

## **USE OF BALNEOLOGICAL METHODS IN COMPLEX TREATMENT OF EARLOBE KELOIDS**

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### **Abstract**

Under certain conditions, skin damage may be accompanied by a complication in the form of hypertrophic scars, keloids. A significant role in the pathogenesis of the development of keloids is attributed to immune mechanisms, neuro-endocrine disorders, hereditary factors. The most effective way to treat keloid scars is still surgical. At the same time, simple excision of keloid stimulates additional collagen synthesis, increases the risk of relapse. Traditionally used steroid drugs, metered pressure, X-rays and radiotherapy. However, these methods can lead to undesirable consequences, which justifies the search for new, less aggressive methods. To increase the effectiveness of treatment of keloids of the earlobe using a new medical complex consisting of cryotherapy, a course of injections of the drug based on hyaluronidase and a course of drawing of sulphide-peloid extracts. A study of the state of keloid scar after cryodestruction and subsequent use of the drug based on hyaluronidase was carried out in 14 people. The cryoexposure was carried out by the two-cycle method with an exposure time of

30 to 90 s. To increase the efficiency and improve the performance in the complex treatment, a spinner made of silt-sulfide peloids was used, whose components stimulate collagen resorption by fibroclasts. As a result of treatment, all patients showed a significant improvement: subsidence of paresthesia, itching, leveling the height of keloid in relation to unchanged skin. Findings. The results obtained allow us to recommend the proposed method for the introduction into the practice of cosmetologists and otorhinolaryngologists.

**Keywords: keloid scars, cryotherapy, hyaluronidase, silt sulfide peloids.**

**Introduction.** Formation of rough scars is one of the common complications in patients with skin lesions. Otorhinolaryngologists are often approached by patients complaining of scar formation in the ear lobes, on the face and on the face, causing functional impairments: in the form of discomfort, itching, slight soreness, stress, and cosmetic defects - rough, protruding to the surface skin structure having a pale pink color, in some cases acquiring a bluish tint [1]. Keloid scar, dermal benign fibro-proliferative growth that extends outside the original wound and invades adjacent dermal tissue due to extensive production of extracellular matrix, especially collagen, which caused by over expression of cytokines and growth factors. Although many attempts were made to understand the exact pathophysiology and the molecular abnormalities, the pathogenesis of keloid scar is yet to be determined. [2, 3]. Hypertrophic scars and keloids are forms of abnormal scarring, which may be the cause of somatic ailments and, due to unfavorable aesthetic effect, also mental disorders and social problems. Given the unclear aetiology and the lack of effective treatment methods, they pose a serious challenge for modern science. The contribution of genetic factors is one of the proposed hypotheses regarding the formation of hypertrophic scars and keloids. Gene polymorphism and mutations occurring in them may interfere with the proper course of signaling pathways responsible for the subsequent stages of the wound healing process. An important role in the pathogenesis of abnormal scarring may be the TGF-B1/Smad pathway, MAPK kinase, pathway for IGF-I and its receptor, plasminogen activator inhibitor-1 and urokinase plasminogen activator, gene polymorphisms for the vitamin D receptor and the ADAM33 gene, as well as abnormal expression of suppressor genes [4]. However, it is possible that several factors such as age of onset, sex, cause of scarring, blood groups, anatomical site, presence of family history, number of injured sites (multiple/single), and modifiable factors like delayed healing, and hypertension have an important role in keloid formation and consequentially in predicting keloid's behavior in response to treatment and prognosis [5].

Cicatricial keloid can occur anywhere on the skin that has been affected. Keloid is a scar-shaped isolated tumor, which belongs to the group of pseudo-tumoral fibromatosis, resulting from the overgrowth of dense fibrous tissue, which usually develops during the healing process of the damaged epidermis. It corresponds to the form of a previous defect of the skin, may extend beyond the zone of damage and rises above the level of the skin, rarely penetrates into the subcutaneous tissue. Keloid usually does not regress spontaneously, often recurs after excision. In understanding the appearance of keloid scars, it is important to remember the sequence of wound healing. Wound healing is a combination of the process of collagen synthesis and its degeneration. In some cases, the formation of collagen significantly ahead of its degeneration, and the scar acquires a tendency to excessive growth. There are a number of studies that prove the relationship of neuro-endocrine disorders and the incidence of keloid scars [6, 7, 8].

