*ТОШКЕНТ ТИББИЁТ АКАДЕМИЯСИ УРГАНЧ ФИЛИАЛИ*
*ЖАНУБИЙ ОРОЛБЎЙИ ТИББИЁТ ЖУРНАЛИ*
*1-ТОМ, 2-СОН. 2025*

**UDC: 616.314-007.24**

# EFFICIENCY OF EARLY DIAGNOSIS OF CROSSBITE IN SCHOOL-AGED CHILDREN

**Abasniya Surayyo Rasulovna**
**PhD, senior teacher of the dentistry department of Urgench branch of Tashkent medical academy**
**suraya8089@gmail.com**
**ORCID: https://orcid.org/0000-0002-7115-4491**
**tel: +998974578771**

**Abstract.** There are some reasons for the development of cross bite: inflammation and the resulting violation of jaw growth, reduction of chewing function or chewing on one side, violation of the timing and sequence of teething, non-wrinkled tubercles of milk teeth and uneven contact of dental lines, violation of nasal breathing, improper swallowing; common diseases associated with impaired calcium metabolism; congenital clefts of the sky, impaired miodynamic balance, consequences of injuries. Common causes of cross-bite are disorders in the musculoskeletal system, dysplastic diseases, systemic damage to the entire skeleton, including the dental apparatus. Delayed diagnosis cross-bite increases the terms of treatment and social adaptation of the child.

**Keywords:** diagnosis, cross-bite, occurrence.

# MAKTAB YOSHIDAGI BOLALARDA KESISHGAN PRIKUSNI ERTA TASHXISLASHNI SAMARADORLIGI.

**Abasniya Surayyo Rasulovna**
**Toshkent tibbiyot akademiyasi Urganch filiali stomatologiya kafedrasi katta o'qituvchisi, PhD**

**Annotatsiya.** Kesishgan prikusning rivojlanishining ba'zi sabablari bor: yallig'lanish va buning natijasida jag'ning o'sishi buzilishi, chaynash funktsiyasining pasayishi yoki bir tomondan chaynash, tishlash vaqti va ketma-ketligini buzish, sut tishlarining ajin bo'lmagan tuberkulyarlari va tish chiziqlarining notekis aloqasi, burunning nafas olishining buzilishi, noto'g'ri yutish; kaltsiy almashinuvining buzilishi bilan bog'liq umumiy kasalliklar; osmonning konjenital yoriqlari, miodinamik muvozanatning buzilishi, jarohatlarning oqibatlari. Kesishgan prikusning umumiy sabablari mushak-skelet tizimidagi buzilishlar, displastik kasalliklar, butun skeletning tizimli shikastlanishi, shu jumladan tish apparati. Kechiktirilgan tashxis davolash muddatini va bolaning ijtimoiy moslashuvi davrini oshiradi.

**Kalit so'zlar:** tashxislash, kesishgan prikus, yuzaga kelishi.

# ЭФФЕКТИВНОСТЬ РАННЕЙ ДИАГНОСТИКИ ПЕРЕКРЕСТНОГО ПРИКУСА У ДЕТЕЙ ШКОЛЬНОГО ВОЗРАСТА

**Абасния Сурайё Расуловна**
**PhD, старший преподаватель кафедры стоматологии Ургенчского филиала Ташкентской медицинской академии**

**Аннотация.** Причины развития перекрёстного прикуса: воспалительные процессы и обусловленное ими нарушение роста челюстей, снижение жевательной функции или жевание на одной стороне, нарушение сроков и последовательности прорезывания зубов, несморщенные бугорки молочных зубов и неравномерный контакт зубных рядов, нарушение носового дыхания, неправильное глотание; распространённые заболевания, связанные с нарушением обмена кальция; врождённые расщелины нёба, нарушение миодинамического равновесия, последствия травм. Распространенными причинами перекрёстного прикуса являются заболевания опорно-двигательного аппарата, диспластические заболевания, системное поражение всего скелета, включая зубочелюстной аппарат. Несвоевременная диагностика перекрёстного прикуса увеличивает сроки лечения и социальной адаптации ребёнка.

