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Beauty Functional Technique - Part I: Beauty History, principles and botulinum A toxin use

Técnica de Beleza Funcional - Parte I: História da Beleza, princípios e uso de toxina botulínica

Técnica de Belleza Funcional - Parte I: Historia de la Belleza, principios e uso de toxina botulínica A

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Abstract
Background: The Functional beauty is a new analytic technique which combines aesthetic treatment and functional maintenance of structures taking into account the myomodulation that occurs over time. This new approach seeks to improve perception and sensitivity so that it is possible to capture the essence of Beauty and expand the vision of facial harmony. Objective: Describe the fourth principles of the Functional Beauty technique and present the application of facial botulinum toxin based on it. Method: This publication brings a historical perspective of beauty and provides information on the specific characteristics of the technique and focuses on the fourth principles that guide facial assessments and the treatment panel. Results: Recommendations on injection techniques are provided for face based on the particular anatomy of each area, the focus is on the technique (fourth principles) and devices of injection of botulinum toxin. Marking photos are presented for illustration. Conclusion: Functional Beauty is an innovative aesthetic treatment technique, which aims not only at aesthetic benefits, but also at the absence of functional impairment in the short and long term not just treating defects and wrinkles.
Keywords: Beauty; Dermal fillers; Botulinum A toxin; Cosmetic techniques; Adverse effects.

Resumo
Introdução: A Beleza Funcional é uma nova técnica analítica que combina o tratamento estético com a manutenção funcional das estruturas, levando em consideração a miomodulação que ocorre ao longo do tempo. Essa nova abordagem busca aprimorar a percepção e a sensibilidade para que seja possível captar a essência da beleza e ampliar a visão da harmonia facial. Objetivo: Descrever os quatro princípios da técnica de Beleza Funcional e apresentar a aplicação da toxina botulínica facial com base nesses princípios. Método: Esta publicação oferece uma perspectiva histórica da beleza e fornece informações sobre as características específicas da técnica, com foco nos quatro princípios que orientam avaliações faciais e o plano de tratamento.Resultados: São fornecidas recomendações sobre as técnicas de injeção facial com base na anatomia particular de cada região. O foco está na técnica (quatro princípios) e nos dispositivos de aplicação da toxina botulínica. Fotografias de marcação são apresentadas para fins ilustrativos. Conclusão: A Beleza Funcional é uma técnica inovadora de tratamento estético que busca não apenas benefícios estéticos, mas também a ausência de comprometimento funcional a curto e longo prazo, indo além do simples tratamento de defeitos e rugas.
Palavras-chave: Beleza; Preenchedores dérmicos; Toxina botulínica tipo A; Técnicas cosméticas; Efeitos adversos.

Resumen
Antecedentes: La Belleza Funcional es una nueva técnica analítica que combina el tratamiento estético con el mantenimiento funcional de las estructuras, teniendo en cuenta la miomodulación que ocurre con el tiempo. Este nuevo enfoque busca mejorar la percepción y la sensibilidad para que sea posible captar la esencia de la belleza y ampliar la visión de la armonía facial. Objetivo: Describir los cuatro principios de la técnica de Belleza Funcional y presentar la aplicación de la toxina botulínica facial basada en estos. Método: Esta publicación ofrece una perspectiva histórica de

la belleza y proporciona información sobre las características específicas de la técnica, centrándose en los cuatro principios que guían las evaluaciones faciales y el panel de tratamiento. Resultados: Se proporcionan recomendaciones sobre las técnicas de inyección facial basadas en la anatomía particular de cada zona. El enfoque se centra en la técnica (cuatro principios) y en los dispositivos de aplicación de la toxina botulínica. Se presentan fotografías de marcación con fines ilustrativos. Conclusión: La Belleza Funcional es una técnica innovadora de tratamiento estético que busca no solo beneficios estéticos, sino también la ausencia de deterioro funcional a corto y largo plazo, y no se limita al tratamiento de defectos y arrugas.
Palabras clave: Belleza; Rellenos dérmicos; Toxina botulínica tipo A; Técnicas cosméticas; Efectos adversos.

1. Introduction

What would it be to be beautiful? Defining beauty is not an easy process. The definition of it is not static. What era are we talking about? Because, yes, the historical phase that society finds itself in changes the concept of beauty. Beauty, over time, refers to what is pleasant, related to a type of object, judgment, attitude, experience or type of value.

Beauty is analyzed through historical questions, mathematical reasons, social standards and unconscious and instinctive factors through the subjectivity of personal taste. Bringing to an objective assessment, beauty is what arouses admiration and attracts the eyes. (Eco, 2015)

In general, beauty is associated almost automatically with artistic representation, which is considered to be the object of aesthetics itself. This original perspective cannot be fully understood if we look at beauty through modern eyes (Eco, 2015).

It is necessary to understand that any process that involves evaluating beauty cannot be solely objective. There are subjective aspects that, when well evaluated, are able to define beauty and thus propose beautification techniques.

The Functional Beauty (FB) technique consists of four pillars of structured, sequenced assessment as a way of making your understanding more didactic, addressing objective and subjective aspects simultaneously.

It is important to explain the historical perspective of beauty and art to better understand the Functional Beauty approach.

The objective of this article is to describe the fourth principles of the Functional Beauty technique and present the application of facial botulinum toxin based on it.

2. Methodology

A qualitative research study was carried out, using a simpler narrative literature review (Pereira et al., 2018; Rother, 2007). The research was carried out in the Google Scholar database and with the search terms: beauty; botulism; injection. In this part I, we seek to focus on historical aspects. There were no strict criteria in the selection of bibliographic material for the study.

