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SURGICAL TREATMENT OF UNILATERAL CLEFT LIP AND PALATE – OWN EXPERIENCE

LECZENIE CHIRURGICZNE JEDNOSTRONNEGO ROZSZCZEPU WARGI I PODNIEBIENIA. DOŚWIADCZENIE WŁASNE

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Abstract

Aims: the aim of this paper is to present the final modification to a one-step operation of unilateral cleft lip and palate, together with a plaster-model representation of the shape of the palate in the 5th, 10th and 15th year of life of the patients treated at the Institute of Mother and Child. A modified one-step surgical technique for treating cleft lip and palate is presented.

Material and methods: The study included 265 children and adolescents from the years 1980-2000. The paper also discusses the so-called critical points relating to the surgical technique which to a large extent makes it possible to avoid complications. In addition, the importance of conducting the treatment by a multidisciplinary team is emphasised.

Conclusions: Based on many years of experience and my own research, I believe that the use of the one-step surgery method in children with cleft lip and palate, as well as conducting the treatment in a multidisciplinary team, quickly restores the correct anatomical conditions in the craniofacial area and enables further growth and development similar to normal physiological phenomena. The need for subsequent orthognathic procedures may largely be due to genetic factors.

Key words: unilateral complete cleft lip and palate, one-step surgery – surgical technique, the shape of the palate

Streszczenie

Cel pracy: Przedstawienie ostatecznej modyfikacji operacji jednoetapowej jednostronnego rozszczepu wargi i podniebienia, wraz z przedstawieniem i ukazaniem na modelach gipsowych odwzorowanego kształtu podniebienia w 5, 10 i 15 roku życia pacjentów leczonych w Instytucie Matki i Dziecka. Przedstawiono zmodyfikowaną technikę operacyjną jednoetapową rozszczepu wargi i podniebienia.

Materiał i metody: Badanie obejmowało 265 dzieci i młodzieży w latach 1980-2000. Omówiono też tzw. punkty krytyczne dotyczące techniki operacyjnej pozwalającej w dużej mierze uniknięcie powikłań. Podkreślono znaczenie prowadzenia przez wielodyscyplinarny zespół.

Wnioski: na podstawie długoletniego doświadczenia i własnych badań uważam, że zastosowanie techniki jednoetapowego zabiegu operacyjnego u dzieci z rozszczepem wargi i podniebienia oraz prowadzenie leczenia przez wielodyscyplinarny zespół, szybko przywraca prawidłowe warunki anatomiczne w zakresie twarzoczaszki i umożliwia dalszy wzrost i rozwój zbliżony do fizjologicznego. Konieczność wykonania późniejszych zabiegów ortognatycznych może w dużej mierze wynikać z uwarunkowań genetycznych.

Słowa kluczowe: jednostronny całkowity rozszczep wargi i podniebienia, operacja jednoetapowa – technika operacyjna, kształt podniebienia

INTRODUCTION

In a child with a cleft lip and palate the continuity of soft tissues, as well as that of the bone and muscle systems is interrupted. The nose and mouth are one cavity. Muscle asymmetry causes the dominant side to pull the alveolar arch, and the deviated septum sometimes moves by about 1 cm in relation to the midline. In the case of a bilateral cleft, the premaxilla and all the related structures grow forward in an uncontrolled way, since the nasolabial muscle complex and the orbicularis oris muscle are interrupted on both sides. The defect grows together with the child. It seems, therefore, that the need arises for a quick restoration of muscle balance and a repair of the soft tissues. Then, a bone graft is performed which involves connecting the interrupted arch of the maxillary alveolar process.

The aim of this study is to present the technique which is the final modification to the one-step operation of the unilateral cleft lip and palate based on 16 publications written or co-written by the author, as well as to show the representations of the shape of the palate of the cases discussed on diagnostic plaster models.

MATERIAL AND METHODS

The study involved children born in the years 1980-2000. In total, there were 265 children with unilateral clefts of the primary and secondary palate who were operated on using a modified one-step technique. Afterwards, combined surgical and orthodontic (removable appliance) treatment was administered. When the children were 5 and 10 years old, before introducing orthodontic treatment with fixed appliances, diagnostic plaster models were made, which showed the shape of the palate. After the surgery repairing the lip and palate (at the age of about 6-9 months), the children concerned underwent the procedure (at the age of about 2-3 years) of early secondary autogenous bone grafting from the iliac crest to the alveolar process. The children were then treated with removable orthodontic appliances.

