

**MINISTRY OF HEALTH OF UKRAINE
IVAN HORBACHEVSKY TERNOPIL NATIONAL MEDICAL UNIVERSITY
OF THE MINISTRY OF HEALTH OF UKRAINE**

Park Svetlana

Manuscript copyright
UDC:

Master's thesis

**CORRECTION OF AGE-RELATED SKIN
CHANGES USING RETINOID PEELING**

223 – Nursing

Academic advisor:
DSc, Ed. Professor
Head of Nursing Institute
of Ivan Horbachevsky Ternopil
National Medical University
Yastremska Svitlana

Ternopil – 2021

TABLE OF CONTENTS

RELEVANCE OF THE RESEARCH TOPIC.....	3
CHAPTER 1. INVOLUTIONARY SKIN PROCESSES AND THEIR CORRECTION. LITERATURE REVIEW.....	7
1.1. FEATURES OF CHRONO AGING AND PHOTO AGING.....	7
1.2 ESSENCE OF PEELING: PROBLEMS, ADVANTAGES, IMITATIONS...	10
1.3 SKIN TYPES TO BE CONSIDERED WHEN SELECTING A PEELING METHOD.....	14
1.4 INDICATIONS FOR APPLICATION OF PEELING.....	16
1.5 CLASSIFICATION OF TYPES OF PEELING.....	17
2. MATERIAL AND RESEARCH METHODS.....	22
3. RESULTS OF THE STUDY.....	27
3.1 CLINICAL EXAMINATION DATA.....	28
3.2. THE RESULTS OF EVALUATING THE FUNCTIONAL PARAMETERS OF THE SKIN.....	31
4. DISCUSSION OF RESEARCH RESULTS.....	43
CONCLUSIONS.....	46
PRACTICAL RECOMMENDATIONS.....	47
REFERENCES.....	48

RELEVANCE OF THE RESEARCH TOPIC.

Exposed skin areas are not only affected endogenous, but also external, exogenous factors that accelerate the processes aging, lead to the appearance of hyperkeratosis, telangiectasias, disorders pigmentation and conditions for the development of neoplasms. Such pathological skin aging is called photoaging [5, 24]. Photoaging outstrips chronological aging. Ultraviolet radiation induces the formation of reactive oxygen species, DNA damage and disruption of cellular homeostasis. This is accompanied by a violation signaling pathways, activation of the cascade of inflammatory reactions, development immunosuppression and remodeling of the extracellular matrix [6, 7].

For the prevention of photoaging, general recommendations are given, including sun protection, regular use preparations moisturizing the skin [9], and with a formed clinical picture photoaging can be treated with cosmeceutical agents, biorevitalization [13], botulinum therapy [8], cosmetic fillers [10], apparatus methods [14], chemical peels [20]. Until now, retinoids remain the main treatment photoaging, they are prescribed for physiological regulation of cellular level. Cosmetics include as an active substances retinol or its esters (retinyl palmitate, retinyl acetate, retinylpropionate), all living skin cells are targets [3].

Retinoids allow addressing age-related changes such as smoothing out wrinkles and skin texture by stimulating cell renewal epidermis; elimination of age spots by activating proliferation and differentiation of basal keratinocytes, influence on activity tyrosinase, which is a key enzyme of melanogenesis, and a direct effect on melanocytes due to the presence in them of intracellular proteins that bind retinoic acid. In the long term, retinoids increase moisture of the skin, accelerating the renewal of the epidermis, increasing the synthesis glycosaminoglycans and the amount of natural moisturizing factor. Retinoids themselves are lipophilic compounds and able to penetrate the stratum corneum, however, they are not stable, not completely

penetrate into the dermis and are metabolized. The action of retinoids depends on specific forms, their concentration and additional components, contained in a cream or peel. According to research carried out on skin biopsies, only 20% of retinoids penetrate the dermis, and 75% remain in the epidermis, while 60% of them are not metabolized and, therefore, are not have an effect on the structure of the skin. In addition, most of them are unstable and easily destroyed by light [17]. Only living cells that react to them are sensitive to retinoids by expressing certain genes. Retinol is not active compound and serves as a reserve, the cell independently activates retinol, converting it from the form of alcohol to the form of acid.

Retinoic acid free passes through the cell membrane and acts directly on the genetic apparatus of the cell [2]. Due to the activation of the corresponding genes, the proliferative activity of keratinocytes is stimulated, hyperplasia of the epidermis and visible peeling of the stratum corneum. Retinoic acids cause a decrease in the excretion of sebum and a change in its composition, facilitate the emptying of the ducts of the sebaceous glands [3].

Scientific substantiation of the therapeutic effects of peels with retinol and retinoic acid, their comparative analysis, underlying pathogenetically grounded method of correcting age-related changes and photoaging of the skin of the face and neck is an urgent scientific task and belongs to to the leading areas of scientific research in modern dermatology and cosmetology. However, studies confirming changes in skin function under the effect of various compositions of chemical peels with retinoids on areas of the skin with structural features, such as the forehead, the skin of the corner of the eye, cheeks and neck, we did not find it in patients of different age groups. Also not found data reflecting the parallels of changes in functional parameters skin under the influence of peels with immunohistochemical changes in skin. Analysis of clinical criteria, functional parameters of the skin, the corresponding immunohistochemical changes in patients of different age groups,

would allow developing indications for choosing an adequate chemical peels and achieve the best clinical results.

Purpose of the study.

Scientific and practical substantiation of the use of chemical peeling with retinoic acid and retinol in the correction of external signs of aging face and neck skin in patients of different age groups.

Research objectives:

1. To identify the features of the functional properties of the skin of the face and neck in patients of different age groups.

2. To determine the effect of chemical peeling with retinoic acid and peeling with retinol on the clinical characteristics of the skin of the face and neck of patients different age groups.

3. To determine the effect of chemical peeling with retinoic acid and peeling with retinol on the functional parameters of the skin of the face and neck of patients different age groups.

Scientific novelty.

It was shown that in the group of patients aged 46-60 years, the index of skin elasticity lower by 5-15% in the area of the corner of the eye, cheek, neck compared to the group of 30-45 years old. The group of patients 46-60 years old differs in a lower (by 16-26%) degree erythema in the forehead, corner of the eye, cheek. It was found that within a month, chemical peeling with retinoic acid leads to a significant decrease in the severity of wrinkles on the Merz scale in the group of 30-45 years old by 14% (subjectively, the general appearance improved by 67%), in the group of 46-60 years old - by 6 % (overall appearance improved by 42% Chemical peeling with retinol in the group of 46-60 years old significantly reduces the Merz scale index by 10%, reduces the severity of signs of photo aging, the MASI index in the group of 30-45

years decreases by 12% (the overall appearance improved by 27%), in the group 46-60 years - by 24% (the overall appearance has improved by 57%).

Theoretical and practical significance of the work.

It has been shown that for effective correction of age-related skin changes face and neck need to carry out chemical peeling with retinoids. It was found that chemical peeling with retinol significantly reduces the degree of pigmentation of the skin, increases elasticity, reduces the elasticity of the skin, these properties determine the need for its appointment for prevention and correction of age-related changes in the skin of the face and neck.

CHAPTER 1. INVOLUTIONARY SKIN PROCESSES AND THEIR CORRECTION. LITERATURE REVIEW

1.1. FEATURES OF CHRONO AGING AND PHOTO AGING.

The number of people over the age of 65, which in 2000 was 14% of the total number of inhabitants of the Earth, according to the UN forecast by the 30s of the XXI century will make up 25-30% of the total population. The current demographic the painting has contributed to the fact that the main priority for scientists of gerontologists, it has become an extension of the opportunity for older people to continue active lifestyle [2, 15]. Seniors have a professional and life experience, which allows them to be socially realized [11], however the outward signs of aging progressing with age are of concern not only the vast majority of women, but also many men.

In the process of aging, the skin changes due to the general biological a process that occurs throughout the body, which is influenced by endogenous and exogenous factors. Endogenous factors include the accumulation of cellular mutations, telomere shortening, changes in the metabolism of skin cells, age-related hormonal disorders, etc .; to exogenous - UV radiation, ionizing radiation, pollutants, microorganisms.

Physiological (chronological) aging of the skin is carried out under the action of endogenous factors and is clinically characterized by dryness, sagging skin, the appearance of fine wrinkles, benign neoplasms. Pathological skin aging (photoaging) is caused by exogenous factors. Back in the 19th century, they noticed that the skin peasants and sailors, in contrast to the skin of people working in the premises, especially thickened, has a yellowish-brownish tinge on open sites [16]. Thus, chronoaging is distinguished as a result of aging the body as a whole, and photoaging associated with exposure to open areas of the skin of the sun's rays [1, 4].

In the study of gene expression profiles in people of different ages groups (158 women aged 20 to 74 years) revealed age changes concerning the activity of more than 5600 genes, of which 1072 responded for a youthful appearance of the skin. These changes were progressive and significantly increased in the group of 60-70 year old women who entered menopause. The greatest changes were in genes associated with oxidative stress, energy metabolism, transition to a senescent state and the quality of the epidermal barrier [24].

The authors conclude that although the primary genotype plays a fundamental role in determining the mechanisms of aging, how it will occur depends primarily on changes in the expression of these genes. Perhaps in the future there will be an opportunity to influence this and slow down the processes aging. As for today, the data received once again confirm the need for regular use of sunscreen means for the longest possible preservation of health and youthfulness of the skin.

Slowdown of metabolic processes and a decrease in the pace of physiological regeneration is the basis of morphological changes in chronoaging in epidermis and dermis [12].

With chronological aging, the epidermis flattens by 10-50% in 30-80 years, the number of layers of spiny cells decreases, increases heterogeneity of keratinocytes in shape, they decrease in size and flatten, their mitotic activity decreases. By the age of 60, the number melanocytes in the skin are reduced by 24-60% [24], the number of cells responsible for immunity - up to 50%. The process of cell renewal and their displacement slows down. The stratum corneum becomes loose and thickens, its hydrophilicity decreases. Slowing down the processes of exfoliation of the horny scales, acanthosis and parakeratosis develops, which manifests itself in a deterioration complexion, it takes on a grayish, earthy hue.

Changes in the basement membrane are observed, it becomes more linear, the area of contact between the epidermis and the dermis decreases. In area

dermoepidermal junction, a decrease in the content of collagen types IV, VII and XVII, as well as integrin- β 4 and laminin-332, which leads to a weakening of structural and metabolic links and mechanical characteristics of dermoepidermal contact, promoting predisposition of the skin to damage [23]. Decrease in quantity collagen type VII helps to reduce the density in the area dermoepidermal junction and is one of the components formation of wrinkles [14]. Atrophy processes are also observed in the dermis, its thickness decreases. [19].

Revealed age-related changes in the cytoskeleton of fibroblasts can contribute to the violation of their functional abilities. Integrins, located on the surface of fibroblasts, grouping, form complexes focal adhesion between fibroblasts and their surrounding components extracellular matrix, in particular with collagen, ensuring their indissoluble structural and functional relationship [23]. Decrease observed content of mast cells and macrophages. The number decreases and the structure of collagen and elastic fibers. Collagenolytic processes prevail over collagenogenesis. Collagen fibers become denser, coarser, their architectonics [14]. With age, elastic fibers are subject to degradation, they fragmented, not identified in the papillary layer, but in the reticular layer hyperelastosis is formed. The mechanical strength, mobility and skin elasticity, turgor decreases. There is a gradual decline the amount of acidic glycosaminoglycans, glycogen, the activity decreases RNA synthesis, the amount of glycoproteins increases, acidic alkaline balance of the skin, pH shifts to the alkaline side [12], slows down repair processes in the skin. Blood vessels have an uneven lumen diameter and sclerotic changes in the walls, forming the effect of spider veins and networks [22]. On the border between the dermis and hypodermis, some authors also note structures resembling "fatty papillae", they are part of dermal fat layer, they are found in patients with both gynoid lipodystrophy, and without it. Aging and gynoid lipodystrophy can have a similar mechanical nature. So women with this aesthetic defect, signs of skin aging appear earlier than in women without it [18].

Skin changes during chronological aging and photoaging are implemented through the same mechanisms. Blood vessels have an uneven lumen diameter and sclerotic changes in the walls, forming the effect of spider veins and networks [22]. On the border between the dermis and hypodermis, some authors also note structures resembling "fatty papillae", they are part of dermal fat layer, they are found in patients with both gynoid lipodystrophy, and without it. Aging and gynoid lipodystrophy can have a similar mechanical nature. So women with this aesthetic defect, signs of skin aging appear earlier than in women without it [18]. Skin changes during chronological aging and photoaging are implemented through the same mechanisms.

