



## Anatomofunctional changes in male facial skin during the aging process

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### SUMMARY

Nowadays, men are much more concerned about their appearance and well-being, as male vanity is on the rise and is projected to grow in our country. One of the main concerns of the male public is skin aging, and therefore, there is a search for specialized professionals and aesthetic procedures that aim to prevent, slow down and control the aging process. In order to adequately meet the demands of the male public, it is necessary for professionals in the aesthetics area to understand the anatomical and physiological differences between men and women, in addition to their main pathophysiology. Considering that Brazil is among the main countries with high demand in the area of beauty and well-being for the male public, it is important to identify the main changes that occur in the aging process and to know the characteristics of this skin in order to optimize the development of personalized and specific protocols that meet the needs of this public. Aiming to identify the main anatomical and physiological characteristics of male facial skin and to understand the main unsightly changes in the aging process, this study carried out a bibliographic survey using *Scielo, PubMed, and Lilacs* databases related to the topic addressed. The period of bibliographic research occurred from August 2024 to May 2025. The results indicated that the anatomical and physiological differences in male skin require specific adjustments when compared to the protocols conventionally used for the female gender, and are therefore personalized for the male audience.

**Keywords:** aging, skin anatomy and physiology, male beauty

### ABSTRACT

Nowadays, men are becoming much more concerned about their appearance and well-being, as male vanity is on the rise and is projected to grow in our country. One of the main concerns of men is skin aging, and therefore, there is a search for specialized professionals and aesthetic procedures that aim to prevent, slow down and control the aging process. In order to adequately meet the demands of the male public, it is necessary for professionals in the aesthetics area to understand the anatomical and physiological differences between men and women, in addition to their main pathophysiology. Considering that Brazil is among the main countries with high demand in the area of beauty and well-being for the male public, it is important to identify the main changes that occur in the aging process and to know the characteristics of this skin in order to optimize the development of personalized and specific protocols that meet the needs of this audience. Aiming to identify the main anatomical and physiological characteristics of male facial skin and to know the main unsightly changes of the aging process, the present study carried out a bibliographic survey using *Scielo, PubMed, and Lilacs* databases related to the topic addressed. The period of bibliographic research occurred from August 2024 to May 2025. The results indicated that the anatomical and physiological

differences of male skin require specific adjustments when compared to the protocols conventionally used for the female gender, and are therefore personalized for the male public.

**Keywords:** aging, skin anatomyphysiology, male beauty

## 1. INTRODUCTION

In contemporary society, taking care of one's appearance is not just for the public.

female but also to the male audience, and the male aesthetics market has growing a lot in recent years.

Aesthetics is an area that brings the desire for improvement in aesthetic dysfunctions according to the standards designed for each individual and the professional in this area must be prepared to identify the specific needs of its customers (LIMA, 2023) and develop protocols

facial and body treatments aimed at improving self-esteem and caring for each client. Professionals who wish to serve diverse audiences such as: men, transgender people and ethnic groups specific (e.g. Asian group) must have in-depth knowledge of the differences

anatomical and functional aspects of each group and also have knowledge of the main dysfunctions prevalent aesthetics among them. It is also worth noting that in some audiences, some care additional precautions during treatment should be taken to prevent skin damage such as

For example, Post-Inflammatory Hyperpigmentation that can occur after an aesthetic treatment that does not consider the physiological differences of certain skin types.

The aging process is one of the main concerns reported by customers in aesthetic clinics. The aging process is multifactorial and affects all cells, tissues and organs of the body, leading to alteration, deficiency and/or loss of function in these systems through multiple mechanisms (AGRAWAL, 2023). The process is related to a complex network of physical, psychological, social, economic and cultural (DA ROCHA, 2018).