The surgical technique of simultaneous lip repair and palate closure

One-step cleft lip and palate surgery begins with closing the split palate and ends with repairing the cleft lip (Fig. 1 – Surgical protocol – with marked incision lines, the neurovascular bundle and the fracturing point of the pterygoid hamulus). After the surgical field has been prepared, i.e. the edges of the cleft and the area where the surgery will be performed are administered local anaesthesia, incisions are made in the vicinity of maxillary tuberosities and at the base of the alveolar ridge, the purpose of which is to facilitate the identification of the neurovascular bundle and the pterygoid hamulus, which must be fractured. Lifting the mucoperiosteal flap severs the fibrous attachments which stabilise the neurovascular bundle. An incision along the side of the nasal septum creates a several-millimetre vomer flap pedicled at the palatine suture. The incision line goes from the front of the nasal septum to the alveolar process in order to facilitate a double-layer closure of the nasal cavity and secure the incisal part of the alveolar process. The proper release of the mucoperiosteal flap of the hard palate and partially of the nasal septum makes it possible to move the tissue beyond the midline. An incision to the bone at the base of the alveolar process and the split maxilla on the cleft side can be facilitated by inserting a raspator into the opening created by cutting the tissues at the alveolar process. After making an incision in the fissure up to the margin of the hard palate and carefully removing the periosteum from the bone edges, a lateral flap is formed which, together with a septal flap, is used to close the nasal cavity.

The periosteal flap at the margin of the hard palate should be cut up to the fractured pterygoid hamulus on both sides without damaging the muscle complex. Then the muscles of the palate “drop” and form an unclosed ring. A correctly performed cut in the soft palate towards the uvula should reveal the palatal muscles. Closing the wound with absorbable 4/0 and 5/0 sutures starts with closing the nasal cavity at the margin of the hard palate, and ends with a continuous suture at the margin of the anterior nares.

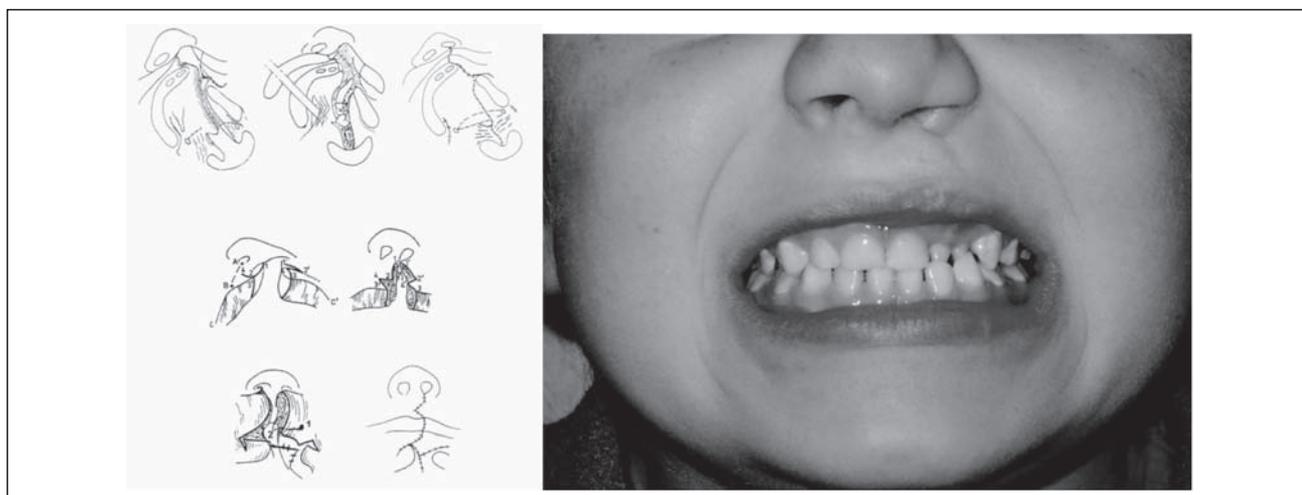


Fig. 1. The surgical protocol and example of a child after one-step unilateral cleft lip and palate surgery.

Ryc. 1. Schemat i przykład dziecka po operacji jednoetapowej w jednostronnym rozszczepie wargi i podniebienia.

