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**THE USE OF AUTOLOGOUS RIB CARTILAGE IN SECONDARY
RHINOPLASTY IN PATIENTS AFTER CHEILORINOPLASTY, TAKING INTO
ACCOUNT ORTHODONTIC PREPARATION**

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ABSTRACT:

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Relevance of the study

Congenital cleft upper lip and palate are among the most common congenital malformations of the maxillofacial region and occupy a significant place in the structure of congenital pathology. According to domestic and foreign epidemiological studies, the frequency of their occurrence ranges from 1: 700 to 1:1000 newborns, which determines the high social and medical significance of this problem. Patients with this pathology require long-term, step-by-step medical rehabilitation, including surgical, orthodontic and functional treatment, often continuing until the growth of the facial skeleton is complete.

Despite early primary cheilorhinoplasty aimed at restoring the anatomical integrity of the upper lip and nose, a significant part of patients develop secondary deformities of the external and internal nose during the growth and development of the facial skeleton. According to various authors, the need to perform secondary rhinoplasty after cheilorhinoplasty occurs in 65-85 % of patients. At the same time, more than 70% of patients have clinically significant disorders of nasal breathing caused by deformity of the nasal septum, collapse of nasal valves and insufficiency of supporting structures. In 80-90% of patients, there is a pronounced asymmetry of the external nose, a violation of its projection and a deformation of the cartilage frame, which negatively affects both the functional state and the aesthetic perception of the face.

A particular difficulty in performing secondary rhinoplasty in this category of patients is a pronounced deficit of their own cartilage tissues, due to both congenital anatomical features and the consequences of previous surgical interventions. Soft tissue scarring, impaired blood supply, and altered anatomical landmarks significantly limit the use of standard rhinoplasty techniques and the use of local cartilage grafts. In this regard, the problem of choosing the optimal plastic material that provides sufficient strength, volumetric stability and biological compatibility in the conditions of repeated reconstructive operations is relevant.

At the same time, the vast majority of patients with congenital cleft upper lip and palate are diagnosed with dental anomalies. According to clinical observations, various forms of malocclusion and dentition deformities are detected in 85-95 % of patients, which leads to a violation of the formation of the middle zone of the face, the base of the nose and the alveolar process of the upper jaw. Unformed or unstable bone structures of the facial skeleton directly affect the position and support of the nose, reducing the predictability of the results of reconstructive interventions.

The lack or insufficiency of orthodontic preparation prior to secondary rhinoplasty significantly increases the risk of instability of the results obtained, the development of secondary deformities, and the need for repeated surgical corrections. At the same time, the issues of the sequence and scope of orthodontic treatment in preparation for nasal reconstruction are still debatable and insufficiently covered in the literature.

In this regard, the use of autologous rib cartilage in secondary rhinoplasty in patients after cheilorhinoplasty is of particular interest. This graft has a number of advantages, including high biological compatibility, sufficient mechanical strength, and the ability to model



significant support elements, which makes it a promising material in conditions of severe tissue scarcity. However, the effectiveness of its use in combination with preliminary orthodontic preparation requires further clinical and scientific justification.

Thus, the relevance of this study is due to the need to develop and justify a comprehensive strategy for nasal reconstruction in patients with congenital cleft upper lip and palate, based on the use of autologous rib cartilage in conditions of scar-altered tissues and cartilage structure deficiency, as well as taking into account the role of preliminary orthodontic training in improving the functional and aesthetic stability of long-term treatment results.

Purpose and objectives of the study. Objective: to improve the planning of rhinoplasty surgery and evaluate the effectiveness of using autologous rib cartilage in secondary rhinoplasty in patients after cheilorhinoplasty, taking into account orthodontic preparation.

Literature review.

Rhinoplasty planning is a complex process based on the analysis of the anthropometric data of the face and the psychological status of the patient, including determining its goals, aesthetic and anatomical assessment of the face, drawing up a preliminary surgical plan, conducting photo analysis with consideration of alternatives, and finalizing the tactics of surgical intervention.

