CLINICAL AND SPECIFIC CHANGES OF DENTAL ARCHES AND OCCLUSION RELATIONS AFTER FIRST PERMANENT MOLAR LOSS, IN TEENAGERS AND YOUNG ADULTS

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ABSTRACT
Interrupted continuity of the dental arches by the first permanent molars loss in adolescents and young people is followed, more frequently and more rapidly than in adults, by morphological changes due to migration of teeth in the sagittal, transversal and vertical plans. These changes of position are likely to trigger an occlusal dysfunction, with a number of negative consequences for the entire dental/maxillary system. The aim of this study was to determine and reveal the changes of dental arches and occlusal relations after first permanent molar loss, in a population (224) of teenagers and young adults, with ages between 12 and 22 years old. The complete dental examination was conducted by two examiners, and data were recorded for each study participant, in terms of horizontal and vertical migrations. The most frequently changes of dimensions in dental arches were observed after the loss of first permanent mandibular molars, with uneven occlusal plane, asymmetry of sagittal and transverse curves and the appearance of premature contacts with a pathogenic action more pronounced in young adults.

Key words: first permanent molar, loss, changes, dental arches, occlusal relations

INTRODUCTION
Edentulous status changes the normal morphology of the occlusal plane, so horizontal migrations of the neighbouring teeth and vertical movements of the teeth antagonists are complex, and involve changes to all elements of dento-maxillary system. There are changes of the dynamic occlusion, static occlusion, of dental contacts are less, and they occur in other areas. Morphological changes occurring after first permanent molars are correlated with stage held in tooth loss. Complete translation of second permanent molars, is observed when the first permanent molar was removed before second molar eruption. When the eruption of second permanent molar occurred after 12 years, the adjacent multiple changes are: elevation of occlusal, sagittal and transverse curves and asymmetry, with the appearance of premature contacts. The loss of first permanent molars in adolescents and young people in almost 50% of cases around the age of 18 years, resulting by the rapid evolution of dental decays with coronal mass destruction, by practicing extractions, for emergency and therapeutic of unrecovered teeth.

Interrupting the continuity of the dental arches of youth, by losing the first permanent molar is followed more frequently and rapid, by morphological changes due to migration of teeth in the sagittal, transversely and vertically plane. These changes of position, which can reach up to a true malposition tooth, are likely to trigger a malfunction occlusion, which in turn may cause "morphological"
malocclusion with uneven wear of teeth, dental malposition and deeper periodontal lesions, changes in maxillary bones and temporo-mandibular joint injuries. Changes in position of the teeth following the loss of first permanent molars is not installed sometimes immediately, the main factors influencing changes are: the patient's age, the type of constitution, individual response of bone tissues, dental and periodontal status, the strain functional and parafunctional of dental arches.

MATERIAL AND METHODS

The aim of this study was to determine and reveal the changes of dental arches and occlusal relations after first permanent molar loss, in a population (224) of teenagers and young adults, with ages between 12 and 22 years old. The studied patients were divided in 3 groups: 12-14 years (78), 15-17 years (64) and 18-22 years (82). The inclusion criteria were healthy communicative teenagers and young adults, with at least one permanent first molar lost. Clinical examinations were performed in two private dental practice offices, by the same two examiners, using simple kit for consultation (dental mirror and dental probe). Data from the clinical examinations were coordinated with a short history of important recent dental procedures. The complete dental examination was conducted by the two examiners, and data were recorded for each study participant, in terms of horizontal and vertical migrations, and changes of occlusal relations. The repartition of age groups of examined patients is illustrated as with the number of patient examined and there are noted: the number of molars lost registered for each group (at least 1 or 2, till 4) and the percent values correlated. (Fig. 1, Table 1).

