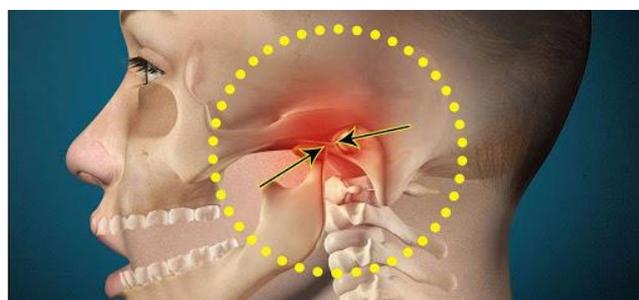


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DIAGNOSIS, TREATMENT AND PREVENTION OF SECONDARY DENTAL DEFORMATIONS IN THE MIXED BITE



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MINISTRY OF HEALTH OF THE REPUBLIC OF UZBEKISTAN

TASHKENT STATE DENTAL INSTITUTE

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The monograph describes the issues of diagnosis, treatment and prevention of secondary dentition deformations in children during the period of mixed dentition, taking into account the etiopathogenesis of their development. The structure and prevalence of dentofacial anomalies and secondary deformations in children in various morphofunctional periods of development of the dentofacial system are described; the main etiological factors of the occurrence and development of secondary deformation are identified; the need for orthodontic treatment of these children was determined; modern methods and devices for diagnosis, prevention and orthodontic treatment were proposed and, based on the data obtained, an effective algorithm for the diagnosis and treatment of secondary deformations of the dental system in children with mixed dentition was developed.

The book is intended for orthodontists, masters, clinical residents, as well as dental students.

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LIST OF SYMBOLS

HI – hygienic index

U/J – upper jaw

L/J – lower jaw

DFS – dentofacial system

DA – dental anomaly

OCC - occlusion

SD – secondary deformation

CDM – control and diagnostic model

OPTG – orthopantomogram

DAE - dentoalveolar elongation

PMA – papillary-marginal-alveolar index

MFR – maxillofacial region

GT - gastrointestinal tract

CNS - central nervous system

TMJ – temporomandibular joint

TRG – teleradiography

IOTN – index of need for orthodontic treatment

IFM – facies morphological index

Md – mesiodistal size

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INTRODUCTION

Anomalies and deformations of the dentofacial system (DSS) in children and adolescents occupy one of the leading places among common dental diseases. “Dental anomalies and secondary deformations in children and adolescents disrupt the functions of the dental system, complicate prosthetics, negatively affect the condition of periodontal tissues, bite formation, facial aesthetics, and in general, the psycho-emotional state of people”¹. At the same time, “...there is a certain dependence: the older the age group, the greater the number of children in need of therapeutic orthodontic measures and the smaller the number of children in need of preventive measures”². Timely diagnosis and effective treatment of dental anomalies and deformities is an urgent problem. Therefore, the greatest attention should be paid to carrying out the most effective methods of treatment and prevention of CFA in children at the stages of primary and mixed dentition.

Data from recent studies by European scientists indicate that there is no downward trend in this indicator. “...The highest prevalence of deformations of the dentofacial system occurs in childhood, and according to this indicator, orthodontic pathology is one of the main dental diseases after dental caries and periodontal diseases”³. The frequency of occurrence of anomalies and deformations of the ZES in each state and region is different. For example, “...in different regions of the Russian Federation it varies significantly from 34.9 to 76.5%”⁴.

Despite the successes in the prevention and treatment of secondary deformations of the dental system in children, many aspects of this problem require the use of modern research methods; indications for further study have not been developed.

So, there are no clear enough recommendations for choosing a method

¹ Muratov A.M., Gallyamova E.E. Improving orthodontic care for young people. M., -2018. P. 018-022.

2 Gherunpong S., Tsakos G., Sheiham A. Developing and evaluating an oral health-related quality of life index for children // *Community Dent Health*. – 2004. – Vol. 21. – R. 161-169.

3 Khoroshilkina F.Ya. *Orthodontics*. M.: Med. information agency, 2006. – 544 p.

4 Vodolatsky V.M., Pavlov A.A., Nekrasova A.A. // *Bulletin of new medical technologies*. – 2012. – T. 15, No. 3. – pp. 176–177.

treatment that takes into account the causes of secondary deformation, their severity and topography.

A number of priority studies are being carried out in the world to improve the effectiveness of treatment of anomalies and deformations of the maxillofacial area, in particular, the development of mechanisms for the prevention of maxillofacial anomalies, the introduction of modern methods of orthodontic treatment of maxillofacial anomalies, the substantiation of complex methods of treatment of anomalies of the maxillofacial area, the use biotechnologies for the treatment of maxillofacial anomalies, development and improvement of methods for the treatment of maxillofacial anomalies and deformities using modern computer technology.

For many years in our republic, orthodontists have been developing early methods of treating cervical joint pathology in children with primary and mixed dentition. Particular attention is required to study the

etiological factors of secondary deformations of the posterior joint, since their timely elimination will be the key to successful orthodontic treatment. "...The correct formation of the dentofacial system is of great importance for the physiological growth and development of the child. The need to preserve primary teeth is due to their role in the process of developing the height of the bite; correct formation of the dentition and ensuring their normal growth; timely eruption and correct positioning of permanent teeth in the alveolar process"^{5, 6}. Therefore, taking into account the quality of life of a child with secondary dentition deformations, improving methods of prevention and orthodontic treatment requires further in-depth research.

One of the reasons for the increasing prevalence of CFA among children is premature loss of teeth during the period of temporary dentition (Phulari D.S., 2017). Currently, the number of preschool children with dental defects as a result of early removal of temporary molars has increased, and therefore the need for dental prosthetics has increased from 14.7 to 45.4% (Souames M., 2006).

5 Mannanova F.F. Gizzatullina F.V. Problems of dentistry / The actual problems in dentistry. - Ufa, 2015. No. 2. P.36-38.

6. Maksudov S.N., Nusratullaev Z.S. An improved method for the treatment of sagittal malocclusion. - Almaty, 2016. - P. 101-102.

Early loss of baby teeth in children and adolescents leads to disorders in the dentofacial apparatus, which are manifested by dysfunction of the entire masticatory apparatus. Evidence is provided that early removal of primary teeth affects the growth of the facial skeleton, the formation and development of dental and alveolar arches, the relationship between teeth and dentition, and elements of the temporomandibular joint. These changes are irreversible and cannot be self-regulated, since all parts of the dentofacial apparatus are involved in the pathological process. The results of the study allow us to conclude that today among the child population of the city of Tashkent the level of prevalence of secondary deformations of the posterior jaw during the period of mixed dentition is increasing (Maksudov S.N., 2016).

Especially relevant against this background are routine examinations that promptly detect pathology, as well as the introduction of modern methods of treatment and prevention. Based on the results obtained, the study of functional and psycho-emotional indicators in secondary deformation of the dentition in children with mixed dentition serves as the basis for the need to develop precise and intensive measures in the treatment and prevention of this disease. Based on the results of an analysis of scientific research and scientific literature data, we can come to the conclusion that there is a ripe need to conduct large-scale research on this issue in the Republic.

CHAPTER I.

MODERN VIEWS ABOUT THE FEATURES OF DIAGNOSTICS AND TREATMENT OF SECONDARY DEFORMATIONS OF THE DENTAL SYSTEM IN THE MIXED BITE

1.1. Prevalence and classification of secondary deformations of the dental system in children.

Due to various etiological factors (partial edentia of teeth, increased abrasion of hard dental tissues, periodontal pathology, primary edentulous teeth and others), the human chewing apparatus undergoes a number of morphological and functional changes throughout life, among which an important place belongs to secondary deformations of the teeth, dentition and bite

Although secondary deformations of the position of the teeth and dentition can be attributed to dentofacial anomalies, in the opinion of a number of authors, in clinical practice, dentofacial anomalies and secondary deformations (or simply deformations) should be clearly distinguished. meaning by the first - congenital and acquired at an early age deviations from the normal development of the dental system, and by the second - acquired after the formation of the bite (Gavrilov E.I., 1984; Romanenko A.G. et al., 1995; Shcherbakov A.S. et al., 1997, etc.).

Secondary deformation of teeth, dentition and bite differ not only in the type and degree of its severity, but also in changes in the nature of the bite, a decrease in its height, changes in the kinematics of the lower jaw and reflex connections in the masticatory apparatus, as well as serious functional and morphological changes in the pulp, periodontium, masticatory muscles and temporomandibular joints. This, in turn, adversely affects the formation of children's bite, chewing muscles, food processing in the oral cavity, which leads to functional changes in the activity of the digestive system, speech function and violations of the aesthetic norm of the face. Therefore, orthodontic and orthopedic treatment of children with secondary deformation should ensure not only the correct relationship of the dentition, the dynamics of the lower jaw and temporomandibular joints (TMJ), but also eliminate functional and aesthetic disorders of the masticatory apparatus as a whole (Abolmasov

N.G., 2010; Gunenkova I.V. 2005; Romanov D.O., 2010; Yakubova F.Kh., 2007).

Under certain conditions of the dental system, individual teeth move in different directions, which leads to a change in the shape of the dentition. In the dental clinic, these changes are called deformations of the dentition and bite (Doroshenko S.I., Tril S.I., 1991).

There are primary and secondary deformations of the dentition and bite. Primary deformations occur at the moment of eruption of primary or permanent teeth, that is, during the formation of the bite, and are called anomalies.

Secondary deformations include the movement of teeth after their eruption due to the appearance of a defect in the dentition or some other pathology (caries, periodontitis, periodontal disease, underdevelopment of the alveolar processes, jaw tumors, traumatic occlusion, pathological abrasion, etc.).

A number of theories are given in the literature to explain the mechanism of occurrence of secondary deformations. Secondary deformations are described in the works of Avicenna and Aristotle. Whether they observed anomalies or secondary movements is very difficult to say.

There are only a few reports in the literature about the frequency of secondary deformations. For example, N.G. Abolmasov and A.A. Novikov (2010), during an examination of 270 students aged 18-26 years with partial loss of teeth, revealed secondary deformations of the dentition and bite in 67.4% of cases (Dolgoarshinnykh A.Ya., Bogdanova G.E., 2003; Novikova Zh.A. ., Gavrilova O.A., 2018).

One of the pressing problems in orthodontics is the study of the structure and prevalence of PCA and deformities, as one of the necessary conditions for planning regional treatment and diagnostic programs. Data from various authors indicate significant variability in these indicators in different regions. A number of authors in the early 60s (Dektyareva A.P., Napadov M.A., Sannikova M.D., Demner L.M., Zvolinskaya R.M.) provide figures on the prevalence of PCA and deformities within 34.7-54.9%.

A survey of children in Riga (Kreslinya V.Ya., 1975) revealed the frequency of CFA at 26%. After 15 years, this figure increased to 54.6% (Urtane I.F., Hartmane I.G. et al., 1990). Works by Abolmasov N.G. (1980) revealed the need for preventive and therapeutic measures in children of preschool and school age in Smolensk at the level of 60 - 70%.

There is evidence in the literature that from 20 to 75% of children of preschool and school age have certain dental anomalies and require special treatment for these anomalies (Kalamkarov Kh.A. et al., 1973; Kalamkarov Kh.A., 1978; Khoroshilkina F.Ya., 1982; Bondarets N.V., Khoroshilkina F.Ya., 1995; Tril P.S. et al., 1995) .

The frequency of secondary deformities, according to different authors, also varies significantly, since surveys were carried out in different historical periods, in different countries, in different social and age groups of the population. According to a survey of schoolchildren in Lvov, who had already formed a permanent dentition (12-17 years old), secondary deformations were found in 28.7% of those examined (Chuchmai I.G. et al., 1996).

According to a survey of the urban population of Ukraine, they were found in 35% of adolescents who had already formed a permanent dentition (Zubkova L.P., Khoroshilkina F.Ya., 1993).

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E.I. Bondareva (1983), based on 337 subjects, indicates that she observed secondary deformations in an average of 50% of patients with defects in the dentition, and the frequency of deformations is directly

proportional to the time elapsed after tooth extraction, and increases with age from 35% up to 70%.

Based on a survey of 7065 workers and employees aged from 16 to 67 years, A.A. Pochtareva (1985) found that 61.8% of them have certain defects in the dentition, and 44.3% have secondary deformations of the dentition (54.6% - vertical and 39.7% horizontal). A.A. Pochtareva notes that teeth deform most quickly during the period of active jaw growth after the loss of the first permanent molars of the lower jaw.

Malygin Yu.M. (1990) established the following data on the number of ZFA: 24% - in the primary dentition, 49% - with a replaceable dentition, 36% - with a permanent one. Research by Ospanova G.B. (1991) showed that the need for orthodontic treatment was 36.3% of the number of children examined.

The prevalence of orthodontic pathology among the child population of Turkmenistan, according to A.G. Iskanderyan, A.V. Alimsky et al. (1990), is 34.94%. The frequency of pathology in schoolchildren increases significantly compared to similar indicators in preschool children (20.85%) and reaches 42.4-43.7% by the age of 8-9 years. Bite anomalies occur 2 times more often than anomalies of individual teeth.

Sharova T.V., Rogozhnikova G.I. (1991) provide data from a survey of children aged 3 to 17 years from 1964 to 1980. The prevalence of PCA and deformities in children with primary dentition was 55.7%, in children with mixed dentition - 76.1%, in children with permanent dentition - 49.0. Prognathia of the upper jaw was observed in 11.2% of children, deep bite - in 12.9%, prognathia of the lower jaw - in 4.1%, anomalies in the position of individual teeth - in 10.7%.

In 1993 I.G. Hartman and R.Ya. Tsare, having examined children in the first 3 years of life, obtained the highest frequency - 61.4% in Talsi, and the lowest in Riga - 50.7%.

According to F.Ya. Khoroshilkina (1995) in the regions of Russia, the prevalence of dental pathology is 33.2% and 44.0% in Moscow. Research by the same author and Yu.M. Malygina (1999) revealed a pattern of growth of the PCA when comparing the period of the primary dentition with the period of the mixed dentition. During the period of

permanent occlusion there is an opposite tendency towards a decrease in pathology. The discovered pattern is associated with the phenomenon of self-regulation; according to the authors, it is 11.0%.

Research by Tsarinskaya N.M. (1995) in the Krasnodar region showed that 43.4% of children need orthodontic care. Anomalies of individual teeth occur in 6.1%, anomalies of the jaws - in 13.5%, occlusion - in 23.1%, and combined lesions - in 5.6% of those examined.

The prevalence of PCA and deformities among the child population of the Arkhangelsk region (T.N. Yushmanova, Yu.M. Mishutin et al., 1998) was 66.9%. In the structure of anomalies, the leading place is occupied by distal bite (36.2%), anomalies in the position of individual teeth (20.2%), deep bite (10.9%), crowded position of teeth (10.6%). One of the factors causing the high prevalence of dental anomalies, according to the authors, is the low level of public health in this region.

According to the results of research by P.D. Mailyan, G.Yu. Ter-Poghosyan et al. (1991) the prevalence of PCA and deformities in Yerevan was 38.0%, and in 1997 – 45.0% (deciduous occlusion 25.0% and 28.0%, respectively, permanent – 29 and 48%, replaceable 53 and 59%). The authors associate the increase in the prevalence of CFA to a large extent with a sharp decline in the socio-economic standard of living of the population.

According to M. Ledovik and L. Madi (1998), 40.8% of children at the stage of primary occlusion experience PFA and deformations, 58.7% at the replaceable stage and 48.9% at the permanent stage.

Studies conducted in the Netherlands by Burgtrsdruk R. (1991) revealed the prevalence of orthodontic pathology among adolescents and adults at the level of 45%, in Norway similar studies by Espeland L. (1991) found the presence of PFA and deformities in 37% of those examined, and in Finland (Tuominen M .L. 1994) - 47%.

Work on studying the prevalence of CFA and deformities among children in Lipetsk, carried out by A.I. Khamchishkin. in 1999, revealed the following figures: among children with primary dentition it was 30.9%, and with mixed dentition - 59.6%.

Alimsky A.V. (2000) found that over a ten-year period (1988-1999) the frequency of cervical spine anomalies in children 7-19 years old in Karaganda almost doubled (from 30.2% to 53.2%). The author associates this growth with a deterioration in the indicators of sanitation of both temporary and permanent dentition.

It should be noted that, in general, the prevalence of CFA and deformities in different regions of Russia varies significantly. At the same time, an analysis of the literature data indicates that there is no downward trend in this indicator over the past decades. In Tver, a survey conducted among preschoolers (Lavrikov V.G., Volkhova O.M. 1985) showed the presence of orthodontic pathology in 41.5% of preschoolers. Pichuev E.E., based on studies of 2000-2003 in Tver and the Tver region, it was found that out of 1196 examined lei aged 3-14 years, 10.3% had dentition defects and needed prosthetics, as well as normalization of shape and size dental arches and bite. Thus, the need for a broader study of the prevalence of PCA and deformities has not lost its relevance.

A.B. Alimsky (2008), having examined 896 middle-aged people with defects in the dental arches, found secondary deformities in 78.6%. B.C. Vusaty (2004), having examined 565 patients of different ages with secondary partial adentia, established secondary deformations of the dentition in 85% of cases. The authors found that the frequency of secondary deformities increases with age.

There is evidence in the literature that from 20 to 75% of children of preschool and school age have certain dental anomalies and require special treatment for these anomalies (Gunenкова. I.V., 2005; Ikromova G.D., 2007; Kozlov D. S., 2009; Teperina I.M., 2004).

The frequency of secondary deformities, according to different authors, also varies significantly, since surveys were carried out in different historical periods, in different countries, in different social and age groups of the population (Fares I.M., Pashaev A.Ch., 2009; Ayupova F. S., Voskanyan A.R., 2016). According to a survey of schoolchildren in Lvov, who had already formed a permanent dentition (12-17 years old), secondary deformations were found in 28.7% of those examined (Bayzakova G.T., 2002; Burya E.Yu., 2009).

Differences in the number of diagnosed cases of secondary deformities in children of the same age group can be explained by the lack of a single criterion for assessing existing anomalies, that is, researchers define the degree of observed deviation differently. Such discrepancies in diagnosis occur especially often in the early period of mixed dentition. This indicates that the same signs of the formation of the dental system are in some cases regarded as an anomaly, and in others as a variant of the norm. In addition, as A.V. writes Alimsky (2008), the authors do not always group by age, do not pay due attention to the national characteristics of the subjects, geographical and socio-economic indicators of the areas of epidemiological survey [11].

So, A.G. Korenev (2005), F.S. Ayupova (2016) found that dental anomalies in children living in a large city are more common than in children in rural areas. The author notes that the prevalence of anomalies is higher among people who are physically better developed, associating this factor with disharmony in the development of the organs of the masticatory apparatus, which occurs as a result of acceleration.

Based on a survey of 7065 workers and employees aged from 16 to 67 years, A.A. Pochtareva (1985) found that 61.8% of them have certain defects in the dentition, and 44.3% have secondary deformations of the dentition (54.6% - vertical and 39.7% horizontal). A.A. Pochtareva notes that teeth deform most quickly during the period of active jaw growth after the loss of the first permanent molars of the lower jaw.

F.Ya. Khoroshilkina et al. (2006), combining their research over the past 30 years, notes that in large cities, dental anomalies are observed in 37.2% of children, and in the country (Russia) on average in 33.7%. It has also been established that the prevalence of anomalies and deformations of the ZES in different regions, depending on the geographical location and level of industrialization, can reach 85% (Alieva R.K., 2000; Bogdanova G.E., 2003; Cobourne M.T., 2017; Mohammad Hossein, 2007 and etc.).

S.Ya. Ali (2003) indicates that the anomaly in the position of individual teeth, due to lack of space in the dentition, increases from 13.4% at 7 years to 23.2% by 16-22 years, and crowding of the lower jaw teeth in

89.1% of cases from the early phases of a mixed dentition passes into a permanent one.

Grist Fiona (2011), observing 150 children in two age periods (8 and 14 years), found that 89% of them with SPPD in the period of permanent dentition also had it in the replacement dentition. Self-regulation was observed in only 11% of children, while, as the authors note, complete self-regulation was observed in children with lingual displacement of the lateral incisors and a lack of space in the frontal area of 1.5 - 2 mm.

I.L. Kuznetsova, with a lack of space for abnormally located teeth, observed self-regulation in 19.48% of 378 examined, in 22.07% the anomaly worsened, and in 58.44% it did not change.

O.A. Salamatina et al. (2011), based on a survey of 563 patients with dentition defects, states that after 5-10 years after tooth loss, secondary deformations develop in 98% of patients.

S.S. Murtazaev (2005), I.L. Kuznetsova (2000), L.A. Loginova, Ya.Yu. Dyachkova (2001) and others studied the prevalence of crowded position of the anterior teeth of the lower jaw in children in the early period of mixed dentition and carried out a differentiated assessment of their severity. They established a high frequency of crowded position of the frontal teeth of the lower jaw, and convincingly proved the low self-regulation of this pathology. Therefore, pediatric dentists working in kindergartens and schools, in their daily work when studying the dental status, need to pay special attention to the condition of the erupting incisors and, as soon as the crowded position of the front teeth is identified, refer children to an orthodontist.

Developing secondary deformations complicate prosthetics, negatively affect the condition of periodontal tissues (Smolyar N.I., Masny Z.P., 1987), the formation of bite (Krishtab S., 1986), facial aesthetics and, in general, the psycho-emotional state of people.

Thus, the above data, which are far from complete, indicate the importance of prevention and treatment of dentofacial anomalies in general and secondary deformations in particular.

Such a high frequency of occurrence of secondary deformations in patients and their insufficient description in textbooks and specialized literature forced us to present this material in the form of a scientific work.

Classification and clinical characteristics of secondary deformations of the dentition and bite.

In orthodontics, classifications serve as the basis for diagnosis, the basis for preventive measures, and in treatment, for the distribution of patients into categories and better understanding between orthodontists during discussions. Classifications of anomalies and deformations of teeth and dentition are based on etiological and morphological characteristics.

According to (Galiullina M.V., 2008; Kuznetsova I.L., 2000), crowding is a hereditary phenomenon, especially if we take into account factors such as tooth migration, jaw growth and environmental influences.

Using these criteria, it distinguishes between primary, secondary and tertiary crowding. Primary crowding occurs as a result of inheritance of the relationship of teeth and jawbone. Secondary occurs under the influence of environmental factors, such as premature loss of baby teeth or bad habits. Tertiary is crowding of the incisors in adolescents and adults.

M. Souames et al. (2006) proposed dividing SPFZ into 2 groups: a) primary and b) secondary crowding. According to the author, the primary crowded position of teeth is the result of hereditary variations in the relationship of dental tissues, which are influenced by growth and environmental factors, especially those acting during the period of formation and growth of teeth. Secondary crowding of teeth is specific to adolescence and older age and develops regardless of previous treatment, as well as in untreated individuals.

Clinically, deformation of the dental arch is manifested by various variants of their incorrect position with a lack of space in the dental arch and is characterized by a decrease in the longitudinal length of the dental arch in comparison with the sum of the mesiodistal dimensions of the crowns of the teeth forming it. The severity of this anomaly determines the severity of the incorrect position of the teeth and the corresponding amount of lack of space (Suntsov V.G., Distel V.A., Losev A.V., 2005;

Shishmareva A.S., Melnikova M.A., Akimova K.M. ., 2017). The clinical picture of secondary deformation of the dentition and bite is formed in accordance with the periods of bite development.

The following classification of secondary deformation of the dentofacial apparatus is currently accepted:

I. Factors causing secondary deformations of the dentofacial apparatus:

1. Crown defects.
2. Violation of the structure of hard dental tissues - pathological abrasion of teeth.
3. Partial edentia.
4. Anomalies of the dentofacial apparatus.
5. Diseases of the supporting apparatus.
6. Neoplasms.
7. Diseases of masticatory and facial muscles of various origins - parafunction, contractures, hyperkinesis.
8. Diseases of the temporomandibular joint - arthritis, arthrosis, ankylosis.
9. Surgical intervention and irrational dental prosthetics and orthopedic treatment.
10. Bad habits, industrial occupational pathologies.

II. Morphological types of deformations of the dentofacial system:

1. Deformation of the crowns of individual teeth.
2. Position of individual teeth: a) horizontal; b) vertical; c) transversal.
3. Position of groups of teeth: a) horizontal; b) vertical; c) transversal.
4. Deformation of dental arches: a) elongation; b) expansion; c) shortening; d) narrowing.
5. Bite deformations: a) sagittal; b) transversal (discrepancy in the width of the upper palate and lower dentition, bilateral discrepancy of the

lateral teeth, unilateral discrepancy of the lateral teeth); c) vertical; decreased bite height; increase in bite height; deep open bite.

6. Deformations and damage to the supporting apparatus of the teeth (functional periodontal pathology).

7. Deformations of the temporomandibular joint.

8. Changes in muscles.

9. Traumatic injuries to the soft tissues of the oral cavity.

III. Types of functional pathology caused by secondary deformation:

1. Reduced chewing efficiency:

a) by reducing the area of occlusion;

b) due to impaired articulation;

c) due to damage to the supporting apparatus of the teeth;

d) due to traumatic occlusion and articulation.

