

Algorithm for Early Detection and Treatment of Malocclusion in Children

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Abstract: Dento-jaw and bite deformities are the second most common dental diseases among children. Their diagnosis and treatment is considered one of the urgent tasks in orthodontics, they affect the chewing functions, cause speech disorders, aesthetic defects and limit the manifestation of human potential, significantly reducing the quality of life.

Keywords: tooth-jaw; bite deformations; children; algorithm; bite anomaly; electromyography.

It is known from a number of scientific publications that the development of dental-jaw anomalies and deformities is considered polyetiological. Including common etiological factors: low body weight at birth, pregnancy and birth defects, lagging fetal development, nervous system disorders, various diseases in infancy, food ration disorders, mental stresses: local etiological factors - negative changes in the activity of the jaw area as a result of harmful habits, improper treatment of milk teeth, premature loss of milk teeth, untimely elimination of defects in dental.

Introduction. In the unilateral form of crossed bite in children, electromyographic examination of the muscles revealed the observation of dysbalance in muscle activity. The very long use of chewing with the usual side leads to a change in the muscles in the area of the face-jaw, which in turn leads to the formation of a crossed bite.

The condition of the muscular system in children with unilateral cross-bite using electromyography has been studied. The study showed that there is an imbalance in the activity of the chewing muscles of the tooth-jaw area. This imbalance was present even in the normal position of the lower jaw, even after the occlusion tire, which was used temporarily. The authors believe that the cause of unilateral chewing muscle hypertrophy is neuromuscular injuries caused by occlusion barriers.

The conditions for the development of crossed bites will be diverse: an inflammatory process and, due to it, a violation of jaw growth, a decrease in chewing function (slow chewing) or unilateral chewing (large amounts of caries, early pulling of teeth), a violation of the exit sequence and duration of teeth, uneven contact of dental lines and unobstructed swellings of milk teeth, breathing disorders with.

In a crossed bite, the upper and lower jaw tooth rows intersect with each other as a result of the lower jaw being pushed to one side. This is a violation of the cosmetic condition in a pathological state, accompanied by a violation of food chewing, various pathological changes also occur in the Chakalower jaw joint. When pathological bites are observed in adolescents, changes are also observed in their general psycho-emotional state. By studying the family environment of children and adolescents in the treatment processes, the effectiveness of medical psychological approaches will be higher.

In our country, a radical improvement of the health system has established important tasks aimed at adapting medical care to the requirements of health standards for the population, including reducing dental diseases in patients with dental anomalies. In the implementation of these tasks, it is advisable to carry out research on the early detection of dental-jaw anomalies and deformities in dentistry, improving the quality of diagnosis and treatment, and the development of preventive measures.

All of the above confirms that new approaches to the diagnosis and treatment of crossed bites in children are necessary.

Materials and methods. As the object of the study, during the period from 2018 to 2022, 140 of children and adolescents between the ages of 10 and 18, living in the Bukhara region, who applied for treatment to a Dentist Specialist at the "Dental educational and scientific-practical center" of the Bukhara State Medical Institute, were examined. Of these, 110 examiners were assigned to children with crossed bites and 30 examiners to children with normal bites.

Anamnestic and medico-social data were obtained from all 140 verifiers of both sexes between the ages of 10 and 18; of these, 78 were male (55.71%) and 62 were female (44.29%).

Clinical – laboratory validations serve as the main criteria for selecting patients to the group under study. As the subject of the study, a clinical picture of patients with crossed bites, muscle and bone tissue of the face-jaw area, parodont tissue were selected. The study used biometric assessment, functional and statistical methods of Clinical-Dental, social-psychological, social, morphometric, X-ray, diagnostic models of the jaw.

To study and assess the dental condition in the oral cavity (OC hygiene condition, periodontological index, caries indicators, biochemical composition of oral fluid (OF), TJS (morphometric parameters of teeth, jaw, face, head, face), Anamnestic and medico-social data were obtained from all 140 examiners living in Bukhara, both genders between the ages of 10 and 18; of these, 78 boys (55.71%) and 62 girls (44.29%). Of these, 110 examined were children with crossed bites (main Group – MG) and 30 examined were with normal bites (control group – CG). (Table-1.)

Table-1. Distribution of examined children by Group, n=140

Gender	Control group, n=30				Main group, n=110				Total			
	abs	M (%)	m	P	abs	M (%)	m	P	abs	M (%)	M	P
Boys	16	11,43	2,69	Xi-k square = 0,133; p = 0,715	62	44,29	4,20	Xi-square = 1,78; p = 0,182	78	55,71	4,20	Xi-square = 1,829; p = 0,176
Girls	14	10,00	2,54		48	34,29	4,01		62	44,29	4,20	
Total	30	21,43	3,47		110	78,57	3,47		140	100,0	0,00	
P	XI- Pearson square = 0,088; p = 0,767											

Results and discussions. For the first time in the course of scientific research, the epidemiology of interstitial bites in children during the period of permanent bites, the role of Risk Factors in the occurrence of bite anomalies was evaluated. Analysis of Examinations by orthopantomogram and telorentgenography gave the possibility of early detection of a crossed bite, analyzing the positions of the arch of the upper and lower jaw tooth rows in patients, the attitude of the bite and the exit sequence of the teeth. During the scientific examination, the treatment of interstitial bites in children was approached medico-psychologically, and the effectiveness of treatment was increased, taking into account the social and psychological state of adolescents. During short and long-term observations aimed at the complex treatment of crossed bites in children, an algorithm of measures has been developed that have achieved sufficient effect.