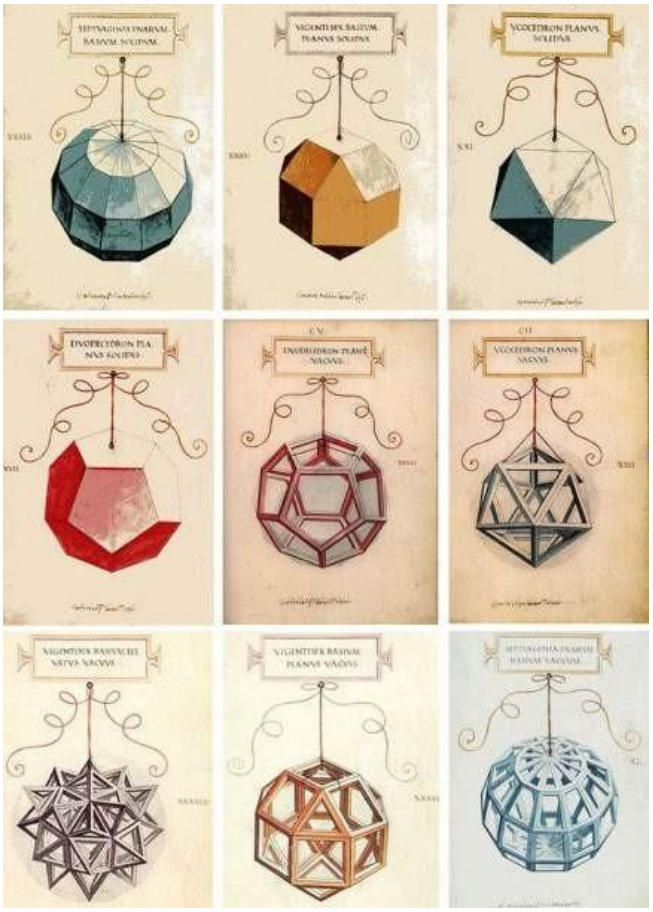
3. Results and Discussion

Historical Analysis

Historically, beauty is the greatest fruit of the Greek aesthetic ideal. The Greek word kalón, generically translated as “beautiful” is actually something that pleases, arouses admiration and attracts the eye. The most important conception of beauty stems from the Greek canon of harmony and proportion. It is the idea of beauty as proportion, while harmony is not an absence, but the balance of contrasts. In general, beauty is symmetry of parts, with a complexity that, so to speak, makes the whole the combination that it individually makes up (Eco, 2015; Arnold, 2004).

Pythagoras was the first to argue that the beginning of all things is number. The aesthetic-mathematical vision that all things exist according to an order is a condition of existence and beauty. This conception seeking to establish ideal propositions was classically established through the golden proportion, also known as “divine proportion”. The golden section based on the harmonic rectangle principle is depicted by Luca Pacioli in De Divina Proportione (Figure, 1), illustrated by Leonardo da Vinci (Eco, 2015; Chang, 2006).

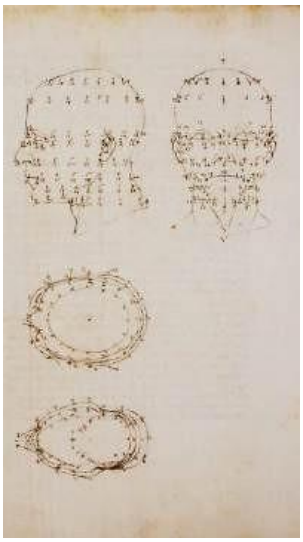
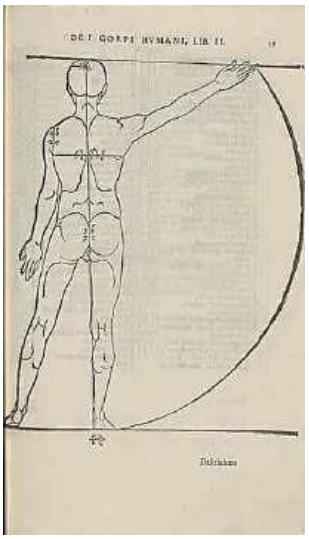
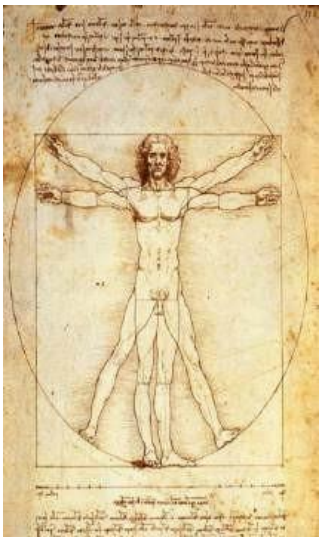
Figure1: Divine Proportion pictured by Leonardo da Vinci.



Source: Author's own.

The beauty of geometric forms, based on proportion and mathematical reason, was mainly portrayed in Renaissance works and in studies on body proportions (Figure, 2) by Pierro della Francesca in De Prospectiva Pingendi (Figure, 2A), and by Albrecht Dürer in Della Simmetria Del Corpi Humani (Figure, 2B) and Leonardo da Vinci's Vitruvian Man (Figure, 2C). The division of the face into distinct facial thirds and the presentation of body proportions as fractions of the whole are examples of this view (Eco, 2015).

Figure 2: Illustrations of studies on body proportions in prospective Pingendi (A), Della Simmetria Del Corpi Humani (B) and Leonardo da Vinci's Vitruvian Man (C).

A  B  C 

Source: Author's own.

Greek sculpture and art favored enormous progress through the connection of art and common sense. Greek sculpture presents the expression of the body's living beauty. Most of the Greek sculptures present a fragment of action or body movement, even when facial balance is observed at rest and in a static manner. The exception to this rule is found in the sculpture The Laocoon Group, one of the most important Greek sculptures. The suffering of Laocoön and his sons is not only revealed in their bodies, but is expressed through the expressions on their faces (Figure 3, A, B, C). The portrait of expression is what makes art come alive (Eco, 2015; Gombrich, 2005).

Figure 3: The statue "The group of Laocoon" represents Laocoon and his two children, Antiphantes and Timbreus , being strangled by two sea serpents, a legend from the Trojan War.

Source: Author's own.

In the Renaissance, beauty, beyond the proportion of the parts, appears to express the dynamism of the movement, which for expository purposes can be referred to categories such as Classicism, Mannerism, Baroque and Rococo. The concept of grace linked to beauty in movement thus paves the way for a new model of Beauty (Eco, 2015; Haughton, 2004).

The greatness of Da Vinci's Last Supper is due to its portrayal of the dynamism of expressions. When contemplating drama, theatricality and excitement, the work becomes real, alive, in portraying movement. What makes the portrait of Mona Lisa intriguing is not only its shape, but also the fact that it appears to be alive, insinuating that it looks beyond the mystery that exists in its smile to the viewer. The expression mainly rests on two characteristics: corners of the lips and corners of the eyes (Eco, 2015).

The representation of movement brings life, beauty to the work. Beauty, above all, is linked to the way feelings and emotions are expressed on the face. Beauty lies in dynamic contemplation, not static contemplation. Beauty is like a prism, it cannot be captured by an exclusive perspective and, if an explanation within a certain subject is sufficient, it becomes insufficient here. Beauty is one of those mysteries that hide in the simplest things and reveal themselves to our eyes. What best explains beauty is the ability to express yourself. It is by considering expression the most beautiful form that beauty can be taken to the level of contemplation (Eco, 2015; Konstan, 2017).

Functional Beauty

Beauty can be considered from three aspects: the first is that of ideal beauty as a form in which beauty is an objective quality. Part of common sense. The second is the personal subjective judgment that determines if something is beautiful or not. In this aspect, beauty does not just depend on your external shape, it also depends on personal taste. (Arantes & M, 2017) In other words, beauty is considered from the point of attractiveness, that is, a person can consider something beautiful that is ugly (Arantes & M, 2017).

Finally, the third aspect takes function into account. FB goes beyond the ability to produce an aesthetic experience, but also contributes to a specific function (Arantes & M, 2017).

