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Optimization Of The Orthodontic Monitoring And Rehabilitation Plan For Malocclusion In Children With Cheiloplasty

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Abstrack : Congenital cleft lip and palate are developmental anomalies that can affect maxillofacial growth, dental arch morphology, and occlusal development in children. These conditions may contribute to delayed tooth eruption, narrowing of the dental arch, abnormal tooth positioning, and malocclusion, emphasizing the importance of early orthodontic monitoring and individualized rehabilitation. This study aimed to examine strategies for optimizing orthodontic monitoring and rehabilitation in children with congenital cleft lip and palate following cheiloplasty. The discussion focuses on anthropometric assessment, three-dimensional (3D) dental arch analysis, the timing of surgical intervention, and the integration of orthodontic treatment with postoperative rehabilitation. The findings presented indicate that early cheiloplasty may facilitate the approximation of alveolar segments and support the development of the anterior maxillary region, while regular orthodontic monitoring and individualized treatment planning may improve dental arch stability and occlusal relationships. Furthermore, the use of orthodontic appliances and appropriate rehabilitation procedures may contribute to improved oral function, including speech and mastication, as well as facial symmetry and aesthetic outcomes. However, delayed surgical intervention may be associated with narrowing of the alveolar segments and more complex subsequent orthodontic management. In conclusion, optimizing the timing of cheiloplasty, implementing early orthodontic assessment, and conducting continuous multidisciplinary rehabilitation are important components of comprehensive care for children with congenital cleft lip and palate to support maxillofacial development and reduce the risk of persistent malocclusion.

Keywords: congenital cleft lip and palate; cheiloplasty; orthodontic monitoring; malocclusion; dental arch stability; maxillofacial rehabilitation.

Relevance of the study

The congenital lip and palate defect is one of the most common congenital developmental defects of the human facial skeleton. This pathology has a certain effect not only on the structure of the facial jaw, but also on the overall physical development of the child. According to the results of scientific studies, anthropometric indicators in children with a defect in the lip and palate may differ in comparison with healthy children. In particular, it is observed that the height, body weight and size of the head circumference in some cases are lower than the normative indicators. This suggests that there is an indirect effect of a birth defect on the overall growth and development process of the child. Also, in such children, characteristic features are observed in the development of the tooth-jaw joint. The exit process of milk teeth is often delayed, changes appear in the formation of the tooth row, and the stability of the teeth decreases. As a result, the chance of incorrect placement of teeth, narrowing of the tooth row and the formation of bite anomalies increases. In determining these changes in the development of the tooth-jaw system, the assessment of anthropometric indicators is of important diagnostic importance.

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The study of the dimensions of the facial skeleton, jaw and tooth row serves as an important criterion in the development of an orthodontic treatment plan. Therefore, in children with congenital lip and palate defects, it is important to start dental control at an early age, regularly monitor the development of the tooth-jaw system, and carry out the Prevention of bite anomalies. Such an approach makes it possible to improve the functional and aesthetic condition of patients and reduce the need for complex orthodontic or surgical treatment in the future.

Congenital lip and palate defects are one of the congenital pathologies that significantly affect the development of the tooth row of the upper jaw in children. This defect changes the morphology of the bone and tooth structures of the upper jaw, leads to a narrowing of the tooth row, incorrect positioning of the teeth and the appearance of bite anomalies. The study conducted studied dental arch stability in patients with congenital lip and palate defects using 3D analysis. The results of the 3D analysis show small deformations in the tooth Arch in the form of a color map. The results of the analysis showed that the upper jaw and mucous membrane of patients with congenital lip and palate defects change over time. Lip and palate knockout is one of the most common birth defects of the human facial jaw, this pathology changes the morphological development of the upper jaw. As a result, there is a misalignment of the teeth, narrowing of the tooth row and the development of bite anomalies. In a retrospective study, dental row stability of patients with congenital lip and palate defects and healthy patients were compared through 3D digital models. The study involved 35 adults: 15 patients with congenital lip and palate defects and 20 healthy patients. In the methodology of the study, the models obtained in the post-orthodontic treatment and rehabilitation period of patients were transferred to a digital format. The results showed that patients with congenital lip and palate defects had significantly improved dental row stability, but did not fully match the healthy control group. This means that in the treatment of patients with congenital lip and palate defects, it is necessary to individually plan the stages of Orthodontics and rehabilitation, maintain the stability of the tooth row and prevent bite anomalies. The study also shows that a 3D analysis and monitoring system is important to maintain the stability of the upper jaw row of patients with congenital lip and palate defects. In this way, it is possible to increase the effectiveness of orthodontic treatment and prevent tooth row deformities. As a result, the integrated use of surgical, orthodontic and rehabilitation steps in the treatment of patients with congenital lip and palate defects helps to ensure dental row stability and improve the aesthetic and functional condition of patients.

