THE IMPORTANCE OF FACIAL ASSESSMENT AND THE USE OF DERMAL FILLERS IN AESTHETIC MEDICINE

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Recepção: 30 de setembro de 2024
Aprovação: 29 de outubro de 2024

Abstract - Facial beauty is a multifaceted concept, influenced by physical characteristics such as proportion and symmetry, which are fundamental in aesthetic perception. This study aims to investigate the importance of facial assessment, including the measurement of facial structures and the analysis of facial lines, in the practice of aesthetic medicine. The methodology is based on a comprehensive literature review on techniques of faciometry and facial line analysis, which allow for the identification of deviations and asymmetries often imperceptible to the naked eye. This section explores facial aging, its cellular and molecular mechanisms, and the variations in aesthetic perception among different age groups, genders, and ethnicities. The findings indicate that the use of dermal fillers, classified as permanent and non-permanent, is a growing practice in aesthetic medicine, with evident benefits in facial harmonization. However, these procedures are not without risks, particularly in areas such as the nasal region, where severe ocular complications can occur. It is concluded that a detailed evaluation of facial proportions and symmetry, combined with a deep understanding of the patient's individual characteristics, is essential for success in aesthetic procedures, promoting a more harmonious and safer aesthetic outcome.

Keywords - Faciometry, Dermal Fillers, Minimally Invasive Procedures, Preventive Measures.

Resumo - A beleza facial é um conceito multifacetado, influenciado por características físicas como proporção e simetria, que são fundamentais na percepção estética. Este estudo tem como objetivo investigar a importância da avaliação facial, incluindo a medição das estruturas faciais e a análise das linhas faciais, na prática da medicina estética. Metodologia: baseou-se em uma revisão de literatura abrangente sobre técnicas de faciometria e análise das linhas faciais, que permitem a identificação de desvios e assimetrias muitas vezes não perceptíveis a olho nu. Referencial teórico: explora o envelhecimento facial, seus mecanismos celulares e moleculares, e as variações de percepção estética entre diferentes grupos etários, gêneros e etnias. Os resultados indicam que o uso de preenchimentos dérmicos, classificados em permanentes e não permanentes, é uma prática crescente na medicina estética, com benefícios evidentes na harmonização facial. No entanto, esses procedimentos não estão isentos de riscos, especialmente em áreas como a região nasal, onde complicações oculares graves podem ocorrer. Conclusão: Conclui-se que a avaliação detalhada das proporções e simetrias faciais, aliada a uma compreensão aprofundada das características individuais do paciente, é essencial para o sucesso em procedimentos estéticos, promovendo uma estética mais harmoniosa e segura.

Palavras_chave - Faciometria, Preenchimentos Dérmicos, Procedimentos Mínimamente Invasivos, Medidas Preventivas.

I. INTRODUCTION

Beauty is a multifaceted concept, and its perception is influenced by a variety of facial characteristics. Proportion undoubtedly stands out among these characteristics [1,2]. Therefore, the assessment and measurement of facial structures, along with their peculiarities and deviations, are crucial for understanding the nuances that shape individual aesthetics. Facial metrics is a technique that involves precise measurements from previously defined anthropometric points, allowing for simple and effective data collection [3,4]. In addition to analyzing anthropometric points, the evaluation of facial lines plays a significant role. These lines can be defined vertically and horizontally by the true vertical line (TVL), which is parallel to the plumb line. Similarly, the true horizontal line

(THL) is perpendicular to the TVL. Decomposing these lines provides easily executed parameters, facilitating the identification of deviations and asymmetries that often go unnoticed during clinical examination [4,5].

The demand for minimally invasive and non-surgical procedures, such as dermal fillers, to address age-related changes in the skin is constantly increasing in aesthetic medicine [6]. These fillers can be classified as permanent (non-resorbable and non-biodegradable) and non-permanent (resorbable and biodegradable), depending on their rheological properties and the duration of effects. Permanent fillers can last over 5 years, while non-permanent fillers last approximately 6 to 18 months, depending on the product's cross-linking and particle size [7].

