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3S TECHNIQUE ASSOCIATED WITH SUSPENSION OF SMAS DUE TO TEMPORAL ACCESS

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Abstract: The interest in minimally invasive aesthetic procedures performed in an outpatient setting has increased considerably in recent years, due to the low risk of complications, the possibility of returning to work activities and the improvement in self-esteem with the rejuvenation of the face that has suffered from ptosis over the years. This work aims to demonstrate the association of two techniques of tissue repositioning and face restructuring: SMAS suspension by temporal access and the 3S technique of verticalization of the face. For this study, a 72-year-old female patient, who had never undergone any aesthetic procedure before, who wanted an improvement in her appearance without the need for surgical intervention, was selected. Their immediate degree of satisfaction was achieved, demonstrating that this procedure is an alternative for rejuvenating the face, in a natural, safer way and with a short recovery period.
Keywords: Face suspension. Suspension with suture threads. Face lift.

INTRODUCTION

Signs of facial aging, such as wrinkles and folds, changes in skin color and texture, as well as unbalanced distribution of soft tissues, can have deleterious psychological, emotional and social effects, altering self-perception and the way individuals are seen by others. This can affect interpersonal relationships, influencing perceived personality characteristics or traits, or contributing to misprojected emotions (eg, anger, tiredness, or sadness) that do not reflect the individual's true feelings.

A youthful face, commonly defined as a blend of harmonious, symmetrical and balanced features, is likely to convey more positive feelings. Therefore, a successful facial aging treatment that achieves attractive, natural-looking results can have a substantial positive impact on an individual's self-image and how he is perceived by those with whom he interacts socially.

Knowledge about the etiology of facial aging changes has evolved considerably, advancing from a simple focus on ptosis and skin laxity to a growing understanding that aging is a complex, dynamic and integrated process that involves all layers of the facial anatomy (SWIFT et al., 2020). Therefore, mastering three-dimensional changes during the chronology of aging allows for a more precise therapeutic approach, providing natural and appropriate results for each patient (BASILE et al., 2019).

Although the surgical facelift is considered the gold standard in facial rejuvenation, the search for minimally invasive procedures has been gaining popularity in recent years (TONG; RIEDER, 2019). Patients are increasingly looking for less invasive treatment alternatives, with low morbidity, quick recovery, performed in an outpatient setting, under local anesthesia, that meet their needs and can return almost immediately to their activities, and are willing to negotiate a more modest degree of aesthetic improvement in return. The use of suspension procedures with threads on the face is not recent, but the use of these techniques associated with botulinum toxin and fillers can lead to results very close to those obtained by classic surgical treatments, without very expressive changes, since today each search is more and more natural results where rejuvenation does not alter the patient's features

CASE REPORT – 3S FACE VERTICALIZATION TECHNIQUE ASSOCIATED WITH SMAS SUSPENSION WITH TEMPORAL ACCESS

Patient MES, 69 years old, female, presented as her main complaint an aged face, with a tired appearance, wanting a natural facial

rejuvenation, without changing her features. After facial analysis, a large tissue ptosis was found, involving all thirds of the face, with very evident grooves and lines, maxillary deficiency resulting in deep dark circles, prominent jowls, lack of mandibular contour.

