THE INFLUENCE OF BILATERAL IMPACTED THIRD MOLAR ANGULATION AND POSITION ON THE INCISORS CROWDING

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Abstract

This study was aimed to investigate the influence of bilateral impacted third molar angulation and position on the incisors crowding. The sample of this study consisted of 50 volunteers (35 males and 15 females) from the students of Al Andalus university for medical sciences, the sample was divided into three main groups according to the mandibular third impaction depth. Third molar angulation was measured with reference to the anterior angle between the occlusal plane of the first and second premolars and a line drawn through the occlusal surface of the third molar. Angulation and impaction depth of all right and left molars were compared with the incisors crowding. The results showed that there was a minimal irregularity in all groups. There were no statistically significant differences between impaction depth and total mandibular dental crowding (p > 0.05). In addition, no statistically significant differences were found between molar angulation and incisors crowding (p > 0.05). The mandibular third molar angulation and impaction depth have no effect on the incisors crowding.

Keywords: Excessive Gingival display, Lip Repositioning, Gummy Smile

Introduction:

Third molars generally erupt between 16 and 24 years of age, and the position of the mandibular third molar changes during the eruption and development period (Hattab FN, 1997; Richardson M, 1975). The third molars have the highest rate of impaction of all the teeth (Dachi & Howell, 1961; Bishara & Andreasen, 1983; Grover & Lorton, 1985; Andreasen JO et al. 1997) From 17% to 25% of the general population will have ≥1 impacted third molar (Cavanaugh JJ, 1985; Richardson ME, 1975). A commonly accepted theory states that the third molars apply mesial pressure on the mandibular posterior teeth (Andreasen JO, 1997). Souithard et al. (Southard TE et al. 1991) suggested that interproximal forces help to determine crowding of the mandibular anterior teeth after the retention phase. The impact of the third molars on incisor crowding has long been discussed in the dental literature and has been a controversial subject for many years (Richardson ME, 1975).
On the other hand, a number of studies found no correlation between lower third molars and lower incisor crowding. (Lindqvist B & Thilander B, 1982; Pirttiniemi PM et al, 1996; Southard TE et al. 1991).

Although several studies were conducted to explain the role of impacted third molar in incisor crowding, a few of them interrelate with third molar position and angulation (Niedzielska I, 2005). Therefore, the aim of this study was to investigate the influence of bilateral impacted third molar angulation and position on the incisors crowding.

MATERIALS AND METHODS:

The sample of this study consisted of 50 volunteers (35 males and 15 females) with an average age 20.05 ± 3.12 years. Patients were selected using the following criteria: all patients had a class 1 molar relationship, mild and moderate dental crowding, age at least 17 years, have bilateral mesio-angular or horizontally impacted mandibular third molars, have the same difficulty level of bilateral third molars based on the Pederson classification (sum score of the spatial direction of tooth value, depth of impaction, and relation with the ramus on the panoramic radiograph) (Pedersen GW, 1988), complete lower dental arch, no orthodontic treatment before records collected and good state of care of the lower teeth with no artificial dental crowns.

Digital Panoramic radiographs were taken with the same device, and dental casts made. Impaction depth classified according to the study of Ay et al. (Ay S et al. 2006). Group 1 (12 patients, mean age 21.3 ± 1.14 years), the occlusal surface of the impacted tooth was level or nearly level with the second molar; group 2 (20 patients, mean age 20 ± 2.14 years), the occlusal surface was between the occlusal plane and then cervical line of the second molar; and group 3 (18 patients, mean age 19.4 ± 1.14 years), the occlusal surface was below the cervical line of the second molar.

Third molar angulations were measured with reference to the anterior angle between the occlusal plane of the first and second premolars and a line drawn through the occlusal surface of the third molar (Fig. 1). (Little RM, 1975).

The severity of the crowding was measured by the Index developed by Little in 1975. (Little RM, 1975). The scoring method, applied to the stone cast, involved measuring the horizontal linear displacement of the anatomic contact point of each mandibular incisor from the adjacent teeth and the sum of these five measurements represents the severity of lower anterior dentition irregularity and as follow: 0 = perfect alignment, 1– 3 = mild irregularity, 4
– 6 = moderate irregularity, 7 – 9 = severe irregularity and >10 = very severe irregularity. All measurements were repeated twice and if mismatched, a third measurement was adopted.