Consequently, injections of fillers in the nasal area pose a particular risk of complications related to ocular injuries, such as total or partial loss of vision and diplopia. The pathophysiology of these ocular injuries is generally determined by the retrograde flow of the injected filler into the ophthalmic artery, which can cause complete or partial occlusion of the artery or one of its branches [8]. For rhinofilling procedures, it is suggested to perform precise syringe aspiration before injection and to avoid high-pressure bolus injections to prevent unintentional intravascular accidents, as indicated by Helmy [9].

Facial beauty is a complex concept influenced by a variety of physical characteristics. Facial proportion and symmetry are fundamental aspects of aesthetic perception, and understanding these nuances is essential for the practice of aesthetic medicine. In this regard, this literature review aims to investigate the importance of facial assessment, including the measurement of facial structures and the analysis of facial lines, in the practice of aesthetic medicine. Additionally, it seeks to understand the different types of dermal fillers available, their properties and duration of effects, as well as the risks and complications associated with filler injections in the facial region.

II. METHODOLOGY

This study consists of two main stages. In the first stage, a systematic literature review is conducted, addressing human anthropometric measurements, concepts of the golden ratio in facial analysis, skin aging processes, and recommendations for the combined use of dermal fillers and botulinum toxin. This review follows strict inclusion and exclusion criteria, using recognized databases such as PubMed, Scopus, and Google Scholar, ensuring the selection of relevant studies with high methodological quality. In the second stage, a qualitative analysis is performed on the cultural and psychological aspects related to the perception of facial beauty. This analysis is based on studies that explore the multicultural evolution of beauty standards and the interpretations of emotional expression in ambiguous facial expressions. Through these complementary methodological approaches, the study aims to achieve a comprehensive and in-depth understanding of the topics addressed, contributing to a critical and well-founded analysis of the proposed research questions.

III. THEORETICAL FRAMEWORK

A. Aging

The process of facial aging is of significant aesthetic importance as it is easily visible and has a considerable impact on individuals' self-image. Understanding the underlying mechanisms of this process is crucial for developing strategies for prevention or delay. Aging is complex and occurs at molecular and cellular levels, involving the skin, bone and cartilage structures, adipose tissue, and muscles. Intrinsic factors, such as hormonal decline and reduced DNA repair capacity, combined with external influences like UV radiation and moisture, contribute to these changes [10].

The intrinsic aging process of the skin is closely related to the decline in antioxidant capacity with age, resulting in increased production of reactive oxygen species and oxidative stress. Furthermore, chromosomal analysis reveals progressive telomere shortening and tissue damage. Aging rates, both intrinsic and extrinsic, vary due to individual exposure to causal factors and genetic predisposition. These findings justify the combined treatment approach, where both toxins and fillers play complementary roles, especially as the patient ages [11].

Optimizing therapeutic outcomes across a variety of patient groups is a basis for implementing combined treatments. While facial rejuvenation is a common goal attributed to aesthetic treatments, a more inclusive view, considering the patient's age, ethnicity, and gender, leads to a more precise goal: facial harmonization. This is achieved by correcting acquired disharmonies and modifying congenital characteristics. In response to the growing diversity of patients in clinical practice, it is suggested to include more diverse groups in studies on injectable treatments [11].

B. Patient Populations

a. Age

Research indicates that the typical age range for patients seeking cosmetic procedures is between 30 and 50 years. Both older and younger patients show clinical benefits from fillers and toxins when indicated. A retrospective review of data from 2008 to 2013, sourced from a database endorsed by the American Society of Plastic Surgeons, revealed that patients over 65 years of age underwent significantly more cosmetic procedures compared to younger patients (62.9% vs. 12%) [11].

b. Gender

Female Face: Harmonization of the female face involves restoring the prominence of the upper and middle thirds,

creating a lower facial tapering. The goal is to achieve a heart or inverted triangle shape, with an emphasis on the innovations and delicacy of visual features.
Male Face: The male face is perceived as harmonious when it is slightly longer, with equal prominence to the dry thirds and a well-defined jawline. Male cranial bones are significantly larger than female cranial bones, with wider, squarer, and flatter frontal, maxillary, zygomatic, and mandibular bones, and a more prominent supraorbital ridge [11].

c. Ethnicity
We live in a multicultural society where people from diverse backgrounds seek aesthetic procedures. In this context, it is essential for professionals to be aware of the average acoustic characteristics of different ethnic groups. Variations in photoaging between ethnic groups are attributed to physical differences, such as fibroblast structure, as well as lifestyle differences. Although all groups show signs of aging, Caucasians typically exhibit an earlier onset and more wrinkles at younger ages. Notably, Black skin tends to show more folds than wrinkles, highlighting the importance of volume restoration and scar correction for all patients [11].