The skin is a dynamic and complex organ that relies on the interrelation among different cell types, macromolecules, and signaling pathways. Further, the skin has interactions with its own appendages and other organs such as the sebaceous glands and hair follicles, the kidney, and adrenal glands; systems such as the central nervous system; and axes such as the hypothalamic-pituitary-adrenal axis. These continuous connections give the skin its versatility, and when an injury is caused, some triggers start a cascade of events designed to restore its integrity. Nowadays, it is known that this psychoneuroimmune-endocrine intercommunication modulates both the homeostatic condition and the healing process [9].

Despite the existence of numerous methods of conservative therapy (radiation therapy, topical use of steroid drugs, extracts of plant origin), the surgical method remains the most effective method for keloids [10]. However, simple excision of keloid stimulates additional collagen synthesis and increases the risk of an even larger and deformed keloid. Surgical treatment should be supplemented by the rational use of steroid drugs, pressure dosing, X-ray and radiotherapy [11, 12, 13, 14]. It should be remembered that the introduction of steroids in the zone of damage can lead to undesirable consequences: skin atrophy, hypopigmentation, the occurrence of telangiectasia. For the treatment of keloids, in recent years, cryodestruction [15, 16] has been successfully applied, as well as the method of internal cryotherapy (freezing of scar tissue from inside the keloid itself) and microwave cryodestruction [17]. With the cryogenic method, the use of deep cold, aimed at the diseased organ, or pathologically changed tissue, leads to the destruction of the latter. Cryonecrosis occurs when the temperature decreases by more than 150° C.

At the same time, protoplasm crystallization, “osmotic shock”, and ischemic necrosis occur in the cells. Protein degradation products and other components of necrotic masses, which are formed as a result of lysosomal proteolysis, become genetically alien to the body, necessarily cause the production of antibodies, i.e. an immunological reaction develops, which plays a role in late tissue reactions. Cosmetic procedures for keloid scars are ineffective and sometimes dangerous, as scar tissue can begin to grow.

In this context, the use of physiotherapeutic methods of treatment can be effective and promising. At the same time, an important requirement (or condition) for the use of physiotherapeutic treatment methods is the presence of the biological and physiological activity of the applied factor (or method) on the one hand, and on the other, the minimal or total absence of side effects. One of these methods is balneotherapy - external use of mineral waters, peloids and balneological products based on them. The concept of the mechanism of the therapeutic action of peloids is based on the idea of a multistage realization of the effect of applications (procedures) with the successive deployment of a neuro-reflex reaction, involving the hypothalamic-pituitary-thyroid, pituitary-sympatho-adrenal, pituitary-wago-insurnoe systems, the pituitary-sex glands [18]. They determine the reflex and humoral effects on the central and autonomic nervous systems, including the cortical-subcortical level, with the inclusion of feedback on the individual functional systems of the body up to the cellular and subcellular levels, regulate metabolic processes, release of biologically active substances, neurohormones, activity of enzyme systems, which ultimately ensures the development of sanogenesis processes. As a result of the impact of therapeutic mud, viyavleno increase in the bioelectric activity of the cerebral cortex and subcortical centers, changing the content of histamine, acetylcholine, catecholamines, serotonin and other neurotransmitters, the functional state of the thyroid gland, the pituitary-adrenal system and the endocrine system of the digestive tract, the increased activity of immune, enzymatic and bioenergetic processes [19]. Under the influence of applications with peloids, metabolism increases in the underlying tissues, differentiation of the basal layers of the epidermis is induced, excitability and conductivity of the skin nerve guides (the effect of silt sulfide peloids) increases, and the balance of pro-and antioxidant systems is restored (to a greater extent - sapropel peloids). In the epidermis of the skin, ribonculeoproteids accumulate and the content of lymphoid elements that emigrate from the vascular bed increases, their functional activity increases [20, 21]. The authors report that the use of silt-sulfide peloids in the study of the regeneration of experimental skin excision in laboratory animals led to accelerated healing and granulation of wounds, epithelialization, stimulation of angiogenesis, and deposition of collagen. An

increase in cell proliferation and migration of fibroblasts has been established [22]. Under the influence of phonophoresis, morpho-functional changes in postoperative skin scars, as well as quantitative indicators of the main structural indicators of scar tissue (mature fibroblasts, tissue basophils, vessels) [23].