Men and women age, but the aging process occurs differently between the two genders due to the anatomical and functional characteristics of each gender. It is

It is important that the beauty professional is prepared to work with the public

male because it presents physiological, biochemical and biophysical differences in the skin when compared to the female audience. (RAHROVAN *et al.*, 2018). The differences

anatomical and functional differences between men and women is attributed to the differences found in the sex hormones of each gender, behavioral and environmental factors in addition to ethnicity (RAHROVAN *et al.*, 2018).

When developing a protocol for the male audience, it is also important to keep in mind social, cultural and environmental differences such as pain tolerance, affinity with terms technicians and types of treatments related to the aesthetics area, time available to perform long treatments, dedication to the skincare routine , among others. Such aspects can seem quite common to the female audience or even basic, such as a skincare routine , however, for the male audience, such aspects may be relevant to decision-making in the selection of aesthetic treatments. Therefore, understanding the characteristics physiological, chemical, biophysical and morphological characteristics of male skin, in addition to the characteristics specific behavioral strategies will enable professionals in the aesthetics field to develop customized protocols considering the differences, enabling an approach suitable for the treatment and care of aesthetic skin problems of this group. In addition Furthermore, knowledge of the anatomical and functional differences in facial skin linked to gender can enable the development of new cosmetic products, treatments and aesthetic interventions appropriate to the specific needs of each gender. The study aimed to identify the main physiological, biochemical and biophysical changes that occur during the aging process of male facial skin and also identify the main strategies in the area of aesthetics and cosmetics available in market for men's skin that are currently used.

## 2. THEORETICAL FRAMEWORK

Throughout the history of advertising, an idealization of beauty has been created in society in which one should follow supposed standards of what is a body or a face socially accepted as beautiful (PÉREZ, 2024). In the past there was social pressure generated by machismo institutionalized among the male public that caused negative effects on themselves men, establishing an ideal of a “virile” man and associating self-care with feminization of man (DE OLIVEIRA, 2024). Due to the great influence of society, man does not demonstrated their interest in the issue of self-care for a long time, but in nowadays, due to the younger society, this new profile of masculinity is breaking taboos and providing a significant increase in demand from this audience in cosmetic area. Also worth mentioning is the significant increase in the number of men who use cosmetics aimed at self-care (DE OLIVEIRA, 2024), in addition to the high demand of this public through various aesthetic treatments.

## 2.1. Structure and function of the skin

The skin is made up of integumentary tissue and is the largest organ that humans have. It has as main functions: to be a skin barrier that protects the internal organs and systems. This organ also controls the passage of water and electrolytes and plays a important role in the body's thermoregulation, in addition to its immunological, sensory functions and autonomic (RAHROVAN *et al.*, 2018). The skin is divided into epidermis, dermis and hypodermis.

### Epidermis

It is the outermost layer of the skin, it is thin, but has many sublayers: basal layer, stratum spinosum, stratum granulosum, stratum lucidum and stratum corneum (GOUVEIA, 2023). It is in this layer that important processes occur for the aesthetic area, such as: cell renewal, melanin production, keratin production and hydrolipidic mantle. It is made up of mainly by eratinocytes, cells that produce keratin. They act as a barrier physical protection against water loss and the invasion of microorganisms (BEZERRA, 2025). An important feature of this layer is that it is avascular.

### Dermis

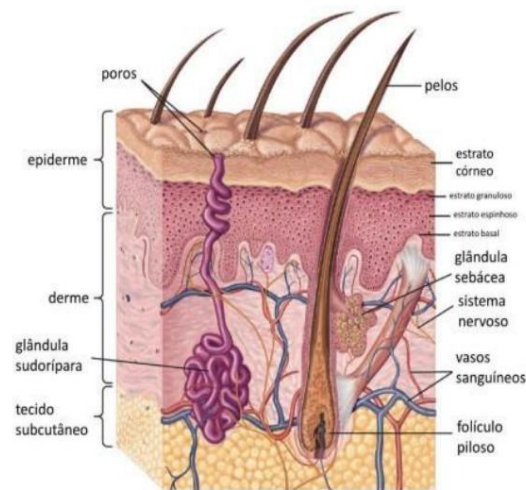
It is the intermediate and supporting layer. It is divided into two layers: the papillary dermis and the reticular dermis. In the papillary dermis, which is located in the upper part of the dermis and is wavy and presents the dermal papillae. The reticular dermis is the thickest layer of the dermis and is made up of dense, irregular connective tissue. It is in the dermis where the collagen fibers and elastin, which give the skin resistance and elasticity, as well as blood vessels blood vessels and nerve endings responsible for the exchange of nutrients and the perception of stimuli (BEZERRA, 2025). It is also in the dermis that the hair follicles and sebaceous and sweat glands. The main cells present in the dermis are the fibroblasts, responsible for the production of collagen and hyaluronic acid.

