


DERMAL SUPPORT WITH BIDIRECTIONAL SPICULATED POLYDIOXANONE THREADS

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Thiago Borges Mattos¹, Lídia Batista Conrado Martins², Francisco Cerdeira Filho³, Paola Ferreira Galito⁴, Maria Fernanda Ramos Mattos⁵, João Marcos Borges Mattos⁶, Joaquim Nogueira Pacheco⁷, Luiz Eduardo Meireles Mayrink⁸.

ABSTRACT

The present study is a narrative review of the literature that addresses the theme of orofacial harmonization with the use of polydioxanone (PDO) threads. PDO threads have been used as an option that slows down the natural aging process by promoting facial rejuvenation. The non-surgical procedure is performed in the office and is minimally invasive. However, there are still contraindications, for example, in the case of autoimmune diseases, pregnancy, and the use of anticoagulants. In these cases, complications such as hematoma and infection may occur, however, they are mostly easy to manage, since they are transitory and disappear in a few days. In addition, it is essential to apply the technique correctly to avoid complications, such as hair migration. Although most studies point to positive results with the use of PDO, investigations are still needed to verify its long-term effectiveness, especially in older people and those with more facial flaccidity, since this technique is more suitable for patients with mild wrinkles and sagging. Based on this, the objective of this study was to perform a narrative review of the literature on the efficacy of the use of PDO threads in orofacial harmonization. For this, searches for scientific articles were carried out on the PubMed, SciElo platforms, in the year 2024, using the descriptors: "Orofacial harmonization", "PDO threads". Nine articles were selected and presented in order to contribute with a theoretical basis on the benefits, indications, applicability, safety, in addition to highlighting the efficacy of use.

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¹ Doctor in Oral Biology – USC/Bauru – SP

Master's Degree Teacher – UNINCOR/ Três Corações- MG

² Master in Oral Rehabilitation and Imaging – UFJF/Juiz de Fora – MG

³ Master in Periodontics – UNIGRANRIO/RJ

⁴ Master's Degree Student – UNINCOR/Três Corações-MG

⁵ Master's Degree in Orthodontics – UERJ/Rio de Janeiro-RJ

⁶ Master's Degree Professor – UNINCOR/Três Corações-MG

⁷ Postgraduate in Orofacial Harmonization – NEEO/Judge of Fora- MG

⁸ UNIPAC Professor – Barbacena – MG

INTRODUCTION

Today, Dentistry takes into account the patient in general, paying attention to the patient's well-being in addition to the shape and dental aspects, treating not only the individual's oral cavity, but the entire set. From this perspective, these patients seek treatments in order to modify their appearance and well-being, especially with regard to rejuvenation. Thus, these interventions are increasingly easier to access and there is a trend towards less invasive procedures, according to Silva *et al.* (2024).

Also according to Silva *et al.* (2024), the appearance of tiredness and sadness caused by dark circles mean an important aesthetic disorder, affecting the patient's quality of life. Some factors are involved in its etiology, and specifying each of them is necessary for appropriate treatment, such as local hyperpigmentation, which may be due to post-inflammatory hyperchromia. In addition, genetic predisposition and excessive sun exposure can stimulate melanin production and, consequently, local browning.

However, according to Pedro *et al.* (2024), facial aging is something natural and the demand for aesthetic procedures is common in modern society. Therefore, based on the search for procedures, the supply for these procedures has increased considerably. In this way, the dental surgeon has been performing procedures such as the application of botulinum toxin; gingival and facial fillers; autologous blood derivatives, percutaneous collagen inducers (by microneedling; facial lipoplasty, by chemical, physical or mechanical techniques; and even the use of support threads for facial lifting (polydioxanone threads).

Polydioxanone (PDO) threads are being used to stimulate collagen formation and have shown satisfactory results, according to Silva *et al.* (2024). The authors justify this statement by highlighting that the threads are absorbable by the body, flexible and induce collagen production and tissue nutrition, in addition to being a minimally invasive, fast and scar-free procedure. As a result, sutures have been increasingly used. Thus, polydioxanone (PDO) is a synthetic, non-allergenic, non-pyogenic and absorbable monofilament polymer. Facial thread can be absorbable, or non-absorbable, monofilament or multifilament. The characteristics that involve its healing are associated with the technique and the material of composition, thickness and the characteristics of the patient himself.

