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# NON-SURGICAL METHODS FOR THE CORRECTION OF THE HUMP AND THE TIP OF THE NOSE

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## ABSTRACT

**Introduction**: It can be said that the nose is the most characteristic element of every face. It occupies one third of the middle part of the face. For this reason, it is very important in creating face profile. In addition, its distortions are important due to the aesthetic appearance of the face, which in turn can significantly affect the personal and professional life of a person. In aesthetic medicine, mainly non-surgical methods of correction of the hump and the tip of the nose are preferred. For this purpose, special substances called hyaluronic acid and botulinum toxin are used.

**Aim of the study**: The aim of this study is to present non-surgical methods of correction of the hump and the tip of the nose.

**Materials and methods**: The research method is an analysis of the literature on the subject of contemporary trends in aesthetic medicine.

**Conclusions**: In conclusion, it should be stated that the use of hyaluronic acid or botulinum toxin allows you to quickly achieve the effect without having to undergo a complicated surgery. In addition, these are solutions with a much lower risk than in the case of surgical methods.

**Key words: nose, hyaluronic acid, botulinum toxin**

**Introduction**

It can be said that the most characteristic element of each face is the nose. It occupies one-third of its middle part. For this reason, it is very important in creating a face profile. In addition, its distortions are important due to the aesthetic appearance of the face, which in turn can significantly affect the personal and professional life of a person. An important aspect is the fact that the nose gets its final shape only at the moment of getting sexual maturity. Therefore, the aesthetic treatment of this part of the face should be carried out only after it has been achieved. An important parameter is determining the shape of the nose (nasal index). It is expressed as the ratio of its width to height. On its basis, you can specify the race of a particular person. In the case of people with narrow noses, this index is lower than 70, and usually does not exceed 55. Such a value is characteristic mainly of Europeans, Indians and Eskimos. In the case of the intermediate group, the nasal index ranges from 70-85. This value applies primarily to North and Central Asian peoples. In the case of broad-nosed communities, the nasal index ranges from 85 to 100. In this case, the value is characteristic of Malayans and Mongols. There is also a group of people with particularly high nasal index, which exceeds 100. Such value applies mainly to blacks, Aborigines, Bushmen and Pygmies.

The shape of the nose, which also allows to determine the origin of a human being, is equally important. An example is the Europeans, who are characterized by straight, hooked, convex and concave noses. At the same time, noses in these groups may differ from each other. This applies first of all to the nose profile line, which may be different [1].

**State of knowledge**

Under the term of the nose is meant the external nose and nasal cavity along with the paranasal sinuses. Sometimes this concept is applied only to the outer nose, so you can treat the right inner part separately. These elements are a part of the respiratory system, which includes the mouth, throat, larynx, trachea and bronchi. They can be divided into upper and lower airways. The first one is the nasal cavity with the throat, in which the digestive tract is crossed with the airway [1, 2, 3]

Two important structures are distinguished within the nose, namely the external and internal nose. The first one will be discussed later in the work. In contrast, the internal nose includes the nasal cavity and paranasal sinuses. The term nasal cavity is understood as the space between the frontal nostrils and the nasal part of the throat with which it is connected through the posterior nostrils.

The nasal cavity is divided by the nasal septum into two chambers, the right and the left. They are separated from each other and are not always equal. In addition, each chamber has four walls, namely the upper, lower, lateral and medial walls. From the lateral wall there are three gills, namely the lower, middle and upper nasal conchae. Of these, only the inferior nasal conchae is an independent bone. The remaining plaques are the appendages of the lobe of the ethmoid bone. Clusters are arranged in a layered manner, one above the other. They are parallel to each other and protrude from the nasal cavity together with the adjacent side wall elements and thereby divide the nasal cavity into three parts, called nasal meati. The lower, middle and upper nasal meatus are distinguished. The area between nasal conchae and nasal septum is called the common nasal meatus.

All distinguished meati fuse into one nosopharyngeal meatus. It is a junction between nasal cavity and throat. In addition, in the posterior and upper part of the nasal cavity there is a Spheno-ethmoidal recess, which is located above the nasal conchae [1, 2, 3, 4].

