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STUDYING OF THE INFLUENCE OF THIRD MOLARS ON THE DENTOALVEOLAR ARCH

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Abstract
The influence of the third permanent molars on the dentoalveolar arches remains in the focus of attention of many researchers. The objective of the present study was to elucidate the influence of the third permanent molars on the dentoalveolar arches. Material and methods. We analyzed the photographs and X-ray images obtained from 58 patients in the course of the orthodontic correction and during the retention period in whom the formation of the third permanent molars was completed. We registered changes that developed in the dentoalveolar arches during this time. The methods of logical analysis were employed. Results. In the case of lack of space, third permanent molars transmit the force generated in the course of formation of their roots and eruption onto the anteriorly located teeth. This force may cause bone resorption in the anteriorly located teeth as well as their displacement and/or that of the third molars. The magnitude of the displacement is a function of both the resulting force acting on the teeth and its direction. Conclusion. The occlusal force exerts an influence on the teeth location.
Difficult eruption of the wisdom teeth may substantially increase this force and lead, in the case of occlusal interference between the eyeteeth, to the deformation of the mandibular dental arch in the region of the eyeteeth. The immature teeth occupy in the alveolar process the optimal position for the current anatomical and functional state. The extraction of the immature third molars prior to the onset of mineralization of their crown is minimally injurious.

Keywords: dentoalveolar arch, third molar, semi-retention.

Introduction

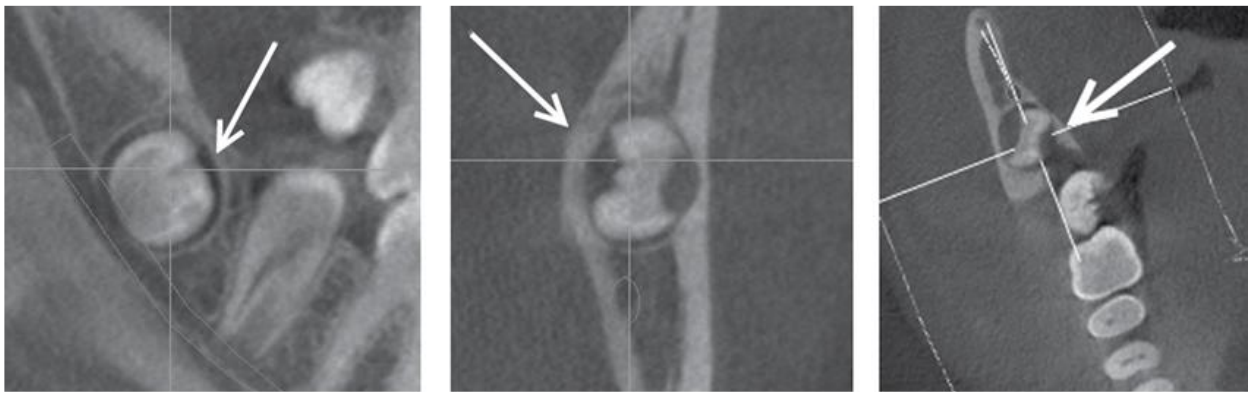
The results of the study conducted by K. Zawawi, M. Melis showed that the presence of third molars or their removal does not have a significant impact on the formation of anterior teeth crowding or recurrence after orthodontic correction. According to G. Kaveri, S. Prakash (2011), despite well-founded indications for the removal of third molars, the preventive extraction of these teeth ranges from 22 to 51.8%[2]. E.S. Gordina et al. (2013) propose to remove the rudiments of the third molars for the stability of orthodontic correction with a decrease in the retromolar space [3].

According to a study published by M. Elsey and W. Rock (2012), third molars are retained in 73% of children [5]. A 2022 survey of 60 orthodontists in Tashkent found that 65% of them considered third permanent molars sometimes responsible for crowding. Thus, 24.4% of orthodontists “rarely” or “never” and 75.6% of orthodontists “generally” or “sometimes” are referred for prophylactic extraction of third molars to prevent crowding.
The existence for decades of a clear inconsistency between scientific publications and practice makes one wonder about the causes that cause it.

The aim of this study was to evaluate the influence of the third permanent molars on the dentoalveolar arches.

Material and methods.
In order to study the influence of the third permanent molars on the dentoalveolar arches, a study was conducted on 58 children aged 15 to 30 years. Of these, 38 boys (66%) and 20 girls (34%). All examined children underwent clinical, radiological, anthropometric and photometric studies in the process of orthodontic correction or in the period of retention in which the formation of third permanent molars was completed. The changes that occurred during this period in the dentoalveolar arches were analyzed.

