

## DESCRIPTION OF CUSTOM THREAD IGM TECHNIQUE WITH USE OF PDO FACIAL SUPPORT THREADS IN THE OROFACIAL HARMONIZATION.

Gustavo Otoboni Molina<sup>1</sup>, Joze Fabiana Garcia Molina<sup>2</sup>, Sheila Soratto Zeferino Nandi<sup>3</sup>, Eduarda Braz<sup>4</sup>.

<sup>1</sup> Professor at the University of Southern Santa Catarina and Gustavo Molina Dental Institute. Tubarão, Santa Catarina, Brazil

<sup>2</sup> Professor at the Gustavo Molina Dental Institute. Tubarão, Santa Catarina, Brazil

<sup>3</sup> Professor at the Gustavo Molina Dental Institute. Tubarão, Santa Catarina, Brazil

<sup>4</sup> Professor at the Gustavo Molina Dental Institute. Tubarão, Santa Catarina, Brazil

CORRESPONDING AUTHOR: gomolina72@gmail.com

### ABSTRACT

The aim of this article was to describe a thread lifting procedure used for face lifting and skin rejuvenation, developed by the Doctor Molina Dental Institute (IGM, in the Portuguese acronym), termed "IGM custom thread technique" that has shown excellent results in facial tissue repositioning for facial harmonization. In this study, rather than presenting the results, we have described and discussed the proposed custom thread injection technique.

**KEYWORDS:** Collagen biostimulator. RFQ. Rhytidoplasty. Rejuvenation. Sutures.  
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### INTRODUCTION

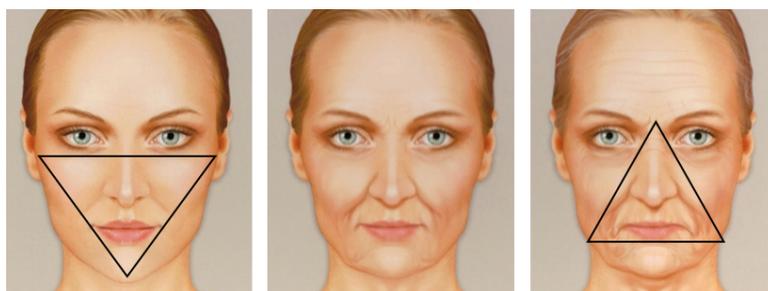
Currently, there is a growing tendency for patients to seek less invasive aesthetic procedures that would reduce risks and side effects in comparison to conventional surgeries. Noninvasive procedures present faster results and leave less scarring, thus delaying the aging process. Facial aging is mainly due to loss of volume, texture and elasticity of the tissues, which leads to wrinkles and lines on the skin. Several studies have been conducted, and minimally invasive clinical procedures have emerged in the last few decades to alleviate tissue

loosening, thus avoiding more invasive surgeries.<sup>1</sup>

Skin aging is caused by several factors, mainly due to the lack of collagen in the body, which naturally causes the emergence of wrinkles, creases, ptosis, and tissue atrophy<sup>2</sup>. The amount of skin collagen may indicate the person's chronological

age. The appearance and characteristics of the skin depend on the amount of dermal collagen and its structural organization. From the age 30 onwards, the production of protein is reported to decline at an annual rate of approximately 1%.<sup>2-4</sup>

Aging is an inevitable, progressive process, and the person's face serves as



**Figure 1.** Facial aging, face squaring with age. Source: Pimentel<sup>8</sup>



**Figure 2.** Custom Thread IGM Technique.

a mirror that reflects aging of the whole body. In this process, aging affects all facial layers, skin, subcutaneous fat, ligaments, neuro-facial muscles, bone structure, and superficial muscular aponeurotic system (SMAS). Innovative procedures for facial rejuvenation have been created in recent years, using surgical and non-surgical techniques.<sup>5</sup>