Epithelial cells move more slowly to the surface of the epidermis [7], while its thickness decreases [21]. A decrease in the expression of $\beta 1$ integrin in skin keratinocytes is observed when its aging, is a marker of decreased proliferation and adhesion of keratinocytes [fourteen]. Under the influence of UV radiation, mitochondrial dysfunction develops, which includes caspase activation, membrane depolarization and release of cytochrome C. At the same time, there are processes of energy in cells, increasing oxidative stress by increasing the amount of reactive oxygen species formed in the mitochondrial complex [5]. With photoaging within the epidermis, the described changes allow observe dysplasia of keratinocytes with an increase in the number of melanocytes and a decrease in the number of Langerhans cells [9].

1.2 ESSENCE OF PEELING: PROBLEMS, ADVANTAGES, LIMITATIONS.

Every day we perform daily hygiene procedures that help us maintain the beauty and health of our skin. Cleansing, moisturizing and nourishing the skin has long been a habit and is taken for granted.

No one will deny that the face is our calling card. A beautiful, well-groomed face is nice to see. To a greater extent, the beauty of the face depends on the condition

of the skin. Our skin is made up of two layers - the epidermis (outer) and the dermis (inner). The anatomical structure of the human skin allows it to perform a protective function. The upper layers of the skin become keratinized, becoming an obstacle for pathogenic microbes. But there are also negative aspects of such coarsening or, as they say, necrosis of the surface of the skin. Dead cells in the upper layer of the skin interfere with the normal exchange of substances between the external environment and skin cells. They also worsen the condition of the skin, its color, making it dry and emphasizing wrinkles, the accumulation of sweat and dirt on dead cells will lead to clogged pores. To get rid of dead skin cells and achieve velvety skin, you need to regularly cleanse your face. Peeling is the cleaning of the upper layers of the skin, thus, we help the skin to get rid of unnecessary cells.

The epidermis is separated from the dermis by a membrane that consists of numerous cells. Gradually, skin cells die off and peel off, giving way to new ones. This is how the skin is renewed. If this process is disrupted, then the skin begins to age. This means that in order to rejuvenate the skin of the face, you need to somehow stimulate the renewal of skin cells. And here peeling comes to the rescue.

The word peeling comes from the English "to peel" - "peel off, peel off" (literally it sounds like "peel off the crust"). In cosmetology, the word peeling is used in two meanings: to denote the process of removing the epidermis and as the name of cosmetics used for this purpose. The purpose of the facial peeling procedure can be both simple skin rejuvenation and elimination or reduction of various defects - acne, scars, burn marks. Peeling not only cleanses the skin well, but also enhances blood circulation in the tissues, nourishes the skin with oxygen and even prevents the appearance of cellulite. Another name for peeling is exfoliation, that is, the removal of dead cells from the surface of the body.

Until recently, only a visitor to a beauty salon could pamper himself with peeling. Now it is possible to carry out this wonderful procedure at home. It has been

used since antiquity. The girls used salt and sea sand to make their skin healthy and radiant.

Cosmetologists say that autumn and winter are the best times for peeling: during this period, the sun is the least active, and exfoliation will not lead to the formation of age spots. They insist that the skin renewal procedure is shown to almost everyone. It is relevant not only when signs of aging appear, but is also able to solve significant aesthetic problems: acne, removal of scars, scars, the fight against age spots, rejuvenation and lifting, by reducing the number of wrinkles of any etiology (expression wrinkles, dermal and epidermal wrinkles). Some cosmetologists even consider deep peeling to be an alternative to plastic surgery.

Peeling procedures are perfectly combined with other cosmetic procedures: mesotherapy, injection contour plastics, botulinum toxin injections.

Peeling can be used not only for facial skin care, but also for treating other hardened areas of the body: elbows, knees, feet, hands. Remember the mistake of Scarlett from "Gone with the Wind", whose hard hands gave the shrewd Rhett Butler the whole truth, and in one second destroyed the carefully selected image of a frivolous fidget? The delicate and thin skin of the hands requires even more careful attention than the skin of the face - because all changes in the body are also reflected on the hands, it is the hands that give out real age. It is no coincidence that few physically working women are called white-handed, but not only work ages and spoils the skin, but also the weather, ecology, and, most importantly, insufficient care.

But, with all the power of this method in improving the appearance, you need to know that any peeling does not solve the problem of sagging and sagging skin; does not tighten pores; does not remove spider veins; does not remove deep wrinkles and pronounced scars.

Peeling is also contraindicated for any skin disease. In this case, the procedure can only aggravate the situation. It is very important to remember that the use of

peeling is possible only if the skin is healthy, there is no damage or irritation on it. It is not recommended to use scrubs in the presence of acne or acne, as there is a high likelihood of the infection spreading all over the face. To prevent the appearance of new inflammations, it is recommended to carry out a cleansing procedure using special healing gels once a week.

Today, peeling is one of the most popular procedures in beauty salons, and this is not surprising, because with the help of peeling (removal of old dead skin cells), you can solve more than one cosmetic problem. In addition, cosmetologists are impressed by the simplicity and quick application, the clients are impressed by the availability of these products. Most of the peeling techniques can be carried out only in special salons, as they require special chemicals, tools and equipment. And they should only be carried out by a specialist who has undergone special training and has permission for this kind of intervention - a cosmetologist. It is he who will be able to correctly choose the type of peeling you need and prescribe a course of procedures that will give the maximum result.

Despite the fact that recently a number of products for carrying out peels at home have appeared on the free market, salon procedures still remain not only in demand, but also preferable. At its cost, the course of peels in salons is much higher than the same procedure performed at home. The final price consists of two indicators - the number of procedures (their number is determined by the cosmetologist at the first consultation examination) and cosmetics, with which the peeling will be carried out (as a rule, cosmetics of several manufacturers are presented in salons)

1.3 SKIN TYPES TO BE CONSIDERED WHEN SELECTING A PEELING METHOD

Now a little more about the types of skin that need to be considered when choosing a peeling method. Each skin type should have its own peeling. But we must

also remember that these funds must also be used with different frequencies. For example, thin and dry skin only needs to be cleansed once every two weeks, never more often. Oily skin will enjoy more frequent cleansing, once a week is optimal. But if your skin is very shiny, then peeling can be applied up to three times a week.

With dry skin, you also need to remember that she is unlikely to like the frequent use of hard pieces of bone or walnut shells, they can injure her, which is why in this case a peeling based on a cream containing wax is more suitable, which will cleanse and exfoliate the skin. Or you can use gommage, a method that we will talk about below.

With normal skin, you can exfoliate once a week. If you are not sure which peel is right for your skin type, you should first try it on a small area of your skin to see how it responds.

Like a person himself, his skin is unique. To properly care for your skin, you need to know its type.

There are several types of leather:

- normal,
- dry,
- oily,
- combined.

Moreover, the type of skin can change over time. This can depend on many factors (age, illness, excess sunlight).

Let's consider the types of skin in more detail.

Normal skin type is typical for young people. Good metabolism, blood supply, normal moisture content give the skin elasticity. It flakes slightly and is easier to keep fresh and clean. There are no black dots and red spots on it. However, over time, due to aging of the body, normal skin becomes dry. Therefore, if you have a normal skin

type, then try to keep it in this condition as long as possible. With proper facial skin care, the aging process becomes noticeable much later.

Oily skin is characterized by an oily sheen, which is the result of excess sebum production. This is especially noticeable in the area of the forehead, wings of the nose and chin - the pores are enlarged and covered with black dots. The reasons for this may be unhealthy diet, overweight, heavy sweating, and others. Such skin also does not age for a long time, remains elastic, but it is more susceptible to inflammatory diseases and its shine is not very aesthetic.

Dry skin is caused by the slower pace of the sebaceous glands. It looks smooth but feels tight. Dry skin can occur in people of any age. With it, there is no protective film on the skin and moisture loss occurs. Such skin reacts sharply to external influences: the sun, dry air, temperature changes. Dry skin care includes essential hydration.

Combination skin is often the result of improper facial care. Typically, the skin on the cheeks and around the eyes is dry. The skin of the rest of the face (forehead, nose, chin) is oily. For the care of combination skin, it is necessary to use together products for dry and oily skin, or special products for combination (combination) skin.

1.4 INDICATIONS FOR APPLICATION OF PEELING

Peeling can solve many problems: acne, acne scars, age spots, wrinkles. And with the help of a course of median peeling procedures, you can smooth out even wrinkles of medium depth, get rid of scars and pigmentation.

Glycolic peeling is effective for removing small and first wrinkles and the effects of acne, as well as for: superficial wrinkles, with deep and medium facial wrinkles, with gravitational ptosis (drooping) of the nasolabial triangle and facial tissues, hyperpigmentation, scars, scars, in the treatment of acne diseases (acne, post-acne - traces left after acne).

A significant effect of the procedures is observed with superficial and dermal dehydration; hyperpigmentation, hyperkeratosis; restoration of the skin; prevention of photoaging and age-related skin changes; prevention and elimination of age-related cosmetic skin defects (wrinkles, loss of tone and elasticity); preparation for plastic surgery and deep dermabrasion.

The main effects of peels - rejuvenation, lifting and the disappearance of age spots - are achieved through: smoothing the texture and complexion; regulation of keratinization; stimulation of reparative processes.

Additional peeling effects: stimulation of collagen and elastin synthesis; face lifting; improvement of lymphatic drainage function; facial rejuvenation, disappearance and reduction of mimic wrinkles, ptotic wrinkles, epidermal wrinkles, as well as the disappearance of age spots

Peeling methods are relevant not only when signs of aging appear, but are also able to solve significant aesthetic problems: removal of scars and scars.

The list goes on and on. But we will dwell on the purpose of peeling in more detail when considering specific methods for carrying out this procedure.

1.5 CLASSIFICATION OF TYPES OF PEELING

In cosmetology, there are several types of peeling methods classification:

a) according to the depth of penetration and exfoliating properties, there are three types of peeling:

- superficial (light)
- middle
- deep

- b) according to the method of carrying out peels are subdivided into:

- chemical peels (glycolic acid, lactic acid, etc.)
- enzymatic peels (papaya and others)
- physical peels (laser, liquid nitrogen, vacuum, ultrasound)
- mechanical peels (using abrasives, scrubs - microdermabrasion, brossage - using special brushes to smooth the skin)
- c) depending on the patient's age and on the problem being solved:
- at the age of 25-35 years, superficial peels are shown, which perfectly cope with the problem of the first superficial wrinkles. They are effective for the prevention of photo- and biological aging of the skin.
- At the age of 35-40, superficial peels are recommended, which moisturize the skin well, remove the superficial keratinized epithelium and enable more active penetration of nourishing and moisturizing preparations into the skin. With superficial peeling, acid does not penetrate into the deep layers of the skin and does not cause pronounced desquamation of the epithelium, so it can be carried out without changing your usual lifestyle.
 - At the age of 40-45 years, surface peels are not very effective, since wrinkles lie already at the level of the dermis. Therefore, median peels are shown here.

Chemical Peeling. Chemical peeling is based on the use of products that include various acids: citric, malic, pyro-grape, lactic. It is carried out mainly in a beauty salon by professional cosmetologists. For dry skin care, it is advisable to use as few chemicals as possible. Due to hypersensitivity, some of the chemical components can cause an allergic reaction. The impact provides uniform exfoliation of several layers of dead cells, which stimulates the synthesis of collagen and elastin, leads to the emergence of young cells, and contributes to the overall rejuvenation of the skin. Chemical peeling promotes rapid skin regeneration, it looks rejuvenated, healthy and

fresh. Small wrinkles disappear, skin tone and elasticity return. Facial peeling is also one of the stages of a complex of acne treatments. Indications for chemical peeling: skin aging, hyperpigmentation, problem skin, scars.

Superficial chemical peeling is carried out using fruit, glycolic acids. Peeling with fruit acids (enzyme peeling) is recommended as a prophylaxis against aging. It is also used in combination with other cosmetic procedures. The exfoliation is gentle and the skin looks healthier. This type of peeling is a rather gentle procedure that does not require breaking the usual rhythm of life. Fruit acid is applied to the skin, which, after a short period of time, is neutralized with a special composition and washed off. A day or two after such a procedure, the skin begins to peel off a little, but if you follow all the recommendations of the cosmetologist exactly, then it will be noticeable only to you, but not to those around you. To obtain a good result, it is necessary to carry out 5-10 procedures with an interval of 3 to 7 days.

Milk Pilling. Milk peels stimulate the synthesis of collagen and elastin, have anti-inflammatory and immunostimulating effects, increase the level of skin hydration, smoothen and tighten the skin. Recommended for dry and aging skin, with photo and chrono-aging, improves complexion.

Glicol Peeling. Glycolic acid belongs to the group of acids found naturally in fruits, aged wine, sour milk, citrus fruits, etc. This type of peeling is considered the newest. This is the most popular and one of the most effective surface peels. Peeling with glycolic acid is the most comfortable and not traumatic. The method delivers impressive results, thanks to the safe and complete correction of aesthetic problems, for example, age-related skin changes, acne, seborrhea, hyperkeratosis, skin dysfunctions, hyperpigmentation.

The popularity of glycolic peels (among the methods of anti-aging therapy) is closely related to the miraculous properties of glycolic acid, discovered about forty years ago by the scientist Van Scott.

In European countries, this type of peeling is called "lunch break peeling". After the procedure, you do not have to use creams that even out the tone and hide skin imperfections. You can see the effect of peeling with glycolic acid on the same day, more serious changes will occur in a month and a half. New cells will ripen and come to the surface. In the deeper layer of the skin (dermis), new collagen and elastin fibers will form, contributing to natural lifting.

Peeling efficiency: the main action of glycolic peeling is realized through the active activity of glycolic acid. It has a high and effective result, after the first procedure you will see how your skin is smoothed, it becomes smoother and more delicate. In addition, glycolic peeling procedures have a beneficial effect on the pores of the skin, eliminating ugly plugs (blackheads) that clog the passages that allow your skin to breathe. Experts also note an increase in collagen and elastin production after the procedure - glycolic peeling gives a good rejuvenating effect on the skin.

Indications: superficial and dermal dehydration, hyperpigmentation, hyperkeratosis, acne treatment, skin restoration, post-acne, prevention of photoaging and age-related skin changes, prevention and elimination of age-related cosmetic skin defects (wrinkles, loss of tone and elasticity), preparation for plastic surgery and deep dermabrasion.

Enzymatic Peeling. Enzymatic peeling can be classified as a cosmetic product, since it does not provide the same skin stimulation as classical chemical peels. The most commonly used are papain, bromelain, trypsin. They can be compared to gommage or ultrasonic peeling.

Physical Peeling. Physical peeling is an ultrasonic peel, which is performed using an ultrasonic wave generator. This type of peeling is both deep and non-traumatic. It will help get rid of blackheads and fine wrinkles, unclog pores.

Vacuum Face Cleaning. Vacuum cleaning of the face is very popular, which not only exfoliates the epidermis, but also improves blood circulation in the face area.

Laser Face Sanding. Laser face resurfacing (laser peeling) also refers to physical peeling methods. It is one of the most effective methods of facial rejuvenation. During the procedure, the top layer of the skin is burned with a laser. Light laser resurfacing can be done in a beauty salon, and deeper ones only in a specialized clinic. The recovery period after a deep cleaning can be up to one month, after a light one - several days. In addition to removing wrinkles, not deep scars and various skin imperfections, laser face resurfacing makes the skin more elastic and more elastic, and stimulates the production of collagen. To combat deep wrinkles, deep resurfacing is suitable. The procedure is performed using anesthetic ointments.

Laser cosmetology is considered the most developing part of cosmetology. Today, using her techniques, you can treat various skin diseases, as well as carry out cosmetic procedures. One of the main places is occupied by laser peeling of the face with results that have no analogues among other procedures.

Face Grinding. Facial resurfacing is one of the methods of mechanical peeling, used to eliminate skin defects in the form of scars from past rashes, skin irregularities, etc., as well as a rejuvenating procedure. It is usually used in adulthood, when anti-aging cosmetics lose their effectiveness, as well as to eliminate acne scars.

Facial resurfacing techniques are different, they include dermabrasion, microdermabrasion of the face, as well as laser resurfacing, which also refers to physical methods of peeling.

Dermabrasion. The dermabrasion procedure is a mechanical peeling that is carried out using special equipment. The leather is processed using special attachments in the form of a brush. This procedure must be performed under sterile conditions, and skin infections can be possible complications. With dark skin, pigmentation may occur. After the procedure, swelling and irritation occurs, after a while these areas become covered with a crust, which disappears within 7-10 days.

Microdermabrasion. Microdermabrasion is a more gentle procedure, but the resurfacing effect is also less pronounced. Microdermabrasion is skin resurfacing with fine alumina crystals. With the help of a special apparatus, they are injected onto the face under pressure, "knocking out" the particles of the upper layer of the skin. This procedure can be performed even on sensitive areas of the face such as the eyelids.

2. MATERIAL AND RESEARCH METHODS.

In the center of medical cosmetology of the Spark Med Spa Chicago, from 2018 to 2020, 117 patients aged 30 to 60 years were under observation (mean age 45.17 ± 8.68). Of these, 96 patients, along with a clinical assessment of the condition of the skin, measured the functional parameters of the skin.

Criteria for the inclusion of patients in the study: female sex, belonging to I-III phototypes according to Fitzpatrick, the presence of indications for CP (chemical peeling) - dull complexion, pronounced porosity, decreased turgor and skin tone, wrinkles, hyperpigmentation and / or hyperkeratosis, signed informed consent to participate in the study.

Exclusion criteria from the study: pregnancy, lactation, cancer, dermatoses of various origins, history of mental illness, violation of the integrity of the skin, infectious and viral skin lesions, a tendency to form hypertrophic and keloid scars, individual intolerance to the components of the investigated cosmetics, insulin-dependent diabetes mellitus, fever, taking systemic retinoids, liver disease in the acute stage, carrying out mesotherapy procedures, chemical peels, the use of cosmetics with keratolytics less than 2 months before the start of the study, the administration of fillers or botulinum toxin preparations less than 6 months before the start of the study, the period of less than 6 months after surgery in the facial area, the period of solar activity (from March to November), and also in case the patient wishes to discontinue participation in the study.

The surveyed sample of patients was divided into 2 groups. Within each, two subgroups were identified by age. Group 1 patients underwent chemical peeling with retinoic acid. Group 1A included 29 women aged 30 to 45 years (average age 37.14 ± 4.05), group 1B - 30 people aged 46 to 60 years (average age 51.87 ± 4.97) ... Group 2

patients underwent chemical peeling with retinol. Group 2A included 29 women from 30 to 45 years old (mean age 38.51 ± 4.34), group 2B included 29 patients aged 46 to 60 years (mean age 52.97 ± 5.34).

The selected subgroups were comparable in terms of age, skin type, features of home and professional care of the face and neck skin, external signs of aging and photoaging, the state of subcutaneous fat 10

fiber and muscle tone, as well as bad habits and concomitant diseases.

Patients were questioned, including an objective assessment of the nurse and subjective assessment by the patient, and photography, The Merz Scale was used to assess the depth of wrinkles, and The Melasma Area and Severity Index (MASI) [25] was used to assess the degree of dyschromia (Fig 1).

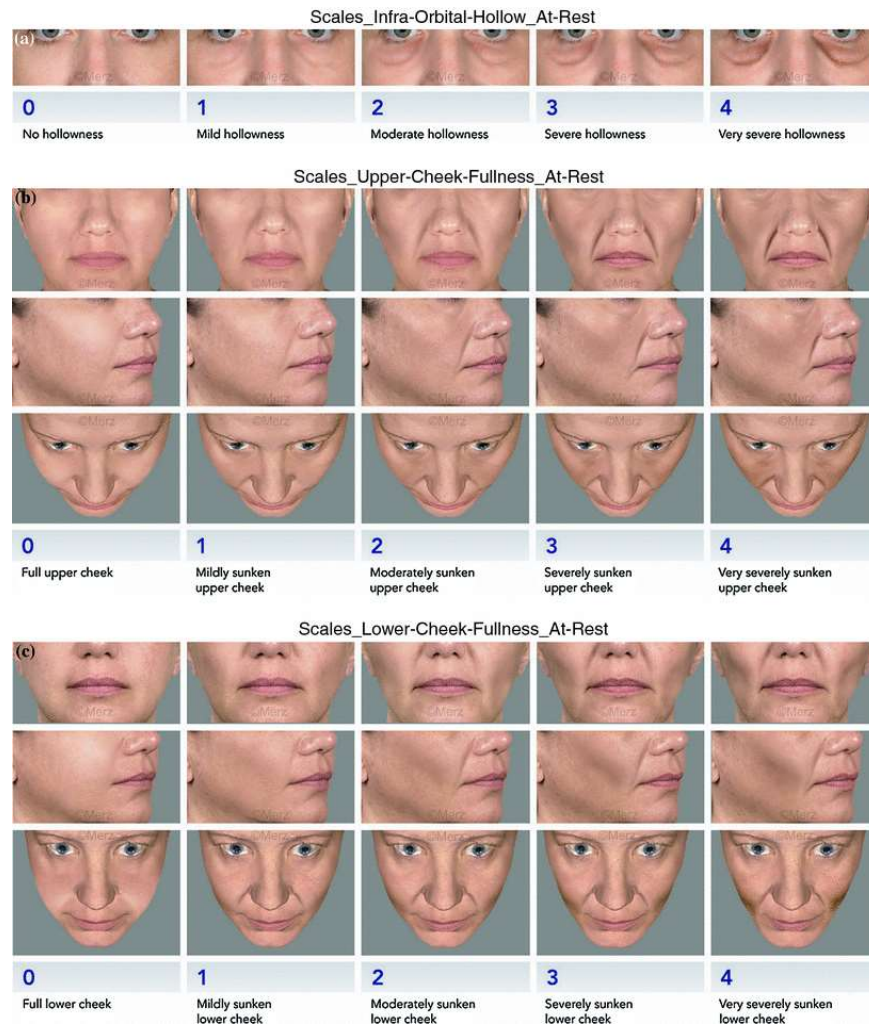




Figure 1. Assessment of skin condition

Methods of functional skin diagnostics included corneometry (Corneometer CM 825; Courage & Khazaka, Germany; measured in cu from 0 to 120), Determination of the degree of erythema and skin pigmentation (Corneometer CM 825; Courage & Khazaka, Germany with Mexameter MX 18 sensor; Courage & Khazaka, Germany; measured in cu from 0 to 999), measurement of the level of skin elasticity with indicators, device Cutometer MPA 580; Courage & Khazaka, Germany before, 14 and 28 days after peeling in all patients.

A chemical peel with retinolic acid was used, which included 5% retinoic acid, as well as 15% azelaic acid, 5% koic acid, 5% phytic acid, and 5% ascorbic acid. The retinol chemical peel included 5% retinol as well as 10% ascorbic acid and 30% antioxidant serum. We studied clinical indicators and functional parameters after peeling in patients of different age groups (A - 30-45 years old and B - 46-60 years old). The peeling procedure included three applications on the skin at half an hour intervals. Intact skin samples were used as a control, the parameters of which were taken as 100%.

Procedures of peeling. Facial peeling was done with the index and middle fingers of both hands for 2-3 minutes. The movement pattern is as follows:

- from the middle of the forehead to the temples;
- from the corners of the mouth to the temples;
- from the middle of the chin to the earlobes;
- then gently massage the nose and nasal wings.

The scrub is gently applied with your fingertips to a damp face. Do not scrub the skin around the eyes. Rubbing your skin too vigorously can damage it. Similar to the scrub, gamma products are also used. Body peeling is performed with circular massage movements towards the heart. In no case do not stretch the skin, do not make rough and abrupt movements. But, on the skin of the body, peeling should be done

much more intensively than on the face. At the end of the exfoliating procedures, the scrub must be completely washed off and use a moisturizer or mask.

Statistical data processing was performed using the STATISTICA software environment (version 10.0). Depending on the test results, the Student's t-test was used. The value $p = 0.05$ was taken as the critical level of the null statistical hypothesis.

3. RESULTS OF THE STUDY

3.1 Clinical examination data.

The analysis of the clinical picture was carried out after chemical peeling with retinoic acid (1A and 1B) and chemical peeling with retinol (2A and 2B) in each age group on the 14th and 28th days after the procedure, the indicators were also compared between groups 30-45 years (1A and 2A) and 46-60 years (1B and 2B) on the 14th and 28th days after the procedure using an objective assessment of the nurse and a subjective assessment by the patient.

According to an objective assessment of the nurse, peeling with retinoic acid in group 1A by the 28th day had a significant positive dynamics in the indicators of skin relief, color inhomogeneity, dryness, and the depth of wrinkles decreased by 14% ($p < 0.01$).

