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THE ISSUE CONTAINS:

Proceedings of the 12th  
International Scientific  
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**SCIENCE AND PRACTICE:  
IMPLEMENTATION TO MODERN SOCIETY**



MANCHESTER, GREAT BRITAIN  
6-8.05.2022



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**CAUSES OF INVOLUTIVE CHANGES AT THE SOFT  
TISSUE LEVEL OF THE FACIAL SKULL**

***Abstract.** The article considers the processes of involutinal changes at the level of the skin, superficial and deep fat compartments, as well as bone tissue. A role of the facial ligaments in the degree of protrusion in different parts of a face. This helps to prevent complications and facilitate the work of cosmetologists and aesthetic specialists in a variety of cosmetic interventions, regardless of the level of penetration: hypodermis, superficial fat structures or deep fat compartments.*

***Keywords:** involutinal changes, skin, compartments, augmentation, retaining ligaments of the face.*



In general, the processes of involutonal human change depend on a number of genetic and epigenetic factors. First, they are most noticeable on the skin. But if we look more fundamentally at the processes that take place at different levels, it becomes clear where the most significant transformations take place, on which depends the formation and degree of manifestation of age-related changes. These reasons are the condition of the skin, the position of the compartments, both superficial and deep, protrusion of the ligaments [1], muscle hypertonia, which have no less significant impact on the general condition of tissues regardless of age.

In order for cosmetologists to correct involutonal changes as effectively and safely as possible by augmenting different parts of the face, it is necessary to know very well and be oriented towards the level of filling with hyaluronic or stimulating filler. Applied anatomy is proposed to facilitate the work of cosmetologists, which greatly facilitates correction and reduces the number of complications.

The educational content of doctors and specialists in the field of aesthetics should be provided with information related to different levels of cosmetic interventions. It is advisable to offer practical seminars with training and posture of the hand when performing procedures of biorevitalization, redermalization, augmentation with hyaluronic or stimulating fillers, as well as blocking the muscle layer in different parts of the face and neck with neurotoxin.

The cosmetology field is quite young. A sufficient number of anatomical sources represents anatomy of the face, but cosmetology requires the most accurate filigree representation. In which layer or place the procedure is most effective to obtain the expected effect? This is a major issue for aesthetic injectors, due to the fact that operations in the derma or hypodermis stimulate fibroblasts, which provide collagen formation, hyaline metrics, and a whole cascade of different growth factors. The augmentation procedure requires spotting of the filler in another layer - superficial or deep fat compartments under conditions of obligatory dangerousness criterion, because deep compartments are located near the periosteum where the vascular and nervous formations are located.

Stimulation processes occur at the skin level and are provided by the manipulation of biorevitalization. The effectiveness of the intervention depends on

how correctly we inject the liquid or a cocktail.

It is important to understand that a distinction must be made between hypodermis of the skin and subcutaneous tissue (compartments), because the saturation density of hypoderm fibroblasts distinguishes from the saturation density of subcutaneous tissue fibroblasts. These cells are the main implementers of repair and production of glycosaminoglycans. Therefore, injections are more effective in the subdermal layer.

The skin is represented by a three-component system consisting of the epidermis, dermis and subcutaneous fat connected morphofunctionally [2]. These are two types of tissues: epithelial and connective.

The epidermis is a multilayered squamous keratinizing epithelium that has a layered structure and significant regenerative properties. It is rested on the basement membrane, the components of which are synthesized by epithelial cells and compose of a set of glycosaminoglycans such as fibronectin, laminin, heparan sulfate and collagen Type IV [3]. Directly on the basement membrane, which separates the epithelium from the dermis are placed keratinocytes, melanocytes, Langerhans cells which come from the macrophage pool [4]. Features of the structure and composition of the basement membrane prevent the penetration of cosmetic ingredients into the dermis, where located cells that provide the synthesis of hyaluronic acid and a range of growth factors. This feature is taken into account in the development of some cosmetics, which introduce special molecules of bioregulators that trigger the process of dermo-epidermal interaction.