A minimally invasive approach is more cost-effective than traditional methods to repair facial tissues and provide skin rejuvenation. Noninvasive procedures allowed for the improvement of skin treatment and prevent facial aging.<sup>6</sup>

The aging process occurs differently among individuals, and may depend on genetic, intrinsic and extrinsic factors. Facial aging begins to appear first on the eyelids and then the middle and lower third, i.e., this process occurs from top to bottom, causing the soft tissues to fall downwards and inwards, thus changing the shape of the face. Young people have a rather oval face shape, similar to an inverted triangle, with its base in the upper third region, whereas elderly people show a square-shape face, inverting this triangle.<sup>7</sup> (Fig. 1)<sup>8</sup>

Aging is a complex and continuous biological process that is characterized by cellular and molecular alterations, with a progressive decrease in the body's homeostasis capacity, leading to

apoptosis or programmed cell death, which changes from body to body, and from organ to organ.<sup>9</sup>

Various rejuvenation techniques are available for patients looking for facial rejuvenation. Thread-based facelift is a minimally invasive technique that has excellent postoperative results. Different resorbable materials have been used for the treatment of tissue defects, such as polydioxanone (PDO) thread, which is a synthetic, biodegradable polymer with low inflammatory reaction. It provides support and stimulates the tissues of the areas around the aesthetic defect by triggering the production of collagen, softening the effects of aging.<sup>10</sup>

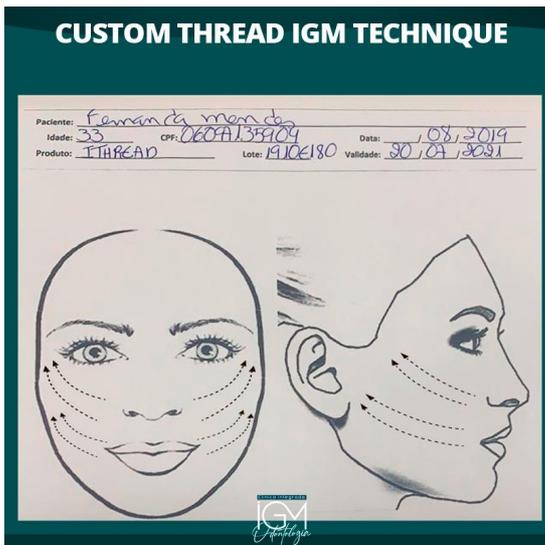
The use of facial support threads fills a gap in rejuvenating medical procedures, as they reposition and suspend facial tissues, which is rarely achieved with other minimally invasive techniques. It is quite a simple procedure and often scheduled in an outpatient setting. Given the shorter post-procedure recovery period, this minimally invasive treatment using suspension threads is highly recommended.<sup>11</sup> A procura por tratamentos com fios faciais é uma tendência e um desafio à medicina atual. The great demand for thread facelift treatment is a major challenge to modern medicine. In this context, face lifting with surgical threads appears to be a good option to treat initial sagging of the neck and face, and restore lost volume to these areas.<sup>12</sup>

PDO threads provide an opportunity for non-surgical rejuvenation, being able to lift soft tissues and increase the production of collagen fibers to reverse skin aging. In view of all its advantages, numerous improvements can be foreseen to expand this new treatment with PDO threads, based on its biodegradable properties.<sup>13</sup>

For many years, ptosis correction was performed exclusively through surgical procedures. Latest technology advancements and increasing demand



**Figure 3.** Selection of DPO support wire.



**Figure 4.** Planning template with PDB pre-curved yarn technique.

for minimally invasive procedures have led to new treatment methods for skin rejuvenation and tissue repositioning by using polydioxanone support threads (PDO). This method prevents ptosis from facial soft tissue, complemented by harmonious aesthetic techniques available.<sup>6-8</sup>