When the nurse objectively evaluated peeling with retinol in group 2A, by the 28th day, color inhomogeneity, relief changes, and skin dryness decreased. In contrast to retinoic acid, the severity of signs of photoaging decreased ($p < 0.01$). In group 2B, after treatment, the indices of color inhomogeneity, dryness, the severity of signs of aging ($p < 0.01$), the depth of wrinkles 10% ($p < 0.001$) decreased (Tabl 1, 2).

Table 1. Dynamics of indicators of objective and subjective assessments after peeling with retinoic acid.

	Group 1A		Group 1B	
	Before treatment	After treatment	Before treatment	After treatment
Subjective assessment	1.9 ± 0.21	3.17 ± 0.29	1.93 ± 0.17	2.83 ± 0.31
General appearance	1.3 ± 0.14	1.91 ± 0.21	1.32 ± 0.15	2.28 ± 0.25
Objective assessment	1.98 ± 0.22	2.47 ± 0.26	0.98 ± 0.11	1.95 ± 0.22

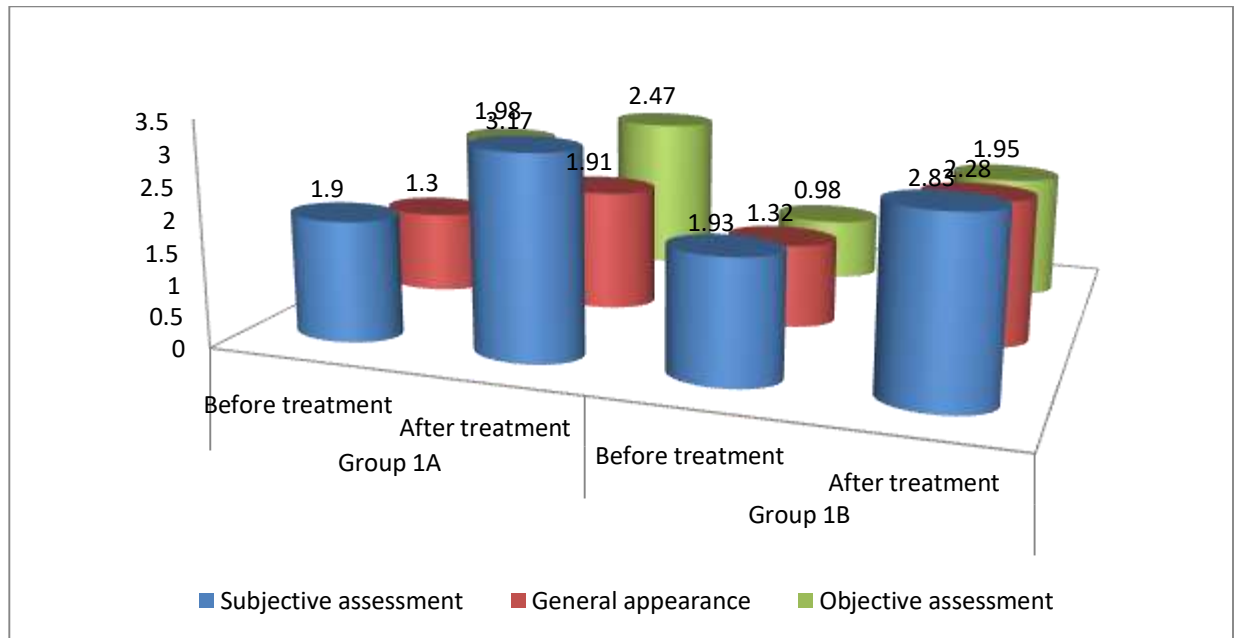


Figure 2. Dynamics of indicators of objective and subjective assessments after peeling with retinoic acid.

Dynamics of indicators of objective and subjective assessments after treatment with peeling with retinoic acid and with retinol (subjective assessment includes tightness, dryness, roughness, severity of wrinkles; softness, smoothness, color uniformity).

Table 2. Dynamics of indicators of objective and subjective assessments after peeling with retinol.

	Group 2A		Group 2B	
	Before treatment	After treatment	Before treatment	After treatment
Subjective assessment	1.9 ± 0.22	3.17 ± 0.28	1.93 ± 0.33	2.83 ± 0.36
General appearance	1.3 ± 0.11	1.91 ± 0.29	1.32 ± 0.15	2.28 ± 0.39
Objective assessment	1.98 ± 0.21	2.47 ± 0.31	0.98 ± 0.15	1.95 ± 0.24

Thus, peeling with retinoic acid and with retinol had a positive effect on the clinical characteristics of the skin of the face and neck, while treatment with peeling with retinoic acid to a greater extent reduced the severity of wrinkles, and treatment with peeling with retinol to a greater extent reduced the severity of signs of photoaging (Fig. 2, 3).

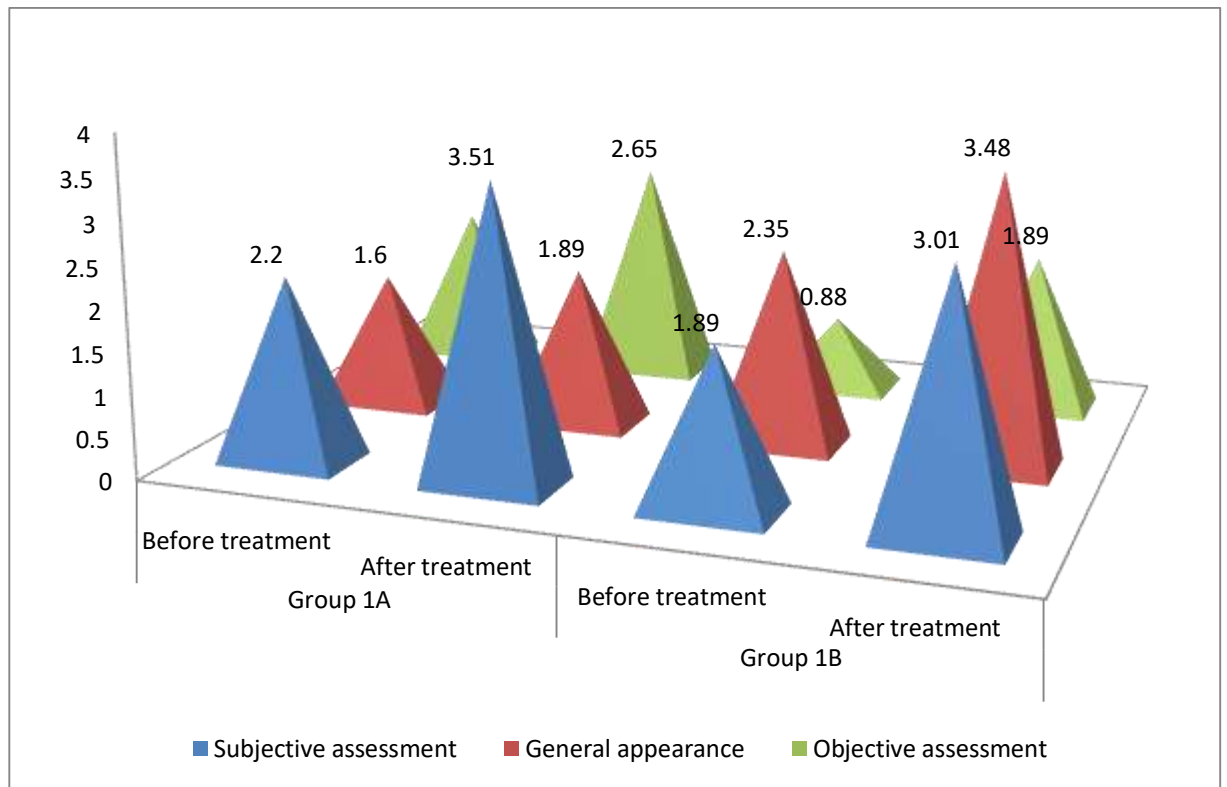


Figure 3. Dynamics of indicators of objective and subjective assessments after peeling with retinol.

With a subjective assessment on the 28th day, patients of all study groups noted a decrease in the severity of wrinkles, skin roughness, an increase in skin smoothness, softness, color uniformity, an improvement in the general appearance (in group 1A by 1.7 times, 1B - by 1.4 times, 2A - 1.3 times, 2B - 1.5 times). The overall appearance

score in Group 1A on day 28 after treatment was the highest compared to the scores in the other groups (Figure 1, 2).

It should be noted that within 5-7 days after peeling with retinoic acid, 29 (100%) patients from group 1A and 30 (100%) patients from group 1B had erythema and severe peeling of the skin of the face and neck, which later gradually disappeared on their own. After peeling with retinol, 14 (48.3%) patients from group 2A and 10 (34.5%) patients from group 2B had slight peeling and slight redness lasting up to five days. These data indicate that peels with retinoic acid are more irritating to the skin than peels with retinol.

3.2. The results of evaluating the functional parameters of the skin.

The clinical characteristics of changes in the skin of the face and neck are directly related to its functional parameters, which were determined in the forehead, skin of the corner of the eyes, cheeks and neck in the same groups.

Analysis of the degree of pigmentation revealed that in group 1A, its value fluctuates around the initial values of the skin of the corner of the eye and cheek, decreases in the forehead and neck, and is significant only on the 14th day by 6% in the forehead ($p < 0.05$). In group 1B patients, an initially lower level of skin pigmentation was found ($p > 0.05$), which after peeling with retinoic acid decreases in all zones, but is significant only on the 14th day after treatment in the neck area by 9% ($p < 0.05$).

In group 2A, the degree of pigmentation decreases in all measurement areas, especially in the corner of the eye on the 14th day by 7% ($p < 0.01$) and the neck on the 28th day by 10% ($p < 0.05$). In group 2B, an initially lower level of the degree of skin pigmentation was also found in all studied areas, except for the neck. After CP with P, the degree of pigmentation decreased by 6% on the 14th and 28th days in the

forehead area ($p < 0.05$); in the corner of the eye on the 14th day by 5% ($p < 0.05$); in the cheek area by 8% ($p < 0.01$).

When comparing A and B age groups with each other, a lower degree of pigmentation was found in the age group 46-60 years old ($p > 0.05$). peels with retinoic acid and retinol reduce the degree of skin pigmentation. By the number of significant effect zones and the minimum absolute value of the melanin content, peeling with retinol to a greater extent reduces the amount of pigment in the skin in patients of group 2B.

Analysis of the severity of erythema revealed that in group 1A after treatment, it was found to increase on the 14th day in the forehead area by 7% ($p < 0.05$), in the eye angle by 10% ($p < 0.05$) and in the neck by 14%. ($p < 0.01$). In group 1B, the severity of erythema increased on the 14th day in the corner of the eye by 10% ($p < 0.01$) and in the cheek by 8% ($p < 0.001$); on the 28th day in the corner of the eye - by 6% ($p < 0.01$). When comparing age groups with each other, a 16% lower severity of erythema was found in group 1B in the corner of the eye compared to group 1A ($p < 0.05$).

In group 2A, after treatment, the severity of erythema was reduced in all measurement areas ($p > 0.05$). In group 2B, on day 28, the degree of erythema tended to decrease in the corner of the eye and neck, but increased in the forehead by 9% ($p < 0.01$) and tended to increase in the cheek area ($p > 0.05$). When comparing A and B age groups with each other, a 20-26% lower severity of erythema was found in group 2B ($p < 0.01$) in the forehead, corner of the eye, cheek, with the exception of the skin of the neck, where no differences were found.

Thus, when comparing age groups with each other, a 20-26% lower degree of erythema was found in the 46-60 age group ($p < 0.05$), with the exception of the neck skin. According to the number of significant effect zones and the maximum absolute value of the degree of erythema, CP with PK had an irritating effect on the 14th day

after the procedure in three zones in group 1A and two zones in group 1B, the values of the degree of erythema remained high until the 28th day. peeling with retinol increased the degree of erythema only in the forehead.

Analysis of the moisture content of the stratum corneum of the epidermis revealed in group 1A on the 14th day an increase in values in the forehead area by 16% ($p < 0.01$), in the cheeks by 16% ($p < 0.01$), on the 28th day an increase in neck skin by 10% ($p < 0.01$). After treatment in group 1B, corneometry indices increased by 13% in the forehead area by 13% ($p < 0.01$) and by 7% on day 28 ($p < 0.05$); in the corner of the eye on the 28th day they increased by 5% ($p < 0.05$) and in the cheek area by 12% ($p < 0.01$). When comparing A and B age groups with each other before treatment, the moisture content of the stratum corneum was 3-7% higher in group 1B ($p > 0.05$) in all measurement areas.

In group 2A, corneometry indices increased on the 14th day in the forehead area by 12% ($p < 0.01$). In group 2B, on the 28th day, they had a general tendency to decrease ($p > 0.05$). When comparing A and B age groups with each other before treatment, the moisture content of the stratum corneum was 1-6% higher in group 2B in all measurement areas ($p > 0.05$).

