Stretch marks, causes and treatments used today – Scoping review

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ABSTRACT

Introduction: As it is the largest organ in the body, the skin is more exposed to solar radiation, body changes as well as genetics. The skin covers the body and acts as a physical barrier between the body and the outside environment and represents about 16% of body weight. Because the skin is an organ with numerous functions, it is exposed to structural changes that are easily perceived by the naked eye, including stretch marks. For a better understanding, we need to understand that the elastic fibers of the skin are the starting point for the formation of stretch marks. Methodology: This is a scoping review where descriptors in Health Sciences - DeCS were used. The descriptors of interest and Boolean operators were: "Therapeutic AND "Skin Lesions (stretch marks)". The search was carried out in the PubMed, Scielo and Bireme databases by these databases provide a broad search combining information from other platforms, using 19 relevant articles. Results: There are treatments that can treat and reduce this problem and include micropuncture, microdermabrasion, microneedling, carboxytherapy as well as the combination of treatments, which must be performed by trained professionals due to their specificities. Final considerations: Stretch marks are acquired integumentary lesions and, like any scar, can be considered a difficult treatment. However, with the current advancement of techniques, there are several aesthetic treatments that are performed, however, there is no scientific proof of their effectiveness for the total disappearance of stretch marks and, as it is a genetic predisposition, prevention includes both the maintenance of the ideal weight and good skin hydration.

Keywords: Stretch marks, Skin, Treatment, Microneedling.

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INTRODUCTION

The second half of the 20th century was a milestone in the development of new body image, public concern for body image, and a growing sense of community identity, resulting in a variety of beauty treatments that will be pursued to achieve this goal. the perfection of the skin (Bohjanen, 2017).

As it is the largest organ in the body, the skin is more exposed to solar radiation, body changes as well as genetics. The skin covers the body and acts as a physical barrier between the body and the outside environment and represents about 16% of body weight. Formed by an outermost epithelial portion, the epidermis and conjunctiva, below the epidermis, called the dermis. The epidermis acts as the main barrier between the body and the external environment due to the keratinized layer that covers the entire surface of the skin. However, this barrier is not enough to stop nervous stimuli that allow the skin to identify the information that the environment transmits to the body and are interpreted by the central nervous system (CNS) (Bohjanen, 2017); (De Camargo, 2018).

The skin contributes to the body's thermoregulation with the help of blood vessels, adipose tissue and sweat glands, protecting the body against the action of ultraviolet rays, through the melanin produced by melanocytes, which uses ultraviolet (UV) radiation to form vitamin D3 (Alves et al, 2019).

Our body has places where the skin can be thin or thick, depending on its location. Hands and feet have a thicker epidermis due to a larger keratin layer on the outer portion of the skin, and the face, chest, and neck skin is thinner and more fragile (Alves et al, 2019); (De Camargo, 2018).

Because the skin is an organ with numerous functions, it is exposed to structural changes that are easily perceived by the naked eye, including stretch marks. For a better understanding, we need to understand that the elastic fibers of the skin are the starting point for the formation of stretch marks, where the process of mast cell granulation and macrophyc activation begins, increasing elastolysis in the epithelial tissue (Cosme, 2015).

Stretch marks are considered an acquired tegumentary atrophy, with a linear and sinuous aspect that presents itself in two aspects: in the initial red phase, it has this color, because it has adequate vascularization, so that it can try to recover the skin, being easier to treat, later those that were not treated or that continued to be distended, will be found in white, They not only change color, but over time they become deeper, with the appearance of aged skin, and consequently wider and longer. In the case of obese people, or pregnant women, or individuals with accelerated growth, the structures that withstand pressure generate a weakening in the thickness of the connective tissue with great tensions on the skin, thus causing the rupture of elastic fibers and the formation of stretch marks (Cosme, 2015).

However, there is no precise explanation for the causes of the appearance of stretch marks, studies point to multifactorial causes, endocrinological and mechanical factors, genetic and family factors. Such factors have led to the emergence of three theories of its etiology: mechanical, endocrinological, and infectious (De Souza et al, 2016).

For the treatment of lesions, several techniques have been used so far to reduce or, if possible, eliminate undesirable stretch marks. Thus, this study will describe, through a scoping review, the therapeutic resources used in the treatment of stretch marks, discussing the benefits of these procedures and the more selective methods.