**Ключевые слова:** диагностика, перекрестный прикус, встречаемость.

**Introduction.** Cross bite refers to transversal anomalies, which is one of the complex bite anomalies. It is caused by the mismatch of transversal size and shape of the dentition [1] . In the scientific literature use different terms for characterizing cross-bite: oblique, lateral, buccal, vestibular, and buccal- lingvooccclusion, lateral forced bite, cross-bite articular, laterognatia, laterogeny, laterodeviation, laterodisgnatia, lateroposition, exo- and endooccclusion [2]. Cross occlusion is one- and two-sided. In the occurrence of cross-occlusion can be blamed as one dentition (upper or lower), and both dentition, as well as the jaw bones. Clinically, this form is manifested by the following facial signs: facial asymmetry, which depends on the shape and severity of the anomaly, one- or two-sided impairment, the degree and extent of the interruption of the dentition, the dental alveolar or skeletal anomaly; violation of the configuration of the face, the displacement of the chin in the direction of the lips and chin obliquity.

The various types of crossbite include anterior, posterior, unilateral, and bilateral crossbite. A skeletal or dental component, or a combination of both, can be present in crossbite malocclusion. In dental anterior crossbite, one or more teeth are involved and more commonly associated with a class 1 malocclusion. A thorough examination of the etiology of the malocclusion and the inclination of the affected teeth is required.[7,8] If the maxillary posteriors are initially tilted palatally, then the arch expansion is more likely to be stable. The commonly used expansion appliances are hyrax, quad-helix appliance, coffin spring, and nickel–titanium palatal expander. A predominant chin, concave profile, retrusive upper lip, and negative ANB angle are some of the patient characteristics that can be seen.

Anterior crossbite is defined as “a malocclusion in which one or more of the maxillary anterior teeth occlude lingually to the mandibular incisors” [3]. Single tooth crossbite is the most commonly encountered malocclusion in growing children during the mixed dentition period [3]. Various reasons may cause dental crossbite such as palatally erupting maxillary anterior teeth, over-retained deciduous tooth or root, presence of supernumerary teeth or any periapical pathology, inadequate arch length, crowding, and cleft lip and/or palate [4,5,6].

There are many interceptive methods to treat the developing dental crossbite. Various methods such as tongue blade therapy, lower inclined plane, reverse stainless-steel crowns, Hawley retainer with springs or screws, and labial or lingual archwires have been previously used for this purpose [6]. This case series presents a simple and economical method to treat anterior dental crossbite using a posterior bite plane with a palatal plate.

In palatoccluses, palatine hillocks of the upper posterior teeth are projected when orally closing from the longitudinal fissures of the same lower teeth as a result of a decrease in the transverse dimensions of the upper dentition. At the same time, during the closing, the palatal hillocks of the posterior teeth of the upper jaw are not in contact with the longitudinal fissures of the lower posterior teeth, but with their lingual tubercles and, when the anomaly is pronounced, they can remain without contact.

Lingvo-occlusion, formed by narrowing the lower dentition, is characterized by the fact that the palatal tubercles of the upper posterior teeth are projected when they are closed in the cheek side from the longitudinal fissures of the lower teeth of the same name and come into contact with the cheek tubercles of the premolar and molars of the mandible.

Vestibular occlusion is formed as a result of an increase in the size of the upper and lower dentitions in the transverse direction. The vestibular occlusion can also be one- and two-sided. When vestibular occlusion, formed by increasing the transverse size of the lower dentition, there is a significant overlap of the upper posterior teeth of the lower. Late diagnosis of cross-bite increases the duration of treatment of pathology, as well as the social adaptation of the child[3].

**Materials and methods.** As a result of orthodontic examinations, the prevalence of dental-anomalies was studied, namely the frequency of occurrence of cross-bite among patients aged 12 to 14 years. A total of 150 people were examined, who sought specialist advice, out of a total of 20 adolescents, a cross bite of various forms and severity was revealed.

Orthodontic diagnosis is preceded by a complete clinical, functional and instrumental examination. During the examination, patients were conducted clinical, radiological and functional diagnostic methods.