The data presented in Table 2 shows that the initial hygiene condition in children with intersecting bites, for whom complex treatment is planned, corresponds to an "unsatisfactory" condition, and a statistically significant difference in quantity and quality was not detected. In children with crossed bites, the value of the RMA index in parodont tissues and the inflammatory change in the pattern of Schiller-Pisarev are more clearly and reliably distinguished by the relevant data of an almost healthy group. In children with crossed bites, the first examination revealed a sign of frequent bleeding from gingiva.

Table-2. Hygienic index indicators in a group of children with cross bite and healthy children

Children's age	HI						P
	Control group, n=30			Main group, n=110			
	N	M	σ	n	M	σ	
10-13 years old	8	1,10	0,16	23	1,80	0,23	<0,001
15-18 years old	22	1,20	0,27	87	2,80	0,56	<0,001
Total	30	1,17	0,25	110	2,59	0,65	P<0,001

Note: P - Defincerity of reliability against the control group



Figure 1. Patient R, 15 years old. Unilateral cross bite

In the control group, dental calculus was detected in 10 children, which is 33%. Both groups of children needed "professional" oral hygiene, which included learning hygiene skills, motivation, and monitoring teeth cleaning, according to the CPITN index. According to the CPITN index, the need for these activities in the main group was 82.5%, in the control group - 55%.

Children's Quality of Life (HS) scale SF-36 - visual. The Short Form-36 is a non-specific questionnaire widely used in HS research in Europe and the USA. With the help of this questionnaire, it is possible to assess the patient's level of HS - the level of general well-being and the level of satisfaction with the areas of life that affect his sense of self. [Brazier John E., Roberts J., Deverill M., 2002]. The questionnaire can be used to assess Quality of life in any disease state, it also focuses the patient's attention on problems of a social and psychological nature. Diagnosing social-spiritual adjustment of the person (Rogers K. and Damon R) questionnaire can be used to study the peculiarities of social-spiritual adjustment and related aspects of personality. The methodology determines the level of adaptation and non-adaptation of a person in the social sphere. The answers in the methodology are differentiated on a 7-point scale. The authors distinguish the following 6 integral indicators: adaptation; accepting others; internality; self-acceptance; emotional comfort; striving for leadership.

Each of these indicators is calculated according to an individual formula. Interpretation is carried out in accordance with the normative information provided by the individual choices of adolescents.

Treatment of crossbite was carried out step by step.

- 1) Preparation period provides for the implementation of activities for cleaning the oral cavity and Prevention of caries, surgical preparation, myogymnastics exercises, elimination of harmful habits, normalization of nasal breathing.
- 2) Treatment period it provides for the use of an orthodontic apparatus that normalizes the shape of dental arches, correction of the position of the upper and lower jaw teeth, normalization of the width of the tooth rows, correction of the occlusion plane. For this, removable orthodontic apparatus consisting of various elements, apparatus for expanding dental alveolar arches were used.
- 3) During the retention period, the final straightening of the upper and lower jaw teeth was carried out, the results obtained by achieving a dense fissur-contact with the help of non-removable retainer, removable retenting apparatus were stabilized.

In the orthodontic treatment of patients, orthodontic apparatus was used, which is mainly obtained from traditional methods of treatment.

The results of treatment were assessed according to the duration of treatment, the number of visits, the number of treated children who ended up with a positive result. The orthodontic effect was assessed using biometric measurement, photometry of radiological, control-diagnostic models before and after treatment. The procedure for using the apparatus was determined by the attending physician, and based on the mechanism of action of the orthodontic apparatus, the use of the apparatus in what way was explained to patients. The duration of observation was from 1 to 3 years. Control was carried out using plaster models.

Periods of complex treatment of patients:

1. Evening alternating bite - 10-13 years old: the use of myofunctional Cappas to normalize the jaw relationship, as well as orthodontic apparatus with removable mechanical action and Capps to normalize the occlusion level.
2. Permanent bite - 14-18 years old: the use of non-removable mechanical-acting (brackets) orthodontic apparatus and Capps to normalize the occlusion level in order to ensure the jaw relationship, the cipsification of antogonist teeth in the normative position.

Before conducting treatment according to clinical indications, the following were performed: recommendations for hygienic care of the oral cavity after the installation of the apparatus were made, and the duration of dispensary observation was set.