C. Understanding Ethnic Differences in Facial Aging Characteristics
Compared to the skin of Caucasian women, the skin of Black women has larger groups of multinucleated fibroblasts, which are dermal cells responsible for collagen production and wound healing. Additionally, collagen fibers in the skin of Black individuals have been found to be smaller, more closely organized, and surrounded by proteoglycans in the dermis. Fragmentation of fibers was also observed in the dermis of Black individuals, though in much smaller amounts compared to Caucasians [39].

D. Effectiveness of Aesthetic Procedures and How to Prevent Unwanted Results
Depending on the type of procedure, the risk of pigmentation changes can be minimized by using lasers with longer wavelengths, applying lower fluences and treatment densities, and employing skin cooling techniques. For most laser treatments, conducting preliminary tests (which help determine the ideal settings) or adopting more conservative approaches are effective strategies to reduce pigmentation-related complications in patients with skin of color (SOC). It is essential to inform patients about the risks of pigmentation changes associated with laser treatments and the available corrective treatment options, if necessary. Additionally, for procedures that cause dermal damage, assessing the risk of keloid formation is crucial, taking into account the severity of the injury and the individual's personal or family history of keloids [40].

E. Important Considerations in Evaluating and Treating Patients of Different Ages and Genders in Facial Rejuvenation Procedures
The panel highlighted the importance of an integrated approach to evaluation and treatment. The balance between fillers and the use of toxins should be based on a personalized assessment of each patient, considering tissue quality, volume loss amount and pattern, muscle contraction, and skin changes. This allows the professional to make the best choice of injectables to achieve optimal results [41]. Men's and women's faces require distinct treatment approaches due to significant differences in anatomy and characteristics considered attractive. On average, the male skull is larger than the female skull, and men tend to have more muscle mass and a higher density of blood vessels. Gender variations in skin thickness and fat distribution are influenced by sex hormones. Additionally, facial imaging research shows that greater facial symmetry contributes to a more typical appearance for each gender [41].

F. Facial Aging
The main causes of facial aging include the influence of gravity, soft tissue maturation, changes in bone structure, facial muscle activity, effects of sun exposure, and changes in the stomatognathic system [13]. These factors can be categorized as local and systemic. Research on facial aging has shown significant progress: we now recognize that the face does not age as a single entity but rather as a complex set of various components. These components include the underlying position of bones, skin, and soft tissues, such as facial fat, which can undergo changes like descent, selective deflation, and alterations in supporting ligaments and septa [12].
Facial aging occurs in two ways: internally and externally. Internal aging, often called "natural," is a process that happens over time and encompasses various aspects, such as reduced collagen production, decreased elastin production, loss of fat cells, decreased moisture retention capacity of the skin, formation of expression lines due to muscle contraction, delayed shedding of dead skin cells, and slower cellular renewal. Some aspects of aging are influenced by hereditary factors and are therefore largely uncontrollable [13].
With advancing age, there is a decrease in the extracellular matrix and hyaluronate, its main component, which is responsible for stabilizing intracellular structures and forming a viscoelastic network where collagen and elastin fibers are embedded. This results in a loss of the skin's mechanical properties. Hyaluronate plays a crucial role in providing cushioning effects to the skin structures, including the epidermis. Skin firmness is maintained by the extracellular matrix, and the reduction in hyaluronate and, consequently, the cushioning viscoelastic system can lead to skin fragility and increased susceptibility to tears.