Previously to the advent of PDO threads, gold threads or Russian threads were used, which were permanent. However, they presented discomfort at the site and could hinder future procedures, and sometimes they became visible over the years and caused considerable adverse reactions. Technological advances were required to overcome these limitations. Currently, Polydioxanone (PDO) threads are absorbable and allow for a better tissue fixation. They stimulate fibroblast growth and collagen formation, providing skin remodeling with long-lasting effects.<sup>6</sup>

From 1996 to 1999, Dr. Marlen Sulamanidze and son Dr. George Sulamanidze (Georgia) developed the Aptos suture lifting method, based on special threads provided with microscopic angled barbs (Aptos Thread), double-pointed and elastic needles, known as anti-ptosis threads.<sup>6,14</sup>

The idea of using lifting threads is not new. There have been reports of several types of threads and different

injecting techniques for over thirty years. The goal has always been to achieve a treatment for saggy skin with a shorter, less painful recovery time and better results compared to traditional invasive procedures.<sup>11,15</sup> As stated by Matos<sup>16</sup> in the 1980s, PDO threads have been used as absorbable sutures in cataract eye surgery. In recent years, these threads are also used for facial and body lifting. Recent studies have shown the emergence of

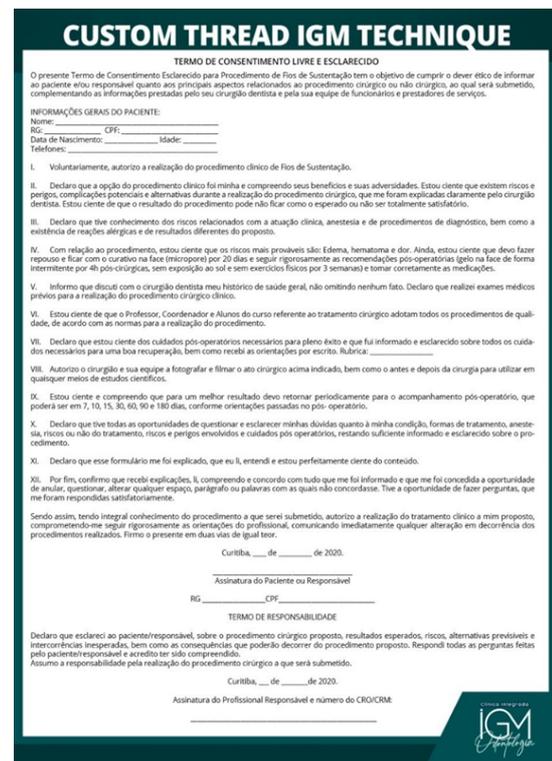
new methods for delaying aging signs, using unidirectional or multidirectional PDO threads with monofilaments for soft tissue approximation.<sup>17</sup> According to Bortolozzo<sup>11</sup> polydioxanone suture can be a synthetic, absorbable monofilament made of polyester, poly (p-dioxanone). It is a non-allergenic, non-pyogenic polymer, causing only mild tissue reaction during absorption.

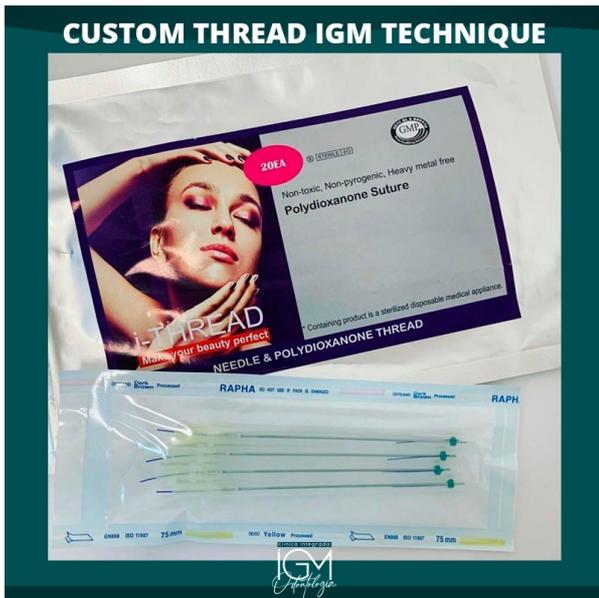
**MECHANISM OF ACTION**

Absorbable PDO threads are biostimulators that can repair soft tissue defects when inserted into the skin. During biodegradation, they trigger neocollagenesis and are absorbed into the body over 4 to 6 months, depending on the thread thickness.<sup>16,18</sup>

