting Endoskin's effectiveness and safety as a non-surgical option for skin rejuvenation. The findings suggest that Endoskin offers a gradual, natural-looking transformation and is a promising alternative to traditional methods, though further research is needed to evaluate its long-term effects.

Nilforoushzadeh et al. (2022) investigate the effectiveness of Endolift therapy for treating lower eye bags, a common and challenging cosmetic issue. In this pilot study, nine patients with lower eye bags underwent Endolift therapy using 200–300 nm fibers and were monitored for six months. Patients were assessed based on biometric characteristics, and outcomes were reviewed by three blinded dermatologists, with patient satisfaction also evaluated. Biometric results showed that Endolift therapy significantly improved both the dermis and epidermis, as well as increased skin elasticity in the treated area. Approximately 90% of patients experienced good to very good improvement, with photographic data showing a 90% improvement in the appearance of eye bags ($P < 0.05$). The study concludes that Endolift is a safe, effective, and non-invasive treatment for lower eye bags, offering satisfactory results with minimal downtime and side effects. It effectively reduces eye bags and wrinkles while increasing skin elasticity, providing a pain-free, bloodless alternative to surgical methods.

Finally, Dell'Avanzato (2022) evaluates the effectiveness of Endolift® in treating lower eyelid laxity and wrinkles, an area often requiring surgical intervention. In this study, a 43-year-old patient with skin laxity and wrinkles underwent Endolift® treatment using a 200-micron second-generation bare fiber connected to a 1470 nm semiconductor laser. The procedure was performed without anesthesia, with the fiber inserted through the skin directly between the orbicularis oculi muscle and the septum, delivering a total of 80 J of laser energy to each side. The patient resumed daily activities immediately after the procedure. Skin condition was assessed using various scales, including the Snap Back test,

Fitzpatrick wrinkle score, and degree of elastosis, both before (T0) and six months after (T1) the procedure. Additionally, the study used the Global Aesthetic Improvement Scale (iGAIS), External Investigator Global Aesthetic Improvement Scale (eiGAIS), and Participant Global Aesthetic Improvement Scale (pGAIS) at T1. The treatment was complemented by a session of 532 nm vascular diode laser to address fine telangiectasias. Results showed significant improvements in skin laxity and reduction in superficial wrinkles, with only minor adverse effects such as temporary redness and swelling.

Based on the reviewed studies, Endolift and related technologies represent promising advancements in non-invasive aesthetic treatments, particularly in facial rejuvenation and skin improvement. These technologies leverage low-intensity laser and other therapeutic modalities to stimulate collagen production, enhance skin elasticity, and address common cosmetic concerns such as wrinkles, sagging, and under-eye bags. The studies reviewed highlight the efficacy of these treatments in improving skin texture, firmness, and overall appearance with minimal downtime and discomfort.

However, while the benefits are clear, the studies also underscore the importance of adhering to rigorous application techniques and proper procedural protocols to mitigate potential risks and complications. The increasing incidence of adverse effects, particularly in specific regions, suggests a need for enhanced training and standardization in the use of these technologies. Additionally, ongoing research is crucial to fully understand the long-term outcomes and to refine these methods for optimal results.

In conclusion, Endolift and similar technologies offer a viable and effective alternative to traditional surgical approaches for facial rejuvenation. Their non-invasive nature, combined with promising results in collagen stimulation and skin rejuvenation, makes them valuable tools in modern aesthetic practice. Continued research and careful application will be essential to maximizing their benefits and ensuring patient safety.

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