**Statistical Analysis**

The results were calculated with the software SPSS for Windows (release 10.0.0; SPSS, Inc, Chicago, IL, USA). The Kolmogorov-Smirnov test was performed to test the normality of the data. 1-way ANOVA statistical analysis was used to define the differences between the groups.

**RESULTS:**

In 12 patients the occlusal surface of the impacted molars was level or nearly level with the second molar, In 20 patients the occlusal surface was between the occlusal plane and the cervical line of the second molar and the occlusal surface was below the cervical line of the second molar. There were no statistically significant differences between the 3 different impaction depth groups and total mandibular dental crowding (p > 0.05; Table 1). The angulation of impacted third molars were less than 16 in 9 patients and between 16-30 in 23 patients and more than 30 in 18. There were no statistically significant differences were found between the angulation of impacted third molars and total mandibular dental crowding (p > 0.05; Table 2).

**Table 1. means of crowding severity and p values according to the depth of impacted depth molar**

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of Subjects</th>
<th>Mean of Total Crowding severity</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>12</td>
<td>0.916</td>
<td>0.341</td>
</tr>
<tr>
<td>Group 2</td>
<td>20</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td>Group 3</td>
<td>18</td>
<td>0.944</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. means of crowding severity and p values according to angulation of impacted molar**

<table>
<thead>
<tr>
<th>The angulation of impacted molar</th>
<th>No. of Subjects</th>
<th>Mean of Total Crowding severity</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 15</td>
<td>9</td>
<td>1.111</td>
<td>0.251</td>
</tr>
<tr>
<td>16-30</td>
<td>23</td>
<td>0.913</td>
<td></td>
</tr>
<tr>
<td>&gt; 30</td>
<td>18</td>
<td>0.944</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION:

The effects of impacted third molar presence and position on incisor crowding have been investigated for many years. Bergström et al (Bergström K & Jensen R, 1961) noted that there was greater crowding in the quadrants in where third molars were still present, than in those in which third molars they were absent. Vego (Vego L, 1962) also found a greater percentage of dental crowding in subjects with erupting third molars in comparison to subjects with congenitally missing third molars. Woodside (Woodside D, 1970) suggested that in cases where mandibular third molars were not present, a more distal settling of the lower dentition occurred in response to growth and soft tissue pressure. Other studies, however, found no correlation between lower third molars and lower incisor crowding. Richardson (Richardson ME, 1982) followed up two groups of patients, one with impacted third molars, the other with non-impacted third molars, for 5 years. She found that the subjects in the former group had considerably more crowding both anteriorly and in the molar region and larger teeth than the subjects in the non-impacted group. The previous studies evaluated the role of the presence of the third molar in anterior crowding. This study investigated the influence of impacted third molar angulation and position on the changes in incisors crowding. The results showed that there was a minimal irregularity in all groups according to the degree of crowding of Little index (the value between 1-3), additionally, there were no statistically significant differences between impaction depth, angulation and incisors crowding.

Niedzielska (Niedzielska I, 2005) indicates that patients with retained third molars have higher risk of tooth crowding in relation to the Ganss ratio, meaning that when such space is sufficient the presence of the third molars does not cause tooth crowding; conversely, when such space is reduced the presence of the third molars can cause tooth crowding. Another theory was suggested by Al-Balkhi (Al-Balkhi M K, 2004) who reported that third molars did not cause re-crowding of the mandibular anterior teeth when interproximal contacts were removed. The hypothesis is that the mesial force of the erupting molars cannot be transmitted through the teeth in absence of interproximal contacts, thus preventing anterior tooth crowding. Zachrisson (Zachrisson BU, 2005) reported that a mesially directed force is an important factor in increased mandibular incisor crowding in early teenagers. On the other hand, Ades et al. (Ades AG et al. 1990) stated that third molar removal didn’t effect incisor crowding. Similarly, Hasegawa et al. (Hasegawa et al. 2012) found no significant correlation
between the angulation of the lower third molar and the angulation of the other teeth in the lateral segment.

CONCLUSION:
Within the limits of the present study. The mandibular third molar angulation and impaction depth have no effect on the incisors crowding.

REFERENCES: