DERMATOFUNCTIONAL PHYSIOTHERAPY PROCEDURES IN FACIAL REJUVENATION

LITERATURE REVIEW

BESSA, Vicente Alberto Lima


ABSTRACT

Aging is a natural process of any living being and represents the inevitable and irreversible decline of the functions of body structures. It also promotes an emotional and aesthetic impact, so many seek to slow you down while maintaining a healthier life by good nutrition, exercise practice and aesthetic procedures. Slowing down the aging of the face is possible through dermatofunctional physiotherapy that employs an arsenal of aesthetic treatments. However, the following question arose: what are the main procedures that can be used in facial rejuvenation in dermatofunctional physiotherapy? To answer this question, a study was developed that aimed to investigate the main aesthetic treatments and their therapeutic effects used to keep the skin of the face younger and healthier. For this, a literature review was conducted on aesthetic anti-aging treatments of the face, which are available in the databases of PubMed, Semantic Scholar, Scielo, BVS-BIREME and Science Direct. It was concluded that the main procedures used are: radiofrequency, laser, intense pulsed light, LED, microcurrents, electrolifting, microneedling, micropuncture, peelings, acupuncture and cosmetics. It can be inferred that dermatofunctional physiotherapy has a vast arsenal at its disposal to moisturize, nourish, improve skin and muscle

1 Professor.

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tone, depigment, stimulate collagen and elastin synthesis, have antioxidant, antiglicante and desglicante actions that result in a more jovial and healthy skin.

Keywords: rejuvenation treatment, anti-aging treatment, facial aesthetics.

INTRODUCTION

Projections by the World Health Organization estimate more than 800 million people over the age of 65 worldwide by 2025 (PORTELA and DUTRA, 2019). And as the life expectancy of the population tends to increase, so does the search to maintain a standard of beauty with a youthful skin, without blemishes and without wrinkles. It is a fact that we all want to live longer and in a healthy way, so many seek a healthier lifestyle, and in this case are included the aesthetic procedures.

However, every living being is predestined to age and the process of skin aging is the result of intrinsic and extrinsic factors that produce several changes in facial architecture and progressively reduces the body's homeotase capacity (PEREIRA et al., 2019).

But to meet the needs of the human being to stay healthy and beautiful, science has evolved a lot and, currently, there are several treatments that soften facial aging from cosmetics, physical agents, acupuncture and even surgeries. Although cosmetic surgery is highly sought after by people to delay or minimize signs of facial aging, there are other very efficient non-surgical procedures. These non-surgical procedures have the advantage of providing skin rejuvenation through fast and safe techniques that contribute to the well-being of its sympathizers (PORTELA and DUTRA, 2019).

In this context, dermatofunctional physiotherapy has been an ally of the human being to maintain the skin more jovial and healthy and correct some of its imperfections. It is known that there are several physical and cosmetic resources that contribute to skin rejuvenation. Therefore, the following guide question arises: what are the main
procedures that can be used in facial rejuvenation in dermatofunctional physiotherapy?

To better understand the performance of the physiotherapist, a literature review research was developed, whose objective was to investigate the main aesthetic treatments and their therapeutic effects used to keep the skin of the face younger and healthier.

An analysis of the published research on aesthetic anti-aging treatments of the face was made, which are available in the databases of PubMed, Semantic Scholar, Scielo, BVS-BIREME and Science Direct, covering the last 13 years. The descriptors were: rejuvenation treatment, anti-aging treatment and facial aesthetics. Inclusion criteria include articles, books and academic papers in Portuguese and English that have been working on the aesthetic treatments of noninvasive and minimally invasive rejuvenation. Exclusion criteria were articles without scientific character and those that address aesthetic procedures that cannot be prescribed by the physiotherapist.

80 materials were collected from articles, books and academic papers that were discussing the theme, but 37 articles, 2 books and 1 thesis for the study were selected.

**DEVELOPMENT**

It is necessary to emphasize that aging decreases the function of organs and systems of the body, including the skin. It is known that aging of the skin is influenced by heredity, but especially by sun exposure. These factors promote epidermal changes, such as: decreased proliferative potential, dysfunction of melanocytes, Langerhans cells and dermoepidermal adipic ades; in addition to changes in the dermis, such as: reduction of thickness, cellularity and vascularity, collagen degeneration (MORAES, 2008). It can be affirmed that the skin is the organ that most evidences aging (PORTELA and DUTRA, 2019). However, the signs and intensity of
natural facial aging can be reduced through dermatofunctional physiotherapy procedures.

It is worth noting that it is possible to classify skin aging as intrinsic or chronological or actinoscenescence that is caused by genetic and extrinsic programming or photoaging derived from external environmental conditions, such as ultraviolet irradiation, wind, heat and tobacco.