Clinical examination methods. Complaints were collected, anamnesis was collected, a general examination, an examination of the face and oral cavity, and palpation of the temporomandibular joint when lowering and raising the lower jaw.

Additional examination methods. To measure the size of the teeth, the width of the dentition and the apical bases (according to the methods of Pon, Linder-Hart, NG Snagina), the study of the head TRG in a direct projection.

Biometric methods for studying models of the jaws make it possible to determine the topography and severity of morphological abnormalities in anomalies of the development of the jaws and dentitions, help to make the correct diagnosis and substantiate the optimal treatment plan for the patient. Measurements of models of the jaws are based on the existence of regularities in the relationship between the sizes of teeth on the one hand and the sizes of dentitions, apical bases on the other [4].

Functional tests were also applied. Clinical functional tests give an idea of the direction of displacement of the lower jaw and its causes, impaired dentition closure, changes in TRG, the size of the interocclusal space in the region of the posterior teeth, differences in the voltage of the masticatory muscles on the left and right, and the asymmetry of the facial skeleton. Our patients were carried out functional test by Ilina-Markosyan [5]:

1. When examining a patient, the position of the lower jaw was assessed at rest and during a conversation, which made it possible to identify facial bite anomalies.
2. Patients were asked to close the rows of teeth without opening their lips. With anomalies caused by the displacement of the mandible, the facial signs of the violation became more pronounced, respectively offsets. Sagittal abnormalities were recorded by changing the profile of the face, horizontal - by changes in its face.
3. Patients were asked to open their mouth wide. With cross-bite with displacement of the lower jaw, due to pathology of the temporomandibular joint or its size, the asymmetry of the face increased. In cases where there was a “habitual” displacement of the jaw, the asymmetry was eliminated. The displacement of the midline between the incisors in the upper jaw was evaluated in relation to the mid-sagittal plane of the face, and in the lower jaw in relation to the center of the upper dental arch.

**Results.** As a result of the examination, 20 cases of cross bite of various forms were identified, of which 8 were boys and 12 girls. It was established vestibular occlusion in 4 patients, lingual occlusion in 13 patients and palate occlusion in 3 patients.

A survey of some patients revealed complaints of pain in the temporomandibular joint (TMJ), due to a decrease in the number of occlusal contacts, the chewing function, chewing of the cheek mucosa, abnormal speech articulation (dyslalia) were disturbed, and patients also noted the appearance of crunch and pain when opening the mouth .

During the clinical examination, asymmetry of the face was revealed, therefore, a violation of the face aesthetics, while the patient's chin is shifted to the side, the upper lip on the same side sinks, the opposite side of the lower part of the face is flattened. On examination of the oral cavity, the dilation of the 4 and narrowing of the dentition in 16 patients, displacement of the mandible, impaired contact of the posterior teeth, intersection of the dentition when the jaws were closed, misalignment of the labia of the lower and upper lips and the midline of the dentition relative to the midline of the face decreased lower third of the face, pronounced chin fold. When viewed in 2 patients, a blockage of the mandible was noted - a dysfunction of the TMJ develops; further high risk of deforming arthrosis of the TMJ. As a result of the uneven distribution of chewing pressure in almost 100% of patients, development of lesions of periodontal tissues — periodontitis of mild and moderate severity — is observed.

After the collection of complaints and clinical examination were conducted biometric studies. To determine the width of the dental arches, the Pond method was used, which established the relationship between the sum of the width of the crowns of the upper four incisors and the width of the dentitions in the area of premolars and molars. The teeth are marked with dots: on the upper 4th middle of the inter-tubercular fissure, on the upper 6th anterior depression of the interbugular fissure, on the lower 4th most distant point of the slope of the buccal tuber, on the lower 6th apex of the posterior or middle buccal hill. Then, the obtained data were compared with the average individual norm (according to Linden - Hart) taking into account the shape of the face, determining the degree of narrowing of the dentition, symmetrical or asymmetric narrowing.