2. Impaired movements of the lower jaw:

a) limiting the excursion of the articular head;

b) excessive excursion of the articular head.

3. Violation of sound production and speech.

4. Aesthetic violations.

5. Dysfunction of the masticatory muscles and neuromuscular bundles.

IV. Methods for the prevention and treatment of secondary deformations and their consequences:

1. Elimination of the causes of deformation.

2. Non-hardware methods of prevention and treatment: a) drug treatment; b) physiotherapy; c) mechanotherapy.

3. Earlier and rational dental prosthetics.

4. Orthopedic treatment.
5. Orthodontic treatment.
6. Surgical treatment.
7. Combined method of treatment.

1.2. Etiological factors of secondary deformations of teeth, dentition and occlusion in children.

The etiological factors of deformation of the teeth and dentition that occur after the formation of the bite, i.e., secondary deformations, are tooth loss, periodontal disease, caries, trauma, inflammatory diseases of the jaws, including osteomyelitis, tumors and other pathological conditions leading to changes in the position of the teeth in relation to the vertical, sagittal and transversal occlusal curve (Handbook of Dentistry, 1977).

A clear understanding of the etiology and pathogenesis of PCA and deformities is a necessary component for the development of measures for their prevention and treatment.

The formed dental system is the result of the interaction of heredity and environment. The genetic cause of HFA is determined on the basis of genealogical analysis data according to three options (Snagina N.G., 1985):

- direct inheritance of characteristics (diastema, adentia, supernumerary teeth, retention, changes in the number, shape and size of teeth);
- inheritance of anomalies in the size of the jaw bones (macrognathia, micrognathia) and anomalies in the position of the jaws relative to the base of the skull (prognathia, retrognathia);
- inheritance of discrepancy between the size of the jaws and the size of the teeth (crowding due to insufficient size of the apical base, rare arrangement of teeth with the presence of three).

According to M.P. Vodolatsky and B.G. Babanina (1986) the share of hereditary anomalies is small and amounts to 14% of the total.

The reasons contributing to the formation of CFA of a non-hereditary nature may be a difficult pregnancy (Kasibina A.F., 1986), as well as diseases of various organs and systems that arose in the child both in the prenatal and postnatal periods (hypotrophy, hemolytic diseases of newborns, sepsis, rickets, pneumonia, etc.).

Abolmasov N.G. (1982) determined the risk of “progenia” in children with 1 affected parent; it was 28.4%. They also established a teratogenetic termination period - 9-13 weeks. If during this period there is an unfavorable environmental factor, especially against the background of a genetic predisposition, then the likelihood of congenital “progeny” occurring in the postnatal period is quite high.

The same author established a directly proportional significant significance between the frequency of pathology of pregnancy, childbirth and the frequency of “progeny”. The likelihood of an anomaly occurring is determined not by the specificity of the action of the unfavorable factor, but by the stage of intrauterine development of the embryo at the time of its action (critical and teratogenetic termination periods). “Progenia” is more common in children born with a transverse position of the fetus, in a breech or leg presentation, when there is a protracted course of labor, with a long anhydrous interval, labor stimulation and surgical delivery.

Jaw bones from birth until the completion of the formation of the desired apparatus should be considered as anatomical formations with a constantly changing external shape and internal structure (Vares E.Ya., 1967). Among the factors influencing the development of HS, hormones play an important role.

The most pronounced effect on the growth and formation of the skull is exerted by the pituitary somatotropic hormone (STH), which regulates the process of chondrogenesis, the growth and development of cartilaginous matrices and their analogues, as well as periosteal bone formation. E.N. Sukhoretzkaya (1969) found that when the function of the pituitary gland decreases, the growth of the jaws decreases, and with increased function, the growth of the jaws, especially the lower one, increases. The change of teeth in hypophysectomized animals is

delayed, and when the functions of the pituitary gland are stimulated, an early change of teeth to permanent ones is observed.

Parathyroid hormones control the processes of cartilage resorption during enchondral osteogenesis, which determines the rate of formation of mature bone structures. M.G. Zagripova (1964), examining children with damage to the thyroid gland, came to the conclusion about the influence of endocrine disorders on the development of dentofacial deformities.

According to Nikitin B.A. (1966), the shape of the jaw bones is influenced by the development of teeth, eyeballs, and the function of the dental system. The development of the upper jaw is associated with the stages of development of the maxillary sinus, as well as with changes in the volume of air passing through the nasal cavity.

A.A. Pogodina (1981) confirms the connection between chronic pathological processes in the nasopharynx and PCA. In this case, the predominant role is played not by mechanical factors, but by reflex effects through the nervous system, which regulates the trophism of bone tissue. According to the observations of F.F. Mannanova (1991), in children under 14 years of age with nasopharyngeal pathology, PCA occurs 2-3 times more often than in healthy ones.

An important cause of CFA is Demner L.M. (1981) calls reduced resistance of the body, tuberculosis was considered as a criterion. The data he obtained indicate not only a higher frequency of PCA than in children of the control group, but also their greater severity.

Kreslinya V.Ya. (1961) determines the effect of rickets on the jawbone in the following areas: the process of calcification of permanent teeth is disrupted, teeth erupt late in the wrong order, growth and calcification of the jaw bones are disrupted, which results in the formation of anomalies in the position of the teeth and bite, and jaw deformations.

Data regarding the relationship between dental anomalies and the consumption of drinking water with different fluoride contents are very contradictory. So, R.M. Zvolinskaya (1966), Ch.A. Pashayev (1968) did not find statistically significant differences in the frequency of dental anomalies in children living in areas with low and high fluoride content

in drinking water. At the same time, A.G. Guseinov (1971), A.V. Alimsky, R.K. Alieva (1999) indicate that in children who consume water with low fluoride content, dental anomalies are more common than in children living in areas with high and optimal fluoride content. The authors associate these data with the prevention of early removal of primary and permanent teeth as a result of caries and its complications. As a result of research conducted by Andreev I.M. (1981) revealed a significant role of increased fluorine content in the environment in the pathogenesis of dentofacial anomalies. Their prevalence is much higher among children and adolescents who consume water with excessively high fluoride content.

Among other factors contributing to the occurrence of PCA and deformities, a certain part is represented by various types of arthritis (Yu.A. Petrosov 1996, A.N. Karpov 1999). Infectious arthritis can cause damage to the growth zones, which leads to a lag in the growth of the lower jaw, although its mobility is not impaired. The second large group of acquired micrognathias consists of injuries to the articular process. In 26–39% of children, after injuries to the lower jaw, ankylosis of the TMJ develops, and 30% of them are generic (A.N. Karpov 1999).

To the factors contributing to the emergence and consolidation of CCA Vinogradova T.F. (1988), Snagina N.G. (1985), Okushko V.P. (1975) and other authors include: diseases of children in the first year of life, incorrect methods of artificial feeding, bad habits (three groups according to V.P. Okushko's classification). In children with bad habits, the frequency of dental anomalies is significantly higher than in children who do not have a history of them. The reliability of this difference is confirmed by the statistical method (S.Ya. Dymshits, 1973). According to Osetrova T.S. (2001), most often as a result of bad habits, distal bite and open bite develop in various variants with other types of anomalies in the transversal and vertical direction. A study by this author of the prevalence of bad habits among the city of Khabarovsk in 2002 showed that the following habits are most often observed: mouth breathing (6.0%), improper swallowing and the habit of pressing the tongue on the teeth (5.0%), finger sucking (4.5%).

As a result of research conducted by T.M. Kuchumova (1972), S.A. Dubivko, N.V. Smolentseva (1974), Yu.M. Malygina (1990), V.V. Belyaeva, A.N. Chumakova, S.Kh. Hasem (2000), revealed a close relationship between PCA and dental caries, as well as deformation of the jaws and dental arches due to early tooth extraction due to complicated caries. I.V. Zlotnik (1952) believes that between the ages of 4 and 15 years, 20% of dentoalveolar deformities occur as a result of premature removal of primary molars. According to G.I. Khudonogov (1963) removal of the first permanent molars in children leads in 100% of cases to a shortening of the dentition due to the mesial shift of the second molar, and in 39.1% of cases there is a displacement of the middle incisal line and the formation of vertical deformations. According to Yu.M. Malygin, as well as Ospanova G.B. (1987), the consequence of premature removal of primary molars is retention of premolars, eruption of canines outside the dental arch. Dentoalveolar lengthening in the area of the teeth opposing the defect creates a block for normal articulatory movements of the lower jaw forward and to the side. Structural and functional changes in the dental system develop in a short time due to the growth of children and adolescents. These deviations are irreversible and cannot be self-regulated, since all links of the articulatory chain are involved in the pathological process. T.M. Kuchumova (1972) showed that two primary molars were removed prematurely in 12.9% of children with dentition defects, three molars in 12.1%, four in 44.6%, five in 10.6%, six - in 9.8%, seven - in 5.4%, and all molars were removed prematurely in 4.6% of children. This author also found that only 50% of children with extracted primary molars have orthognathic occlusion. V.P. Delekhin (1987) found that the earlier the baby teeth were removed, the greater the likelihood of deformations, and with age they become more pronounced. T.V. Sharova, G.I. Rogozhnikova (1991) also associate the high incidence of malocclusion pathology during the period of tooth change with premature loss of teeth, which entails a decrease in chewing function and a slowdown in the growth of the jaw bones. Samokhina E.S. (1974) studied the need for prosthetics among children and found that it was 8.9%.

According to Donald J. Ferguson (2000), among the environmental factors that cause dental anomalies, the most common are caries and

premature loss of primary teeth. Northway (1984) found the following: most unfavorably early loss of second primary molars, early loss of lateral teeth leads to a reduction of space by 2-4 mm in each quadrant on both jaws. The same author discovered other patterns. After early tooth extraction, the resulting space is closed within the first year, early loss of the upper first primary molars most often leads to interlocking canines, and loss of the upper second primary molars usually causes retention of the second permanent premolars. In the upper jaw, the lack of space during the growth period is not restored, and in the lower jaw only a slight improvement is observed.

Pichuev E.E. in 2000-2003, the level of prevalence of dental defects among children 3-14 years old in Tver and the Tver region was studied. Among other things, he found that the largest part of extractions occurs in the share of primary and permanent molars 74.5% - this area of the dentition is considered the most important for the correct formation of the masticatory apparatus.

The formation of PCA is also influenced by anomalies of the soft tissues of the oral cavity (Khoroshilkina F.Ya. 1972, 1983, Kamysheva L.I. 1974, Velichko V.S. 1979, Danilevsky N.F. 1977, Obratsov Yu.L. 1985, Ospanova G.S., Kolesov A.A., Zhilina V.V. 1991, Zolotukhina G.A. 1999, Parmal 1960, Hange D.E. In the study by Zolotukhina G.A. (1999) of 100 examined patients aged 5-12 years with anomalies of occlusion of the dentition, all had soft tissue pathology. Among them, short frenulum of the tongue accounted for 50%, short frenulum of the upper lip 28%, small vestibule 22% of cases.

According to Malygin Yu.M. (1970).

In Tver, a study of the prevalence of etiological factors of CFA was carried out in 1985. (Lavrikov V.G., Volkova O.M. et al.). The authors examined bad sucking habits in children of 2 groups: with a developing deciduous bite (1.5-3 years) and with a formed deciduous dentition (3.1-6 years). Tongue sucking in the first group was 4.3%, in the second - 5.5%, pacifier sucking - 8.6% and 1.2%, respectively, lip biting - 4.3% in the first and 3.0% - in the second group. Other causal factors, as well as older age groups, were not considered by the authors, which confirms the feasibility of further research.

The most common (44 - 100% of cases) cause of secondary deformations are tooth movements due to the loss of adjacent teeth and antagonist teeth (Stern N. et. al., 1981; Diedrich P., 1986; Bondareva E.I., 1983; Pochtarev A.A., 1985; Askerov S.B., 1990).

One of the reasons contributing to the occurrence of dentoalveolar deformities in preschool children is the removal of primary molars before the onset of their physiological change (Bailova G.B., Chernysheva L.E., 1995; Mozgovaya L.A., Danilova M.A., 1995). According to various authors, this operation is carried out in 40 - 78% of cases (Shamsiev Kh.N., 1980; Rimanovskaya U.Yu., Sharova T.V., 1981; Lepikhin V.P., 1985; Khikhinashvili L.I., 1989; Maksudov S.N., 1991).

One of the main risk factors in the occurrence of dental anomalies in preschool children is active caries of primary teeth (Vinogradova T.F., Snagina N.G., 1987; Yakhina Z.Kh. et al., 1995).

The role of difficult nasal breathing in the development of anomalies and deformation of the cervical joint was studied by F.F. Mannanova and other foreign scientists who identified the development of adenoids in patients (Mannanova F.F., 1989; Kuznetsova G.V., Markaryan L.G., 2016).

Such etiological factors of deformities as otitis media (18%), nasal breathing disorders (40%), bad habits (37%), early loss of primary teeth (45%), congenital diseases of the maxillofacial area (21%), heredity (19 %) noted in her studies A.B. Slabkovskaya et al. (2016).

Over the years, the problem of congenital adentia has been addressed by such prominent researchers as F.Ya. Khoroshilkina (2006), N.A. Ryabukhin (1999), V.A. Distel (2001), L.S. Persin (2007) and others. The authors emphasize the features and complexity of anomalies, especially in children in the period of mixed dentition. In this regard, complex and combined treatment of children and adolescents with congenital absence of teeth remains relevant.

Araújo Eustáquio A., Buschang Peter H. (2016) noted that sucking a pacifier before 2 years of age leads to a narrowing of the upper dentition,

and before 3 years it increases the lower dentition, which causes cross-occlusion in the lateral regions.

In his research D.O. Romanov (2010) noted that in early mixed dentition, along with the increase in the number of PCA, the frequency of risk factors also increases. Myofunctional disorders (44.78%) predominate in the structure of risk factors; infantile type of swallowing (12.88%); early removal of temporary teeth (13.5%); mouth breathing (12.27%); unworn cusps of temporary teeth (8.59%); absence of three (3.07%), speech impairment (4.91%).

The secondary deformations described above can lead to functional overload of the periodontium, deformation of the sagittal occlusal curve, blockade of mandibular movements, dysfunction of the joint with the possible subsequent development of arthrosis.

Functional overload of the periodontium causes progressive destruction of its tissues in the absence of inflammatory phenomena, which in turn increases tooth deformation, and thus closes a vicious circle (Kopeikin V.M., 1993; Mokrenko E.V. et al., 1995).

The rate of development of secondary deformations of the occlusal surface of the dentition depends on age. In childhood they develop very quickly in all children, and in adolescence somewhat slower, and in older people they occur very rarely. This pattern should be taken into account when planning the prevention of deformities in all age groups.

1.3. Diagnosis, basic principles of treatment and prevention of secondary dentition deformations.

The diagnosis of secondary deformities is not difficult to make. It is more difficult to determine the degree of deformation. In practice, this problem is usually solved using plaster diagnostic models (anthropometric studies) and radiological methods (radiography, panoramic radiography, teleradiography, etc.) (Tekucheva S.V., Oborotistov N.Yu., Persin L.S., Chanturia N. Z., Carton E.A., 2015; L.S. Persin et al., 2012; Phulari Basavaraj Subhashchandra, 2013).

Anthropometric studies are used for scientific purposes. For this purpose, special models of jaw areas are used, made of polymers, on which the stresses that arise in them are studied when various forces are applied to the teeth. Thus, some authors (Budai M., 2003) studied stresses by illuminating transparent epoxy resin models with polarized light. A method has been proposed for studying stresses in plastic models using strain gauge sensors, which, due to their small size, were used to paste over various areas of the model, including the internal surfaces of the alveoli into which the dental models were inserted. At the same time, in the method proposed by S.B. Askerov, using “Ortosil-M” applied to the inner surface of the alveoli, even imitated the elasticity of the periodontium. When analyzing stresses, mathematical modeling methods are used.

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The study of diagnostic models allows us to establish the characteristics of deformations. By comparing the primary and control diagnostic models, you can track the progress of correction of deformations (Reference, according to st., 1977; Gavrilov V.I., 1983; Kopeikin V.N., Demner L.M., 1985; Bushan M.G. with al., 1988).

The angles of inclination of the longitudinal axes of teeth on diagnostic models are determined using a parallelometer or special devices. For example, one of such devices was proposed by S.B. Askerov. (1990).

Intraoral and extraoral radiography allow one to judge the degree of deformation, the condition of bone tissue and periodontium. Panoramic radiography makes it possible to obtain images of the entire dentition and alveolar processes of the upper and lower jaw. The advantage of this method is the identity of the resulting images, which makes it possible to dynamically observe the process of correcting deformations. The radiation exposure with this method is almost 10 times less than with intraoral radiography.

Assessment of the functional state of the periodontium. The success of orthodontic treatment depends on many factors, among which the leading importance is the condition of the periodontium in the area of movable teeth and its ability to be rebuilt under the influence of devices. When moving teeth, the processes of resorption and bone formation must occur in a balanced manner; imbalance delays the duration of orthodontic treatment, and sometimes leads to complete failure. If, after treatment, the teeth are intended to be used as a support for bridges, then it is necessary to determine the stresses that they can withstand. Determination of the functional state of the periodontium before treatment and its monitoring during treatment is carried out using functional diagnostic methods, among which the following are important for the treatment of secondary deformations: gnathodynamometry, determination of tooth mobility, rheography, determination of electrical excitability of the pulp.

Gnathodynamometry (measurement of chewing pressure) has been used to determine the functional characteristics of periodontal tissue for more than 100 years. The first gnathodynamometer was designed in 1895 by V. Black, and despite the fact that to date more than a dozen different designs of gnathodynamometers are known: mechanical, hydraulic, electronic, photometric, research to improve their designs continues. They are aimed at ensuring that the measuring element is of minimal size and allows measurements to be taken in the area of any tooth and in any direction. The results of measuring periodontal endurance for each tooth are recorded in the form of a table called a periodontogram. A.A. Sedunov (1992), analyzing the periodontograms of various researchers over a century-long history, came to the conclusion that they are

extremely inconsistent (varying from 5-72 kg per tooth), characterize the average endurance of the periodontium, therefore, when determining the functional state of the teeth, it is necessary to proceed from the individual data of each patient.

Until recently, determination of tooth mobility was determined by eye according to D.A. Entinu. But this method is not precise, and when used, it is impossible to record comparative data obtained as a result of treatment. Therefore, recently there has been a tendency to record mobility using devices whose operation is based on various principles: mechanical, electronic, optical, etc. (Sedunov A.A., 1992). In the simplest of them, the degree of tooth deviation was measured using an apparatus based on a conventional metalworking micrometer (Svarkov D., Atanasova E., 1962). The load on the tooth was created with a micrometer screw until mild pain appeared. The disadvantage of the device is that this device allows you to record tooth displacement only in the horizontal direction. But the disadvantage of all devices is that the displacement of the teeth was caused by a constant load or effort by the researcher in directions unusual for chewing. A.A. Sedunov believes that in order to more fully characterize the functional state of teeth, it is necessary to simultaneously record the degree of displacement in natural directions for chewing and the load the periodontium can withstand.

The electrical excitability of a tooth is assessed by the magnitude of the electric current, which, when passed through the tooth, causes a response from the dental pulp. It is measured using devices OD-1, OD-2, etc. Healthy teeth respond to currents of 2-6 μA . With periodontal disease, an increase in electrical excitability is observed, i.e. unpleasant sensations occur at currents below 2 μA . A decrease in excitability to 60 μA indicates the death of the coronal part of the pulp. A reaction to currents above 100 μA indicates the death of the entire pulp. The most sensitive surface of the tooth is: in the incisors - the cutting edge, in the canines - the cusps, in the premolars - the buccal cusps, in the molars the anterior buccal cusps (Dental Reference, 1977; Bushan M.G. et al, 1988).

Rheography (rheoparodontography, electroplethysmography, impedance plethysmography, rheoplethysmography) is based on recording pulse

changes in the electrical resistance values of tissues when a high-frequency electric current (500-800 kHz) passes through them, depending on the phases of the cardiac cycle and the speed of blood flow. For rheography, rheoplesmograph RPG 2-02 or rheographs of the RG-1-02 type are used together with a multi-channel recorder N-338 or an electrocardiograph.

Since rheograms can record changes caused by the state of the patient's cardiovascular system at a given time, it is possible to differentiate functional changes in blood vessels from organic ones (and in organic ones, reversible from irreversible ones), as well as to identify initial (hidden) changes in blood vessels. Various functional tests are used in the vascular system (chewing load, temperature stimulus, vasodilators).

In orthodontic practice, rheography is used for the following purposes: 1) determining the initial state of periodontal tissues before the start of orthodontic intervention; 2) monitoring the condition of periodontal tissues during orthodontic treatment; 3) differentiation of functional and organic changes in the blood vessels of the tissues under study using functional tests; 4) determination of the functional state of the pulp of the teeth being moved; 5) determination of the nature of therapy for periodontal diseases accompanying dental anomalies (Prokhonchukov A.A. et al., 1980).

By eliminating secondary deformations, it is possible to achieve: elimination or prevention of all disturbed functional and morphological changes in the joint.

Dates for starting orthodontic treatment

In the literature, there are two opposing directions regarding the timing of orthodontic treatment. There is an opinion to start orthodontic treatment in the primary dentition - A.Ya. Katz (1940), L.V. Ilyina-Markosyan (1961), I.L. Zlotnik (1957), A.I. Betelman (1968), Orlik-Grzybowska (1958), Grosfeldowa (1962) E.I. Gavrilov (1968), G.A. Turobova (1968), F.Ya. Khoroshilkina (1972, 1999), N.G. Snagina (1995), S.I. Burlutskaya (1998). Long-term clinical and experimental observations of these authors have proven that untreated anomalies of primary occlusion lead to severe deformations not only of the jaw bones,

but also have a direct impact on the formation of the TMJ, as well as the entire facial skeleton.

According to research by V.Ya. Kreslin (1961), anomalies of primary occlusion must be considered as progressive disorders of the development of the masticatory organ, requiring urgent treatment. In cases where preventive measures cannot eliminate the malocclusion of the primary occlusion, hardware treatment should be used. According to this author, the results of treatment are more reliable the earlier the conditions for the normal development and function of the masticatory organ are created.

Another opinion was expressed by B.N. Bynin (1951), Ya.S. Khurgina (1956), Kh.D. Bovdzey (1955), L.V. Gelirmanaite (1955) - start treatment at the stage of mixed dentition, due to the possibility of relapses, as well as negative effects on the rudiments of permanent teeth. This point of view was completely refuted by numerous experimental studies by H.A. Kalamkarova (1967, 1981). He proved that when weak forces are used, orthodontic intervention does not have a negative effect on the dental system.

According to Brudon (1990), not all orthodontic treatment is based on the premise that the earlier the treatment, the better. The doctor must have a thorough understanding of the processes of maxillofacial growth and development of the dental arches in order to provide the most effective and efficient treatment regimen for the patient.

According to McNamara (1990), to optimize the treatment of patients in mixed dentition, it is important to outline the phases of treatment, their duration and the expected result. The initial phase of treatment, according to him, should be about a year, with regular follow-up examinations during the eruption of permanent teeth (the intermediate period). After the completion of the period of mixed dentition, the second phase of treatment follows - the final "detailing" of the occlusion, lasting 12-18 months. The decision on the possibility of early treatment is based, according to Ms. Namara, on a number of interrelated factors: the ability to control growth, the level of cooperation with the patient, and the type of pathology.

1. Growth management. The most important condition for proper treatment planning is, according to many authors (Khoroshilkina F.Ya., 1987, Persia L.S., 1996, Anisemenko A.A., 2001, Bjork, 1971, Richardson, 1969, Brudon, 1990, Alexander, 1966, Sampermans, 2002, etc.), determining the type of jaw growth, as well as the activity of residual growth. These data are obtained based on the analysis of TRG, as well as pictures of the hand. According to Bjork, 70% of patients have a neutral type of growth, 20% have a horizontal type of growth, 10% have a vertical type of growth. Orthodontic treatment is most effective during periods of active jaw growth, especially in the case of skeletal occlusion pathology (Khoroshilkina F.Ya., Frenkel R., 1987).

2. Collaboration with the patient. According to Graber (1975), the “Achilles heel” of most early treatment techniques is collaboration with the patient. The goals and objectives of early treatment must be clearly defined to prevent unduly prolonged treatment. Thus, when choosing a treatment method in mixed dentition, every effort should be made so that the quality of treatment and the stability of results do not suffer.

3. Type of pathology. According to McNamara (1992), the optimal time to begin treatment for mesial malocclusion coincides with the loss of the upper primary incisors and the eruption of the permanent ones. The main goal of treatment at this age, according to this author, is to create conditions for the normal development of the jaws and dentition. Beginning treatment of distal occlusion with mandibular micro- and retrognathia is recommended from the period of late mixed dentition.

According to Ya.S. Khurgina (1956), treatment of dentofacial deformities should be carried out taking into account the general physical and mental condition of the child, as well as the diseases he has suffered. The dental system cannot be considered as something separate, but only as part of a single organism. Consequently, its development is connected with the development of the entire child’s body as a whole. Orthodontic intervention cannot be limited to the dental system; it must be combined with activities that promote the development of the entire organism as a whole.