To explain aging, several biological theories have emerged, however, the mechanisms involved in the process are not yet fully known. There are three groups of biological theories proposed by Weinert and Timiras: evolutionary theories, systemic theories and theories of aging at the molecular-cellular level (TEIXEIRA and GUARIENTO, 2010).

Evolutionary theories explain that aging is related to multiple factors such as the accumulation of mutations that affect health with advancing age; genes that are beneficial when the person is young become more harmful in the post-reproductive phase; and somatic cells that remain healthy to ensure reproduction but are disposable after the reproductive period. On the other, the theories of aging at the molecular-cellular level involve the possibility of errors in protein synthesis; molecular damage accumulated in DNA; telomere shortening; oxidative metabolism that produces highly reactive free radicals; advanced glycoylation end products accumulate in extracellular matrix proteins during aging; and programmed cell death. In turn, systemic theories address changes in the neuroendocrine system that impair homeotase; decline in immune system function that increases the incidence of autoimmune diseases; and pace of life that considers that energy consumption represents a limitation in longevity (TEIXEIRA and GUARIENTO, 2010).

The theories that explain aging are important for the development of cosmetic technology and equipment that can slow down skin damage that can be treated by aesthetics. It is evident that the theories of aging are not restricted to the skin, but
refers to the organism in its entirety. However, the search to slow aging is a fact. And in relation to skin aging, physiotherapy has contributed significantly.

Over time, great advances have emerged in aging treatments, especially with the advent of several noninvasive techniques that seek to treat dyschromy, wrinkles and expression lines, skin and muscle sagging with rapid recovery procedures and without interference in the daily tasks of clients.

Therefore, around the world there are efforts to slow down the aging process of the skin and, therefore, there is a growth of the market of the anti-aging industry. Aesthetic treatments for skin have been constantly proposed, either through cosmetics, appliances, surgeries and alternative modalities. Many seek health and aesthetics for skin, especially the female public.

However, it is good to highlight that aesthetic treatments for skin are not the exclusive privilege of the female public, since men have already shown a lot of interest in this type of therapy. The same cosmetic, electrotherapeutic, thermotherapeutic, phototherapeutic resources that are used in the female public can be applied in men. However, the cosmetic industry has already developed an exclusive cosmetic line for men (PEREIRA et al., 2019).

An integrative review from the analysis 8 articles described the types of aesthetic treatments that can be used to attenuate skin aging. The result of the study indicated that the most common procedures used in skin care to smooth wrinkles, reshape the skin and improve texture are: radiofrequency, laser, intense pulsed light, LED, microcurrents, electrolifting, microneedling, micropuncture, peelings and cosmetics (NOVAIS and DE SOUZA, 2020). In addition to these procedures, there is the use of alternative therapy, such as acupuncture to maintain a young skin.

This millenary technique has been incorporated as a therapeutic alternative by physiotherapists for decades to treat various types of diseases and, currently, it is

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another ally of anti-aging techniques for the face. It has the advantage of being painless, has low financial cost, fast results and no colaterais effects (CRUZ and PEREIRA, 2018). Therefore, acupuncture can slow down facial aging, since it improves the functioning of internal organs and systems, a fact that softens expression lines, tones muscles, improves vascularization and local nutrition and improves the overall appearance of the skin (SANTOS; NASCIMENTO and BRITO, 2018).

It is known that since 2003, acupuncture has become an alternative trend used in anti-aging treatment and it is believed that its therapeutic effects for this purpose have been discovered accidentally while it was other diseases. For Traditional Chinese Medicine, acupuncture consists of the introduction of needles at points of the face and body to provide a local and systemic balance. It is known that there is a correspondence between the face and the organs, for example there is the ear that relates to the kidneys, the horizontal line above the upper lip that relates to the ovaries and the uterus (CRUZ and PEREIRA, 2018).

For facial acupuncture, the needle will produce two actions, one is local that represents an injury to the skin that responds with collagen and elastin production to repair the damage; another is the stimulation of the balance of organs as a result of the representation of Zang Fu (organs and viscera) on the face (CRUZ and PEREIRA, 2018).