The soft palate is closed in three layers with a vicryl suture. The delicate structures of the palatine uvula must be carefully sutured using the vertical mattress stitch as the mucosa easily shrinks and curls. For the same reason, mattress sutures should be used for stitching the mucosa of the palatal flaps on the side of the oral cavity, taking particular care with the vomer flap. The surgeon must carefully cover the palatal muscles with the periosteal layer. It is important that the future growth and re-adherence of this muscle complex should resemble the fibrous attachment of the palatine aponeurosis as closely as possible.

Proper healing of the palate following the first operation has a positive effect on the early speech development of the child. To ensure this, it is essential to correctly suture the muscles, according to their natural structure. Good reference points are the palatal arches along with the pharyngoglossal muscles and the level of the pterygoid hamulus, which defines the perimeter of the palatal muscles in the form of the tensor veli palatini muscle. Between them lies the most important muscle for pharyngopalatine closure – the pharyngopalatinus muscle. The sutures on the muscles should be done in all layers with the entry points inside the wound and the exit points at least one centimetre away from the edges of the wound. Precise and accurate execution of this part of the operation will ensure proper healing of the muscles and can significantly reduce the indications for pharyngofixation. After a complete double-layer suture of the cleft in the hard palate and of the other wounds has been done, the surgeon can proceed to do the surgery on the lip.

The lip operation begins with marking the key points on the skin and the vermilion border. These points are measurable and are typically used in generally accepted surgical techniques for extending the height of the lip. Fig.

1 – surgical protocol – shows the elongation of the skin with the use of a triangular flap. In a one-stage operation various techniques of lip extension may be employed. However, a fully functional and at the same time aesthetically satisfying lip can be obtained only if muscle continuity is correctly restored without making any incisions within the muscle complex. After drawing the incision lines on the skin, a local anaesthetic is injected into the edges of the cleft lip. On the side of the cleft an incision is made in the oral vestibule, so as to form an extraperiosteal flap with a freed naso-labial muscle. This incision line connects to the incision line in the fissure, i.e. on the margin of the alveolar process. In order to expose the abnormal attachment of the naso-labial muscle at the anterior nasal aperture and to further extend the recessed lip, a 5-7 mm long incision must be made at a right angle in front of the inferior nasal concha. In this way, the improperly attached muscle complex will be completely freed from the base. On the midline side, a cut should be performed in such a way as to simultaneously obtain an extension of the short attachment of the frenulum of the upper lip, free the lip and expose the anterior nasal spine. At this point the first muscle suture of the naso-labial complex should be placed. The sutures ought to be put at the key places in this complex, i.e. at the base of the nostrils, halfway up the lip, by the orbicularis sphincter and within the sphincter itself (Fig. 1 – Example of a child treated with this technique). In the oral vestibule all the wounds should be closed tightly, with the labial flap from the vestibule creating a second layer for the closure of the nasal cavity from the side of the mouth. The one-step operation ends with placing a suture affixing the lateral nasal cartilage to the skin.

The shape of the palate is represented on plaster models of randomly selected patients with a unilateral cleft lip and palate (Fig. 2).

