PROBLEMS IN THE TREATMENT OF ANKYLOSING DECIDUOUS MOLARS

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Ортодонтия, 2016; 74 (2): 26-31

ABSTRACT

Dental ankylosis is the fusion of anatomical alveolar bone with the cement of the tooth. This occurs during teething, but sometimes at a later stage of development of the dental arch. Diagnosis is made strictly after analysis of cone-beam computed tomography (CBCT).

Our goal is to assess the frequency of ankylosis of temporary and permanent teeth of the patients we treat in our practice. To do this, we analyzed the clinical records, medical imaging and treatment plans of the 1404 of our patients. We have found ankylosis in 19 of them (1.35%) from the analyzed group of patients. Anglicized temporary molars were observed in 12, the ankylosis of permanent teeth in 7 patients, which struck four first lower molars, two upper canines and one central upper incisor.

In 73 patients we have observed hypodontia of the premolars, as well as in 8 (10.95%) of them there is ankylosis of like temporary molars. In 39 patients we have observed hypodontia of the incisors, which are not depended on ankylosis of the temporary molars. In 13 patients we found hypodontia of the upper lateral and lower and /or upper premolars, and two of these patients (15.38%) and ankylosis of like temporary molars. In 2 cases, ankylosis has no connection with hypodontia. In 2 cases, except with the hypodontia, ankylosing process is combined with mikrodensom or impacted canine. Most often we have seen ankylosing processes in the case of multiple hypodontia (7 out of 10 cases involving hypodontia).

The most frequently used surgical technique in the extraction of ankylosed temporary molars - segment osteotomy, together with bone replacing therapy. It is typical in areas of ankylosis - layering of adjacent teeth ankylosing teeth sprouting antagonist, lack of development of the affected alveolar region - all the consequences that lead to functional and aesthetic problems.

Key word: tooth ankylosis, hypodontia, dental malocclusion

INTRODUCTION

Dental ankylosis is the fusion of anatomical alveolar bone with the cement of the tooth. This occurs during teething, but sometimes at a later stage of development of the dental arch. Diagnosis is made strictly after analysis of cone-beam computed tomography (CBCT).

Our goal is to assess the frequency of ankylosis of temporary and permanent teeth of the patients we treat in our practice. To do this, we analyzed the clinical records, medical imaging and treatment plans of the 1404 of our patients. We have found ankylosis in 19 of them (1.35%) from the analyzed group of patients. Anglicized temporary molars were observed in 12, the ankylosis of permanent teeth in 7 patients, which struck four first lower molars, two upper canines and one central upper incisor.

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The tooth ankylosis represents anatomical fusion of the alveolar bone and cement of the tooth. This merger happens during the time of the teeth’s eruption, but it could be observed even at a later stage of the dental arch’s development. Ankylosing occurs when the root coalesces into the surrounding bone, as in some areas processes of cement resorption are monitored. This process may be observed as histologically calcified tissue mixed with the alveolar bone.

No one can say clearly the causes of this phenomenon. In some patients, the ankylosis is due to locally abnormal metabolism, wherein the periodontal ligament disappears at the time of the physiological root resorption and ankylosing processes occurs. Trauma of teeth, alveolar bone and periodontal ligament is also considered as a possible cause of the ankylosis. Ankylosing processes are observed in cases of auto transplantation. Some common diseases serve as a predisposition to ankylosis. Such as are: endocrine conditions, congenital diseases cleidocranial dysostosis, ectodermal dysplasia with impacting and ankylosing of the affected teeth. Most often the ankylosis is observed in temporary molars associated with hypodontia of the homonymous permanent premolars.

Ankylosed teeth can be observed in mixed and rarely in a permanent dentition, where this condition is typically associated with trauma. The incidence of ankylosis of the provisional teeth ranges from 1.3% to about 10%.

The diagnosis is usually based on clinical findings, expressed with infraoclusion in temporary molars. It is possible that the tooth has been in occlusion and slowly has gone down. There is also a sound, as an accompanying feature, when making a sharp percussion on the ankylosed tooth. These teeth remain often after the time for their replacement, they do not shake themselves, they tip the adjacent to themselves and lead to disturbances in occlusal relationships between the lower and upper jaw.