There is scientific evidence that proves the reduction of wrinkles in the face by acupuncture intervention. A study that aimed to evaluate the effectiveness of acupuncture to reduce the depth, area and volume of wrinkles of the upper third of the face was conducted through a randomized clinical trial with partial crossover. The study participants 87 women between 40 and 65 years of age with wrinkles with grades III and IV on the Glogau scale. They were randomly distributed into 3 groups: 27 in the control group, 31 in the acupuncture group and 29 in the electroacupuncture group. Evaluations were performed before the first session and
after the last session to measure the depth, area and volume of wrinkle scans through photographic analysis processed in two free software (ImageJ and IDEA), in addition to the use of the adapted checklist (Guideline Face-Q and Arizola) the perception of the participants about wrinkles and appearance. The volunteers were submitted to 8 sessions of 30 minutes, twice a week. And it can be evidenced that in the acupuncture and electroacupuncture groups they obtained reduction in the measurements of depth, area and volume of wrinkles in the region of the glabella and forehead compared to the control group. There was an improvement between the 4th and 5th session (SOUZA, 2020).

Another study that resulted in facial aesthetic benefits through acupuncture was conducted at Kyung Hee University Hospital in Gangdong, South Korea in 2011. The study hypothesized that facial cosmetic acupuncture affects facial elasticity by restoring the tone of the mime muscle at rest by inserting needles into the muscles of the head, face and neck. To this end, an open-label and single-arm pilot study was conducted in which 28 participants were eligible, but only 27 completed the study. The participants were women with an average of 50.04 ± 6.07 (range: 40-59) years with grade III on the Glogau scale and were evaluated before and after the five sessions by the Moiré topography criteria and by the oriented facial elasticity self-assessment scale. They were submitted to 5 sessions over 3 weeks. The result was a significant improvement observed by moiré’s topography and by the score in the self-assessment of the elasticity of the volunteers (YUN et al., 2013).

In addition to acupuncture there are more conventional treatments used in facial aesthetics, such as radiofrequency which is excellent for improving skin tone. This feature heats the tissues generating an immediate tensor effect due to the reduction of collagen bundles, but also stimulates the increase in collagen production. It is an excellent noninvasive method for toning the skin and soft tissue, which provides the reduction of nasolabial wrinkles, papacy and better definition of cervicomentonian angle.
It is known that radiofrequency represents a technology that generates a thermal tissue action that promotes satisfactory results to attenuate typical marks of skin aging, so it is beneficial for the process of facial rejuvenation. However, the increase in temperature can also cause cellular damage, so it is necessary to standardize the ideal temperature to be prescribed in treatments. Studies have concluded that temperatures ranging between 37º and 40º Celsius show better results of the treatment of wrinkles and sagging skin (SANTOS et al., 2020).

There are several studies that prove the efficacy of radiofrequency in the treatment of facial aging. Among them, there is a case study of a basic, quali-quantitative nature of exploratory nature that aimed to analyze the effects of radiofrequency treatment on facial aging in lines and wrinkles of expressions, particularly periorbital and nasogenic grooves in women. In it, 5 volunteers between 30 and 50 years old were submitted to 9 treatment sessions. All were evaluated before and after radiofrequency treatment through photographic evaluation and questionnaires. In each session there was the sanitization of the skin and the application for 10 minutes of therapy with power of 60W in the initial sessions and 70W in subsequent sessions. The temperature was controlled between 39 and 41ºC. At the end of each session, facial moisturizer and SPF 60 sunscreen were applied. The result was an index of 9.6 satisfaction and improvement in skin appearance, both in hydration and texture, firmness and elasticity (CASTRO and MENSCH, 2017).

Another study, conducted in 2018, highlighted the benefits of radiofrequency in order to evaluate the scientific evidence published on its effects for the treatment of wrinkles and facial sagging. For this, a systematic review of the literature was conducted with meta-analysis on radiofrequency in facial cutaneous aging. A study was developed that evaluated the methodological quality of radiofrequency studies in facial skin aging based on the 27 pointable items published by Downs and Black in 16 studies. Most studies use photographic records, but 2 did histological analysis. There was an improvement in the periorbital and nasolabial regions by the evaluators, so there is sufficient clinical evidence to state that radiofrequency
decreased sagging and wrinkles in the face region in the face of high temperatures (MENDONÇA et al., 2018).

A major study was conducted at the Hospital of Dermatology in Yongin, Gyeonggi-do, South Korea and involved 30 women between 30 and 55 years of age. The effects of low-level laser therapy (non-ablative) or low-level light therapy (LLLT), electroacupuncture (EA) and radiofrequency (RF) on facial pigmentation and skin tone in the volunteers were investigated. The participants were divided into 3 groups of 10 components, namely: LLLT group, EA group and RF group. There were 2 weekly sessions of 15 minutes for a period of 6 weeks. The skin tone analysis was done before and after the intervention. It can be inferred that the LLLT group did not show significant improvement in skin pigmentation after the intervention, but there was an increase in skin tone in the frontal region and in both edges of the eyes. The EA group, on the other hand, resulted in a significant reduction in pigmentation at the edges of both eyes, as well as in the left cheek, but without significant changes in skin tone. The RF group showed a post-intervention decrease in pigmentation under the left eye as well as at the edges of both eyes and left cheek and resulted in a significant increase in skin tone under both eyes. The study concluded that all 3 features had positive effects on facial pigmentation and skin tone in adult women (KIM et al., 2016).