In summary, the objective of this study is to perform a narrative review of the literature with a focus on verifying the efficacy of the use of PDO threads in orofacial harmonization. For this bibliographic research, searches were carried out with the descriptors "orofacial harmonization" and "PDO threads" on the PubMed, *SciElo* platforms.

In addition, we sought to verify academic works with the time frame in the year 2024, in order to analyze more up-to-date information on the subject.

METHODS

This study is a narrative review, suitable to expose the state of the art of a given subject. According to Vosgerau and Romanowsk (2014), the narrative review consists of a broad analysis of the literature, without methodological rigor and reapplicable at the level of data reproduction and quantitative answers to specific questions. However, as stated by Elias *et al.* (2012), is essential to acquire and update knowledge on a specific theme, presenting new ideas, methods, subthemes with greater or lesser prominence in the selected literature.

Searches for scientific articles were carried out on the platforms of *Google Scholar*, *National Library of Medicine* (PubMed), *Scientific Electronic Library Online* (SciElo) with the following descriptors: "Orofacial harmonization", "PDO wires". As an inclusion criterion, the publications should have expressions used in the title or keywords. In addition, the publications should refer to the year 2024. And, as an exclusion criterion, articles that did not address "orofacial harmonization" related to polydioxanone (PDO) threads.

To define the articles to be presented in this article, the technique of the theme of Minayo (2007) was used, which addresses the core of meanings, which seeks the relationship of meanings between the articles found and the theme highlighted by this article. This method consists of three stages: pre-analysis, in which the data obtained are ordered; the exploration of the material, where categories are established; treatment of the results obtained and interpretation, in which the narrative review is presented in order to answer the research question.

After carrying out the floating reading based on Minayo (2007), for the selection of the material for this research, nine more recent articles that were most related to the theme were selected for discussion among the twenty-nine publications.

RESULTS AND DISCUSSION

For an overview of the articles selected for this study, a table with the characterization of the articles found in *Google Scholar* is presented. Chart 1 below shows the title, objective, date of publication, authorship, and access *link* of these publications found on *Google Scholar*.

Chart 1 – Characterization of publications

ARTICLE TITLE	GOAL	PUBLICATION DATE	AUTHORS HIP	ACCESS LINK
A 1 - Treatment of sagging dark circles with PDO threads and hyperdiluted calcium hydroxyapatite	The objective of this clinical case report would be to promote biostimulation using polydioxanone support threads (PDO), usually cannulated smooth threads, to improve the texture and flaccidity of the region, through the induction of collagen, associated with a type of filler, such as hyperdilute calcium hydroxyapatite, injected in the deepest plane in a supraperiosteal location.	Jan./Feb./Mar. 2024	Silva <i>et al.</i> (2024)	https://editoraplena.com.br/wp-content/uploads/2024/06/12-19-Tratamento-de-flacidez.pdf
A 2 - The use of polydioxanone threads in orofacial harmonization	To identify the main properties of available polydioxanone (PDO) threads, their indications, limitations, and complications reported in the literature.	Feb./Mar 2024	Silva <i>et al.</i> (2024)	https://revistas.utfpr.edu.br/rbqv/article/view/18224
A 3 – Considerations on the victim's legal situation in orofacial harmonization procedures performed by dental surgeons	The purpose of this work is to establish considerations about the victim resulting from the practice of Facial Harmonization by the dental surgeon and the subsequent judicialization of the issue, with the responsibility of the professional for the aesthetic damage and the health of the victim.	March 2024	Pedron, Calvanti and Dias (2024)	https://revista.proitima.org/ojs/index.php/rpv/article/view/75
A 4 – Rhinomodeling with polydioxanone I-thread (PDO) support threads: case report	The objective of this study was to report a clinical case of a rhinomodeling procedure using polydioxanone I-thread (PDO) thread using the closed technique.	May 2024	Silva <i>et al.</i> (2024)	https://ojs.studiespublicacoes.com.br/ojs/index.php/cadped/article/view/3967
A 5 – Hyaluronic acid in facial harmonization and possible complications	This study is a narrative review of the literature, with the objective of discussing the applicability of hyaluronic acid in facial harmonization, also exploring the possibility of complications.	May 2024	Gontijo and Silvani (2024)	https://repositorio.pucgoias.edu.br/jspui/handle/123456789/8131

