Gentle Plastic Surgery To Restore The Pharyngeal Ring In Patients With Congenital Cleft Palate

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Annotation
Relevance. Congenital cleft palate is one of the most severe forms of malformations of the maxillofacial region. Despite the variety of surgical methods, the results of treatment of children with congenital cleft palate are often unsatisfactory. After surgery, patients may experience postoperative defects that require additional surgical interventions. The purpose of our study was to study and modernize the technique of urano-, velo- and pharyngoplasty with simultaneous restoration of the palatopharyngeal ring.
Materials and methods. This work was carried out at the Republican Children's Multidisciplinary Hospital in the city of Nukus (Karakalpak Republic), Uzbekistan. 280 patients with congenital cleft lip and palate (CCLP) were examined, comparing the results of previous operations. Among the studied patients, 120 children and 68 patients with congenital cleft palate, 34 with CCLP, and 18 with bilateral CCLP were identified. The first group included 35 patients, the second group consisted of 85 patients (42 patients who had undergone cheiloplasty and 43 primary isolated cleft palates IIa – 16, IIb - 17). The examination of patients was carried out jointly with otorhinolaryngologic (ENT) specialists to assess changes in the nasopharyngeal space.
Results. By studying the anamnesis of the selected patients, the types of postoperative complications were determined. To achieve a narrowing of the pharyngeal ring, we suggest using a muscular-mucous flap on the pedicle located in the side wall. This flap will mechanically contribute to the contraction and elevation of the soft palate, closing the nasopharyngeal space.
Conclusion. When performing early veloplasty before cheiloplasty, the strength of the muscles and scars leads to an expansion of the cleft lip. Early performed cheilo-veloplasty leads to a decrease in pathological changes in the tissues of the nasopharyngeal space. The results of the study showed that the proposed technique can improve the results of speech therapy sound correction and speed up the rehabilitation process.
Key words: congenital cleft palate, palatopharyngeal insufficiency, eustachian tube.

INTRODUCTION

The development of surgical methods for the treatment of congenital cleft palate (CCP) dates back more than two centuries. To date, there are various modifications and new approaches to the use of the basic elements of radical uranoplasty [3; 5; 8, 10; 12].

Improving the quality of surgical treatment of congenital cleft palate and reducing the traumatic nature of surgery made it possible to recommend uranoplasty not at late preschool age (5-7 years), but earlier — at the age of 2-4 years [4; 15]. This requires the participation of orthodontists in the preparation for surgery and postoperative management of the child in order to prevent postoperative deformity of the jaws. [2; 10; 11]. Although views on the timing of uranoplasty still differ, there has been a recent trend towards earlier surgical treatment of palatine clefts.

Despite the variety of surgical methods, the results of treatment of children with congenital cleft palate are often unsatisfactory. After surgery, patients may experience postoperative defects that require additional surgical interventions [1; 6; 9].

After primary uranoplasty, many children experience scarring of the soft palate, which occurs in 30-82.6% of cases. This leads to palatopharyngeal insufficiency and speech impairment. In some cases, repeated surgical treatment is required [7; 10; 11].

When assessing the quality of surgery on the palate, it is necessary to take into account many factors, including the form and degree of pathology, the patient's age and other features that make up the "surgical personality" of the patient. The results of surgery may vary depending on which method the surgeon uses in patients of different age groups [13; 14].

Nevertheless, it is worth noting that all methods of gentle uranoplasty have their own characteristic disadvantages. In some cases, after surgery, a scar forms in the area of the soft palate, which can lead to its wrinkling and shortening. In addition, the presence of a linear wound in the area of the soft palate and nasal mucosa can lead to the formation of a through scar that deforms the palate. It is also worth noting that the formation of rough scars in the near-pharyngeal niches can lead to a violation of mouth opening. All these disadvantages can negatively affect the functioning of the soft palate. As a result, palatopharyngeal insufficiency may occur, in which the air stream enters the nasal cavity during speech, and liquid food enters the nose. This impairment of speech and nutrition function can make it difficult for the patient to adapt socially. To eliminate these problems, repeated surgery and long-term rehabilitation may be required. (Fig.1).