Approach

Functional Beauty proposes an approach that values individual beauty and expression. In the same way, as an artist does not repeat a work, doctors and artists of living beauty, should not copy a model. It is recognizing that aesthetic treatment must be idealized according to the peculiarities of each individual and that beauty is in the harmony of a whole, whether at rest or movement. This new approach seeks to improve perception and sensitivity so that we are able to capture the essence of Beauty and expand our vision of aesthetic treatment. Only then will we be sensitive to beauty as a whole, and in this way, we will be able to truly appreciate it (Arantes & M, 2017; Weeden et al., 2001).

To achieve beauty in its fullness, above all we must think about function. One of the most important functions of the face is the capacity to express emotions and feelings through non-verbal communication. Far beyond the artist who sculpts solid marble, the doctor who sculpts the face has the mission of producing living beauty and, as a result, must value facial movements. Based on this vision, the author determined principles to be followed to perform facial harmonization. Far beyond technique, in an artistic way, treatment must involve perception and sensitivity. The principles of Functional Beauty systematize the propaedeutics applied to aesthetics, with technical and semiological criteria for the assessment and execution of treatment (Weeden et al., 2001).

Four principles

- **Assessment on functional axes:**

Every patient must be evaluated in axes. The assessment on axes defines that the examiner evaluates all the structures that appear on the same axis together.

1. **Horizontal axis:**

It must be observed through the horizontal line of the interpupillary line. On the horizontal axis are located the eyebrow, temporal, periorbital and malar regions. The facial structures present in this axis must be considered simultaneously, as they present an intimate correlation. With ageing, the malar and infraorbital regions become clearly distinguishable, as there is no longer a fluidity of light distribution between them, and the middle malar region is divided by the appearance of the nasojugal, palpebromalar and middle malar furrows (Arantes & M, 2017).

When talking about ageing, treatment should be performed in priority order along the horizontal axis, since the changes in facial aesthetics resulting from this process are related and are primarily observed in this region. Horizontal axis treatment aims to restore the definition of lateral malar volume, consequently causing an improvement in the periorbital region. In some cases, treatment of temporal fossae should be considered as it provides balanced volumization of the horizontal axis (Arantes & M, 2017).

2. **Vertical Axis**:

The vertical axis contemplates the structures located in the mid-vertical line of the face: the nose, lips and chin. In balance, the horizontal axis presents the most anteriorly projected facial structures, playing a fundamental role in facial definition and elegance (Arantes & M, 2017).

Just like the structures on the horizontal axis, the structures on the vertical axis also have an intrinsic relationship. This relationship is most commonly observed through the definition of anthropometric standards. An example of this occurs when we use the width of the nose to define the ideal horizontal length of the female chin, or even when we define the ideal length of the lower third according to the vertical length of the lips and chin (Arantes & M, 2017).

The systematic evaluation of the structures of the vertical axis should allow, in addition to these standard relationships, the observation of more complex and extremely relevant relationships. Changing any of the vertical axis structures has a significant effect on the other structures. This effect caused by the change in a structure causes the need for functional compensation and generates the illusory effect of reducing or increasing a related structure (Arantes & M, 2017).

Mental bone deficiency creates the impression that the lower lip is larger than it really is. At the same time, the inclination of the lower lip in relation to the labiomental groove affects the perception of the size of the chin. The nose may also appear larger than its real size in retrognathous patients or those with inadequate lip projection (Arantes & M, 2017).

Patients with lip incompetence tend to involuntarily raise their lower lip to seal the lips. In the same way, the nasal tip depressor responds by depressing the upper lip (Arantes & M, 2017).

By promoting joint assessment, the restructuring treatment of the components of the vertical axis is capable of not only promoting a more harmonious presentation, but above all, treating the components of the vertical axis in a functional way.

- **Luminous Distribution:**

Brighter regions represent places with greater projection. Therefore, as the aging process progresses, the loss of contour and structural volume leads to the emergence of shadow areas. To better understand lighting and its importance in facial evaluation, we must first have the concept of light and shadow well defined (Arantes & M, 2017).

Light and shadow are elements that define and characterize the structure evaluated. In other words, light and shadow are the elements that guarantee the three-dimensional shape of a structure. The eyes fundamentally perceive light, and consequently, the shadows that light casts. A common example of this is the use of a highlighter during the makeup process. The main function of the highlighter is to enhance the face, highlighting important structures in order to make the face harmonious and more elegant (Arantes & M, 2017).

Understanding the importance of structural examination of the face guided by light perception allows us to relate the loss of volume not only in the region of the patient's complaint, but also in all adjacent structures that directly influence the perception of the shadow of the region to be subjected to the aesthetic procedure (Arantes & M, 2017).

- **Grace:**

The concept of grace refers to beauty in movement. The graceful structure cannot imply any appearance of difficulty or effort. The movement must express in its essence, fluidity and harmony. The curved lines are the ones that best describe what we define as graceful movement. It is with this principle that we will bring art to medicine applied to aesthetics, contemplating and valuing the individual in their most human form, in their expressiveness. This last principle shows the importance of Functional Beauty in facial harmonization, which is to value facial movements in the production of living beauty (Arantes & M, 2017).

- **Message:**

Unlike the other three principles, which are from a more rational sphere, this factor to be analyzed has a more emotional connotation. The evaluator's sensitivity must be trained. The doctor's intention is not just to correct defects, but to edit the message that the patient sends in order to bring more beauty, without, of course, compromising the form and function. We must go into the abstract to better understand the foundation of this principle, which is emotional so that, together with the other three (rational), it will bring the true purpose of treatment. The persona you want to highlight must be considered as an essential factor. A person with a predominance of horizontal axis sends a more childlike, docile, welcoming message, for example, we can talk about the famous Walt Disney princesses, with delicate features and more rounded faces. A more predominant vertical axis sends a message of more robustness, greater grandeur and less welcoming, the most extreme example being witches portrayed as villains. Pay attention to their nose and chin, they are more prominent. Then, the profession, lifestyle, dreams, desires, social group you belong to. All of this implies that the message must be defined as ideal for each patient individually. It is something that should not be forgotten: the function always has superiority over the message, as it is the factor that cannot be harmed, as damage to the function harms what is most basic in facial harmony, which is non- verbal communication and primitive activities, as how to eat, smile, look.

Despite being sequenced in order to bring understanding and didactic application, the four principles will be evaluated simultaneously in order to generate the best message editing without functional impairment (Arantes & M, 2017).

Aesthetic assessment of the face

- **Medical history:**

Medical consultation aimed at aesthetic purposes has peculiarities that differentiate it from traditional medical consultation. Many of the treatments offered and the aspects involved are aimed at conditions that are not pathological, but that create discomfort for the patient and, in certain cases, even influence the ability to socialize. Aesthetic procedures can produce numerous benefits, which go beyond improving physical appearance. Its potential to increase self-esteem and self-confidence reflects on the patient's psychological well-being and quality of life. The key to the success of any treatment, be it aesthetic or

not, is clinical assessment. In this way, the systematic approach to propaedeutics applied to facial aesthetics aims to support and guide the assessment (Arantes & M, 2017).