Dehydration is one of the treatable issues in the outer skin layer that contributes to the formation of fine lines [13].

a. Main Cellular and Molecular Mechanisms Contributing to Facial Aging

The idea that aging could be caused by a single factor, such as a specific gene or the decline of a physiological system, has been replaced by the understanding that this process is multifactorial, involving the interaction of various molecular, cellular, and systemic mechanisms. The following are six hypotheses illustrating some of these mechanisms: the catastrophic-error theory, somatic mutations and DNA repair, cellular senescence and telomere shortening, free radicals and mitochondrial DNA (mtDNA), glycation and cross-linking, and cell death [42]. Cellular senescence, or natural aging, is influenced by intrinsic factors, including physiological and genetic aspects. As cellular proliferation and hormonal levels decrease, various signs of aging manifest. These signs include telomere shortening, accumulation of dysplastic keratinocytes, degradation of the extracellular matrix, mutations in nuclear and mitochondrial genes, and various metabolic changes related to lipids and amino acids [43].

Extrinsic factors such as smoking, pollution, alcohol consumption, dietary habits, and lifestyle also play a role in aging. Ultraviolet (UV) radiation, from both the sun and artificial sources, impairs skin functions and keratinocyte survival, a phenomenon known as photoaging. Recent studies have shown that visible light and infrared radiation can also damage the skin [43].

G. Facial Evaluation

Facial evaluation plays a crucial role in diagnosing and treating dentofacial deformities. While it was previously based primarily on cephalometric concepts, it now also incorporates patients' aesthetic needs, utilizing a more comprehensive facial morphological analysis. The goal is to establish precise guidelines for treating dental malocclusion and superficial asymmetries, going beyond traditional cephalometric measures to include direct visual assessment of the patient or photographs, allowing for the classification of faces into different profiles. However, reliance solely on right lateral profile images is limited [14].

It is crucial for plastic surgeons to understand the specific aesthetic standards of different ethnic groups before performing procedures such as rhinoplasty, genioplasty, and lip augmentation. A thorough and personalized pre-operative assessment is essential to ensure superior results in the treatment of congenital or traumatic bone deformities. The existence of databases containing profiles of specific ethnic populations is advantageous, as these data are based on precise anthropometric measurements, allowing for more accurate and efficient surgical planning [15].

Facial symmetry, which varies considerably between individuals, can be assessed through various methods, such as clinical evaluation, photography, cephalometry, and 3D imaging. Mediocrity, symmetry, and sexual dimorphism are crucial factors in facial attractiveness across different cultures and genders. Facial attractiveness is associated with social benefits, such as lower incidence of depression and higher self-esteem [16].

H. Interpretation of Facial Proportions

According to studies from the 16th century, while facial beauty is a subjective matter, atmospheric proportions can be assessed objectively. A face with correct proportions is generally considered acceptable, even if it is not necessarily beautiful. Understanding average proportions helps healthcare professionals identify individual discrepancies from population norms. The face can be vertically divided into balanced thirds, and accurate measurement of these thirds can reveal deviations in these areas. For example, the width of the mouth should approximately match the distance between the medial margins of the arch, especially as a reference point to check if the mouth width conforms to the desired proportion [17].

Assessment of Facial Analysis Measurements by the Golden Ratio: In the field of facial aesthetics, a specific mathematical proportion known as the Golden Ratio (GR) is considered relevant. The goal of this study is to assess the proportions of visible soft tissues. Additionally, various authors have adopted the Golden Ratio as a tool to measure and analyze apparent aesthetic qualities in their respective regions. The study was conducted from January 2016 to January 2017. It is important to note that the concept of aesthetics has evolved over time, making it challenging to define beauty and aesthetics precisely [18].

Interpretation Bias: The interpretation of ambiguous expressions can easily be influenced by cognitive biases, such as negativity bias, leading us to interpret uncertain situations negatively. This occurs when people evaluate distorted facial expressions, often presenting a more negative connotation to surprised faces, for example. Moreover, the quality of the image can affect the direction of interpretive views. For instance, a decrease in image resolution can result in a more positive perception. These findings suggest that our brain is less tolerant of interpreting ambiguous expression signals, depending on viewing conditions [19].

