

Synergistic approaches in facial aesthetic rejuvenation: guidelines for combining hyaluronic acid fillers and laser/energy-based technologies

Abordagens sinérgicas no rejuvenescimento estético facial: diretrizes para utilização de ácido hialurônico combinado a tecnologias baseadas em laser e outras energias

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ABSTRACT

This article presents practical guidelines for the synergistic use of HA and laser/energy-based technologies in facial rejuvenation. These recommendations originate from the collaborative interaction of a multidisciplinary group of physicians with experience in dermatology and plastic surgery, and can potentially be extended to treat other areas of the body, including neck and hands. The synergy between HA and lasers/intense pulsed light was recognized, emphasizing patient-tailored treatments and post-treatment care. These recommendations represent valuable guidelines, which can be adapted according to individual patient needs and to the continuous advancement of dermatological technologies.

Keywords: Lasers; Light; Rejuvenation; Hyaluronic Acid; Laser Therapy; Intense Pulsed Light Therapy.

RESUMO

Este artigo apresenta diretrizes práticas para o uso sinérgico de AH e tecnologias baseadas em laser/energia no rejuvenescimento facial. Essas recomendações se originam da interação colaborativa de um grupo multidisciplinar de médicos com experiência em dermatologia e cirurgia plástica e têm o potencial de serem estendidas para o tratamento de outras partes do corpo, incluindo pescoço e mãos. A sinergia entre AH e lasers/luz intensa pulsada foi reconhecida, enfatizando a personalização dos tratamentos e o cuidado pós-tratamento. Essas recomendações representam diretrizes valiosas, passíveis de adaptação conforme as necessidades individuais do paciente e o avanço contínuo das tecnologias dermatológicas.

Palavras-chave: Lasers; Luz; Rejuvenescimento; Ácido Hialurônico; Terapia a Laser; Terapia de Luz Intensa Pulsada.

Review Article

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INTRODUCTION

The landscape of facial rejuvenation techniques has transformed substantially over the years, marked by the pursuit of a revitalized and youthful appearance. The realm of modern non-surgical cosmetic procedures now offers a wide range of solutions tailored to enhance the nuances of facial aesthetics while preserving the integrity of natural harmony and expressions.¹⁻⁴ Hyaluronic acid (HA)-based dermal fillers have emerged as a cornerstone of this paradigm of minimally invasive aesthetic procedures.^{4,5} These fillers not only restore volume but also lift tissues to reduce the effects of fine lines, folds, hollowing, and wrinkles. Their strategic placement, including regions such as the forehead lines, temple, glabellar lines, lateral canthal lines, nasolabial folds, lips, jawline, marionette lines, chin, and tear troughs, leads to a contoured and rejuvenated aspect.^{3,5-7} In the context of HA for facial aesthetic rejuvenation, comprehensive characterization of the product holds pivotal clinical significance. Notably, NASHA® crosslinking technology provides HA with prolonged stability and bioavailability, enhancing its clinical utility. In addition, OBTTM technology^{8,9} finely regulates the physicochemical properties of HA, optimizing its integration within dermal tissues for superior outcomes.^{10,11} At the same time, lasers and energy-based treatments, exemplified by fractional laser resurfacing and radiofrequency devices, and intense pulsed light (IPL) therapy, have taken center stage. Their capacity to stimulate collagen production, tighten skin, and refine texture and tone has propelled them to the forefront of non-invasive modalities, amenable to individual or combined applications.^{7,12,13} As technological progress accelerates, the palette of non-surgical interventions for achieving facial rejuvenation is evolving with increasing diversity and efficacy. Yet, within this dynamic backdrop, the pursuit of facial rejuvenation is a nuanced process demanding comprehensive knowledge of individual patient demands, the complexities of aging physiology, facial anatomy, aesthetic principles, product characteristics, optimal technological choices, and the expertise of proficient practitioners^{3,6,12,14}. Considering this multi-dimensional understanding, the aim of the present study is to create practical guidelines for HA treatment with laser/energy-based technologies while meeting evolving clinical needs for optimized outcomes, enhanced safety, and business viability within the particular context of minimally invasive aesthetic interventions of facial and non-facial areas.