The periodontal ligament is not visible by the X-ray, but in contrast, the merger between root cement and alveolar bone is visible. Two-dimensional X-ray does not give always sufficient objective data, especially in case when ankylosing processes cover vestibulo-oral areas. The diagnosis is done emphatically by analyzing CBCT. We evaluate on the two-dimensional X-ray the accuracy of the position of the teeth, the presence of a zone of confluence between the cement and the alveolar bone, the possibility of surgical access.

PURPOSE

We set a goal to investigate the frequency of ankylosis in temporary and permanent teeth in patients treated in our practice, the dependence on the problem of tooth hypodontia and the most common protocol of surgical-orthodontic treatment in these patients.

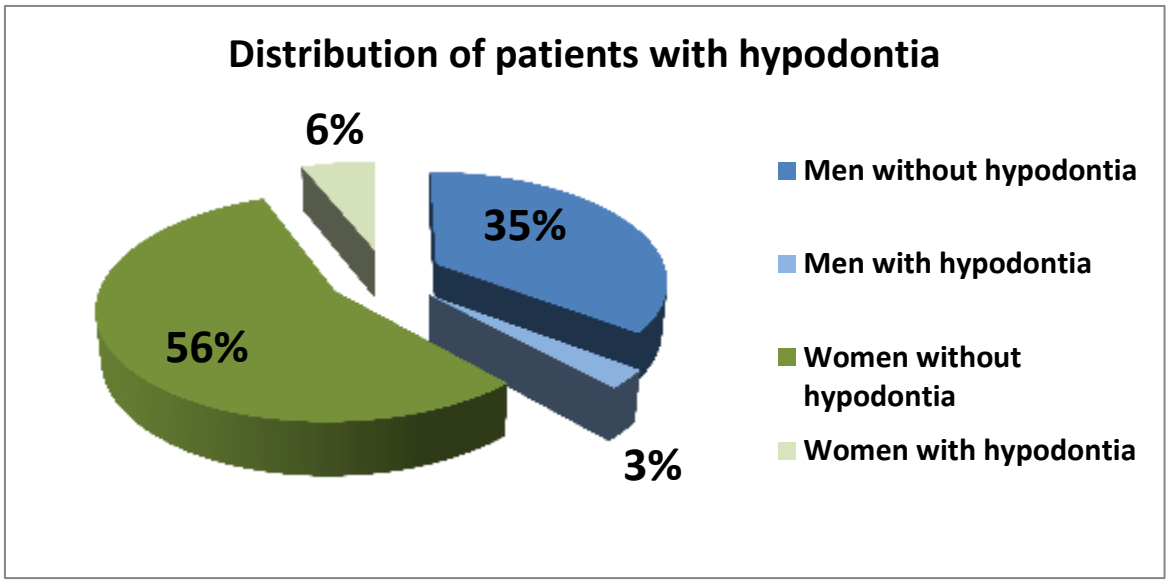
MATERIAL AND METHODS

We analyzed clinical records, X-ray and medical plans of 1404 patients treated by us over the past eight years. The enrolled patients are at middle-aged 14,03 +/-3,58 years (age range 8 to 21). Of these 536- 38.20% are male and 868-61.80% women. From these patients, 258-18.37% were in a period of mixed dentition and 1146 -81.63% in a period of permanent dentition. We used statistical package IBM SPSS Statistics 22.0 for processing the data. The level of significance in rejecting the null hypothesis was accepted $p < 0.05$.

RESULT

It was found at analyzed 1404 patients that 125 (8.90%) of them had hypodontia, that does not include such as in molars. Hypodontia was observed in 73 patients had only in premolars (upper and / or lower), experiences hypodontia - in 39 patients in central incisors, laterals, upper and / or lower). We found out both hypodontia affecting incisors and premolars in 13.

Both sexes differ statistically from the proportion of involvement of hypodontia (Figure. 1), which was significantly greater in women. (536) 40 (7.46%) of the whole group of men had hypodontia that does not include the third molars. (868), 85 (9.80%) of the group of women had hypodontia excluding third molars.