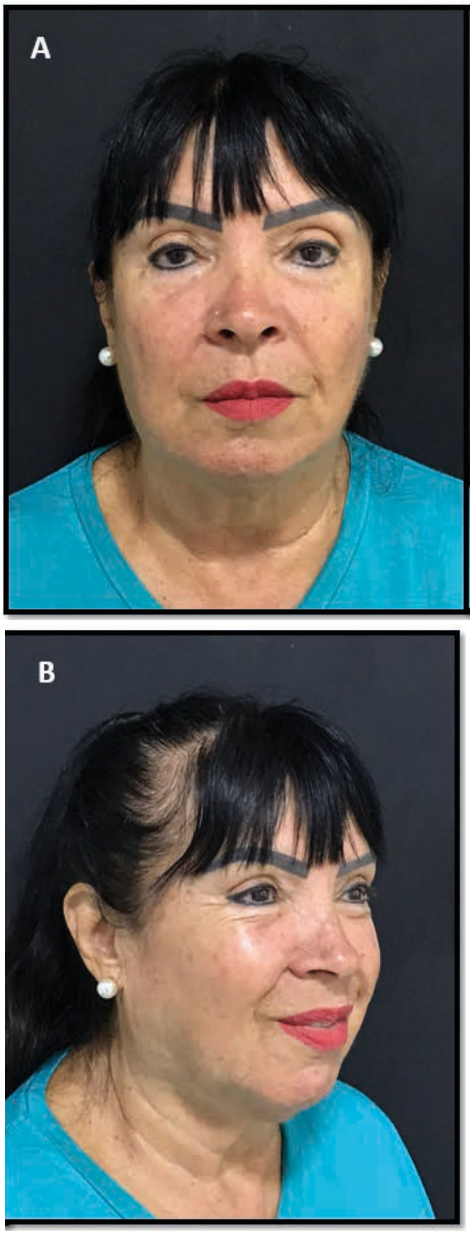

Figure 1 – Initial frontal photographs (A) and initial 45 degrees (B).

Source: The authors.

According to the 3S Philosophy of Verticalization of the Face, in order to achieve the facial harmonization desired by the patient, botulinum toxin (TXB) was first applied, which is necessary prior to face suspension procedures with absorbable threads. Initially, the application of full face TXB was performed including the muscles: Frontal, orbicularis oculi, corrugator supercilium, procerus, nasal, oral angle depressor, sternocleidomastoid, platysma, and also the muscles of mastication: Masseter and temporal, relaxing the entire the facial musculature and enabling better integration of PDO and polyglycolic acid threads to the tissues in their lifting effect. The TXB used was Xeomin (Merz) in 1:1 reconstitution. It is essential to relax the depressor muscles of the face in this technique, so that the traction provided by the absorbable threads used is effective.

Therefore, the technique is performed on the medial and lateral platysmal bands, as well as on the base of the mandible ending in jowls, and on the sternocleidomastoid muscle, distributed in twelve points per hemiface with application of 1U (one unit) of botulinum toxin in the papule.

Figure 2 - Marking of botulinum toxin application points on the medial and lateral bands of the platysma muscle (C).

Source: The authors.

Then, 15 days after the application of TXB, in the suspension stage, the suspension of SMAS was started, where 2 threads of polyglycolic acid 2.0 were inserted on each side with surgical material appropriate for the technique, which consists of sterilizable needles in autoclave, with peculiar characteristics for carrying out the procedure, such as specific tips for each time the wire is passed, depending on the plane used, and a central hole for conducting the wire.

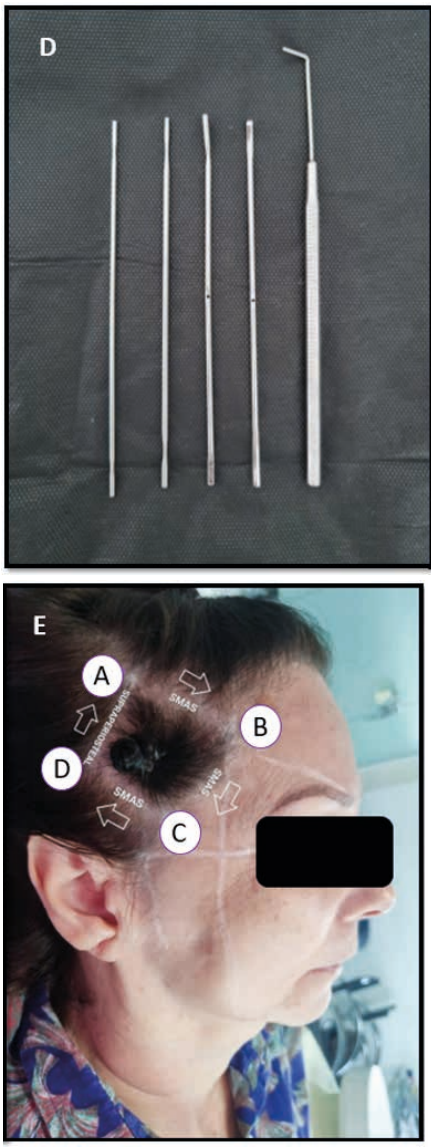

Figure 3 - Instrument used for the technique (D). Example of Marking for SMAS Suspension by temporal access (E).