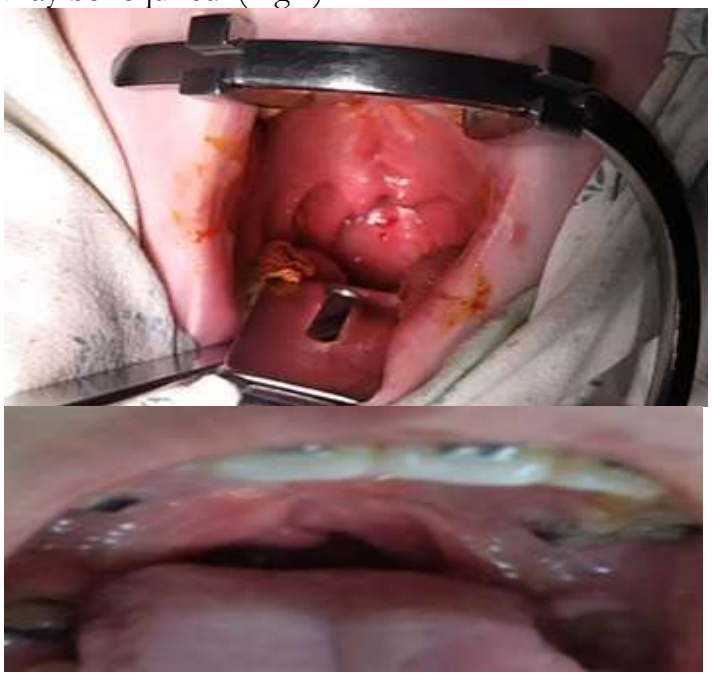

Fig.1. Cicatricial reduction in the size of the soft palate and incomplete closure of the pharyngeal ring

The purpose of our study was to study and modernize the technique of urano- velo- and pharyngoplasty with simultaneous restoration of the palatopharyngeal ring.

MATERIALS AND METHODS

By studying the archival data of patients with congenital cleft lip and palate (CRGN) who came forward with indications of rhinolalia and palatopharyngeal ring insufficiency, we determined that many of them underwent palatoplasty. In the process of studying the archived data, we also identified a group of patients who underwent the above procedures at an older age. Taking into account the above data, the patients were divided into 2 groups:
1. Patients with palatopharyngeal insufficiency;
2. Primary patients with a wide cleft palate;
This work was carried out at the Republican Children's Multidisciplinary Hospital in the city of Nukus (Karakalpak Republic).
Palatoplasty was mainly performed by specialists from humanitarian groups in the USA (1999-2002), South Korea (2007-2009) and Turkey (2010-2011).
280 patients with VGN were examined, comparing the results of previous operations.

Table 1. The number of plastic surgeries performed by patients with VGN in the humanitarian line

Country experts	USA	South Korea	Turkey	Uzbekistan
Palatoplasty	22	18	17	-
Cheiloplasty	39	67	22	54
Uranoplasty	-	-	-	41
Total	61	85	39	95

Of the 280 patients studied, 120 children and 68 patients with BPH, 34 with HCV, and 18 with bilateral HCV were identified. The first group included 35 patients, the second group consisted of 85 patients (42 patients who had undergone cheiloplasty and 43 primary isolated cleft palates IIa – 16, IIb - 17).
The examination of patients was carried out jointly with ENT specialists to assess changes in the nasopharyngeal space.
Group I included children (n=35) who underwent urano- or palatoplasty with palatopharyngeal insufficiency. Group II included children (n=85) with HCG (n=42) who had previously undergone cheiloplasty and children with isolated cleft palates (n=43).
Group I: 35 patients were selected from the examination of patients operated on from 1999 to 2011. The age of the patients in this group at the time of the examination ranged from 9 to 25 years.
Group II: The selection of 85 patients in this group was carried out starting in 2019 from among all children with HCG who underwent surgery to restore the integrity of the upper lip (n=52) and 33 primary isolated cleft palates (IIIa – 16, IIIb – 17) degrees. The age of the patients in this group at the time of the examination ranged from 3 to 20 years. At the time of the examination, there were 18 patients aged 3 to 5 years, 25 from 6 to 8 years, 30 from 9 to 11 years, and 12 from 12 to 20 years.

RESULTS

Foreign humanitarian specialists mainly performed plastic surgery. From 1999 to 2011, they performed about 700 operations, 185 of them for the treatment of patients with congenital cleft lip and palate in various types and severity. Of these, 79 patients developed a complication in the form of palatopharyngeal insufficiency. 95 patients with VGN were operated on in Uzbekistan, and the study revealed rhinolalia in 14 of them, and dilation of the pharyngeal fissure in 8 patients after cheiloplasty.

The selected 120 patients were distinguished from 280 by the fact that they had severe rhinolalia and many required orthodontic preparation for surgery on the palate. By studying the anamnesis of the selected patients, the types of postoperative complications were determined.