Prior to the facial assessment, the patient must fill out a medical history form. Continuous use medications and medical conditions that may influence treatment should be investigated. A questionnaire about the history of previously performed aesthetic procedures should also be completed. This will help during the assessment of the face, as the patient's baseline state may have been altered transiently or surgically (Arantes & M, 2017).

- **Facial analysis:**

The facial assessment stage must be performed thoroughly. in this phase, it is possible to evaluate the patient's complaint, dysfunctions and changes present. Facial assessment is performed in two views: frontal and profile. The frontal assessment includes the assessment of bilateral symmetry and the proportion between the upper, middle and lower thirds. While the profile covers the assessment of deficiency or prominence of facial structures (Fitzgerald et al., 2010).

Frontal assessment: The ideal face can be divided into two equal parts by a median vertical line that crosses the midpoint of the glabella, the tip of the nose, the philtrum of the lips and the chin (Figure 4). However, we are unlikely to find a perfectly symmetrical face. During bilateral assessment, the size proportion between the structures and their position in relation to the midline must be examined. It is desired that the two parts are balanced and that structures present the minimum lateral deviation. The existence of a small degree of asymmetry is very common in the majority of individuals, however, this degree of asymmetry should not compromise facial aesthetics (Liu et al., 2014).

Figure 4: Analysis of bilateral symmetry.

Source: Author's own.

For a pleasing frontal proportion, the width of the nasal alar base should be approximately equal to the intercanthal distance, while the width of the mouth should approximate the distance between the margins of the iris. This relationship is called transversal facial proportion or rule of fifths. This is a convenient and practical guideline for analyzing the transverse facial proportional relationships. According to this rule, the face can be divided into five equal parts by horizontal lines (Fitzgerald et al., 2010; Remmelink & Kuijpers-Jagtman, 2000).

- Thirds of the face: Facial harmony is based on balancing the upper, middle and lower thirds. When its vertical dimensions are approximately equal, the face is considered balanced, harmonious and aesthetic on its axis.

Upper third: The upper third of the face corresponds to the area delimited between the hair implantation line and the eyebrow region. As it begins in this region, it is highly variable and dependent on the hairstyle. In a patient with a receding hairline, this point can be located by instructing the same patient to lift the eyebrow. The superior aspect of the contraction of the frontalis muscle indicates the position of the trichium (hairline). Furthermore, any possible abnormality should be assessed, more specifically in the temporal, frontal and eyebrow areas. Abnormalities in this third are generally associated with craniofacial syndromes (Dhaliwal, 2016; Calder et al., 2001).

The eyebrows play a fundamental role in facial harmony, having the enormous power to change expression. They must be evaluated regarding position and shape, taking into account that the original position and shape may have been altered by waxing or micropigmentation techniques and/or even arched through the application of botulinum toxin. The importance of evaluating pre-existing changes or asymmetries lies in the fact that, if not previously informed after the evaluation, the patient may later attribute them to the aesthetic procedure (Lam et al., 2015; Raphael et al., 2013; Yalcinkaya et al., 2016).

Middle third: The middle third begins below the eyebrows and limits itself below the subnasal region. This area includes the eyes, nose and malar regions.

In the eye region, the eyelids cover the largest exposed projection of the eyeball. The upper eyelid margin should overlap the upper limbus of the iris by up to 1 or 2 mm. There should be minimal or no exposure of the sclera between the lower palpebral margin and the lower limbus of the iris (Arantes & M, 2017).

The malar convexity is the framework of the face and, therefore, deserves a closer look during the evaluation. Malar assessment involves analysis of volume, contour and projection. The malar region has a prominent anterior projection. The well-defined volume and contour of the malar region are associated with a youthful appearance (Marianetti et al., 2015; Levesque & de, 2015).

Due to its central location on the face and prominence, the nose plays an important role in facial aesthetics and harmony. In the frontal view, the medial alignment of the dorsum and tip of the nose must be assessed (Woodard & Park, 2010; Mukherjee & Nair, 2012).

Lower third: The lower third is limited between the subnasal region and the chin or gnathion. The closer the vertical values of the lower and middle thirds are, the greater facial aesthetic balance there will be. The lower third can be further subdivided into another three thirds, with the upper lip comprising the first third, the lower lip the second, and the chin comprising the third (Arantes & M, 2017).

Lips should be assessed at rest and while smiling. During rest, symmetry is common. However, if asymmetry is observed during smiling, it may be due to an intrinsic deformity of the lip, such as cleft lip, facial nerve dysfunction or skeletal-dental asymmetry. The thickness of the lips is directly influenced by the patient's age, gender and ethnic group. The lip volume is presented with one third corresponding to the upper lip and two thirds to the lower lip. The proportion of exposure of the upper lip mucosa in relation to the lower lip should be 1:1.6 (Arantes & M, 2017; Calder et al., 2001). Although the projection of the lips seems to be a simple concept, it is more complex and comprehensive due to its direct relationship with other structures. It is necessary to evaluate tooth exposure at rest and during smiling. The amount of upper incisor exposure at rest is a critical aesthetic parameter, because one of the inevitable characteristics of aging is decreased upper incisor exposure, at rest or smiling. Care must be taken in this regard because the effect of reducing incisor exposure results in an aged appearance to the patient (Weeden et al., 2001).

The chin, due to its inferior location, plays a huge role in the shape and length of the face. It must be assessed for its projection and shape. The chin must be in balance with the facial structure, which is why the patient's height and sex must be

taken into account. During the assessment the lips, labiomandibular groove depth, soft tissue thickness and bone relationship must be observed (Fitzgerald et al., 2010).

The mandible must be assessed for symmetry, contour and volume.

- Profile: The relationship between the structures that appear on the vertical axis of the face (front, nose, lips and chin) are best seen in profile. Harmonizing the profile allows the individual to have a more elegant and clear facial presentation. The profile assessment begins with the frontal projection and the supraorbital rim without excesses or deficiencies (Liu et al., 2014; Lam et al., 2015).

Continuing in the craniocaudal direction, the frontal region should be convex or slightly flat. The concavity that appears over time is mainly due to a deficiency in the middle third of the face. A flat nasal dorsum is also expected with a nasofacial angle that varies from 35 to 40, with the nasal apex facing upwards, the oval columella, and the nasolabial angle varying from 90 to 110 , which may undergo changes due to li, nasal or nasolabial changes. The nasolabial angle is a very important component of nasal aesthetics and can be greatly affected by changes in the rotation or projection of the tip. The ideal nose width at the base from wing to wing should be equal to the intercanthal distance. (Remmelink & Kuijpers-Jagtman, 2000) The nasal width/length proportion (from the nasion to the tip) should be approximately 0.7. In basilar view, the nostrils comprise two- thirds of the length of the columella and the tip occupies the remaining one-third (Arantes & M, 2017).