These nasal meati connect to the paranasal sinuses, which are even spaces filled with air and layered with a thin respiratory mucosa. The sinuses are located in the bones that restrict the nasal cavity. Among them, [1] are mentioned:

- maxillary sinus, which is located in the shaft of the jaw,

- frontal sinus, which is located in the frontal bone,
- sphenoidal sinus, which is located in the sphenoid vein,
- ethmoidal sinus which, together with the anterior and posterior ethmoidal cells, is located in the ethmoidal labirynth

The frontal and maxillary sinus as well as the anterior ethmoidal cells connect to the middle nasal meatus. In turn, the posterior cells have an outlet to the superior nasal meatus. The ethmoidal sinus connects to the spheno-ethmoidal recess. Another element is the bony nasal septum, which is supplemented by the cartilage nasal septum in the anteroinferior section. It is formed by the cartilage of the nasal septum, which, anteriorly and inferiorly, passes into the membranous and cutaneous part of the nasal septum. This element consists of a double skin layer, which is located between the frontal nostrils and also contains the medial branches of the major alar cartilage. The part in question is mobile and is therefore referred to as the movable part of the nasal septum. All these elements form the nasal septum, which very often shows a curvature directed by the convexity to the right or left. It is caused by the general asymmetry of the skull, which is probably the result of the lack of interdependence during the development of the previously mentioned components of the septum [1]. The nasal cavity is composed of the respiratory region and the olfactory region. The former occupies 75% of the entire surface of the cavity and is characterized by the presence of the respiratory membrane. In most cases, it has a pink-red color and is covered with a ciliathed epithelium. It includes numerous nasal glands, goblet cells and cavernous venous plexuses. The movements performed by epithelial cilia are directed towards the throat and allow the removal of particles of dust and other impurities. Both epithelial cells and nasal glands secrete mucus of different consistency, which moistens incoming air and also retains particles of foreign bodies. In addition, on the surface of the nasal conchae, there are venous plexuses, which which aim is to warm up the cold air entering the nose [1, 2].

The olfactory region occupies a small space in humans and is located in the superior part of the nasal cavity and adjacent part of the side wall and the nasal septum. The color of the olfactory mucosa in this case is yellowish, it is less vascularized, has numerous small olfactory glands. The whole is covered with olfactory epithelium, which has no cilia. This epithelium, however, has olfactory cells that are created by bipolar nerve cells which are equipped with dendrites, which are receptors of the sense of smell. In this case, the axons create olfactory nerves [1].

The nasal cavity and the sinuses are primarily responsible for the purification and heating of the air as well as for the sense of smell. On the other hand, anomalies in their scope result in a disorder of various functions. An example may be sleep apnea, which may be the result of eg too strong distortion of the nasal septum.

The external nose is located in the middle of the face and is located between the cheeks, below the forehead and above the upper lip. It is characterized by the shape of an irregular and trihedral pyramid. The nasal base is divided into the membranous part of the nasal septum and is directed downwards. The front is constrained by two openings that bear the name of the frontal nostrils and form the entrance to the nasal cavity. From the lateral side, the nostrils are limited by the ala of the nose. In contrast, the side surfaces are characterized by a triangular shape. In addition, their superior part is immobile due to their strengthening through the bone skeleton. On the other hand, the inferior part of the lateral surfaces is highly mobile and slightly convex. These elements are called the ala of the nose. On the side, they pass gently into the cheeks, while in the front direction they go to the anterior margin. This one is called the dorsum of the nose, which connects to the forehead at the top. This connection is called the root of the nose. Towards the bottom, the ridge passes into the base of the nose and tip of the nose [1, 2, 3].

In aesthetic medicine, non-surgical methods of correction of the hump and the tip of the nose are performed. For this purpose, a special substance called hyaluronic acid (HA) is used. It was discovered by K. Meyer and J. Palmer in 1934 by isolating it from the bovine lens of the eye. This

substance is a charged biopolymer characterized by a linear and unbranched system. Its molecules do not sulphate or epimerize. In addition, they always form the same type of chains, differing only in terms of polymer size [5].

Hyaluronic acid (glycosaminoglycan) occurs in all tissues and body fluids of vertebrates. In addition, it exists in cell walls in the case of many bacteria. The ability to synthesize hyaluronic acid is characteristic for many cell types, in particular endothelial cells, fibroblasts and smooth muscle cells. For the synthesis of HA inside the cell occurs with the participation of specific enzymes. Then HA is translocated to the outside of the cytoplasmic membrane, namely the extracellular space. In this way a protective coat around the cell is created, which ensures an adequate level of hydration, as well as protecting against the action of free oxygen radicals. It should be noted that the products of the action of hyaluronan synthesis isoenzymes are different from each other due to the length of the chains. In the case of the human body, HA occurs in the extracellular matrix, inside the cells and on their surface [5, 6].

