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MODERN VIEWS ON BIRTH DEVELOPMENT MALFORMATIONS OF THE EAR

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Abstract:

Various local deformations, such as "satyr's ear" - thickening and unnatural elevation of the horizontal part of the helix, "macaque ear" - thickening and deformation of the descending part of the helix, Darwinian tubercle - significant thickening of the edge of the helix at the very beginning of its descending part, and also the additional leg of the antihelix , if necessary, is eliminated by wedge-shaped resection of the protruding parts . Plastic surgery of total lobe defects is based on the use of soft tissue surrounding the auricle. The disadvantage of all methods is the multi-stage nature, scars on the neck and parotid area, and most importantly, the inevitable reduction and deformation of the new lobe.

Keywords: Ear, scars, antihelix , auricle

INTRODUCTION. And abnormalities of the auricle occur, as a rule, in combination with anomalies of the external auditory canal and middle ear, and sometimes even with anomalies of the inner ear. The processes of embryonic development of the external auricle should be considered inextricably with the development of the middle and inner ear. The embryological development of the inner middle and outer ear occurs autonomously at certain stages; later these parts merge into an integral functional system.

By the 7th month of uterine life, the auricle acquires a normal shape, like that of a newborn. The main period of its growth in children occurs in the first years of life. The size of the outer ear of a child at the age of 3 years is 85%, and at 7 years old it is 95% of the corresponding size in an adult [1].

It is more correct to assume that disturbances in the development of the auricle can occur at any period of the embryo's life. The severity of the deformity is directly dependent on the stage at which the harmful factor operates. Anomalies of embryonic development that occur before the 6th week lead to serious defects of both the outer and middle ear. Damage occurring after the 3rd month, at the end of fetal age, does not cause middle ear defects [2].

From the point of view of the upcoming surgical treatment, congenital malformations of the auricles can be divided into *defects themselves* - malformations, the elimination of which requires *reconstruction* , that is, the mandatory use of a supporting frame and borrowing of integumentary tissue from distant areas, and *anomalies* - deformations that require only *correction* without an additional frame , in rare cases requiring skin replacement.

RESULTS. *Microtia* is a congenital malformation characterized by the complete or partial absence of the auricle or any of its components. As a rule, it is combined with atresia of the external auditory canal, and in 35% of cases – with underdevelopment of the facial skeleton, primarily the lower jaw. This is a fairly rare disease, its frequency in different parts of the world ranges from 0.4 to 5.5 per 10,000 newborns, in the European race - approximately 1:10,000 newborns [3].

The most common form of microtia is represented by a *vertical cutaneous - cartilaginous ridge ending in a moderately hypoplastic lobe* . Almost always accompanied by atresia of the auditory canal. Hypoplasia of the bones of the facial skeleton is insignificant. The lobe is displaced upward and anteriorly compared to the healthy side. In every eighth case the defect is bilateral.

The rarest form of microtia *is anotia* - the complete absence of the auricle or the presence of a cartilaginous tubercle without a lobe. Usually combined with underdevelopment of the bones of the facial skeleton. In some cases, the external auditory canal can be preserved.

The hearing ability of the defective ear can be objectively tested soon after the baby is born using auditory evoked potentials. An early visit to an audiologist and speech therapist promotes the development of normal speech, but timely hearing-improving surgery will help rid the child of the complexes associated with wearing a hearing aid. Computed tomography confirms the presence of the tympanic cavity and traces the condition of the ossicular chain. Options for the location of the facial nerve are clarified using nuclear magnetic resonance. Audiometric testing can distinguish conductive hearing loss from sensorineural damage. If the latter predominates, then

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middle ear reconstruction is not advisable. The absence of pneumatization of the mastoid cells by the age of 4 is an absolute contraindication to hearing-improving surgery.

Unfortunately, the improvement in hearing after surgery is not as noticeable and lasting compared to the extent of the surgical intervention. The abnormal structure of the temporal bone forces the creation of the external auditory canal so high and close to the hairline that there is no space or skin left for reconstruction of the auricle, despite the fact that the reason for the mental suffering of a child with unilateral microtia is not hearing loss, to which patients easily adapt, but external disfigurement. Therefore, in case of a unilateral defect, one should refrain from hearing radiation surgery or perform it after reconstruction of the auricle.

For psychological reasons, it seems optimal to perform reconstructive auriculoplasty on a child before starting school, that is, immediately after 6 years of age [5,12]. Although in 85% of cases, by the age of 4, a child's auricle acquires the same dimensions as an adult's, the size of the costal cartilages and especially the traumatic nature of harvesting autocartilage require postponing the timing of auriculoplasty to 8 and even 10 years of age [4, 6]. The question of the timing of the start of reconstructive operations in children with ear defects should be decided individually, focusing on the wishes of the patient himself, and not his parents. The sequence of stages of total reconstruction of the auricle depends on the severity of the deformation, location and quality of microtic elements in each specific case.

