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Angulations of mandibular third molar impaction and lower anterior crowding

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Abstract:

Introduction: Despite a substantial body of literature refuting an association between third molar eruption and crowding of the lower anterior dentition, the issue continues to be controversial. This study sought to assess the correlation between angulations of impact mandibular third molars and anterior crowding of the lower arch.

Materials and methods: 127 patients were examined in this analytical-descriptive study. Clinical and paraclinical records were obtained to assess different impaction angulations and the rate of crowding. Patients with history of previous extractions, orthodontic treatment, Bolton discrepancy and skeletal orthodontic malformations were excluded. Kruskal –Wallis test was used for statistical analysis.

Results: Of the 127 patients studied, mesioangular impaction was observed in 61 patients (48%). This study showed no significant correlation between different angulations of mandibular third molar impaction and crowding (P>0.05).

Conclusion: This study seems to confirm that the role of the lower third molars is not a significant factor in causing late anterior crowding.

Keywords: Crowding, mandibular third molar, angulation

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Mandibular incisor crowding is considered as one of the most common forms of malocclusion with a prevalence of 40% and 85% in American children (6-11 years of age) and adolescents(12-18 years of age) respectively.[1] Furthermore, reports have documented that the frequency of crowding among Iranian students between 13-18 years of age is 17.54- 57.2%.[2-5]

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This condition may compromise patients' oral hygiene and esthetic. On the other hand, mandibular incisor crowding may considerably influence various aspects of orthodontic treatment plans, retention period and treatment outcomes.[6]

Several factors are said to be associated with the incidence of mandibular incisal crowding after the age of twelve the roles of which cannot be clearly determined. Mandibular third molars have long been considered as one of the contributing factors to the incidence of mandibular incisal crowding.[7]Their development and eruption is influenced by numerous genetic factors and nutritional habits. This issue has been extensively reviewed by various authors who have come to different conclusions regarding the extent to which third molars are

etiologic factors in the development of late anterior crowding of the dentition. Studies have shown that the pressure from mandibular third molar eruption is generally an indisputable cause of anterior crowding in the lower arch. However they refute this factor as a sole causative agent in the development of mandibular crowding .[8,9,10]

Other studies suggest that in order to prevent late anterior crowding, mandibular third molars should be extracted in early stages of eruption. Whereas, some reports confirmed incidence of crowding in cases with mandibular third molar agenesis.[11] Fostlicht et al and Laskin et al failed to demonstrate greater rate of crowding in patients with erupted mandibular third molars compared to those without mandibular wisdom teeth.[12,13]

Further studies have reported that presence of mandibular third molar results in considerable space loss and more relapse following orthodontic treatment compared to cases with mandibular third molar agenesis. [14,15]

Extraction of second molars has also been shown to be effective in reducing the chance of crowding in the lower jaw .[16]

In a study in 1994 Pirthinieni and Oikarinen demonstrated that a distolateral movement of second molars occurs following extraction of third molars in the third decade of life. However, it does not justify extraction of third molars to prevent anterior crowding. Richardson assessed the severity of mandibular incisal crowding five and ten years post-mandibular second molar extraction and failed to reveal any significant changes over these periods. [17, 18] There is controversy regarding the extent and significance of the role of mandibular third molars on the incidence or relapse of lower incisal crowding and to the best of our knowledge, there is no reliable evidence regarding the correlation between different angulations of mandibular third molar impact teeth and anterior crowding. [19-24]

Hence, this study sought to assess the correlation between these two phenomenons among patients between 15-25 years of age attending Shahid Beheshti School of Dentistry in years 2007-08.

Materials and methods:

This analytical-descriptive study was conducted on patients with impacted mandibular third molars (age range of 15-25 years) who referred to the departments of Orthodontics and Oral and maxillofacial surgery, Shahid Beheshti School of Dentistry in2007-08. Participants were recruited via simple sampling. Clinical and paraclinical records (photography, radiography, cephalometry and diagnostic casts) were obtained. Patients with the following inclusion criteria were considered:

Patients with genetically induced crowdings i.e. cases with midline deviations. Cases with dental anomalies and Bolton discrepancies were eliminated. Patients between 15-25 years of age. Normal growth pattern; i.e. Jaraback index of 62-65% and Base Plane Angle of 24-26. All patients were skeletal C^{I} Patients with specific systemic conditions which may lead to crowding were excluded.