Finishing in the lower third, the upper lip must be projected around 2 mm from the subnasal point, which leaves the columella towards the chin, resting under the lower lip. The chin must follow the alignment of the nasal projection, which leaves the subnasal point. And with the adequacy of all the aforementioned structures, the definition of the cervico-facial contour becomes more evident (Arantes & M, 2017).

- Shadow areas and three-dimensional perception of the face:

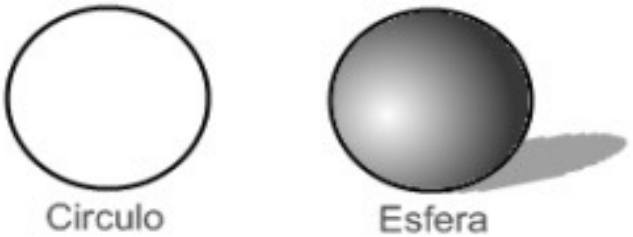
Light and shadow are key elements in visual language. The idea of volume, in visual perception, is related to the presence of light and shadow. Therefore, these terms can be used to describe the volumetric assessment of facial structures.

Light and shadow are elements that define and characterize the volume of the evaluated structure. In other words, light and shadow are the elements that ensure the three-dimensional shape of a structure (Arantes & M, 2017).

We can observe that, when a light source (natural or artificial) emits its rays onto an object, it will appear with a more illuminated area, and this region will be the one that is more projected than the less illuminated one. In the following example, it will be easy to understand how the perception of light and shadow characterizes volume, and makes a difference in the assessment of shape and volume (Arantes & M, 2017).

In Figure 5 we distinguish two objects with the same shape, size and proportion; however, one represents a circle and the other a sphere. The effect of light and shadow turned the circle into a sphere. The circle stopped being a two-dimensional element and became a three-dimensional element with volume and depth perception. The difference between the two objects is achieved in this case through the perception of light and shadow in the second image (Eco, 2015).

Figure 5: The effect of light and shadow turned the circle into a sphere.



Source: Author's own.

Working on the perception of light and shadow on the face will allow the physician to diagnose the most important signs of aging, those related to loss of structure. In other words, by evaluating light and shadow, we can recognize, in a three-dimensional way, facial changes related to volumetrics (Eco, 2015; Arantes & M, 2017).

Only by perceiving the light distribution will we be able to assess regions in need of volumization, which are shadow regions. After treatment, their projection will appear brighter and therefore more projected. Understanding the importance of structural examination of the face guided by light perception will allow us to relate the loss of volume not only in the region of the patient's complaint, but in all adjacent structures that directly influence the perception of the shadow in the region to be subjected to the aesthetic procedure (Eco, 2015; Arantes & M, 2017).

The shadow zone is the part deprived of light. This is the least designed region and has the smallest volume. The figure below (Figure 6) illustrates the appearance of shadow areas throughout the aging process (Eco, 2015; Arantes & M, 2017).

Figure 6: The aging process.

Source: Author's own.

- Photodocumentation:

There is no successful treatment without a well-performed assessment. Photographic records should reflect this approach in order to facilitate a complete three-dimensional assessment of the patient's aesthetic appearance before and after the treatment. Photodocumentation is not only a good source of monitoring the treatment progress over time, it also assists the doctor during the initial planning stage and assists the patient during the self-assessment process. These photographs can greatly improve the level of patient satisfaction, as many tend not to remember or at least not observe the treatment progress without recording them. For this reason, photography has become one of the main forms of legal documentation (Fernandez-Riveiro et al., 2003).

Some precautions must be observed during photographic taking in order to standardize this important stage. Some of these factors, whenever possible, should be controlled. The patient should be at the same height as the photographer. If there is a large difference between the height of the patient and the photographer, the photographic shots can be taken with both of them sitting on height-adjustable chairs (Kuhnel & Wolf, 2005; Sommer & Mendelsohn, 2004). The same camera and the same settings mode must be used in all consultations. The patient must always be photographed with the same background, preferably dark. Image framing must be standardized for all follow-up photos of the same patient. It is recommended that the framing is limited inferiorly to the sternoclavicular region and superiorly to the top of the head. The patient's head should be positioned so that the Frankfort horizontal plane is parallel to the ground and the edges of the photograph, and the midsagittal plane should be perpendicular to the ground and parallel to the vertical edges of the photograph. Ears must be uncovered and unadorned, and hair must be tied up (Shah et al., 2005).

- Informed consent form:

Obtaining informed consent is an incredibly important aspect of any medical procedure. It is an ethical responsibility and a legal obligation to be fulfilled before any intervention procedure. After communication between the doctor and the patient, the patient must understand and agree with the specific medical intervention to which they will be subjected. The doctor must guide the patient using easy-to-understand terms, and must offer alternative treatments. The patient must be given the opportunity to ask questions that allow them to better understand the procedures (Armstrong et al., 1997).

The patient must attest to his or her understanding and consent before beginning therapy. Proof of his or her understanding is obtained by signing a form highlighting the key aspects of what was proposed. A written consent form is a legal document that includes the name and signature of the patient and doctor, as well as the date of signature. The term must include the medical procedure to be performed, its benefits and possible risks of the procedure. The most commonly expected side effects must also be listed (Armstrong et al., 1997).

Myomodulation

As the name suggests, it is the act of modulating the muscles, that is, facilitating or hindering or even modifying a movement by acting on its own structure or on adjacent tissues.

Aging itself, due to the loss of support structures such as bone, muscle and fat and even sagging skin, contributes to the myomodulation that happens over the years (de, 2018).

Deficits in the facial structure can produce abnormal muscle action reflected in the skin and throughout the face. When structural support is absent or lost, muscular action is changed, affecting the balance in activity between muscles. Examining the interactions between facial structure and muscle movement, and recognizing unbalanced action in muscle synergists and antagonists, allows the clinician to understand the effects on appearance both at rest and in movement. The use of myomodulation can address muscular movement with botulinum toxin, injectable fillers, bio-stimulators, technologies such as microfocused ultrasound and cryolipolysis help in the treatment of facial structural deficiencies. This remodeling can be used to support muscle movement or block excessive action to essentially preserve function and also to work on form in order to edit the final message to achieve the desired purpose (Arantes & M, 2017; de, 2018).

Botulinum toxin

- **Action mechanism:**

Botulinum toxin is capable of denervation by selectively reducing muscle contraction, causing a transient state of paralysis, through a mechanism of adhesion to the synaptosomal protein (SNAP-25) and inhibition of the release of acetylcholine at the neuromuscular junction (Botox, 2014).