Thus, the attempt at rejuvenation, especially in the facial aspect, is possible with the use of treatments with laser (light amplification by stimulated emission of radiation) and with intense pulsed light (intense pulse light). The biggest difference between laser and intense pulsed light is that laser employs a technology that produces monochromatic, coherent and collimated electromagnetic radiation (single direction), while LIP emits non-coherent, non-collimated (in multiple directions) polychromatic light beams.

It is worth noting that there are several types of lasers used for facial rejuvenation, as they are able to minimize wrinkles, expression marks, acne scars and skin spots and

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thus allow a more aesthetic appearance. Among the lasers used are the CO2 type, Nd-YAG long pulse and Érbium-YAG, but the most aggressive for ablative resurfacing are the CO2 laser and the Érbium-YA. On the other hand, the less aggressive lasers are the non-ablative and, currently, the fractionation laser represented another advance in rejuvenation techniques (SANTOS, 2019).

Therefore, the advancement of technology has provided new devices for facial rejuvenation and the treatment of skin damage. And this includes fractional ablative and non-ablative lasers, although not as effective for skin renewal as traditional lasers, they can provide good results with reduced side effects. It is worth mentioning that the fractional technique allows a regeneration more efficient than the non-fractionated, a fact that shortens the recovery time and reduces complications (ZACHARY, 2016).

Fractional ablative laser represents a good strategy to stimulate collagen regeneration as a function of dermal heating and this fact leads to a facelift. This fact can be proven with several field studies, among them there is a research using fractional lasers non-ablative 1340nm in high energy with single pass and medium energy with triple passage to evaluate facial rejuvenation. To this end, a prospective, unicentric and comparative clinical study was carried out at the Dermatology outpatient clinic of the Faculty of Medicine of Jundiaí. Twenty women between 40 and 70 years old participated, with phototype I to IV on the Fitzpatrick scale and moderate degree in glogau classification. The 15 volunteers were submitted to 3 laser sessions with an interval of four weeks and another 5 volunteers participated only in 2 sessions due to personal inability to attend. The right hemiface of the volunteers received three strides and cooling of the skin with the non-ablative fractionated laser 1340nm (SIBERIAN apparatus) with 90mJ fluency and pulse duration 5', 100mtz/cm². The right hemiface received a pass with non-ablative fractional laser 1340nm, with fluency 120mJ, pulse duration 5', 100mtz/cm². The volunteers were evaluated in a period of 6 to 24 months through photographic analysis regarding the variables spots, wrinkles, porphyrins and overall appearance.
As a result there was a decrease in wrinkles on both sides, but the improvement of the spots was significant only on the right side, but there was no improvement in relation to porphyrins. The research concluded that the skin became more beautiful and with a rejuvenated appearance, so the laser emerges as a safe and effective alternative for facial rejuvenation (CAMPOS et al., 2017).

Intense pulsed light (LIP) is another option to treat aging, as it can stimulate the addition of collagen and elastic fibers with decreased wrinkles and improvement in the texture of the cutis. A study reporting the benefits of LIP was published in 2020 and aimed to verify the benefits of intense pulsed light in skin aging. In this bibliographic study, publications were analyzed between 2007 and 2019 through the databases of Google Scholar, Scielo and PubMed. Lip is an appropriate therapy for aged skin since this resource can stimulate fibroblasts to produce collagen and elastin, reducing wrinkles and expression marks, in addition to improving skin texture (STROPARO and DE SANTIS, 2020).

A research carried out with 26 women between 40 and 65 years old, with Fitzpatrick phototypes II and III and grade III on the Glogau scale was developed to study the action of intense pulsed light on photoaging and on the cutaneous immune response. The clinical and histopathological study evaluated Langerhans cells (CD1), the expression of the intercellular adhesion molecule, CD4 and CD8 lymphocytes, and the quantification of collagen and elastic fibers. The volunteers were evaluated histologically and immunohistochemically before and after treatment (6 months), as well as photographically. The skin was prepared with 0.025% retinoic acid plus 4% hydroquinone on the face overnight. The application of LIP consisted of 5 sessions with monthly intervals with the Israeli Record 618 equipment, which has a wide wavelength (420 to 1100 nm). The duration of the single pulse was 10 milliseconds, energy 20 J/cm² and air cooling, 3 passes being made. The results were a clinical improvement of the skin from moderate to severe in 76.92% of the cases (p<0.05); histologically there was an increase of 51.33% (p<0.05) of collagen fibers and 44.13% of elastic fibers; the quantification of Langerhans CD1 cells and CD8...
lymphocytes did not show significant differences, but there was a decrease in CD4 lymphocytes with an increase in the fraction of the area of small blood vessels in the dermis. This fact allowed us to affirm that LIP promotes skin rejuvenation (PATRIOTA; RODRIGUES and CUCÉ, 2011).