A 6 – Main aesthetic procedures performed on young people and possible complications	This study is a narrative review of the literature, with the objective of analyzing the main aesthetic procedures sought by young people, their impacts on self-esteem and possible complications.	May 2024	Caetano and Vieira (2024)	https://repositorio.pucgoias.edu.br/jspui/handle/123456789/8132
A 7 - Exploring Facial Harmonization Techniques: A Comprehensive Study for Advanced Clinical Practice	This study aims to explore the fundamental principles behind facial harmonization, highlighting the latest techniques and advancements in the field, while also examining the clinical and ethical challenges associated with its use.	June 2024	Silva (2024)	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4851375
A 8 - Vectorization and directing of forces for non-surgical force rejuvenation using PDO barbed wires	To highlight the action of vector forces in the elevation of the soft tissues of the face ceded by the aging process.	July 2024	Campos <i>et al</i> (2024)	https://ahof.emnvens.com.br/ahof/article/view/204
A 9 – Dermosa support through polydioxanone (PDO) thread, reverse technique	To report through a clinical case the applicability of spiculated polydioxanone threads, evaluating the lifting effect, the efficacy of tegumentary replacement by exclusively mechanical locking, as well as the neocollagenesis process.	July 2024	Martins, Mattos e Filho (2024)	https://ahof.emnvens.com.br/ahof/article/view/200

Source: author (2024).

Silva *et al* (2024) categorize the periorbital region as the first of the face to show signs of aging. They point out that complaints about dark circles are frequent, which can happen in individuals of various ages, and are considered by many to be aesthetically displeasing. Because it is a region that has thin layers of tissue and complex anatomy, the authors point out that filling the lower eyelids is a great challenge, especially regarding the application plan and the option for the most appropriate filling for each case. The objective of the clinical report, in this sense, was the observation by the practice of biostimulation from polydioxanone support threads (PDO), with smooth cannulated threads, in the search for improvement of the texture and flaccidity of the region. For this purpose, collagen

induction was also performed, associated with the injection of a type of filler, such as hyperdiluted calcium hydroxyapatite, in the deepest plane of the supraperiosteal region of the face. As a result, the aim was to reduce flaccidity, in addition to better dermal quality and thickness, and rejuvenation of the periorbital region.

Silva *et al* (2024) conducted a literature review in the PubMed and Virtual Health Library (VHL) databases with the objective of identifying the fundamental properties of polydioxanone (PDO) threads available on the market, in addition to their main indications, limitations, and possible complications identified in the studies. For the search, the authors used keywords such as Polydioxanone and Thread and selected 25 articles published in English between 2017 and 2022. As a result, the authors found in the research that facelift with absorbable PDO threads is a procedure with low complication rates and minimally invasive. Among the advantages of using PDO threads pointed out in the observed studies, the authors highlight their biodegradability and biocompatibility and their relatively slow degradation process. More than that, research points to other advantages of the use of PDO threads, such as the possibility of applying local anesthesia, the short surgical time, and the temporary effect of the procedure. In this sense, the researchers conclude that PDO thread, biocompatible and collagen stimulant, is promising in performing orofacial harmonization since it offers good tensile strength. In addition, the investigators point out that it is a procedure indicated, mainly, for patients with mild to moderate ptosis or facial paralysis who seek symmetry. However, they warn of possible complications, such as edema, hematomas, ecchymosis, undulations and asymmetry and emphasize that the procedure is not indicated for those who seek permanent results.

Pedron, Calvanti, and Dias (2024) address the growing demand for aesthetic procedures in dental clinics, pointing out by them as the list of procedures performed by dental surgeons, techniques once offered by plastic surgeons and dermatologists. Such conduct, they say, is now recognized as a dental specialty called Orofacial Harmonization. Although performed by dental surgeons, the authors emphasize that, as reported in the medical literature, these procedures can cause several complications such as: Edema, nodule formation, painful symptoms, tissue necrosis, asymmetries, blurred vision, blindness and even death. These consequences are mostly treated by Plastic Surgery. In this sense, the study established considerations about victims of the practice of Facial Harmonization by dental surgeons, establishing relationships with the judicialization of cases and the responsibility of professionals for aesthetic damage and the health of the victims.