Source: The authors.

After separating the hair in the temporal region, the suspension vector was identified, where we drew a line that goes from the beginning (head) of the eyebrow to the temporal eminence, defining point A at the site of greatest muscle contraction. Point B is marked on the hairline, tangent to that line. These two points (A, B) constitute the support of the suspension. To observe temporalis muscle contraction, we asked the patient to clench her teeth (biting with her mouth closed). Then, two other points are identified: C and D. We draw 3 lines that converge to the ear: From the corner of the eye, from the wing of the nose, from the corner of the mouth. On the hairline, we marked point C, with the greatest suspension of the face. Point D, anchorage, is marked in the direction of point A, also a little inwards. It is important to emphasize that these points must form a trapeze, to produce maximum suspension. Next, antisepsis was performed on the region with 2% chlorhexidine and 70% alcohol, followed by local anesthesia between the points with 2% lidocaine and vasoconstrictor. With the help of an 18 G needle (40 x 12), small holes are made in the marked places, which are then dilated with one of the blunt needles. The passage of the threads begins at point A, with a blunt needle, in SMAS, towards point B. At that moment, the needle is externalized.

Between points B and C, the blunt needle and the threads are also passed through SMAS, so that there is greater traction and elevation of the midface flap. Between points C and D, the wires continue to be passed, also through the SMAS, avoiding the superficial temporal artery, being exteriorized again. Finally, between points D and A, the needle is exchanged for a flat-tipped one, passed in a supra-osseous plane, serving as a reference for traction. During the passage of the threads, it is necessary to check if any hairs entered the orifice, in the path of the needle, so that

it can be removed, with specific instruments, thus avoiding the risk of infection and the appearance of granulomas in the postoperative period.

After the whole process, traction is performed to the point of greatest tissue progression, and 3 knots are tied. The result is obtained immediately. The same procedure is performed contralaterally. Vitamin A ointment, in the case of Hipoglós, is applied to each orifice, due to its excellent healing power. Usually, a certain elevation is reported in the hair area, which disappears within 40 days after the procedure, a period in which tissue accommodation occurs. The patient can return to their activities on the same day of the procedure. Although the ideal is to perform the 3S Technique 15 to 30 days after the temporal lifting procedure, in this case the PDO threads were inserted immediately. Four spiculated PDO threads 19 G, 100 mm, 160 mm from the Ithread brand were used on each side of the patient, at points one, two, three and four of the technique. The thread insertion plane is in the hypodermis, entering at 40 degrees and sliding at 10 degrees.

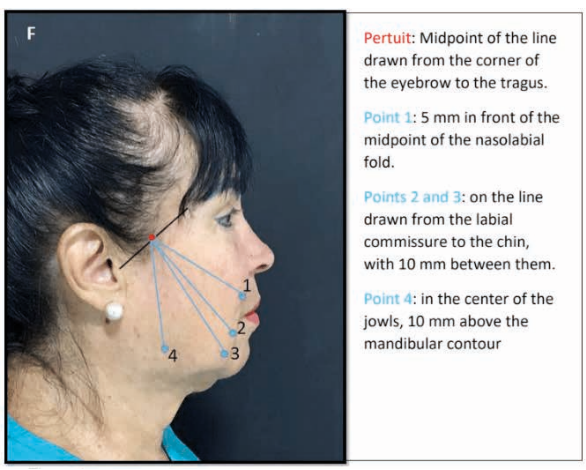

Figure 4 - Marking Spiked Wires: 3S Technique.

Source: The authors.

