The Relationship of the Lower third Molar to the Anterior Dental Crowding

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Abstract
Introduction: The role of the lower third molars in the lower incisors crowding has been debated for more than a century. Significant disagreement exists among practitioners, including both orthodontists and oral and maxillofacial surgeons whether the third molar causes mandibular anterior crowding.
Aim of study: The purpose of this study is to ascertain whether the lower third molars can contribute to the occurrence or aggravation of crowding.
Materials and methods: A sample of 131 volunteer (67 males and 64 females) aged 18-25 years were included in the 1st, 2nd, 3rd, 4th and 5th stage of college of dentistry / Tikrit University was chosen, the sample was divided into three main groups consisted subjects who had mandibular third molars that were either impacted, erupted into function or agenesis.
Results: The study showed that 70(53.4%) volunteers out of the 131 have impacted lower 3rd molar, 52(39.7%) volunteers have erupted lower 3rd molar, while 9(7.6%) volunteer have agenesis of the 3rd molar.
Conclusion: The crowded group revealed a higher percentage of impacted third molar while lowest percentage of third molar agenesis.
Keywords: Mandibular third molar impaction; anterior arch crowding

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Introduction
The mandibular third molars erupt after 18 years of age. They are the last teeth to erupt in the oral cavity, and are the most commonly impacted teeth as well. With evolution, jaw sizes in humans have reduced, effectively reducing the maxillary and mandibular arch lengths. This has resulted in either absent or impacted third molars. Occasionally these third molars, with inadequate space for their normal eruption, are mesially tilted. This situation is more common in the mandibular arch.

(Mehta K et al 2012).
In teenage years with the eruption of lower third molars, a marked increase in crowding of mandibular incisors is noticed (Cryer, 1965; Helm, 1970). Late mandibular incisor crowding is a well-recognized clinical problem. Increasing lower dental arch crowding with the age has become more apparent as a clinical problem in recent years as more adults retain their teeth longer (Bergstrom and Jensen, 1961).
The effect of third molar retention on incisor crowding has been investigated for over 140 years (Sheneman, 1968). As early as 1859, Robinson stated that tooth irregularity frequently results from mesially directed third molar pressure (Southard et al., 1991). The role of erupting third molars as a cause of such dental crowding has been the subject of controversy over the years. There are two schools of thought regarding influence of third molars on incisor crowding: The first school of thought states that mandibular third molars create an anterior component of force which leads
to crowding in the anterior segment. The second school of thought suggests that the force generated by third molars is insufficient to cause anterior crowding. Mehta K et al. 2012 Significant disagreement exists among practitioners, including both orthodontists and oral and maxillofacial surgeons regarding this problem (Lindauer et al., 2007; Mehta et al., 2012; Weinberger, 1926).

Some studies reported no relationship between erupting third molars and late anterior arch crowding, others stated there is a definite association. Richardson suggested that the growth of third molars is the cause of late lower arches crowding (Richardson, 1996). Conversely, Bjork et al., found no clear evidence that crowding was caused by the eruption of third molar (Bjork and Skieller, 1972).

Therefore the aims of the present study are: to assess potential third molar influence on lower incisor crowding and to localize the sites of most noticeable dental arch changes.

**Materials And Methods**

The samples of this study consisted of 131 volunteer (67 males and 64 females) in the 1st, 2nd, 3rd and 4th stage of college of dentistry University of Tikrit and aged 18-25 years with the Mean age was calculated as 20.5% were included in the current study. The data was collected according to the following inclusion criteria:

- Age ≥ 18 years;
- Complete lower dental arch “full set of permanent teeth” (except third molars);
- No orthodontic treatment before records collected.
- Good state of care of the lower teeth with no artificial dental crowns.
- Good quality orthopantomograms (Carestream Dental (KODAK Dental Systems))

Good alginate impression (hydrogum 5 from Zhermack) with good stone casts available (elite master from Zhermack).