The next component in the skin structure is the dermis. It provides nutrition to the epidermis and is the site of concentration of blood vessels and nerves. There are two layers in the dermis: papillary, formed by loose fibrous connective tissue, and reticular, consisting of dense fibrose connective tissue [3]. This layer, without a former boundary, turns into subcutaneous fat, which connects the skin with deeper tissues. Not only adipocytes but fibroblasts is found in hypoderm of the skin as an adipose tissue. The number of these cells in the hypodermis is greater than in the compartment layer of adipose tissue. Therefore, stimulating manipulations are more effective at the level of the hypodermis than in fat compartments.

All layers of the face are connected by dense connective tissue ligaments that run in the transverse direction from the periosteum to the skin and keep (fix) the soft tissues from falling down.

There are true ligaments - strong connective tissue structures attached to the bones of the skull. They are adhesions between the dermis and attached to the skull in only four areas: orbital, zygomatic, buccal-maxillary and mandibular. Ligaments limit the displacement of the soft tissues of the face, which occurs with age [5]. There are about 15 of them, but only 4 of them are true:

- Orbital retaining ligament passes along the bony edge of the orbit, at the lateral edge of the orbit it is perforated, through it pass vessels from the orbital cavity. In the lateral cantula, the orbital ligament forms a lateral orbital thickening.

- Zygomatic ligament is located along the chin arch and runs below the molar fat sac. In the medial part, the chin ligament connects with the orbital ligament and forms the nasolacrimal ligament.

- Maxillary ligament consists of a medial maxillary ligament in the nasal ala and a lateral which is located slightly more laterally.

- Anterior and posterior mandibular ligament. Posterior mandibular ligament is placed at the appearance of the facial vein and the edge of the masticatory muscle.

The next layer is muscles, which are in constant motion, and with age it leads to hypertension of some muscles and atony of others. The spasmodic muscle contracts and pulls on the skin, which shrinks as much as it needs enough natural elastin, and its remnants sag. Spasm of the facial muscles results in nasolabial folds, wrinkles on the forehead, nose, chin and around the mouth. In turn, the stretched muscle lengthens, in the area there is a depression of the musculoaponeurotic system of the face, while the support of the tissues lying above is weakened, the skin "slips" down. For example, this is typical of the corners of the mouth and lower lip, which causes the corresponding facial expressions "sadness" and "disgust". The oval of the face loses definition, the contours are deformed.

In some areas where there are deep fat compartments that form the mobility of higher tissues. With age, the volume of deep fat structures decreases, while the surface ones hypertrophied. Bone resorption together with the above mentioned



features exacerbates the manifestation of age-related changes.

In medical science, the physiological basis of human aging is associated with a decrease in moisture in the tissues of the whole body - in the skin, bones, blood vessels, including the skull [6]. This principle is unfairly despised by cosmetic science when explaining the causes of age-related changes. The significance of the condition of the bones of the facial skull has been actualized nowadays. The skull is a solid base, support and frame, which determines the position of all structures attached to it. Like all bones in our body, skull bones tend to dry out and deform with age. The skin tries to compress as much as possible, holding on to the deformed skull, which, as it decreases in volume, loses weight and moisture levels. This changes the attachment points and facial tone, as well as the vector of movement. Atrophy of the alveolar processes of the jaws leads to changes in the three-dimensional pattern and the formation of deep wrinkles. The lower jaw is the main part of the face, its various changes affect the overall appearance of a person. With age, the size of the orbits increases, as well as the angle of the lower jaw. The length and height of the body of the jaw to the line of growth changes significantly decreases, while its width changes insignificantly. These changes are due to the selective resorption of the bones of the facial skull, most pronounced in the above areas.

Thus, age-related changes in the soft tissues of the face occur gradually, starting with the bone tissue, which is the support for muscles, compartments and skin. The communication apparatus in this case plays the role of supporting all structures and, if it is well developed, it is a safeguard against the early manifestation of involutional changes. But the most important is the selective resorption of bone tissue.

Therefore, we believe it is necessary to add such a topic to the curriculum of all specialties related to the aesthetic field with injectable interventions.

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