Table 2. Distribution of 120 studied patients by groups

Specialists / Groups		USA	South Korea	Turkey	Uzbekistan	Total
I	Cheiloplasty	8	7	8	-	23
	Palatoplasty	7	8	5	-	20
II	Cheiloplasty	21	19	14	8	62
	Palatoplasty	5	2	2	-	9
	Uranoplasty	-	-	-	6	6
Total		41	36	29	14	120
General operated with CCLP		***69***	***85***	***39***	***95***	***280***

When performing cheiloplasty at an early age, we often forget that the scar tissue of the upper lip, nasal wing and mucous membrane in the transitional fold leads to difficulty in the growth of the upper jaw, the child's tongue, increasing with growth, presses on the split soft palate and enlarges the gap. Analyzing the data obtained, 35 patients of group I and 52 patients of group II with HCG did not receive the necessary orthodontic and speech therapy treatment after cheiloplasty.

Comparing the methods used by Frolova-Makhkamov and Ad.A. Mammadov, they suggested the need to narrow the pharyngeal ring in order to achieve a positive result. To do this, they used the method of immobilization of the lateral walls of the pharynx. By studying the location of the mouth of the Eustachian tube before and after surgery, the researchers found that patients often had ear pain after surgery. This is due to the fact that the operation can lead to displacement of the soft tissues of the lateral walls of the pharynx and bending of the tube.

As a result, scarring of the tissues of the lateral pharyngeal wall and increased bending of the tube can cause changes in air conduction and lead to hearing loss. To minimize injury and reduce the volume of immobilization of the soft tissues of the lateral pharyngeal wall, the authors proposed a new approach to narrowing the pharyngeal ring. This method allows you to preserve the topographic location of the mouth of the Eustachian tube and prevent bending of the pipe.

To achieve a narrowing of the pharyngeal ring, we suggest using a muscular-mucous flap on the pedicle located in the side wall. This flap will mechanically contribute to the contraction and elevation of the soft palate, closing the nasopharyngeal space (see Fig. 2).

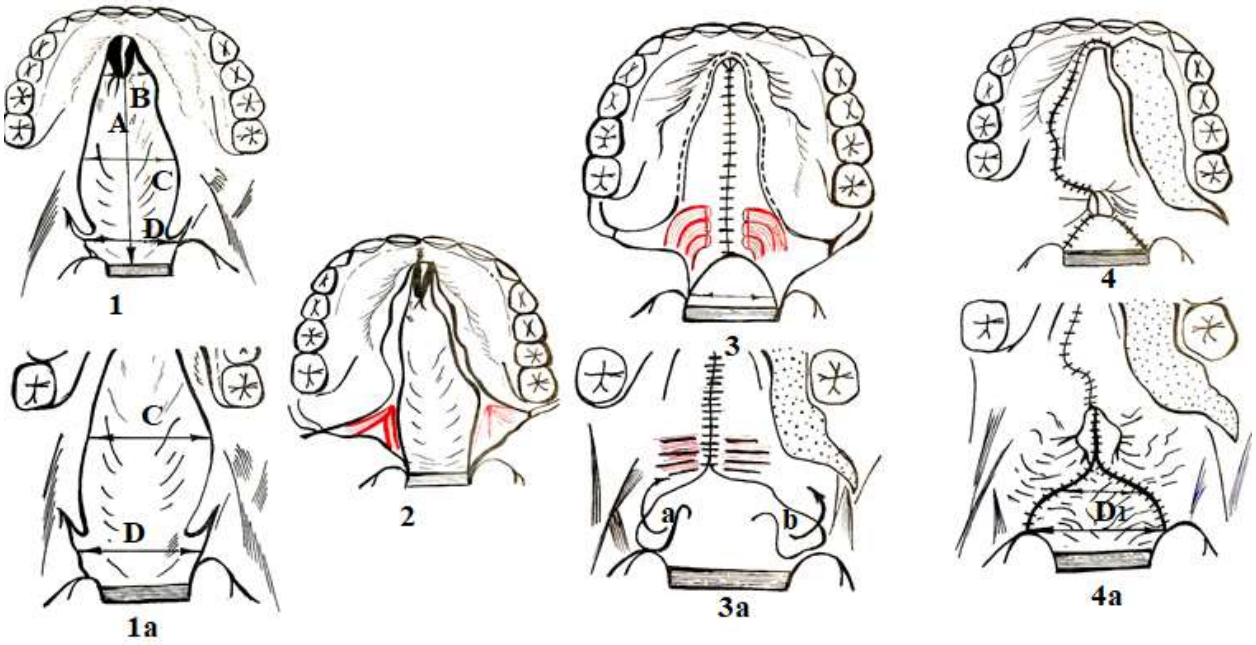

Fig. 2. Diagram of the stages of the modified uranoplasty method according to Makhkamov E.U. 1. A is the size from the peak of the cleft to the back wall of the pharynx, B is the size of the edges of the gap in the area of 15 and 25 teeth, C is the size of the gap in the area of the "A" line, D is the size of the width of the pharyngeal ring; 2. The directions of incisions along the edge of the gap; 3. Suturing of the nasal mucosa with the release of soft muscles palate, D- narrowing of the pharyngeal ring during the operation; 3a. direction of incisions along the posterior walls of the pharynx with the release of flaps "a" and "b", with an eversion arrow; 4. Suturing wounds of the hard, soft palate and posterior-the lateral wall of the pharynx with narrowing of the pharyngeal ring D1

By immobilizing the posterior pharyngeal wall and isolating the musculoskeletal flap and suturing it along the posterior walls of the soft palate curtain, we lengthen its size and also narrow the size of the pharyngeal ring (Fig. 3,4).