### Hypodermis (Subcutaneous Tissue)

In the lower layer, the presence of adipocytes provides thermal and mechanical protection to the body (GOUVEIA, 2023). Men have smaller collagen fiber septa in relation to the fibrous septa of women which have a parallel distribution and are larger. The collagen fibers in men are arranged in oblique planes with small lobes of fat. The specific characteristics in the distribution and size of fibers in women make them unique to the pathology known as Lipodystrophy Gynoid (LDG), popularly known as cellulite. (DA CUNHA *et al.*, 2014)

The figure below illustrates the layers of the skin.

Figure 1. Illustration of the layers of the skin



Source: BRITANNICA [sd] -Translated by Biondo, 2022.

## 2.2. Anatomofunctional differences between male and female skin

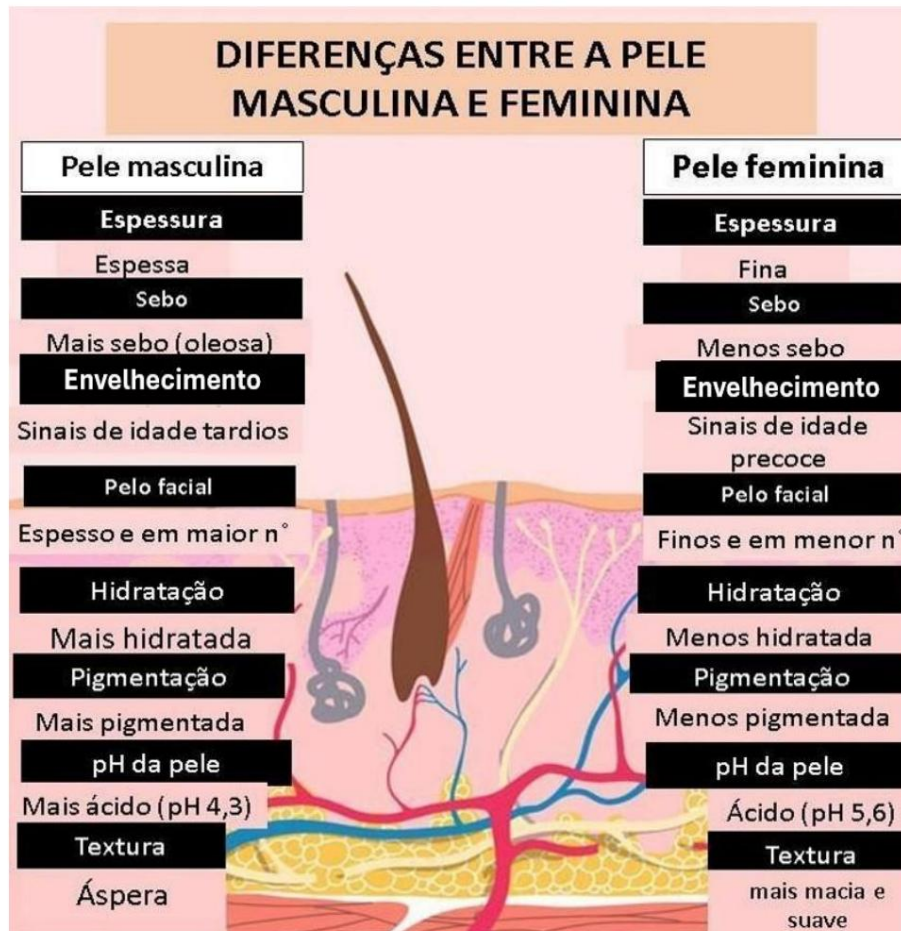
There are relevant differences in the area of aesthetics related to gender such as: anatomy, physiology, the manifestation of dermatoses among others. The differences in facial skin between genders are mainly due to sex hormones (testosterone and estrogen). (CHEN *et al.*, 2010)