Biometrics - Pon's method (narrowing in the area of premolars in the upper jaw by 7.2 + 1.5 mm, at the lower one - 8.3 + 1.1 mm; narrowing in the area of the molars, respectively, by 9.9 + 1.2 mm and 9 , 2 + 0.81 mm), Bolton (discrepancy between the size of the incisors and canines of the upper jaw with the sizes of the corresponding teeth on the lower jaw), Tonn (index 1.26), N.G. Snagina (narrowing of the apical base of the lower jaw 2 degrees in 9, 1 degree in 11), offset of the midline of the lower dentition, its mismatch with the middle line of the upper dentition by 3 + 1.2 mm, sagittal slit - 3 + 2.2 mm , the overlap of the lower incisors with the upper more than 2/3 of the height.

To substantiate the diagnosis, teleroentgenography (TRG) of the head was performed in a direct projection. The TRG was decoded using the R.M.Ricketts method. The following indicators were revealed: the distance between the upper and lower molars from the right and the left (1.3 + 0.9 mm), the lower intermolar width (50.0 mm), the lower interfangular width (24.3 + 0.2 mm), the position of the middle line (1.0 + 0 3 mm). The interposition of the lower first pattern and the J-Ag line (15.3 + 0.5 mm), the middle lines of the dentition and jaws (0.4 + 0.15 mm) and the position of the occlusal plane (0.8 + 0.21 mm).

Consultations of specialists from related specialties were recommended for the planning of a comprehensive individual treatment - a therapist, the need is the presence of carious teeth; the surgeon, the need for a history of pain in the temporomandibular joint; orthopedist, necessity - identification of secondary edentulous in 2 patients; periodontist, the need - almost 100% of patients noted the development of damage to periodontal tissues - gingivitis, periodontitis mild and moderate severity.

**Discussion.** Frontal dental crossbite is a condition with major esthetic and functional concerns for children which needs interceptive intervention. Also, developing Class III or pseudo-Class III malocclusion with moderate to severe anterior dental crossbite may require immediate intervention. Dental crossbite may be caused due to palatally erupting maxillary anterior teeth, over-retained deciduous tooth or root, presence of supernumerary teeth or any periapical pathology, inadequate arch length, crowding, or cleft lip and palate [6].

Anterior dental crossbite results from functional forward shift of the mandible without any skeletal discrepancy. If the mandible is guided in centric relation, then a normal overjet or labio-lingual relationship of incisors can be obtained. If immediate intervention is not performed, it may lead to a skeletal malocclusion which requires more complex treatments. The ideal age to intercept dental crossbite is between 8 to 11 years, the period when the tooth is in the active eruption stage. There are few factors like age of the child, number of teeth involved or required repositioning, degree of overbite, and motivation of the child towards treatment which should be taken into consideration during treatment planning. There are additional factors which should also be considered like adequate space in the arch, sufficient overbite to maintain the tooth in position after correction, Class I occlusion, and apical position of the tooth in crossbite that is the same as it would be in normal occlusion [6].

Developing malocclusion involving a single tooth during mixed dentition period can be easily corrected with removable appliances and does not require a comprehensive fixed orthodontic treatment. The positive overjet obtained after anterior crossbite correction is self-retentive; thus, there

is no need for any retention appliance. The appliance should be worn the entire day while having meals also. The appliance should be stored in an airtight container and should be cleaned using soap solution and soft bristle brush. Oral hygiene instructions should be given to patients to prevent halitosis. The only disadvantage of removable appliances that needs to be addressed is patient compliance for regular wear, maintenance, and cleaning of the appliance [6].

Prohibitive orthodontic procedures are commonly used in mixed dentition period to correct the developing malocclusion. Anterior crossbite is not a self-correcting condition due to locking of the upper incisor with respect to the lower incisor which causes severe malocclusion at the later stages. Thus, immediate intervention is required which establishes the muscle balance and enables a well-organized occlusal development. There are various appliances which can be used for correction of anterior crossbite like tongue blade, reverse stainless-steel crown, reverse inclined plane or composite plane, the Hawley's appliance with a 'z' spring and expansion screw, and other fixed orthodontic appliances [6]. Different appliances used for anterior bite correction, treatment duration. In tongue blade therapy, patients are instructed to put the tongue blade on the palatal aspect of the maxillary incisors, and the patients are asked to bite so that it comes in contact with the mandibular incisors acting as a fulcrum, which absorbs the reciprocating forces and generates forward thrust to the maxillary incisor. This technique is rarely used when more than one tooth is involved in the crossbite, and patient compliance is needed which is difficult in children [7].