Hyaluronic acid has very important and useful properties. First of all, HA is highly hygroscopic, which affects the physical properties of tissues, their proper hydration, and also allows the elimination of friction and adhesion of individual tissue elements. In addition, the hyaluronic acid molecule is able to bind water in a thousand times more than it weighs. Therefore, it forms sticky and flexible solutions that are capable of filling the extracellular space. For these reasons, the content of hyaluronan in tissues is responsible for its hydration [5, 8, 9]

Hyaluronic acid acts also as an immunocompetent molecule that is a ligand for many receptors. In addition, HA is one of the most important factors that determine the stability of the internal tissue environment. It is also an element regulating the course of inflammatory processes, including wound healing.

The size of the hyaluronic acid molecule is very important in this respect. In the case of low molecular weight HA, the action is pro-inflammatory and immunostimulating. However, high molecular weight hyaluronan has anti-inflammatory and immunosuppressive effects. Hyaluronic acid is also an anti-radical disc. It results from the phenomenon of disruption of glycosidic bonds between monomers by reactive oxygen species as well as depolymerization of hyaluronan. Thanks to this, cellular structures remain protected. It is important that the hyaluronic polyanion has the ability to chelate iron and copper cations. This, on the other hand, allows limiting the availability of cations for Fenton's reactions, in which the result is an aggressive hydroxide radical, characterized by a long half-life in tissues. HA is also an essential factor in wound healing as it occurs in every phase of this process [5, 7].

On the basis of hyaluronic acid, special fillers are made, which are used to improve the condition of the facial skin, as well as to model it. The first products of this type were obtained already in the 80's. Then it was obtained from rooster combs, and the fillers contained an admixture of bird proteins. Nowadays hyaluronic acid is obtained in the process of bio-fermentation. The main source of HA are strains of Streptococcus equi. Then, the hyaluronic acid obtained in this way is purified from proteins and bacterial toxins in accordance with the relevant standards. Of course, after the production of the substance, it is also necessary to stabilize it. This is mainly due to the very short half-life of HA in the skin, which is about 12 hours. Thanks to stabilization it is possible to prolong its operation. In addition, commercially available preparations of hyaluronic acid differ in its concentration, as well as the morphology of the product. The second element depends primarily on the production technology used, and also affects the essential properties of the filler. Among them, it stands out above all [5]:

- flexibility
- viscosity
- hardness
- the ability to lift tissues
- quality of degradation in tissues
- water binding capacity

- formability.

Hyaluronic acid can be introduced into the tissues in two ways – with the help of sharp needles or blunt cannulas. Needles are used for spot fills. However, cannulas are used for volumetric operations, as well as in situations where the use of a sharp needle is dangerous. The use of needles is connected with the possibility of damaging the vessels or nerves. The use of the needle is also connected with the necessity of choosing the right injection technique. In this area, the most popular methods are spot drop, linear, sandwich, fan and cross [5].
The use of hyaluronic acid allows you to perform non-surgical rhinoplasty. The correct injection of the filler allows you to correct different aesthetic defects. These include [10]:

- too small nose
- curvature of the nose after fracture
- lack of an bridge, located between the root and the tip of the nose
- a disproportionately large tip of the nose
- too much raised nose
- a nose with a hump

Nasal correction using filler can be performed in a variety of ways, depending on the technique chosen by the doctor. Their selection is largely determined by the size of the adjusted area. Both needles and thin cannulas can be used for the procedures. The most important element in the case of using needles is the proper formation of the filler in the field of nasal skin tissues. However, a dense preparation of hyaluronic acid is introduced using the cannula. In the case of correction of the nose hump, the entire procedure lasts from 30 to 60 minutes. The initial stage is to provide anesthesia by the doctor. Usually a special cream or local anesthetic is used. The main stage of the procedure involves the injection of the product in three places. They must be appropriately selected for the nature of the correction.
In the case of rhinoplasty, injections are applied in front of and behind the hump as well as at the tip of the nose. The last injection aims to achieve the effect of tip's elation. This results in a nice nose shape and reduced visibility of the buckled bone. Normally, hyaluronic acid remains in the skin for 6 to 12 months. After about a month the topping up of the filler is used [10].
As with any treatment, the use of fillers has various contraindications. They can be divided into absolute and relative.