In addition to laser and LIP, there is another type of phototherapy widely used in the area of aesthetics called LED (light emitting diode) that improves the quality of the skin. The LED acts through photobiomodulation that allows stimulation of antioxidant responses, increased production of ATP and, in this way, acting on the improvement of skin quality and rejuvenation (BORGES, SANTOS and MOLZ, 2019).

Photobiomodulation can be obtained with the use of laser phototherapy and the LED within the light range corresponding to 600-950nm, i.e. the red and infrared bands. Phototherapy in this range of light spectrum allows the mitochondria to stimulate to increase the synthesis of ATP and, as a result of the increase in ATP production, there is also an increase in the production of superoxide that acts as an antioxidant. Therefore, photobiomodulation improves skin quality and promotes rejuvenation (BORGES; SANTOS and MOLZ, 2019).

Therefore, led is often used in skin rejuvenation therapy due to its photobiomodulation mechanism. It is a safe and painless procedure and to validate this therapy several studies have been developed. One of the studies was an experimental study with a controlled and blind clinical trial in volunteers from 35 to 55 years old, living in the municipality of Parnamirim/RN. The women were evaluated with facial evaluation protocol and photographic analysis to evaluate the angle and measurement of the nasogenian sulc, by radiocef studio 2 software. They were divided into a control group (group 1) composed of 20 women and an experimental group (group 2) formed by 20 others. However, during the study, 16 volunteers were excluded for giving up or abandoning treatment. Since 8 volunteers belonged to group 1 and 8 to group 2, the result of the study was related to 24 volunteers. The aim of this study was to evaluate the effect of LEDs on facial rejuvenation. Group 2
was treated with phototherapy with red LED (660nm), a power of 20 watts, for 20 minutes, in a frequency of 2 weekly sessions, for a total of 16 sessions. The study concluded that the led rejuvenates the face, as it decreases the cutaneous hypotonia evidenced by the increase in the nasogenic angle and reduction of the nasogenic groove measurement (ESTRELA et al., 2014).

Therefore, epidermis integrity and stimulation in increasing collagen production in the dermis are possible with the application of non-ablative rejuvenation techniques. For example, intense pulsed light (LIP) allows for non-ablative photorejuvenation. It is worth noting that LIP is not a laser, but just as non-ablative laser generates heat on the skin without cuts and is a therapy that can be used against aging, sagging and skin blemishes (SANTOS, 2019).

A less costly treatment for skin rejuvenation is the microcurrent also called MENS (Microcurrent Electrical Neuromuscular Stimulation). It is a type of electrostimulation that employs low intensity currents (microampères) and low frequency, and may present continuous or alternating currents. This type of current has the characteristic to be subsensory, so it does not generate discomfort to the client. The frequency of the device, in general, can be helped between 0.5 Hz and 900 Hz and the intensity between 10 and 1000 μA. It has an advantage for aged skin snares by restoring tissue bioelectricity, improving tissue oxygenation and increasing the active transport of amino acids, protein synthesis and ATP.

MENS has been frequently used in aesthetic treatments and there are relevant studies on its efficacy. One of these studies analyzed the effects of MENS in 6 volunteers with periorbital wrinkles, their degree of satisfaction and tolerance to treatment. Women between 45 and 60 years of age were evaluated by noninvasive technique of viscoelasticity of the skin by suction. To this end, courage & Khazaka Electronic GmbH’s Cutometer® MPA580 equipment was used, which allows the analysis of the mechanical properties, firmness and elasticity of the skin. A questionnaire was also applied about the satisfaction index and the tolerance index.

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To apply the MENS, the Neurodyn Esthetic device of Ibramed was used, whose parameters were: continuous mode and monopolar square waveform, with polarity inversion every 3 seconds, frequency 500 Hz, variable intensity from 10 to 990 μA, in a total of 16 applications distributed in 2 weekly sessions. The research resulted in an increase of 54.4% in firmness in the left periorbital area and 53.8% in the right area (p<0.05). The satisfaction and tolerance index with the treatment by MENS was 66.67%, which allows us to infer that mens improves skin firmness, thus contributing to the overall improvement of its appearance (SANTOS, 2015).