Furthermore, men are generally more affected by infectious diseases, while women are more susceptible to psychosomatic problems, pigmentary disorders, certain hair diseases and, particularly, autoimmune and allergic diseases (CHEN *et al.*, 2010). The

susceptibility to various skin diseases such as acne, rosacea and seborrheic eczema, vary between the sexes, and therefore the therapeutic needs of men and women of skin color are often diverse. (GIACOMINI., 2009)

Figure 2 shows the main differences between male and female skin.

Figure 2. Differences between male and female skin



Source: Proksch, 2018 *apud* Tahalramani, 2024 - modified.

The main differences in men's skin are related to the hormone testosterone, which plays an important role in skin health. The hormone in question is responsible by generating an increase in skin thickness (20% more than female skin), by increasing of horny layers, and consequent increase in keratin, producing rougher skin. (BAYLER *et al.*, 2012 *apud* RAHROVAN *et al.*, 2018). The difference in skin thickness between male and female genders are related to the collagen content in the dermis also with the size and diameter of collagen fibers (KEANEY, 2016).

Sebum content is higher in men because sebum is highly influenced by sex hormones (RAHROVAN *et al.*, 2018), as they present greater activity of sebaceous glands, leaving the skin more oily and more prone to the spread of acne. In addition, men also sweat more than women because their glands sweat glands have greater activity. (KEANEY, 2016)

Male skin has a higher amount of collagen than female skin for these reasons. reasons your skin looks more compact and firm. As these protein fibers are consumed over time, the skin becomes sagging and expression lines appear, However, this loss of collagen occurs later when compared to women. (KEANEY, 2016)

The hair on the male body is distributed throughout, and is thicker than the that the hairs present on the female body due to the hormones they have in the body, facial hair in particular due to testosterone (TAHALRAMANI, 2024). It is important also highlight that on the male face there is greater vascularization of the dermis, which can cause a higher incidence of postoperative bleeding when in cases of male facial plastic surgeries. (KEANEY, 2016)

In a study developed by Firooz *et al.* (2012) it was found that skin hydration in man is slightly smaller than that of woman, however transepidermal water loss is higher in men when compared to women. The levels of erythema and melanin are also higher in men than in women and sebum production follows the same profile for the male gender.

**Table 1.** Mean and standard deviation of skin hydration, TEWL, melanin index, index of erythema, elasticity and sebum according to gender.

Parameter	Man	Woman
Hydration	48.42 +/- 22.12	49.06 +/- 16.09
TEWL	15.49 +/- 11.47	9.52 +/- 7.36
Erythema index	378.14 +/- 124.50	303.63 +/- 100.73
Melanin index	214.82 +/- 77.66	176.82 +/- 58.42
Elasticity	0.270 +/- 0.142	0.273 +/- 0.121
tallow	60.39 +/- 74.52	42.19 +/- 54.10

Source: Firooz *et al.*, 2012 – translated



In addition to differences in facial skin, sexual dimorphism is also seen in anatomy, for example, men have a square face with balanced facial proportions, have a more angled and larger jaw when compared to women.

(FARHADIAN; BLOOM AND BRAUER, 2015)

Considering the biochemical, structural and anatomical differences found between the genders, it is possible to predict that the aging process between them also presents significant differences.

