

ORIGINAL RESEARCH

Influence of the lower third molars on Lower Anterior Crowding

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ABSTRACT:

Background: This study was aimed to investigate the influence of mandibular third molar position on lower anterior crowding in adult patients. **Methodology:** A sample of 70 patients (45 males and 25 females) were divided on the basis of lower third molar position into three groups: erupted group, unerupted group, and agenesis or absent group. Orthopantomograms and dental casts of all 70 samples were obtained for the study. Modified arch analysis proposed by Lundstorm was used for individual quantitative analytical registration of crowding. **Results:** There was no statistically significant difference in lower anterior crowding between the groups with erupted, unerupted, and agenesis of third molars as revealed by Chi-square test and ANOVA statistical tests. **Conclusion:** The mandibular third molar position have no effect on the lower incisors crowding. There was no statistically significant difference in lower anterior crowding in patient with erupted third molars when compared to subjects with unerupted, and absent third molars. The recommendation to extract third molars in the lower jaw cannot be solely done on the basis of doubtful rationale to minimize future crowding of the lower anterior teeth.

Keywords: Agenesis, third molar position, lower anterior crowding.

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INTRODUCTION

Generally third molars erupt in oral cavity between 16 to 24 years of age. Considerable changes have been observed in the position of the mandibular third molar during the period of eruption and development period (Richardson M,1975). According to Dachi et al in 1961 and Bishara & Andreasen in 1983 the highest rate of impaction has been observed in 3rd molars of all the teeth. One of the commonly accepted theory states that the third molars apply mesial pressure on the mandibular posterior teeth **and** push anterior teeth forward and cause crowding¹. One of the controversial topic in the field of orthodontics for many years is the impact of the third molars on incisor crowding. The effect of the lower third molars position and angulation in the lower incisor crowding has been debated for more than a century. With the increasing age lower arch crowding increases and it has become more apparent in recent years as more adults retain their teeth longer² (figure 1).

Bergstrom and Jensen concluded in their study that there was more crowding in the quadrant with a third molar present than in the quadrant with a third molar missing. Vego³ in his study examined 40 individuals with lower third molars present and 25 patients in which lower third molars were congenitally absent. Vego concluded that the erupting lower third molars can exert a force on the neighboring teeth. On the other hand, a number of studies⁴⁻⁹ concluded that no correlation exists between lower third molars and lower incisor crowding. Lindquist and Thilander³ conducted a study in which they remove the impacted molar on one side where side as non extraction was used as a control. The findings after three years suggested that removal of lower third molars did not relieve anterior crowding.

Because of all these contrasting evidences, this study was done to re-evaluate correlation between third molars and lower dental arch crowding. The role of lower third molar causing lower anterior crowding is still controversial.

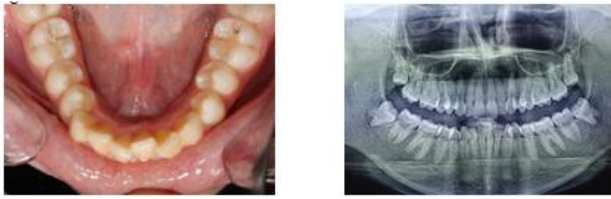


Fig. 1. Initial clinical (A) and radiological (B) view of the lower anterior crowding

MATERIALS AND METHODS

The study group consisted of 70 subjects (45 males and 25 females) with an average age 22.05 ± 5.03 years.

Inclusion Criteria.

- Full complement of teeth was presents including 3rd molars.
- Third molars should be seen in the orthopantomograph.
- There should be no or minimal damage to tooth dimension by caries or attrition.

Exclusion Criteria

- Absence of third molar.
- Presence of supernumerary teeth and retained primary teeth, etc.
- Patients with mandible asymmetries, skeletal disorders and abnormalities.
- Patients with presence of large restorations and artificial teeth.
- Patients with history of prior orthodontic treatment or orthognathic surgery.
- Patients who were not willing to take part in the study

Null hypothesis

There is no relationship of mandibular third molar position and lower anterior crowding in adult patients.

The OPGs and dental casts of the patients were divided into three groups on the basis of position of lower third molars:

- Erupted (Lower third molar partially or completely visible in oral cavity) [Figure 1a],
- Unerupted (Lower third molar not visible in oral cavity) [Figure 1b], and
- Agenesis (Lower third molar neither visible in oral cavity nor in OPG) [Figure 1c]



Figure 1: (a) Erupted third molar, (b) unerupted third molar,(c) agenesis of third molar

Method for measuring lower anterior crowding

Modified segmented arch analysis as proposed by Lundström¹⁰ was used for quantitative and analytical

registration of crowding. Mesiodistal widths of six lower anterior teeth were measured with the help of a caliper placed parallel to the masticatory surface of the dental arch segment. The lower arch length was measured in the anterior and buccal segments (Figure 2, B). The crowding was calculated for every separate lower dental arch segment. The length of lower anterior region which extend from canine of one side to contralateral canine was measured in two segments with the help of brass wire . These two segments are canine to central incisor on each side. The crowding was calculated based on the difference between the tooth size and arch length discrepancy. To determine the measurements reliability, 30 dental casts were randomly selected and analyzed by the same investigator at different time-points. The repeated measurement errors was in the range of $\pm 0,5$ mm per segment, which was considered negligible.