The drug's inhibition mechanism comprises three distinct processes. Initially, the toxin binds to specific receptors on presynaptic neurons in the plane of the neuromuscular junction. Internalization or penetration into the specific receptor then occurs. Finally, there is the inhibition of acetylcholine release. The effects of weakening and paralysis of striated muscles appear around the 2nd or 3rd day after the injection, remaining, depending on the dose applied and the muscle treated, for an approximate period of 3 to 4 months (Botox, 2014).

Treatment with botulinum toxin is contraindicated in the presence of local infection, impaired healing and in case of hypersensitivity to the ingredients contained in the formulation, including albumin. Use extreme caution when treating patients with neuromuscular diseases, including myasthenia gravis, Eaton-Lambert syndrome, or amyotrophic lateral sclerosis (or Lou Gehrig's disease). Aminoglycosides, if administered concomitantly, such as gentamicin, streptomycin and/or other agents such as quinidine, may interfere with neuromuscular transmission and enhance the effect of botulinum toxin. Although there is no

available data that defines the degree of risk, the treatment of pregnant or breastfeeding women is contraindicated (Botox, 2014; Carruthers, 2013; Klein, 2003).

Despite the contraindications and precautions, the use of botulinum toxin is safe and effective for many therapeutic and cosmetic indications. It is a simple technique, with a short treatment time and which results in great patient satisfaction. Its lasting clinical effect is relatively short, compared to other aesthetic procedures. Although repeated treatment may cause cumulative effects that extend the duration of overall effectiveness, it is generally necessary to repeat the treatment every 3-4 months (Carruthers, 2013).

It is important to highlight that the duration of the aesthetic effect of chemical denervation depends mainly on the dermal- muscular distance, that is, the more tissue volume and the more structured the surface covering the treated muscle, the greater the durability and aesthetic gain from the treatment. In this way, we understand that aging and the reduction of structures adjacent to the treated muscle cause a decrease in the duration of the aesthetic effect, as minimal muscle activity becomes evident more briefly (Carruthers, 2013).

- **Anatomy:**

It is impossible to perform a precise treatment using botulinum toxin without solid anatomical knowledge. To achieve this, it is necessary to assess in detail the anatomy of the muscles relevant to each region to be treated, as well as the adjacent structures

(vessels and nerves). To achieve successful treatment, it is necessary to consider the anatomical variations and individuality of each patient. In addition to assessing which muscles are dominant during facial expression, it is necessary to discern which portions within the same muscle are characteristically stronger. Therefore, knowing the location, origin, insertion and function of the different muscles is not enough, it is essential to understand the functional anatomy (Kahn et al., 2000; Le, 2016; Polselli & Saban, 2006).

- **Assessment:**

It is essential to minimize the risk of patient dissatisfaction, assessment and understanding of the patient's desire for treatment are essential for success. To this end, all patients must be aware of the duration of treatment results and the potential undesirable effects that may occur immediately or delayed after filler treatment (Arantes & M, 2017).

It is key to give the patient a realistic understanding of what can be achieved with their treatment. It should be noted to the patient that botulinum toxin causes improvement in dynamic facial rhytids caused by underlying muscle contraction. However, treatment alone will not provide significant improvement in areas with loss of secondary skin or volumetric elasticity. Therefore, in this case, a multifactorial approach that includes filler treatment may be recommended to meet the patient's expectations (Arantes & M, 2017).

Before initiating treatment, it is essential to carefully assess the patient. A review of the medical history must be performed, which includes checking continuous medication use, allergies, aesthetic procedures and plastic surgeries previously performed, as well as satisfaction with the results obtained. In order to minimize the risk of edema and bruising, patients can be advised, if clinically possible, to discontinue the use of acetylsalicylic acid, vitamin E and non-steroidal anti-inflammatory agents one week before treatment (Botox, 2014).

It is important that the patient's skin has been clean and that there is no makeup of any kind or even sunscreen. The facial examination must be performed with the patient holding a mirror. This way, any pre-existing changes and asymmetries can be discussed, photographed before treatment and documented in the patient's medical record. The medical record must contain a specific location for details of the procedure that will be performed, as well as illustrative figures that allow marking

of points, units and volume injected for the treatment of each area (Arantes & M, 2017).

Achieving a natural and relaxed appearance, rather than causing complete paralysis, is key. It is necessary to critically analyze and discuss with the patient the need to maintain a balance between areas where there is complete absence of movement and areas where it is necessary to maintain a certain level of movement. The ideal aesthetic effect is the one capable of causing a reduction in muscle contraction without compromising facial expression.

- **Procedure Steps:**

The patient must be positioned seated and slightly reclined. The delimitation of the treatment area and the marking of injection points should be based on the patient's functional anatomy. Therefore, it will be necessary to ask the patient to alternate between a relaxed state and one of muscle contraction by performing different facial expressions. It is during this step that functional anatomy is assessed and, through this, treatment is individualized. The dominance of a muscle group or specific muscle is determined, as well as the dominant portions within the same muscle. This way, the strongest portions of the muscle will be demarcated, not the rhytids. This will not only influence the definition of injection points, but also the number of units that will be injected. Based on this understanding, male patients, as they have greater strength and muscle mass, may generally require a higher dose (Arantes & M, 2017).

The injection must be performed perpendicular to the skin, in the area of maximum contraction and within the muscle. However, in superficial muscles where the skin is thin, such as around the eyes and lips, the injection made superficially in the intradermal plane is sufficient to spread the botulinum toxin into the target muscle. The injection must be carried out with minimum and constant pressure on the plunger. If resistance is observed, remove the needle completely and check whether the needle needs to be replaced. Avoid direct contact between the needle and the periosteum, as the sensation is painful and will certainly cause the needle to lose its edge, causing greater discomfort to the patient in subsequent applications. For this same purpose, it is recommended to change the needle after a certain number of applications (Arantes & M, 2017).

- **Local anesthesia:**

Normally, local or block anesthesia is not necessary. However, the use of topical anesthetic before treatment is capable of promoting greater patient well-being during the procedure. For this purpose, it is recommended to pre-apply a topical anesthetic such as, for example, BLT, which is composed of 20% benzocaine, 6% lidocaine and 4% tetracaine, for a period of 15-20 minutes. BLT is considered one of the most potent topical anesthetics and has rapid action, however, if the patient has a history of sensitivity to any of the components of the formulation, another anesthetic option must be assessed (Sutton & Hanke, 2023).

- **Treatment areas:**

1. **Glabella:**

Contraction of the muscles of the glabellar complex results in the appearance of glabellar rhytids. The expression of feelings of worry, fatigue, stress and anger are related to the frowning of the glabellar region. The botulinum toxin approach to the glabellar complex produces a decrease in muscle strength, which results in softening of the skin in this region and promotes a rested and youthful appearance (Carruthers & Carruthers, 1992).