Another useful procedure to treat wrinkles typical of skin aging is electrolifting also called galvanopuntura or microgalvanopuntura. It consists of a therapy that uses the galvanic current in the order of some microamps indicated for the treatment of stretch marks, rhythms and expression marks. This therapy allows to increase vascularization, antioxidant action, increase the number of young fibroblasts increasing protein synthesis, facilitate the migration of keratinocytes and macrophages that will result in tissue repair (BESSA and BESSA, 2019).

A case study conducted in Santa Cruz do Sul, in the State of Rio Grande do Sul, with 5 volunteers between 40 and 55 years of age compared the efficacy of electrolifting alone with electrolifting associated with a nutricosmetic to treat facial aging. The women were evaluated by questionnaires using the Rosenberg Self-Esteem Scale (EAR) and modified satisfaction questionnaire (Facial Outcome Evaluation), Self Perception Age (SPA) and the Visual and Analog Scale (VAS) for pain, in addition to photographic record. In the group that was associated with electrolifting with nutricosmetic composed of vitamins A, C and E, zinc, selenium and hydrolyzed collagen obtained a better rejuvenating effect on periorbicular wrinkles than the group that was only submitted to electrolifting. Pain perception, on the other, suffered slight variation. The results of the questionnaires were more satisfactory in the electrolifting group with nutricosmetic indicated increased self-esteem, greater satisfaction and feeling of youth in self-perception of appearance in relation to age (HELFER and MACHADO, 2017).

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Another research on electrolifting in the treatment of facial aging was a pre-experimental study with 6 volunteers between 34 and 65 years old who had wrinkles and/or expression lines on the face. The study aimed to verify the effects of galvanic current through the electrolifting technique in the treatment of wrinkles and/or expression lines. All participants were evaluated for skin type, skin color, use of sunscreen, use of cosmetics and whether there are circulatory disorders or scars, in addition to photographic records. The treatment was composed of 10 sessions, once a week and with intensity varying according to the sensitivity of each volunteer (between 350 and 400 uA). The equipment used was the Striat of Ibramed®. The results of the study proved the satisfaction of the participants and reduction of wrinkles (BARBOSA and CAMPOS, 2013).

To stimulate collagen formation in order to rejuvenate the skin it is possible to apply percutaneous collagen induction therapy (CIT) which is a procedure based on the use of microneedles that cause microlesions to stimulate a response to the inflammatory process. CIT can be obtained both with the micropuncture (with dermograph) and with microneedling (with dermaroller or dermapen), and the big difference is that micropuncture is used to treat the lines and scars in a concentrated and punctual way. Microneedling, on the other hand, is a technique that slows down a larger area, however, without much concentration in specific lines.

It is known that when CIT is applied it will cause an injury to the skin that can reach even the dermis. Needle piercing can break the skin barrier and some capillaries, which can cause bleeding. Initially, there is the release of platelets and neutrophils that are responsible for releasing the growth factors of transformation (TGF-α and TGF-β), platelet-derived growth factor (PDGF), insulin growth factor (IGF), vascular endothelial growth factor (VEGF). In turn, keratinocyte dissociation promotes the release of cytokines (interleukin -1α, interleukin-8, interleukin-6, TNF-α and GM-CSF). In a 2nd phase healing begins, in which neutrophils are replaced by monocytes and in this phase occurs the process of angiogenesis, epithelialization, proliferation of fibroblasts and induction of collagen type III, elastin,
glycosaminoglycans and proteoglycans. Monocytes secrete fibroblast growth factors (TGF-α and TGF-β) enabling the formation of new collagen. At a later stage, type III collagen is replaced by type I collagen that is longer-lasting (LIMA; LIMA and TAKANO, 2013).

The CIT applied alone already stimulates collagen formation and rejuvenates the skin, but the effectiveness of the treatment will be much greater if associated with cosmetics. It is important to highlight that this technique facilitates the permeate of active ingredients (drug delivery), because the needles open channels that connect the skin to the external environment. The opening of these channels serves as the gateway to topical assets in the deepest layers of the skin. Therefore, it is recommended to take advantage of the technique and associate the active with antioxidant, moisturizer, bleach, antiglicante etc. functions.

The efficacy of CIT-induced drug delivery has been presented in several studies. A research entitled "the use of the microneedling technique associated with vitamin C in the treatment of facial rejuvenation", aimed to elucidate the mechanisms related to microneedling and its association with vitamin C in the process of facial rejuvenation. And the result was that CIT was effective in vitamin C permeation promoting increased collagen synthesis as well as antioxidant action to rejuvenate the face (GARCIA; LIMA and BOMFIM, 2017).

Another important resource to treat aged skin is peeling which means peeling and presents itself of two types: chemical and physical peelings. They are non-invasive procedures that remove the layers of the skin and stimulate cell renewal, thus promoting skin flaking. Necessarily, chemical peeling uses specific acids to promote cell renewal while physical peeling uses a sanding process on the skin.