I. Evolving Facial Concepts

As we age, our face undergoes transformations at all levels, including the epidermis, dermis, subcutaneous tissue, and bones. These changes involve constant remodeling, where the manipulation of existing tissue is balanced by the

generation of new tissue. However, with advancing age, regenerative capacities decrease, affecting the balance of remodeling. This results in a net loss of tissue, known as resorption. This loss of volume is more pronounced in the deeper layers of tissue, where subcutaneous fat compartments deplete, resulting in deflation and descent. Additionally, there is bone loss and an increase in the total collagen content in the skin, along with qualitative degeneration of tissue components, including dermal collagen and elastin [11].

There are four main concepts of facial beauty: symmetry, proportionality, youth, and sexual dimorphism. Facial symmetry suggests good development and offers advantages in sexual competition. Proportionality is valued as a representation of genetic diversity and disease resistance. Youth is associated with neonatal features such as large eyes and a small nose, evoking a sense of youthfulness and affability. The result is a loss of attractiveness due to deviation from the phi pattern and the interpretation of changes as a decrease in fertility. Finally, sexual dimorphism refers to the distinct phenotypic characteristics between men and women, each associated with fertility and reproductive advantage [20].

J. Treatment Planning

The continuous use of hyaluronic acid fillers and botulinum toxin results in cumulative improvements. It is more advantageous for patients to return for treatment when previous results begin to diminish, rather than waiting for them to completely disappear. In the long term, this can reduce the need for frequent treatments and allow for lower doses [11].

K. Treatment Area Preparation

Proper skin preparation before dermal filler procedures is essential to avoid infections. Patients with ongoing infections in the area to be treated should not undergo the procedure. Various antiseptic solutions are used, but there is no significant difference in contamination rates between them. It is recommended to use a quaternary ammonium compound with 70% ethyl alcohol, or chlorhexidine and 70% ethyl alcohol, avoiding chlorhexidine in the periocular region due to the risk of keratitis and ocular damage [21]. Proper skin preparation is crucial before procedures, especially considering that many patients may have makeup on. Removing all makeup, not just from the treated area, is essential to reduce microorganisms on the skin. Avoid using textile wipes with preservatives to prevent chemical and hazardous residues, opting instead for a thorough facial wash. Then, a specific antiseptic solution should be applied to prepare the skin before the procedure [22].

Nutrition plays an essential role in modern medicine and surgery, as optimal nutritional status is considered a critical factor for surgical success. Adequate nutrition can improve healing and result in better outcomes in all types of surgery. Unsatisfactory nutritional status, often caused by deficiencies in minerals and vitamins, can affect the three main phases of the healing process after surgery: inflammation, remodeling, and proliferative phase. Therefore, it is crucial to ensure that the patient is in an optimal nutritional state to improve surgical outcomes [23].

L. Mid-Face and Lower Face

In the analysis of the height of the lower third of the face (from the subnasal to the mentonian), statistically significant differences were found in both men and women. The average values recorded for both sexes followed the order: dolichofacial, mesofacial, and brachyfacial. This pattern was predictable, as the lower third of the face in individuals with a long face tends to be more elongated, while in short faces, it is generally more reduced compared to the other thirds. A previous study that assessed this measurement indirectly through photographs found higher average values than those obtained in this research, for both men and women [24].

In the assessment of the height of the mid-face (from the nasion to the stomion), statistically significant differences were also observed in both sexes. The average values followed the order of dolichofacial > mesofacial > brachyfacial, for both men and women. These results are consistent with what is described in the literature, showing a longer mid-facial third for dolichofacial individuals and shorter for brachyfacial ones. The averages found in this study were lower than those reported in a study conducted directly with Caucasian adults and higher than those presented in another study focused on Turkish adults [24].

It is essential to conduct a comprehensive facial assessment, considering shape, balance, and symmetry. It is crucial to correct or restore the volume of the mid-face before addressing the treatment of the lower face, as this facilitates the repositioning and lifting of soft tissues. However, it is important to consider that many patients may not be aware of their physical deficiencies. Therefore, when treating the mid-face of a patient, it is also necessary to assess the lower third to ensure the optimization of atmospheric proportions [25].