Lack of previous extractions, missing or supernumerary No previous orthodontic treatment The frequency of various impaction angulations was recorded and data were subjected to Kruskal-Wallis test.

Results:

127 patients (67 females and 60 males) participated in this study. The prevalence of third molar angulations were as follows: 48% (61 patients) Mesioangular, 23.6% (30 patients) vertical, 18.1% (23 patients) horizontal and 10.2% (13 patients) distoangular (Table 1).

Angulation	Frequency	Percent
Mesioangular	61	48.0%
Vertical	30	23.6%
Horizontal	23	18.1%
Distoangular	13	10.2%
Total	127	100%

Table 1- Distribution of mandibular third molar angulations

Of the 127 patients with mandibular incisal crowding, 72% (18 patients) were between 21-22 years old. The majority of cases (27.6%, 35 patients) presented moderate crowding (Table 2,3).

Impaction crowding	Mesioangular	Vertical	Horizontal	Distoangular
No crowding (n=46)	21 (45.7%)	10 (21.7%)	11 (23.9%)	4 (8.7%)
Mild (n=21)	9 (42.9%)	7 (33.3%)	4 (19%)	1 (4.8%)
Moderate (n=35)	17 (48.6%)	8 (22.9%)	5 (14.3%)	5 (14.3%)
Severe (n=25)	14 (56%)	5 (20%)	3 (12%)	3 (12%)
Total (N=127)	61 (48%)	30 (23.6%)	23 (18.1%)	13 (10.2%)

Table 2 – Different patterns of crowding regarding impaction types in the studied patients

	Crowding	N	Mean rank
	No crowding	46	65.93
	Mild	21	64.17
	Moderate	35	64.54
	Severe	25	59.54
	Total	127	

Table 3 – Different patterns of crowding regardless of impaction angulations

The rate of crowding was determined according to Profit's criteria, i.e. the difference between the mesiodistal width of the 6 lower anterior teeth and the lower anterior arch was measured; were this value over 4 mm, "severe" crowding was confirmed. Less than 2 mm difference would fit into the "mild" category and values within this range were considered as "moderate" crowding.

The maximum number of cases with crowding were patients with meisoangular impaction (49.4%, 40 cases) whereas the minimum number of cases with anterior crowding were 9 patients (11.1%) with distoanular impaction.

Our statistical analysis revealed that there is no significant difference between various types of third molar angulations and the severity of crowding (P>0.05).

Discussion:

The role of mandibular third molars in creating an anterior component of force capable of producing crowding has long been a controversial issue among dental practitioners [12] which has been noted from various aspects. Our results regarding the prevalence of mesioangular impaction in mandibular third molars were consistent with Peterson's text book of contemporary oral and maxillofacial surgery [25] This study failed to confirm a significant correlation between different angulations of mandibular third molar impaction and anterior crowding. Previous studies have similarly assessed different aspects (i.e. presence/impaction/agenesis) of mandibular third molars and their association with anterior crowding of lower teeth. Despite the methodological differences, the results were consistent with those presented in this study.[26, 16] Sanin and Vasir listed a number of etiologic factors which can contribute to mandibular incisal crowding in patients with erupted third molars which include remodeling and anterior growth tendency in mandible, periodontal forces and connective tissue changes, physiologic mesial drift of the teeth, anterior component of occlusal forces, size and shape of the teeth, tooth size: jaw size ratio and finally mandibular third molar status.[27, 28] The insignificant statistical difference in this study could be associated with the multi factorial nature of crowding.

On the other hand, we revealed several reports which documented significant correlation between late anterior crowding and mandibular third molar impaction.[16] However, some of these studies failed to eliminate confounding factors such as absence of third molars due to extraction which distort the true results of the study and eventually lead to significant bias in the interpretation of the findings.

Chaconas believes that focusing on the role of third molars on anterior crowding of the mandible may result in negligence of other complex contributing factors and therefore be missed in diagnosis.[29]

Conclusion:

The results failed to demonstrate a significant correlation between the angulation of impacted mandibular third molars and the incidence and severity of mandibular incisal crowding and cannot be regarded as an etiologic or predisposing factor for anterior crowding. Further studies should assess possible etiologic factors to this condition.

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