In children born with congenital lip and palate defects, the facial jaw is anatomically different from normal development. This pathology changes the dental segments and alveolar parts of the upper jaw, which directly affects the growth and formation of the tooth row. Studies show that the timing of the practice of lip plasticity (heiloplasty) is an important factor for the development of segments in the front of the upper jaw and the stability of the tooth row. In the study conducted, 35 babies were divided into two groups. In the first group, the first 14 days after the birth of children, lip plasticity was carried out, and in the second group, plasticity was planned for the third month. The upper jaw row and alveolar segments of each child were measured using the upper jawmodels in 14 days, 3, 6 and 12 months, and anthropometric parameters were analyzed. The results of the study showed that the alveolar distance (distance between segments) decreases significantly after lip plasticity, ensuring that these segments converge. This study shows that early heiloplasty (in the first 14 days) improves the growth and development of the anterior segment of the upper jaw, which ensures compliance with the normative phases of the anatomy of the tooth row. Children with congenital lip and palate defects were considered. The article details the stages of post-surgical rehabilitation. The first stage is the initial period after

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heiloplasty, in which the soft tissue is restored, the lip muscles are adapted, and the condition of the bite structure is assessed after the injury. And at the second stage, with the help of an orthodontic apparatus, segments of the tooth row are placed, which serves to improve the functional position of the upper jaw and facial symmetry. In addition, at this stage, special exercises are also recommended to normalize muscle balance. The study showed that the decrease in the imbalance between the segments of the tooth row through orthodontic rehabilitation after surgery, along with an improvement in the bite relationship, also has a positive effect on the overall oral function of patients. In particular, speech, chewing and mimic movements are improved, which positively affects the psychological state of children. In the article, the authors recommend: drawing up a post — surgical orthodontic rehabilitation plan in children born with a congenital lip defect on an individual approach, that is, using appropriate apparatus and exercises, analyzing the functional state of the skeletal and dental row of each patient separately-significantly improves the patient's long-term rehabilitation results. Studies the importance of oral rehabilitation in the process of orthodontic rehabilitation of patients born with congenital lip and palate defects. The study observed 44 patients with congenital lip and palate defects aged 10-18 over the 2013-2020 period. They were treated with the help of active orthodontic apparatus, and during this period their alveolar injury or defect was also supplemented with prosthetic construction — which helped to restore the functional state of the segments of the tooth row. The authors note that by filling the tooth or cavity lost from the alveolar segment, the effectiveness of orthodontic treatment increases, since it not only restores the strength of the tooth row ligament, but also improves the mutual position and function of the tooth segments throughout the entire process of orthodontic intervention.

Conclusion

As a result, the plan for orthodontic monitoring and surgical rehabilitation is optimized, children develop a comfortable anatomical structure for absorption, digestion and speech development. At the same time, the delayed timing of lip plastic causes narrowing of the alveolar segments and slowing of the growth of the anterior tooth row, which complicates further orthodontic and surgical treatment. Therefore, optimization of the time of heiloplasty and early monitoring of the upper jaw segment are important in the process of clinical rehabilitation.

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