M. Applying Science to Optimize Clinical Efficacy and Safety

The scientific quality of each hyaluronic acid product is intrinsically linked to its clinical characteristics. Increased elasticity contributes to greater tissue projection, providing firmness and resistance to muscle and gravitational forces, while cohesiveness promotes a three-dimensional expansion of the tissue. Regarding safety, it is crucial to note that these fillers are broken down transarterially after being implanted in cadaveric arteries. This occurs through the action of exogenous hyaluronidase injected into surrounding soft tissues or through exposure of internal arterial segments to hyaluronidase in therapeutic doses [11].

Hyaluronic acid (HA) is a naturally occurring glycosaminoglycan that plays a vital role in the extracellular matrix of adult tissues, with approximately half of the body's total HA located in the dermis. Due to its water-retention capacity, HA is crucial for regulating and maintaining tissue hydration. HA-based dermal fillers have been developed with proprietary technologies to increase their resistance to biological manipulation and mechanical stress in vivo, resulting in longer-lasting and more manageable treatments. The proven safety and efficacy of these products have established HA fillers as a standard option for correcting visible lines and wrinkles, as well as restoring or creating facial structure and volume [26].

A careful selection of filler products and injection techniques, grounded in scientific evidence, allows for a safe and effective approach. The scientific design of products, considering the target tissue and implantation techniques, enables the prediction of treatment outcomes. Controlled studies show that the ideal nasolabial fold requires less filler volume with greater elasticity compared to less elastic fillers. Additionally, histopathological and ultrasonographic analyses directly relate the peculiarities and cohesiveness of fillers to their pattern of dispersion and technical integration after intradermal implantation in vivo [11].

N. Knowledge of Procedures

Hyaluronic acid (HA) is used for soft tissue filling and can be derived from avian or bacterial sources. Most modern HA fillers are made from bacterial HA due to their lower allergenic and immunogenic potential. Manufacturing processes are modified according to different HA characteristics to meet various clinical needs. Therefore, HA fillers are not all the same, and physicians select different products for different applications based on their personal experience and manufacturer guidelines [27]. Non-permanent fillers, such as hyaluronic acid (HA) and calcium hydroxyapatite (CaHa), are safe and effective in combating the effects of aging. HA, naturally present in the body, helps stabilize, lubricate, hydrate, and enhance the viscoelastic properties of the extracellular matrix. On the other hand, CaHa stimulates fibroblast activity and induces the formation of new collagen and elastin fibers. Due to its higher peculiarities and longer-lasting effects, CaHa is a valuable alternative to HA for improving contour and increasing volume in aging faces [28]. Hyaluronidase is a soluble protein enzyme used in aesthetic medicine and other medical fields since 1949. It is applied in various specialties such as anesthesiology, cardiology, radiology, oncology, ophthalmology, and plastic surgery. In the past 15 years, hyaluronidase has gained prominence for its ability to break down cross-linked hyaluronic acid, facilitating the dispersion and absorption of fluids and medications. It is used to treat specific conditions such as keloid scars, hematoma dissolution, and lymph edema [29].

O. Response to Repeated Treatments with Botulinum Toxin Type A

The efficacy of botulinum toxin type A in aesthetic procedures is notably high. In cases of apparent lack of response or partial response, doctors should investigate possible causes, such as patient selection, dosage, or injection site. When volume loss is a significant factor for wrinkles, combined treatments with fillers and toxin tend to be more effective. Insufficient doses or poorly positioned injections can compromise the treatment response, while overdosing may result in contraction of adjacent muscles, mimicking a lack of response [11].

The use of botulinum toxin type A to improve the appearance of hyperfunctional lines is one of the most common cosmetic procedures today. In the medical community, confidence in the widespread use of this singular therapy for aesthetic purposes requires adequate documentation of both its long-term efficacy and safety in this application. Additionally, it is important to demonstrate that repeated and prolonged use of botulinum toxin for aesthetic constraints does not result in reduced effects due to antibodies against the substance. It is worth noting that botulinum toxin is also widely used in various therapeutic applications [30].