Chemical peeling is also called chemoexfoliation and is basically an acid that can be applied topically to the skin in order to remove, in a controlled way, the layers of the skin with consequent regeneration, which results in a healthier skin. It is known that
there are different types of acids and with different concentrations that can be applied for a very superficial, superficial, medium and deep action, that is, they can remove only the corneal layer or even the mean reticular dermis (BESSA, 2020).

It is known that chemical peeling has numerous benefits for the skin and is extremely effective in combating its aging, combined with the fact that it is a rapid treatment and that brings results from the first application (FERNANDES et al., 2018).

A case study in which 10% glycolic acid peeling was applied to the face in a 47-year-old volunteer, phototype II and with moderate aging degree, was carried out in the city of Cascavel, State of Paraná. In total, there were 8 40-minute sessions with weekly breaks. The volunteer was evaluated by satisfaction questionnaire and photographic analysis. The result was the reduction of the signs of advanced age, because the skin became softer, uniform, clear and revitalized in a short term. Confirming that glycolic acid acts as exfoliators that promotes increased epidermis renewal and pigmentation uniformity (ZDEBSKI et al., 2014).

Another study carried out in India on chemical peels in the treatment of facial melanosis (melasma, photomelanosis and post acne pigmentation) demonstrated the effectiveness of this type of therapy for skin revitalization. The research was a blind, parallel and randomized control study of 36 cases, with 12 cases for each dermal dysfunction (melasma, photomelanosis and post-acne pigmentation). The volunteers were divided into 3 groups of 12 with their respective elementary skin lesions. And each group was divided into 3 subgroups: group 1 to be treated with 20% salicylic acid (SA) peeling applied once in 2 weeks; group 2 for 50% glycolic acid (GA) peel applied once in 3 weeks; and group 3 with 15% trichloroacetic acid (TCA) applied once in 3 weeks. The follow-up was done by classifying the satisfaction of the volunteers and based on clinical photographs. The result was that the GA, TCA and SA peelings provided extraordinary response in melasma, photomelanosis and post-acne pigmentation, respectively. All 3 peeling agents were well tolerated with no
significant side effects at the specified concentrations tested (CHOUDHARY; DHANDE and SINGH, 2017).

Among the peelings that obtained satisfactory responses in melasma therapy that is a hyperpigmentation in the skin typical of photoaging stand out tranexamic acid, ascorbic acid, retinoic acid, Jessner solution combined with 15% trichloroacetic acid, glycolic acid and salicylic manandelic acid (BESSA, 2020). In addition to lightening the skin, chemical peeling improves skin appearance and texture, reduces wrinkles and expression marks and has decreased oil, so it is a powerful rejuvenating.

Physical peelings are of three types: crystal that uses an aluminum oxide powder on the skin, diamond that promotes exfoliation through a diamond sandpaper tip and the ultrasonic that employs a metal tip that emits ultrasonic waves to remove dead cells from the surface of the skin. There are also physical peels formulated with abrasive substances conveyed with creams, emulsion, gel, gel-cream or lotions that remove the first layers of the skin.

Diamond peeling is a microdermabrasion feature that consists of a negative pressure device along with a glass or acrylic pen and diamond tips of different particle sizes (50 to 200 microras). Its use allows the remove of aged cells, stimulate the production of new cells and neocollagengenesis. In general, it is associated with the application of cosmetics, but even its isolated action already produces benefits for the skin.

There are clinical studies that prove that diamond peeling alone or associated with cosmetics is effective for treating facial aging. This is the case of the uncontrolled clinical trial composed of 26 women selected for convenience, aged between 25 and 55 years. The study aimed to analyze the effects of microdermabrasion through diamond peeling versus its association with topical vitamin C. To participate in the study, volunteers would need to have signs of facial aging, such as: spots, wrinkles and dryness. They were evaluated by physical therapy test form, skin quality

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perception questionnaire and pre- and post-treatment photography. They were divided into two groups: group A: microdermabrasion with diamond peeling and group B microdermabrasion with diamond peeling associated with topical vitamin C, Bio C® Home Care 10% of Bel Col®. The treatment lasted 4 weeks, being applied once a week. In both groups diamond peeling was applied to 200 micron and with vacuum pressure from -100 to -200 mmHg, and vitamin C was added to group B in group B. In all volunteers, factor 30 sunscreen was applied, in addition to orientations regarding its use and avoiding exposure to the sun. As a result, visual improvement was observed in fine wrinkles and facial grooves in both groups and without significant difference. However, the skin tone, texture and overall appearance was better perceived in group B. Therefore, in both groups the result was satisfactory (CAMPOS; CALEGARI and SILVA, 2017).

