

MEDICAL SCIENCES

EVALUATION OF THE EFFECTIVENESS OF DISTALIZATION OF UPPER MOLARS

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Abstract

Distalization of the upper permanent molars is an important and often decisive component in many orthodontic treatment cases. The key role of the correct position of the first upper permanent molars in the formation of physiological occlusion, the complexity of the biomechanical requirements for their orthodontic movement create an independent branch of orthodontics from the distalization of molars. The most common indication for distalization of upper molars is their mesial position.

Keywords: Mesial position of the upper permanent first molar, distalization.

The main cause of this pathology is premature removal of primary molars (detected in more than 17% of children already at the age of 3–5 years) [1]. During the period of mixed dentition, the number of dentition defects increases, and due to the active growth of children, in addition to the mesial displacement of the molars, other structural and functional disorders of the dental system quickly develop: inclination of the first permanent molars towards the dentition defect, shortening of the dental arch, lack of space for erupting permanent premolars and canines, violation of the timing of their eruption, axial rotation and supraocclusion, decreased bite height. These disorders cannot be self-regulated; their elimination is possible only with the help of active orthodontic treatment [2,4]. Indications for distalization of molars are also dentoalveolar disorders (disproportion between the sizes of teeth and dental arch, mesial position of the upper dental arch) and skeletal disorders (protrusion of the upper jaw, protrusion of the upper jaw in combination with retrusion of the lower jaw) [3,5]. Molar distalization is often the first step in the treatment of malocclusions without extraction of premolars or in treatment with extraction of second molars. Appliances for distalization of upper molars are divided into extraoral (face arch with various traction options - occipital, cervical or combined) and intraoral (plate with distalizing elements, nitinol springs, Wilson distalizing arch, Distal Jet, Jones Jig, etc.). Intraoral devices developed recently are becoming increasingly popular, as they provide greater comfort to the patient, do not even require periodic connection of extraoral or intermaxillary traction, and allow for rapid and effective significant corpus distalization of molars with minimal loss of support in the frontal area and without side effects such as extrusion, intrusion or rotation of the teeth being moved. One of such devices is the First Class distalizer (a set of distalizer components is produced by Leone, Italy). The supplied kit includes: • two

extension screws, • two 0.045 inch wire blanks, • two 0.045 inch ID tubing, • two extension screw support rings, • two nitinol springs, • two screw retaining rings.

Device manufacturing technology.

1. Fit rings or make and fit crowns on repositioned molars and supporting premolars. Obtain an alginate impression, insert the indicated elements into it, and cast the model from supergypsum.

2. Solder a 0.045-inch diameter tube on the palatal side of the first molar and a screw support ring on the labial side of the premolar, oriented parallel to each other.

3. Bend a 0.045 inch wire to the shape of the palate, insert it into the molar tube and solder it to the palatal surface of the premolar.

4. Place the nitinol spring on the wire between the premolar and the molar tube. Insert the screw into the guide ring of the premolar, install the locking ring into the screw. Solder the screw body to the vestibular surface of the molar, ensuring that the wire guide on the palate and the screw body are mutually parallel. Polish the device parts.

5. Bend the distal part of the wire according to the shape of the palate and in accordance with the expected length of movement of the molar.

Form an expanded Nance stop from plastic, polymerize it, and polish the plastic stop. Thus, the manufactured apparatus in its vestibular part is represented by extension screws soldered to the rings of the molars, bushings and locking rings that fix the screws on the premolars. Palatal part: a guide sleeve on the molar, a frame of 0.045 inch wire that serves to secure the extended Nance stop and as a guide for moving the molar (the wire is loose in the molar sleeve and soldered to the premolar) and a nitinol spring between the premolar and molar to move the molar. The joint work of the extension screw on the vestibular surface, the nitinol spring on the palatal surface and the Nance stop ensures

body movement of molars up to 10 mm without rotation, extrusion, intrusion and loss of support in the anterior region. The design of the device allows for its autonomous operation on the right and left or only on one side of the jaw, and also allows it to be easily converted into a support device for retraction of anterior teeth. The device can be used in both mixed and permanent dentition. The anterior support can be either a permanent premolar or a primary molar. The device is activated by a quarter turn of the screw once a day. A full turn of the screw gives 0.4 mm of movement. Before installing the screw, it is necessary to eliminate rotation of the molars. Clinical example of using the First Class device. Patient N., 20 years old, complained of an aesthetic defect associated with a pronounced uneven position of the teeth. Previously, orthodontic treatment was carried out with plate-type devices, and leveling extractions of teeth 14, 24 and 34 were also performed. Treatment was interrupted due to lack of positive results. Upon external examination, a flattening of the facial profile is noted. When analyzing the bite, the ratio of the molars according to class II was 6 mm on the right and 3 mm on the left, the ratio of the canines according to class II was 6 mm on the right and 4 mm on the left, narrowing and shortening of the upper dentition, a complete lack of space for 13, shortening of the lower dentition. The midline of the upper jaw dentition is shifted 4 mm to the right. Vestibular position and supraocclusion 13, axis rotation 15, 16, 25, 26, 43.

Treatment was carried out.

1. Leveling extraction 44 was performed.

2. The width of the upper dentition in the area of the chewing teeth was normalized, rotations 16, 15, 26, 25 were eliminated - Quadhelix arch

3. The molars of the upper jaw were distalized on the right by 6 mm and on the left by 3 mm using a First

Class apparatus with the purpose of creating space for installation in the dentition 13 and normalizing the position of the midline of the upper jaw dentition.

4. 13 was installed in the dentition and the position of the teeth was normalized in relation to the sagittal plane using a multibonding system and the use of fragments of the First Class apparatus for retention of displaced molars.

5. The position of the teeth was detailed and retention of treatment results was carried out. Treatment steps are presented in Figures 4–20.

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