![Fig. 1. Number of patients for each age group](image)

Table 1. Number of first permanent molars lost and the percentage, for the studied groups

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Number of molars loss</th>
<th>Percentage values</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 – 14 years</td>
<td>101</td>
<td>22.54%</td>
</tr>
<tr>
<td>15 – 17 years</td>
<td>152</td>
<td>33.92%</td>
</tr>
<tr>
<td>18 – 22 years</td>
<td>195</td>
<td>43.52%</td>
</tr>
</tbody>
</table>
RESULTS

For each age group we observed the absence of first permanent molars: for the age group 12-14 years, and a number of 101 molars (upper and lower, and one or two molars lost) the percentage was 22.54 – the lowest, and the values are increasing with the age group, with almost 45% for the age of 20/22 years old. We illustrated the fact that, as the age of group examined increased, the percentage of the number of molars lost increased also (Fig. 2).

We analysed the changes of dental arches, in terms of space after drifting the second molars, usually, and the occlusal relations modified in the sagittal and vertical plans, and the results shown that only 15% of the patient from group 12-14 years had significant changes. But then, the percentage of changes increases according to increasing of the age group, and the time passed from the moment of losing the first permanent molars, and of course, the changes are more important in terms of modified occlusal plane, asymmetry of sagittal and transverse curves and the appearance of premature contacts between dental arches (Fig. 3).

The clinical significance of existing space through changes in the dental arches is evidenced by clinical and radiological analysis following the evaluation of occlusal characteristics and corroboration with all stakeholders, with the impact on inter-arches relations. It is important to notice that this clinical significance, but must be determined for each clinical case (Fig. 4, 5).

![Fig. 2. Increasing the number of first permanent molars lost in conjunction with age groups](image)

![Fig. 3. Changes (in dental arches and occlusal relations) registered for patients of each age group](image)
The most frequently changes of dimensions in dental arches were observed after the loss of first permanent mandibular molars, with uneven occlusal plane, asymmetry of sagittal and transverse curves and the appearance of premature contacts with a pathogenic action more pronounced in young adults. It is worth noting that changes of dental arch/movements statistically significant may be defined, but not be appreciated/considered clinically significant in terms of space narrowing, and vertical or horizontal movements (Fig. 6 and 7).

**DISCUSSION**

In the literature it was long discussed the key-role played by first permanent molars in maintaining the morphology of the dental arches. Some
researchers argued that first permanent molars were instrumental in determining a normal occlusion and therefore of paramount importance in maintaining incisal relationships. For these researchers the loss of first permanent molars would lead to lingual collapse of lower incisors and increased overjet and overbite. Conversely, other group of researchers contended that the loss of first molars produced no detrimental effect on incisal relationships [1]. The first permanent molar is undeniably the most important unit of mastication and is essential in the development of functionally desirable occlusion. The loss of a first permanent molar can lead to changes in the dental arches that can be traced throughout the life of that person. Unless appropriate corrective measures are instituted, these changes include diminished local function, drifting of teeth, and continued eruption of opposing teeth [2, 3, 4]. In the permanent dentition the effect of loss of a first molar can be difficult to predict after the second molar has erupted. The effects are more of a problem in the lower arch, where the second molar tips mesially and rolls lingually forming a very poor contact with the second premolar or may leave excess space [5]. Previous Romanian studies have reported that in 13-14-year-old children who had not received systematic (regular) dental care, the frequency of extracted or scheduled-to-be-extracted permanent first molars was between 30 and 40% [6, 7]. In a studied regarding the changes in dental arches after extraction of permanent molars, Çağlaroğlu et al. [8] showed that patients with early loss of a first permanent molar had both dental and skeletal asymmetries, and they found that skeletal asymmetries mainly occurred in the lower anterior region.

CONCLUSIONS

First permanent molar is an essential key in establishing correct occlusal relations, to develop the dental arches in sagittal, transverse and vertical plan, such that early loss of this tooth determine morphological and functional changes, with horizontal and vertical migrations of antagonist teeth. Our study revealed that there is an increasing number of patients who lost one or more of these permanent molars, with definite consequences, and therefore it is necessary to introduce measures in order to prevent the fact of losing the first permanent molar, and then consecutively to prevent any changes that may occur at dento-maxillary level.

REFERENCES