Lopandina<sup>18</sup>, states that PDO threads can be classified as follows: (a) Mono soft thread, which are used mainly for bio-stimulation and tissue shielding; (b) Double or twin threads consisting of two strands intertwined with each other, having a double effect; (c) Screw threads are screwed around

**Figure 5.** Informed Consent Form.





**Figure 6.** Selected DO support wire.

the needle in a spiral form; (d) Double screw threads consist of two strands twisted together and wrapped around a needle in spiral shapes. Their special feature is to provide spiral stability when inserted into the skin. These threads are more traumatizing, but they trigger neocolagenesis more effectively; (e) Coq or barbed threads are thicker strands, formed with laser-cut barbs that allow moving soft tissues of the body and face in any direction. Barbed threads are used to stretch the eyebrows, neck, and facial contour, model facial bones, correct double chin, rebuild body soft tissues, and model new shapes and volumes. After the threads are inserted into the skin, there is an immediate lifting effect.

The skin repair process after lifting with PDO threads occurs through atraumatic needle insertion and high biocompatibility with human tissues. PDO threads are flexible, strong, hydrophobic and non-capillary; they have no antigenic or pyrogenic features, and the absorption process is followed by a moderate skin reaction and neocollagenesis.<sup>6,14,18</sup> PDO threads are indicated for skin rejuvenation, facial lifting, attenuation of nasogenian and chin grooves, and repositioning of ptosed soft tissues. They are flexible, absorbable by the body, and trigger

collagen production and tissue nutrition. The procedure is minimally invasive, fast, and leaves no scars.<sup>19</sup>

After inserting the PDO threads, a normal, controlled inflammatory process occurs for the recruitment of fibroblasts and deposition of collagen and elastin. Collagen formation occurs around the threads and barbs and is degraded by non-enzymatic hydrolysis, thus stimulating fibroblast proliferation, and therefore, increasing collagen synthesis.<sup>4</sup>

In this process, there is a granulomatous reaction composed of active mononuclear histiocytes and

polypropylene, there is less tissue reaction, which results in the formation of a tubular ligament of collagen and elastin that is highly resistant and lasts forever. The threads are surrounded by a fibrous sheath around its main axis and barbs, which provides high ligament strength.<sup>8</sup>

PDO threads were reported to be efficient in triggering collagen synthesis in a study that used swine tissues. After thread implants, there was an increase in inflammatory cells and in the number of fibroblasts within the first 7 days. After 14 days, type III collagen formation was detected, and after 28 days, an increase in type I collagen and a reduction in type III collagen was observed. Two months after PDO thread implantation, there was a formation of micro vessels, and thick collagen bundles, mostly type III were observed. One year after, dense collagen fibers were seen with irregular disintegration of the support threads.<sup>19</sup>

Currently, there are several techniques for using the support threads through intramuscular or intradermal and subcutaneous injections, such as the linear vector technique, shielding technique, and sandwich technique. In addition, suture technique, fanning technique and a combination of all these



**Figure 7.** PDO support wire before pre-bending.

fibroblasts. Because it is made of techniques are available as well. 18



**Figure 8.** PDO support wire without bending and pre-bending.

Within this context, we will describe the IGM custom thread technique. Pimentel<sup>8</sup> has reported that, in 1998, Dr. Nikolay Serdev presented the Bulgarian or elastic thread technique, and in 2002, Dr. Beramendi launched the Russian thread technique. In 2005, the French thread technique was launched by Dr. Bischoff.

### IGM technique using PDO threads

Spiked PDO threads are the most effective for facial lifting known so far. Commonly, the threads are injected intradermally using needles or cannulas. However, needles enter the skin by drilling, breaking and damaging anatomical structures, which raises concerns. Cannulas, on the other hand, bypass these structures and provide greater safety and cause less tissue damage or trauma. The biggest disadvantage of these cannulas would be the unique shape they present, as they have a straight shape, without curvature, thus making it hard to insert the threads in certain areas of the face. As a consequence, when the patient contracts the muscles or has a thin skin, the threads may become apparent and cause discomfort.

In view of these pitfalls, we propose a custom thread technique, developed by a group of professionals from the IGM Dental Institute. In the IGM custom thread technique, the threads are injected smoothly, which

allows more predictable and natural results.

### IGM CUSTOM THREAD TECHNIQUE

This technique promotes tissue elevation and traction for superior and posterior positioning.

#### *Technique description:*

Prior to using the method, the patient's face must be examined to determine how the tissues should be repositioned.

After facial analysis, the threads are pre-curved according to the patient's features in the malar region, labial commissure, mandible angle, orbital region, and frontal region. These customized, pre-contoured threads allow to reduce tissue sizes, the amount of disorders, and possibly decreasing the number of entries for facial infections. (Fig. 2).

#### **Protocol and description of the IGM technique for inserting spiked PDO threads using pre-curved cannulas**

1. Initially, anamnesis, clinical examinations and detailed planning are carried out to select the required number and position of the PDO threads. (Fig. 3).
2. Design the facelift region and determining the number of PDO support threads, and obtain the patient's free and informed consent form. (Fig. 4 and Fig. 5).

3. Take photographs of the patient before the procedure, given the importance of photography for the treatment and comparison of changes between pre- and post-lifting. It will also serve as evidence, since the patient tends to forget what his face was like before the procedure. It will also be useful for long-term follow-ups.

4. Skin touching test to determine its condition and mobility, thread entry points and directions to provide maximum lifting effect.

5. Wash the patient's head with antibacterial soap and using a cap to separate the scalp from the face, fixing the sides with micropore tapes. Skin cleansing should be made using a 2% chlorhexidine solution and dried gently.

6. The thread entry points are made using a white or skin-colored marker. The insertion vectors are designed, indicating the path the threads will take. This step is extremely important, as the surgeon must determine the segments to be reinforced, tightened, and fixed; otherwise, the threads will not have the expected effects and results.

7. Injectable anesthetic with Mepivacaine hydrochloride 3% without vasoconstrictor (DFL brand, half tube) will be used at the thread entry points and superficially along the path. The threads will be inserted within a few minutes after anesthesia induction.

8. The operating table must be sterilized and equipped with gauze and gloves, scissors, 18G needle size, supporting PDO threads, and micropore tape. (Fig. 6 and Fig. 7).

9. Cannulas pre-curved manually using sterile gauze will be prepared for the surgical procedure. The customization of the supporting threads will be carried out according to the planning analysis, bending the thread to contour the face and get the desired aesthetic result. (Fig. 8).



**Figure 9.** Postoperative guidance guide.

**10.** A stitch is made at the starting point of the mark on the skin, where the thread will be introduced, with an 18G needle (DFL brand), and bevel facing the tissue in the same direction from where the cannula will later be introduced. The needle diameter must always be larger than that of the cannula. Then, the need is slowly withdrawn.

**11.** The cannula is inserted into the orifice, entering the dermis. As the cannula is slowly withdrawn, the thread must be hold by gently pressing the skin to prevent removing the thread from the desired position. All threads are inserted consecutively into the targeted areas, according to what was planned.

**12.** Massage movements are made on the skin from outside to inside direction and then from inside to outside direction to open the thread spikes and set them in the right position. Apply light pressure and traction for face lifting. Check if both sides of face are symmetrical.