### 2.3. Sex hormones and their relationship with the skin

The skin has numerous receptors for sex hormones in a large number of cells present in the epidermis and dermis, indicating that they have a great influence on this organ (CHEN *et al.*, 2010). Hormones influence the anatomy and physiology of the skin, such as: thickness, roughness, homeostasis and even its immunological responses. (LAGACÉ, 2023).

Androgen hormones, also called steroid hormones, play a role relevant in the development of male sexual characteristics. These compounds are synthesized in the reproductive organs and also in the peripheral tissues of the glands adrenal glands. Androgen hormones (e.g. testosterone) can also be synthesized in the sebaceous gland and other skin structures

Just to get an idea of the relevance of the action of hormones on the skin, it is possible to identify androgen hormone receptors in keratinocyte cells, dermal papilla cells, eccrine glands and sebaceous glands (BLÄUER; VAALASTI AND PAULI, 2016 *apud* DEL ROSSO; KIRCIK, 2024).

Androgen hormones are related to the production of sebum by the sebaceous glands, and in the sweat glands promote greater perspiration in individuals of the same sex masculine. According to Kim and Rosenfield (2000) men use more than women even when in the same environmental conditions or situations. The greater production of sebum by the glands in men is one of the predispositions to seborrheic dermatitis and acne (LAGÁCE *et al.*, 2023). It is in the sweat glands that the enzymes responsible for the synthesis of hormone DHT (dihydrotestosterone). Hormones also stimulate hyperplasia epidermal in adult men, generating thicker skin, in addition to this effect,

hormones suppress the function of the epidermal barrier, which makes men's skin drier when compared to that of women. (ZOUBOULIS *et al.*, 2007).

#### 2.4. Aging process

Aging is seen as a natural process that occurs since we are born, becoming older. evident with the arrival of old age (DA ROCHA, 2018), this process is multifactorial being molecular, cellular, systemic, behavioral, cognitive and social endogenous and exogenous, and must be considered in an integrated manner (SOBRINHO, 2024) can be subdivided into four phases in middle age, which includes people between 45 and 59 years of age, in the elderly, people between 60 and 74 years of age, in the elderly, people between 75 and 90 years and in extreme old age, people over 90 years of age (DA ROCHA, 2018). However, The aging process begins in your early 20s and can be accelerated depending on some intrinsic and extrinsic factors.

Genetic and physiological factors play a big role in the aging process, but they are individually enhanced (information processing, memory, performance cognitive, among others); with interference from the environment and the sociocultural context (DA ROCHA, 2018) can affect the process much more and can enhance it, leaving the person looking much older than he really is. The aging process from a biopsychosocial perspective it encompasses different aspects that can influence the improving social relations among the elderly. (DA ROCHA, 2018)

One of the extrinsic factors of aging is ultraviolet (UV) rays on the skin which can cause deep damage to the layers of the skin, accelerating aging and increasing the risk of skin cancer (PARRA, 2025), and also causes collagen and elastin breakdown as well as the appearance of sun spots and wrinkles, which is why it is important to use protective and preventive measures.

With the decrease in cell division in the germinal layer of the epidermis, associated with progressive decrease in collagen synthesis and the accumulation, throughout life, of excessive sun exposure, the skin becomes thinner and less elastic, resulting in wrinkles and flaccidity (GOUVEIA, 2023) with androgen deficiency in young adults as decrease in muscle mass and strength, increase in abdominal fat mainly visceral with insulin resistance and atherogenic lipid profile, decreased libido and hair sexual, osteopenia, decreased cognitive performance, depression, insomnia, sweating and

decrease in the feeling of general well-being (SILVA, 2021).

The decline in testosterone levels, when associated with signs or symptoms, has been called andropause, or, more recently, androgen deficiency male aging (DAEM) or late-onset hypogonadism. (SILVA, 2021).