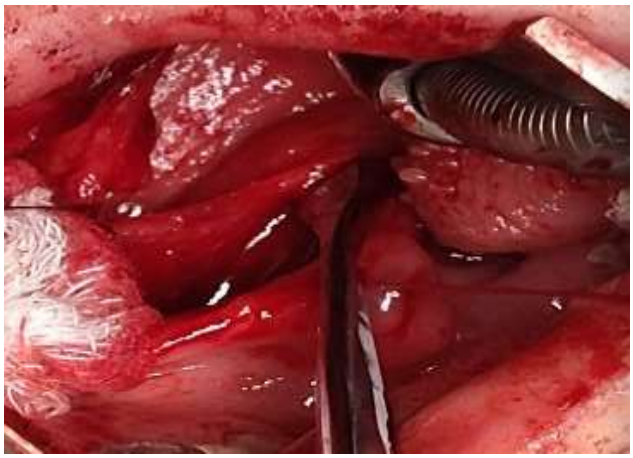

Fig. 3. Incision along the lateral and posterior walls of the pharynx

Fig. 4. Immobilization of the lateral and posterior pharyngeal walls

Due to the fact that due to the topography of the Eustachian tube, after mobilization of the pharyngeal walls, it bends, which makes it difficult for the contents to drain out, patients may experience local inflammation and pain.

Fig. 5. Musculoskeletal flap during suturing on the back wall of the soft palate curtain

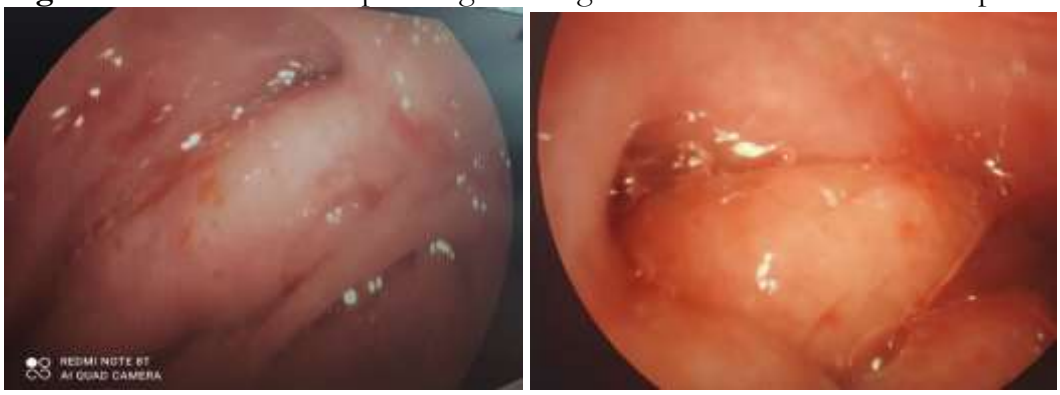

Fig. 6. The mouth of the Eustachian tube on the right (a) before (b) after uranoplasty according to the proposed modification

Fig. 7. Suturing of the anterior wall of the soft palate with the formation of a uvula from cicatricial altered mucosa

To solve this problem, we propose to modify the uranoplasty technique. This is especially important for older patients.

An indication for the use of this modification is the presence of a patient with a wide BPH gap, with hypoplasia of the muscles of the soft palate, and a significant shortening of the hard palate. The patient's presence of a congenital through-the-wall cleft of the alveolar process, a soft and hard palate with a wide slit, or a soft palate defect with palatopharyngeal ring insufficiency, with hypoplasia of the muscles of the soft palate, and a shortening of the hard palate is also an indication of the choice of this technique.

CONCLUSION

The developed modification of gentle urano-, velo- and pharyngoplasty using a flap from the posterior pharyngeal wall is indicated if the patient has all forms of congenital cleft palate, with a wide defect, with hypoplasia of the muscles of the soft palate, significant shortening of the hard palate, and can be presented as a method of choice.

The results of the study showed that the proposed technique can improve the results of speech therapy sound correction and speed up the rehabilitation process.

A preliminary examination by an ENT doctor and speech therapist helps identify groups of children with different perspectives of correction and individualize the approach to surgery.

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