In terms of anatomy, the glabellar area works from a complex of interrelated muscles, which act collectively due to their function and anatomical location. This complex comprises the corrugator muscle of the eyebrow, depressor muscle of the eyebrow, and the procerus muscle. All of these muscles act as depressors of the eyebrow, more specifically the corrugator and depressor moving the eyebrow downwards and medially, while the procerus depresses the forehead medially. The corrugator of

the eyebrow is located obliquely under the frontal bone, originates in the nasal region of the frontal bone and is inserted into the middle third of the eyebrow. The procerus originates on the nasal bone, vertically extending to insert into the skin of the glabella where its fibers interconnect with the frontal bone in the region between the eyebrows. Lateral to the procerus and medial to the orbicularis of the eye, the depressor of the eyebrow originates in the bony process of the region of the median corner, runs obliquely and inserts into the skin of the medial region of the eyebrow (Arantes & M, 2017).

The patient must be instructed to contract their eyebrows as if they were nervous, alternating between a relaxed and mime state. During this process, it is possible to evaluate dynamic and static rhytids, in addition to observing whether there is simultaneous contraction of the frontal muscle and the glabellar complex. In some patients, contraction of the frontalis muscle contributes to the formation of glabellar rhytids and combined treatment of the frontalis is necessary in these cases. In this step, the choice of appropriate injection sites should be guided by the strongest portions of the glabellar complex muscles. This identification must be done when stimulating muscle contraction and relaxation in the proposed area. In the case of the glabella, when contracting the eyebrows, the corrugator muscle will become more evident, with its head being more medial and the tail being more lateral, which can be delimited to facilitate application to the muscle (Arantes & M, 2017).

The injection sites must be positioned within a safety zone, which must be delimited laterally to the vertical line of the limbus and at least 1 cm above the supraorbital margin, extending towards 1 cm above the glabellar prominence. Clamping the corrugator muscle between the thumb and index finger with the other hand helps to isolate the muscle and allows concomitant palpation of the supraorbital bone crest. Holding the procerus in a similar way across the upper nasal bridge also helps (Figure 7) (Carruthers et al., 2007).

Figure 7: Dynamic frown lines with glabellar complex muscle contraction.

Source: Created by the Authors.

It is normal during glabella treatment, due to the proximity of the frontal muscle, for toxin to diffuse to some of its inferior- medial fibers. This damage to the elevation of the eyebrow by the inferomedial fribras can cause compensatory hyperactivity of the superior and lateral fibers of the frontal, resulting in increased muscle tone and elevation of the lateral portion of the eyebrow (Arantes & M, 2017; Carruthers et al., 2007).

2. Forehead:

The horizontal rhytids of the forehead that appear during contraction of the frontalis muscle can be softened by the action of botulinum toxin. In addition to being responsible for raising the eyebrows, the frontal has an intimate anatomical and functional relationship with the muscles of the glabellar complex and the orbicularis of the eye. Understanding this interaction is essential for treatment with botulinum toxin. The focus of forehead treatment is muscle strength and not just rhytids. A patient

with many wrinkles on the forehead with a short lower third, if too much TB is applied, it will leave the upper third in disharmony with the other thirds (Prager et al., 2012; Hotta, 2016).

Another observation is a patient with light and dark hair. Those with light hair will perceive the forehead to enlarge and those with dark hair will decrease.

With regard to anatomy, the frontal muscle presents significant anatomical variations between individuals. Commonly, it is formed by a single thin band that covers the entire forehead or made up of two portions separated by a thin fascial component in the middle region of the forehead that give the muscle a "V" shape. The vertical orientation of the fibers of the forehead muscle allows it to act as a brow elevator. In the upper portion, the forehead muscle is in continuity with the galea aponeurosis of the scalp. Inferiorly, it is inserted into the skin of the eyebrow. The temporal fusion line limits the frontalis muscle laterally (Hotta, 2016).

The patient must be instructed to raise the eyebrows as much as possible and then return to a resting state. The action must be repeated while identifying the margins of the frontal muscle and observing the strongest portions of the muscle. The safety zone for application in the forehead region is delimited laterally by lines vertical to the limbus and inferiorly by the area 3 cm above the supraorbital margin (Hotta, 2016).

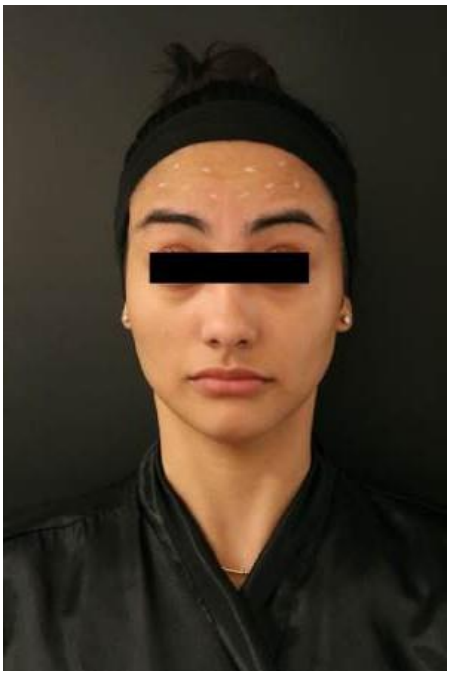
The elimination of all rhytids on the forehead can increase the extension of this area and neutralize the contraction of the frontalis muscle, which is necessary for the intrinsic elevation of the eyebrow and can prevent tissue drooping.

In women, avoid injections close to the plane of temporal fusion, as this allows the residual fibers to pull the eyebrow upwards, preserving an intrinsic degree of elevation of the lateral portion of the eyebrow. The "V" shaped application pattern reduces the action of botulinum toxin on the lateral portion of the frontal muscle and helps preserve the eyebrow arch with elevation of the lateral portion. A straighter eyebrow shape can be obtained by injecting in a more inferior direction, in the lateral portion of the forehead. Men generally have straighter eyebrows, less arched, so we tend to inject horizontally to the forehead in men and in a "V" shape in women (Hotta, 2016).

In patients with a wide or high forehead, adjustments need to be made taking into account the functional anatomy. Patients with a high forehead may require a second series of injections above the first ones. Patients with a wide forehead may require more lateral injections to compensate for their size. If the injections are not applied laterally, it will cause hyperactivity of the upper and lateral fibers, which in some cases, results in elevation of the lateral portion of the eyebrow and an unsightly appearance.

Forehead treatment must be performed in conjunction with treatment of the glabellar complex. Otherwise, the eyebrow will fall out (Figure 8) (Hotta, 2016).

Figure 8: Maximum frontal contraction.



Source: Created by the Authors.