METHOD

The scoping study or scoping review is a study that aims to explore the main concepts of the topic addressed in the study, as well as to verify the size, scope and nature of the study, in a clear and concise way in the publication of the data found, allowing an analysis of the results of published studies (Ferraz et al, 2020).

Scoping review is a form of literature review, also called *scoping review* - directed by a research protocol that aims to evaluate current evidence, clarify concepts or definitions (Jesus, 2023 et al)

Scoping review can be used to assist in the collection of broad and focused information, without distinction between types of studies and methods used.

In the first stage of this study, the descriptor was established based on the Health Sciences Descriptors - DeCS. The descriptors of interest and Boolean operators were: "Therapeutic AND "Skin Lesions (stretch marks)".

The search was carried out in the PubMed, Scielo and Bireme databases by these databases provide a broad search combining information from other platforms. The following question was used: how is the scientific production about the therapeutic resources used in the treatment of skin lesions, particularly stretch marks, presented?

The inclusion criteria were: (a) original articles in Portuguese and English; (b) contain the keyword; (c) studies in the last 15 years; and (d) time frame between the years 2008 and 2023. The exclusion criteria were: (a) studies undertaken outside the period delimited for the search for production in scientific literature; (b) publications referring to reports of experiences and opinion articles; (d) texts not related to the themes addressed in the work – skin lions – stretch marks. The analysis focused essentially on the scoping review, with a descriptive approach. A total of 132 articles were found on the subject, but only 19 were used in this study, due to their relevance.

RESULTS

To understand the process of formation of stretch marks, it is necessary to understand the layers of the skin and their functions that will be important factors in the formation of stretch marks.

The layers of the skin are composed of the Epidermis, which is formed by:

- Basal or germ layer: the deepest and responsible for the constant renewal of the epidermis, in this process the cells leave the basal layer and move to the layer, in a period of 21 to 28 days.
- Spinous layer: the cells in this layer have a spiny appearance and play a role in maintaining the cohesion of the cells of the epidermis and in the resistance to friction.
- Lucid Layer: prominent in areas of thicker skin and may be absent in other places. When visualized, it looks like a clear, bright and homogeneous line. Composed of flattened cells of keratinocytes.
- Corneal Layer: consists of several planes of dead and closely linked cells, being the most superficial layer of the epidermis. When their cytoplasm is replaced by keratin, the dead cells are referred to as cornified cells that not only protect the body from external invaders but also help restrict water loss. These cells are eliminated as a result of abrasion and friction.
- Granulosa Layer: its cytoplasm is characterized by having keratohyaline granules. As the granules increase in size, the nucleus disintegrates resulting in the death of the outermost cells of the granulosa layer.

The second layer of the skin is the Dermis, formed by:

- Papillary Layer: made up of loose connective tissue and some authors admit that the function of the papillae is to increase the dermal-epidermis contact zone, giving greater resistance to the skin. Some papillae contain capillary wings and other specialized sensory receptors that react to external stimuli.
- Reticular layer: made up of dense connective tissue, it is the thickest and the bundles of collagen fibers that make it up intertwine in an arrangement similar to a network, hence its name. It contains many elastic fibers, responsible, in part, for the elastic characteristics of the skin (Guirro, 2004).

Skin integrity occurs when physiological homeostasis is present and can be impaired when for some reason there is injury to the skin, mucosal, and corneal tissue, and has as established characteristics the destruction of the continuity of the skin and its layers, as well as the invasion of body structures (Costa, 2021).

Atrophic scars, also called stretch marks, are visible and protruding linear scars, arranged parallel to each other, their cause is a rupture of elastic fibers, collagen and loss of skin color. It is diagnosed as a skin lesion, as it presents as a localized elastic imbalance (Machado, 2014).

Tissue stretching is very important for a person in several organs, including the skin, which responds to a series of physiological and pathological applications throughout their life, mainly due to the presence of stretch marks in the muscle. (Elsais et al, 2009)

The fiber can be determined by the shape of the slit lines or by the Langer lines, the lines that determine the shape of the threads in the fabric. The strength of elasticity varies according to the region of the body, and this is due to the variation in the normal direction of collagen and elastic fibers in the dermis. (Shu et al, 2023)

Collagen fibers provide tissue formation and elastin fibers provide flexibility, these are closely linked to the dermis, which is one of the main supporting tissues of the skin. Elastin, a high molecular weight fibrillar protein, is composed of a series of rare amino acids, such as desmosine and isodesmosine, responsible for its properties (Un-Din; McGeorge; Bayat, 2016).