Determining the patient's goals when planning rhinoplasty begins at the first consultation, when the surgeon places the patient in front of a tricuspid mirror and offers to independently assess the shape of the profile and the presence of indentations or protrusions, the shape of the tip of the nose in the frontal projection (excessive roundness, flatness, hook-like shape, etc.), as well as the width of the nose — due to bone structures or wings, then, taking into account the severity and validity of complaints, patients are divided into groups according to the severity of indications for rhinoplasty.

The nose is examined and evaluated in many ways: statically and dynamically, from the outside and from the inside, visually and by feeling, from different angles (front, side, oblique, from the base). The goal is to identify aesthetic problems and their anatomical basis, which allows you to develop an operation plan. The data is entered in a special document that helps to give an overall assessment with the development of an operation plan.



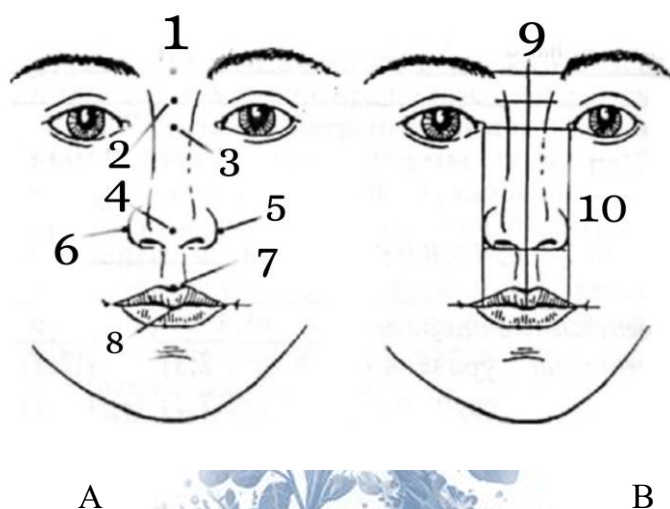


Fig. 1. Main points and lines recorded when assessing the shape of the nose in the frontal projection.

A — the main points: 1-the upper nose; 2 — the bridge of the nose; 3 — the point located between the corners of the eyes; 4 — the tip of the nose; 5,6 — the edges of the wings of the nose; 7-the middle of the Cupid's bow; 8 — the middle oral point; B-the main lines: 9-the vertical line of the face; 10 — the transverse line faces.

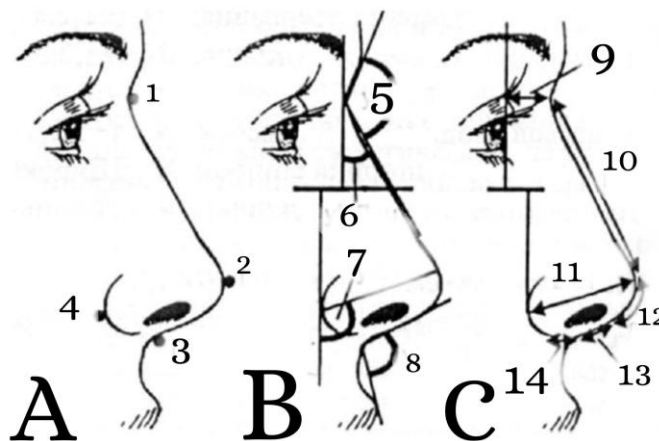


Fig. 2 Main points (A), angles (B) and distances (C) in assessing the shape of the nose in the profile projection.

A-points: 1 — bridge of the nose; 2— tip of the nose; 3-podnosovaya point; 4— posterior fold of the wing of the nose, B-angles: 5-naso-frontal; 6-naso-facial; 7 — angle of the tip of

the nose; 8-moso-upper labial. C-distances: 9 — height of the bridge of the nose; 10 — length of the back surface of the nose; 11 — distance (projection) of the coccyx of the nose; curvature and ratio of the maxillary area (14). columns (13) and lobules (12).