Graphic1. Gender distribution of patients with hypodontia

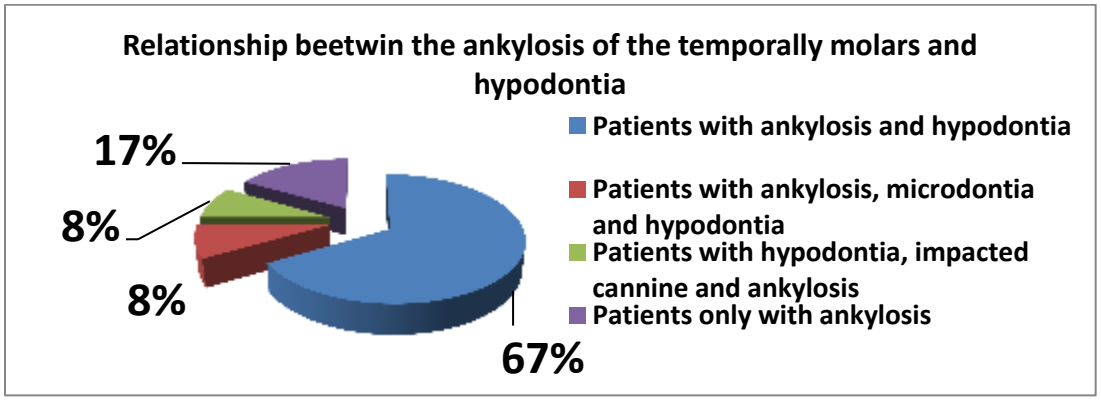
We found out ankylosis in 19 (1.35%) people in the analyzed group of patients. Ankylosed temporary molars were observed in 12 of them with

ankylosing an average of 2.33 deciduous molars (1 to 5). We found ankylosis of the permanent teeth in 7 patients, hitting four first lower molars, 2 upper cannines and a central upper incisor.

Indicator	Ankylosis on the decidual molars				p
	Total number of patients with hypodontia - 125		Number of patients with ankylosis - 12		
	Number	%	Number	%	
Hypodontia of premolars	**73**	**58,40**	**8**	**10,95**	**0,007**
Hypodontia of lateralis	**39**	**31,20**	**-**	**-**	**0,015**
Hypodontia of laterals and premolars	**13**	**10,40**	**2**	**15,38**	**1,000**
Hypodontia	**-**	**-**	**2**	**16,66**	**-**

Table1. The connection of ankylosing in temporary molars with other abnormalities

The hypodontia in premolars had observed in 73 patients, as in 8 (10.95%) was observed ankylosis of the homonymous temporary molars. 39 patients had hypodontia in incisives, which was in relation with the ankylosis of the temporary molars. We found hypodontia of upper laterals and lower and / or upper premolars in 13 patients, while at two of them (15.38%) ankylosis of homonymous temporary molars as well. In 2 cases ankylosing process is not associated with hypodontia. In another 2 cases except hypodontia, ankylosing process is combined with micro dents or an impacted canine. Most often ankylosing processes was observed in cases of multiple hypodontia (in 7 out of 10 cases related hypodontia). It can be seen from table 1 and graph. 2



Graphic2. Correlation between ankylosis of temporary molars and hypodontia

The most common surgical method (in 9 cases - 75%) applied to the extraction of ankylosing temporary molars is a segment osteotomy together with substitute bone therapy.

The therapy, for the treatment of ankylosed permanent teeth, was different and individually targeted. In the case of ankylosed upper canines, the corticothomia surgery and orthodontic pull up with orthodontic mini implants in the lower jaw support were applied. In the treatment of ankylosed lower first molars we used the conservative treatment with an occlusal upgrade of their masticatory surface to their inclusion in occlusion with antagonists. Patients are being monitored for either the development or not of ankylosing process.