Thus, there is no consensus in the literature regarding the timing of the start of orthodontic treatment. This confirms the feasibility of our study.

Elimination of secondary deformations pursues the following goals:

- 1) prevention of dysfunction of muscles and joints (prevention of arthrosis;
- 2) prevention or elimination of functional overload of periodontal teeth;
- 3) restoration of normal movements of the lower jaw by eliminating blocking points;
- 4) creating conditions for rational prosthetics by straightening the line of occlusion (Norton L.A., Proffit W.R., 1993; Norton L.A., Parker W.T., 1970; Oral Handbook, 1977; Polsen A.M., Heijl L.C., 1980; Stern N. et al., 1981; Rivers I.A., Richardson J.T., 1982; Gavrilov E.I., 1984; McNamara J.A., Jr., Brudon W.L., 1983;).

The following methods for eliminating secondary deformations are known:

- 1) hardware; 2) surgical; 3) by selective grinding of tooth crowns; 4) through prosthetics; 5) combined.

1. There is a wide variety of orthodontic appliances used for the prevention, treatment and preservation of the results of treatment of dentoalveolar anomalies. Some of them are used to correct secondary deformities. With the help of orthodontic appliances, which use pressure and traction forces, the teeth are returned to their original position (Gavrilov E.I., 1984; McNamara J.A.Jr., Brudon W.L., 1993; Proffit W.R., 1993; McNamara J.A., Jr., Brudon W.L. , 1993; Persia L. S., 1996).

When manufacturing and installing orthodontic appliances in the oral cavity, it is necessary to take into account the point of application of external forces, their strength and duration.

Forces applied tangentially cause the tooth to rotate. To move the tooth body in the horizontal direction, two parallel forces are used. A force applied to a tooth crown horizontally causes the crown to tilt in one direction, while the tooth root moves in the opposite direction (Proffit W.R., 2015).

A.M. Schwartz found that pressures of 15-20 g/cm² are optimal for orthodontic treatment, and they should not exceed blood pressure in the capillaries (20-26 g/cm²). At loads of 67 g/cm², traumatic pinching of the periodontium occurs. However, in clinical conditions it is almost impossible to measure the area of the periodontium that perceives pressure, therefore the magnitude of the developed loads is usually judged by the subjective sensations of the doctor and the patient. The patient should experience a slight feeling of discomfort, but not pain (Persii L.S., 1995).

To move deformed teeth, support is needed, the role of which is most often played by abutment teeth. To prevent movement of abutment teeth, the pressure on them should be 2-3 times less than on the teeth being moved, which is achieved by increasing the number of abutment teeth.

The duration of action of the devices is also significant. Active mechanical devices operate continuously, passive functional ones - for a short time, during the closure of the dentition. Some researchers believe that using small and intermittent forces is more appropriate.

The use of orthodontic appliances began in the last century, and for a long time it was believed that they could only be used to change the position of teeth in childhood, until the growth of the jaws and other bones of the facial skeleton was completed. However, by the 70s of our century, through the efforts of many orthodontists, including in experiments with animals, the possibility of orthodontic treatment in adults was finally proven (Richardson M.E., 1974; 1975; 1978; Uzhumetskene I.I., 1970; Kalamkarov Kh.A. et al., 1978; Shcherbakov A.S., 1987, etc.; Proffit W.R., 2013).

Dubivko S.A. et al. (1995) based on an analysis of 1135 medical records of adults who sought orthodontic care in 1991-1995. in clinics in Kazan give a picture of the effectiveness of treatment for various types of dental anomalies in them. Of the 1,135 applicants, 59.1% completed treatment with varying degrees of effectiveness. The largest percentage (about 55%) complete treatment for various types of dental position anomalies (palatal, labial displacement, etc.), about 1/3 complete treatment for malocclusions. Although the percentage of completed treatment for progenia was quite high (69.3%), the authors assess the

effectiveness of treatment as average or even low. One of the reasons for interrupting treatment was the inconvenience of wearing devices of complex designs. The smallest percentage of patients interrupt treatment when wearing Katz crowns, the highest when using the Basharova apparatus to treat prognathia. Patients also easily adapt and complete treatment when wearing plates with a vestibular arch and an inclined plane or with only a vestibular arch. The authors conclude that in adults, anomalies of dental position and progeny are the easiest to treat, while open bite and prognathia are the most difficult to treat.

Tilted lower molars are the most difficult to orthodontically correct, as they are awkwardly positioned, have large roots and require high pressure (Hood J. et al., 1975; Simon R.L., 1984).

Since treatment with orthodontic appliances creates increased functional stress in the periodontium of the teeth, the indication for treatment is the absence of pathological changes in the periodontium (Gavrilov E.I., 1984; McNamara J.A. Jr., Brudon W.L., 1993; Proffit W.R., 2013).

2. The surgical method for eliminating secondary deformities is based on the removal of deformed teeth, and sometimes resection of the alveolar process. The method is indicated for severe deformations, when all other methods are either unsuccessful or not indicated due to old age, or general diseases in which long-term treatment is impossible, and shortening the teeth will lead to their complete destruction. The method is also indicated for periodontal diseases, tooth decay, chronic periapical processes, if their treatment is impossible (Gavrilov E.I., 1984).

During the period of mixed dentition, the removal of individual teeth for orthodontic indications is recommended by F.Ya. Khoroshilkina (1970; 1982), G.K. Spatar (1984), V.P. Norkunaite and I.N. Minaeva (1995).

There is a report in the literature about surgical correction of the position of a molar inclined to the medial side, in which part of the bone was removed from the distal side of the alveolar process, and bone filings were introduced into the resulting defect from the medial side (Howard D.W. et al., 1976).

3. In case of mild vertical deformations, it is recommended to grind down the cusps or parts of the crowns of the displaced teeth without

depulping the teeth. In case of severe deformations, when it is necessary to grind down one third or even half of the tooth crown, depulping of the teeth, their shortening and covering with an artificial crown is indicated (Redtenbacher K., 1973; Ross J.F., 1974; Dental Handbook, 1977; Gavrilov E.I. , 1984).

Grinding down inclined lateral teeth without depulping to ensure parallelism of their walls was proposed by S.B. Askerov (1990) provided that the angle of inclination does not exceed 15°.

4. The prosthetic method is used to level the occlusion with the mesial inclination of the second and third lower molars. In this case, special removable or fixed prosthetic designs are used. Fixed structures are represented by bridge-like prostheses, the distal support of which on a mesially inclined tooth has the form of an occlusal overlay, inlay, “inlay in an inlay,” support-retaining clasp or ring. Removable structures are represented by small saddle-shaped prostheses, fixed with Ney system clasps. In case of mild vertical deformations and a decrease in the height of the bite on antagonistic teeth, the application of crowns is recommended (Gavrilov E.I., 1984; Kopeikin V.N., Demner L.M., 1985; Proffit W.R., 2013).

5. Quite often, treatment of secondary deformities is carried out using simultaneously various methods described above, sometimes supplementing them with physiotherapy.

The average duration of orthodontic treatment is 2-3 months for abnormal position of teeth (Romanenko L.G., 1974) and up to 2 years for narrowing of the dentition (Salkovskaya E.A., 1981), which leads to premature termination in approximately 30 - 56.6% of patients (Akodis Z.M., 1971; Demner L.M., Dubivko S.A., 1976).

To speed up treatment with orthodontic appliances, compact osteotomy is sometimes used. The principle of the operation is to remove a compact layer of bone over a certain extent, which weakens the resistance of bone tissue to the mechanical effects of the orthodontic apparatus. An inflammatory response to injury occurs in bone tissue, as a result of which demineralization of bone tissue occurs and reparative processes are activated, promoting the restructuring of bone tissue under

the influence of the orthodontic apparatus. The compact layer of bone tissue is perforated in the form of tapes (Gavrilov E.I., 1984), in a checkerboard pattern (lattice) (Titova A.T., 1983), or in a combined way (combination of tape and lattice) in the area of intersocket spaces, root tips teeth and buttresses. Orthodontic treatment begins 12-14 days after surgery (bone softening time) (Persii L.S., 1995).

To shorten the treatment time for dental anomalies and, in particular, secondary deformations, it is recommended to use a number of physiotherapeutic methods: vacuum stimulation (Sorokina L.V., 1974; Al-Khairi I.N., 1977; Kovalenko T.I., 1985, etc.), ultrasound treatment (880 kHz) (Novoselov R.D., Chumakov A.N., 1983; Chumakov A.N., Lavrikov V.G., 1988; Lyutik G.I., 1995), laser irradiation (Prokhonchukov A.A. et al., 1980; Lyutik G.I., 1995, etc.), vibration massage at a frequency of 50 Hz (Krishtab S.I. et al., 1986; Lyutik G.I., 1995), low-frequency vibration (1 kHz) (Flis P.S. et al., 1996), electromagnetic waves in the millimeter range and magnetic field (Stepulla V.I. et al., 1976), gum massage with a toothbrush or finger, combined finger massage with rubbing in medicinal substances (Persii A.S., 1995), etc., electrophoresis of lidase and ronidase (Tyupenko G.I., Androsova I.E., 1984; Ibragimov Kh.M., 1984), focal dosed vacuum in combinations with electrophoresis of a 2% lithium chloride solution for temporary reversible focal demineralization of bone tissue (Simanovskaya E.Yu. et al., 1995).

Prevention of secondary deformations. Considering that secondary deformations create significant difficulties for restoring the integrity of the dentition, there are proposals in the literature on measures to prevent them. Basically, it is proposed to immediately after tooth extraction carry out prosthetics with fixed dentures or use some devices to prevent the movement of teeth until the wound is completely healed (Stern N. et al. 1981; Rivers I.A., Richardson J.T., 1982; Kolos G.A., 1986 ; Proffit W.R., 2013).

O.G. Omarov (1988) suggests using removable dentures (preventive dentures) immediately after wound healing, before fixed prosthetics.

V.Yu. Kurochkin (1982) suggests conducting medical examinations of persons aged 16 to 35 years and, if dental defects are detected in them, recommending prosthetics.

It is known that sagittal anomalies of occlusion are manifested by various disorders of the structure of the facial skeleton, such as changes in the position and size of the jaws, anomalies of the dental arches, mainly in the sagittal direction. When planning orthodontic treatment and determining its prognosis, it is important to identify these disorders and take them into account during orthodontic correction of anomalies (Agajanyan S.Kh., 1985).

Studying the response of the dentofacial system (DS) to one or another impact allows us to plan adequate treatment and timely create conditions for the harmonious development of the maxillofacial system (Abolmasov N.G., 2010).

Orthodontic treatment of sagittal anomalies of occlusion without tooth extraction gained popularity in the second half of the twentieth century, when doctors began to pay attention not only to occlusion, but also to the aesthetics of the face as a whole (Averyanov S.V., Zubareva A.V., 2016; Espeland L., 2008), as well as pay attention to the characteristics of the growth, development and function of the ZES.

To correct sagittal anomalies of occlusion in non-growing patients, various types of orthodontic structures of mechanical action are used (Admakin O.I., 2006). New devices for the treatment of sagittal malocclusions, developed in recent years (Wilson, K Loop, Jonesjig, Locasystem, Pendulum), have a more effective mechanism for distalization of molars and minimize inconvenience for the patient. Clinical trials have proven the Distaljet device to be quite effective and comfortable for the patient, but movement of the frontal teeth due to loss of support was noted. According to R. Nanda, the method of distalization of the upper lateral teeth for sagittal anomalies using existing modern distalizing devices in 25% of cases is accompanied by protrusion of the upper anterior teeth. The noted partially negative result is difficult to correct and requires large material costs and time. All this was a prerequisite for analyzing the effectiveness of new devices and

systems for unilateral or bilateral mesiodistalization of the upper and lower lateral teeth without protrusive complications.

For the prevention, treatment and preservation of the results of treatment of dental anomalies, there is a wide variety of orthodontic appliances. Orthodontic appliances use pressure and traction to return teeth to their original position.

When manufacturing and installing orthodontic appliances in the oral cavity, it is necessary to take into account the point of application of external forces, their strength and duration. Forces applied tangentially cause the tooth to rotate. To move the tooth body in the horizontal direction, two parallel forces are used. A force applied to the crown of a tooth horizontally causes the crown to tilt in one direction, while the tooth root moves in the opposite direction.

The use of orthodontic appliances began in the last century, and for a long time it was believed that they could only be used to change the position of teeth in childhood, until the growth of the jaws and other bones of the facial skeleton was completed. However, by the 70s of the twentieth century, through the efforts of many orthodontists, including experiments with animals, the possibility of orthodontic treatment in adults was finally proven.

To move deformed teeth, support is needed, the role of which is most often played by abutment teeth. To prevent movement of abutment teeth, the pressure on them should be 2-3 times less than on the teeth being moved, which is achieved by increasing the number of abutment teeth.

The duration of action of the devices is also significant. Active mechanical devices operate continuously, passive functional ones - for a short time, during the closure of the dentition. Some researchers believe that using small and intermittent forces is more appropriate.

As a result of the scientific research carried out by Aripova G.E. (1998) compiled a table of inclinations of the dental axes of the lateral teeth in intact dentition for people with different types of faces in front and profile and found that people with a concave profile and a narrow type of face in the case of loss of their lateral teeth. A simple definition based

on the type of patient's face, drawn up in the work, will serve the purpose of preventing secondary deformations of the dentition.

The tables of inclinations of dental axes in intact dentition, depending on the type of face, compiled in this work allow us to more competently determine the tactics of medical intervention when eliminating secondary deformations of the lateral teeth (Botova D.I., 2018; Iordanishvili A.K., Soldatova L.N. , Kerimkhanov K.A., 2016).

Tilted lower molars are the most difficult to orthodontically correct, since they are inconveniently located, have large roots and require high pressure (Afanasyeva O.E., Arsenina O.I., Popova N.V., 2016). Since treatment with orthodontic appliances creates increased functional stress in the periodontium of the teeth, the indication for treatment is the absence of pathological changes in the periodontium (Kuznetsova G.V., Markaryan L.G., Kuznetsov D.A., Gunko O.V., Novitskaya A.D., 2016).

Elimination of secondary deformations by surgical method is based on the removal of deformed teeth, and sometimes resection of the alveolar process. The method is indicated for severe deformations, when all other methods are either unsuccessful or not indicated due to old age, or general diseases in which long-term treatment is impossible, and shortening the teeth will lead to their complete destruction. The method is also indicated for periodontal diseases, tooth decay, chronic periapical processes, if their treatment is impossible. During the period of mixed dentition, the removal of individual teeth for orthodontic indications is recommended by F.Ya. Khoroshilkina, I.N. Minaeva and others.

Knowing that secondary deformations create significant difficulties for restoring the integrity of the dentition, there are proposals in the literature on measures to prevent them. Basically, it is proposed to immediately after tooth extraction carry out prosthetics with fixed dentures or use some devices to prevent the movement of teeth until the wound has completely healed.

The prosthetic method is used to level the occlusion with the mesial inclination of the second and third lower molars. In this case, special removable or fixed prosthetic designs are used. For mild vertical

deformations and decreased bite height on opposing teeth, crowns are recommended.

S.S. Murtazaev (2005) identified specific radiological signs of crowded position of the frontal teeth and data on the dynamics of blood microcirculation and their compensatory capabilities in the periodontal tissues in the area of these teeth. They also determined the scope and sequence of preventive tactics of an orthodontist and a pediatric dentist to eliminate this pathology, including the elimination of harmful factors, separation, removal of temporary teeth, and step-by-step removal of teeth according to Hotz, followed by the use of orthodontic devices of various designs, aimed at regulating jaw growth.

Some authors suggest conducting medical examinations of persons aged 16 to 35 years and, if dental defects are detected in them, recommending prosthetics.

It is known that sagittal anomalies of occlusion are manifested by various disorders of the structure of the facial skeleton, such as changes in the position and size of the jaws, anomalies of the dental arches, mainly in the sagittal direction. When planning orthodontic treatment and determining its prognosis, it is important to identify these disorders and take them into account when orthodontic correction of anomalies.

S.A. Vasilevsky (2011) suggests using removable dentures (preventive dentures) immediately after wound healing, before prosthetics with fixed dentures. When planning orthodontic treatment and determining its prognosis, it is important to identify these disorders and take them into account when orthodontic correction of anomalies.

Congenital absence of teeth is a consequence of endogenous or exogenous errors in the implementation of the hereditary program of morphogenesis of dental tissues. Analysis of observations by V.A. Botsvadze (1962), V.I. Shilov and R.A. Musyakaeva (1971) allows us to think about the presence of a hereditary predisposition to the occurrence of primary adentia.

Normally, in the presence of the rudiment of teeth, during the period of their replacement, intensive growth of the jaws and alveolar processes occurs. Anatomical disorders of the maxillofacial region with edentia

depend on the number of missing teeth, untimely prevention and treatment of teeth during their replacement, which leads to morphological and functional changes and, as a consequence, the development of secondary deformations of the dentition. Edentia of the frontal teeth disrupts the child's speech, appearance and traumatizes his psyche. Such children become withdrawn, talk little, rarely smile (McNamara, Jr, 2006; Scarfe W., Farman A., Sukovic P., 2006).

Over the years, the problem of congenital adentia has been addressed by such prominent researchers as F.Ya. Khoroshilkina (1960), N.V. Bondarets (1990), N.A. Ryabukhin (1998), V.A. Distel (2001), L.S. Persin (2007) and others. The authors emphasize the features and complexity of anomalies, especially in children in the period of mixed dentition. In this regard, complex and combined treatment of children and adolescents with congenital absence of teeth remains relevant.

Thus, several conclusions can be drawn:

- There are isolated reports in the literature about the frequency of secondary deformations. The frequency of secondary deformities, according to different authors, also varies significantly, since surveys were carried out in different historical periods, in different countries, in different social and age groups of the population.
- The rate of development and clinical course of secondary deformations of the occlusal surface of the dentition depends on age. They develop very quickly and irreversibly at the age of primary and mixed dentition, and in youthful puberty they develop somewhat more slowly, and in older people they occur very rarely. This pattern should be taken into account when planning the prevention of deformities in all age groups.
- Secondary deformation of teeth and dentition refers to acquired anomalies in the development of the dental system and is formed already in the occlusion of temporary teeth, while various etiological (causal) factors play a large role in the development of secondary deformation of teeth, dentition and occlusion. Most often they develop due to the loss of lateral teeth during the period of active jaw growth (12-15 years).

- The hardware method is the main method of treatment, although surgical, prosthetic and combined methods are used much less frequently.
- Dental anomalies and secondary deformations in children are diverse and not eliminated in childhood lead to pronounced aesthetic and functional disorders. Combination treatment methods, including complex surgical methods, are discussed quite widely. Much attention is paid to the etiology, functional methods of research and treatment. However, in our opinion, not enough attention has been paid to instrumental methods without removing teeth, and to the peculiarities of treatment during the occlusion period of changing teeth.
- In the literature, we did not find scientific studies devoted to studies on the diagnosis of secondary deformations of the dentition using a computer program in children. This study is especially useful in the early treatment of anomalies and deformations of the posterior teeth in children during the period of mixed dentition.

Thus, the study of specialized literature has shown that the issues of diagnosis and treatment of anomalies of the dentoalveolar system are currently quite well studied. However, the problem of eliminating dentition deformations accompanying anomalies of the dentofacial system has currently received insufficient attention. This is primarily due to the fact that patients who seek orthodontic treatment are mainly young, who, as a rule, do not have tooth loss. At the same time, the clinic often encounters patients in whom anomalies of the dental system are accompanied by partial loss of teeth. In this regard, a secondary problem arises, which is the need for this group of patients, along with the correction of anomalies of the dentofacial system, to eliminate deformations of the dentition. As an analysis of the specialized literature shows, this problem is currently practically not discussed or is not given due attention, which, in our opinion, is due, first of all, to the lack of special treatment methods. This monograph is devoted to solving precisely this problem.

CHAPTER II.

PREVALENCE OF DENTAL ANOMALIES AND SECONDARY DEFORMATION OF THE DENTAL SYSTEM IN CHILDREN DURING THE PERIOD OF MIXED BITE IN TASHKENT CITY.

Studying the epidemiological situation and obtaining initial baseline data on the structure of pediatric dental morbidity in specific populations is the most important condition for the development and implementation of programs for timely prevention and early orthodontic treatment of childhood dental diseases (Averyanov S.V., Zubareva A.V., 2016; Grevtsova E. A. 2010).

In children of different ages, developing dental anomalies and secondary deformations have a much higher incidence of dental caries, gingivitis and poor oral hygiene are often observed. As the child grows, secondary deformations of the dental system, as a rule, intensify; their treatment becomes lengthy and usually requires the use of various orthodontic appliances and surgical interventions. Therefore, at present, no one doubts the importance and necessity of early diagnosis and treatment of dentoalveolar anomalies and secondary deformations, and this is only possible with regular follow-up of all children by a dentist.

This work is based on the analysis of the results of a mass dental examination of 505 children in the period of mixed dentition from 6 to 14 years old, attending a school educational institution in Tashkent. Of these, 232 (45.9%) were boys and 273 (54.1%) girls.

From among the examined (505) children, we selected 152 children (main group) aged from 6 to 14 years, including 73 (48.03%) boys and 79 (51.97%) girls, who underwent a complex of diagnostic, therapeutic and preventive measures.

The survey results were combined by age groups characterizing the period of occlusion formation and the main group was divided conditionally into 2 subgroups:

1st subgroup - early mixed dentition (6-9 years) - 70 (46.1%) children, of which 31 were boys and 39 were girls;

2nd subgroup – late mixed dentition (10-14 years old) – 82 (53.9%) children, of which 42 were boys and 40 were girls.

The comparison group (control) consisted of 69 children in the mixed dentition from 6 to 14 years old with physiological occlusion and the absence of anomalies and deformations of the posterior jaw, including 28 (40.6%) boys and 41 (59.4%) girls selected during professional examination of schoolchildren in Tashkent (see Table 1).

Table 1

Distribution of children by age groups and gender

Subgroups	Control group (patients with neutral occlusion)			Main group (patients with secondary dentition deformation)			Total/ %
	boys	girls	total	boys	girls	total	
1st subgroup (early mixed dentition)	12 / 17,4%	14 / 20,3%	26 / 37,7%	31 / 20,4%	39 / 25,7%	70 / 46,1%	96 / 43,4%
2nd subgroup (late mixed dentition)	16 / 23,2%	27 / 39,1%	43 / 62,3%	42 / 27,6%	40 / 26,3%	82 / 53,9%	125 / 56,6%
TOTAL	28 / 40,6%	41 / 59,4%	69 / 100%	73 / 48,0%	79 / 52,0%	152 / 100%	221 / 100%

Parents of the examined children signed an information consent to conduct a set of diagnostic studies over time, as well as to collect information for their distribution into the main and control groups (see Fig. 1).

Research material

<p align="center">Examined n=505 children aged 5 to 18 years</p>		<p align="center">An anomaly and secondary deformation of the joint joint were identified in n=304 children aged 5 to 18 years</p>	
<p align="center">Control group n=69 children at the age of 6 to 14 years (the period of occlusion of changing teeth) with physiological occlusion without pathological changes in the posterior jaw</p>		<p align="center">Main group n= 152 children aged 6 to 14 years (period of occlusion of teeth change) with secondary deformation of the posterior jaw</p>	
<p align="center">A subgroup n=26 children aged 6 to 9 years</p>	<p align="center">B subgroup n=43 children aged 10 to 14 years</p>	<p align="center">A subgroup n=70 children aged 6 to 9 years</p>	<p align="center">B subgroup n=82 children aged 10 to 14 years</p>

Pic. 1. Design of research material

Diagnosis of secondary deformation of the teeth and dentition was carried out on the basis of anamnesis, clinical examination, anthropometric examination of the face and oral cavity, TRG and orthopantomography of the jaws, and a biometric study of diagnostic sample models of the jaws.

All children underwent clinical, hygienic, anthropometric, biometric, photometric, radiological, functional and statistical research methods.

The examination of children was carried out selectively according to diagnosis, according to the chosen method before treatment and after orthodontic treatment and in the period 1-2 years after completion of active orthodontic treatment. Diagnostic studies and orthodontic treatment were performed at the department and clinic “Orthodontics and Dental Prosthetics” of the Tashkent State Dental Institute.

Clinical examination of children included standard research techniques. For all patients, examination cards were filled out, which included the

results of a clinical examination and data from additional research methods.

When interviewing parents, it is necessary to find out living conditions, the course of pregnancy, taking various medications, bad habits, the presence of injuries during childbirth, type of feeding, the presence of rickets or hormonal diseases in childhood that affect skeletal growth. Particular attention should be paid to obstructive and allergic diseases of the upper respiratory tract. It is necessary to find out the manifestation of the first signs of deformation of the facial skeleton, the time of pronounced growth and its final formation. It is also necessary to find out the results of orthodontic treatment and ENT surgeries in childhood.

When collecting anamnesis from children or from parents of children, they took into account the presence of complaints about poor chewing of food, incorrect positioning of teeth, deformation of a particular tooth and jaw, aesthetic disorders of the face and smile, etc.