Method for locating lower third molar position

Lower third molar position is located with the help of OPG and dental casts (other than in case of agenesis. On the basis of this it was decided whether the third molar is erupted, unerupted, or absent for right and left sides, respectively.

RESULTS

The gender distribution of the sample in this study is shown in table 1. Males constitutes about 64% of total sample where as females constitutes 35% of total sample size. The percentage distribution of severity of crowding in the erupted, unerupted and absent, third molar groups on the right side in shown in table 2. There were 43 patients with erupted third molars, 15 with unerupted, and 12 patients where third molars was absent. In the erupted group of 43 patients, 48.9 % had 2–3 mm crowding, 23.3% had 1-2 mm crowding and 18.9% had < 1 mm crowding. . In the unerupted group of 15 patients, 26.7 % had 2–3 mm crowding, 46.6 % had 1-2 mm crowding and 13.3 % had < 1 mm crowding. . In 12 patients with absent 3rd molars, 33.3 % had 2–3 mm crowding, 33.3% had 1-2 mm crowding and 8.3 % had < 1 mm crowding.

The study results indicates that the lower dental arch crowding is a common feature of the permanent dentition. Space deficiency was reported in 90% of the sample. On using Chi-square test no statistically significant difference was reported in lower anterior crowding between the groups with erupted, unerupted, and agenesis of third molars on the left and right sides.

Sex	Frequency (%)
Male	45 (64.29%)
Female	25 (35.71%)
Total	70 (100%)

Table 1: Sample distribution

DISCUSSION

The study of the mandibular third molar has always been a topic of great interest for orthodontists and oral surgeons.

Table 2: Comparisons between crowding and third molar position on right side

Third molar position on right side	Crowding on right side						Total
	<1	1-2	2-3	3-4	4-5	≥5	
Erupted	8 (18.6 %)	10 (23.3 %)	21 (48.9 %)	1 (2.3%)	0 (0%)	3 (6.9 %)	43 (100%)
Unerupted	2 (13.3 %)	7 (46.6 %)	4 (26.7 %)	1 (6.6 %)	1 (6.6 %)	0 (0 %)	15 (100%)
Absent	1 (8.3%)	4 (33.3%)	4 (33.3%)	0 (0 %)	2 (16.7 %)	0 (0 %)	12 (100%)
Total	11 (15.7%)	21 (30 %)	29 (41.4%)	2 (2.8 %)	3 (4.2%)	3 (4.2%)	70 (100%)

Various factors affects the development of space for the third molar which includes backward slope of anterior border of ramus in relation to the alveolar border, resorption of bone from anterior border of ramus, mesial movement of dentition, growth of the mandible and sagittal direction of eruption of dentition.

There is no union opinion about extraction of third molars to prevent late lower incisor crowding. Many potential etiological factors have been identified to cause lower arch crowding. These includes; dental factors, skeletal factors and general factors. The etiology behind the late incisor crowding is considered to be multifactorial in nature. It involves a decrease in arch length, discrepancy in jaw/tooth size, narrowing of the lower intercanine width, retroclination of the lower incisors, mesial movement of the posterior teeth, and age related skeletal and soft tissue changes. Garn and Lewis in their study concluded that early loss of mandible deciduous first or second molars have greater influence on the formation of third molar¹¹⁻¹³. The early loss of some deciduous and permanent teeth might have some effect on the emergence time and formation stage of the other permanent teeth. **According to** Niedzielska patients with retained third molars have higher risk of tooth crowding. If there is sufficient space for third molars, it does not cause tooth crowding in lower anterior region; conversely, when such space is deficient the presence of the third molars can cause tooth crowding. The present study shows that there is no statistically significant correlation between lower anterior crowding and third molar position in all the three groups (erupted, unerupted and absent molars). However, there is an increase in the mean crowding in lower anterior region in the erupted group in comparison with unerupted and absent group bilaterally. The results of this investigation supports the work of the Linquist and Thilander⁶. They extracted third molars unilaterally and found a very small increase in crowding with third molars present but with no clinically significant effect. Ades¹⁴ *et al.*, in their retrospective study of patients who had received orthodontic treatment also came to same conclusion. However, this study does not support the conclusions of Schwarze¹⁵. Schwarze in his retrospective study found that third molar extractions are clearly beneficial in reducing lower anterior crowding. Shanley¹⁶, Buschang and Shulman¹⁷ Richardson,¹⁸ also came to same conclusion which is in concurrence with our study. The findings of this study are not in concurrence with study done by Bergstorm and Jensen⁹. Niedzielska found

that possible reason might be, if there is sufficient space available for the eruption of the third molars, the tooth assumes a normal position in the dental arch and does not cause displacement or crowding of the other teeth; conversely, when the space is deficient, third molars may cause dental crowding.

CONCLUSION

The mandibular third molar position have no effect on the lower incisors crowding. There was no statistically significant difference in lower anterior crowding in patient with erupted third molars when compared to subjects with unerupted, and absent third molars.

The recommendation to extract third molars in the lower jaw cannot be solely done on the basis of doubtful rationale to minimize future crowding of the lower anterior teeth.

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