METHODS

Participant Selection and Composition of Expert Group

A multidisciplinary group of nine medical experts with relevant knowledge and extensive clinical experience in HA treatment combined with laser/energy-based technologies convened in August 2023. The expert group included physicians specializing in dermatology and plastic surgery. The aim of this group was to provide insights and discuss best practices in facial treatments involving these modalities.

Questionnaire Development and Pre-Meeting Inquiry

Prior to the meeting, the members of the expert group were asked to answer a pre-meeting questionnaire consisting of 17 components relating to various aspects of the treatments:

1. Patient selection criteria
2. Clinical recommendations
3. Contraindications
4. Preoperative preparations
5. Varieties of hyaluronic acid products
6. Techniques of hyaluronic acid injection
7. Number of hyaluronic acid sessions
8. Interval between hyaluronic acid sessions
9. Laser/energy-based technologies used
10. Approaches in laser/energy-based techniques
11. Frequency of laser/energy-based sessions
12. Interval between laser/energy-based sessions
13. Sequencing of technology application
14. Guidelines for intraoperative care
15. Protocols for postoperative care
16. Potential adverse effects
17. Post-treatment follow-up strategies

Meeting Facilitation and Data Collection

During the meeting, organized by a neutral and trained medical facilitator (RT), discussions based on the responses to the questionnaire were captured on video. The facilitator steered the conversation, summarized key points, and facilitated clarifications to ensure equitable engagement and contribution from all participants. The discussions focused on comprehensive explanations of different treatment methods, the rationale underlying particular sequences, safety, and synergistic effects of combined treatments for facial aesthetic rejuvenation.

Formation of Guidelines

Open debates and dialogues were used to reach an agreement on potentially controversial topics. Participants drew from available evidence, their individual clinical experiences, and their concerns to identify high-relevance principles. These discussions, complemented by a review of current literature, formed the basis of a practical guideline encompassing facial aesthetic rejuvenation treatments.

Manuscript Development and Validation

Panel observations and suggestions from the discussions were assessed, resulting in the development of a manuscript. This manuscript was subsequently subjected to iterative revisions by all the authors, progressively refining its content. The culmination of this collaborative process led to unanimous agreement on the result. The final recommendations presented in this study represent the distilled expertise of the panel, grounded in clinical experience, and substantiated by previously published data.

pertaining to the intersection of HA and laser/energy-based technologies in the field of facial aesthetic medicine focused on rejuvenation.

RESULTS AND RECOMMENDATIONS

Composition of Expert Group

The average age of the experts in the group was 48 years old, with an average of 25 years of medical practice, enhanced by advanced training acquired in residencies, master's programs, and doctoral degrees within the specialized domains of general surgery, plastic surgery, dermatology, and internal medicine. After thorough discussions, the following recommendations were formulated based on a combination of scientific evidence and the collective clinical expertise of leading dermatologists, plastic surgeons, and researchers.