**13.** Successive cuts of thread ends using curved scissors will avoid sutures protruding from the skin.

**14.** A skin-colored micropore tape is placed at each entry points. The micropore bandage should be left on for 7 days, changing by a new one whenever it gets moistened.

**15.** Take a photo of the patient's face after the procedure is concluded.

**16.** Provide post-procedure guidelines. (Fig. 9).

**17.** Medication: Azithromycin 500 mg, one tablet daily for 3 days should be prescribed as an oral antibiotic. In addition, Dipyron 500 mg, one tablet every 8 hours for 3 days should be taken as an analgesic medication.

**18.** Photos from the patient's face should be taken before and after the procedure.

**19.** Patient's follow-up.

## CONCLUSION

PDO threads are used to provide support and lift facial sagging tissue. They act to support or reposition tissues to help reduce the effects of ptosis, i.e., gravity or aging. It is a procedure that provides an almost immediate result, considering that the muscles, skin, and subcutaneous tissues are correctly repositioned, thus reducing the effects of expression lines, such as wrinkles, furrows, and facial sags.

Patients are increasingly seeking less invasive cosmetic procedures that require less healing time compared to plastic surgery before they can return to their normal activities. Treatment with PDO support

threads is one of the most interesting and sought-after procedures. It addresses sagging facial tissues to restore a more naturally youthful appearance.

Facial aesthetic aging and dissatisfaction with self-image have a negative impact on the person's life, which aggravates biopsychosocial dimensions and compromises self-esteem and well-being. For this reason, understanding these issues and listening to the patients' image-related complaints is essential for an adequate planning and individual treatment plan.

Based on the findings of this study, we can conclude that using pre-curved cannulas and following the IGM method will help insert absorbable PDO threads under the skin for lifting and tightening of the sagging area, respecting the patient's facial anatomy. In addition, The IGM custom thread technique is the one that presents fewer complications during the postoperative period.

Satisfactory results have been achieved, and patients have provided positive feedback during the follow-up period.

## REFERENCES

1. Suh DH, Jang HW, Lee SJ, Lee WS, Ryu HJ. Outcomes of polydioxanone knotless lifting for facial rejuvenation. [Internet]. *Dermatol Surg* 2015 [cited 2020 Set 10];41(6):720-5. Available from: <https://is.gd/Gs66At>.
2. Rodrigues GKB. Fio para dermossustentação retardando a ritidoplastia. [Internet]. Paraná: Faculdade Tuiti; 2012. [cited 2020 Set 12]. Available from: <https://docplayer.com.br/11524437-Fio-para-dermossustentacao-retardando-a-ritidoplastia.html>.
3. Baroni ERV, Biondo-Simões MLP, Auersvald A, Auersvald LA, Netto MRM, Ortolan MCAB, et al. Influence of aging on the quality of the skin of white women: the role of collagen. [Internet]. *Acta Cir Bras*, 2012 [citde