For over two decades, botulinum toxins have been employed in aesthetic procedures to improve facial appearance. Botulinum toxin type A injections are among the most popular non-surgical procedures in the United States, with nearly 2.5 million procedures performed in 2010. Comparative studies have revealed that incobotulinumtoxinA has a similar duration of action to onabotulinumtoxinA in healthy volunteers and in therapeutic prescriptions such as blepharospasm and cervical dystonia. Furthermore, a comprehensive study comparing incobotulinumtoxinA and onabotulinumtoxinA for the treatment of glabellar expression lines found a similar percentage of patients responding well, providing high efficacy for both treatments, according to evaluations from various sources [31].

P. Injection Techniques and Standards

Techniques are selected based on the treated area, the physician's preference, and safety guidelines. For the face, a deeper placement of PCL-based stimulators is recommended, while subcutaneous placement is preferred for the hands. Subcutaneous techniques include linear threading, fan, or cross-hatching. The bolus method, which involves injecting small amounts of product, is used to create a low-pressure gradient. After injection, it is important to massage the area to ensure even distribution of the product [32].

The maximum amount of liquid to be injected into muscles is a controversial topic. More than 45% of professionals mistakenly consider 4 ml as the limit for large muscles. Exceeding this limit can cause variations in vessels and

nerves, pain, increased local temperature, hyperemia, and even more severe reactions. The amount of medication injected varies according to the muscle and the drug's properties. The deltoid can accommodate up to 3 ml, while the gluteus maximus can accommodate up to 5 ml, preferably divided into two sites [33].

Safe injection practices involve proper use by trained professionals, the use of sterile equipment, and the correct disposal of refined materials. According to the WHO, safe injections do not harm the patient, do not expose healthcare professionals to risks, and do not produce hazardous waste. In the US, more than 50 disease outbreaks since 2001 have been limited to adverse injection practices. Unsafe injections in developing countries have led to diseases such as Hepatitis B, Hepatitis C, and HIV [34].

Q. Standardized Photographic Scales

In the scientific-academic realm, across all medical disciplines, the use of photographs for documentation is crucial for sharing knowledge and experience among surgeons and their communities, as well as for surgical education at all stages of training. Despite the standardization challenges presented by intraoperative photography, it is extremely valuable in surgical practice. Additionally, photographic archives enable statistical analyses and monitoring the scientific progress of medical teams and service outcomes. In the current context, digital photography is widely preferred over slides (chromes), especially due to its practicality for dissemination via the internet [35].

The Image Department of the Brazilian Society of Dermatology (SBD) promotes the use of photographs to document dermatological procedures, covering clinical, educational, and research aspects. Digital technology has reduced costs, increased innovation and productivity, popularizing the use of photography in dermatology. Unlike artistic photography, dermatological photography prioritizes precision and fidelity in documenting lesions to allow accurate recognition of conditions at any time [36].

A study used standardized photographs to assess facial aesthetics by dental students. Three common scales were employed: the analog scale, the proportional scale, and the rating scale. Participants assigned responses from 0 to 100 on forms where a horizontal bar was divided into 10 equal segments to assess the facial aesthetics of each photograph. A reference photograph with an average score of 60 was presented to participants, who used it as a benchmark when evaluating other photographs. These standardized methodologies were applied twice with a two-week interval between sessions [37].

R. Documentation

To ensure traceability of adverse effects, it is recommended to attach the batch number of the filler to the patient form. Detailed documentation of the process, including injection technique, type and amount of filler, and treated areas, is crucial. Using a diagnostic/treatment tool is helpful. This ensures that patients are informed about the procedures, risks, and benefits, guaranteeing informed consent [38].

S. Informed Consent

It is essential that the patient receives complete information about the filler to be used, the application technique, possible outcomes, side effects, post-procedure care, and the need for maintenance. The informed record should be comprehensive and include questions related to immunological diseases. The patient should complete a detailed questionnaire about previous treatments to ensure that they are fully informed before the procedure [38].

IV. CONCLUSION

Facial aging is a multifactorial process involving a complex interaction of intrinsic and extrinsic factors, affecting various levels of facial anatomy, from the skin to the underlying bony structures. Understanding the underlying cellular and molecular mechanisms is crucial for developing effective and personalized aesthetic interventions. A combined approach to treatments, considering the diversity in age, gender, and ethnicity of patients, allows for facial harmonization that respects individual characteristics, promoting more natural and satisfying aesthetic outcomes.

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