General Recommendations

The group emphasized the significance of patient selection and assessment, highlighting the importance of considering medical history. Pre-treatment evaluations should encompass detailed skin analysis to determine the most suitable HA formulation and laser/energy-based treatment for each patient. Sequential planning was recommended, with laser/IPL intervention typically preceding HA treatments, in the same session, to optimize skin response. A key aspect of the recommendations was determining the appropriate interval between laser/energy-based treatment and HA administration. The group recognized the potential for synergistic effects through the combination of HA and various laser modalities/IPL therapy within the same appointment to offer improvements in skin rejuvenation and overall aesthetic outcomes without requiring a minimum interval between procedures, unless the laser results in considerable swelling or heightened susceptibility to infection, in which case a 7-day interval between laser treatment and HA administration is advisable. The statements underscored the versatility of laser technologies that can be combined with HA, including fractional lasers, ablative technologies, nonablative lasers, and non-laser technologies, such as IPL therapy, tailored to each patient's needs and manufacturer's specifications. The optimal timing for laser/IPL procedures before administering HA treatments was also debated, culminating in the conclusion that the time between the two interventions does not impact the aesthetic or safety outcomes of the procedure, as laser/IPL application can be immediately followed by the HA injection in the same session, though still accounting for exceptional circumstances related to technologies prone to significant edema or contamination, which can be seen in lasers with ablative potential, such as Er:YAG or CO₂. In these cases, it may be necessary to delay HA application by 7 days. Customization emerged as a recurring theme in the recommendations, encouraging practitioners to tailor treatment plans based on individual patient characteristics and desired outcomes, while also accounting for specific laser/energy-based and HA formulations (considering the use of Restylane®

NASHA and/or OBT fillers for vertical projection and volume effect, alongside the incorporation of Restylane® Skinboosters™ for skin quality improvement, is advisable). Furthermore, the group emphasized post-treatment care as a pivotal element in minimizing downtime and adverse effects. The recommendations acknowledged that the combination of laser technologies, or IPL therapy, and HA is generally safe when administered by experienced practitioners. However, careful monitoring for potential adverse reactions and thorough patient education were considered essential. The expert group acknowledged the importance of maintaining comprehensive documentation and highlighted the need for further research to fully understand the long-term effects and potential advantages of combining laser/energy-based treatments and HA.

Guideline Outcomes

The guidelines present the results for each of the 17 domains discussed by the expert group related to various aspects of the combination of treatments with laser/energy-based technologies and HA. It is important to note that these recommendations serve as guidelines and should be adapted to the specific needs of each patient and the evolving landscape of dermatological technologies. Clinicians are encouraged to keep up-to-date on the latest research and developments in the field to provide the highest standard of care when combining laser/energy-based technologies and HA for facial rejuvenation interventions. Table 1 presents recommendations for the optimal use of HA combined with laser/energy-based technologies for effective facial rejuvenation, table 2 provides guidelines on the effective use of laser/energy-based technologies combined with HA for enhanced facial rejuvenation outcomes, and table 3 provides comprehensive recommendations for an integrated approach to optimizing outcomes when combining laser/energy-based technologies and HA for facial rejuvenation.

DISCUSSION

The use of integrated therapeutic strategies for facial rejuvenation through protocols combining HA injection with laser/energy-based application is known to enhance patient satisfaction and achieve sustained efficacy.¹⁵ Nonetheless, the present article seems to represent a pioneering effort to establish practical guidelines for concurrent use of injectable HA treatments and laser/energy-based technologies. While attending to the growing worldwide interest in aesthetic medicine in the area of facial rejuvenation, it also emphasizes improved treatment results and the enhanced sustainability of clinical practice.^{7,12,16} Following prior findings,¹⁷ the expert group suggests that determining the most suitable approach depends on patient preferences, time constraints, anatomical factors, and financial considerations. Nevertheless, the core challenges of determining the extent of the intervention and the sequencing of its components remain a matter of dispute and are scarcely explored in clinical studies. Expert opinions have a key role in steering evidence-based prac-

TABLE 1: Recommendations for combining hyaluronic acid and laser/energy-based technologies in facial rejuvenation