Particular attention was paid to identifying etiological factors (the presence of bad habits, pathology of soft tissues surrounding the dentition, caries and its complications, unerased cusps of milk teeth, delayed loss and remnants of radix of milk teeth, loss of milk teeth early in their time and removal of permanent teeth due to caries and its complications, the presence of primary dentition, lack of preventive measures and timely prosthetics). We considered bad habits according to Okushko's classification.

When examining children with early mixed dentition, outpatient dental records and parent interviews were used to obtain this information.

Functional clinical tests were carried out according to L.V. Ilyina-Markosyan and assessed the dysfunction of the displacement of the lower jaw during dynamics and at rest.

The swallowing reflex, the ability to swallow a food bolus or liquid on command, or involuntary swallowing based on a planned time, was determined step by step. When determining respiratory function, nasal and oral breathing were determined.

In case of secondary deformations of the dentition in children during the period of mixed dentition, the degree of inclination and the degree of vertical change of the tooth were determined by us using the proposed method using a dental mirror with radial and horizontal marks. (Rationalization proposal No. 12 dated February 28, 2018) (see Appendix 1).

A dental mirror, which differs from a regular one in that two different lines are applied to the mirror surface of the dental mirror using a laser, differing in that some (4 lines) are applied along a horizontal line in 2 mm increments and the second is perpendicular to it radially (5 lines) located lines are 60 (degrees) apart. Using these lines, the inclination of the tooth and the severity of dental deformation in children were determined (see Fig. 2).

Our proposed method complements the diagnosis of occlusal relationships between the teeth of the upper and lower jaw.

When examining children with partial absence of teeth with forming secondary deformations, determining the degree of inclination of the tooth in the dentition towards the defect using a developed mirror was carried out as follows: in the oral cavity, an axis on the inclined tooth was marked with a marker, and the mirror in the oral cavity was positioned to the extent that it was possible to find one line at the level of the occlusal surface of a correctly positioned tooth (teeth), and another line with the possibility of positioning at the level of the occlusal surface of a tooth that has advanced, relative to the prosthetic plane, falling into the viewing area.



Pic. 2. Dental mirror to determine the degree of tooth deformation.

The developed examination technique makes it possible to optimize the process of determining the type and severity of dental deformations in the oral cavity and use the proposed method as part of a mass preventive dental examination of children.

When determining the severity of secondary deformation in children, the classification of I.Yu. Lebedenko.

The final diagnosis was made after the use of additional research methods: anthropometric (biometric measurement of jaw models), radiological (orthopantomography, teleradiography in the direct and lateral directions), photometric studies of the face, functional research methods (occlusiography, in the articulator and determination of chewing efficiency).

When examining children, we paid special attention to identifying etiological factors (the presence of bad habits, pathology and anomalies of soft tissues surrounding the dentition, caries and its complications, unworn cusps of milk teeth, surgical procedures, delayed loss of milk teeth, early loss of milk and permanent teeth, lack of timely prosthetics), since their consideration and timely elimination are the main principles of prevention aimed at preventing the occurrence and development of dentoalveolar anomalies and secondary deformations. We considered bad habits according to Okushko's classification.

To diagnose secondary deformation of the posterior jaw and to determine the clinical severity of infra- and supra-occlusion of teeth, tooth inclination in the dental arch and their mesio-distal movement, we proposed the use of dental mirrors with horizontal and radial marks.

Horizontal marks in the mirror are distinguished by the fact that horizontally directed lines are applied to it, while drawn parallel to the handle and located at a distance of 2 mm from each other. Determination of the degree of clinical severity of tooth protrusion, i.e. Infra- and supra-occlusion of teeth using our device is carried out using a clinical method: selectively in the oral cavity with a diagnosis of secondary deformations, a mirror was placed on the same line and at the level of the occlusal surface of a correctly, normally standing tooth (teeth), and another adjacent line with the possibility of being positioned at the level the occlusal surface of a tooth that has protruded due to deformation relative to the prosthetic plane and falls into the viewing area.

This determined in millimeter measurements the clinical severity of the advancement of the occlusal surface of the deformed tooth relative to this measuring prosthetic plane.

Using the proposed method, we detected tooth protrusion relative to the prosthetic plane in 8.3% of examined children with mixed dentition.

The clinical severity of the inclination of a tooth in the dentition in the direction of a defect in the dentition in case of secondary deformations was determined using a dental mirror with a radially directed mark, which was horizontally applied to the mirror surface with linear marks located parallel to the handle, a line perpendicular to it and lines located at a radial distance marked 6° apart.

Determination of the severity of the clinical degree of tilt of a tooth in the dentition towards the formed defect was carried out as follows: with a marker, an axis was drawn on the deformed tilted tooth, and then a mirror in the oral cavity was positioned with optimal opportunity and horizontal lines were found, the radial direction was positioned to coincide with the axis of the tooth, and the more pronounced deviation of the tooth axis was shown in degrees.

During school dental preventive examinations, we identified secondary deformations, displacement of the tooth towards the extracted tooth: in the radial direction 6 degrees in 17.6% of those examined, 12 degrees in 13.1% and 18 degrees in 7.3%. The vertical dentoalveolar elongation was 2 mm in 9.1% of those examined, 4 mm in 5.1%.

To create a more stable algorithm for dental orthodontic treatment of children with mixed dentition, it became necessary to modify the classification of dentition deformation by I.Yu. Lebedenko (2007). During the school preventive mass preventive examination of children in the period of mixed dentition, this classification allowed us to conditionally distribute them into groups, depending on the severity of the clinical diagnosis of secondary dentition deformations in children and the development of the formative pathological process, for planning and determining the optimal preliminary plan treatment. We used the classification of dentition deformations according to I.Yu. Lebedenko (2007).

Using dental mirrors with horizontal and radially directed marks, the clinical severity of vertical extension, infraocclusion, extraocclusion or tilt of the tooth in the dentition in children with mixed dentition was determined. All examined children were divided into one group or another based on the degree of clinical severity of the development of secondary dental deformations (mild, moderate, severe). The most pronounced clinical picture was considered to be in one examined child during a mixed dentition in the presence of edentia of several teeth with a deformed position in the dentition. For each group of children with mixed dentition with varying clinical severity and severity of pathology, an appropriate algorithm for preliminary and planned treatment, including orthodontic treatment, was developed. As well as the volume of dental treatment in order to eliminate deformation of the dentition for subsequent rational prosthetics to prevent secondary deformations.

The results of clinical and additional studies of the dental system of 505 children aged 6-14 years attending school educational institution No. 18 of the Mirzo-Ulugbek district of Tashkent showed that out of the 505 children examined, 314 (62.2%) varieties of bad habits were identified, of which of which impaired nasal breathing in 48 (9.5%) children,

speech impairment in 64 (12.7%) children, chewing disorder (one-sided chewing) in 57 (11.3%) children and biting on foreign objects (objects) in 46 (9.1%) children (see Table No. 2).

Table 2

Prevalence of bad habits among children 6-14 years old

№	Bad habits	Age group							
		1-group (6-9 years old)			Group 2 (10-14 years old)			Total	%
		N	M	D	N	M	D		
1.	Mouth breathing	25	14	11	23	18	5	48	9,5
2.	Infantile swallowing	22	13	9	14	8	6	36	7,1
3.	Chewing disorder (unilateral chewing)	26	14	12	31	16	15	57	11,3
4.	Speech impairment	43	24	19	21	9	12	64	12,7
5.	Bad habits of sucking objects	18	11	7	12	5	7	30	6,0
6.	Biting foreign objects	34	19	15	12	6	6	46	9,1
7.	Putting your hand on your cheek while sleeping	14	8	6	19	8	11	33	6,5
TOTAL		182	103	79	132	70	62	314	62,2

Note: N – total children; M – boys; D – girls

Of the examined 505 children with mixed dentition, malocclusion was detected in 323 (63.9%) of the examined, among them prognathic occlusion was more often diagnosed in 99 (19.6%) children, of which 53 (10.5%) in 1 group of children and 46 (9.1%) in group 2; deep bite in 51 (10.1%), of which 24 (4.8%) and 27 (5.3%), respectively, as well as progenic bite in 41 (8.1%) children, of which 24 (4.8%) and 17 (3.4%), respectively, for the surveyed groups.

The prevalence of various types of malocclusion in children with mixed dentition is presented in Table No. 3.

Table 3

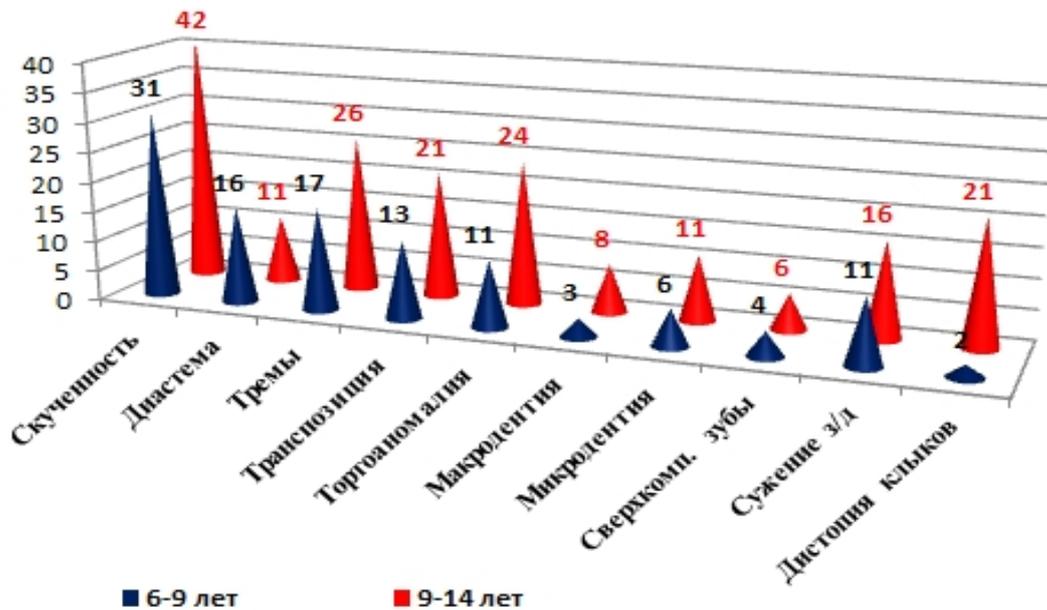
Prevalence of various types of malocclusions in children with mixed dentition

№	Malocclusion	Age group						Total	%
		1-group (6-9 years)			2-group (10-14 years)				
		N	M	D	N	M	D		
1.	Upper prognathia	53	28	25	46	25	21	99	19,6
2.	Prognathic ratio	12	7	5	27	13	14	39	7,7
3.	Progenia (lower prognathia)	24	11	13	17	9	8	41	8,1
4.	Progenic ratio	25	11	14	10	5	5	35	6,9
5.	Deep bite	24	13	11	27	12	15	51	10,1
6.	Open bite	13	7	6	18	10	8	31	6,1
7.	Crossbite	16	7	9	11	6	5	27	5,4
Total		167	84	83	156	80	76	323	63,9

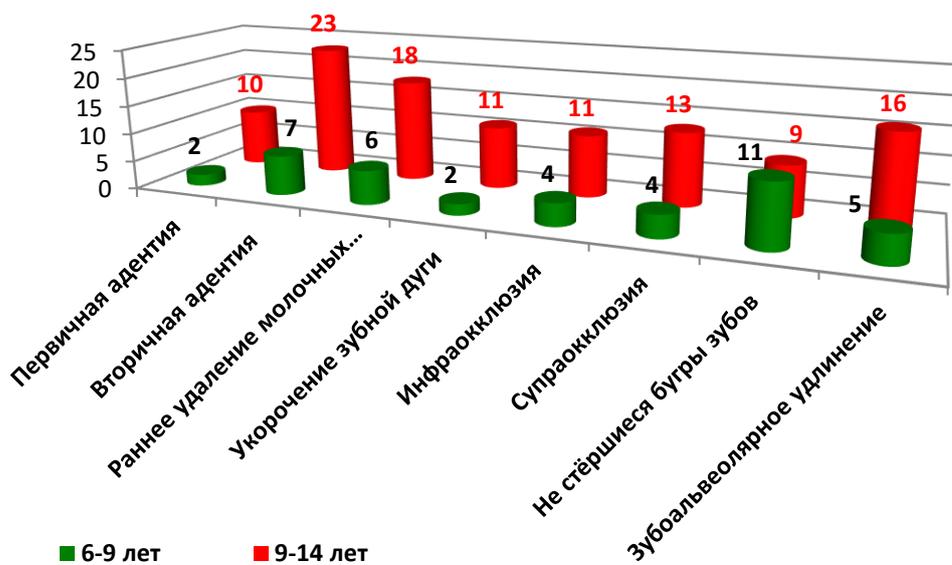
Note: N – total children; M – boys; D – girls

The prevalence of anomalies in the position, number of teeth and anomalies of individual teeth in children with mixed dentition is presented in Fig. 3. Of this group, the most common anomalies were crowding of teeth and dentition in 73 (14.5%) cases, transposition of teeth - 34 (6.7%), gaps between teeth - 43 (8.5%), diastema - 27 (5.3%), tortoanomaly - 35 (6.9%), etc. Of the 505 children examined, 152 children were found to have secondary deformations of the dental system, this accounted for 30.09% of children with mixed dentition. It should be noted that one child had several types of spinal joint

deformities, and we included them in the group according to the severity of a particular deformity. Among them, the most common deformations of the posterior teeth were due to: secondary adentia in 30 (5.94%) children, early removal of milk teeth - in 24 (4.75%), unworn cusps of milk teeth - in 20 (3.96%) and dentoalveolar lengthening – in 21 (4.16%) children with mixed dentition (see Fig. 4).



Pic. 3. Prevalence of anomalies in the position, number of teeth and anomalies of a group of teeth in children with mixed dentition



Pic. 4. Prevalence of secondary deformations of teeth and dentition in children with mixed dentition

The results of a survey of schoolchildren in Tashkent and their analysis show that the prevalence of anomalies and deformities in children with mixed dentition is very high and, according to our data, is 63.9%. But, despite the high prevalence of anomalies and deformations of the teeth, dentition and bite, the provision of dental care, including orthodontic care, to these children is not high and amounts to only 6.93% (see Table No. 4).

Table 4

Data on the presence of orthodontic appliances in the oral cavity

Age group	Number of children	Availability of orthodontic appliances					
		Absolute number			%		
		M	D	N	M	D	N
6-9 years	211 (103m+108d)	5	8	13	0,99	1,58	2,57
9-14 years	294 (129m+165d)	15	7	22	2,97	1,39	4,36
Total	505 (232m+273d)	20	15	35	3,96	2,97	6,93

Note: N – total children; M – boys; D – girls

In each selected age group, depending on the type of intended pathology, an individual selection of preventive and therapeutic measures was carried out. To instill further hygienic skills that contribute to the healthy state of the oral cavity, reports and conversations were held with children about oral hygiene and caries prevention. Children are taught how to properly brush their teeth.

All examined children, depending on the condition of the hard and soft tissues of the oral cavity, the presence of a speech defect, and the degree of nasal breathing impairment, were referred for consultation and treatment to appropriate specialists.

Of those examined, 86 children underwent sanitation of the oral cavity, 12 had temporary partial dentures made, 19 had various orthodontic appliances made, 38 had myogymnastics prescribed, 15 had grinding of the cusps of milk teeth, 11 children had frenulum correction, 14 children - removal of the roots of baby teeth and 8 - sanitation of ENT organs.

A significant number of children examined had combinations of anomalies and position of the teeth with secondary deformations and occlusion pathology, as well as the presence of several types of occlusion anomalies simultaneously.

Among them, the most common deformations of the posterior teeth were due to secondary adentia in 30 (5.94%) children, due to early removal of baby teeth - in 24 (4.75%), due to unworn cusps of baby teeth - in 20 (3, 96%) and due to dentoalveolar lengthening - in 21 (4.16%) children with mixed dentition (see Table 3.4).



Pic. 5, 6. There was a loss of support, 6!6 teeth moved mesially, the closure of 1 molar was disrupted

Early loss of primary and permanent chewing teeth over time in children in the period of mixed dentition led to mesial displacement of the lateral group of teeth, and subsequently to crowding of the anterior teeth (see Fig. 5-6).

The largest group of posterior dentition deformities in children with mixed dentition was due to secondary adentia - in 30 (5.94%) children. Depending on the number of missing teeth and the nature of the malocclusion, all those examined by us were conditionally divided into 5 groups.

The 1st group consisted of 10 (4 boys and 6 girls) children with primary adentia, who retained a temporary tooth in the area of the missing permanent tooth rudiment. In these children, as a rule, the bite was not disturbed. Children were taken to the dispensary and, in case of loss of a temporary tooth, the dentition defect was replaced with temporary removable dentures.

The 2nd group consisted of 10 (5 boys and 5 girls) children with edentulous permanent teeth with no defect in the dentition due to medial displacement of adjacent teeth. In the absence of lateral incisors, adjacent canines, moving, erupted medially and filled their place. With symmetrical primary adentia, as a rule, children did not experience severe cosmetic deviations, there were no gross malocclusions, and, therefore, there was no need for orthodontic treatment (see Fig. 7-8).



Pic. 7. Child K. 13 years old.
With primary edentia 32 teeth

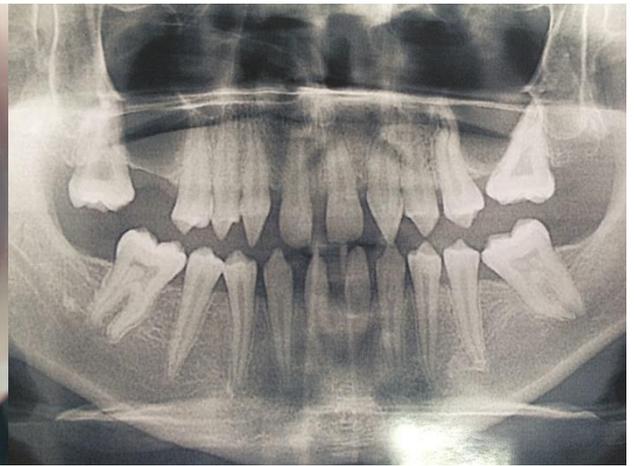


Pic. 8. Orthopantomography
of the same patient.

The 3rd group consisted of 10 (4 boys and 6 girls) children with partial primary adentia and malocclusion (see Fig. 9-10). Patients in this group were initially prescribed orthodontic treatment, depending on age and type of pathology, and completed with children's preventive prosthetics in order to prevent secondary deformations of the dentition.



Pic. 9. Child D. 14 years old, primary adentia of 12,22,32,42 teeth



Pic. 10. Orthopantomography of the same patient

After appropriate orthopedic and orthodontic treatment, secondary deformation of the dental system was reduced and prevented.

In order to prevent the development of changes in the dental system, children were treated early with the help of dentures of various designs, made taking into account the active growth of the facial skull.

Therapeutic measures were chosen not only depending on the age at which the pathology was diagnosed, but also took into account the degree of formation of the masticatory apparatus and the severity of clinical manifestations. Children of the 1st group were registered with an orthodontist, and after the loss of a temporary tooth, preventive dentures with artificial teeth were made. From the 3rd group of children, orthodontic treatment was first carried out with removable and fixed appliances, taking into account the clinic and age of the child, anomalies of the dentoalveolar system and emerging secondary deformations of the dentition were prevented, normal conditions for prosthetics were created and then prosthetics were carried out with partial removable dentures.

Analysis of data in the mixed dentition by age period allowed us to confirm the presence of a direct correlation between primary adentia and the formation of secondary deformations of the dentition.

Treatment for primary adentia depended on the number of missing teeth and the type of malocclusion that arose against the background of this pathology.

Thus, it should be noted that after examining children and providing them with appropriate dental care, in 80.4% of children, secondary deformations of the dental system in the mixed dentition were eliminated and prevented.

The hard tissues of baby teeth are sometimes more resistant and are not subject to abrasion, and this is an indispensable reason for the uneven course of the process of their physiological abrasion by the time they are replaced by permanent teeth in children in the period of mixed dentition. Most often, non-wearable cusps of the primary canines were observed, which over time were replaced later by the incisors and chewing teeth.

In the mixed period of occlusion in children, disruption of the wear of the crown part of temporary (baby) teeth is most often the etiological factor in the development of secondary dentition deformations in children. According to research by E.S. Bimbas, a disorder of untimely wear of primary teeth, occurs in every third child encountered with primary and early mixed dentition.

Impaired wear of temporary canines leads to: transversal disorders (asymmetry of the face and dental arch, dysfunction and retro position of the articular head of the TMJ), exo- and endo-occlusion, forced position of the lower jaw, skeletal disproportion in the size of the jaws, etc.

Due to the non-erased cusps of primary teeth, as a result, clinical conditions arise for the occurrence of malocclusions with displacement of the lower jaw (mesial and crossbite), which undoubtedly interfere with chewing food and at the same time the chewing function of the dentoalveolar system is disrupted. Highly located cusps along the modified shape of the lower primary canines can also promote and develop the palatal eruption of the permanent upper second lateral incisors.

Under our observation, unworn cusps of primary canines in children during the period of mixed dentition were found in 20 (3.96%) examined. In 11 (55.0%) they were clinically combined with progeny or occlusion disorder. The high prevalence of progenic occlusion was, at its optimal time, the canines that were not naturally ground down are longer than the incisor teeth, and very often they do not allow the child to bite

food normally, and the child is forced to move the lower jaw forward, as a result of which, at the stage of the primary and mixed dentition, the formation of forced position of the lower jaw with signs of mesial occlusion.

In 4 (20.0%) children, distal occlusion was detected during the period of mixed dentition. On the upper jaw, the presence of high cusps of temporary primary canines does not allow the normal closure of the dentition, and based on this, the distal prognathic position of the lower jaw is most observed. A long-term forced position in the retropositional direction of the lower jaw spontaneously leads to the formation and development of distal occlusion.

Transverse malocclusion, namely, unilateral exocclusion with displacement of the lower jaw, was detected in 5 (25.0%) children. In 3 (15.0%) of them, the cause of crossbite was a direct violation of the physiological abrasion of primary teeth. At the same time, transversal malocclusions were observed more often, namely unilateral exocclusion with displacement of the lower jaw; these children have a very stable, stable, persistent habit of shifting the lower jaw to the side and this will lead to the formation and restructuring of the function of selective masticatory muscles, a change in the relationship of the elements of the temporo- mandibular joints, the formation of a crossbite and mismatched facial symmetry.

In early mixed dentition from 6-9 years of age, these disturbances often lead to the adaptation of a new formative dynamic stereotype of the chewing reflex, as a result of which the concentration of chewing pressure on the growing bone tissue always changes, and further development of disturbances in the shape of the dental arches and the configuration of the face in symmetry (see. Fig. 11-12).



A

B

Pic. 11. Patient Sh., 9 years old. Facial asymmetry (a) and crossbite (b).



Pic. 12. Panoramic radiograph of patient Sh.

The examined children with reduced abrasion of primary teeth were started in a planned manner by eliminating the cause, i.e., the cusps of primary canines or other teeth were ground down in a timely manner, and after the orthodontic grinding procedure, two-stage fluoridation of tooth enamel was always carried out to prevent caries and its complications.

Sometimes, due to the need to reduce a large volume of hard tissue of temporary canines, the procedure was performed in 2-3 visits. After all, if self-regulation of occlusion did not occur in children with mixed dentition, then treatment with orthodontic appliances was mandatory.

In our study, unworn cusps of primary canines were more common than other pathologies of primary dentition and mixed dentition and were detected in 3.96% of children from the total number of those examined. Violation of row abrasion in children during the period of mixed dentition. temporary primary canines is certainly a factor predisposing to the formation of secondary deformities. Often, when the abrasion of primary canines is impaired, the most common causes are progenic bite and transversal occlusion, which is characteristic of crossbite.

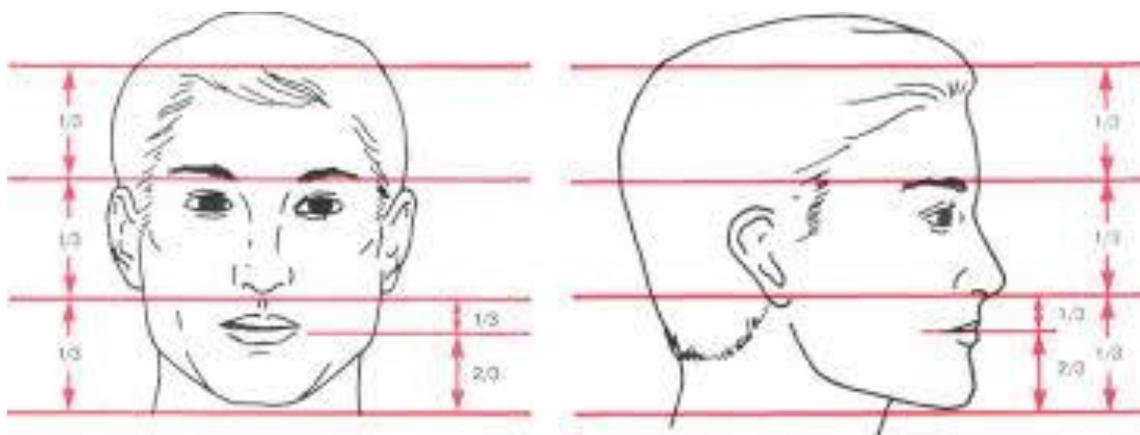
Timely grinding of temporary canines is a measure and stage of primary prevention of dentoalveolar anomalies and dentition deformations in children during the formation of a mixed and permanent dentition.

CHAPTER III.

Assessment of the severity of secondary deformation of the dental system in children during the period of mixed dentition.

3.1. Anthropometric features in examined children with dentofacial anomalies and secondary deformation of the dentofacial system.

When examining patients, anthropometric data of the facial area and the severity of nasolabial and chin folds were determined. The condition of the teeth and their periodontium, dentition were assessed, and the height and type of bite were determined (see Fig. 13).



Pic. 13. Determination of facial anthropometric data

To determine the nature of deformations of the dental arches, malocclusions and planning the upcoming complex treatment, jaw models were subjected to biometric study. For each patient, 2 pairs of plaster diagnostic jaw models were made. The first pair after installation in the articulator was used to determine the nature of the malocclusion; the dimensions of the dental arches and the magnitude of their sagittal, vertical and horizontal discrepancies were measured. We paid attention to the size and shape of the teeth, the deviation of their axes from the axes of the jaws, the width and shape of the dental arches and their symmetry. In addition, the mesial and distal displacement of individual or group of teeth, the shape and depth of the palate were determined.

The height of the alveolar processes was measured in different parts of the jaws. To measure the width of the dental arches in the area of the first premolars and molars, the technique proposed by Pont (1907) was most often used. When determining the individual norm, we used the Pont index table with amendments by Linder and Harth.

Anthropometric methods were carried out by our own research by measuring the biometric parameters of diagnostic jaw models. “A program for assessing the calculation of the required space for permanent chewing teeth in the lateral region of the dentition in children with mixed dentition according to the Tanaka – Johnston index (Ortodont-TJ.exe)” (UzR Patent No. DGU 05748) and “Cephalopro” computer program for diagnostics and programming anomalies of the dental system” (UzR Patent No. DGU 05626), which were used to diagnose and predict secondary deformation of the dentition in children (see Appendix No. 2 and 3).

The software product “Ortodont.exe” is intended to determine the calculation of the required space for permanent chewing teeth in the lateral region of the dentition to predict the width of permanent third canine teeth and small chewing lateral premolar teeth to determine the lack of space in the dental arch of the upper and lower jaw. The method is used only in mixed dentition.

Functionality and technical characteristics: the software product allows you to determine the method of planned orthodontic treatment depending on the degree and severity of dental arch deformation and anthropometric indicators of the upper and lower model obtained from a child of the appropriate age. The support zones were measured sectorally (the distance between the contacts of the lateral incisor and the mesial contact of the canine, the mesial contact of the first permanent large chewing tooth and the distal contact of the second primary molar). The software product consists of 1 module “Ortodont.exe”. The type of implementing computer is IBM Pentium. Operating system – Windows 7. Programming language – Visual Basic 6.0. The volume of information is 114.69 Kb.

Analysis of the results of a study of diagnostic models of the jaws of children in the period of early and late mixed dentition confirmed the

data of a subjective and objective clinical examination and its time to identify in detail violations of dental anomalies of the dentition, dentoalveolar arches, secondary deformations, the position of individual teeth and the relationship of the dentition.

Diagnostic models of jaws before treatment in children in the period of early mixed dentition; the results obtained indicate that in children in this period pathology in the sagittal and transversal plane was formed in 38% + 2.35 cases, and in children in late mixed dentition 46% + 3.32.

When studying separately the frontal and lateral segments of the dentoalveolar arch, 65% of children with late mixed dentition were found to have a lack of space for permanent chewing teeth in the upper jaw, and 54% in the lower jaw. The location of the canines and small chewing teeth and the specific inclination of the tooth axes to the medial side is due to the underdevelopment of the dentoalveolar arches in the plane in the transversal direction.

Secondary deformations of the dentition are often characterized by an asymmetrical narrowing of the dentition and asymmetrical tooth arrangement. In this regard, it is advisable to use additional biometric measurement methods that determine the degree of narrowing in the frontal or lateral sections, and the asymmetry of the dentition.

We have determined a statistically significant one-sided discrepancy in the location of the upper premolars in the sagittal and transversal directions in the early and late mixed dentition using the Tanaka Johnson method.

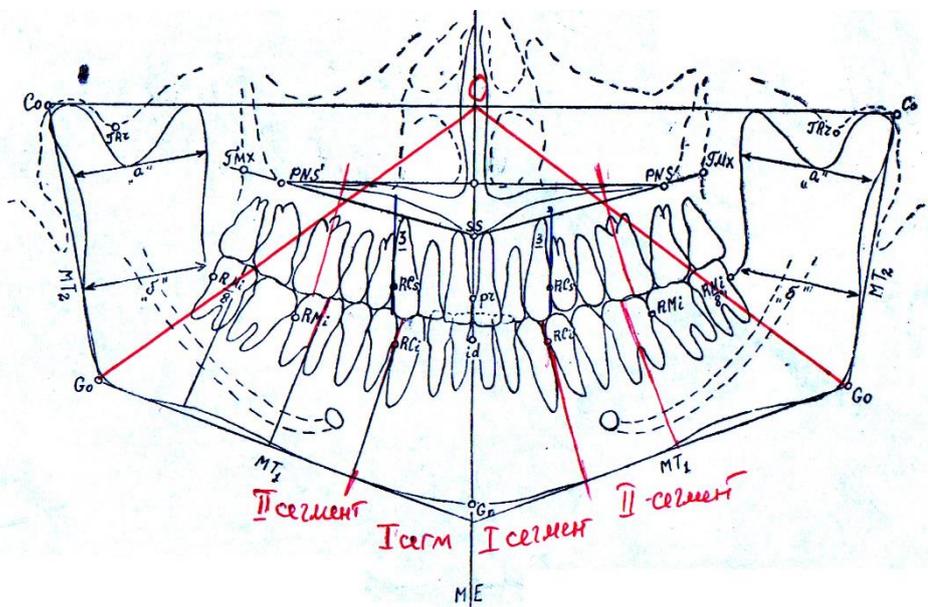
3.2. X-ray and photometric data in children with secondary deformity of the spinal joint.

We studied orthopantomograms of 221 jaws. Of these, 69 children had a neutral dentition (control group) and 152 children with secondary dentition deformations during the period of mixed dentition (main group).

A method has been developed for the sequential study of orthopantomograms of the jaws with secondary deformation of the

dentition and a diagnostic card for recording the obtained data and their evaluation (Fig. 14).

The position of the teeth in the sagittal and vertical planes was measured not in millimeters, but in degrees. In the vertical plane, the zygomatic arches and orbits were vertical criteria for us, since they are considered stable bony structures that do not change during orthodontic treatment. The position of the teeth in the sagittal plane was used as a reference point. A marker was used to draw lines and angles.



Pic. 14. Scheme of an orthopantomogram of the jaws with designations of points and lines for studying the structure of the dentofacial system.

We used direct (antero-posterior) telerradiography of the head to study the dimensions of the skull in the transverse and vertical directions, determine the discrepancy between the right and left sides of the halves of the face, dental arches, the displacement of the interincisal centers of the dental arches, the discrepancy between the interincisal centers with the middle measuring line of the face, the presence or absence changes in the tooth along the axis of the occlusal and mandibular planes, changes in the inclination of some teeth, asymmetry in the size of the dentition. She allowed us to correctly diagnose, draw up a treatment

plan, and also conduct a differential diagnosis with dentoalveolar and gnathic forms of occlusion anomaly.

Due to the wide variety of parameters for analyzing teleroentgenograms in frontal projection, in practice it is not possible to standardly determine all variants of existing analyzes. Therefore, facial discrepancies often go undiagnosed and are not taken into account when planning planned orthodontic treatment for PCA.

The material for our study was a dental examination of 32 children (14 of them boys and 18 girls) aged 6 to 14 years in the period of mixed dentition, with secondary deformations of the dentition with a displacement of the interincisal center line towards the defect. To determine the symmetry of the dentition or asymmetry, as well as the presence of mesial shift of the lateral group of teeth with TMJ deformation, we used the method of teleradiography (TRG) of the skull in a direct projection. The obtained direct teleroentgenograms were subjected to further study using a negatoscope. The parameters were assessed by performing an X-ray cephalometric analysis of the direct direction of the TRG of the skull of children according to the methods of A.B. Slabkovskaya (2010).

On the TRG, the median (vertical) plane was used as the main lines, as well as the horizontal planes formed by connecting the points Lo-Lo (intersection of the orbits), Co-Co (the most lateral measuring points on the articular heads of the lower jaw), Zy-Zy (the most lateral points on the zygomatic arches), Mx-Mx (points on the outer contour of the alveolar process of the upper jaw), Go-Go (angles of the lower jaw), etc. To measure angular and linear values, the point of intersection of the medial plane with the orbital was found. After it was connected to points Go, Zy, Zy, Go and others, the sides of the resulting triangles and their angles were measured.

The relative position and degree of deviation (asymmetry) of the interincisal center lines on the TRG in the forward direction were assessed relative to the sagittal and midline (MRS measuring contour). It was performed between the tip of the cockscomb (Cg) and the anterior nasal spine (ANS).

Pearson's coefficient of asymmetry (CA) is used as an indicator of mismatch. If $KA > 0$, skew on the right side, if $KA < 0$, skew on the left side; if $KA = 0$, the variation series has symmetry. The Cephalopro computer program for diagnosing and programming anomalies of the dentofacial system allows us to quickly decipher TRG, draw up a treatment plan, and compare X-ray images before and after orthodontic treatment. Significantly reduces the time required for the tedious and time-consuming task of creating cephalometric markings and related analysis lines. Makes it possible to predict changes in the patient's facial profile as a result of orthodontic treatment (see Fig. 15).

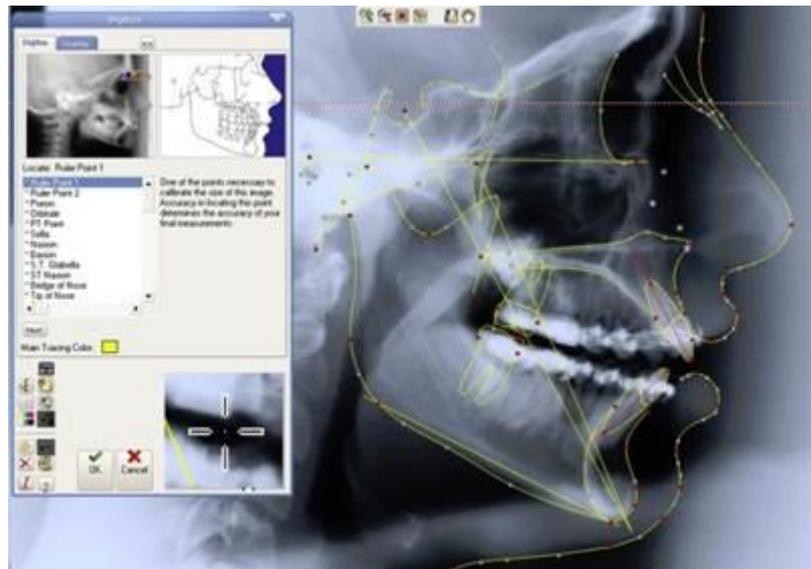
TRG analysis in lateral projection includes the following methods: Ricketts, McNamara, Steiner (Tweed), Jarabak, Roth, Sassouni, McLaughlin, Downs-Northwestern, Bjork, Alexander, Holdaway, Alabama, Burstone, Gerety and others.

This program includes a calculation, which is a set of the most basic, informative and most frequently used parameters by doctors.

Pearson's coefficient of asymmetry (CA) is used as an indicator of mismatch. If $KA > 0$, skew on the right side, if $KA < 0$, skew on the left side; if $KA = 0$, the variation series has symmetry.

In the transversal measuring forms and sizes of the skull base in children and the fixed upper jaw, the coefficient of symmetry mismatch was based on the presence of a slight mismatch of symmetry in the structure of the skull at the early stage of the formation of the articular form of the transversal anomaly and violation of occlusion.

Statistically significant differences were determined in dimensional parameters characterizing the transversal direction and at the same time the dimensions of the dentition of the upper and lower jaws were obtained (L6-MRS = 3.1; U6-MRS = 2.5), as well as transversal dimensions from the midsagittal line to the articular processes of the lower jaw (CD = 1.7), which can indicate the presence of asymmetry in the structure of the skeleton of the body of the lower jaw and changes in the location of the alveolar processes of the jaws. The sizes of the branches of the lower jaw on the right and left sides differed slightly (Co-Ag = 0.3 mm; J-Ag = 0.01 mm).

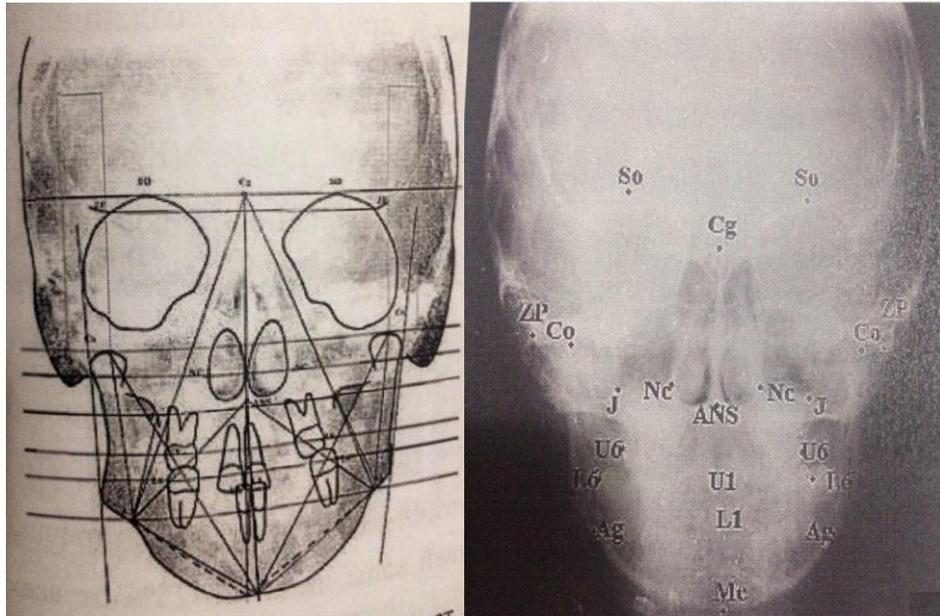


Pic. 15. Analysis of TRG in lateral projection using the “Cephalopro” program

As a result of the clinical examination and radiocephalometric analysis of direct teleroentgenograms, the children were selectively divided into three groups based on the degree of displacement of the interincisal center line towards the defect (see Fig. 16).

Group 1 included 16 (50.0%) children whose direct teleroentgenograms showed the first degree of displacement of the interincisal central line (from 0° to 3°). The 2nd group consisted of 10 (31.25%) children with II degree of displacement of the interincisal central line (from 3° to 5°). The 3rd group was represented by 6 (18.75%) children in whom the third degree of displacement of the interincisal frontal line towards the defect was detected (from 5° and above).

As can be seen from the above figures, the discrepancy in symmetry can be easily determined by eye visually by the appearance of the outlines of the lines. With asymmetry on the left of the dental arch relative to the center of the distribution, a long left-sided branch of the distribution curve was observed and, while with asymmetry on the right, the right branch of this curve was observed.



Pic. 16. Contours of TRG of the skull in a direct projection with point parameters of X-ray cephalometric analysis on the diagram (left) and teleröntgenogram (right).

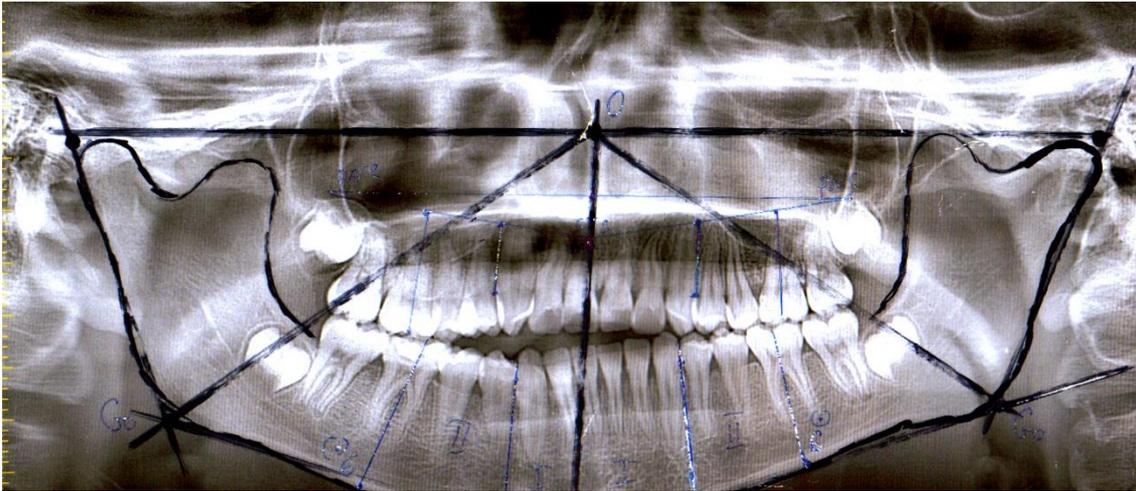
We studied orthopantomograms of 221 jaws. Of these, 69 children had a neutral occlusion (control group), 152 children with secondary dentition deformations during the period of mixed dentition (main group).

During the study, anatomical points were marked on the orthopantomogram and connected with lines. Orthopantomograms were drawn on a negatoscope using well-sharpened pencils and transparent squares; For measurements, a caliper, a meter, a transparent square with millimeter divisions, and a protractor were used.

Determined:

- dimensions of the lower jaw: body MT1 (points Gn-Go) and branches MT2 (points Go-Co) on the right and left sides;
- dimensions of the mandibular angle Go, formed by continuous lines TM1 and MT2;
- the width of the branches of the mandibular jaw in the upper section (a) and lower section (b);
- dental alveolar height of the maxillary and mandibular jaw in the anterior and lateral sections;

- the length of the body of the upper maxillary jaw on the right and left continuously between the SS-SNP points;
- incisal angle of teeth to the midline;
- the degree of discrepancy between the symmetry of the upper and lower dental rows based on the ratio of the midlines was determined by 1 and 2 segments on the right and left sides (see Fig. 17).



Pic. 17. Orthopantomogram of patient Abdulkasymova M., 13 years old. D-z: Secondary deformation of the dental arch and displacement of the center.

The obtained digital results of the segments for this patient are shown in Table No. 5.

Table 5

The degree of mismatch in the symmetry of the dentition in relation to the midline

(1 and 2 segments on the right and left), in mm.

Parameters		Segment on the left	Segment on the right	Difference
1 segment of the	upper jaw	20	24	4
	Lower jaw	15	27	12
2 segment of the	upper jaw	15	12	3
	Lower jaw	33	25	8

In order to determine the similarities and differences in the formation of the dental system of boys and girls of the same age, the data obtained from all examined patients were compared. Analysis of the data shows that the sizes of Co-Co: MT1, SS-TMx, SS-Gn, Go-Go in girls in the early mixed dentition are significantly smaller than in boys. The dimensions of MT2, the width of the branches of the lower jaw - "a", the angles of MT2-MT1 and MT1-MT1 in boys in the late mixed dentition are greater than in girls.

When comparing data in boys with an early mixed dentition with a late mixed dentition, it was revealed that with age, in any comparison, the sizes of MT2, SS, PNS-PNS, SS-Gn increase - as there is a growth of the branches of the lower jaw and dentoalveolar elongation in the frontal and lateral areas of the upper jaw. jaws.

Comparison of the studied sizes in boys and girls of age groups made it possible to reveal the intensity of changes in jaw sizes with age.

A metric study of the orthopantomogram of the jaws, and the subsequent assessment of the obtained data using a variation-statistical study, made it possible to determine the average linear and angular dimensions of their individual sections with a neutral bite and with secondary deformations of the dentition, taking into account gender and periods of bite formation.

Measurements showed that with secondary deformation of the dentition, when comparing the right first and second segments on the left side, we determined a significant asymmetry of the dentition and, according to

this parameter, the asymmetry was observed MT1-Go. The degree of tooth inclination and the size of the segments were studied using lines drawn on orthopantomograms.

Thus, for successful diagnosis and treatment of dentofacial anomalies and deformities in children and adults, as well as long-term stability of treatment results, an orthopantomogram is necessary. This technique is very accessible and has great practical value.

Currently, the most common method for studying aesthetic changes in the face is the photographic method. Clinical examination is very important when assessing facial aesthetics. A disproportionate appearance looks unaesthetic; the discrepancy between symmetry on the right and left is the main problem of facial aesthetics. During the treatment process, the elimination of unaesthetic and unfavorable changes in facial features is considered the main task of orthodontics.

Analysis of the face in the forward direction and from the side was carried out selectively using photographs taken with a camera from a distance of 1.5 m. In this case, the head was in a natural position.

To obtain accurate, identical photographs of the front and profile, bite and other facial indicators, all photographs are taken under the same conditions using a photostat.

When studying photographs in the forward direction, certain lines were drawn on selective photographs and the face was conditionally divided into specific parts, based on its anatomical features (frontal part of the face, ocular part of the face, nasal part of the face, upper jaw part of the face, chin part of the face). For further research, parallel lines were drawn at the level of the trichion measuring point, in the area of the superciliary arches, the corners of the eyes on both sides symmetrically, the lower edge of the eye sockets on both sides, a line in the base of the nose, on both sides of the mouth symmetrically, the corners of the lower jaw on both sides and measuring area of the chin.

We connected individual measuring points of a certain person and obtained his different directional polygons, studied the dimensions according to linear and angular indicators; studied the specific parameters of the angles between the marked and listed lines and the

average central line of the face; studied facial proportions by measuring the upper, middle, and lower thirds.

Parameters along the vertical plane were determined: from the measuring point of the outer lateral contour of the zygomatic arch to the angle of the lower jaw on the right and left sides (Zy-Go); from the middle of the pupil on both sides to the corner of the mouth on the right and left (Pu-Ch).

The lips were assessed according to the relationships of aesthetic planes and measured along measuring directed lines:

- S – formed between the measuring precise contours of the nose and the upper lip connecting the middle of the bend;
- E – drawn by an exact line passing through the most convex specific points of the nose and chin (Pg);
- the point between the lower edge of the nasal area and the upper lip and chin in the connecting line, the most in-depth, was marked - (Sn-Pg);
- Perpendicular to the Frankfurt horizontal line from the bridge of the nose from the nasal plane - BVN;
- Real concrete vertical lines passing through the concavity at the base of the upper lip and through the concavity between the lower lip and chin, respectively, vertical lines - A and B.

We studied 62 children in the period of mixed dentition with secondary deformations of the dentition before treatment and after orthodontic treatment. The facial profile was analyzed from photographs of children, with the head in a natural position. The profile was assessed using generally accepted points and lines. The Frankfurt horizontal line is marked through the Orbital and Porion points. In photographs of children, the angles passing between anatomical points were measured. The labio-nasal angle was defined as formed by the stable nasal septum and upper lip. The norm was 101 ± 6 degrees. An increase in the aesthetic limit of this labio-nasal angle from the standard is observed with an “upturned” shape of the nose or the position of retrusion of the upper teeth. This angle was used in photometric studies to assess the

anteroposterior, post-anterior position of the maxilla. The sharpness of the labio-nasal angle allowed us to perform orthodontic displacement of the maxilla distally. For boys it was 112.9 degrees, and for girls it was 107.6 degrees. The height of the lower part of the face in children of variable age was determined from the Menton point to the base of the nasal septum. This height was a very important parameter for diagnosis and planning of orthodontic treatment, and this value of the height of the lower third of the face was normally 54-55% of the total height of the facial area in children. During the growth process in children in the period of mixed dentition, this limiting ratio remains stable and constant. From the intended anterior point of the lower lip to the soft tissue point, the angle of the upper lip was determined. Flattening of this angle was observed with increased hypertonicity of the lips. Normally, in children during the period of mixed dentition the angle was 137.1+9 degrees.

3.3. Features of dysfunction of the dental system in children with secondary deformation.

Swallowing function test

Swallowing from birth to 2-3 years of age is considered the infantile type of swallowing. During swallowing in infants, the tongue pushes away from the closed lips; in this period of the child, the chewing function is not expressed, only there is a sucking reflex. As the child grows, the act of swallowing improves over time. At the age of 2.5 to 3 years, after the emergence of baby teeth in the occlusion, a somatic type of swallowing develops and this is considered normal. This period is very important for the child, since during this period the child gradually moves from the sucking reflex to chewing, therefore, normally, during swallowing, the child's tongue spontaneously pushes away from the closed dentition and the forming palatine vault. Normal swallowing involves the movement of a bolus of food from the oral cavity through the esophagus into the stomach, and this process is conventionally divided into three stages: the 1st stage includes voluntary and conscious, with food being supplied to the oropharynx; The 2nd stage is considered the shortest and is poorly understood by the child, in which it is possible, if desired, to spontaneously return the food bolus to the oral cavity; The

3rd involuntary stage, when food or a bolus of food passes the upper esophagus and purposefully moves towards the stomach. And if the child retains the infantile type of swallowing, then as a result of incorrect position and formation of the tongue and lips, the upper or lower dentoalveolar arches are quickly deformed and the formation of the bite in the milk stage of occlusion is disrupted.

The position of the tongue in the active and passive position, the tension of the lips, the symmetry of the cheeks and the movement of the hyoid bone were selectively studied during different phases of swallowing.

Determination of functional endurance of teeth.

Age-related changes in the dentofacial apparatus in children during the period of mixed dentition at all stages of its development and improvement of the endurance of permanent cutting teeth in children are due to the further formation of roots, differentiation of periodontal tissues and the formation of the function of masticatory muscles.

Consequently, the functional endurance of teeth in children in the period of mixed occlusion in the lower jaw is on average 1.4-1.8 kg and higher than in the upper jaw, and this comes from the anatomical and morphological shape of the jaws. In addition, in children with mixed dentition, differences (2-5%) in certain opposite sides of the jaw indices of endurance between specific teeth were identified. This is observed in children during the period of mixed dentition due to the one-sided type of chewing.

In children with mixed dentition, selective calculations were carried out and the percentage of participation of each primary and permanent tooth in the act of chewing was determined. The calculation was carried out selectively using the following formula:

$$S \times 100/F$$

where, S is the functional endurance of one specific milk or permanent tooth, kg;

F is the total functional endurance of all teeth for a given age period, kg.

The assessment of the chewing endurance of the dentofacial apparatus was based on the anatomical, topographical, age-related and functional characteristics of individual teeth and dentitions. The evaluation criterion was the data of gnathodynamometric experiments. On these grounds, the effectiveness of the chewing coefficient in primary, secondary and permanent dentition in normally growing children and adolescents without delayed eruption was derived (Table 6).

Chewing efficiency during early loss of a baby tooth or removal of permanent teeth in children during the period of mixed dentition was calculated taking into account antagonist teeth. If a baby or permanent tooth was missing in one jaw, then for ease of use its antagonist of the same name was also locally excluded from chewing efficiency.

Table 6.

The coefficient of chewing efficiency of teeth in children in the period of primary, mixed and permanent dentition

Bite	Coefficient	Chewing efficiency, %						
		milky		3	3	5	6	8
	Upper jaw %							
	Teeth	I	II	III	IV	V		
	Lower jaw%	3	3	5	6	8		
Replaceable	Upper jaw %	3	3	4	4	5	6	
	Teeth	1	2	3	4	5	6	
	Lower jaw%	2	3	4	4	5	7	
Постоянный	Upper jaw %	1	1	3	4	5	5	6
	Teeth	1	2	3	4	5	6	7
	Lower jaw%	1	1	3	4	5	5	6

Our experiments were based on determining chewing efficiency depending on the age of the child and the position of the anatomical and functional principles of each milk and permanent tooth separately and

the entire dental apparatus as a whole, since in the mouth of children with a mixed dentition there are unformed, formed milk and permanent teeth. And also, in the primary occlusion, the chewing efficiency of all teeth is (168.52 ± 0.69) kg, and in the shift period - (158.82 ± 0.58) kg.

We calculated the percentage of participation of the formed, forming each primary and permanent tooth in the act of chewing during the period of mixed dentition, taking into account the stamina and age of the child; the chewing efficiency coefficient was taken as 100% and in each age group was calculated based on the bite. In children, the functional effectiveness of the dentition during the period of mixed dentition is of great importance and is a practical indicator of indispensable prosthetics for the prevention of secondary deformations of the dentition. Therefore, determining the chewing efficiency coefficient in children of this period was considered important.

During the period of formation of orthodontic pathology, after early tooth loss within three months, the location and nature of the deformation of the dentition plays an important role. In the lower jaw, the displacement of teeth towards the defect was characterized by tilting and rotation of the tooth, and in the upper jaw it often resulted in corpus movement.

In children during the period of mixed dentition, it is more relative to specifically determine the fact of premature loss of primary teeth. We considered it premature if the tooth was lost earlier than a year before the period of physiological change.

Premature and early loss of teeth in children during the period of mixed dentition was studied using a modified table by N.A. Agapov for mixed dentition. Studies have shown that after 6-8 years, chewing efficiency decreased by 89%, due to the physiological change of teeth. In children in the period of late mixed dentition due to the change of temporary canines and molars, the level of chewing efficiency was 68%.

Among children, reduced chewing efficiency most often occurred with deformation of the posterior jaw due to secondary adentia in 30 (5.94%) children, due to early removal of milk teeth - in 24 (4.75%), due to

unworn cusps of milk teeth - in 20 (3.96%) and due to dentoalveolar lengthening - in 21 (4.16%) children with mixed dentition.

Thus, secondary deformations aggravate the condition of the dental system and disrupt the normal rate of chewing efficiency.

CHAPTER IV.

FEATURES OF ORTHODONTIC TREATMENT OF SECONDARY DEFORMATION OF THE DENTAL SYSTEM IN CHILDREN DURING THE PERIOD OF MIXED BITE.

4.1. Complex treatment of children with secondary dentition deformation.

In this chapter, orthodontic treatment and observation before and after, as well as in the long term after orthodontic treatment, were carried out for children with secondary deformities of the dental system, and a comparative analysis of treatment results in the study groups was substantiated.

Orthodontic treatment and dynamic monitoring of young patients was carried out in the Orthodontics clinic of the department and the TGSI clinic.

The results of our examination of schoolchildren in Tashkent showed that the prevalence of anomalies and deformations of the dental system in children with mixed dentition is very high and, according to our data, is 65.5%. But, despite the high prevalence of anomalies and deformations of teeth, dentition and bite, the provision of dental care, including orthodontic care, is only 6.93%.

In children with anomalies and deformations of the teeth and dentition in the mixed dentition, it was part of the overall plan for the comprehensive diagnosis and treatment of the pathology of the dentofacial system and was determined taking into account the characteristics of the etiopathogenesis of the disease.

Bad habits, impaired chewing (one-sided chewing), biting on foreign objects (objects), early loss of primary molars, primary adentia, unerased cusps of primary canines and secondary adentia were a factor predisposing to the formation of secondary deformations of the dentition in children during the period of mixed dentition (in 152 (30.1%) children).

After a comprehensive examination, all selected children received a course of therapeutic dental treatment. Depending on the etiology and pathogenesis of the occurrence of secondary deformation of the cervical jaw, the localization and severity of the deformation, we performed various dental interventions: removal of teeth or their roots, selective grinding of non-erased cusps of milk teeth, orthodontic correction of the position of teeth and dentition, and prosthetics of partial defects in the dentition (Appendix No. 7).

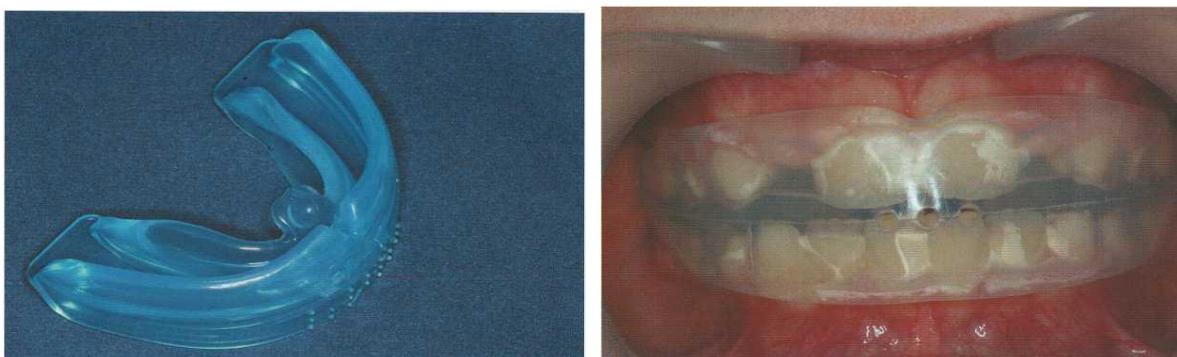
Timely orthodontic treatment and prosthetics for children with cervical joint deformities began with the choice of treatment method, the design of the orthodontic apparatus and the design of the denture. Because if the design is chosen incorrectly, errors and complications occur.

All children undergoing orthodontic treatment were divided into 2 subgroups: the 1st subgroup (main) orthodontic treatment was carried out using modern and our proposed devices (in 103 children) and the 2nd subgroup (comparison group) orthodontic treatment was carried out using traditional orthodontic devices.

In the orthodontic treatment of secondary deformation of the cervical jaw in children, the correct choice of treatment method and design of the orthodontic apparatus is of particular importance, therefore, clinical, radiological and anthropometric data of the dentition of small patients should be taken into account.

Patients of both subgroups underwent clinical, anthropometric studies of jaw models (calculation according to Ponn, Linder Harth, Ekell, Korkhaus, Tonn, as well as measurement of the shape of the dental arch according to the Howley-Gerber-Gerbst diagram), radiological (direct and lateral TRG, orthopantomography) studies .

In each age group under orthodontic treatment, we selected preventive and therapeutic devices individually, depending on the type of pathology. In children of the 1st subgroup, depending on the age and nature of the pathology, elasto-positioners of various modifications were used: pre-orthodontic trainer, infant trainer, myobrace system, T4 K tm, i-3tm, T4 KA, TMJ-MVV tm, T4 A tm (see. Fig. 18-21).



A

Б

Pic. 18. Pre-orthodontic trainer (a); LM activator (b).



A)

Б)

Б)

Pic. 19. Trainer infant (a); Trainer T4K (b); Trainer T4A (c)



A)



Б)

Pic. 20. Trainer (a); Trainer T4CII (b)



A



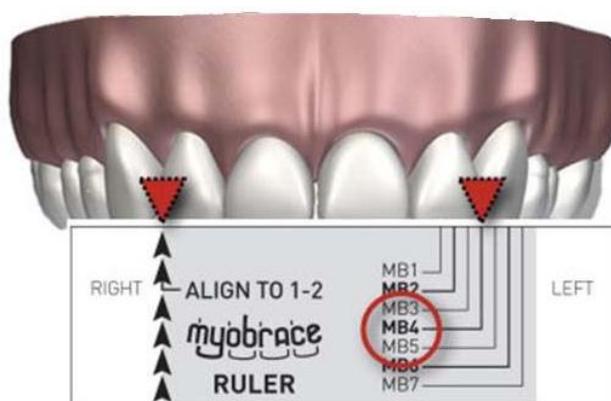
B

Pic. 21. “Myobrace” device (a); Myofunctional trainer (b).

“Myobrace” devices are functionally operating standard double-jaw removable orthodontic devices designed for correction of deformed teeth, dentition and occlusion by correcting myofunctional disorders of the posterior jaw.

The device consists of two layered structures: an outer silicone layer - functionally corrective and a solid inner layer - active.

Myobrace devices are available in 6 sizes. They are used in mixed and permanent dentition. They are selected individually for each patient by measuring the mesiodistal dimensions of the 4 upper front teeth. The mesiodistal dimensions of the 4 upper frontal teeth are measured using a disposable paper ruler (Fig. 22).



Pic. 22. Ruler for determining the size of the Myobrace.

When prescribing elastopositioners of the Myobrace system, we selected the sizes according to a special table for this device (see Table 7).

Table 7

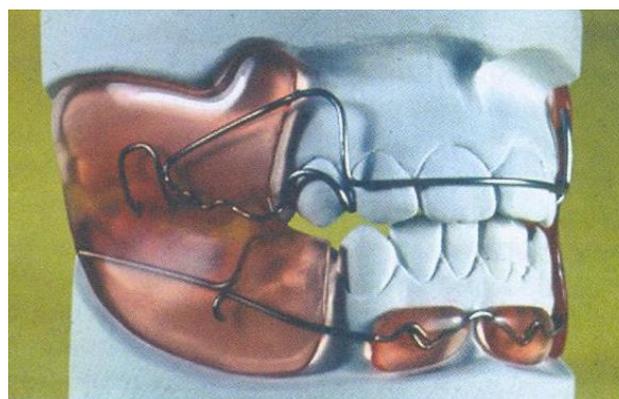
Myobrace size chart, mm

Размер (номер)	Расст-е между 2-2 в/ч (мм)	Расст-е между 2-2 н/ч (мм)	Ширина клыков в/ч (мм)	Ширина клыков н/ч (мм)	Ширина зубно дуги б-б в/ч (мм)	Глубина дуги А/Р (мм)
1	30,0	22,0	7,0	6,5	55,0	42,0
2	31,5	23,0	7,3	6,8	55,0	42,0
3	32,5	23,8	7,5	7,0	60,0	48,0
4	33,5	24,5	7,7	7,2	60,0	48,0
5	35,0	25,5	8,0	7,5	60,0	48,0
6	36,5	26,7	8,5	8,0	60,0	48,0
7	38,0	28,0	9,2	9,0	60,0	52,0

For children of the 2nd subgroup, traditional treatment devices: Klampt activator, Frenkel device types I-II-III-IV, Andresen-Goipl monoblock, Janson Bionator, a plate with a vestibular arch with an inclined plane, etc. were also selected individually (see Fig. 23- and table 8).



Pic. 23. Open Klammt activator.



Pic. 24. Frenkel apparatus type I



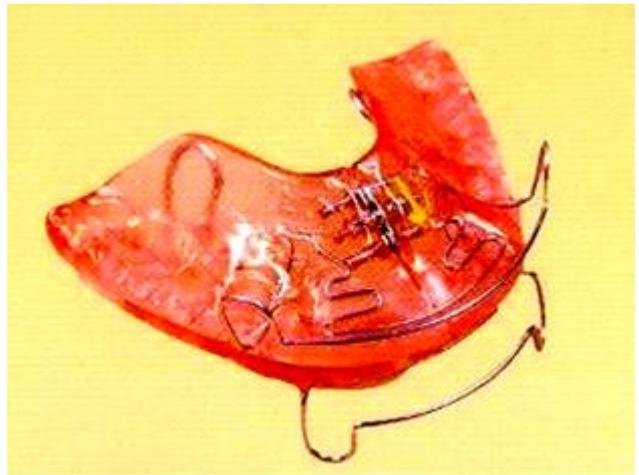
Pic. 25. Frenkel apparatus type II



Pic. 26. Frenkel apparatus type III



Pic. 27. Frenkel apparatus type IV



Pic. 28. Andresen-Goipl apparatus.



Pic. 29. Andresen-Goipl apparatus in the oral cavity.



Pic. 30. Janson Bionator.

Table 8

Individual selection of treatment and prevention for the formation of occlusion in children during the period of mixed dentition

Type of occlusion	Children 6-9 years old (early mixed dentition)		Children 9-12 years old (late mixed dentition)	
	main group	comparison group	main group	comparison group
Prognathic	Myogymnastics, T4K tm	Myogymnastics, plate with vestibular arch, Klampt activator	T4K tm, T4A tm myobrace system	Plate with an inclined plane, Klampt activator, Frenkel apparatus type I, II, Andresen-Goipl monoblock (arch at the top)
Progenic	i-3 tm Myogymnastics, chin sling	Myogymnastics, plate with a sector-cut screw with occlusal pads, chin sling	i-3 TM	A plate with a screw, a sectoral cut, a Brückle apparatus, a picking sling
Open	Myogymnastics, T4K TM, myobrace system	Myogymnastics, plate with tongue barrier	Myobrace system	plate with occlusal pads
Deep	Myogymnastics, myobrace system, T4K TM	plate with a bite platform, mouthguards for chewing milk teeth.	Myobrace system, T4KA TM ,	Bite plate

Cross	stitching of the cusps of primary canines, Myogymnastics, T4K tm Myobrace system	Grinding of unworn cusps, plate with screw and one-sided mouth guard	Myobrace system T4KA™,	Plate with screw and one-sided mouth guard, Frenkel apparatus
Dento-alveolar extension	Myobrace system, T4K™	Plate with occlusal overlays, with artificial teeth	T4K™, Myobrace system, T4KA™	Plate with occlusal pads and artificial teeth
Having bad habits: -infantile swallowing	Trainer-infant, myobrace system, T4K™, myogymnastics Myogymnastics,	plate with tongue flap	Myobrace system	Plate with tongue flap
- moving the lower jaw	forward Grinding the cusps of primary canines, i-3™	Sling hat, myogymnastics	i-3™	Frenkel apparatus, Klampt apparatus
-bad sucking habit	Pre-orthodontic trainer,	Plate with tongue flap	Myobrace system	Plate with tongue flap

	infant trainer, myobrace system			
-mouth breathing	Myobrace system, T4K™	Plate with tongue flap	Myobrace system, TMJ-MBV™	Plate with tongue flap
Premature loss of primary teeth	Myobrace system	Partial removable dentures with artificial teeth	Myobrace system	Partial removable dentures with artificial teeth
The presence of three and the center shift is not more than 3 mm towards the defect	Myobrace system	Plate with arm-shaped springs for medial or distal displacement of teeth	Myobrace system	Plate with arm-shaped springs for medial or distal displacement of teeth

In the main group of 21 patients who began treatment with elastopositioners, a positive result from wearing the device (elimination of parafunction of the tongue, reduction of the vertical gap in the anterior section, elimination of bad habits, normalization of the position of the lower jaw) was observed in 19 (90.5%) of them. In 2 (9.5%) patients, the results were assessed as unsatisfactory, which is explained by insufficient wearing of the device during the day or its incorrect use.

Thus, the elastopositioners of various designs we used gave effective results for the treatment and prevention of secondary dentition deformations in children in the period of early mixed dentition.

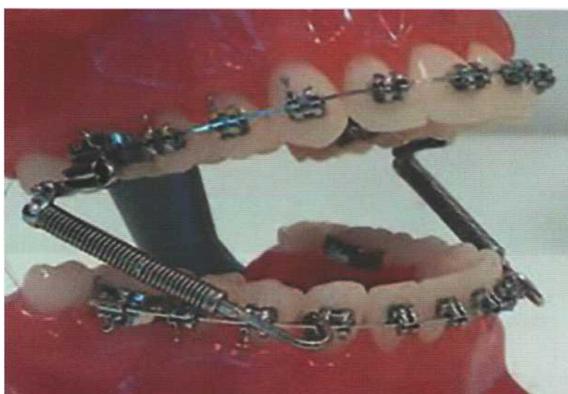
We accepted 152 children for orthodontic treatment. Of these, 115 children received orthodontic treatment using various types of orthodontic appliances (active, passive, combined). 23 patients with dentition defects were provided with preventive children's dentures, 11 patients were under observation, 3 patients refused treatment.

71 (46.7%) of 152 children had bilateral symmetrical mesial displacement of molars and premolars, 39 (25.7%) had bilateral asymmetric displacement, and 42 (27.6%) had unilateral displacement.

Loss of support in the premolar area and, as a result, lack of space to place the front teeth in the dental arch; distalization of the chewing teeth using removable plates with a sectoral cut, leading to a reverse reaction of the screw, which transfers the pressure of the chewing teeth to the front teeth, and also the fact that molars displaced distally should subsequently be used as a support in the orthodontic treatment of the front teeth, can give a high percentage of relapse in moving the chewing teeth to their original position (see Fig. 31, 32).



Pic. 31. Use of the Edgewise system for the treatment of secondary deformation of the dentition.



A**Б**

Pic. 32. Jasper-Jumper device (a); Herbst apparatus (b).

In late mixed dentition in children, to prevent complications and increase the effectiveness of treatment, we used various types of skeletal anchorage to strengthen the support (Fig. 33). The method of molar distalization in children at the end of the mixed dentition and in adult patients involves the use of microimplants as an independent posterior skeletal support.



Pic. 33. Mechanical orthodontic devices using microimplants.

We treated 7 children aged 13-14 years who needed orthodontic treatment using distalizing mechanics using fixed orthodontic equipment. Persons with a lack of space behind the last chewing teeth were excluded from the examination; the presence of destructive changes in bone tissue in the area of the apices of the roots of chewing teeth; contraindications to dental implantation. All patients were treated with self-cutting orthodontic microimplants with a diameter of 1.4 mm and a length of 8 mm “HUBIT Co ltd. (Ojeon-dong, Byeoksentechnopia), A-1204.

The third posterior teeth were removed after a leveling step and installation of full-slotted steel arches (19x22 SS); a mini implant was installed between the roots of 5-6 teeth 5-7 mm above the interdental papilla. An elastic traction (“Powerchain” from Ormco, USA) was applied from the hook of the U-shaped spring to the mini-implant, and the distal end of the U-shaped spring was applied to the mesial edge of the tube of the distally moved tooth. The force imparted to the tooth being moved was 150-250 g, the interval for replacing the elastic

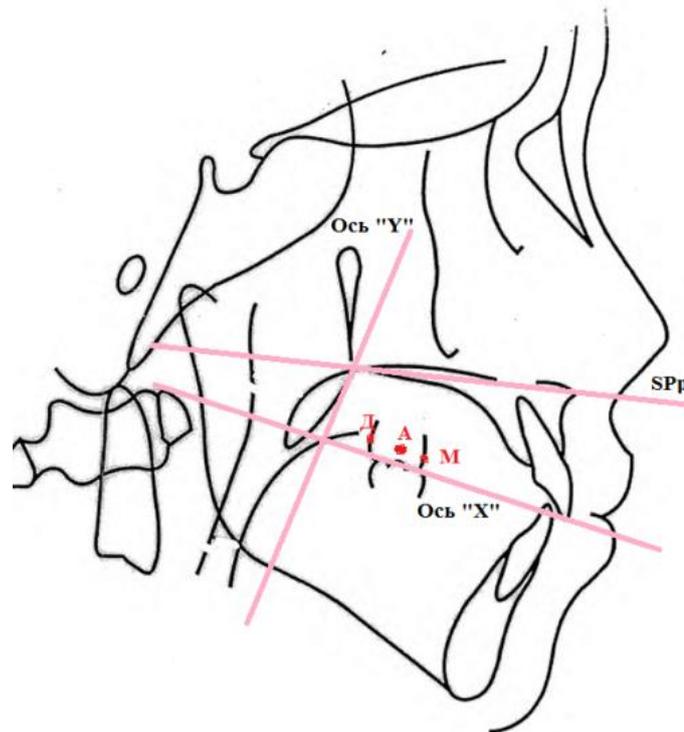
traction was 14 days, and they tried to create the force traction vector parallel to the occlusal plane (see Fig. 34).



Pic. 34. Image of the structure (on the model) for the distal movement of chewing teeth.

Tooth movement was determined by direct superimposition of TRG images of the head in the lateral direction and this was done before orthodontic treatment and after the stage of distalization of the second chewing tooth. The images measured the plane of the anterior part of the skull base SN, the base of the maxilla SPp and the anterior stable surface of the zygomatic process in stages.

In Fig. Figure 35 shows the defined and measured points and planes that were assessed during orthodontic treatment during the stage of distalization of the last chewing tooth. The initial chewing occlusal plane, drawn through the cutting incisal edge of the central incisors of the upper jaw and the mesial tubercle of the first chewing tooth, is designated as the “X” axis, and the perpendicular to this plane from the PNS point is designated as the “Y” axis. On the surface of the coronal part of the distal chewing tooth, 3 points were determined in stages: a mesial point in the area of the equator of the tooth (point M), a distal point (point D) and the center of the coronal region (point A). After distal movement of the last molar to the required distance, the archwire was replaced with a 19x22 SS with a curved omega loop in front of the mesial edge of the distal tooth tube, then the mesially located premolars and molars were alternately moved to the omega, and lastly, orthodontic treatment of the anterior group of teeth was performed.



Pic. 35. Schematic designation of points and planes.

The displacement of the chewing teeth in the distal direction to the initial occlusal position in the plane which is marked X1 at points D, A, M according to our study was 1.91 ± 0.20 , respectively; 2.16 ± 1.2 and 2.1 ± 0.29 mm, and the Y1 marked point was -2.03 ± 0.44 ; 1.35 ± 0.79 and 1.13 ± 0.78 mm in the intrusive direction of displacement relative to this plane.

In the intrusive and distal directions, the displacement from point D1 to D2, A1 to A2, M1 to M2 was 2.91 ± 0.41 ; 2.78 ± 0.71 and 2.85 ± 0.62 mm. The minimum was considered to be the movement of a certain point M - 1.2 mm, and the maximum - 4.8 mm. The sharp continuous displacement in the distal direction and intrusion to the X1 plane of the fifth tooth was 1.1 ± 0.42 and 0.91 ± 0.32 mm, and the inevitable movement of the first frontal teeth of the upper jaw in the distal direction and with extrusion was 0.81 ± 0.41 and 0.43 ± 0.39 mm (see Table 9).

Table 9

Linear measurements obtained before treatment and after distalization of the second molar of the maxilla, ml

Point	Average value	Minimum value	Maximum value
D _{1x} -D _{2x}	$1,87 \pm 0,19$	1,2	2,4
D _{2y} -D _{1y}	$2,02 \pm ,45$	1,1	3,7

D ₂ -D ₁	2,83±0,39	2	4,1
A _{1X} -A _{2X}	2,05±0,17	1,3	2,5
A _{2y} -A _{1y}	1,35±0,8	-0,3	4
A ₁ -A ₂	2,8±0,51	1,4	4,4
M _{1X} -M _{2X}	2,03±0,31	1	2,9
M _{2y} -M _{1y}	1,33±0,78	-0,3	3,8
M ₂ -M ₁	2,63±0,62	1,1	4,6
P _{1X} -P _{2X}	1±0,32	0,4	2,3
P _{2y} -P _{1y}	0,87±0,28	0	1,8
I _{1X} -I _{2X}	0,77±0,33	0	1,9
I _{2y} -I _{1y}	-0,37±0,33	-1,7	0,5

The chewing tooth along the axis tilts at an angle to X2 after moving the tooth distally and this is equal to 93.21 ± 1.91 , this indicates that the chewing tooth is moved body-wise in the distal direction. The frontal incisor teeth of the upper jaw tilt at an angle to the plane - 109.27 ± 1.7 , and this indicates that at the stage of treatment, the movement of the chewing teeth distally to the location of the incisors was normalized. The angular divergence of the upper and lower jaws NL-ML in our study increased by 0.86 ± 0.31 , and accordingly the angle of inclination of the upper jaw plane to the occlusion plane increased by 1.41 ± 0.39 (see Table 10).

Table 10

Angular parameters after distalization of the last maxillary molar

Parameter	Before treatment	After distalization	Difference
<AX ₁	89,53±1,79	89,88±1,2	
<AX	92,07±1,84	92,17±1,83	
<A-NL	101,88±3,47	101,78±0,92	-0,1±1,4
<I-NL	105,7±3,47	108,25±1,6	2,55±2,03

<NL-X	11,55±0,55	12,87±0,83	1,32±0,38
<NL-ML	22,08±2,68	22,93±2,79	0,85±0,26

Molar distalization in all patients was performed in accordance with treatment goals. In all cases, the correct relationship between the front teeth of the upper and lower jaws was achieved.

Thus, microimplants can be used in patients as a support for the distalization of maxillary and mandibular molars in children with late mixed dentition and during permanent dentition. The installed microimplant, U-shaped spring and rubber chain do not create discomfort for patients, do not require additional effort during distalization, prevent extrusion of molars, eliminate the need to use other devices to achieve absolute results and prevent mesialization of the supporting molars during subsequent retraction of the anterior group of teeth. Distalizing mechanics after the leveling stage on full-slot SS arches promotes body movement of molars to the distance required for a given clinical situation. This method of tooth distalization is recommended for use in patients with mesial migration of posterior teeth and sufficient incisal overlap of the anterior teeth.

4.2. Analysis of the results of clinical, anthropometric and cephalometric studies after orthodontic treatment.

Analysis of the general theoretical and practical prerequisites for continuous force on a moving tooth allowed us to develop a method for distal movement of lateral chewing teeth in a targeted direction, including their translational movement.

To increase the effectiveness of the orthodontic apparatus for the treatment of mesial occlusion, we have improved the apparatus by introducing an additional element into the design - a tongue rest.

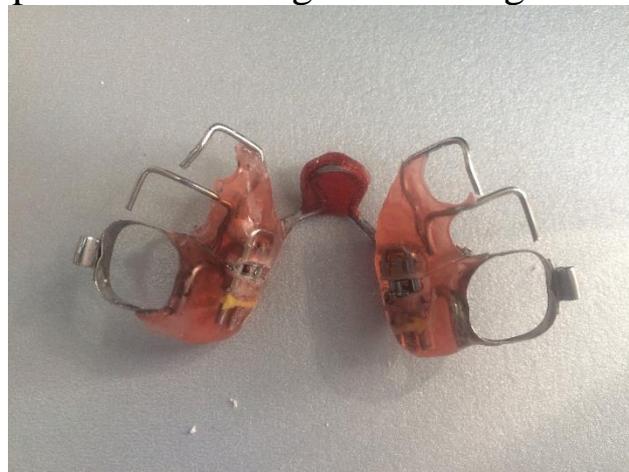
A patent was received for the “Orthodontic apparatus for the treatment of mesial occlusion” (Patent of the Republic of Uzbekistan No. FAP 01242, dated February 16, 2017), which gave a positive effect in the treatment of secondary deformation of the dentition (see Appendix

4).

The essence of this utility model: an orthodontic apparatus for the treatment of mesial occlusion, contains a bracket, labial pilots located between the upper lip and the frontal part of the alveolar processes, brackets connecting the upper lip pilots, cheek shields between the cheek and the lateral part of the alveolar processes, a palatal arch connecting the cheek shields, vestibular arch, located in the area of the front teeth of the lower dental arch. In this case, the device additionally contains a tongue stop made of wire in the form of a zigzag spring, located in the area of the front teeth on the lingual side.

The theoretical necessary calculations of the continuous biomechanical movement of teeth were the basis for the design of orthodontic appliances that we used for the distal movement of small and large molars (Rationalization proposal No. 18 of 02.28.2018) (see Appendix No. 5).

The design of the orthodontic apparatus proposed by us for the distalization of the lateral group of teeth consists of 2 supporting metal crowns, a spring, brackets, 2 basic plates connecting the structure on both sides to the palate (they do not touch the mucous membrane of the palate and gums) and selectively from 1 -th or 2 screws. The metal crowns of the fixed appliance are fixed to modern, saliva-resistant glass ionomer cement of chemical curing Fuji-1, the metal brackets are to light-curing fluid-flowing composite Revolution (see Fig. 36). After installation and fixation of the fixed structure, recommendations were certainly given on oral hygiene and the timing of adaptation. To activate the device, it is enough to tighten the screw of the plate, each turn is 0.1 mm in 1-4 days, it depends on the diagnosis and age of the child.



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Pic. 36. Orthodontic apparatus for distal movement of chewing teeth (a): before movement (b), after movement of teeth (c).

It is known that in orthodontic practical dentistry, for orthodontic treatment of anomalies of individual or group of teeth, as well as to create space for teeth located outside the dental arch, the method of removing permanent teeth was previously used. Modern orthodontics makes it possible to treat such anomalies and deformations of teeth and dentition without removing teeth - through distalization of molars, using orthodontic appliances.

To correct the deformation of the dentition, all children received the device we proposed, the effectiveness of which was assessed over time.

The effectiveness of the design we used was compared with the second subgroup of patients in whom orthodontic treatment was carried out with traditional devices: Klampt activator, Andresen-Goipl monoblock, Gashimov-Khmelevsky device, a plate with a vestibular arch with an inclined plane, a plate with a screw and a sectoral cut, etc. were also selected individually.

The orthodontic appliance we offer belongs to the category of non-removable appliances. It consists of a palatal clasp equipped with a plastic base located parallel to the dental arch on the palatal side, and active elements - distal screws attached to the base of the device, opening springs on the vestibular side, support rings for the first molars, as well as elastic metal arches - brackets and plastic in the shape of a heel in the area of the arch of the palate.

The advantages of the orthodontic fixed appliance we propose are:
 - possibility of carrying out unilateral or bilateral distalization of

teeth;

- the ability to move teeth, both in the period of early mixed dentition and in late mixed dentition;
- without rotation and without tilting, allows you to move the chewing teeth body-wise;
- does not irritate the mucous membrane of the hard palate and does not injure it;
- activation of the device (screw) is sufficient once a day for half a turn (0.1 mm step);
- rapid and stable achievement of a therapeutic orthodontic effect;
- reduces the transfer of load to the frontal group of teeth;
- combination with other orthodontic devices.

Thus, the device we used turned out to be most effective for the distalization of the first chewing teeth in the final period of the mixed dentition, when the second permanent molars had not yet erupted. The average duration of orthodontic treatment was 56 ± 8 days, maximum – 108 ± 16 days, minimum – 31 ± 4 days.

Cephalometric and anthropometric measurements taken after treatment indicate good stability of mesially displaced teeth.

The clinical examination data were confirmed by the results of a study of diagnostic models of the jaws and x-ray images of the upper and lower jaws after treatment.

To treat gingivitis in orthodontic patients with fixed appliances, we used an infusion of red rose petals according to the Avicenna method. Avicenna wrote about the medicinal properties of roses: “an infusion of red rose petals is useful for thickening and pain of the gums, and this rose decoction strengthens the gums.” Red rose petals contain vitamins C, B, PP, K, pantothenic acid, catechin, quartz, cyanine. Rose has an antiseptic, wound-healing, anti-inflammatory effect. Preparation of infusion: 3 tablespoons of red rose petals are poured into 2 cups of boiling water and infused in a well-sealed container for 10-12 hours. Rinse your mouth 3 times a day after meals.

Gingivitis was treated in 23 children with secondary dentition deformations during the period of mixed dentition. All children experienced gingivitis that occurred two months after the start of active orthodontic treatment with fixed appliances. Age of children from 6 to 14 years: When examining patients, the Greene-Vermillion and PMA indices according to Parma were used. All patients underwent correction of oral hygiene, removal of dental plaque and rinsing the mouth with an

infusion of red roses for 3-5 minutes twice a day, and the patients were examined again.

Two months after the start of direct orthodontic treatment, most patients complained of swelling and bad breath. Index scores increased in both groups of patients. The oral hygiene index increased to 2.36 points, which indicates a 3-fold deterioration in performance. After performing hygienic measures and using a solution of red rose petals, patients noted a decrease in gum swelling and the disappearance of discomfort as early as 3-4 days. During examination, a decrease in gingival hyperemia was determined. On the 8-10th day of treatment, the redness of the gums and swelling of the gums disappeared, the gingival papillae became denser and acquired a normal shape.

Thus, the inclusion of an infusion of red rose petals according to Avicenna's method in complex therapy for the initial manifestations of gum inflammation had a positive effect on the general subjective feelings of patients, as well as on the index assessment of hygiene and gum inflammation. The results of the study showed high anti-inflammatory effectiveness without the manifestation of allergic reactions in gingivitis in orthodontic patients.

Thus, the result of complex dental treatment of children with secondary deformations of the dentoalveolar system in mixed dentition showed that it was possible to completely eliminate secondary deformation of the dentition, normalize the occlusion of teeth, improve facial aesthetics and ultimately improve the child's quality of life.

4.3. Development of standards for the treatment of secondary dental deformations in children during the period of mixed dentition, taking into account the etiopathogenesis of the disease.

After a comprehensive examination, all selected children received a course of therapeutic dental treatment. Depending on the etiology and pathogenesis of the occurrence of secondary deformation of the cervical jaw, the localization and severity of the deformation, we performed various dental interventions: removal of teeth or their roots, selective grinding of unworn cusps of milk teeth, orthodontic correction of the

position of teeth and dentition, and prosthetics of partial defects in the dentition.

Anomalies and deformations of the dentofacial system (DSS) in children and adolescents occupy one of the leading places among common dental diseases. Dental anomalies and secondary deformations in children and adolescents disrupt the functions of the dental system, complicate prosthetics, and negatively affect the condition of periodontal tissues, bite formation, facial aesthetics and, in general, the psycho-emotional state of people. At the same time, a certain dependence is observed: the older the age group, the greater the number of children in need of therapeutic orthodontic measures and the smaller the number of children in need of preventive measures. Timely diagnosis and effective treatment of dental anomalies and deformities is an urgent problem. Therefore, the greatest attention should be paid to carrying out the most effective methods of treatment and prevention at the stages of primary and mixed dentition in children. Taking into account the enormous importance of anomalies and deformations of the cervical jaw in children and adolescents, and the peculiarities of the organization of orthodontic care, we have developed an algorithm for diagnostics and dental, including orthodontic, management of patients with secondary deformation of the dentition (see Appendix 6. Diagram).

In each age group, depending on the type of pathology, an individual selection of preventive and therapeutic measures was carried out. To instill hygienic skills that contribute to the healthy state of the oral cavity, reports and conversations were held with children about oral hygiene and caries prevention. Children are taught how to properly brush their teeth.

All (505) examined children, depending on the condition of the hard and soft tissues of the oral cavity, the presence of a speech defect, and the degree of nasal breathing impairment, were referred for consultation and treatment to appropriate specialists (Table No. 11).

Table 11

Number of children in need of medical and advisory assistance

Referral to specialists	Group 1 (6-9 years old)		Group 2 (9-14 years)		Total	
	Absolute number	%	Absolute number	%	Absolute number	%
To the dentist:	91	18,1	103	20,4	194	38,4
To a dental surgeon	112	22,2	74	14,7	186	36,8
See a speech therapist for speech impairment	43	8,5	21	4,2	64	12,7
To an ENT doctor	66	13,1	78	15,4	144	28,5

Today, among the child population of Tashkent, in order to reduce the prevalence of secondary deformities of the spinal joint, it is necessary to conduct routine examinations that promptly detect pathology, as well as the introduction of modern methods of treatment and prevention.

4.4. Prevention of secondary deformation of the dentition of children during the period of mixed dentition.

A comprehensive program for the prevention of secondary dentofacial deformations in children with mixed dentition includes:

I. Primary prevention measures: universal primary prevention of dental caries, health education, awareness of high-quality balanced nutrition, training of dental hygienists, professional hygiene, training and control of individual oral hygiene, sealing fissures of chewing teeth,

identification of unworn cusps of milk teeth, bad habits, pathologies of the upper respiratory tract, identification and referral for treatment of concomitant pathologies, preventive examinations at least 2 times a year.

II. Measures for secondary prevention of dentoalveolar deformities

1. Identification of risk factors for the development of secondary dentofacial deformations: conditions contributing to the development of dental caries and tooth loss, carious cavities, poor-quality fillings, unworn cusps of milk teeth, bad habits, pathologies of ENT organs, orthopedic structures, dentition defects.

2. Measures to eliminate identified risk factors for the development of secondary dentofacial deformations: treatment of defects in the hard tissues of teeth using orthopedic structures (microprostheses - inlays, partial removable dentures and sliding bridges), replacement of low-quality fillings, replacement of failed orthopedic structures, selective grinding of premature contacts and unworn cusps of milk teeth, production of preventive orthopedic structures and devices, rational prosthetics.

III. Measures for tertiary prevention of secondary dentoalveolar deformations. During mass clinical examinations, children with identified secondary dentoalveolar deformities should be divided into groups according to the severity of the pathology. For children with mild severity, it is enough to undergo selective grinding of teeth and subsequent early and rational prosthetics. Children of moderate severity need to undergo preliminary therapeutic and orthodontic treatment, then rational prosthetics. For severely affected children, a complex treatment plan is recommended - preliminary therapeutic, orthodontic and surgical treatment, then rational prosthetics.

Based on the results of the study, the main directions for preventing the development of secondary dentoalveolar deformities for children in Tashkent were identified:

1. Hygienic education of children on healthy lifestyle issues, individual oral hygiene, etiology, clinical manifestations of bad habits and dental caries, the need for early treatment of dental caries.

2. Increasing the effectiveness of preventive dental examinations of schoolchildren by including an orthodontist in the commission and introducing a method for express diagnostics of secondary dentoalveolar deformities.

3. Improving the organization of preventive and orthodontic, as well as orthopedic dental care for schoolchildren in the city of Tashkent. For this purpose, we recommend that dental institutions use a comprehensive program to prevent the development of secondary dentoalveolar deformities among school-age children.

CONCLUSION

Anomalies and deformations of the dentofacial system (DSS) in children and adolescents occupy one of the leading places among common dental diseases. Dental anomalies and secondary deformations in children and adolescents disrupt the functions of the dental system, complicate prosthetics, and negatively affect the condition of periodontal tissues, bite formation, facial aesthetics and, in general, the psycho-emotional state of people. At the same time, a certain dependence is observed: the older the age group, the greater the number of children in need of therapeutic orthodontic measures and the smaller the number of children in need of preventive measures. Timely diagnosis and effective treatment of dental anomalies and deformities is an urgent problem. Therefore, the greatest attention should be paid to carrying out the most effective methods of treatment and prevention at the stages of primary and mixed dentition in children.

The study of modern literature devoted to the problem of secondary deformation of the dentition in children, methods of its diagnosis, elimination, prediction of the development or worsening of pathology with the age of the child, as well as a comparative analysis of the results of our own comprehensive (clinical, anthropometric, photometric, radiological and functional) studies allowed us to do The conclusion is that methods of diagnosis, orthodontic treatment and prevention of this anomaly and deformation need to be improved.

The first signs of the formation of secondary deformation, as is known, appear even in the final period of occlusion of primary teeth. Lack of space in the dentition, early removal of baby teeth, bad habits, primary adentia of teeth, unworn cusps of baby canines, discrepancy between the sizes of teeth and alveolar processes predisposed to the formation of secondary deformations of the dentition during the period of mixed dentition in children, and manifests itself from the moment of eruption of permanent teeth .

Despite the successes in the prevention and treatment of secondary deformations of the dental system in children, many aspects of this problem require further study.

Literature data on the frequency of anomalies and secondary deformation of the dentition in children are very contradictory; the features of deformation depending on the time of manifestation and severity are not sufficiently covered. To date, there is no accurate data on the timing of orthodontic treatment of cervical jaw deformity, and effective methods of diagnosis and treatment during the period of mixed dentition have not been developed. There are no clear enough recommendations for the use of modern research methods; indications for choosing a treatment method that take into account the causes of secondary deformation, their severity and topography have not been developed.

A number of priority studies are being carried out in the world to improve the effectiveness of treatment of anomalies and deformations of the maxillofacial area, in particular, the development of mechanisms for the prevention of maxillofacial anomalies, the introduction of modern methods of orthodontic treatment of maxillofacial anomalies, the substantiation of complex methods of treatment of anomalies of the maxillofacial area, the use biotechnologies for the treatment of maxillofacial anomalies, development and improvement of methods for the treatment of maxillofacial anomalies and deformities using modern computer technology.

The purpose of the study was to increase the efficiency of diagnosis, treatment and prevention of secondary dental deformations in children during the period of mixed dentition, taking into account the etiopathogenesis of their development.

In children of different ages, developing dental anomalies and secondary deformations have a much higher incidence of dental caries, gingivitis and poor oral hygiene are often observed. As the child grows, secondary deformations of the dental system, as a rule, intensify; their treatment becomes lengthy and usually requires the use of various orthodontic appliances and surgical interventions. Therefore, at present, no one doubts the importance and necessity of early diagnosis and treatment of dentoalveolar anomalies and secondary deformations, and this is only possible with regular follow-up of all children by a dentist.

We conducted a mass dental examination of 505 children in the period of mixed dentition from 6 to 14 years old, attending a school educational institution in Tashkent.

Of these, 232 (45.9%) were boys and 273 (54.1%) girls.

From among the examined (505) children, we selected 152 children (main group) aged from 6 to 14 years, including 73 (48.03%) boys and 79 (51.97%) girls, who underwent a complex of diagnostic, therapeutic and preventive measures.

The survey results were combined by age groups characterizing the period of occlusion formation and the main group was divided conditionally into 2 subgroups:

1st subgroup - early mixed dentition (6-9 years) - 70 (46.1%) children, of which 31 were boys and 39 were girls;

2nd subgroup – late mixed dentition (10-14 years old) – 82 (53.9%) children, of which 42 were boys and 40 were girls.

The comparison group (control) consisted of 69 children in the mixed dentition from 6 to 14 years old with physiological occlusion and the absence of anomalies and deformations of the posterior jaw, including 28 (40.6%) boys and 41 (59.4%) girls selected during professional . examination of schoolchildren in Tashkent.

Diagnosis of secondary deformation of the teeth and dentition was carried out on the basis of anamnesis, clinical examination, anthropometric examination of the face and oral cavity, TRG and orthopantomography of the jaws, and a biometric study of diagnostic sample models of the jaws.

All children underwent clinical, hygienic, anthropometric, biometric, photometric, radiological, functional and statistical research methods.

The examination of children was carried out selectively according to diagnosis, according to the chosen method before treatment and after orthodontic treatment and in the period 1-2 years after completion of active orthodontic treatment. Diagnostic studies and orthodontic treatment were performed at the department and clinic “Orthodontics and Dental Prosthetics” of the Tashkent State Dental Institute.

Clinical examination of children included standard research techniques. For all patients, examination cards were filled out, which included the results of a clinical examination and data from additional research methods.

When interviewing parents, it is necessary to find out living

conditions, the course of pregnancy, taking various medications, bad habits, the presence of injuries during childbirth, type of feeding, the presence of rickets or hormonal diseases in childhood that affect skeletal growth. Particular attention should be paid to obstructive and allergic diseases of the upper respiratory tract. It is necessary to find out the manifestation of the first signs of deformation of the facial skeleton, the time of pronounced growth and its final formation. It is also necessary to find out the results of orthodontic treatment and ENT surgeries in childhood.

When collecting anamnesis from children or from parents of children, they took into account the presence of complaints about poor chewing of food, incorrect positioning of teeth, deformation of a particular tooth and jaw, aesthetic disorders of the face and smile, etc.

Particular attention was paid to identifying etiological factors (the presence of bad habits, pathology of soft tissues surrounding the dentition, caries and its complications, unerased cusps of milk teeth, delayed loss and remnants of radix of milk teeth, loss of milk teeth early in their time and removal of permanent teeth due to caries and its complications, the presence of primary dentition, lack of preventive measures and timely prosthetics). We considered bad habits according to Okushko's classification.

When examining children with early mixed dentition, outpatient dental records and parent interviews were used to obtain this information.

When determining the severity of secondary deformation in children, the classification of I. Yu. Lebedenko.

The final diagnosis was made after the use of additional research methods: anthropometric (biometric measurement of jaw models), radiological (orthopantomography, telerradiography in the direct and lateral directions), photometric studies of the face, functional research methods (occlusiography, in the articulator and determination of chewing efficiency).

Functional clinical tests were carried out according to L.V. Ilyina-Markosyan and assessed the dysfunction of the displacement of the lower jaw during dynamics and at rest. The swallowing reflex, the ability to swallow a food bolus or liquid on command, or involuntary swallowing based on a planned time, was determined step by step. When determining respiratory function, nasal and oral breathing were determined.

After a clinical examination of children, we found that the prevalence of anomalies and deformities in Tashkent schoolchildren with mixed dentition reaches 65.5%. And according to recent studies by European scientists, there is no trend towards a decrease in the prevalence of anomalies and deformations of the ZES. The highest prevalence of deformations of the dentofacial system occurs in childhood, and according to this indicator, orthodontic pathology is one of the main dental diseases after dental caries and periodontal diseases. The frequency of occurrence of anomalies and deformations of the ZES in each state and region is different. For example, in different regions of the Russian Federation it varies significantly from 34.9 to 76.5%.

The results of the study allow us to conclude that today among the child population of the city of Tashkent the level of prevalence of secondary deformations of the posterior jaw during the period of mixed dentition is increasing (Maksudov S.N., 2016). Especially relevant against this background are routine examinations that promptly detect pathology, as well as the introduction of modern methods of treatment and prevention.

Despite the high prevalence of anomalies and deformities in Tashkent children with mixed dentition, the activity of dental care, including orthodontic care, in these children is not high and amounts to only 6.93%.

According to the literature, one of the reasons for the increased prevalence of PCA among children is premature loss of teeth during the period of temporary dentition (Phulari D.S., 2017). Currently, the number of preschool children with dental defects as a result of early removal of temporary molars has increased, and therefore the need for dental prosthetics has increased from 14.7 to 45.4% (Souames M., 2006).

Our comparison of data from additional objective research methods showed that the pathogenesis of secondary dentition deformation is due to a number of reasons. The most common reasons were:

- chewing disorder (one-sided chewing);
- speech impairment;
- biting foreign objects;
- mouth breathing;
- early loss of primary molars;
- primary adentia;

- not worn down cusps of primary canines.

When planning the elimination of secondary deformation of teeth and dentition, preference was given to instrumental treatment methods with preservation of deformed teeth, i.e. without the use of surgical tooth extraction. For the purpose of orthodontic correction of secondary deformed teeth, we have developed a non-removable orthodontic appliance for tooth distalization.

To prevent secondary deformation of the dentition in children with mixed dentition, it is necessary to conduct a routine examination of schoolchildren, and at the same time it is possible to promptly detect the etiological factors of dentofacial anomalies and deformations and eliminate them in a timely manner, due to which the number of patients with severe dentofacial anomalies and deformations is subsequently reduced. It is through clinical examination with the use of preventive methods and early orthodontic treatment that it is possible, with less labor and time, to provide orthodontic care to a larger number of children in need and move on to their planned orthodontic treatment.

To diagnose secondary deformation of the posterior jaw and to determine the clinical severity of infra- and supra-occlusion of teeth, tooth inclination in the dental arch and their mesio-distal movement, we proposed the use of dental mirrors with horizontal and radial marks. This determined in millimeter measurements the clinical severity of the advancement of the occlusal surface of the deformed tooth relative to this measuring prosthetic plane.

Using the proposed method, we detected tooth protrusion relative to the prosthetic plane in 8.3% of examined children with mixed dentition.