The regulatory effect on the population of tissue basophils in scars and the surrounding skin and the intensification of the reparative processes of connective tissue were revealed. The stimulation of neoplasm of the skin appendages (hair, sebaceous and sweat glands), elastic fibers, the reduction of reactive and destructive changes in the nervous system has been established. That is, under the influence of phonophoresis of an extract by silt-sulfide peloids, a biostimulating, anti-sclerotic, antihypoxic effect on pathological scars was detected.

Given the above, as well as the severity of pathogenesis, the complexity and insufficiently effective treatment of keloid scars, the improvement of existing ones, the search and development of new treatment methods is important and justified.

The aim of the work is to evaluate the effectiveness of treatment of keloids of the earlobe using a new medical complex consisting of cryotherapy, a course of injections of the drug based on hyaluronidase and a course of applications of the extract of silt-sulfide peloids.

**Materials and methods.** Under our supervision there were 14 patients with keloid changes of the earlobe. Patients of the 1st group (10 people) used complex treatment: cryotherapy, local administration of the drug Longidaza. Patients of group 2 (4 people) in the complex treatment (cryotherapy and local administration of the drug "Longidase") used a course of applications with sludge-sulphide peloids squeezing (balneological agent "Pelovit"). Cryosurgical treatment of keloid scars was carried out using tips of various shapes and sizes, depending on the configuration and size of the scar. The impact was carried out by the two-cycle method with an exposure from 30 to 90 s, the period of thawing was from 40 to 120 s. The drug Longidaza was injected into the scar tissue of the earlobe - 3000 IU every three days (5 doses total). Balneological means "Pelovit" - extracts from silt-sulfide peloids (natural colloidal organic-mineral formations) were used in the form of lotions, the solution was applied with a tampon on the changed skin areas. The temperature of the solution ranged from 37° C to 42° C. The duration of the procedure was 40 - 60 minutes. The course of treatment was 10 daily procedures.

### **Results and discussion**

Clinical observations have shown that in all patients, the next day after cryotherapy, pain and tension in the keloid scar disappear. After the condition of the cryo-destroyed tissue

sites is normalized, keloid remains or its location is covered with young skin. However, with extensive keloid scars, it is necessary to repeat cryotherapy up to 4 times with an interval of up to 3-5 weeks. To prevent the damaging effect of cold on the integuments, a coating was applied to the cryo-inserts in the form of individual caps. To normalize the state of connective tissue, immune status, regression of inflammatory changes, proliferative processes, preparations based on hyaluronidase are commonly used. However, these drugs, when administered orally, are rapidly inactivated. Therefore, we administered topically, Longidaza, which is a physiologically active complex of a chemically bound hyaluronidase enzyme with a polyoxonium carrier, into the scar tissue of the ear lobe. Possessing immunomodulatory, antioxidant and detoxifying properties, the drug is a powerful anti-inflammatory agent and therefore affects the root cause of hyperplasia. As a result of treatment, a cosmetic defect was eliminated. There was no need for repeated multiple interventions in keloid tissue. Ten patients in group 1 showed a significant improvement, which was manifested in the following indicators: a decrease in the size of the scar and skin deformity in the area of the scar, relieving pain, paresthesia, itching, normalization of the scar color, leveling the scar in relation to the unchanged skin.

In four patients of group 2 with residual cicatricial deformity of the skin in the scar zone in the complex treatment, we used the method of balneotherapy - the use of applications in the form of "Pelovit" in order to increase the effectiveness. It was found that the introduction of peloidotherapy into the treatment course contributed to the resorption of infiltrates, softening of keloid scars and adhesions, as a result of which these four patients showed positive changes - they approached the cosmetic effect obtained in patients of group 1: the size of keloid scar as well as skin deformity decreased the zone of the scar, pain levels, paresthesia, itching were alleviated, the scar color normalized, the edges of the scar leveled in relation to the unchanged skin.

### **Conclusions**

**Findings.** The new combined method used is highly effective compared to the existing methods of treating keloids of the earlobe and allows getting rid of keloids in a relatively short time. The obtained results allow us to recommend the proposed method for widespread introduction into the practice of cosmetologists and otorhinolaryngologists.

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