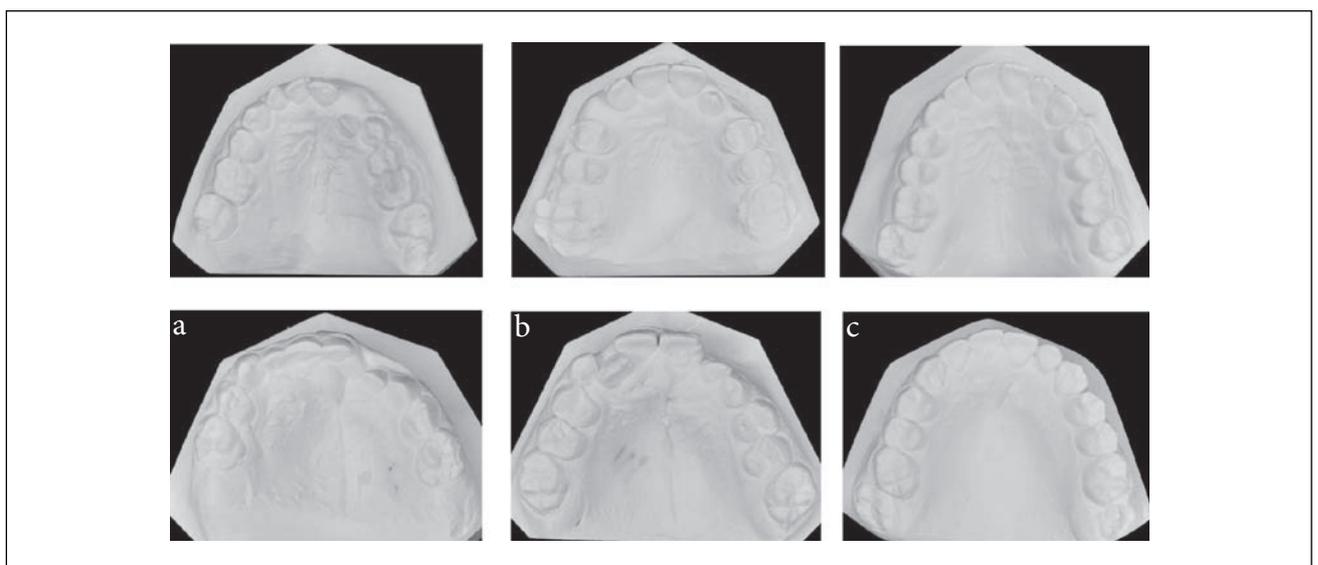


Fig. 2a, b and c. A representation on plaster models of the palates of children with unilateral cleft lip and palate at the ages of 5, 10 and 15 years following a one-step cleft lip and palate correction and alveolar bone grafting.

Ryc. 2a, b i c. Odzworowane na modelach gipsowych podniebienia dzieci z jednostronnym rozszczepem wargi i podniebienia w wieku 5, 10 i 15 lat po jednoetapowej korekcie rozszczepu wargi i podniebienia oraz przeszczepie kości do wyrostka zębodołowego szczęki.

Critical points – a technique which largely helps avoid complications.

1. Time of operation: the operation is usually performed at the age of 6 months. The body weight of a properly developing child should then reach 7-8 kg. It should be emphasized that the surgery must be performed before the age of one year, but no earlier than 6 months of age.

During this period, the periosteum is loosely attached to the bone and, being hypercellular, easily comes off the bone; when cut, it stretches easily, which means that all the wounds can be tightly sealed. Therefore, leaving bare bone in the palate for granulation should be considered malpractice.

2. The period between 5-6 months of age is a period when the palate temporarily stops growing, as this is when teeth start to erupt. Growth activity is mainly concentrated within the alveolar process and continues until the last second primary molar has fully developed. After this period, there is another growth spurt within the jaws to make room for the eruption of permanent teeth. Growth spurts and the developmental age should determine the extent of surgical procedures.

3. The efficiency of the muscle systems makes the shape of the alveolar arch more regular, and the split narrows. Therefore, if occlusion is correct, after the eruption of primary teeth next to the cleft and after space has been made for the growth of the last primary molar, the other essential surgical procedure can be performed, namely a bone graft from the iliac crest to the alveolar ridge. It is important that in a one-step operation the cleft should be sutured in two layers, because then the graft heals well and is almost 100% successful. Another advantage is that in the future the natural eruption of permanent teeth will rebuild the bone and the teeth will be well embedded in it, without creating any major orthodontic problems. At this point it is also advisable to perform a precise open rhinoplasty involving nasal cartilages to prevent significant future deformities of the nose.

4. In the case of incorrect occlusion, bone grafting would normally be delayed until the eruption of permanent teeth in this area, i.e. the age of 8-11 years. Now, I am of the opinion that skeletal stability, that is normal conditions, should be restored as early as possible.

5. The third procedure which should be considered is a revision of nasal patency when the patient is about 5 years old. Attention should be paid to whether the child is more likely to breathe through the mouth than through the nose, for example during sleep. If so, this is an indication for surgery aimed at restoring nasal patency.

After the above-mentioned two or three operations have been performed, all the systems between the mouth and the nose should be tight and the nose should be bilaterally patent. As a result, the appearance of the child will not attract untoward attention and the children can start school being able to talk in the same way as their peers, and will only, similarly to some of their friends, wear an orthodontic appliance.

CONCLUSIONS

Based on many years of experience and my own research, I believe that the use of the one-step surgery method in children with cleft lip and palate, as well as conducting the treatment in a multidisciplinary team, quickly restores the correct anatomical conditions in the craniofacial area and enables further growth and development similar to normal physiological phenomena. The need for subsequent orthognathic procedures may largely be due to genetic factors.

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Conflicts of interest/Konflikt interesu

The Author declares no conflict of interest.

Autorka pracy nie zgłasza konfliktu interesów.

Received/Nadesłano: 07.01.2014 r.

Accepted/Zaakceptowano: 21.01.2014 r.

Published online/Dostępne online

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