Crystal peeling is another resource that can be used in the treatment of facial rejuvenation. The equipment also works with negative pressure, but the pen has two cannulas, one that ejects the aluminum oxide crystals and the other that sucks them from the skin. The sandblasted microcrystals on the surface of the skin produce microabrasion to stimulate the mechanisms of repair and renewal of the dermoepidermal layer.

A typical aged skin disorder is facial hyperchromy and to treat it there is crystal peeling. It represents a noninvasive method employed for the revitalization and rejuvenation of the skin. This type of peeling has been useful for increasing hydration and controlling water loss, but its results are momentary and obtained soon after its application and lasting only one day after its use (DE ALMEIDA and FERRACINI, 2012).

Another type of peeling that can be used to treat aging skin is ultrasonic peeling, as it emits vibrational waves that help remove the cells from the corneal extract and excess sebaceous secretion, promoting cell renewal, reducing the incidence of comedone formations, providing shine and vibe to the skin. This feature allows a

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superficial exfoliation of the skin painlessly and without producing erythema. It can be used alone or by combination therapy with ionization. Other benefits provided by this resource are: deep hygiene, superficial whitening, decreased oil, improved oxygenation and revitalization of the skin, hydration of the skin and introduction of ionizable cosmetics (SOUZA and NASCIMENTO, 2015).

Therefore, microdermabrasão is a resource that can be used in the treatment of skin aging, as it is effective to reduce the thickness of the stratum corneum, increase local circulation, improve hydration and collagen synthesis and, consequently, improve the appearance of the skin (FERNANDES and DE OLIVEIRA ASUNÇÃO, 2011).

Although all electroaesthetic resources can provide more youth and health to the skin, cosmetics are essential to enhance and add the benefits achieved. And when it comes to an aged skin it is necessary to act in several points of dysfunction that it presents, so the selected assets must have several actions, such as: hydration, depigmentation, antioxidant, antiglicante, desglicante, pH control, maintenance of the hydrolipidic mantle, nutrition, cutaneous and muscular firmants, protectors against UVA, UVB and visible light etc. An same asset can have more than one function, so it is important to select, whenever possible, multifunctional active, as it will act simultaneously on various skin changes.

An example is lactobionic acid which is a potent antioxidant, moisturizing, in addition to improving the turn over cell and firmness of the skin. It is an excellent option for photoaged and hyperkeratinized skins without causing irritating skin reactions (FERREIRA, 2019).

Another example is vitamin C or ascorbic acid which is a very common active in cosmetic formulations. It has high efficacy in antioxidant action, but is also a protector in collagen and elastin synthesis, besides being a depigmenter, so it helps to slow down cell aging of the skin (DE OLIVEIRA, 2018).
There are several beneficial active ingredients for aged skin, briefly, as antioxidant actives, one has: coenzyme Q10, green tea extract, Ginkgo biloba and idebenone; for hydration, aquaderm, hydrovance, urea from 1% to 10%, aquaporine active, allantoin and aquaxyl; firming assets such as densiskin, rafermine, dimethylaminoethanol acetoamidobenzoate (DMAE), liftiline, vegetensor, easy lift and sesaflash; dermorelaxants, argireline, leuphasyl and vialox poder (BORGES and SCORZA, 2016).

Growth factors are also widely used in the treatment of the skin, as their deficiency can accelerate the aging process. They represent a group of numerous molecules of biologically active protein structure that regulate the cell cycle, among them stand out: PDGF, TGFα, TGFβ, EGF, FGF, KGF, IGF, VEGF and CTGF. Thus, several growth factors are used to promote collagen synthesis and combat signs of aging, such as wrinkles and facial sagging (AMARAL et al, 2020).

**FINAL CONSIDERATIONS**

Aging is a certainty that we all have, however, the search for the preservation of youthful appearance has been a requirement for the idealization of beauty. A good diet, regular practice of physical exercises and aesthetic treatments can slow down the body's natural aging process, including the skin.

This study aimed to investigate the main aesthetic treatments and their therapeutic effects used to keep the skin of the face younger and healthier. And it was possible to observe that dermatofunctional physiotherapy uses an arsenal of conducts that can moisturize, nourish, improve skin and muscle tone, depigment, stimulate collagen and elastin synthesis, have antioxidant, antiglicante and desglicante actions that result in a more jovial and healthy skin.

Several resources can be employed by the physiotherapist in the process of face rejuvenation, such as: radiofrequency, laser, intense pulsed light, LED,
microcurrents, electrolifting, microneedling, micropuncture, peelings and cosmetics. All these resources already have research that attribute credibility to its effects, therefore, justifies its prescription in isolation or combined.

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