Thus, when comparing age groups with each other, the moisture content of the stratum corneum was 1-7% higher in the group of 46-60 years old ($p > 0.05$). CP with RK increases the indices of corneometry in three zones in group 1A and three zones in group 1B. HP with P reduces these indicators, with the exception of the forehead skin.

In terms of the number of significant effect zones and the maximum absolute value, CP with RK increases the moisture content of the stratum corneum on the 14th day and retains high values on the 28th day, which is fully consistent with the indicators of erythema.

When analyzing the amount of sebum secretion in group 1A on the 14th day, a general tendency to an increase in sebum secretion was revealed, by the 28th day there was a tendency to a decrease in the forehead and neck area and to an increase in the cheek area ($p > 0.05$). In group 1B, on the 14th and 28th days, the degree of sebum secretion tended to decrease in the forehead and cheek area ($p > 0.05$) and to decrease in the neck area ($p > 0.05$).

Sebum secretion in group 2A on the 14th day decreased in the forehead area by 36% ($p < 0.01$); on the 28th day - by 41% ($p < 0.001$). In the neck area, on the 14th day, the rate of sebum secretion decreased, and especially on the 28th day (by 41%, $p < 0.01$). In group 2B, the sebum secretion index on the 14th day decreased in the forehead area by 22% ($p < 0.01$), in the cheek area by 22% ($p < 0.01$). In the neck area, the sebum secretion indicator tended to decrease on the 14th and 28th days ($p > 0.05$), in the forehead and cheeks, the sebum secretion indicator was restored by the 28th day ($p > 0.05$). peeling with retinol promoted a gradual decrease in sebum secretion in group 2A .

After treatment on the 28th day in group 1A in the forehead area the elasticity increased by 16% ($p < 0.01$), elongation (R8) by 28% ($p < 0.05$). In the rest of the zones, the elasticity changed insignificantly and in different directions. The total elasticity index became higher ($p > 0.05$). In group 1B, on the 28th day, the elasticity in the neck area increased by 9% ($p > 0.05$). When comparing A and B age groups before treatment in group 1B, the elasticity index is less by 5-15% (eye angle, $p < 0.01$; neck, $p < 0.05$), elasticity is less by 9-21% ($p > 0.05$), except for the forehead skin, where this indicator is 23% higher ($p > 0.05$) compared to the values in group 1A (Table 3. Fig. 4, 5).

Table 3. Dynamics of functional parameters of the skin in patients 1A after peeling with retinoic acid (n = 24, M ± m)

Indicators by zones		Before treatment	14 days after treatment	28 days after treatment	P when compared	
					Treatment and 14 days after treatment	Treatment and 14 days after treatment
Extensibility of the skin	Forehead	0,215±0,017	0,218±0,013	0,238±0,014	0,89	0,24
	Angle of the eyes	0,301±0,021	0,295±0,013	0,320±0,015	0,81	0,45
	Cheek	0,279±0,018	0,273±0,014	0,282±0,013	0,79	0,90
	Neck	0,537±0,021	0,579±0,029	0,562±0,030	0,16	0,35
Skin elasticity	Forehead	0,612±0,023	0,672±0,024	0,708±0,027	0,063	0,014
	Angle of the eyes	0,62±0,017	0,617±0,020	0,591±0,019	0,74	0,22
	Cheek	0,683±0,021	0,692±0,020	0,701±0,014	0,75	0,45
	Neck	0,805±0,019	0,815±0,016	0,812±0,016	0,54	0,67

Fig 4 . Dynamics of Extensibility of the skin in patients 1A after peeling with retinoic acid

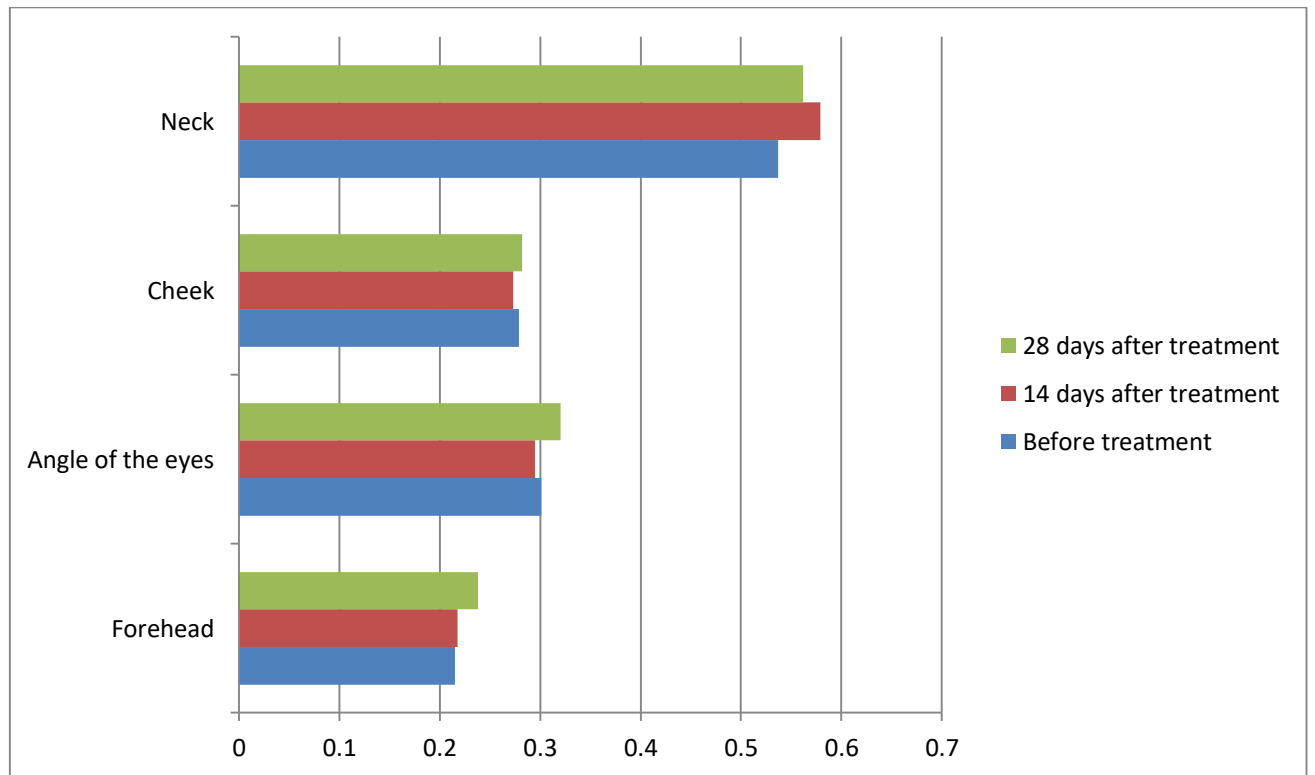
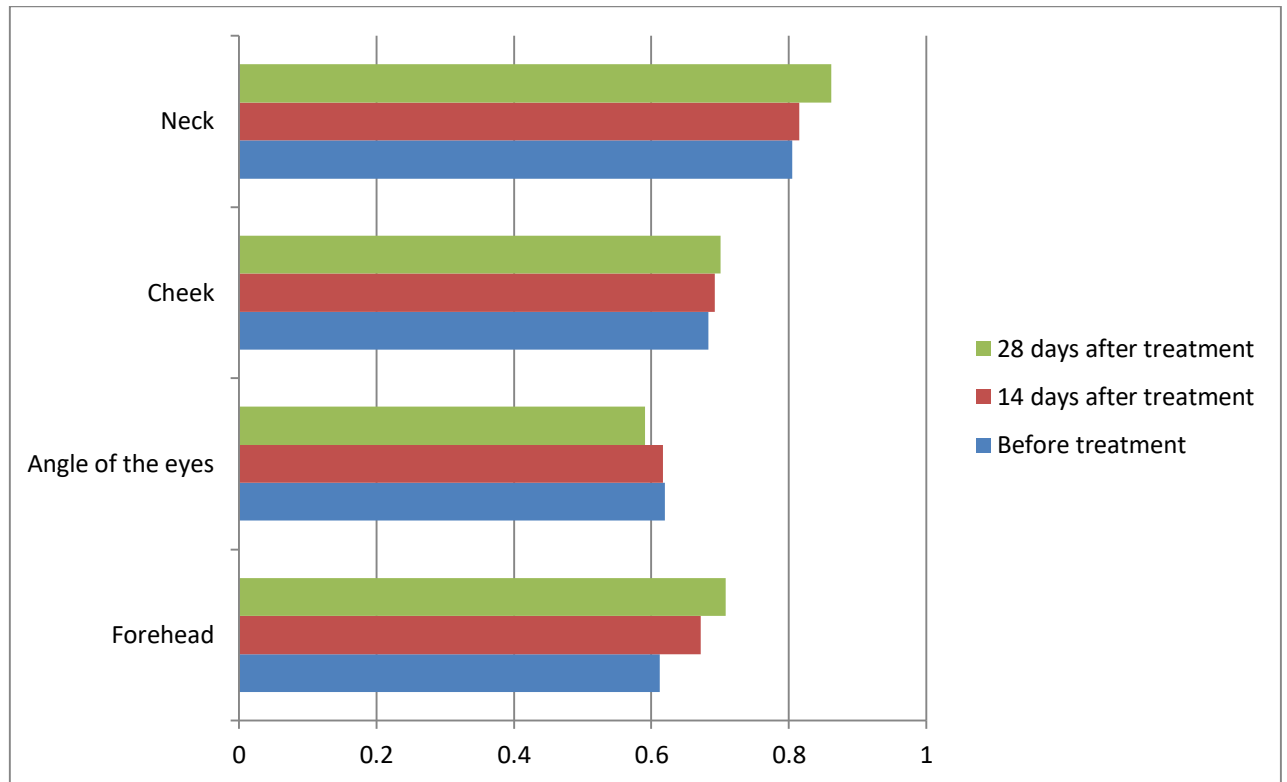


Fig 5. Dynamics of Skin elasticity in patients 1A after peeling with retinoic acid.



In group 2A, the extensibility on the 14th day significantly decreased by 16% in the cheek area ($p < 0.01$) and 10% in the neck area ($p < 0.05$), in the neck area it continued to decrease on the 28th day by 11% ($p < 0.05$). On the 14th day, the elasticity index in the forehead, cheek and neck area remained practically unchanged ($p > 0.05$), in the corner of the eye it increased by 8% ($p < 0.05$), the index of the "fatigue effect" of the skin in the cheek area significantly decreased by 13% ($p < 0.05$), the index of elastic-viscous properties decreased by 8% in the forehead area ($p < 0.05$) and increased in the cheek area by 17% ($p < 0.001$), on the 28th the day increased in the neck area by 18% ($p < 0.05$) (Table 4. Fig 6, 7).