During school dental preventive examinations, we identified secondary deformations, displacement of the tooth towards the extracted tooth: in the radial direction 6 degrees in 17.6% of those examined, 12 degrees in 13.1% and 18 degrees in 7.3%. The vertical dentoalveolar elongation was 2 mm in 9.1% of those examined, 4 mm in 5.1%.

The results of clinical and additional studies of the dental system of 505 children aged 6-14 years attending school educational institution No. 18 Mirzo Ulugbek district of Tashkent showed that from among the 505 children examined, 314 (62.2%) varieties of bad habits were identified, of which nasal breathing disorder in 48 (9.5%) children, speech disorder in 64 (12.7%) children, chewing disorder (unilateral chewing) in 57 (11.3%) children and biting foreign objects (objects) in

46 (9.1%) children

Of the examined 505 children with mixed dentition, malocclusion was detected in 323 (63.9%) of the examined, among them prognathic occlusion was more often diagnosed in 99 (19.6%) children, of which 53 (10.5%) in 1 group of children and 46 (9.1%) in group 2; deep bite in 51 (10.1%), of which 24 (4.8%) and 27 (5.3%), respectively, as well as progenic bite in 41 (8.1%) children, of which 24 (4.8%) and 17 (3.4%), respectively, for the surveyed groups.

Of this group, the most common anomalies were crowding of teeth and dentition in 73 (14.5%) cases, transposition of teeth - 34 (6.7%), spaces between teeth - 43 (8.5%), diastema - 27 (5.3%), tortoanomaly - 35 (6.9%), etc. Of the 505 children examined, 152 children were found to have secondary deformations of the dental system, this accounted for 30.09% of children with mixed dentition.

It should be noted that one child had several types of spinal joint deformities, and we included them in the group according to the severity of a particular deformity. Among them, the most common deformations of the posterior teeth were due to: secondary adentia in 30 (5.94%) children, early removal of milk teeth - in 24 (4.75%), unworn cusps of milk teeth - in 20 (3.96%) and dentoalveolar lengthening – in 21 (4.16%) children with mixed dentition.

All examined children, depending on the condition of the hard and soft tissues of the oral cavity, the presence of a speech defect, and the degree of nasal breathing impairment, were referred for consultation and treatment to appropriate specialists.

Of those examined, 86 children underwent sanitation of the oral cavity, 12 had temporary partial dentures made, 19 had various orthodontic appliances made, 38 had myogymnastics prescribed, 15 had grinding of the cusps of milk teeth, 11 children had frenulum correction, 14 children - removal of the roots of baby teeth and 8 - sanitation of ENT organs.

Among them, the most common deformations of the posterior teeth were due to secondary adentia in 30 (5.94%) children, due to early removal of baby teeth - in 24 (4.75%), due to unworn cusps of baby teeth - in 20 (3, 96%) and due to dentoalveolar lengthening – in 21 (4.16%) children with mixed dentition.

In order to prevent the development of changes in the dental system, children were treated early with the help of dentures of various designs, made taking into account the active growth of the facial skull.

Therapeutic measures were chosen not only depending on the age at which the pathology was diagnosed, but also took into account the degree of formation of the masticatory apparatus and the severity of clinical manifestations.

Analysis of data in the mixed dentition by age period allowed us to confirm the presence of a direct correlation between primary adentia and the formation of secondary deformations of the dentition. Treatment for primary adentia depended on the number of missing teeth and the type of malocclusion that arose against the background of this pathology.

Thus, it should be noted that after examining children and providing them with appropriate dental care, in 80.4% of children, secondary deformations of the dental system in the mixed dentition were eliminated and prevented.

Analysis of the results of a study of diagnostic models of the jaws of children in the period of early and late mixed dentition confirmed the data of a subjective and objective clinical examination and its time to identify in detail violations of dental anomalies of the dentition, dentoalveolar arches, secondary deformations, the position of individual teeth and the relationship of the dentition.

Diagnostic models of jaws before treatment in children in the period of early mixed dentition; the results obtained indicate that in children in this period pathology in the sagittal and transversal plane was formed in 38% + 2.35 cases, and in children in late mixed dentition 46% + 3.32.

When studying separately the frontal and lateral segments of the dentoalveolar arch, 65% of children with late mixed dentition were found to have a lack of space for permanent chewing teeth in the upper jaw, and 54% in the lower jaw. The location of the canines and small chewing teeth and the specific inclination of the tooth axes to the medial side is due to the underdevelopment of the dentoalveolar arches in the plane in the transversal direction.

Anthropometric methods were carried out by our own research by measuring the biometric data of diagnostic models. To speed up and accurately determine the anthropometric data of the subject, we have developed 2 computer programs. The first of them is “A program for assessing the calculation of the required space for permanent chewing teeth in the lateral region of the dentition in children with mixed dentition according to the Tanaka – Johnston index (Ortodont-TJ.exe)” (UzR Patent No. DGU 05748) and the second is “Computer program

"Cephalopro" for diagnosing and programming anomalies of the dentofacial system" (UzR Patent No. DGU 05626), which were used for diagnosing and predicting secondary deformation of the dentition in children

The results of functional research methods showed that with early mixed dentition, the chewing efficiency of our examined patients due to the physiological change of teeth decreased by 89%. In children in the period of late mixed dentition due to the change of temporary canines and molars, the level of chewing efficiency was 68%.

After a comprehensive examination, all selected children received a course of therapeutic dental treatment. Depending on the etiology and pathogenesis of the occurrence of secondary deformation of the cervical jaw, the localization and severity of the deformation, we performed various dental interventions: removal of teeth or their roots, selective grinding of non-erased cusps of milk teeth, orthodontic correction of the position of teeth and dentition, and prosthetics of partial defects in the dentition.

Timely orthodontic treatment and prosthetics for children with cervical joint deformities began with the choice of treatment method, the design of the orthodontic apparatus and the design of the denture. Because if the design is chosen incorrectly, errors and complications occur.

All children undergoing orthodontic treatment were divided into 2 subgroups: the 1st subgroup (main) orthodontic treatment was carried out using modern and our proposed devices (in 103 children) and the 2nd subgroup (comparison group) orthodontic treatment was carried out using traditional orthodontic devices.

In each age group under orthodontic treatment, we selected preventive and therapeutic devices individually, depending on the type of pathology.

In children of the 1st subgroup, depending on the age and nature of the pathology, elastopositioners of various modifications were used: pre-orthodontic trainer, infant trainer, myobrace system, T4 K tm, i-3tm, T4 KA, TMJ-MVV tm, T4 A tm. For children of the 2nd subgroup, traditional treatment devices: Klampt activator, Frenkel type I-II-III device, Andresen-Goipl monoblock, plate with a vestibular arch with an inclined plane, etc. were also selected individually.

In the main group of 21 patients who began treatment with elastopositioners, a positive result from wearing the device (elimination

of parafunction of the tongue, reduction of the vertical gap in the anterior section, elimination of bad habits, normalization of the position of the lower jaw) was observed in 19 (90.5%) of them. In 2 (9.5%) patients, the results were assessed as unsatisfactory, which is explained by insufficient wearing of the device during the day or its incorrect use.

Thus, the elastopositioners of various designs we used gave effective results for the treatment and prevention of secondary dentition deformations in children in the period of early mixed dentition.

We treated 7 children aged 13-14 years who needed orthodontic treatment using distalizing mechanics using fixed orthodontic equipment. Persons with a lack of space behind the last chewing teeth were excluded from the examination; the presence of destructive changes in bone tissue in the area of the apexes of the roots of chewing teeth; contraindications to dental implantation. All patients were treated with self-cutting orthodontic microimplants with a diameter of 1.4 mm and a length of 8 mm "HUBIT Co ltd. (Ojeon-dong, Byeoksentechnopia), A-1204.

Analysis of the general theoretical and practical prerequisites for continuous force on a moving tooth allowed us to develop a method for distal movement of lateral chewing teeth in a targeted direction, including their translational movement.

To increase the effectiveness of the orthodontic apparatus for the treatment of mesial occlusion, we have improved the apparatus by introducing an additional element into the design - a tongue rest.

A patent was received for the "Orthodontic apparatus for the treatment of mesial occlusion," which gave a positive effect in the treatment of secondary dentition deformation.

The theoretical necessary calculations of the continuous biomechanical movement of teeth were the basis for the design of orthodontic appliances that we used for the distal movement of small and large molars.

The effectiveness of the design we used was compared with the second subgroup of patients in whom orthodontic treatment was carried out with traditional devices: Klampt activator, Andresen-Goipl monoblock, Gashimov-Khmelevsky device, a plate with a vestibular arch with an inclined plane, a plate with a screw and a sectoral cut, etc. were also selected individually.

The advantages of the orthodontic fixed appliance we propose are:
- possibility of carrying out unilateral or bilateral distalization of

teeth;

- the ability to move teeth, both in the period of early mixed dentition and in late mixed dentition;
- without rotation and without tilting, allows you to move the chewing teeth body-wise;
- does not irritate the mucous membrane of the hard palate and does not injure it;
- activation of the device (screw) is sufficient once a day for half a turn (0.1 mm step);
- rapid and stable achievement of a therapeutic orthodontic effect;
- reduces the transfer of load to the frontal group of teeth;
- combination with other orthodontic devices.

Thus, the device we used turned out to be most effective for the distalization of the first chewing teeth in the final period of the mixed dentition, when the second permanent molars had not yet erupted. The average duration of orthodontic treatment was 56 ± 8 days, maximum – 108 ± 16 days, minimum – 31 ± 4 days.

Cephalometric and anthropometric measurements taken after treatment indicate good stability of mesially displaced teeth.

To prevent secondary deformation of the dentition in children with mixed dentition, it is necessary to conduct a routine examination of schoolchildren, and at the same time it is possible to promptly detect the etiological factors of dentofacial anomalies and deformations and eliminate them in a timely manner, due to which the number of patients with severe dentofacial anomalies and deformations is subsequently reduced. It is through clinical examination with the use of preventive methods and early orthodontic treatment that it is possible, with less labor and time, to provide orthodontic care to a larger number of children in need and move on to their planned orthodontic treatment.

Thus, the clinical, dental, anthropometric, radiological, photometric and functional studies of the dental system in children of variable age can be concluded:

1. Analysis of the results of a survey of schoolchildren in the city of Tashkent shows that the prevalence of anomalies and deformations in children with mixed dentition reaches 65.5%. Various disorders were identified in 304 (60.2%) of the 505 examined, including chewing disorders (one-sided chewing) was noted in 57 (18.8%), speech disorders - in 64 (21.1%), biting on foreign objects - in 46 (15.1%), mouth breathing – in

38 (12.5%), early loss of primary molars – in 47 (15.5%), primary adentia – in 21 (6.9%), unworn cusps primary canines – in 62 (20.4%). These factors predisposed to the formation of secondary dental deformations during the period of mixed dentition in 152 (30.1%) children.

2. Deformations of the posterior jaw due to secondary adentia occurred in 30 (5.94%) of the examined, due to: early removal of baby teeth - in 24 (4.75%), unworn cusps of baby teeth - in 20 (3.96%), dental alveolar elongation – in 21 (4.16%), primary adentia – in 12 (2.37%), shortening of the dental arch – in 13 (2.57%), infra- and supraocclusion – in 32 (6.34%).

3. Preventive dental treatment aimed at preventing the occurrence and development of dental deformations in children of the city of Tashkent is not carried out in full. Despite the high prevalence of anomalies and deformations in children with mixed dentition, the activity of dental care, including orthodontic care, in these children is not high and amounts to only 6.93%.

4. The fixed orthodontic appliance we developed turned out to be most effective for the distal movement of the first molars in the period of early mixed dentition. The average duration of treatment with a fixed appliance for patients in the main group, required for distal movement of the chewing teeth, was 56 ± 8 days, maximum – 108 ± 16 days, minimum – 31 ± 4 days. Corpus indispensable movement of chewing teeth was carried out without extrusion, intrusion or rotation.

5. Based on the data obtained, an effective algorithm for the diagnosis and treatment of secondary deformations of the dentoalveolar system in children with mixed dentition has been developed, including assessment of significant clinical manifestations, results of anthropometric, radiological and functional research methods, which allows increasing the speed and accuracy of dental diagnosis, differentiating different types of anomalies bites and secondary deformities of various etiologies and optimize treatment tactics. Thanks to the use of the algorithm, it was possible to significantly reduce the number of complications and prevent severe consequences of secondary deformations of the dentofacial apparatus.

6. The dental mirror we modified can be used for quick

diagnosis of dentition deformations during mass dental examinations of school-age children.

7. Bad habits, impaired speech formation, mouth breathing and early loss of primary chewing teeth lead to deformations of the dentition, as a result of which, in order to prevent anomalies and secondary deformation, it is necessary to use elasto-positioners and aligners with artificial teeth in the early stages of the formation of the dental system.

8. To make wider use in practical dentistry of the “Orthodontic Appliance” we recommend for distalization of chewing teeth in mixed dentition, in which the second permanent molars have not yet erupted.

9. Treatment and prevention of anomalies and secondary deformation of the cervical joint should be carried out by dentists of various profiles (general practitioner, surgeon, orthopedist and orthodontist), ENT doctors, speech therapists and psychologists according to an agreed comprehensive plan (the scheme proposed by us) and the goal should be not only the treatment of diseases but ultimately improve quality of life.

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РАЦИОНАЛИЗАТОРЛИК ИШИГА ТАКЛИФ

№ 18

28.02.2018 й
берилган мuddати

Ўзбекистон Республикаси ДИФМинни 1993 йил 7 июлдаги 11-сонли қарорига асосан

Рузметова Ироля Маратовнага

Нигматов Рахматулла Нигматовичга

Фамилия, исми-шарфи

рационализаторликка тақдим этилган иш бўйича

22.02.2018 й.

қорхона номидан қачон фойдаланишга рухсат берилди: Тошқент давлат стоматология институтининг клиникаси

номи: «Стоматологическое зеркало для определения степени деформации зуба» (Тишнинг деформация даражасини аниқловчи стоматологик ойпа).



ТошДавСИ илмий ишлар бўйича
проректори, профессор **Р.А.АМАНУЛЛАЕВ**

Имзо

ELEKTRON HISOBLASH MASHINALARI UCHUN YARATILGAN
DASTURNING RASMIY RO'YXATDAN O'TKAZILGANLIGI TO'G'RISIDAGI

GUVOHNOMA

СВИДЕТЕЛЬСТВО ОБ ОФИЦИАЛЬНОЙ РЕГИСТРАЦИИ ПРОГРАММЫ
ДЛЯ ЭЛЕКТРОННЫХ –ВЫЧИСЛИТЕЛЬНЫХ МАШИН

ЎЗБЕКИСТОН RESPUBLIKASI INTELLEKTUAL MULK AGENTLIGI
АГЕНТСТВО ПО ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ
РЕСПУБЛИКИ УЗБЕКИСТАН

№ DGU 05626

Ushbu guvohnoma O'zbekiston Respublikasining «Elektron hisoblash mashinalari uchun yaratilgan dasturlar va ma'lumotlar bazalarining huquqiy himoyas, to'g'risida»gi Qonuniga asosan quyidagi ENM uchun dasturga berildi:

Настоящее свидетельство выдано на основании Закона Республики Узбекистан «О правовой охране программ для электронно-вычислительных машин и баз данных» на следующую программу для ЭВМ:

Тиш-жаг аномалияларини ташхислаш ва баъоратлаш учун «Serhalopro» компьютер дастури
Компьютерная программа «Serhalopro» для диагностики и прогнозирования развития
зубочелюстных аномалий

Talabnoma ke'lib tushgan sana:
Дата поступления заявки:

15.08.2018

Talabnoma raqami:
Номер заявки:

DGU 2018 0645

Huquq egasi(egalar)i:
Собственник(и):

Муртазаев Саидазим Саидазамович, UZ

Dastur muallifi(lar)i:
Автор(ы):
программы

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Насимов Эльбек Эльхоневич, Нигматова Ирода Маратовна, Тулаганов
Бехлод Ботиржонович, Воидоя Гийс Гулом угли, UZ

O'zbekiston Respublikasi elektron hisoblash mashinalari uchun dasturlar deval reestriга 14.09.2018 yilda Toshkent shahrida ro'yvatdan o'tkazgan.

Зарегистрирован в государственном реестре программ для электронно-вычислительных машин Республики Узбекистан в г. Ташкенте 14.09.2018 г.

Bosh direktor
Генеральный директор

А. Сайдуллаев



INTELLEKTUAL
MULK AGENTLIGI

Indicators of the position of the left and right lateral incisors according to diagnostic models of patients in early mixed dentition according to the Tanaka-Jonston coefficient.

Num	IB	Y1	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
Num	НБ	Пол	Время лечения	Возраст	a	b	c	d	S1	2a	1a	1b	2b	S2	e	f	g
1	1048	0,0	3,0	6	21	9	12	21	63	6	5	5	6	22	12	16	10
2	198	0,0	3,0	9	20	6	7	20	53	5	5	5	5	20	22	15	14
3	141	0,0	3,0	6	16	6	8	20	50	6	5	5	6	22	11	10	10
4	148	0,0	2,0	6	20	11	11	17	59	5	5	5	5	20	22	15	14
5	582	0,0	2,0	6	23	13	13	26	75	6	6	6	6	24	22	15	15
6	601	0,0	2,0	6	23	13	13	21	70	7	6	6	7	26	23	13	13
7	429	0,0	3,0	6	19	11	13	19	62	7	6	6	7	26	17	17	17
8	544	1,0	3,0	8	21	10	10	22	63	5	5	5	5	20	21	15	15
9	18	1,0	2,0	7	20	11	11	15	57	6	6	6	6	24	23	17	18
10	898	1,0	3,0	8	19	12	12	18	61	6	6	6	6	24	17	17	17
11	703	1,0	3,0	9	25	13	13	24	75	7	6	6	7	26	19	17	17
12	219	1,0	2,0	7	20	11	11	15	57	6	6	6	6	24	23	17	18
13	737	1,0	3,0	9	22	12	12	22	68	5	6	6	5	22	19	17	17
14	48	1,0	3,0	9	20	11	11	21	63	5	5	5	5	20	23	11	13

Appendix No. 5

Indicators of the position of the left and right lateral incisors according to diagnostic models of patients in late mixed dentition according to the Tanaka-Jonston coefficient.

Num	IB	Y1	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
Num	НБ	Пол	Время лечения	Возраст	a	b	c	d	S1	2a	1a	1b	2b	S2	e	f
1	18	1,0	3,0	10	21	9	12	21	63	6	5	5	6	22	12	16
2	233	0,0	4,0	11	22	11	11	16	60	6	5	5	6	22	21	17
3	244	1,0	4,0	12	22	12	11	21	66	7	6	6	7	26	20	11
4	276	0,0	3,0	12	20	11	11	20	62	5	5	5	5	20	20	17
5	345	1,0	3,0	14	21	10	10	18	59	5	5	5	5	20	21	14
6	342	0,0	3,0	13	21	9	12	21	63	6	5	5	6	22	16	16
7	45	1,0	3,0	11	22	11	11	16	60	6	5	5	6	22	21	17
8	465	0,0	3,0	11	22	12	11	21	66	7	6	6	7	26	21	11
9	345	0,0	3,0	12	20	11	11	20	62	5	5	5	5	20	20	17
10	3	1,0	4,0	14	21	10	10	18	59	5	5	5	5	20	21	14
11	33	1,0	3,0	12	22	12	11	21	66	7	6	6	7	26	20	11
12	267	1,0	3,0	11	20	11	11	20	62	5	5	5	5	20	20	17
13	356	1,0	3,0	14	21	10	10	18	59	5	5	5	5	20	21	14
14	432	1,0	3,0	13	21	9	12	21	63	6	5	5	6	22	13	16
15	234	1,0	4,0	11	22	11	11	16	60	6	5	5	6	22	21	17
16	123	1,0	3,0	10	22	12	11	21	66	7	6	6	7	26	20	11
17	432	0,0	4,0	12	20	11	11	20	62	5	5	5	5	20	20	17
18	256	1,0	4,0	12	21	10	10	18	59	5	5	5	5	20	21	14
19	324	0,0	3,0	13	22	11	11	16	60	6	5	5	6	22	21	17
20	23	1,0	3,0	11	22	12	11	21	66	7	6	6	7	26	20	11
21	45	0,0	3,0	12	20	11	11	20	62	5	5	5	5	20	20	17
22	343	0,0	3,0	12	21	10	10	18	59	5	5	5	5	20	21	14
23	765	1,0	3,0	13	22	12	11	21	66	7	6	6	7	26	20	11
24	56	0,0	3,0	14	20	11	11	20	62	5	5	5	5	20	20	17
25	76	1,0	3,0	13	20	10	10	18	58	5	5	5	5	20	21	14

26	54	0,0	4,0	12	21	9	12	21	63	6	5	5	6	22	16	16	16	15	0,5	0,5
27	456	1,0	3,0	12	22	12	11	21	66	7	6	6	7	26	20	11	11	17	2,5	1,5
28	765	1,0	3,0	13	20	11	11	20	62	5	5	5	5	20	20	17	17	20	0,5	0,5
29	655	0,0	3,0	12	21	10	10	18	59	5	5	5	5	20	21	14	15	21	2,5	-0,5



**O'ZBEKISTON RESPUBLIKASI INTELLEKTUAL MULK AGENTLIGI
АГЕНТСТВО ПО ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ
РЕСПУБЛИКИ УЗБЕКИСТАН**

**FOYDALI MODELGA PATENT
ПАТЕНТ НА ПОЛЕЗНУЮ МОДЕЛЬ**

№ FAP 01242

Ushbu patent O'zbekiston Respublikasining "Ixtirolar, foydali modellar va sanoat namunalari to'g'risida"gi Qonuniga asosan quyidagi foydali modelga berildi:

Настоящий патент выдан на основании Закона Республики Узбекистан «Об изобретениях, полезных моделях и промышленных образцах», на полезную модель:

**Мезиал прикусни даволаш учун ортодонтик аппарат
Ортодонтический аппарат для лечения мезиального прикуса**

Talabnoma kelib tushgan sana: **16.02.2017**
Дата поступления заявки:

Talabnoma raqami: **FAP 2017 0010**
Номер заявки:

Ustuvorlik sanasi: **16.02.2017**
Дата приоритета:

Patent egasi (egalari): **Муртазаев Саидазим Саидазамович, UZ**
Патентообладатель(и):

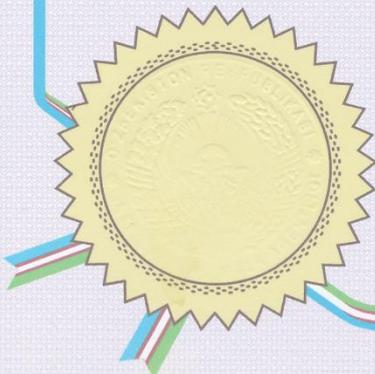
Foydali model muallif(lar)i: **Муртазаев Саидазим Саидазамович, Муртазаев Саидаъло Муртазаевич, Муртазаев Саидмуродхон Саидаълоевич, Махсудов Суннат Нигматович, Сайдалиев Мухиддин Низомиддинович, Насимов Эльбек Эльхонович, Рузметова Ирода Маратовна, UZ**
Автор(ы) полезной модели:

Patent O'zbekiston Respublikasining barcha hududida 16.02.2017 yildan patentni kuchda saqlab turish uchun boj o'z vaqtida to'langandagina 5 yil mobaynida amal qiladi.

O'zbekiston Respublikasi foydali modellar davlat reestrda 22.09.2017 yilda Toshkent shahrida ro'yxatdan o'tkazilgan.

Патент действует на всей территории Республики Узбекистан в течение 5 лет с 16.02.2017 г. при условии своевременной уплаты пошлины за поддержание в действии.

Зарегистрирован в государственном реестре полезных моделей Республики Узбекистан, в г. Ташкенте 22.09.2017 г.



**Bosh direktor
Генеральный директор**

А.Файзуллаев



РАЦИОНАЛИЗАТОРЛИК ИШИГА ТАКЛИФ

№ 12

28.02.2018 й
Берилган мuddати

Ўзбекистон Республикаси ДИФМнинг 1993 йил 7 июлдаги 11-сонли қарорига асосан

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Фамилия, исми-шарifi

рационализаторликка тақдим этилган иш буйича

22.02.2018 й

қирхонга номи, қачон фойдаланишга рухсат берилди: Тошкент давлат
стоматология институтини клиникаси

номи: «Ортодонтический аппарат для дистализации жевательных зубов
в смешном прикусе (Автоматизованный прикус дюррида чайнов тивизирли дистал
томонга сурувчи ортодонтик аппарат)»



ТошДавСИ илмий ишлар буйича
проректори, профессор Р.А.АМАНУЛЛАЕВ

Илоҳ

Nigmatov Rakhmatulla Nigmatovich – Head of the Department of Orthodontics and Dental Prosthetics, Tashkent State Dental Institute, Doctor of Medical Sciences, Professor

Nigmatova Iroda Maratovna – Associate Professor of the Department of Orthodontics and Dental Prosthetics of the Tashkent State Dental Institute, Doctor of Philosophy (PhD)

DIAGNOSIS, TREATMENT AND PREVENTION OF SECONDARY
DENTAL DEFORMATIONS IN THE MIXED BITE
(MONOGRAPH)

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