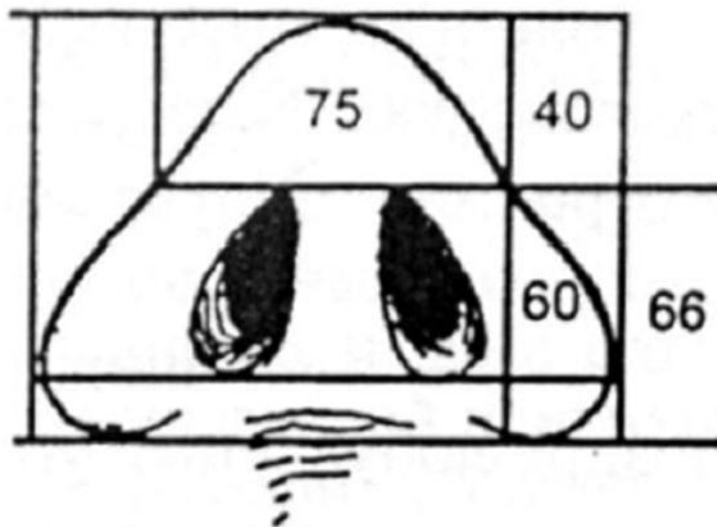


Fig. 4 Main proportions of the nose base elements (%).

Anatomical and functional features of the nose after cheilorinoplasty

Patients with congenital cleft veins often have a pronounced deformity of the nasal skeleton. The main features are:

- lateral displacement of the lower lateral cartilage,
- flattening of the nose wing on the side of the cleft,
- columella shortening,
- asymmetry of the nose tip domes,
- curvature of the septum.

Soft tissue scarring limits the mobility and elasticity of structures, which reduces the adaptive capabilities of standard rhinoplasty.

The role of orthodontic training

Orthodontic treatment is a mandatory stage of preparation for secondary rhinoplasty. It allows you to:

- normalize inter-maxillary ratios,
- correct transversal and sagittal malocclusion,
- stabilize the alveolar process and upper jaw,

- create optimal conditions for the formation of a symmetrical nasolabial region.

Orthodontic preparation reduces the risk of secondary deformities and ensures the stability of aesthetic and functional results.

Selection of materials for reconstruction

In secondary rhinoplasty, the choice of material is critical. The cartilage of the nasal septum is often deformed or used, and the cartilage of the auricle is limited in volume and strength.

Autologous costal cartilage provides:

- sufficient volume,
- high mechanical strength,
- * shape stability,
- * low risk of resorption and immune complications.

Materials and methods

Patients

The study was conducted in the Department of Children's Maxillofacial Surgery of the Dental Clinic of Tashkent State Medical University. The study used data from 25 patients with congenital cleft upper lip and palate who underwent primary cheilorinoplasty and required secondary rhinoplasty. All patients underwent preliminary orthodontic training.



A

B

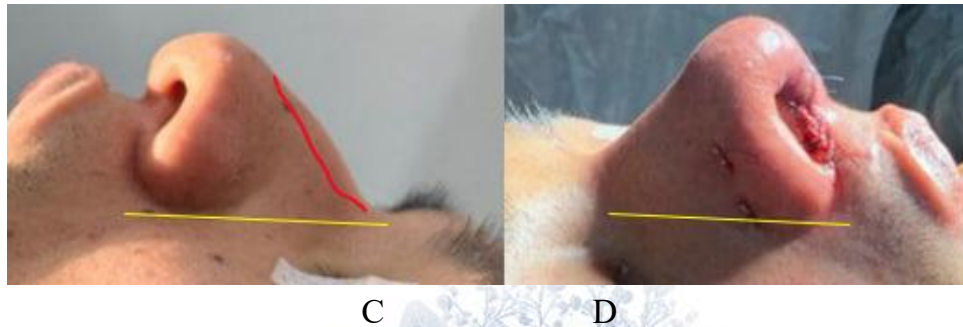


Fig.5 Patient D. 17 years old. Deformity of the right wing of the nose. Condition after cheiloplasty performed at the age of one year. A, C - before rhinoplasty using rib cartilage; B, D-condition after rhinoplasty using rib cartilage.

Rib cartilage sampling and modeling techniques

The costal cartilage is taken from the VII–IX rib through a minimal incision in the sub-thoracic region. Central segments are preferred for modeling grafts. Grafts are used for:

- * creation of dorsal grafts,
- * columellar rod formation,
- * lengthening and stabilizing the tip of the nose.