- 2020 Set 10];27(10):736-40. Available from:  
<https://www.scielo.br/pdf/acb/v27n10/a12v27n10.pdf>.
4. Silva LB, Silva LM. Dermossustentação no tratamento do envelhecimento cutâneo. [Internet]. In: Anais do 5. Congresso de ensino pesquisa e extensão da UEG; 2018; Florianópolis. Florianópolis: UEG; 2018:1-8. [cited 2020 Set 12]. Available from:  
<https://www.anais.ueg.br/index.php/cepe/article/view/13159>.
5. Ali YH Two years' outcome of thread lifting with absorbable barbed PDO threads: Innovative score for objective and subjective assessment. [Internet]. *J Cosmet Laser Ther*, 2018 [cited 2020 Set 15];20(1):41-9. Available from:  
<https://pubmed.ncbi.nlm.nih.gov/28863268/>.
6. Tavares JP, Oliveira CACP, Torres RP, Bahmad F, Jr. Facial thread lifting with suture suspension. [Internet]. *Braz J Otorhinolaryngol*, 2017 [cited 2020 Set 15];83(6):712-9. Available from:  
<https://www.scielo.br/pdf/bjorl/v83n6/1808-8694-bjorl-83-06-0712.pdf>.
7. Ortolan MCAB, Biondo-Simões PML, Baroni ERV, Auersvald A, Auersvald LA, Netto M, et al. Influência do envelhecimento na qualidade da pele de mulheres brancas: o papel do colágeno, da densidade de material elástico e da vascularização. [Internet]. *Rev Bras Cir Plást*, 2013 [cited 2020 Set 30];28(1):41-8. Available from:  
<https://www.scielo.br/pdf/rbcp/v28n1/08.pdf>.
8. Pimentel AS. Fios de sustentação e suas técnicas. São Paulo: LP; 2007.
9. Bagatim E. Mecanismos de envelhecimento cutâneo e o papel dos cosmecêuticos. *RBM Rev Bras Med*, 2009;66(Supl. 3):5-11.
10. Araújo EC, Vieira FLD, Santos MJ, Oliveira NG, Jr, Abruzzini F, Rezende NO. Harmonização estética facial com o uso de fio de polidioxanona (PDO): relato de caso. *Full Dent Sci*, 2017;8(32):102-10.
11. Bortolozo F. A-PDO: técnica de elevação de sobrancelhas com fios de polidioxanona ancorados: relato de 10 casos. [Internet]. *Braz J Surg Clin Res*, 2017 [cited 2020 Set 20];20(1):76-87. Available from: <https://is.gd/49dWYj>.
12. Bortolozo F, Bigarella RL. Apresentação do uso de fios de polidioxanona com nós no rejuvenescimento facial não-cirúrgico. [Internet]. *Braz J Surg Clin Res*, 2016 [cited 2020 Set 20];16(3):65-75. Available from: <https://is.gd/Hyta9J>.
13. Ruff G. Technique and uses for absorbable barbed sutures. [Internet]. *Aesthet Surg J*, 2006 [cited 2020 Set 20];26(5):620-8. Available from: <https://pubmed.ncbi.nlm.nih.gov/19338953/>.
14. Perrone M. Utilização de fio de polipropileno de autossustentação de tripla convergência para a correção do desvio de hemiface causada por lesão do nervo facial. [Internet]. *Rev Col Bras Cir*, 2012 [cited 2020 Set 20];39(5):368-72. Available from: <https://www.scielo.br/pdf/rcbc/v39n5/05.pdf>.
15. Matarasso A, Paul MD. Barbed sutures in aesthetic plastic surgery: evolution of thought and process. [Internet]. *Aesthet Surg J*, 2013 [cited 2020 Set 18];33(3):17-31, 2013. Disponível em:  
[https://academic.oup.com/asj/article/33/3\\_Supplement/17S/176281](https://academic.oup.com/asj/article/33/3_Supplement/17S/176281).
16. Matos J. PDO: fios bioestimuladores de sustentação. [Internet]. In: SPME. Medicina estética e microcapilar; 2017. [cited 2020 Set 21]. Available from:  
<https://www.clidomus.com/wp-content/uploads/2017/06/pdo.pdf>.
17. Karimi K, Reivitis ABA. Lifting the lower face with an absorbable polydioxanone (PDO) thread. [Internet]. *Journal of Drugs in Dermatology*. 2017 [cited 2020 Set 30];6(9):932-4. Available from:  
<http://jddonline.com/articles/dermatology/S1545961616P0932X/3>.
18. Lopandina I. Fios de PDO: nova abordagem ao rejuvenescimento da pele. 2. ed. São Paulo: MultiEditoras; 2018.
19. Kim H, Bae IH, Ko HJ, Choi JK, Park YH, Park WS. Novel polydioxanone multifilament scaffold device for tissue regeneration. [Internet]. *Dermatol Surg*, 2015 [cited 2020 Set 23];42(1):63-7. Available from:  
<https://www.ncbi.nlm.nih.gov/pubmed/26671204>.