In men, the decrease in testosterone occurs gradually throughout life, and as the thickness of your skin has a direct relationship with the hormone, the same also occurs in gradually with age. In women, after menopause, the reduction in the thickness of the skin occurs quickly. (KEANEY, 2016)

### 3. MATERIALS AND METHODS

This study was descriptive in nature and as for the procedure, a survey was carried out bibliographical using the *Scielo*, *PubMed*, *Lilacs* database with broad searches for topics, with search terms such as gender differences in skin and sex differences in skin, as well as searches targeting gender differences in “skin aging”, “female and male aging” “aesthetics in aging” “aesthetics and cosmetics” “assets” “skin structure” “male aging”, “rejuvenation equipment”, “cosmetics for men’s skin”, “male hormones”. The research period bibliographical search took place from August 2024 to May 2025. The articles that report gender differences in the following areas: skin physiology, skin anatomy aging, gender-specific differences in facial skin.

### 4. RESULTS AND DISCUSSIONS

The aging process is multifactorial and therefore promotes changes at the cellular level, of tissues (such as: epithelial, connective, muscular and nervous) and also in the organs. Being the skin is the largest organ in the human body, it will undergo significant changes during

aging process can change the thickness, becoming thinner, losing the elasticity due to changes that also occur in the collagen and elastin fibers. In addition, This will also cause the skin to lose moisture and fine wrinkles will appear (STEFANACCI, 2024). There is a loss of the body fat layer, leading to a reduction in its thickness. layer, causing less tolerance to cold and an increase in wrinkles. And the changes do not end there, there is still a reduction in blood vessels and sweat glands which disrupts the body's ability to self-regulate thermal activity. It also reduces blood flow blood in the deeper layers, further compromising the body's ability to transfer heat and the skin heals (STEFANACCI, 2024). There is a drop in the production of melanin due to the reduction in the number of melanocytes, making the person more vulnerable to exposure to ultraviolet radiation. In addition to the reduction in the synthesis capacity of vitamin D for the skin (STEFANACCI, 2024).

In the male population, the aging process can manifest itself in a gradually slower and longer when compared to the same process in women, however, wrinkles and expression lines can appear more deeply. This difference in the process of

Aging is related to skin thickness, collagen production, among others.

The table below shows the main differences between male and female facial skin during the aging process.

Table 1. Main differences found in facial skin during the process aging in men and women.

Feature	Change in Aging		Reference
	Man	Woman	
Transepidermal water loss	Until the age of 50, water loss through TEWL in men is significantly lower than the water loss in Luebberding; women of the same age, With the aging, gender-related differences in TEWL they assimilate.		regardless of location. Krueger; Kerscher, 2013
Hydration	Corneal hydration (SC) significantly face and neck  Skin hydration in men progressively decreases, starting at age 40.	stratum corneum decreases  hydration is stable or even increases in women throughout life.	Luebberding; Krueger; Kerscher SC, 2013
tallow	Decrease in production of tallow, but variation is small progressively throughout aging, from 39 years old.	The sebum content in the skin decreases to women throughout the lifelong process.	Luebberding; Krueger; Kerscher, 2013
Skin thickness	Hormonal changes can lead to thinner skin and a loss of density	to a thicker skin Parra	, 2025

Continuation

Characteristic Change	in Aging		Reference
	Man	Woman	
Skin color	Higher melanin index than pigmentary disorders more common in women than in men.	disorders more common in women than in men.	FIROOZ <i>et al.</i> , 2012  Parra, 2025 Rashmi; Shivani, 2017
Skin elasticity	After the age of 40, fine lines and lines of elastin and results in loss of skin texture.	the reduction in quantity and collagen fibers, loss of volume, changes elasticity and firmness	Parra, 2025  Trinity, 2025
Wrinkles	The skin becomes saggy and oily expression lines later subcutaneous than increase of wrinkles in the forehead.	the skin being thinner and the loss of muscle weakening and the also play a crucial role in the training of these wrinkles	Tahalramani, 2024  Freitas, 2025

As we can see in table 1, during the aging process many things occur changes in the facial skin of men and women, but there are significant intrinsic differences and extrinsic between genders.