The main component of extension fibers is protein elastin, a fiber capable of resisting acids and acids, easily allowing even the smallest substances, but resumes its original state as soon as the decomposition energy is exhausted. They are composed of various cells, such as fibroblasts, chondrocytes, and smooth muscle cells (Maia, 2009).

Changes in structures that support strong resistance create connective tissue stiffness, which, combined with severe skin tension, such as obesity, produces skin stiffness (Ud. Din; Macgeorge; Bayat, 2016).

Expandable fibers with lateral lesions, for example, are prone to, and older lesions, disintegrate and concentrate in isolated areas and therefore suffer less stress in the captivity of the skin called stretch marks (Ud. Din; Macgeorge; Bayat, 2016).

Stretch marks are defined as the process of fine-tuning the skin, characterized by atrophic lesions in a straight line, varying in color according to the stage of evolution. Atrophy of the skin, in rows, with immediate, straight, curvilinear or sinuous stretching, there is atrophy of the epidermis, with a modified dermal-epidermal border (Liu et al, 2014).

Stretch marks are called atrophic because of their symptoms, as atrophy is the decrease in the firmness of the skin, caused by a decrease in the number and volume of its components. They have a two-state character, that is, there is a tendency for stretch marks to be evenly distributed (Maia, 2014).

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According to studies, three theories seek to justify the etiology of stretch marks, they are, mechanical theory; endocrinological theory and contagious theory;

Mechanical theory: It occurs when the skin is affected by stretching, breaking, or loss of skin stretch marks, for no apparent reason, as in the case of obesity, it is believed that there is overexposure to adipose tissue, especially this fat. What happens next is the main pattern of simple marker appearance, pregnancy, puberty, vigorous exercise, and growth. They are considered fundamental factors at the origin of extensible symptoms (Cenedese, 2018).

Endocrinological Theory: With the advent of cortical adrenal hormone therapy or through the indiscriminate use of anabolic steroids, chemical disorders of the diet, hormonal disorders, latrogens are associated with the appearance of stretch marks whose effect is found only in other regions.

Infectious Theory: Infectious processes have been reported to cause damage to the extensor fibers that cause stretch marks due to the appearance of stretch marks in adolescents after typhoid, rheumatic fever and other chronic liver diseases, chronic hepatitis, Marfan syndrome, elastic pdeuxantoma and buscheke-Ollendorf syndrome.

In addition to these factors, there is a genetic and familial tendency. The gene expression that determines the formation of collagen, elastin, and fibronectin is reduced in (Cenedese, 2018).

Symptoms of dilation can be classified as: pink (primary), atrophic and pearlescent: pink or primary, with inflammatory and pink coloration due to excessive stretching and rupture of some blood capillaries and clinical signs of itching and pain in others. cases, flat papular rash and mild edema (Cenedese, 2018).

Atrophic presents with a scarring aspect, flaccid central line, and hypochromia, with twisted and ruptured fibers, with irregular collagen and preserved cutaneous appendages (Maatta, 2022).

The pearly crop, on the other hand, has moderate flaccidity, covered by leafy epithelium, devoid of adhesive material, with torn stretch marks and fibrosis-transforming lesions (Maatta, 2022).

Stretch marks are a major cosmetic concern in a large number of people. They are red and swollen in the early stage and white and irregular in texture in the later stage. Both men and women suffer from low self-esteem caused by stretch marks.

There are treatments that can treat and reduce this problem and include micropuncture, microdermabrasion, microneedling, and chemical peels, as well as the combination of treatments (Maatta, 2022).

Medical stretch mark tattooing, also known as microneedling, can correct the color of skin pigmentation in the normal direction, but not the actual textural change. The abnormal texture can be modified by microneedling, by non-ablative laser treatment or by microdermabrasion. Treatments can also be combined, for example, initial use of a method to flatten the skin, followed by tattooing aimed at color correction (Maatta, 2022).

