

Determination of Aetiological Factors Causing Upper Jaw Protrusions and Treatment Measures in Age-Dependent Cases

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Abstract This study investigated the prevalence of maxillary protrusions and its etiological factors. In particular, the main causes of upper jaw protrusions are heredity, bad habits, functional disorders and aesthetic problems, and the need for early diagnosis of the factors affecting the disease and the mechanism of their development was emphasized. In a study of 184 children, different modern orthodontic appliances such as aligners, braces, and Twin-Block appliances were shown to be effective.

Keywords Upper jaw protrusion, Orthodontics, Dentition system, Aligner, Bracket, Twin block, Aesthetics, Functional disorders, Genetic factors, Harmful habits

1. Introduction

Today, maxillary protrusions make up 36.8% of tooth-jaw system deformations according to the sources of scientific literature. Early diagnosis and effective treatment of these pathologies in the practice of orthodontic dentistry is one of the urgent problems awaiting a solution. In recent years, there has been an increase in the number of class II deformations and a decrease in class III deformations according to the Engel classification, which is related to the change in the chewing pressure load. E. N. Julev by foreign and local scientists, 2000; V.N. Trezubov, 2001; Mwakatobe D. Ambege, E. Yu. Nikolaeva, 2014; Nasimov E.E., 2019, highlights other forms of maxillary protrusions, that is, information on types of maxillary growth. Objective vision in the examination of maxillary protrusions is a complete analysis of cephalometric indicators, taking into account the growth component of the jaws [1]. According to the current research, deformations of the tooth-jaw system occur in the postnatal period in 25-80% of cases [2]. According to scientific sources, the incidence rate of tooth-jaw system deformations of adult patients is increasing among young children and adolescents [3]. The reason for this is that the improvement of the living conditions and the cultural level of the population indicate that the need to improve facial aesthetics is higher in older patients. Currently, significant progress is being made in improving the methods of treatment and rehabilitation of patients with upper jaw protrusions.

The high level of these results is due to the increase in the quality of orthodontic care and the high level of early diagnosis and prevention of tooth-jaw system deformations in school and pre-school educational institutions. [5,6]. According to the knowledge of orthodontists all over the world, as a result of early diagnosis and effective treatment of deformations of the tooth-jaw system, restoration and normalization of the morphological and functional optimality of the tooth-jaw system, therefore, helps to increase the achieved results of their treatment.

2. Research Material and Method

In 2021-2023, 184 children under the age of 18 with upper jaw protrusion were taken in the orthodontic department of the specialized children's dental center of Bukhara region. Children with upper jaw protrusions were examined objectively, subjectively and through a questionnaire. In our research, the patient children were divided into 3 groups.

3. Research Result

Eliminating the etiological factors that cause protrusions of the upper jaw and studying the age-related condition can be caused by a number of etiological factors. In this study, they were divided into the following groups.

Genetic predisposition. Heredity plays an important role in the development of high protrusions. Genetic studies show that children with this problem are often high in certain genes that affect the development of the upper and lower jaw. In 47% of our patients participating in our study, the origin of upper

jaw protrusions as a result of genetic factors was studied.

Harmful habits. 23% of our patients developed upper jaw protrusions as a result of harmful habits such as finger sucking, long-term use of pacifiers, or mouth breathing.

Functional disorders. Atypical position of the tongue, nasal breathing disorders, improper swallowing and lack of proper chewing were observed in 11% of our study group patients.

Early teething. Absence of teeth during permanent bite period was found in 6% of 14-17 year old patients.

Disorders of the skull and brain. The forward position of the head causes excessive tension and contraction of the neck muscles, which causes the lower jaw to move back. Congenital muscular dystrophy also affects the development and function of muscles (cerebral palsy and Down syndrome) in children. In our research group, these patients were 0.6.

Bone skeleton ratio. When the lower jaw is behind the upper jaw. This occurs as a result of insufficient growth of the lower jaw, excessive growth of the upper jaw, or a combination of both factors, which occurred in 14% of patients in the study.

Teeth ratio. High front teeth bottom teeth significant level covers. This condition most of the time deep bite is also high of the teeth forward out to go take will come This condition in our study participating observed in 7% of our patients.

Aesthetic problems. The face is unbalanced appearance can be extended high jaw and "sunk." gone " chin with is evaluated.

Functional disorders. Cheynov and in speaking difficulty, mouth space to diseases inclination Sleep apnea and in sleep snoring. High jaw protrusions and bottom jaw distal in the situation very common signs. Jaws lack of development because of high breath of the ways volume decreases, this mouth through breath get, sleep during pathological circumstances observed.

Table 1. Types of infant nutrition (months) in children in the study group by questionnaire

Research groups	Feeding niche (months)	A mix to nutrition transition age (months)
Comparison group	18.48±1.13	7.13±0.59
Group I	14±1.3**	6.64±0.6
Group II	15.25±0.99***	5.25±0.46
Group III	13.6±0.93*	5.61±0.51

Infant nutrition of the children in the research group was switched to mixed feeding after 6.5 months in our group 1, after 5 months in our group 2, and after 7 months in our comparison group.

For the patients of the comparison group, the plastic-based screw device Twin block device was used as a modification of the twin block device, which was caused by the reduction of the length of the lower tooth row during the early exchange period, in order to lengthen the lower jaw tooth row.



Figure 1. Application of aligners in maxillary protrusion



Figure 2. Twin block hardware modification form used in comparison group patients

We found it preferable to use the non-removable orthodontic appliance bracket for the treatment of maxillary protrusions in 65 children aged 14 to 18 years during the period of permanent teeth pricus, Trainer V and control group **patients.**

We aimed to use braces, which are widely used in modern orthodontic dentistry practice, in the treatment of upper jaw protrusions that occur during permanent pricus. The bracket is attached to the tooth enamel using special composite materials. If the installation of braces is necessary for medical or aesthetic reasons, it is necessary to approach the choice of its specific type with responsibility. The requirements for the brace system in the patients undergoing treatment should not cause discomfort in life and communication, should not worsen the discussion and make communication difficult. The braces used in patients are attached to each tooth individually and are designed to transfer forces from the arch to the tooth, under the pressure of which helps the teeth and tooth rows to return to their normal position.

In patients undergoing treatment, the following diseases are treated in time when using a brace device.

- * caries and its complications;
- * inflammatory and viral diseases of the oral cavity;
- * supragingival and subgingival calculus.

Currently, there are several types of braces in orthodontic dentistry practice, the difference between them is the material of manufacture and the method of fastening. We selected the braces used in upper jaw protrusions depending on the type and degree of the disease.

For maxillary protrusions, metal type braces - systems made of medical steel are convenient for most people. These types of braces are reliable and structurally strong, and metal braces are durable and have long-lasting results.

Ceramic type braces for maxillary protrusions - this type of braces does not spoil the appearance of ceramic teeth, as such braces are not visible on the teeth. They are almost no different from tooth enamel, but over time, under the influence of certain drinks (coffee, tea, red wine) and coloring spices, they can become slightly stained. Also, ceramic braces differ from other types of braces in that they are not sufficiently resistant to mechanical effects and quickly break their properties.

Plastic braces are the first orthodontic system to compete with metal braces for maxillary protrusions. Aesthetically, plastic looks much better and has almost invisible properties. However, there are disadvantages: low strength, dyeing under the influence of food and drink dyes. In this case, we used colored braces.



Figure 3. Application of Bracket device in the treatment of maxillary protrusions during permanent pricus



Figure 4. Combined use of Bracket Trainer V in patients with stage III sleep

4. Research Results and Discussion

When patients with upper jaw protrusion were examined through additional orthodontic examination methods, it was found that the incidence rate was higher in girls than in boys. Information on treatment methods, duration of treatment and the number of relapses in the three groups of patients being treated is presented in table 2.