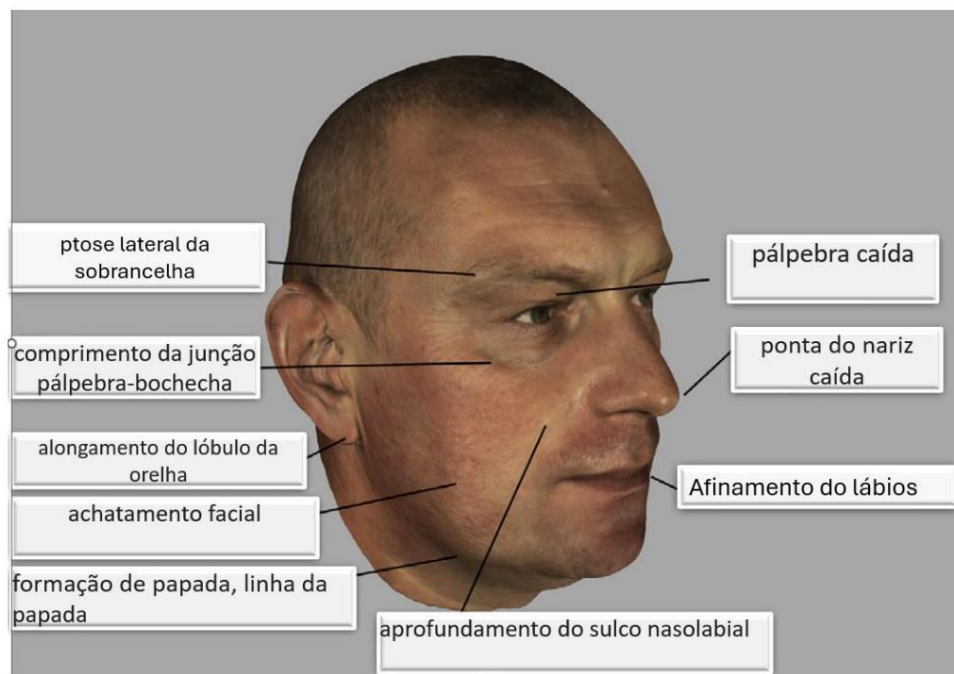
What we can observe is that male skin presents aspects of aging late and slower form, but when the process is enhanced it has a presentation more static and more complicated to improve its aspects.

In addition to the biophysical changes in facial skin during aging, there are also

anatomical differences, such as changes in the shape of the face. Figure 3 presents facial changes in men during the aging process.

Figure 3. Facial changes in men caused by the combination of changes skeletal and soft tissue.

The 3D model of the example face is publicly available at Artec3D(<https://www.artec3d.com/de/3dmodels/gesichtsscan>).



Source: Windhager et al. (2019), p. 679- translated.

In the figure it is possible to observe the expression lines and also the wrinkles generated in the process. aging, however it should be noted that the locations may vary for each age and are dependent on extrinsic factors. (WINDHAGER *ET AL.*, 2019)

## 5. FINAL CONSIDERATIONS

Concluding that the physiological, chemical, biophysical and morphological characteristics of the skin

male will enable the development of an appropriate approach to treatment and care of aesthetic skin problems of this public.

Specialization in the area of aesthetics for the male public becomes important and also differentiated for beauty professionals, who will be able to provide a treatment better for your customers, being able to obtain results with a higher level of satisfaction.

Furthermore, knowledge of the anatomical and functional differences of facial skin linked to sex can enable the development of new cosmetic products, treatments and aesthetic interventions appropriate to the specific needs of each gender.

And we can conclude that specialized beauticians are extremely important for skin treatment for men, due to their level of needs are being questioned to expand the job market. With that the need for truly specialized and focused spaces to treat the aesthetic dysfunctions of this public must be taken into account in the basic aesthetics market.

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