The sample was divided into groups according to the condition of the third molar in the sample:

1) Group 1 (third molar eruption): Include dental arch with unilateral or bilateral third molar erupted to the occlusal plane, in good alignment buccolingually and of normal, size and form.

2) Group 2 (third molar impaction): Include dental arch with unilateral or bilateral third molar impaction. Impaction was defined as a tooth that has failed to erupt and remains completely or partially covered by bone, soft tissue, or both (Ades A et al., 1990; Southard et al., 1991) as interpreted from periapical radiographs by three clinicians.

3) Groups 3 (third molar agenesis): Include dental arch with unilateral or bilateral third molar agenesis. The diagnosis of third molar agenesis was based on the examination of periapical radio-graph taken after clinical examination and a negative history of previous third molar extractions.

Radiographical examination was carried out for the subject who suspected to have impacted or congenital missing third molar by using intra-oral periapical view (bisecting-angle technique) and diagnosed by dental radiologist.

**Assessment of mandibular anterior crowding**

There are wide extremities of late mandibular anterior crowding ranging from mild undetected irregularity to very severe crowding that might compromise the periodontal health of the teeth (Al-Safi and AL-Sahaf, 2005; Rose et al., 2004). Hence, it is important to find a reliable method for ranking the severity of this crowding. The Index developed by Little in 1975 (Cryer, 1965; Little, 1975) was adopted to express the irregularity in numerical score and quantifying the severity.

The patient in outpatient clinic was examined while he is sitting in upright position in the dental chair with head supported by head rest and Frankfort line parallel to floor of the room.

The scoring method, applied to the stone caste, 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
>10 = very severe irregularity

In this study, measurements were obtained by using the same vernier caliper (dental vernier calibrated to tenths of millimeter (dentauram munchner design).

The cast was viewed from above and the Vernier was held parallel to the occlusal plane while the beaks were lined up with the displaced contact points to be measured. All measurements were repeated twice and if mismatched, a third measurement was adopted.

**Results**

Out of 131 subjects, 67 male and 64 female,

53 SUBJECTS “40.5% “ showed anterior arch crowding with a Mild irregularity, 33 subjects (25.2%) showed moderate irregularity, while 22 patients (16.8%) showed severe irregularity and 23(17.6%) showed very severe irregularity calculated on the pre-treatment study models (Table-1).

The sample shows that, the majority of the cases of anterior crowding have impacted lower wisdom tooth as we can see in table 2 that shows 70 cases have impacted wisdom tooth.
that divided into 18 unilateral and 52 bilateral. 52 cases have erupted lower wisdom tooth and the lowest incidence of anterior crowding can be seen with agenesis of lower wisdom tooth only about 9.

Discussion:
Dental crowding is caused by disparity in the relationship between tooth size and jaw size, which results in imbrications and rotation of teeth. Three conditions which may predispose dental arches crowding: excessively large teeth, excessively small bony bases of the jaws and a combinations of large teeth with small jaws (Lakhani et al., 2011).

This study demonstrated that 53.43% (70 out of 131) of the patients had anterior lower arch crowding with impacted lower third molar while 39.7 %. (52 out of 131) had anterior arch crowding with erupted lower third molar. This value demonstrates that the impacted 3rd molar has effect on anterior lower dental arch crowding. on the other hand patient with agenesis of lower 3rd molar demonstrate that lower dental arch crowding occur in 6.87 (9 out of 131 patient) this may mean that absence of molar may provide adequate space for remaining dentition to erupt in normal way. This finding agrees with the studies which confirm the relation between lower third molar and anterior arch crowding (Helm, 1970; Southard et al., 1991). Sheneman, 1968, Sidlauskas and Trakiniene, 2006 also found a positive correlation between change in space condition and forward movement of the lower first molar. On the light of these findings, it seems possible that space for the molar is gained to some extent at the expense of crowding further forward in the arch.