DISCUSSION

Ankylosis of the temporary teeth is highly negative process in the development of alveolar growths. It occurs in the period of most active bone growth in the jaws, during the later mixed dentition, which correlated with the age of the patient and coincides with its puberty growth peak. In these clinical situations, the ankylosing teeth often are found relatively late because of the general belief that decidual teeth themselves are shaken and fall. In the period of development of ankylosing process and their persistence, they stop the growth of the liable alveolar ridge and by the interdental periodontal ligament pull the teeth adjacent to the zone of ankylosis and strongly tipped them toward themselves. This often leads to a lack of occlusal surgical access to them and without their difficult extraction. Dental arc because of mediodiastalisation and strong medial tipping of the teeth is getting shortened. Changes occur in three planes of space: shortened dental arch, vertical and transversal underdeveloped alveolar ridge. All this, combined with the hypodontia of the permanent tooth titled makes the surgical-orthodontic treatment difficult and compromise.

Good diagnostic using modern means (CBCT) helps us to make a differentiation between ankylosis of the temporary molars and impacted by temporary molars. The latest one is rare. CBCT helps to us to plan the surgical approach and method for the treatment, the size of surgery and substitute bone therapy and the tissue integration.

We presented the case of a female patient 21 years (Figure 1) with ankylosis of 55, 64, 65, 84, 85, and plural hypodontia 22, 14, 15, 24, 25, 35, 44, 45 temporal

lateral in the frontal portion was persisted, that was smaller than the constant. The permanent canines were erupted in the wrong position. The second temporary ankylosing molar was retained in the right upper segment and the place to two new premolars was strongly reduced. The ankylosing both temporary molars were reserved in the left segment. The bone was underdeveloped and neighboring teeth are strongly inclined to defect in areas of ankylosis.

Figure.1. Clinical case - before treatment

Restoration of the integrity of the dental arch with implants is a good method in the case of multiple hypodontia. This process is possible if the alveolar ridge has enough volume in three planes and distance with antagonists.

The aim of the orthodontic treatment is to normalize the size of the dental arch and to create conditions for prosthetic restoration of hypodontia. Extending the upper dental arch using the method of distalization of the upper molars we used ankylosing deciduous teeth as bone support. We used the Pendulum appliance and achieved a distal displacement of 16 of 4.5 mm. The appliance opened a space for two premolars in the upper right segment. The frontal area was leveled with leaving enough space to restore aesthetics in laterals. The surgery on extraction of ankylosing teeth was performed which resulted in an expected large bond loss. A single-step bone substitution was made as well as the full restoration of the volume of the alveolar ridge. The leveling in the front and the new position of molars was kept by the orthodontic means.

We distalised 34 in place of 35 in the lower jaw in order to create a tooth-induced bone. A dental implant was placed in so gotten volume of alveolar crest. The lower front was leveled and extracted the ankylosing 84 and 85.

Figure.2. Clinical case - stage of treatment

Without orthodontic preparation and ensuring the arc stability a good surgical operation and effectiveness of subsequent implants could not be achieved. The dental implant in regions 14, 15, 24, 25, 34, 44, 45 was placed. Immediate implant was placed in the area of 22. Osseo integration prosthetic dentition was restored 6 month later.

In the clinical case presented "advantages" of ankylosed teeth serving as a good bone support to move other teeth. They play the role of orthodontic mini screw in distalization of the upper molars.

The common in all cases of ankylosis was that the all of them led during the the extraction to the large amount of bone loss. This happens very often on the the vestibular cortical wall, that makes it difficult and limits the possibilities of orthodontic treatment. It has to wait for 6 month periods for the bone integration using the methods of bone replacement in order to prolong the treatment period. The segment osteotomy remains the most reliable surgical method for treating these problems so that we can be sure in the removal of all ankylosing segments because even if only a small is remained unmoved, it presents irresistible problem in the movement of the adjacent teeth and their correction.

CONCLUSION

The tipping of the adjacent teeth towards the ankylosing one, eruption of the antagonist, lack of development of the affected alveolar are characteristic for the typical areas of ankylosis and they could lead to problems in the function and aesthetics. There is a high incidence of dental aplasia associated with ankylosis.

Open bite is present in the segment ankylosis where the tongue is inserted into this space. The loss of the arc length and the changes of the median line also deviate to the affected side.

Statistically significant link with ankylosing hypodontia and especially multiple hypodontia makes these clinical cases difficult to solve. They require a multi-disciplinary approach, considering each stage of treatment, what consequences of the next stages can be applied and by what means could the negatives be compensated.

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