Table 4. Dynamics of functional parameters of the skin in patients 1B after peeling with retinoic acid (n = 24, M ± m)

Indicators by zones		Before treatment	14 days after treatment	28 days after treatment	P when compared	
					Treatment and 14 days after treatment	Treatment and 14 days after treatment
Extensibility of the skin	Forehead	0,262±0,020	0,257±0,020	0,250±0,017	0,77	0,49
	Angle of the eyes	0,299±0,023	0,292±0,018	0,291±0,015	0,63	0,71
	Cheek	0,261±0,020	0,2759±0,019	0,267±0,015	0,36	0,76
	Neck	0,5333±0,019	0,5411±0,018	0,5454±0,020	0,68	0,54
Skin elasticity	Forehead	0,617±0,019	0,6422±0,025	0,6012±0,017	0,28	0,50
	Angle of the eyes	0,5337±0,022	0,5343±0,020	0,5455±0,014	0,98	0,60
	Cheek	0,6365±0,016	0,6523±0,016	0,6697±0,018	0,48	0,13
	Neck	0,7332±0,022	0,7458±0,020	0,7234±0,017	0,55	0,68

Fig 6 . Dynamics of Extensibility of the skin in patients 1B after peeling with retinoic acid

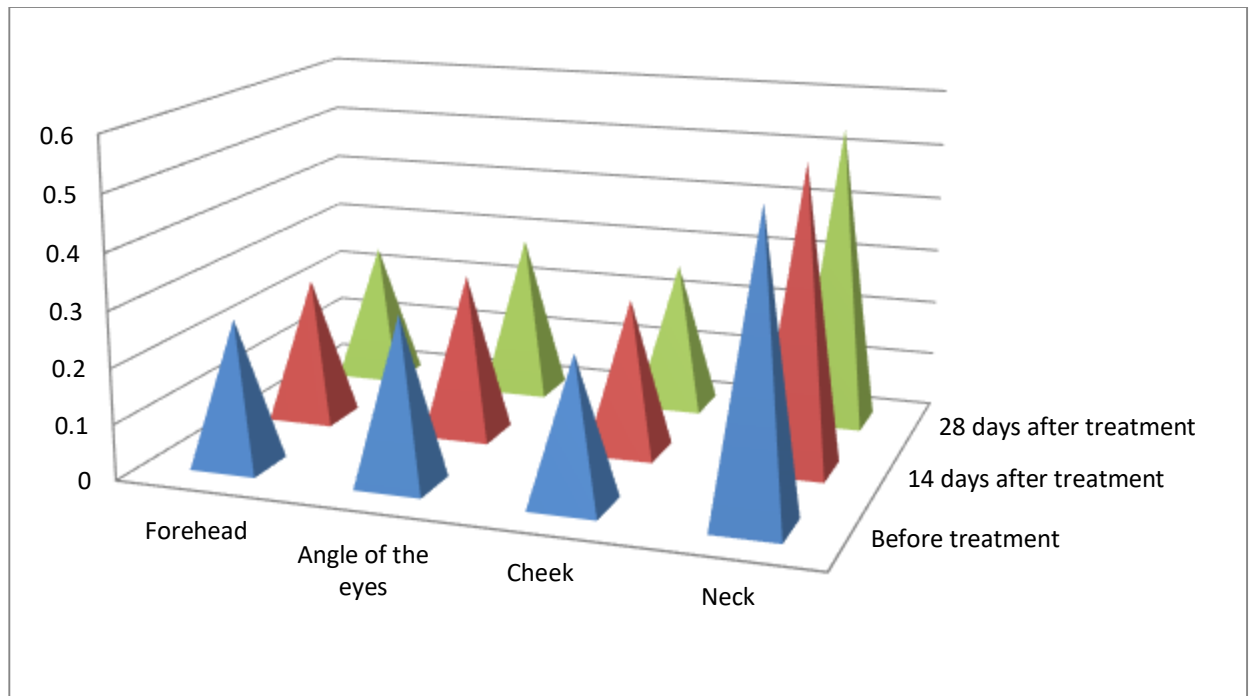
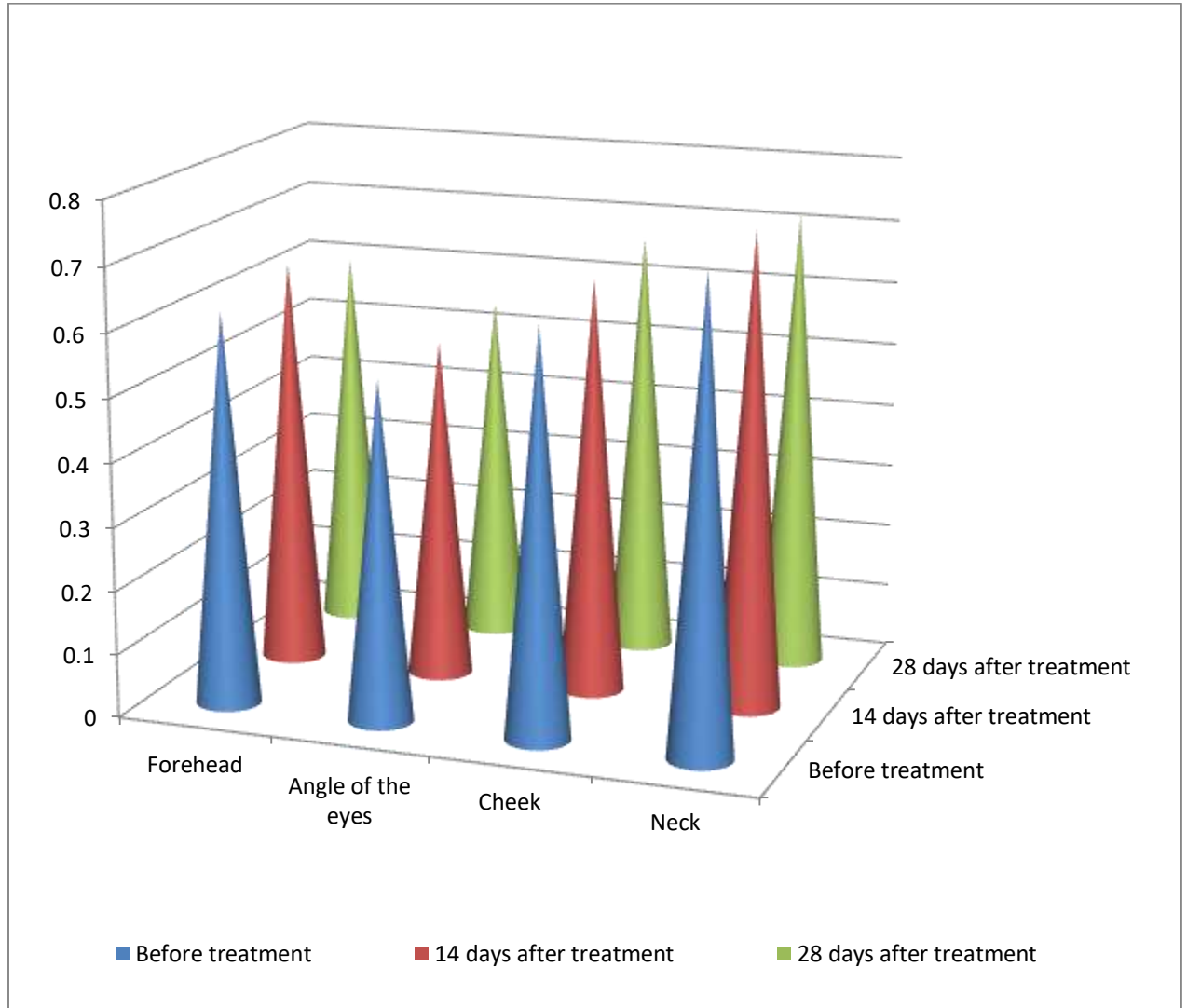


Fig 7 . Dynamics of Skin elasticity in patients 1B after peeling with retinoic acid



The elongation index decreased on the 14th day in the cheek area by 18% ($p < 0.05$), in the neck by 11% ($p < 0.05$) and continued to decrease on the 28th day in the neck area by 14% ($p < 0.01$). On the 28th day, the total elasticity index improved in the forehead area by 16% ($p < 0.05$), in the corner of the eye area by 10% ($p < 0.05$). The index of total elasticity improved on the 14th day in the cheek area by 19% ($p < 0.05$), in the neck by 16% ($p < 0.01$) and on the 28th day by 15% ($p < 0.05$) (Table 5, Fig. 8, 9).

Table 5. Dynamics of functional parameters of the skin in patients 2A after peeling with retinoid (n = 24, M ± m)

Indicators by zones		Before treatment	14 days after treatment	28 days after treatment	P when compared	
					Treatment and 14 days after treatment	Treatment and 14 days after treatment
Extensibility of the skin	Forehead	0,200±0,019	0,173±0,014	0,180±0,022	0,078	0,14
	Angle of the eyes	0,257±0,014	0,238±0,012	0,225±0,018	0,25	0,14
	Cheek	0,283±0,019	0,239±0,009	0,250±0,020	0,010	0,11
	Neck	0,539±0,024	0,484±0,013	0,482±0,019	0,026	0,017
Skin elasticity	Forehead	0,644±0,025	0,631±0,028	0,614±0,022	0,55	0,16
	Angle of the eyes	0,564±0,019	0,610±0,018	0,596±0,018	0,042	0,23
	Cheek	0,704±0,016	0,681±0,013	0,672±0,022	0,23	0,097
	Neck	0,859±0,011	0,850±0,011	0,833±0,012	0,39	0,030

Fig 8 . Dynamics of Extensibility of the skin in patients 2A after peeling with retinoid

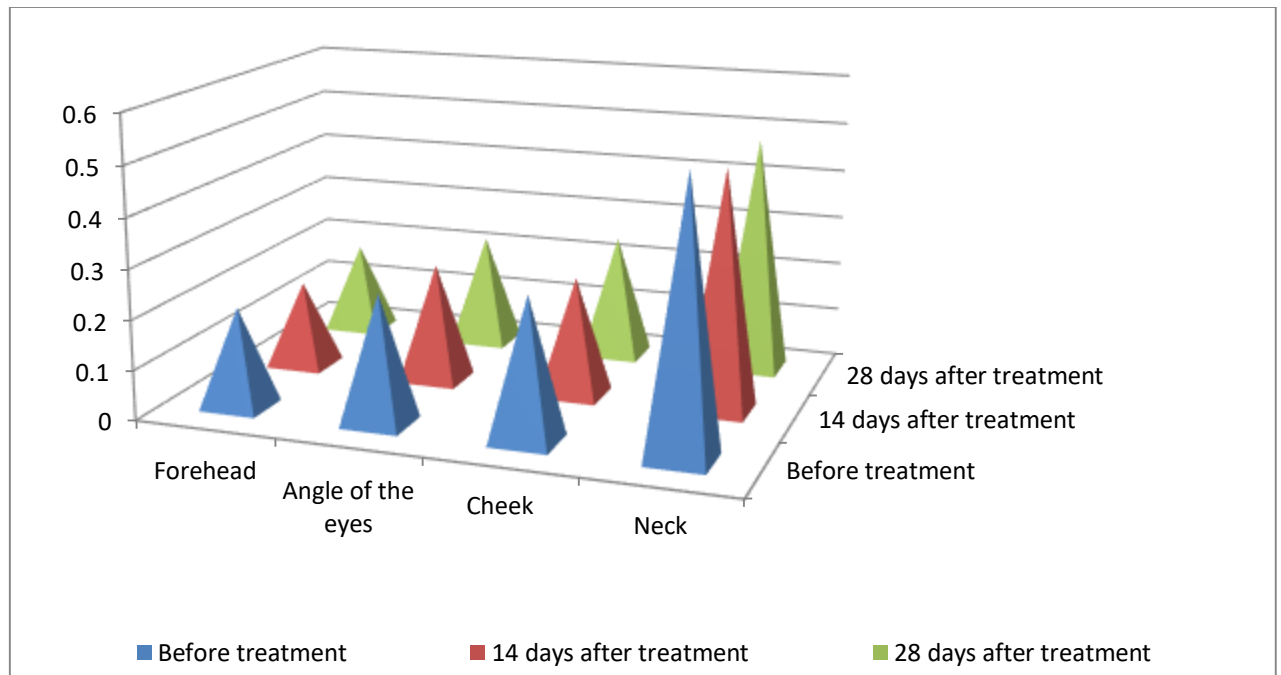
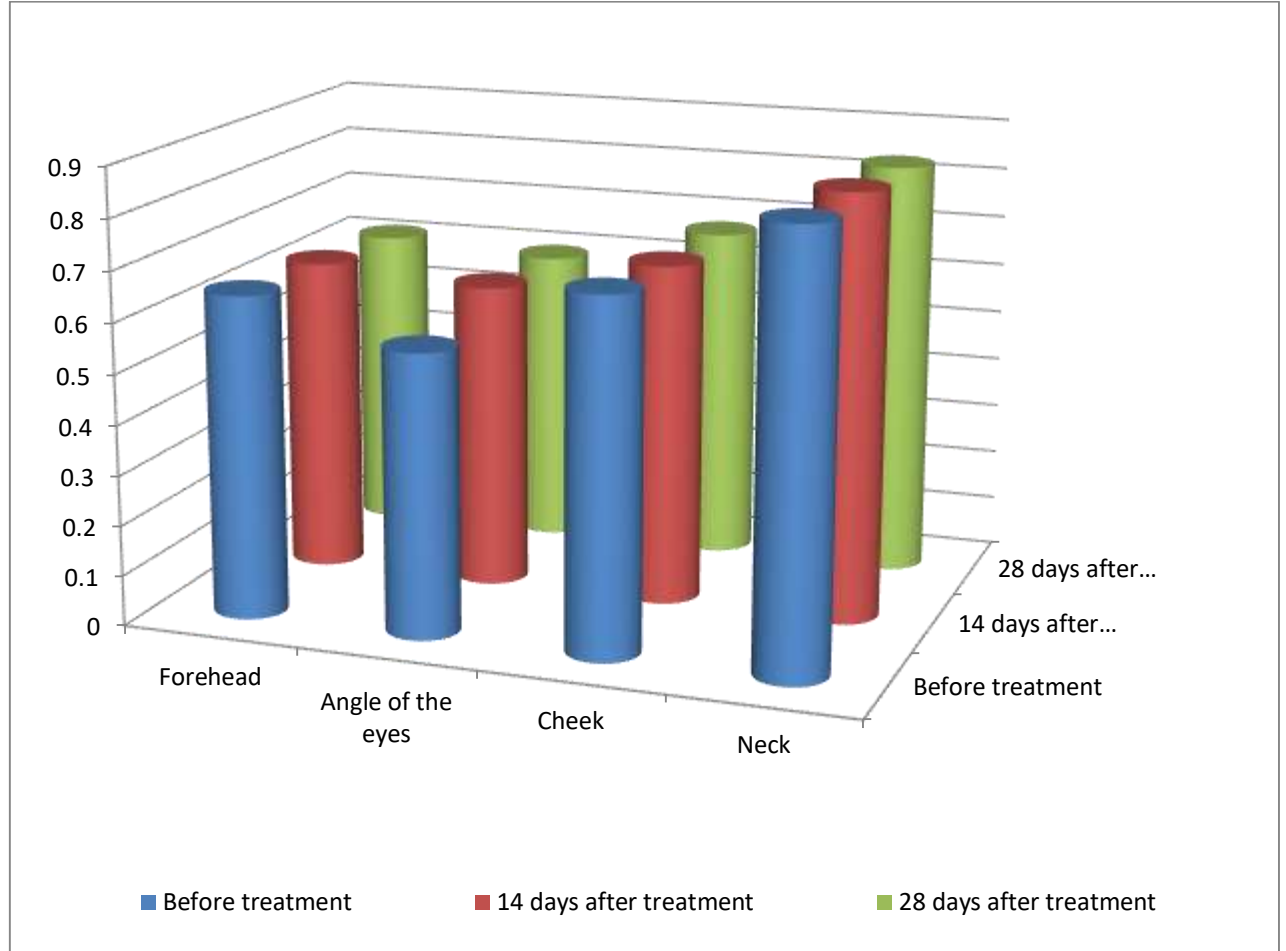


