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IMPROVING ORTHODONTIC TREATMENT FOR DENTAL DEFECTS

Khabilov N. L.
Department of Hospital Prosthetic Dentistry,
Tashkent State Dental Institute, Republic of Uzbekistan

Corresponding Author: M. U. Dadabayeva,
Tashkent State Dental Institute, Makhtumkuli 103,
Tashkent, Republic of Uzbekistan, 100047, tel. +998988090199,
E-mail: ruhsoran@mail.ru

Abstract
The main criterion is the constancy of the teeth. The inconsistency of these parameters can lead to the appearance of gaps between the teeth. This article presents data on the structural features of the dentition and facial skeleton, as well as data on the preservation or removal of teeth when planning orthodontic treatment. Based on the study of patient data, it is necessary to study the biometric structural features of the dentition with angeries of the first and second Engel occuli in patients who need tooth extraction before orthodontic treatment, to conduct a comparative analysis of biometric and X-ray cephalometric indices with anomalies of the bite of the first and second Engle classes.

Keywords: dental alveolar arch, removable functional-acting and mechanically-operating devices, self-ligating braces, telerentgenogram, cephalometric analysis, craniofacial complex, X-ray cephalometric indicators.

Introduction

Teething is a physiological process that is one of the significant components of morphofunctional formation. Over the past 20 years, a lot of work has been done to analyze information about the eruption of permanent teeth. The timing of the eruption of permanent teeth directly depends on the degree of physical development of the child, the degree of maturity of the child's body and puberty, as well as on the peculiarities of the constitution.

The main criterion responsible for the position of the teeth in the dentition is the ratio of the parameters of the dental arches to the size of the permanent teeth. Inconsistency of these parameters can lead to crowding (tight position of the teeth) or spaceing (the appearance of gaps between the teeth) [1].However, when diagnosing anomalies and deformities of the maxillofacial region, it is recommended to take into account the individual features of the structure of the craniofacial complex and their correlation with the size of the teeth.

The discrepancy between the size of the teeth and the parameters of the jaws is considered to be the main cause of abnormalities in the shape of the dental arches. The total estimate of the space in the dentition is expressed in millimeters of additional or deficient length of the dental arch. Various methods have been proposed to calculate them [2]. The method of determining the total

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mesial-distal size of non-erupted teeth based on X-ray examination data has become the most widespread. The difference between the total size of the permanent posterior teeth that have not erupted and the size of the gap that exists for them is indicated by the phrase "free space" [3].

The primary task of orthodontic treatment for narrowing and shortening of the dental arches of the upper and lower jaws during the period of milk and replacement occlusion is the expansion or elongation of the dentition and the acceleration of the growth of the apical bases. For this purpose, removable functionally acting and mechanically acting removable devices are used [4].

At the present stage of the development of orthodontics, fixed orthodontic appliances are actively used for intensive expansion of dentoalveolar arches in various modifications, which allow you to significantly and quickly expand the dentition [5].

In the world of orthodontic practice, out of a large number of types of fixed technique, the straight-wire technique is the most widely used. It was developed and first used by the American orthodontist L.F. Andrews in 1969. The essence of the straight arch technique is to bring the dentition to an ideal anatomical shape due to the design features of braces and a straight orthodontic arch with a rectangular cross-section. [6].

At the end of the 20th century, self-ligating braces were proposed (the arch in the groove was fixed using a special clip located on the vestibular surface of the brace), which did not require frequent visits to the doctor [7].

There are two types of self-ligation – active and passive. In active self-ligating systems, the arch is actively pressed against the bottom of the bracket groove, creating grip and friction of the arch in the groove. In passive self-ligation braces, the arch is not pressed against the brace, and there is almost no friction force [8].

Orthodontic treatment with the use of preliminary widening of the dental arches followed by the use of the straight-wire technique makes it possible to achieve pronounced changes in the alveolar and basal structures, increase the size and improve the shape of the dental arches without resorting to the extraction of individual teeth [9].

Another treatment option is to correct dentoalveolar anomalies with tooth extraction. At the same time, some authors suggest removing the upper first premolars, and sometimes, to create a correspondence between the longitudinal dimensions of the dental arches, the lower teeth [10]. Thus, an artificial reduction of the gnathic part of the facial skeleton is achieved, the growth of the upper and lower jaws is slowed down with a simultaneous change in the aesthetics of the face [11]. In addition, after tooth extraction, the soft tissues of the maxillofacial region can accentuate or, conversely, mask the anomaly in the shape of the dentition and jaws [12].