In the last step, support, performed after 26 days, two syringes of medium reticulation hyaluronic acid (HA) were used, with a syringe of Juvederm Volift (Allergan) being applied in the premaxilla region and a syringe of Juvederm Voluma (Allergan) in zygomatic, retroapplied with a 22 G cannula, according to the scheme below. At each point in the infraorbital region, 0.1 ml of HA was deposited. In each of the five lines of the zygomatic area, a retroapplication of 0.1 ml of HA was performed.

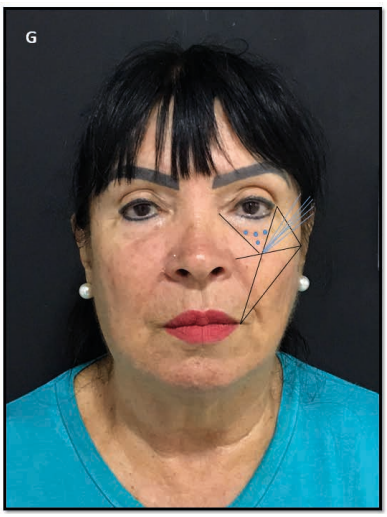

Figure 5 - AH marking: 3S technique.

Source: The authors.

DISCUSSION

Although this patient's signs of aging were quite evident, even because she had never undergone any aesthetic procedure, her expectations were met, especially with regard to facial rejuvenation and maintenance of her natural features. There were no intercurrences or complications that would justify any intervention. The patient followed all postoperative instructions, also performing lymphatic drainage, which contributed to the reduction of edema, avoiding any major discomfort.

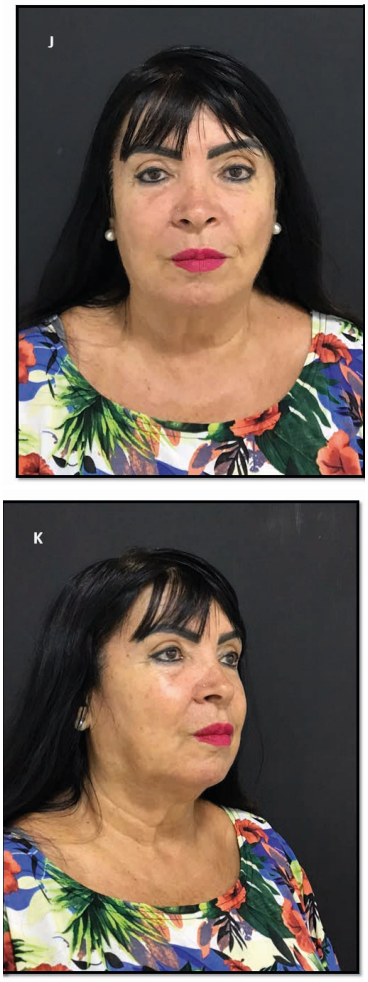

Figure 6 – Front end (J) and 45 degree end (K) photographs.

Source: The authors.

Intrinsic and extrinsic factors contribute to structural alterations of the face over the years, resulting in a tired and marked appearance. Facial aging is a composite, interrelated, three-dimensional process involving changes in bone, soft tissue, and skin. Each anatomical layer undergoes its own aging process, from the most superficial structures to the deepest layers. It is a complex and multifaceted process where a change in one layer often causes a cascade of changes in adjacent layers. (SWIFT et al., 2020) According to Cotofana et al. (2016), although facial aging occurs in all structures, the onset and speed at which it happens differs between each specific structure, between each individual and between different ethnic groups. Therefore, knowledge of age-related anatomy is crucial for the work of the professional who intends to restore a face. The face is made up of five different layers, joined together from the neck to the scalp. They are: Skin, subcutaneous fat, SMAS, hypodermis or deep fat and periosteum or deep fascia. However, it is worth noting that depending on the region, this organization does not exist this way, such as the infraorbital region, which has three layers, and the temporal region, consisting of nine layers. The facial musculoaponeurotic layer has gained prominence in recent years due to the possibilities of approaching it in surgical procedures of face lifting. This layer can be identified in the neck as the superficial cervical fascia and contains the platysma muscle. On the face, this layer is continuous with the superficial musculoaponeurotic system (SMAS) and has unique biomechanical and viscoelastic properties. Although traditional surgical procedures, such as the facelift, produce exceptional results when well indicated and performed, it is known that they are also associated with high cost, temporary absence from activities, in addition to the risks inherent to the procedure. Surgical interventions, however, are accompanied by possible complications, such as infection, skin necrosis, hematoma, seroma and injury to the frontal and marginal branches of the facial nerve, in addition to the risks involved in general anesthesia or even conscious sedation. They are also associated with visible scars and a long recovery time. (TAVARES et al., 2017) In this context, minimally invasive non-surgical procedures have been gaining notoriety in recent years due to the possibility of offering a quick recovery and being carried out in an outpatient environment under local anesthesia. However, even though they are considered to have low morbidity, knowledge