Results and discussion
Typical development of the third permanent molar begins around 8–9 years of age with radiographic appearance of a follicle distal to the second molar. The crown is formed by the age of 14, the root by the 20-21st year. As a rule, third molars erupt between the ages of 17 and 21.
In the visual analysis of computed tomograms of the upper and lower jaws in children undergoing orthodontic diagnostics at the clinic of the Tashkent State Dental Institute, the rudiments of the third molars on the upper jaw were always located in the region of its tubercle, on the lower - in the jaw branch, and the chewing surface of the latter had a lingual slope (Pic. 1).



A B C

Picture 1. The position of the rudiment of the right third molar of the lower jaw on CT scans of a patient aged 15 years 9 months.
A - in the sagittal direction; B - in the vertical direction; C- in the transverse direction.

One of the most popular theories of retention of mandibular third permanent molars is the underdevelopment of the retromolar space, which is formed in the process of modeling resorption of the anterior surface of its branch.

With violations of this process, the eruption of third molars is difficult. L. Chen et al. (2010) found that an increase in the retromolar space as a result of bone resorption along the anterior border of the branch from 13 to 18 years old occurs on average by 1.22 mm in girls and 1.45 mm in boys on each side per year.

However, during the eruption of the third molars, a mesial drift of the first permanent mandibular molar by 1.32 mm was noted, which the authors attribute to the resulting medial pressure.

The resorption of the roots of the second molars when they come into contact with the crowns of the third permanent molars also indicates the pressure exerted by the latter during the formation of their roots

Picture2. The location of the rudiments of the third molars of the upper and lower jaws on the OPTG in a patient aged 14 years.

The erupting third permanent molar in the observed patients in one case changed the position of the germ of the second permanent molar, which did not have a stable mesial support, since it was also located in the lower jaw branch.

If there is sufficient space, the third molar, erupting, does not adversely affect the teeth located in front, which was proven by the studies of E.B. Grishina and A.B. Slabkovskaya (2004), who confirmed the importance of assessing the retromolar space.

It is important for the doctor to know how these forces affect the dentoalveolar arches. Realizing that pressure is transmitted sequentially, one should look for changes in the position of molars, premolars, canines, and, last but not least, incisors. Our observations indicate that, relative to the second molar, the third molars in the upper jaw can erupt buccally or palatally. With the palatal eruption of the third molars and the lack of space for them, the vestibular displacement of the second molars occurs and the dental arch becomes more oval

With vestibular eruption of the third molars and lack of space for them, the second molars may not change their position, shift vestibularly, contribute to the formation of mesial

rotation of the first permanent molars, as well as the recurrence of the saddle-narrowed form of the dental arch.

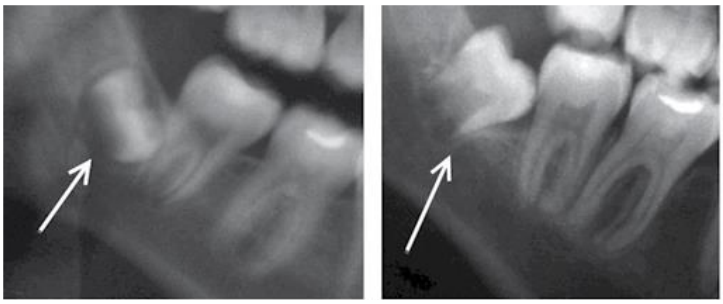
In the mandible, impacted and semi-impacted third molars can block the second molars in their distal tilt.

According to our observations, first of all, occlusal contacts, and secondly, approximal contacts stabilize the position of the chewing teeth located mesially from the third molars. The density of approximal and occlusal contacts increased with age when the antagonists were in dimple-tubercle ratios.

T. Kim et al. (2003) suggest that the removal of premolars with mesial displacement of the molars reduces the incidence of retention of wisdom teeth.

J. Staggers et al. (1992) compared changes in the position of third molars in patients with grade 1 anomalies without extraction and with extraction.

Our observations indicate that a change in the position of the third molars occurs when their mesial edge contacts the distal surface of the teeth in front (Pic. 3).



A B

Picture 3. Change in the position of the third molar of the lower jaw on the right (arrows) upon contact with the distal surface of the second molar during its formation and eruption in the patient.

a — fragment of OPTG — 10 years; b — fragment of OPTG — 14 years;

Conclusions

With a lack of space, the third permanent molars transmit the force that occurs during the formation of their roots and eruption to the front teeth. This force can lead to resorption of the roots in front of the teeth, to the displacement of them or third molars. The displacement of the teeth is determined by the resulting forces acting on them and its direction. Occlusal forces have a decisive influence on the position of the teeth. Difficult eruption of wisdom teeth can significantly increase these forces, which, with occlusal interference of canines, leads to deformation of the dental arch of the lower jaw in the region of the incisors.

Removal of the rudiments of the third molars before the mineralization of their crowns begins is the least traumatic.

Literature Review

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