The problem of recreating the auricle occupies a special place in reconstructive surgery. The complexity of the relief, the presence of a thin cartilaginous plate between two layers of skin, and the peculiarities of the attachment of the auricle to the skull make the restoration of this organ much more difficult. The surgeon's goal is to achieve the most accurate conformation of the auricle, that is, the proper size, position and orientation in relation to other facial structures, as well as the color and thickness of the overlying skin.

To recreate the auricle, a minimum of a supporting frame and covering material are required. The frame, in fact, determines the potential shape of the reconstructed shell, and the skin allows (or does not allow) its implementation in practice. Undoubtedly, the best available material for the ear frame is the patient's own costal cartilage, however, the intervention to prepare this material is more traumatic than the actual reconstruction of the auricle [6, 7], and in children under 10 years of age it can be accompanied by various complications, including spinal curvature [8,13]. Alternative materials: preserved costal allocartilage, subject to resorption in 17% of cases; silicone rubber – in 30% of cases causes pressure sores of the skin; they cannot always be eliminated. Other materials for the frame are of rather academic interest.

Selecting a sufficient amount of skin suitable for total reconstructive auriculoplasty in children is no less difficult . The best skin for covering any defect is considered to be the skin bordering it. But the area of skin of the parotid region, devoid of hair, is, at best, enough to cover the anterior, relief surface of the reconstructed auricle. To cover the dorsal surface of the raised shell and the resulting wound in the area behind the ear, skin is used that is moved from distant areas of the body. Freely transplanted full-thickness and especially split-thickness skin, as a rule, survives well, but may wrinkle in the postoperative period and change color unpredictably due to pigmentation or depigmentation.

Currently, the most common reconstructive auriculoplasty is the B. Brent technique (1974) [9, 10, 11]. The key to a good cosmetic result of the B. Brent operation is the integrity of the skin covering the anterior surface of the reconstructed auricle . Therefore, unlike most authors, he recommends starting reconstructive auriculoplasty not with transposition of parts of the ear rudiment, but with transplantation of the auricle frame.

Cartilaginous grafts (VI–VIII ribs) are taken from an oblique-transverse approach on the side opposite to the reconstruction zone. Using a scalpel, the main frame block, including an antihelix with two legs, an antitragus and a scaphoid, is cut out from a monolith of costal cartilage (the junction of the VI and VII ribs) according to the template of a healthy auricle, and it is carefully thinned with chisels. Separately, make a curl (VIII rib), ensuring that it is twisted in the desired direction, and fix it to the main one. parts of the frame with nylon seams (4–0). To ensure sufficient projection of the future auricle in the center of the antihelix on the side facing the tissues of the head, an additional cartilaginous segment is sutured. Having specified the position of the reconstructed auricle, the rudimentary ear cartilage is removed through a small vertical incision in front of the rudiment and a subcutaneous "pocket" is formed, being careful not to damage the subdermal vascular plexus. After careful hemostasis, the graft is introduced into the resulting cavity.

By As microcirculation is restored and edema subsides, the remaining stages of the operation are performed: transposition of the lobe, elevation of the earlobe guilt and tragus formation. Transposition of the lobe consists of moving the upwardly displaced lobe to a horizontal position and suturing it to the lower edge of the previously formed shell. To elevate the auricle , an incision is made slightly away from the edge of the frame, with the obligatory preservation of the integrity

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of the connective tissue capsule. The split skin graft is taken from the "bikini zone" and, after careful hemostasis of the receiving bed, is fixed with a roller. The dressing is kept for up to 10 days. In case of insufficient projection of the reconstructed concha, a spacer of cartilage prepared at the 1st stage of reconstruction is installed behind the frame, which is wrapped with a fascial flap from the occipital region and the wound defect on the posterior surface of the concha is closed with a skin graft. If a decision is made about the need for hearing-improving surgery, then it is also performed at the elevation stage. According to the classical B. Brent method, at the 4th stage of reconstruction, the tragus and concha recess are recreated by transplanting a complex skin-cartilage graft into this area, taken from the cup of a healthy auricle , and in case of bilateral microtia , they are limited to creating a duplicative skin flap. In some cases, the 2nd, 3rd and 4th stages can be swapped or combined. The intervals between stages are 2–3 months. B. Brent's technique for the treatment of microtia in children allows one to achieve lasting cosmetic results with a minimal likelihood of developing complications at the stages of reconstruction.

CONCLUSIONS Congenital malformations of the auricles can be divided into defects themselves - malformations, the elimination of which requires reconstruction using a supporting frame and borrowing of integumentary tissue from distant areas, and anomalies - deformations that require correction without an additional frame.

For reconstruction of the auricle with malformations of its development (atony), various modifications of the Brent and Nagata methods are optimal . In case of hemifacial microsomia , the best functional and cosmetic results are achieved with the combined use of methods of reconstruction of the auricle and elimination of deformation of the lower jaw using distraction devices.

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