of the anatomy is crucial because the face is extremely innervated and vascularized. One of the most important regions is the temporal one, where we perform the SMAS suspension. The hairline is considered a landmark for the insertion and anchoring points of the hairline. However, in the region of the temples, the frontal branch of the superficial temporal artery (FBrSTA) is known to run in the layer of the superficial temporal fascia. The superficial temporal artery (STA) ascends between the tragus and the posterior root of the zygomatic arch and divides into an anterior frontal branch and a posterior parietal branch. The anterior frontal branch runs close to the hairline and, during the execution of the technique, vascular complications may occur. Also, the hairline varies between patients and there can be variations in the course of the arteries. Therefore, it is important to determine the relationship between the FBrSTA path and the insertion and anchor points.

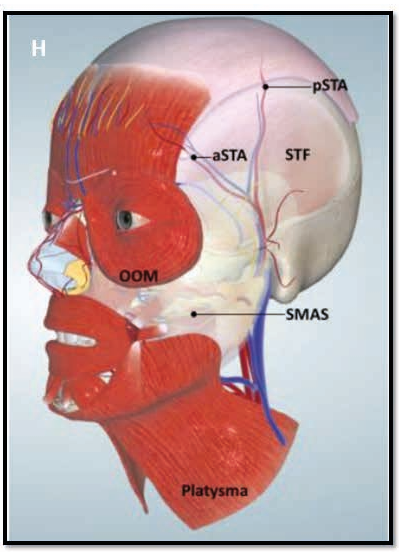

Figure 7- Path of the anterior (aSTA) and posterior (pSTA) branch of the superficial temporal artery below the temporal fascia (STF). Note that the superficial temporal fascia (STF) is a continuation of the superficial musculoaponeurotic system (SMAS), which is a continuation of the platysma.

Source: COTOFANA E LACHMAN, 2019.

A study by Won et al. (2019) with 50 patients undergoing facial suspension with PDO threads with temporal insertion, attempted to determine the relationship between FBrSTA and the hairline using surface Doppler ultrasound in real time. They checked whether the location of the FBrSTA was within the hairline, on the hairline, or on the anterior surface of the hairline. In 37 patients (74%), the FBrSTA pathway ran within the hairline. In 7 patients (14%), it ran exactly in the hairline area bilaterally. In 6 patients (12%), it ran on the cheeks anterior to the hairline. This way, the procedure becomes safer when done on or before the hairline. It is recognized, particularly in cosmetic facial surgery, that not only the skin but also the deep tissues become ptotic and also need to be tightened and repositioned. According to Cotofana and Lachman (2019), regardless of whether they are true or false, the main facial ligaments can be arranged in a single line located immediately lateral to the lateral orbital rim and extending from the temporal crest to the mandible. From superior to inferior, they are: Temporal ligament, lateral orbital ligament, zygomatic ligament and mandibular ligament. Among them, the zygomatic ligament proved to be biomechanically the most rigid, followed by the orbital and mandibular ligaments.