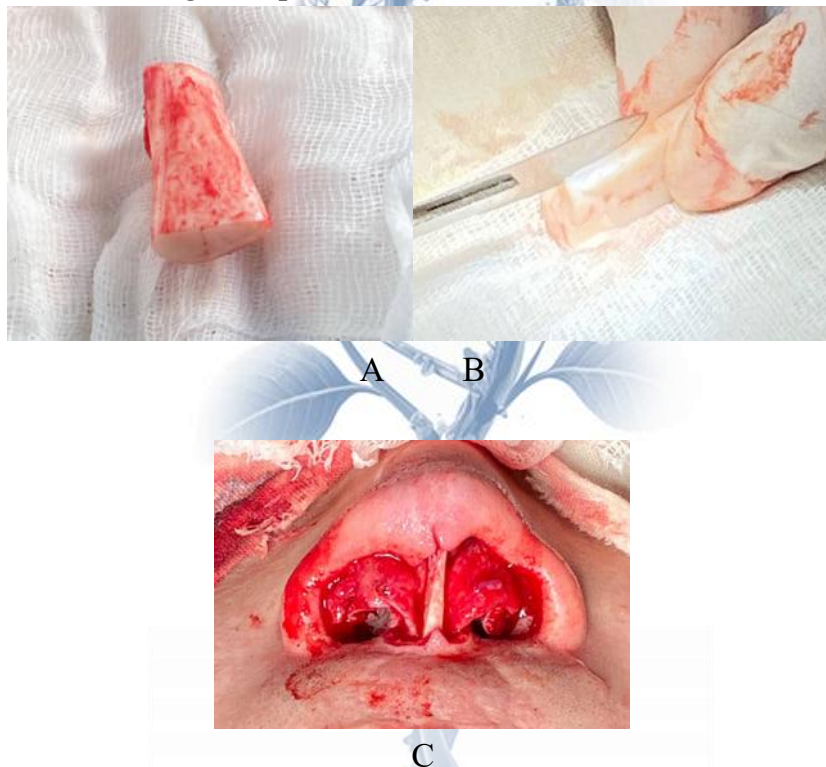


Fig.6 Application of rib cartilage. A - The resulting rib cartilage; B-Shaping the cartilage; C-Installation and fixation of the rib cartilage to raise the height of the nose.

Fixing is performed with non-absorbable seams, providing long-term stability.

Results

After secondary rhinoplasty, it was noted:

- * restoring the symmetry of the tip of the nose,
- * improved nasal breathing,
- * increase patient satisfaction with the aesthetic result.

Recurrence of deformities and the need for corrective interventions are minimal if the technique of cartilage extraction and preliminary orthodontic preparation are observed.

Discussion. The use of rib cartilage allows restoring the supporting framework of the nose in patients with a lack of cartilage structures. The inclusion of the orthodontic stage ensures the correct location of bone structures, reduces the risk of recurrent deformities and stabilizes soft tissues.

An interdisciplinary approach combines the capabilities of maxillofacial surgery, orthodontics, and rhinoplasty, providing a comprehensive restoration of nasal function and aesthetics.

Conclusion. Secondary rhinoplasty in patients who have previously undergone cheilorhinoplasty is a complex reconstructive task due to a pronounced lack of cartilage tissue, the presence of scarring and impaired nasal support function. The use of autologous rib cartilage as a plastic material is a reasonable and effective method of restoring the cartilaginous framework of the nose, which allows achieving stable functional and aesthetic results. Bio-compatibility, sufficient strength and low risk of resorption make this graft an optimal choice for repeated reconstructive interventions.

Preliminary orthodontic preparation helps to normalize occlusal relationships, stabilize the bone structures of the facial skeleton, and reduce the severity of facial asymmetry. Creating a stable bone base provides favorable conditions for the surgical stage and increases the predictability of long-term rhinoplasty results.

Thus, a comprehensive interdisciplinary approach involving an orthodontist, maxillofacial surgeon, and plastic surgeon is a necessary condition for successful nasal reconstruction in patients after cheilorhinoplasty and can improve the quality of functional and aesthetic rehabilitation of this group of patients.

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