Unesthetic appearance and difficulty in adapting a reverse stainless-steel crown to the tooth in crossbite are the main disadvantages ofusing reverse stainless-steel crowns. A composite inclined bite plane is a simple and non-invasive method but it cannot be used in cases where the anterior crossbite exceeds 1/3 the crown length. Moreover, it may cause gingivitis because of the plaque deposition adjacent to the appliance and gingival area [6]. In cases of Hawley's appliance with a 'z' or double cantilever spring or with an expansion screw, frequent activation or expansion of the appliance is required. In the present cases, a simple posterior bite plane appliance was used without a 'z' spring or expansion screw, and anterior crossbite was corrected with positive overjet obviating the need for a retention appliance. The only shortcoming with this appliance is difficulty in mastication and speech in the initial few days, which is common to all removable appliances. The possible maxillary tooth movement was induced by tongue forces, exerted to the tooth in crossbite during function, such as speech and swallowing, as well as during rest.

Removable appliances are safe, easy to fabricate chair side, esthetically acceptable, and easily cleanable. In the present cases, removable posterior bite planes with palatal plates were used, and the crossbite was corrected without addition of any spring or screw. The compliance of patients was good and they did not report any complication during the course of treatment and follow-up [6].

## Conclusion.

1. In the process of diagnosing patients, it was found that in most cases the cause of the development of transversal anomalies was a violation of the sequence of eruption of lateral (premolars, molars) teeth. The prevalence rate among adolescents aged 12-14 years is higher.
2. When making a reliable diagnosis of anomaly, its form and severity, planning appropriate treatment, teleroentgenography takes an important place.
3. Joint diagnostic examination and treatment planning with doctors of other specialities, dynamic monitoring of the patient's condition allow approaching the patient's treatment more individually and comprehensively.
4. It is advisable to identify and eliminate diseases and anomalies of the teeth in children: this contributes to the correct formation of dental arches, preventing the formation of cross bite, asymmetry of the facial skeleton, periodontal pathology and temporomandibular joint.

## REFERENCES

1. Gontarev S. N. Cross bite in orthodontic practice / S. N. Gontarev, Yu. A. Chernyshova, I. E. Fedorova, I. S. Gontareva // SCIENTIFIC VEDOMOSTI Medicine Series. Pharmacy. 2013. № 11 (154). Issue2 2/1-Belgorod - p.26-28
2. Anokhina, A. V. A system for the early detection and rehabilitation of children with dental-anomalies: Abstract. dis. ... Dr. med Sciences / A.V. Anokhina. - Kazan, 2008. - 36 p.
3. Vavilova, T.P. Prevention of dental diseases in the treatment of modern fixed orthodontic appliances / T.P. Vavilova, M.V. Korzhukova. - M., 2007. - 36 p.
4. Propedeutic orthodontics: study guide / Yu.L. Obraztsov, S.N. Larionov. Ch. 5 - 2007 - p. 160
5. General orthodontics: proc. Method. manual / I.V. Tokarevich, L.V. Kipkaeva, N.V. Korkhova, A.G. Korenev - Minsk: BSMU, 2010. –p.18-19
6. Kumar N, Kumari R. Anterior Crossbite Correction in Mixed Dentition Using a Simple Appliance: A Case Series. J Res Dent Maxillofac Sci.2024; 9(2):124-128.
7. Sockalingam SNMP, Khan KAM, Kuppusamy E. Interceptive Correction of Anterior Crossbite Using Short-Span Wire-Fixed Orthodontic Appliance: A Report of Three Cases. Case Rep Dent. 2018 Apr 29;2018:4323945.
8. G. Ramya, Ravindra Kumar Jain, Arya S. Prasad Association of crossbite with vertical skeletal growth patterns: A retrospective study / Journal of Advanced Pharmaceutical Technology and Research. 2022 Nov 30;13(Suppl 1):S59–S62.