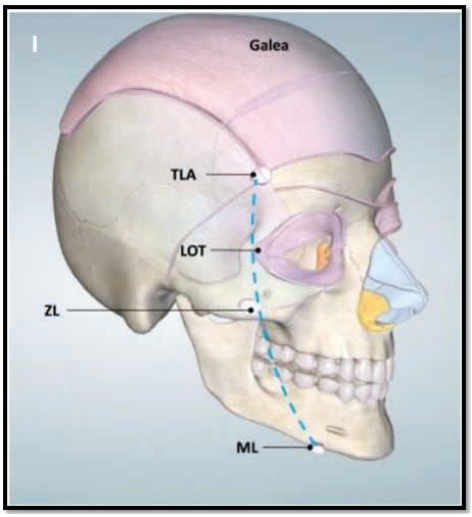

Figure 8- Line of ligaments.

Source: COTOFANA E LACHMAN, 2019.

In the midface (ie, medial to the line of ligaments) are the deep fat compartments of the midface. Surgically relevant spaces are found on the lateral medial aspect, for example, pre-masseteric spaces. It is of some clinical importance that injections medial to the line of ligaments result in projection of the overlying soft tissues, whereas injections lateral to this line lead to a lifting effect in more inferiorly located regions. This is a result of the oblique arrangement of the medial midface versus the parallel arrangement of the lateral midface. Suspension sutures are used in an attempt to reposition the ptotic tissue in its original position. Several articles describe its use, particularly for midface rejuvenation. Insertion of suspension sutures has become popular because it allows for tissue elevation from a distant incision. In many cases, the details of this technique are not described. According to Hudson et al. (2004), suspension sutures must be anchored to a strong and immovable tissue. Obviously, a relatively fixed point is needed as an abutment for suspension sutures. The deep temporal fascia is an example of relatively immovable tissue that can act as a suspension pillar for the lateral brow or midface. This tissue must also be strong enough that the suspension suture does not give out. This implies that the tissue has sufficient volume and turgor to support the tissue suspended below it. Another consideration is the importance of the technique used, where the lift vector must ideally be vertical to achieve maximum lift. Therefore, understanding and valuing the vectors applied to achieve optimal tissue elevation has improved results by repositioning ptotic soft tissues in a more anatomical vertical direction. An anatomical landmark commonly used by plastic surgeons as a guide for SMAS suspension is the zygomaticus major muscle, considering the vector parallel to its long axis. This provides a natural facial movement in the postoperative period. However, a study carried out by Alemi et al. (2020) in 200 hemifaces showed a great anatomical variety, also due to facial aging, where changes in soft tissues and bones modify the orientation of the origin and insertion of this muscle. A consideration also addressed in the work by Hudson et al. (2004) is about knots made at the end of the suspension: An extremely stable knot is required. Experience has shown that the double knot is not secure enough and that at least three consecutive knots are needed. The thread must also be cut 1mm from the knot, so that it does not unravel.

The most important component for the success of a suture suspension is tissue fibrosis, as it keeps the tissue suspended. Therefore, if scar tissue is not created, the repositioned tissue will not adhere and will slowly return to the preoperative position by gravity, mainly because the face is an area of extensive movement. Knowledge of the characteristics of the suture thread to be used in the face suspension technique is essential to minimize ischemia, excess wound tension and tissue injury. According to Byrne and Aly (2019), modern suture material must