3. Periorbital rhytids:

Although the ability to close the eyes is the main function of the orbiculator of the eye, its contraction also occurs during smiling. The application of botulinum toxin to the orbicularis muscle of the eye aims to minimize the formation of rhytids caused by its contraction. However, during smiling, the tissue volume displaced by the contraction of the upper lip elevator muscles may also cause the formation of periorbital rhytids. Regarding anatomy, the orbiculator of the eye is a thin and superficial muscle that surrounds the eyes, which has a sphincter action. It is made up of the palpebral and orbital portion. The palpebral portion covers the eyes when at rest, while the orbital portion surrounds the supra- and infraorbital margin. All portions act on the main function of closing the eyes. The palpebral portion closes the eyelid, either voluntarily or as a blinking reflex. However, the orbital portion is under voluntary control. Its portions situated below the lateral portion of the eyebrow function as depressors. The portions superior and lateral to the pupil intensify medial traction. It is this portion responsible for the patient's ability to frown even after adequate injections into the glabellar complex (Flynn et al., 2001).

Dynamic evaluations with muscle contraction must be performed using facial expressions such as a forced smile and tight eye closure. It is important to ask the patient to alternate between these facial movements, to help define the functional anatomy in this area. The pattern of rhytids formed helps differentiate the stronger portions. In the majority of patients, the complete rhytid pattern is observed. These patients exhibit rhytids from below the lateral portion of the eyebrow, on the upper eyelid, lateral corner, and on the lower eyelid to its junction with the upper portion of the zygomatic arch. However, the other patterns (top, central and bottom) are found less frequently (Figure 9) (Hui & Lee, 2007).

Figure 9: Marking the orbicular rim oculi.

Source: Created by the Authors.

Injections should be applied at least approximately 1.5 to 2 cm to the lateral corner of the orbital edge to avoid inadvertent diffusion to the ocular muscles. As the orbicularis muscle of the eye is very superficial, injections must be applied as intradermal papules.

Do not approach the zygomatic arch as this may cause dispersion, compromising the zygomaticus major and minor muscles, limiting the ability to lift the corner of the mouth and lips (Flynn et al., 2001).

Caution is recommended when treating patients with a previous history of lower eyelid surgery or resurfacing, as they may present with lagophthalmos, excessive visible sclera, or ectropion, which may contraindicate treatment with botulinum toxin. Refractive surgery should be taken into account in the medical history, as these patients have greater eye dryness (Hui & Lee, 2007).

The elasticity of the lower eyelids should be assessed using the snap test, squeezing the skin of the lower eyelid between the thumb and forefinger, gently pulling and releasing it. Rapid return suggests normal function of the orbicularis muscle and little risk of treatment being performed. If the skin returns slowly and the skin position only returns to normal after the patient blinks, it means that the lower eyelid does not have sufficient elasticity and treatment is not indicated (Arantes & M, 2017).

Infraorbital pockets are soft tissue volumes that are visible at rest. Pockets are generally the result of increased volume of infraorbital fat and weakening of the inferior orbital septum. The orbicularis muscle of the eye also helps support the septum and its weakening also contributes to the enlargement of the pocket. Therefore, treatment should be avoided in these patients as the toxin will further reduce the capacity of the orbicularis muscle (Hui & Lee, 2007).

4. Eyebrow lift:

The action of botulinum toxin on the superior lateral portion of the orbicularis muscle of the eye has the function of elevating the lateral portion of the eyebrow (Huang et al., 2000).

The patient must be instructed to close the eyes tightly and then return to the resting state. Assessment of the eyebrow is performed with the forehead muscle at rest.

Apply at least 1 cm below the infraorbital rim, below the orbital margin and lateral to the limbus line. In the lifting procedure, the toxin is applied intramuscularly. The lower fibers of the forehead muscle insert into the muscle in the upper part of the orbicularis oculi, so injection in a position above the safety zone can involve the forehead muscle, resulting in ptosis of the eyebrow (Figure 10) (Huang et al., 2000).

Figure 10: Eyebrow lift technique.

Source: Created by the Authors.

Patients with severe dermatochalasia and excessive folds, or with significant eyelid ptosis may require surgical interventions such as blepharoplasty and forehead lifting (Huang et al., 2000).

Combined treatments contribute as adjuvants to the beneficial effect induced by botulinum toxin in the reduction of rhytids. Areas that experience loss of volume are often regions with intense muscle activity. The ideal approach would be to combine volumization of this region and denervation of the muscles to optimize patient results. Furthermore, it is observed that the durability of the filler is greater when used in conjunction with botulinum toxin (Huang et al., 2000).

5. Nasal rhytids:

Nasal rhytids result from contraction of the nasal muscle. Generally, they make up facial expressions that involve the muscles of the glabellar complex, orbicularis and the lip elevators. For this reason, they can be accentuated after treatment for glabellar and periorbicular wrinkles (Yi et al., 2022).

Regarding anatomy, the nasal muscle originates in the maxilla, and its fibers cross the nasal dorsum and cross in the midline of the nasal bridge aponeurosis, which is continuous with the procerus aponeurosis. Other muscles also contribute to the formation of nasal rhytids, but due to their function they should not be treated. They are the elevator muscle of the upper lip and ala nasis, the zygomaticus major and minor, and the orbiculator of the eye (Yi et al., 2022).

Instruct the patient to force a smile, pretend to be crying, pretend to smell an unpleasant smell, close his/her eyes tightly. Nasal rhytids form on the lateral and dorsal parts of the nose, normally following a diagonal course across the nasal walls and nasal bridge. The transverse lines that run along the nasal root are not related to the nasal muscle, but rather to the contraction of

the procerus muscle. After the static and dynamic assessment, the injection points can be marked on the lateral nasals and another point can be marked on the midline. Botulinum toxin is administered intramuscularly for the treatment of nasal rhytids. Injections are carried out with the nasal muscle contracted (Yi et al., 2022).

If applied too laterally and inferiorly, it can involve the upper lip lifter muscle and the nasal ala, causing everything from ptosis of the upper lip to asymmetry of the smile. If lateral and superior, it can involve the orbicularis of the eye in the medial portion of the eyelid, causing epiphora (excessive tearing) - (Figure 11) (Yi et al., 2022).

Figure 11: Nasal rhytids.

Source: Created by the Authors.

It is important to ask the patient to smile and see gingival exposure. If it is greater than or equal to 2mm, you can do it because even reaching the upper lip elevator muscle, the smile will lower, but it will not be unaesthetic (Yi et al., 2022).

4. Conclusion

FB is an innovative aesthetic treatment technique, which aims not only at aesthetic benefits, but also at the absence of functional impairment in the short and long term. Myomodulation occurs with the normal aging process due to the loss of bone and muscle structures, subcutaneous tissue and sagging skin with the loss of collagen and elastin fibers. All of this generates a rearrangement of structures that culminates in the formation of furrows, wrinkles, falling of the nose, alteration of the smile culminating in the loss of the aesthetic harmony of the face.

The Functional Beauty technique can minimize these changes caused over time and remodel structures so that the function is maintained, even improved and also brings aesthetic benefits.

It is not a technique that only treats defects and wrinkles. On the contrary, through the concept of the message, which is the fourth principle, it is possible to generate change in the patient so that he can, through his expression of beauty, show who he truly wants to be and show himself to society and his social group, expanding his sensation. of well-being and self-recognition

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