Figure 2. Patient A., 17 years old. Individual splint correcting occlusion level

In order to assess the effectiveness of medical preventive measures aimed at improving adaptation to orthodontic constructions, 110 children with intersecting bite anomalies aged 10-18 years were taken for hardware treatment. The children examined in the main group were divided into 2 groups.

The introduction of new methods of diagnosis into clinical practice, in addition to allowing a number of screening tests to be carried out in the Republic of Uzbekistan, made it possible to prevent the disease by early detection of factors leading to cross-bite. Early diagnosis of a crossed bite not only made it possible to fully treat the patient and avoid complications, but also provided the basis for a revision of the low effectiveness of traditional methods of treatment.

A modern theoretical and practical approach is based on the use of research methods from a high methodological level, by a sufficient number of studies, early diagnosis, timely diagnosis of dental-jaw system deformities observed from the influence of various factors in the tissues of the face-jaw area, it was shown that the use of complementary clinical, dental, medical-social, medical-psychological and statistical methods is тадқиқот натижаларининг жорий қилиниши. Based on the scientific results obtained to improve the medico-psychological complex approach to the early diagnosis and treatment of interstitial bites in children;

the methodological recommendation "medical-psychological treatment-prevention algorithm for the early diagnosis and treatment of interstitial bites in children", which allows to improve dental care in sick children, was approved (reference book of the Ministry of Health No. 8n-R/517 of May 26, 2022). The patient, who studied this methodological recommendation, early identified and correctly diagnosed a crossed bite in children, provided an integrated approach to treatment, a timely course of Morpho-functional development of the dental-jaw system, and received cosmetic defects in children. In the complex treatment of Palora and Omega 3-6-9 in relation to the effectiveness of the methods provided for in orthodontic treatment activities, the simultaneous use of palora and Omega 3-6-9 as a general treatment with orthodontic treatments and the consideration of the emotional state of children together with a psychologist increased the effectiveness of the treatment. For the purpose of prophylaxis of inflammatory diseases of the parodont, Ginginorm was prescribed to chew with a remedy derived from natural plants and did not allow the development of complications. The results obtained from the study on improving the medical-psychological complex approach to the early diagnosis and treatment of interstitial bites in children were applied to health practices, in particular, to the Olot and Vobkent district medical associations (reference book of the Ministry of Health No. 8n-R/271 of June 3, 2022).

As a result, taking into account the psychological state of children in the treatment of incisors forming in children, the process of getting used to the orthodontic apparatus was reduced, and the patient increased the coefficient of use of orthodontic devices. The proposed complex treatment algorithm for early detection and early initiation of treatment of interstitial bites in children made it possible to determine the working condition of the tooth-jaw system and prevent the apparent development of disease complications.

Conclusion. According to the results of the study conducted, the cross-bite among children aged 14-18 years was 12%. 23% of children examined during the late exchange period were found to have unilateral cross bite and 6.4% to have bilateral cross bite marks. It has been found that it is possible to assess normal or pathological growth processes in children using anthropometric facial measurements. Children with crossed bites the highest temp in the increase in the physiological height of the face was observed in the main group of children aged 14-18 years. The increase in the physiological height of the face was determined by the highest temp in boys and girls at the age of 14-18 years. The angles of the occlusive transversal curves were found to be at 9.0 o and above in a 100% position in the area of the second molars in the main group. The prevalence of dental caries in children aged 10-18 years was on average 69.8%. In this, caries prevalence was 64.3% at age 10, 62.1% at age 13, 45.1% at age 15, 38.6% at age 18 ($R < 0.001$), with the largest increase in caries prevalence in children aged 10 to 13. In the process of early diagnosis and treatment of pathological bites in children, pathological changes were detected early, using an orthopantomogram and telorentgenological examination. An analysis of

telorentgenography in the performed anterior projection made it possible to early determine the condition of facial asymmetry in patients, and an early detection of a crossed bite in 17.8% of cases in children with an alternating bite was achieved. Complex treatment was reflected in the Sung Depression Scale indicators. Analysis of the results showed a statistically significant decrease in sung performance in the core group, and 34 points before treatment dropped to 22.9 points after treatment. The treatment carried out directed the vector of personal changes in a positive way, which was manifested in a change in global self-attitude, self-assessment (appreciation) of patients, as well as an improvement in their ability to adapt. When the psychological state of children in the treatment of crossed bites was taken into account and approached psychologically, the process of getting used to the orthodontic apparatus for children was reduced, and the patient increased the coefficient of use of orthodontic devices. The complex treatment algorithm developed reduced the duration of treatment and achieved a 93.6% treatment effect in Group 1A, while a 68.3% better efficacy was achieved in Group 1B, where base orthodontic therapy alone was used. Early detection of crossed bites in children, improvement of examination, taking into account the psychological state of children and carrying out orthodontic treatment together with psychologists, while reducing the duration of treatment in children and improving the process of getting used to the orthodontic apparatus, made it possible to save expensive treatment in the future.

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