Fig. 9. Dynamics of Skin elasticity in patients 2A after peeling with retinoid



In group 2B, on the 14th day, the extensibility decreased in the forehead by 22% ($p < 0.05$), in the corner of the eye by 14% ($p < 0.001$), in the cheek by 23% ($p < 0.001$), in the neck by 15% ($p < 0.001$) and continued to decrease on the 28th day in the forehead area by 24% ($p < 0.05$), in the corner of the eye by 18% ($p < 0.05$), in the neck by 16% ($p < 0.01$). On the 14th day, the elasticity index tended to decrease in the forehead, corner of the eye and neck, in the cheek area it decreased significantly by 6% ($p < 0.01$); the indicator of the "fatigue effect" of the skin decreased in the forehead by 21% ($p < 0.01$), in the cheeks by 15% ($p < 0.01$), in the neck by 11% ($p < 0.05$), on the 28th day in the forehead by 30% ($p < 0.01$) (Table 6, Fig. 10, 11).

Table 6. Dynamics of functional parameters of the skin in patients 2B after peeling with retinoid (n = 24, M ± m)

Indicators by zones		Before treatment	14 days after treatment	28 days after treatment	P when compared	
					Treatment and 14 days after treatment	Treatment and 14 days after treatment
Extensibility of the skin	Forehead	0,186±0,015	0,146±0,010	0,142±0,012	0,014	0,0099
	Angle of the eyes	0,240±0,010	0,207±0,008	0,197±0,069	< 0,001	0,047
	Cheek	0,275±0,012	0,211±0,009	0,235±0,016	< 0,001	0,076
	Neck	0,567±0,020	0,479±0,020	0,475±0,022	< 0,001	0,0015
Skin elasticity	Forehead	0,646±0,014	0,621±0,019	0,654±0,027	0,094	0,76
	Angle of the eyes	0,584±0,014	0,562±0,018	0,585±0,013	0,18	0,97
	Cheek	0,675±0,012	0,636±0,011	0,641±0,014	0,0079	0,074
	Neck	0,815±0,010	0,796±0,017	0,797±0,012	0,33	0,23

Fig 10 . Dynamics of Extensibility of the skin in patients 2B after peeling with retinoid

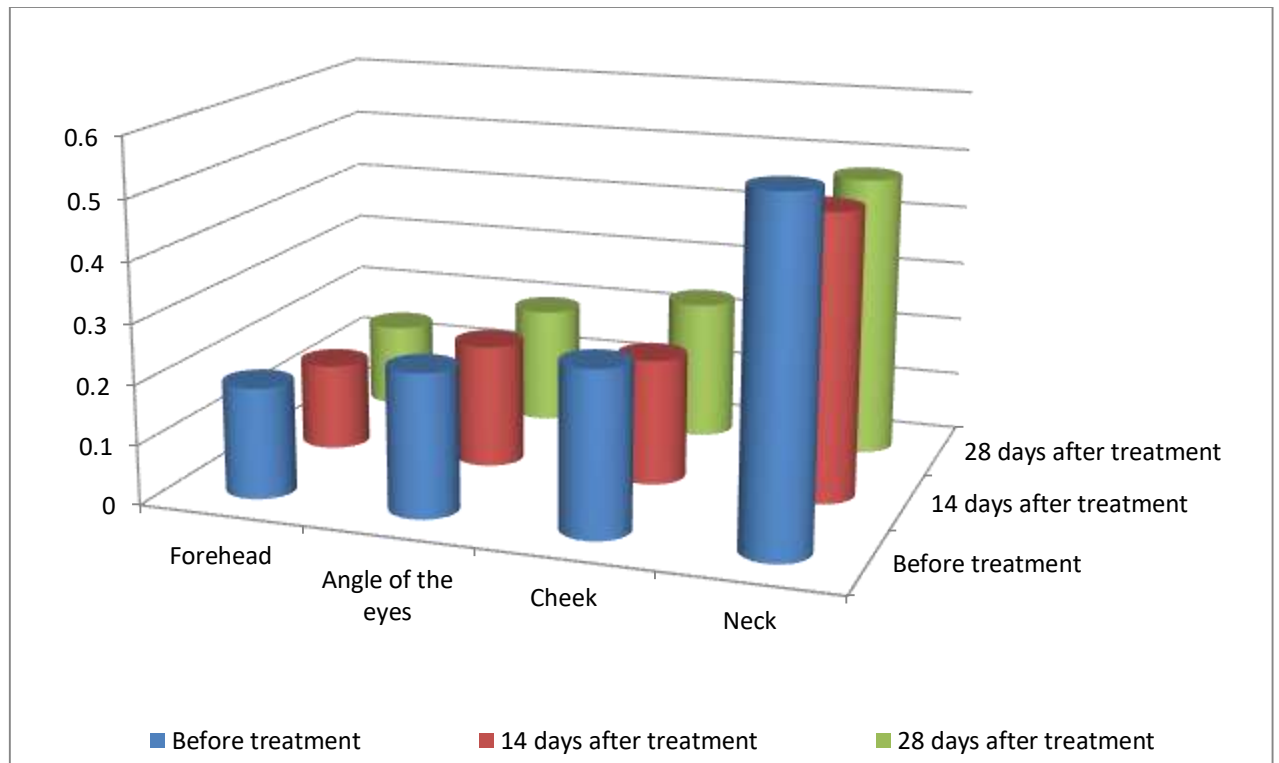
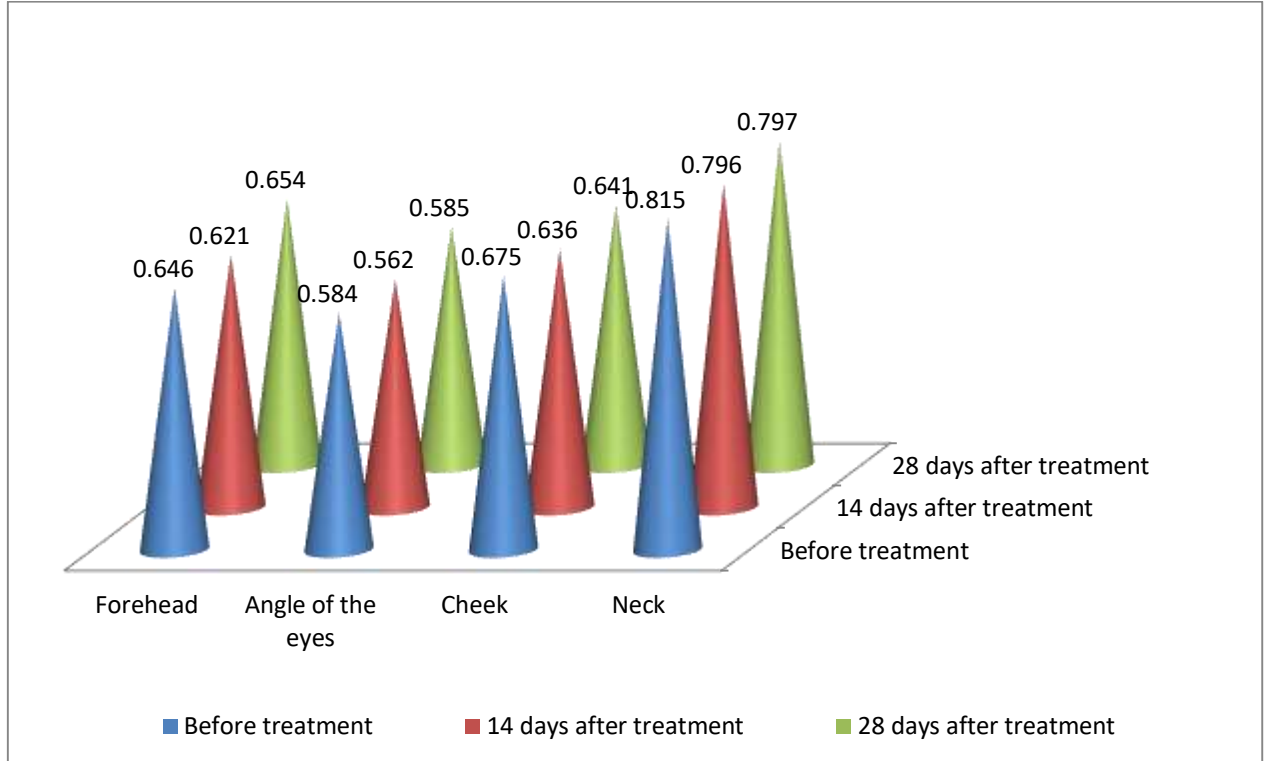


Fig. 11. Dynamics of Skin elasticity in patients 2B after peeling with retinoid



On the 14th day, the index of elastic-viscous properties in the forehead area tended to decrease, in the area of the corner of the eye and cheek - to increase, in the neck area it increased significantly by 21% ($p < 0.001$), on the 28th day it increased in the area the angle of the eye by 14% ($p < 0.05$), in the neck area by 30% ($p < 0.001$). On the 14th day, the elasticity of the skin decreased in the forehead area by 23% ($p < 0.01$), in the corner of the eye by 21% ($p < 0.001$), in the cheeks by 27% ($p < 0.001$), in the neck by 18% ($p < 0.001$); on the 28th day, it significantly decreased in the corner of the eye by 17% ($p < 0.01$), in the cheeks by 18% ($p < 0.05$), and in the neck by 19% ($p < 0.001$). On the 14th day, the index of general elasticity significantly improved in the forehead area by 23% ($p < 0.001$), the corner of the eye - by 10% ($p < 0.01$), cheeks - by 18% ($p < 0.001$); on the 28th day, it significantly improved only in the forehead area by 22% ($p < 0.05$), in other areas only a tendency to decrease was

observed. On the 14th day, the indicator of general elasticity significantly improved in all measurement areas, in the forehead area by 21% ($p < 0.05$), in the corner of the eye - by 20% ($p < 0.001$), cheeks - by 25% ($p < 0.001$), neck - by 20% ($p < 0.001$); on the 28th day it improved only in the neck area by 19% ($p < 0.01$) (Table 6, Fig. 10, 11).

When comparing A and B age groups with each other in group 2B, a 5% decrease in neck elasticity ($p < 0.01$), a 49% increase in neck viscosity ($p < 0.0001$), an increase in viscosity by 16% in the corner of the eye ($p < 0.05$) and by 20% on the cheeks ($p < 0.01$), worsening by 10% in the neck ($p < 0.05$) compared with group 2A.