- absolute contraindications:
    - pregnancy
    - lactation period
    - fever
    - autoaggressive diseases during the active period of illness
    - various skin infections, namely viral, bacterial and fungal infections
    - hypersensitivity after use of fillers
    - previous use of implants in the area to be treated
    - excessive and unrealistic expectations of the patient
- relative contraindications:
    - a positive interview in the field of allergic reactions to numerous antigens
    - using anticoagulants
    - tendency to form hypertrophic scars and keloids.

After the treatment using hyaluronic acid, various side effects may occur. They are mainly related to the body's reaction to the injection, which is why they usually do not depend on the type of product used. Among the most common side effects one should distinguish [5, 11]:

- temporary swelling of the skin and subcutaneous tissue
- local edema
- erythema
- tenderness
- ache
- ecchymosis
- itching in injection locations
- hyper-correction or clear-up of the filler in case of a wrong injection
- congestion in the blood- and lymphatic vessels
- hematomas
- nerve damage
- limited necrosis of the dorsum of the nose

Most of the side effects occurring after the treatment do not require additional treatment. This is due to the fact that they disappear after a short time. However, some adverse effects of the treatment can be difficult to treat, therefore, the doctors performing the procedure must be prepared accordingly [5].
Summarizing the above information, it should be stated that the use of a filler based on hyaluronic acid allows for non-surgical rhinoplasty. Of course, the effects of such procedure differ from the effects of conventional surgery. However, in the case of HA injections, there is limited the possibility of various complications comparing with the case of surgical correction. In addition, they also have various advantages over conventional methods. These include, above all, [10]:

- no risk associated with the use of general anesthesia
- no need to wait for an effect that is immediate if using hyaluronic acid
- pain after the HA treatment is much smaller than the one after surgery
- the patient has control over the effects of the performed procedure
- injections allow to hide the hump of the dorsum of nose
- less risk or even a lack of nasal bleeding or edema
- the procedure is temporary and reversible
- the cost of the treatment using hyaluronic acid is lower than in the case of surgical rhinoplasty.

The use of hyaluronic acid for nose correction is characterized by very good effects. The procedure is generates lower cost than surgery, and has a smaller possibility of complications. At the same time, the effects obtained after the surgery are reversible and temporary. This means that in case of customer dissatisfaction with the effect, you can return to the original version. However, in order to maintain the effect, it is necessary to fill the filler (hyaluronic acid).
In the case of correction of the tip of the nose, it is not necessary to perform a surgical procedure. There are also less invasive methods in this case. The use of botulinum toxin enjoys great popularity in this area. It is a substance detected in 1822. During this period, the neurological effects that were the result of intoxication after ingestion of toxin-containing meat products are described for the first time. After mass events of this type, research was started to identify a substance that was so dangerous to humans. Its identification was made in 1897 by Professor Emile van Ermengen. The botulinum toxin was then called a bot of botulism and was combined with botulism poisoning. Then in 1910, the type B toxin was detected. After 12 years, a study was started to find type A substance, which was finally made in 1940. The next step was to study it and get to know the mechanism of action. It was possible to do this in 1949. A year later, botulinum toxin type A was used in medicine. Initially BTX-A was used in neurology and ophthalmology [12].
Botulinum toxin (BTX) is a protein neurotoxin produced by the anaerobic bacterium *Clostridium botulinum*. It has seven serotypes, namely A, B, C, D, E, F and G. For humans, the most dangerous are

stereotypes A, B and E, as they cause botulism (flaccid paralysis) that leads to death if left untreated. However, the properties of neurotoxins are very useful in procedures of the correction wrinkles in the forehead, nose, and around orbits and mouth. According to the data, treatments using BTX are performed twice as often as using hyaluronic acid fillers [12, 13, 14].

Botulinum toxin causes muscle paralysis. Therefore, it is most applicable in the case of liquidation of mimic wrinkles. Despite the very good effects of using the toxin, its improper use may contribute to the unnatural appearance of the face. Therefore, it is necessary to precisely determine the method of injection, the type of BTX and the demanded results.

Botulinum toxin allows non-surgical correction of the tip of the nose. It is obtained by injecting botulinum, which contributes to the paralysis of the muscles responsible for the dropping of the tip of the nose. Thanks to this, it is possible to elevate it. Very often, a combination of methods using hyaluronic acid with botulinum toxin is used. In this way, it is possible to change the appearance of the entire nose and to obtain the desired shape [12, 14].