Silva *et al.* (2024) address the vital role played by the nose both functionally, for breathing, and aesthetically, for facial appearance. In this sense, the authors point to rhinomodeling as an effective technique for improving facial harmony. Through it, it is possible to correct imperfections such as the hump of the nasal dorsum and the drooping tip. In this sense, in order to achieve satisfactory and functional aesthetic results, it is essential that the surgeon understands the nasal anatomy and surgical techniques in detail. The search for minimization of trauma and postoperative optimization is essential in the approach, which includes the repositioning of the nasal bones through osteotomies. More than that, adapting the technique to meet the specific cases, expectations, and needs of each patient is crucial, and this requires surgeons to have diverse skills. Thus, for a detailed anamnesis and a safe and satisfactory approach, it is essential that the surgeon clearly communicates the risks and benefits to the patient. The objective of this study was to report a clinical case of the use of polydioxanone I-thread (PDO) thread using the closed technique in a rhinomodeling procedure. Pointing out dissatisfaction with her nose, the CFC patient, female, 27 years old, arrived at the specialization in oral and maxillofacial surgery and traumatology at the Amazonas IAES College. After the clinical and imaging examination, rhinomodeling was proposed to the patient with and the bone region reduction procedure was performed without postoperative complications. Finally, the study pointed out that the use of polydioxanone I-thread (PDO) thread in the clinical case of rhinomodeling, through the closed technique, proves to be an effective and minimally invasive approach and results in satisfactory aesthetic improvements with a positive impact on the patient's psychosocial well-being and self-esteem.

Gontijo and Silvani (2024) carry out a narrative literature review, with the objective of debating the applicability of hyaluronic acid in facial harmonization, also seeking to explore possible complications. According to the authors, the delay in aging and the desire for younger and healthier skin have led to a considerable increase in the demand for products, cosmetics and aesthetic procedures based on hyaluronic acid. As a result, injectable hyaluronic acid has become an "object" of desire, as it can provide collagen stimulation, skin protection against intrinsic and extrinsic factors, tissue repair, in addition to restoring deep hydration and stimulating skin moisture, reducing wrinkles. The study considers, therefore, that filling with hyaluronic acid is a safe and minimally invasive procedure. Despite this, because it presents risks and adverse effects during and after the process, the application requires care and attention from the professional and the patient. In addition, to

offer more balanced, natural and complete effects, the authors point out that other procedures can be combined with the first one, such as: mesotherapy, peeling, collagen biostimulators, facial threads, microneedling and botulinum toxin.

Caetano and Vieira (2024) point out that the search for invasive and/or minimally invasive aesthetic procedures is increasing among young people. Therefore, they carry out a narrative review of the literature with the objective of analyzing the main aesthetic procedures sought by them, their possible complications and the impacts of this on the self-esteem of young people. The authors point out that the desire to change the image is mainly aimed at improving self-esteem and achieving physical and mental satisfaction and well-being. Thus, the results indicate that the procedures most sought by young people are: botulinum toxin, fillers, peelings, traction threads, polylactic acid and polymethylmethacrylate. In addition, the study emphasizes that in order to achieve visible improvements in appearance from aesthetic procedures, it is essential that young people become aware of the risks arising from them, such as: dissatisfaction with the results in addition to adverse reactions and infections. The work warns, therefore, of the need for caution and transparency of information in the approach, recommending that in the steps prior to the interventions, young people seek individualized care with qualified professionals to assess the risks and benefits.

Silva (2024) categorizes facial harmonization as an integrative concept in contemporary aesthetic medicine. According to the author, it is a holistic approach to improving facial aesthetics that considers not only individual features, but also the aesthetic proportion and overall harmony of the face. The practice involves, in this sense, several minimally invasive procedures, such as: filling with hyaluronic acid, the application of botulinum toxin, collagen biostimulators and skin revitalization techniques. Debating the growing demand for non-surgical aesthetic procedures, the author states that facial harmonization has gained prominence mainly because it is a viable alternative for patients who aim to change their appearance more naturally, but do not want the risks associated with surgery. With the aim of exploring the fundamental principles of facial harmonization, the study highlights the latest techniques and advances in the field, as well as examining the clinical and ethical challenges associated with the use of such a procedure. Despite the advances, the author points out that, although popular, for a satisfactory and safe result, facial harmonization requires a deep understanding of both facial anatomy and its refined techniques. Finally, considering each patient's unique facial features and individual

aesthetic expectations, the study provided insights into the personalization of facial harmonization treatments.