HA	Key recommendations
Patient selection criteria	Assess volume deficits, tissue projection, skin quality (wrinkles, furrows, dyschromia, pores, scars, dilated vessels), and appropriate laser/IPL choice for various phototypes and tanned skin. Consider tendency to post-inflammatory hyperchromia.
Clinical recommendations	Enhance skin quality using laser/IPL and correct volumetric deficits with HA. Primary treatment areas: face, neck, and hands. Secondary sites include other body regions and intimate area.
Contraindications	Avoid use in case of local infection. There is increased risk of complications if a permanent filler, such as silicone or PMMA, is present in the same area.
Preoperative preparations	Use local anesthetic and analgesic as needed. Prepare skin with suitable skincare regimen based on laser/IPL type, patient phototype, and clinical requirements.
Varieties of HA products	Use Restylane® NASHA and/or OBT fillers, as well as Restylane® Skinboosters™
HA injection techniques	Choose technique based on product and anatomical site: subdermal, subcutaneous, or supraperiosteal; cannula or needle. Amount of HA varies by site and individual assessment.
Number of HA injection sessions	Tailor to individual patient assessment. For Restylane® Skinboosters™: 2–4 sessions/year, 1–3 syringes/area. Other Restylane® NASHA and/or OBT fillers for vertical projection and volume effect: 1 session/year/area.

HA: hyaluronic acid; IPL: intense pulsed light; PMMA: polymethyl methacrylate

TABLE 2: Recommendations for combining laser/energy-based technologies and hyaluronic acid in facial rejuvenation

Laser/energy-based technologies	Key recommendations
Laser/energy-based technologies used	Select laser type (or IPL therapy) based on individual patient clinical criteria. Examples include fractionated, ablative, and nonablative lasers. Note that IPL behaves similarly when combined with HA.
Approaches to laser/energy-based techniques	Choose technique according to technology and patient needs. Use appropriate energy levels to prevent burns, including suitable power and application time.
Frequency of laser/energy-based sessions	Tailor to individual patient assessment, generally ranging from 1 to 5 sessions.
Interval between laser/energy-based sessions	Duration varies based on technology employed, typically ranging from 7 to 30 days.

Observation: Although not a form of laser technology, these recommendations also apply to intense pulsed light (IPL) therapy

Table 3. Comprehensive recommendations for combining hyaluronic acid and laser/energy-based technologies in facial rejuvenation

Clinical guidelines	Key recommendations
Sequencing of technology application	Opt for laser or IPL therapy before HA injection, potentially during a single appointment. Exception: if the ablative laser induces significant postoperative edema or risk of infection, allow for a 7-day interval between laser and HA.
Guidelines for intraoperative care	Maintain asepsis and antisepsis.
Protocols for postoperative care	Apply local cooling or soothing masks according to laser used. Use LED therapy and prescribe moisturizing, healing, soothing, or lightening creams based on diagnosis. Advise against sun exposure and recommend high-SPF sunscreen until skin recovery is complete.
Potential adverse effects	Monitor for vascular occlusion and address hematoma, post-inflammatory hyperchromia, or hypochromia. Manage unsightly scars and guard against local infection and herpetic reactivation.
Post-treatment follow-up strategies	Engage in remote monitoring (telephone contact) within 24 hours post-procedure. Schedule photographic follow-up 3 to 6 months after the procedure.