Botulinum toxin cannot be used in all cases. It is possible to distinguish various contraindications to this type of surgery, which can be divided into absolute and relative ones. Among them, [12] are mentioned:

- absolute contraindications:
    - pregnancy and lactation period,
    - hypersensitivity to any of the ingredients
    - postoperative edema
    - presence of active infection
    - occurrence of factors inhibiting the release of acetylcholine in the neuromuscular synapse: Lambert-Eaton syndrome, taking aminoglycoside antibiotics
    - coexistence of factors that may interfere with the anticipated response to botulinum toxin,

- relative contraindications:
    - no indications for the procedure
    - mental disorders
    - patient expectations that are inadequate to the possibilities
    - the need to obtain an immediate therapeutic effect.

The use of botulinum toxin may be associated with the occurrence of various side effects. Usually, they apply to the injection itself, as is the case with hyaluronic acid. The botulinum toxin itself is safe if the treatment is performed by an experienced physician. Usually, unwanted complications are associated with improper injection. At the same time, it should be noticed that until now no botulism or death has been reported after the application of botulinum toxin [12, 13, 14].

**Summary**

Summarizing the above considerations, it should be stated that the use of hyaluronic acid or botulinum toxin allows you to quickly achieve the effect without having to undergo a complicated operation. In addition, these are solutions with a much lower risk than is the case with conventional methods.

**References**

1. Jakubowicz M. (2007). Anatomia człowieka. Tom II. Poznań: Wydawnictwo WSZPZiU

2. Krechowiecki A., Czerwiński F. (2009). Zarys anatomii człowieka. Wydanie 8. Warszawa: Wydawnictwo Lekarskie PZWL
3. Nerkiewicz O. (red.), Moryś J. (red.) (2010). Anatomia człowieka. Podręcznik dla studentów. Tom IV. Warszawa: Wydawnictwo Lekarskie PZWL.
4. Woźniak W. (2010). Jama nosowa. W: W. Woźniak (red.). Anatomia człowieka. Podręcznik dla studentów i lekarzy . Wydanie drugie. Wrocław: Elsevier Urban&Partner.
5. Szpringer E. (2010). Wypełniacze na bazie kwasu hialuronowego. W: B. Mamcarz (red.), D.Prandecka (red.). Medycyna estetyczna w praktyce
   Tom 1. Warszawa: Medical Education
6. Zalewska A., Kokot Z.J. (2008). Reologiczna analiza fizycznych właściwości kwasu hialuronowego. Nowiny Lekarskie. Nr 6(77).
7. Carruthers J., Carruthers A. (2006). Hyaluronic acid gel in skin rejuvenation. J. Drugs Dermatol. Nr 5(10)
8. Kowalczyk M., Matuszek J., Kwiatek J. (2012). Zastosowanie kwasu hialuronowego w medycynie i kosmetologii. Pielęgniarstwo XXI wieku . Nr 2(39)
9. Baumann L. (2005). Dermal fillers. J. Cosmetic. Dermatol . Nr 3. Beautiful Body: A History of Plastic Surgery
10. Ayman El-Attar MD (2014) Niechirurgiczna rynoplastyka przy użyciu
    wypełniacza kwasu hialuronowego Perfectha Deep. Derma News nr 47/2014,
    http://www.derma-news.pl/images/com_arismartbook/download/44/nr_2014_47.pdf
    [dostęp: 02.08.2018].
11. Szabela M.A. (2009). Skutki niepomyślne i powikłania po wstrzyknięciach syntetycznych substancji trwale wypełniających tkanki miękkie. Postępy Nauk Medycznych. Nr 9
12. Podgórska E. (2010). Toksyna botulinowa w medycynie estetycznej. W: B. Mamcarz (red.), D. Prandecka (red.). Medycyna estetyczna w praktyce. Tom 1. Warszawa: Medical Education.
13. Benedetto A. (2005). Cosmetic uses of botulinum toxin a in the mid face. W: Benedetto A. (red.). Botulinum Toxin in Clinical Dermatology . London: Taylor&Francis.
14. Tamura B.M., Odo M.Y., Chang B. i wsp.(2005). Treatment of nasal wrinkles with botulinum toxin. Dermatol. Surg. Nr 31.