Campos *et al* (2024), with the objective of evidencing the action of vector forces in the elevation of the soft tissues of the face, which give way from aging, address a technique of lifting and redesigning the soft tissues by applying subcutaneous tensor threads, the polydioxanone (PDO) threads, for facial rejuvenation. According to the authors, PDO threads induce an inflammatory response that varies according to the patient's health, age, and immunity. This happens because, during the degradation process, which varies between 4 and 6 months, PDO sutures stimulate collagen production, resulting in positive changes in the skin. For a better understanding of the observed universe, the authors searched for retrospective observational studies or experimental studies of retrieval and critical analysis of the literature in PubMed, in the VHL Databases, and in Science Direct with terms in English, Portuguese, and Spanish. As a result, they found that in order to achieve better results, it is necessary to have extensive knowledge and understanding of facial anatomy, facial vectors, as well as fixation points and traction mechanisms. In addition, the study points out that practicing on fresh cadavers provides professionals with technical advances and greater awareness during clinical practice. Therefore, the authors conclude that the final clinical result of tissue displacement from the *facelift* depends on several factors such as: the type and composition of the thread, the patient's health and the professional's skills.

Martins, Mattos and Filho (2024) carry out a clinical case study to present the applicability of the use of spiculated polydioxanone sutures, with the objective of evaluating their lifting effect, in addition to the efficacy of tegumentary replacement by exclusively mechanical locking, and the neocollagenesis process. In the study, the 57-year-old female patient presented the following condition: skin flaccidity, deepened nasolabial fold, in addition to the presence of facial asymmetry due to the displacement of fat compartments caused by the natural effect of aging. As an approach to the case, it was decided to reposition the structures based on the treatment with polydioxanone thread, accompanied by the support effect, as well as the management of the reverse technique from the potentiated dermal anchorage power. The study concludes that the selected technique is a safe and efficient procedure in terms of the ability to provide support, the medium and long-term management of skin flaccidity and the consequent structural gain of the dermis and hypodermis. Therefore, the authors state that the procedure is a potential alternative for

patients seeking the remodeling of components lost by natural aging from non-surgical techniques.

CONCLUSION

The present study is a narrative review of the literature that contributes to the knowledge of orofacial harmonization with the use of PDO threads, a non-surgical procedure performed in the office as an option that collaborates with orofacial rejuvenation. Although there are contraindications, such as in people with autoimmune diseases, pregnant women and people who use anticoagulants, the procedure is minimally invasive. In these extraordinary occurrences, bruises and infections can be symptoms, however, they are not long-lasting and are easy to manage. To avoid these complications, it is necessary for the professional to apply the technique correctly.

In this sense, the objective of this study was to perform a narrative review of the literature to verify the efficacy of the use of PDO threads in orofacial harmonization. To do so, using the descriptors "orofacial harmonization" and "PDO threads", with the time frame in 2024, we resorted to *Google Scholar*, *PubMed*, *SciElo*, and found twenty-nine academic papers on *Google Scholar* and no publications related to the theme on the *PubMed* and *SciElo* platforms. Thus, the absence of publications on the aforementioned platforms generated a challenge for this work, in which it highlighted nine publications more related to the subject among the twenty-nine works that were presented on *Google Scholar*.

Regarding the results of orofacial harmonization using PDO sutures, most reports and studies point to their efficacy. The procedure, therefore, is characterized, based on the studies under analysis, as safe and efficient in terms of the potential for dermal support, the medium and long-term management of skin flaccidity, among others. Another factor highlighted was the effectiveness of the application of PDO threads, especially since it is a minimally invasive and non-surgical method. In addition, the efficacy of the final clinical result of orofacial harmonization with PDO threads was highlighted, associated with several factors, such as: the type and composition of the thread, the patient's health and the professional's execution.

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