IPL: intense pulsed light

tice and the advancement of aesthetic medicine, particularly within clinical contexts such as the current one which is marked by the limitations of the literature.^{18,19} In this scenario, practical guidelines developed by unanimous agreement and addressing core clinical topics such as those covered by the present recommendations (patient assessment, emerging technologies, personalized treatment, safety issues, and long-term results, among others) may serve as a valuable resource for both practitioners and patients seeking guidance to fully understand the field, its challenges, and the dynamic landscape of treatments.^{20,21} From a comprehensive standpoint, the present practical guidelines encompass patient preferences, volume deficits, and skin quality assessment, coupled with the selection of suitable lasers based on phototypes. The clinical emphasis lies in enhancing skin quality via lasers (or IPL therapy) and addressing volume deficits with HA. The integration of HA with lasers/energy-based interventions in the same session involves sequencing technologies before HA, with exceptions for a 7-day interval due to edema or infection risks. Preoperative measures involve skincare preparation and local anesthesia. The use of Restylane® NASHA and/or OBT fillers, alongside the incorporation of Restylane® Skinboosters™, follows techniques tailored to specific sites. The number of sessions depends on patient assessment, with intervals ranging from 7 to 30 days. Intraoperative care requires asepsis, while postoperative care involves soothing masks, LED therapy, and sun protection. Monitoring adverse effects including vascular occlusion, hematoma, pigmentation, scars, and infection is vital, and management strategies should be guided by the diagnosis. Follow-up requires remote monitoring within 24 hours and photographic documentation 3 to 6 months after the procedure. The recommendations also apply to IPL therapy, which, although not technically a form of laser technology, parallels the findings of Fodor et al. (2004), demonstrating its pivotal role in facial aesthetic rejuvenation. IPL effectively addresses various concerns raised by medical experts, including pigmentation irregularities, vascular anomalies, signs of aging, acne, and unwanted hair growth. This non-invasive modality boasts a favorable safety profile and minimal interruption, making it a versatile and effective solution for comprehensive facial enhancement and rejuvenation.²² Given the predilection of contemporary patients for achieving facial rejuvenation swiftly and cost-effectively, one should consider comprehensive treatments in a single session,¹⁷ following the recommendations outlined in the present practical guidelines, which start patients with medical-grade skincare to create more favorable responses to various interventions, including minimal filler augmentation. Following the protocol, laser/IPL procedures before HA injection are endorsed because this sequence facilitates the modulation of skin texture with minimal edema, thereby enabling subsequent volumization with HA.¹⁷ The rationale behind this clinical sequencing is the physiological

response of the skin induced by laser/IPL treatment. This response encompasses augmented dermal thickness, decreased skin anisotropy, and discernible clinical enhancement characterized by improved texture, diminished pore size, improved wrinkles, and enhanced skin laxity, collectively extending the retention period of HA filler in the treated area.²²⁻²⁶ The proposed guidelines on the volume of HA to be administered and the periodicity of treatment in the context of laser/IPL-filler synergy are grounded on the evidence that diminished dermal thickness attributed to the reorganization of newly formed collagen fibers, a phenomenon known to develop over time, may lead to a discernible aesthetic compromise.^{15,27} However, it is important to highlight that the persistent impact of laser/IPL treatment, combined with the effects of HA, especially when based on NASHA²⁸ and/or OBT technologies,²⁹ remains effective over up to 12 months.³⁰

Limitations

The practical guidelines in this article are rooted in the real-world experience of experts, though this approach has limitations due to subjectivity and lack of standardization. However, the elective nature of aesthetic procedures makes the design of comprehensive long-term studies challenging. Thus, the current understanding of emerging facial rejuvenation methods comes mainly from the collective experiences of individual practitioners.¹⁷ Therefore, these recommendations would benefit from future controlled clinical trials.^{19,21}

CONCLUSIONS

Best practices for synergistic approaches in facial rejuvenation interventions involve the direct sequence of lasers/IPL before HA if administered in the same session. A 7-day interval due to edema or infection risks is advisable when using lasers with ablative potential. Application of Restylane® NASHA and/or OBT fillers combined with technologies follows techniques tailored to specific sites and products while the number of sessions depends on patient assessment. Intraoperative care requires asepsis, while postoperative care involves soothing masks, LED therapy, sun protection, and customized topical treatment. Monitoring and management of adverse effects are key. Follow-up is based on remote monitoring within 24 hours and photographic documentation at 3 to 6 months post-procedure. Furthermore, strategically performing laser/energy-based interventions before HA treatments in the same session to optimize synergistic effects and consequently enhance treatment outcomes during a single session can also be consistent with contemporary patient preferences while enhancing business prospects in the field of facial aesthetics. Based on their expertise, the expert group emphasizes that the combination of Restylane® NASHA and/or OBT fillers with lasers or IPL is an effective and safe strategy for optimizing clinical outcomes in Aesthetic Medicine. ●

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