Micropuncture is an effective technique in the treatment of stretch marks, with the reduction of its size, in millimeters, it provides an improvement in the condition of this dysfunction. Growth factors help in the collagen formation process, rebuilding broken fibers, promoting skin filling, changing its appearance. According to the classification of skin phototypes, the higher the phototype, the greater the risk of hyperpigmentation, so the technique does not provide a significant improvement in cases of phototype VI, even though it is reversible, the de-skinning process is slow and not always the first option of choice according to Cosme (2015).

Some time ago, stretch marks were considered irreversible lesions, but with the evolution of therapeutic resources, a range of techniques have been created in order to improve the appearance of the skin, stimulating the synthesis of new collagen.

Among these techniques, microneedling should be highlighted, which produces significant results in the appearance of scars, as well as in the improvement of recent and old stretch marks. The equipment used for this technique is a formed roller covered with fine needles, made of surgical stainless steel with a length between 025 mm and 2.5 mm in diameter. In the application of the percutaneous collagen induction technique, it is recommended to clean the site with 70% alcohol, and the use of anesthetic may be necessary, which will be determined according to the length of the needle and individual sensitivity. The device has a roller (dermaroller) and pen (dermapen) version. If the amount to be treated is wide, it is recommended to use the dermaroller, while the dermapen is more used in smaller and specific areas such as facial wrinkles. The roller is composed of an average of 190 to 1,080 microneedles, with lengths ranging from 0.20 to 3.0 mm and with a diameter of 0.1 mm to 0.12 mm. The appliance should be handled with vertical, horizontal and diagonal movements to the right and left 10 to 15 times in each direction with adequate pressure. There is no consensus on the ideal number of rolls, so it is suggested to change direction when heavy bleeding, petechiae, or hyperemia is observed. The therapeutic system of microneedles opens microchannels from the layer to the dermis, without harming the epidermis, promoting an inflammatory stimulus which triggers the release of growth factors, where damaged collagen is removed and the development of neocholanogenesis and neoangiogenesis occurs, resulting in increased skin quality. Tissue remodeling persists for months after the procedure, until the skin improves (Queiroz et al, 2021); (Silva et al, 2016); (Costa, et al, 2020).

The last treatment to be mentioned in this study, which also demonstrates effective results in stretch marks, is carboxytherapy, which provides an attractive aesthetic option in skin rejuvenation, atrophic scars, stretch marks distensae (stretch marks), cellulite-fibrolipodystrophy adhesions after liposuction, and certain types of alopecia. It is an aesthetic procedure of a non-surgical interventionist nature based on the application of gas injections into the skin in order to eliminate problems such as

stretch marks, cellulite, sagging skin and localized fat. It is a simple and effective form of intervention aimed at stimulating cell metabolism, without harming it (Bagherani, 2023).

The therapeutic use of medical carbon dioxide (99.9% purity) is administered subcutaneously, promoting peripheral vasodilation improving tissue oxygenation, causing an inflammatory process, where the skin responds with hyperemia and edema whose purpose is to increase fibroblast replication and elastin and collagen production, concomitantly increasing local nutrition. This technique causes a small aggression in the epidermis on the stretch marks. However, it is a painful treatment that should be used by trained professionals and with caution (Ahramiyanpour et al, 2023); (Kroumpouzos, 2022).

Thus, this study sought to present, through a scoping review, the most current treatments regarding skin lesions, especially stretch marks, which can bring aesthetic discomfort and acceptance of body image in individuals of different ages and genders.

FINAL CONSIDERATIONS

Stretch marks are acquired integumentary lesions and, like any scar, can be considered a difficult treatment. However, with the current advancement of techniques, there are several aesthetic treatments that are performed, however, there is no scientific proof of their effectiveness for the total disappearance of stretch marks and, as it is a genetic predisposition, prevention includes both the maintenance of the ideal weight and good skin hydration. Improvement in appearance with a decrease in thickness/width and color is achieved through micropuncture, microdermabrasion, microneedling, carboxytherapy, among others associated with the use of cosmeceuticals, which also prevent the appearance of new stretch marks. These techniques can be used both together and alone, according to the classifications of stretch marks. Where the appearance may vary in different situations, the lesion may be depressed or elevated in relation to the level of the skin and/or with different coloration, and it is up to the professional to correctly evaluate and apply the most appropriate treatment.

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