When planning orthodontic treatment of dentoalveolar system anomalies, as a rule, there is no balance between the lack of space within the dentition and the size of the morphological basis, i.e. the length and width of the apical and basal arches, as well as the length and width of the dentition [13]. In addition, not all authors take into account jaw growth factors, facial type, and aesthetics to determine an orthodontic treatment plan with tooth preservation or extraction [14]. The analysis of the lower dental arch is a determining factor in the decision to extract teeth. Cephalometric analysis should also be performed [15].

At the present stage of the development of orthodontics, there are still no definite indications for treatment with the extraction of individual teeth, taking into account the parameters of the craniofacial complex, the degree of discrepancy between the size of the teeth and these parameters with various variants of individual sizes of permanent teeth. The development of orthodontic

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technology has made it possible to limit the cases of treatment with the extraction of individual teeth. Nevertheless, the absolute indications for tooth extraction in patients with anomalies are overcomplete teeth of irregular shape, which complicate the process of eruption of permanent teeth, or disrupt the shape of dental arches, as well as in relative and absolute macrodontics.

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The choice of treatment method (with or without tooth extraction) depends on the capabilities of the orthodontic equipment used. In the 21st century, orthodontics has undergone changes. With the introduction of a new type of fixed orthodontic technique - passive self-ligation - it became possible to treat complex dentoalveolar anomalies without removing complete teeth [17, 18].

Thus, at present, a number of key positions have been formed that determine the relevance of further study of this problem. In particular, in the literature available to us, we did not find data on the features of the clinical picture of dentoalveolar anomalies, on the features of the structure of the dentition and facial skeleton in patients who need tooth extraction for orthodontic indications. In addition, there is still no automated system for determining the indications for the preservation or extraction of teeth when planning orthodontic treatment. These are the questions that have been the subject of our research.

To solve these problems, we examined and accepted for treatment patients with anomalies of the dentoalveolar system of the first and second class of Engle, in the amount of 100 people, who were indicated for tooth extraction before orthodontic treatment, aged 17 to 35 years.

Patients were divided into groups on the basis of nosological forms of dentoalveolar anomalies (Table 1). 1.):

Table 1 Distribution of patients admitted for treatment

Nosological form					
Engle class I malocclusion		Engle class II malocclusion			
		Subclass I		Subclass II	
22		44		34	
women	men	women	men	women	men
12	10	24	20	18	16

In the first group with Engle's first-class malocclusion, all the first premolars were removed.

In the second group with second-class malocclusions of the first subclass of Engle, the first upper premolars were removed.

In the third group with malocclusion of the second class of the second subclass of Engle, the first upper premolars were also removed.

Along with the premolars, 75 patients had their third molars removed in preparation for orthodontic treatment.

For the treatment of patients with Engle class I and II malocclusion, we used the instrumental method using fixed orthodontic appliances (braces, straight-wire technique). Roth braces were used in 81 cases, with Damon in 19 cases.

All those clinical cases in which it was possible to carry out orthodontic treatment without extraction (i.e. with preservation of teeth) were not included in the groups of examined persons.

Dental examination of patients in need of orthodontic correction of anomalies of the dentoalveolar system was carried out according to a standardized scheme and included a survey, external examination and examination of the oral cavity, study of X-ray cephalometric indicators.

When choosing a treatment method, we took into account the age, individual characteristics of the pathogenesis of the anomaly, the degree of severity of morphological, functional and aesthetic disorders. Particular attention was paid to the profile of the face, the position of the lips relative to the aesthetic line of the Rickets, the nature of the closure of the lips, the size of the tooth crowns, the angle of inclination of the incisors to the base of the jaw, the size of the apical bases, the degree of severity of the close position of the teeth and the lack of space.

Thus, it can be stated with confidence that the study of biometric, anthropometric and X-ray cephalometric indicators of the structure of the dentition in patients with malocclusion who need tooth extraction before orthodontic treatment makes it possible to clearly determine the indications for preserving or extracting teeth before orthodontic treatment.

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