have tensile strength, good handling, safe knot tying properties, and can be enhanced with an antibacterial agent to resist infection. Tensile strength is limited by suture size. The smallest suture size or diameter that will accomplish the purpose must be chosen to minimize tissue trauma and foreign body reaction within the tissues. Monofilament sutures have less resistance when passing through tissues, while multifilament sutures have greater tensile strength and flexibility, but greater tissue friction. The way in which a suture degrades influences the choice of material for internal use in deeper layers and for skin approximation. Absorbable sutures are typically made from mammalian collagen, which is digested by enzymes in the body, or synthetic polymers that undergo hydrolysis. Hydrolysis is a process in which water penetrates the suture threads, causing the breakdown of the polymeric structure of the filament. The balance between rapid absorption and maintenance of tensile strength is provided by treatments and chemical structuring, which prolong the absorption time. Absorbable sutures can be classified as natural (surgical bowel) or synthetic (polyglactin in its various forms, eg Coated Vicryl Polyglactin 910, Monocryl Poliglecaprone 25 and PDS II Polydioxanone). Normally, when a wound is closed with absorbable suture, the decrease in tensile strength in the first weeks occurs gradually and linearly. During this period, a leukocyte cellular response is mounted to remove cellular debris and physical suture material, and this process overlaps with the second stage, where most of the suture mass is lost. Any of these phases can be affected by infection and protein deficiency, where tensile strength is lost very quickly and wound dehiscence becomes clinically manifest. Hydrolysis produces a lesser degree of tissue reaction compared to the enzymatic degradation process. Although non-absorbable suture threads, such as nylon, have extremely high traction power, in this study we chose to use absorbable polyglycolic acid suture in the temporal lift, as it offers a lower risk of postoperative complications. PDO threads (polydioxanone) are absorbable and synthetic. Therefore, they undergo hydrolysis, triggering the production of fibroblasts, which in turn produce more collagen in the target area. When the thread is inserted, granulation tissue is produced and the different types of collagen found in human skin are formed. Type 1 and Type 3 collagen are created and end up playing a role in the tensile strength of the dermis. Myofibroblasts and fibroblasts are generated in this new granulation tissue. Myofibroblasts are related to wound contraction and healing and play a role in skin elasticity in the treated area and skin firmness as part of the regeneration process. Additionally, when spiked strands are used under the skin, they grip and pull loose areas of the face, creating better definition and contour. The formation of fibrous tissue will help the suture hold the ptotic tissue in place. The end result of loose tissue repositioning, myofibroblast and fibroblast generation, and neocollagenesis will impact skin texture, tone, pore size, and elasticity.

The 3S verticalization technique was developed with the aim of suspending, sustaining and smoothing the middle and lower thirds of the face, restructuring the tissues and restoring facial harmony. It is a set of non-surgical procedures involving the use of PDO threads and hyaluronic acid. Previously, TXB is applied to the platysma muscle, in the lateral and medial bands, in order to reduce the traction exerted by the muscle and favor the lifting effect achieved with the technique protocol. The functional assessment of the patient may also indicate the need to block the masticatory muscles. Fifteen days after the application of TXB, the

PDO threads are inserted in the region of the true ligaments of the face and the application of medium reticulation hyaluronic acid is carried out, restoring the volume lost by the action of aging, contributing to the support of the suspended tissues, making this the phase most important of the whole process, since it is what will sustain everything that was suspended. The smoothing of the lower third comes next, also done with hyaluronic acid, reducing creases and furrows produced over time. The 3S Philosophy of verticalization of the face aims at using different materials for different structures altered in the aging process, first reducing the peak of maximum force in the motor plate with the use of TXB, followed by suspending the face with absorbable threads and ending with acid hyaluronic acid, in small amounts, at strategic points, in order to restore the face naturally. The association of this technique with SMAS suspension by temporal access makes it possible to work in the temporal ligament region, contributing to the performance in another area, which is the upper third. This way, we are able to act throughout the entire face.

CONCLUSION

With the advancement of techniques and materials used, the future of facial rejuvenation is in a non-surgical way. Although it does not replace a surgical facelift, especially in complex treatments with a high degree of tissue ptosis, as in this case report, minimally invasive procedures are a good alternative to minimize the effects of facial aging, considering all its advantages, as described earlier in this work. Considering the complexity of the face and its anatomical structures, we must try to work with the union of materials according to the intended objective. In view of this, it is extremely necessary to train professionals to perform not only a detailed facial analysis for good treatment planning, but also to perform such procedures, since the SMAS suspension technique through temporal access requires advanced knowledge. in facial harmonization, as well as clinical experience, because even though it is considered minimally invasive, intercurrences may occur during the trans or postoperative period, which require any intervention and resolution, always seeking to provide the best type of support to the patient. As aging is a continuous process, it is worth mentioning that maintenance of facial suspension must be emphasized, advising the patient to return to the office periodically to carry out new applications of botulinum toxin, reinstallation of new PDO threads and fillings in strategic points, always seeking to maintain the restructuring of the face.

Figure 9 – Comparative photographs of the initial state (L), (N) and final state of treatment (M), (O).

Source: The authors.

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