In the first group treatment, Infant trainer, Trainer T4K first stage was used. Treatment lasted up to 12-14 months. After treatment, regular follow-ups were done every 3 months. Recurrence of the anomaly was up to 12-15%, due to the preservation of functional disorders and due to improper eruption of individual teeth.

Control groups A₁ were treated with traditional removable plate-based lingual barrier orthodontic appliances.

The treatment period lasted 8-12 months. With the onset of eruption of the central incisors, orthodontic treatment was temporarily stopped. Due to the preservation of the infantile type of swallowing in the patients, signs of inappropriate tooth eruption and protrusion of upper incisors were not observed, recurrence was observed in 25-28%.

The second group was treated with the Eliner device from 7 to 14 years of age. A trip to the doctor was made once every three months, and each stage of the aligner was replaced with a new one in 14 days. Depending on the severity of the anomaly, 8-10 aligners were applied to each jaw. In this case, the patient's aesthetically pleasing speech will not be disturbed, and it will not interfere with eating. Diagnosis and expected result, treatment is carried out on the basis of a computer program.

Table 2. Treatment methods, duration of treatment and relapses in the main and control groups of patients with maxillary protrusion

Groups	Treatment methods	Duration of treatment	Relapses
I	Infant trainer, Trainer T4K	Treatment 12-14 months	12-15%
II	Aligner device	Every step of the aligner is replaced with a new one in 14 days Treatment 8 - 10 months	8 - 9%
III	Non-removable orthodontic brace	The duration of treatment is 12-15 months	10%
Comparison group	traditional removable plate-based lingual barrier orthodontic appliances	The duration of treatment is 8-12 months	25-28%

Izox: Treatment durations and relapse rates are higher in the main groups

Control group A₂ - In our patients, plate-based screw orthodontic device was used. A modified form of twin block device was used. Recurrence of the anomaly was up to 10-12% due to narrowing of the side of the upper jaw and associated diseases of the upper respiratory tract. The duration of treatment was 12-18 months.

A non-removable orthodontic brace was used in the third group of patients. At the same time, Trainer V was used to treat functional disorders. The interscapular angle and the angle of the upper scapular teeth were moved to the normal side by 3.5-5 degrees.

Recurrence reduced to 10%.

Control group A₃ - non-removable orthodontic appliance bracket system was used. The treatment period lasted 18 months. After treatment, the Finishne trainer was used for up to 3 years to prevent relapses. The wisdom teeth were examined once a year. This led to an increase in treatment time and treatment costs. As a result of early identification of the etiological factors of upper jaw protrusions and taking treatment measures, the number of treatment and visits for distal pathological occlusions treated for years was reduced by 2-3 times for 8-12 months. Reduction of the number of relapses was achieved by exchanging the treated deformities during pricus and restoring myofunctional balance during permanent pricus. In patients with upper jaw protrusions, aesthetic defects of the face were eliminated by choosing orthodontic appliances in age-related cases. Patients with upper jaw protrusions should be under the supervision of an orthodontist. It is necessary to carry out diagnostic analyzes in the early diagnosis of patients with facial and jaw system deformations. Timely treatment of an aesthetic defect leads to improvement of the quality of life by restoring the state of masticatory efficiency.

5. Conclusions

Maxillary protrusions represent 36.8% of the total number of deformities in dentistry, and this problem needs early diagnosis and effective treatment. Factors such as harmful

habits, genetic predisposition, early or incorrect eruption of teeth, and functional disorders cause this disease. Treatment methods between bracket, aligner and Twin block devices different forms used. Patients to his age looking selected orthodontic equipment different the results showed, including braces use treatment efficiency in raising important and aligners are aesthetically and functionally it is convenient. Treatment term and relapses indicators selected method depends respectively difference made, relapses while more of the teeth wrong output with depends was Treatment own in time execution and preventive measures organize to be done high jaw to the protrusion against in the struggle efficient measures as recommendation will be done.

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