Furthermore, Bergstrom and Jensen demonstrated that there was more crowding in the quadrant with a third molar present than in the quadrant with a third molar missing (Bergstrom and Jensen, 1961). Vego conducted longitudinal study on 40 individuals with lower third molars present and 25 patients with lower third molars congenitally absent. He concluded was that the erupting lower third molars can exert a force on the neighboring teeth (Vego, 1962). Other studies, however, found no correlation between lower third molars and lower incisor crowding. Lindquist and Thilander removed the impacted molar on one side. The none extraction side was used as control. The findings after 3 years indicated that removable of lower third molars did not relieve anterior crowding (Lindqvist and Thilander, 1982). Pirttiniemi and associates evaluated changes in the dental arches of adults in the third decade of life after the removable of all third molars. The study concluded that the extraction of an impacted third molars allows at least the second molar drift posteriorly and laterally, but it has minimal effect on the anterior part of the dental arch (Pirttiniemi et al., 1996).

Southard measured proximal contact tightness between the mandibular teeth in cases with bilaterally unerupted third molars. The measurements were taken before and after the removal of one of the two impacted third molar. They found that surgical removal of the lower third molar did not have significant effect on contact tightness (Southard et al., 1991). Another study done by Nada M Al-Sayagh and Anass Mohammed concluded that the common feature of reduced anterior arch length in late lower crowded dentition leads to the superiority of the flat arches followed by the pointed arches with reduced intercanine width (Al-Sayagh et al., 2004).

Sumitra and Arundhati revised studies regarding the mandibular third molars and late mandibular arch crowding to find out the cause and effect relationship between them. They found that: 1- long-term studies in untreated individuals do not suggest evidence of a cause and effect relationship between third molars and late mandibular incisor crowding; 2-Asymptomact and pathology–free third molars should not be extracted to prevent late lower crowding in untreated individuals (Sumitra et al., 2005). Also M Junaidand ,Wahab Kadri in

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Mild irregularity</td>
<td>28</td>
<td>21.8%</td>
</tr>
<tr>
<td>Moderate irregularity</td>
<td>15</td>
<td>11.5%</td>
</tr>
<tr>
<td>Sever irregularity</td>
<td>11</td>
<td>8.4%</td>
</tr>
<tr>
<td>Very sever irregularity</td>
<td>13</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

Table (1): Lower arch distributions according to the severity of late crowding

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Unilateral</td>
<td>9</td>
<td>13.4</td>
</tr>
<tr>
<td>Bilateral</td>
<td>20</td>
<td>29.9</td>
</tr>
<tr>
<td>Total impaction</td>
<td>29</td>
<td>22.1</td>
</tr>
<tr>
<td>Erupted</td>
<td>35</td>
<td>52.2</td>
</tr>
<tr>
<td>Agensis</td>
<td>3</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Table (2): The distribution of the third molar among the groups
2011 found that evidence of lack of space would be there in anterior segment as crowding and in posterior segment as crowding and in posterior segment, if the arch size is smaller as compared to the tooth size.

This study found no marked difference in the distribution between males and female regarding the severity of crowding. However, Al-Mulla and Al-Joubori concluded that all mandibular skeletal dimensions are larger in males than females; hence girls might be more susceptible to mandibular crowding than boys (Mulla and Al-Joubori, 2005).

In addition, some increase in the jaw length and width is to be expected in teenage subjects (Viken, 1960) and it is not surprising to find a greater increase in males than females (Sumitra et al., 2005). Nevertheless, anterior arch crowding is a multifactorial phenomenon, so based on the above fact decision to extract or enucleate third molar cannot be taken and other factors should also be taken into account.

Conclusions

The study shows that impacted lower third molar seems to play a role in anterior arch crowding.

References:


Sheneman JR (1968). Third molar teeth and their effect upon the lower anterior teeth. A survey of forty nine orthodontic cases five years after band removal, St. Louis University.