4. DISCUSSION OF RESEARCH RESULTS

Thus, when comparing age groups with each other in the group of 46-60 years old for individual localizations, the elasticity was lower, the viscosity was higher, the total elasticity was narrower. peeling with retinoic acid in group 1A improved elasticity indicators in 2 zones, in group 1B it worsened in zone 1. Apparently, in the observed time after peeling with retinoic acid, changes in elasticity reflect a pronounced inflammatory reaction of the skin, and final conclusions should be drawn when examining the condition of the skin in a more distant period peeling with retinol led to an improvement in elastometry indices in group 2A in 16 study areas and in group 2B to their improvement in 30 people in the study area.

It is shown that in the group of patients aged 46-60 years, the index of skin elasticity is 5-15% lower in the area of the corner of the eye, cheeks, neck compared to the group of 30-45 years old. The group of patients aged 46-60 is characterized by a lower (by 16-26%) degree of erythema in the forehead, corner of the eye, cheek.

It was found that within a month, chemical peeling with retinoic acid leads to a significant decrease in the severity of wrinkles on the Merz scale in the group of 30-45 years old by 14% (subjectively, the general appearance improved by 67%), in the group of 46-60 years old - by 6 % (overall appearance improved by 42%).

Chemical peeling with retinol in the group of 46-60 years old significantly reduces the Merz scale index by 10%, reduces the severity of signs of photoaging, the MASI index in the group of 30-45 years decreases by 12% (the overall appearance has improved by 27%), in the group 46- 60 years - by 24% (overall appearance improved by 57%).

Chemical peeling with retinoic acid in both age groups has an irritating effect on the 14th day and retains increased erythema values on the 28th day, significant

changes are observed in the 46-60 year old group in the corner of the eye (10% and 6% higher, respectively); in the group of 30-45 years old, on the 28th day, it increases the moisture content of the stratum corneum of the epidermis by 10% (neck), the coefficient of elasticity by 16% (forehead), increases extensibility by 28% (forehead); in the group of 46-60 years old, it increases the moisture content in the forehead (14th and 28th days by 13% and 7%, respectively), the corner of the eye (28th day by 5%) and cheeks (28th day by 12%)), worsens the total elasticity of the neck (28th day by 9%).

Chemical peeling with retinol in patients 30-45 years old reduces the degree of pigmentation of the neck skin (28th day by 10%), sebum secretion of the forehead skin (14th and 28th days by 36% and 41%) and neck (28th day). day by 41%), improves the indices of skin elasticity on the 14th and 28th days in 16 zones, mainly in the neck (28th day by 3-18%), forehead (28th day by 16%) and corner of the eye (28th day at 10%). In the group of 46-60 years old, it reduces the degree of pigmentation of the forehead skin (14th and 28th days by 6%) and cheeks (28th day by 8%), increases the severity of forehead erythema (28th day by 9%), reduces sebum secretion of the forehead (14th day by 22%) and cheeks (14th day by 22%), improves all indicators of elasticity on the 14th and 28th days in 31 zones of all investigated skin areas.

It has been shown that for effective correction of age-related changes in the skin of the face and neck, it is necessary to carry out chemical peeling with retinoids. It was found that chemical peeling with retinol significantly reduces the degree of skin pigmentation, increases elasticity, reduces skin elasticity, these properties determine the need for its appointment for the prevention and correction of age-related changes in the skin of the face and neck.

Significant changes in the parameters of cell proliferation after peeling with retinoic acid revealed during immunohistochemical study make it possible to predict

its effectiveness in the longer periods of observation and to recommend it as a corrector for pronounced age-related changes in the skin.

A method has been developed for quantitatively assessing the effectiveness of chemical peeling treatment on four areas of the skin (in the forehead, corner of the eye, cheek and neck), which, when determining changes on days 14 and 28, allows each significant indicator to be recorded in the range from 0 to 8. This approach increases the reliability of changes and the validity of the study.

CONCLUSIONS

1. Age-related skin changes in patients aged 46-60 years old (group B) compared with patients aged 30-45 years old (group A) differ in individual areas of skin examination by a significant decrease in the degree of erythema by 16-26%, elasticity by 5-15%, increasing the "effect of fatigue" by 43-49% and viscosity by 16-20%, deterioration by 10% of the total skin elasticity.

2. Retinoid peels affect the clinical characteristics of the skin. After chemical peeling with retinoic acid, the indicator of the severity of wrinkles on the Merz scale in the group of 30-45 years old decreased by 14% (subjectively, the general appearance improved by 1.7 times), in the group of 46-60 years old - by 6% (the general appearance improved 1.4 times).

3. After chemical peeling with retinol, the MASI dyschromia index in the 30-45 year old group decreased by 12% (the overall appearance improved by 1.3 times), in the 46-60 group, the Merz scale index decreased by 10%, the MASI index - by 24 % (the overall appearance has improved 1.5 times).

4. Chemical peeling with retinoic acid on the 28th day in group A significantly increases the moisture content of the stratum corneum by 10% (neck), elasticity by 16% (forehead) and elasticity of the skin by 28% (forehead); in group B, significantly increases the degree of erythema by 6% (corner of the eye) and moisture content by 5-12% (forehead, corner of the eye, cheek), worsens the total elasticity by 9% (neck).

5. Chemical peeling with retinol in group A significantly reduces the degree of pigmentation by 10% (neck), sebum secretion by 41% (forehead, neck), improves elasticity on days 14 and 28 by 8-19% in 16 studied zones; in group B, it significantly reduces the degree of pigmentation by 6-8% (forehead, cheek), increases the severity of erythema by 9% (forehead), improves elasticity on days 14 and 28 by 10-30% in 31 study areas.

PRACTICAL RECOMMENDATIONS

1. Chemical peeling with retinol is recommended for patients of all age groups with hyperpigmentation and increased sebum secretion, as well as with a decrease in skin elasticity. Chemical peeling with retinoic acid is recommended for older patients with hyperkeratosis and hyperpigmentation.

2. When treating patients with chemical peeling with retinoic acid, it is advisable to assess the dynamics of the severity of erythema and moisture content of the skin. When treating patients with chemical peeling with retinol, it is advisable to assess the dynamics of the degree of pigmentation, sebum secretion and skin elasticity.

3. After peeling with retinoid, creams with a high lipid fraction should be used at home to reduce dryness and tightness of the skin for two weeks at home.

4. It is necessary to use sunscreen after chemical peeling with retinol for a month, after chemical peeling with retinoic acid after erythema subsides for a longer period.

REFERENCES

1. Аравийская, Е.Р. Фотостарение / Е.Р. Аравийская, Е.В. Соколовский // Руководство по дерматологии / под ред. Е.Р. Аравийской, Е.В. Соколовского. – СПб. : Фолиант, 2008. – С. 261–264.
2. Баррет-Хилл, Ф. Косметическая химия для косметологов и дерматологов / Ф. Баррет-Хилл. – М. : Косметика и медицина, 2017. – 232 с.
3. Белоусова, Т.А. Гистоструктурные проявления дерматотропной активности ретиноевой мази / Т.А. Белоусова, В.И. Альбанова, С.А. Жучков, Л.Н. Сазыкина, В.И. Ноздрин // Российский журнал кожных и венерических болезней. – 2005. – № 2. – С. 61–66.
4. Борхунова, Е.Н. Микроскопические изменения кожи при старении / Е.Н. Борхунова, А.В. Таганов // Новая косметология. Возрастная и гендерная косметология / под общ. ред. Е.И. Эрнандес. – М. : Косметика и медицина, 2017. – С. 74–102.
5. Бош, Р. Механизмы фотостарения и фотоканцерогенеза, а также стратегии защиты на основе фотохимических соединений / Р. Бош, Н. Филипс, Х. Суарес-Перес, А. Хуарранц, А. Девмурари, Д. Чаленсук-Хаосаат, С. Гонзалес // Косметика и медицина. – 2016. – №4. – С. 36–47.
6. Воробьев, А.А. Косметологическая анатомия лица / А.А. Воробьев, Н.А. Чигрова, И.О. Пылаева, Е.А. Баринова. – СПб. : ЭЛБИ-СПб., 2017. – 279 с. 14.
7. Гриценко, Д.А. Транскрипционный фактор p53 и старение кожи / Д.А. Гриценко, О.А. Орлова, Н.С. Линькова, В.Х. Хавинсон // Успехи геронтологии. – 2017. – Т. 30, № 1. – С. 10–16.
8. Губанова, Е.И. Эстетическая ботулинотерапия / Е.И. Губанова, А.А. Шарова, О.Р. Орлова, Е.И. Эрнандес // Новая косметология. Инъекционные методы в косметологии : 2-е издание / под общ. ред. Е.И. Эрнандес. – М. : Косметика и медицина, 2018. – С. 22–84.

9. Европейское руководство по лечению дерматологических заболеваний: пер с англ. / под ред. А.Д. Кацамбаса, Т.М. Лотти. – М.: МЕДпресс-информ, 2008. – С. 488–490.
10. Инъекционные методы в косметологии / под ред. Б. Ашера; пер. с англ. – М. : МЕДпресс- информ, 2014.
11. Калиниченко С.Ю. Мудрое старение – технологии управления возрастом // Сборник статей Научно-практического общества врачей косметологов Санкт-Петербурга. Выпуск №15. – 2014. – С. 43–52.
12. Мяделец, О.Д. Морфофункциональная дерматология / О.Д. Мяделец, В.П. Адаскевич. – М. : Медлит, 2006. – С. 378–380.
13. Парсагашвили Е.З. Биоревитализация / Е.З. Парсагашвили, Е.И. Эрнандес // Новая косметология. Инъекционные методы в косметологии : 2-е изд. / под общ. ред. Е.И. Эрнандес.– М. : Косметика и медицина, 2018. – С. 306– 379.
14. Пономаренко, Г.Н. Высокоинтенсивные лазерные технологии в дерматокосметологии / Г.Н. Пономаренко, Л.Б. Спокойный, С.В. Ключарева. – СПб. : Санкт-Петербург XXI век, 2012. – 208 с.
15. Рыжак, Г.А. Геронтокосметология : профилактика и коррекция возрастных изменений кожи / Г.А. Рыжак, Т.Н. Королькова, Е.В. Войтон ; под ред. В. Х. Хавинсона. – 2006. – 160 с.
16. Эрнандес, Е.И. Новая косметология. Основы современной косметологии / Е.И. Эрнандес, А.А. Марголина. – М. : Косметика и медицина, 2012. – 600 с.
17. Bailly, J. In vitro metabolism by human skin and fibroblasts of retinol, retinal and retinoic acid / J. Bailly, M. Crettaz, M.H. Schiffers, J.P. Marty // *Experimental Dermatology*. – 1998. – Vol. 7(1). – P. 27–34.
18. Charles-de-Sa, L. Antiaging treatment of the facial skin by fat graft and adipose-derived stem cells / L. Charles-de-Sa, N.F. Gontyo-de-Amorim, C.M. Tokiya, [et al.] // *Plastic and Reconstructive Surgery*. – 2015. – Vol. 135(4). – P. 999–1009.

19. Ciarletta, P. Papillary networks in the dermalepidermal Junction of skin: a biomechanical model / P. Ciarletta, M.B. Amor // *Mechanics Research Communications*. – 2012. – Vol. 42. – P. 68–76.
20. Dreno, B. Expert Opinion: Efficacy of superficial chemical peels in active acne management – what can we learn from the literature today? Evidence-based recommendations / B. Dreno, T.C. Fischer, E. Perosino, F. Poli, M.S. Viera, M.I. Rendon, D.S. Berson, J.L. Cohen, W.E. Roberts, I. Starker, B. Wang. – *European Academy of Dermatology and Venereology*, 2011. – Vol.25, №6. – P. 695-704.
21. Ganceviciene, R. Skin anti-aging strategies / R. Ganceviciene, A.I. Liakou, A. Theodoridis [et al.] // *Dermato-Endocrinology*. –2012. – Vol. 4, № 3. – P. 308–319.
22. Gericke, J. Regulation of retinoid-mediated signaling involved in skin homeostasis by RAR and RXR agonists/antagonists in mouse skin / J. Gericke, J. Ittensohn, J. Mihaly [et al.] // *PLoS One*. – 2013. – Vol. 8(4). – P. e62643.
23. Ghersetich, I. Pyruvic acid peels for the treatment of photoaging / I. Ghersetich, B. Brazzini, C. Cotellessa, T. Manunta, T. Lotti // *Dermatologic Surgery*. – 2004. – Vol. 30(1). – P. 32–36.
24. Glogau, R.G. Chemical peeling and aging skin / R.G. Glogau // *Journal of Geriatric Dermatology*. – 1994. – Vol. 2(1). – P. 30–35.
25. <http://maryqueen.ru/klassifikatsiya-stareniya>.