ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 3, Issue – 2, March - 2020, Page No. : 283 - 289

Correlation between Mandibular Third Molar Impactions and Its Presentation across Various Facial Types - A Retrospective Radiographic Study

[1]Dr. Nitin V Muralidhar, Reader, Department of Orthodontics, JSS Dental College and Hospital, JSSAHER, Mysuru, Karnataka, India.

[2]Dr. Naveen Chandran, PG Student, Department of Orthodontics, JSS Dental College and Hospital, JSSAHER, Mysuru, Karnataka, India.

[3]Dr. Jyotikiran H ,Reader, Department of Orthodontics, JSS Dental College and Hospital, JSSAHER, Mysuru, Karnataka, India.

[4]Dr. Manjula S ,Reader, Department of oral and maxillofacial surgery, JSS Dental College and Hospital, JSSAHER, Mysuru, Karnataka, India.

Corresponding Author: Dr. Naveen Chandran, Dept of Periodontics, Amrita Vishwa Vidhyapeetham Kochi, Kerala.

Citation of this Article: Dr. Nitin V Muralidhar, Dr. Naveen Chandran, Dr. Jyotikiran H, Dr. Manjula S, "Correlation between Mandibular Third Molar Impactions and Its Presentation across Various Facial Types - A Retrospective Radiographic Study", IJDSIR- March - 2020, Vol. – 3, Issue -2, P. No. 283 – 289.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: The lower third molar impactions are most common type of impactions. The most discussed etiology for the only reason for inability of tooth to successfully erupt in the oral cavity is the lack of space. The inadequacy in retromolar space can be related to the direction or rotation of growth of the mandible which can be high angle, average or low angle. The aim of this study is to delineate any relation between percentage and angulations of impactions with growth patterns.

Materials and Methods: OPG's and lateral cephalograms of 72 cases of Patients were considered from which 93 teeth were evaluated**.** The lateral cephalograms where traced for growth pattern of the patient. The third molar impactions were classified according to winter's classification. P & G classification was used to determine the level of impaction and the values were analysed.

Results: High angle cases showed maximum number of impactions (48.5%) followed by low angle cases (31.4%). Mesioangular impaction was the most common type of impaction (40.8%), followed by vertical(29%) and horizontal(21.5%). Winters classification, showed significant correlation between the growth pattern and angulations of impacted third molars (P_V of .007.P and G classification showed no significant correlation (P_V of .928) :

Conclusion: According to this study, lower third molar impactions are seen more in high angle cases. Winters

classification showed a significant relation between the growth pattern and types of impactions. There is no significant relation between levels of impactions and growth patterns.

Keywords: Winters classification and third molar impactions, Third molar impactions and growth patterns, Third molar impaction types.

Abbreviations:

FMPA: Frankforts Mandibular Plane Angle

P and G: Pell and Gregory

Introduction

The third molars erupt into the oral cavity between the age of 17 to 21 years[1] .In some individuals, third molars are found to be missing or get obstructed and does not erupt into the oral cavity leading to impaction[1,2]. The third molar impactions are most common type of impactions. Impaction is more common in the mandible than in the maxilla[3]. The prevalence of their impaction is highly variable and generally reported to be between 16.7 and 73.82%[4]. It is seen more in females than males[5].

The most discussed etiology for the only reason for inability of tooth to successfully erupt in the oral cavity is the lack of space. According to Bjork[6] and Shilling[7] the space deficiency in mandibular third molars arises due to the lack of space in the retromolar region. According to Broadbent[8], the third molar impactions results from the inability of the mandible to achieve its full growth potential. Begg[9] observed the occlusion of aboriginals in Australia and postulated that lack of interproximal attrition in modern man is the main cause of all impactions. The inadequacy in retromolar space can be related to the direction or rotation of growth[6]. The growth of the mandible in a more horizontal direction is more favourable in providing space for third molars to erupt between distal of second molar and ascending border of ramus. Kim et al [10] reported a decrease in third molar impactions in cases treated with first premolar extractions. Other factor is the mesial angulation of lower third molar to the mandibular plane which has not been reoriented to the vertical direction. Winter has classified third molar impaction into four categories based on their inclination of their longitudinal axis ie Mesioangular, distoangular, vertical and horizontal[11]. Pell and Gregory has classified third molars based on their heights[12].

The mandible can grow in upwards and forwards in low angle cases and downwards and backwards in high angle cases. According to Bjork[6], third molar impaction was associated not only with insufficient mandibular growth, but also with a more downward as opposed to forward growth direction. He found that backward direction of eruption and retarded maturation were associated factors.

The mechanism of facial growth occurs in downward and forward direction. Based on this concept, there are basically three patterns - high angle, average and low angle cases. The average individuals with average growth pattern have a normal percentage of growth in both downward and forward direction and is cephalometricaly revealed by values of basal plane angle of 25^0 and FMPA of $22\text{-}30^0$,and upper and lower gonial angles of $52\text{-}55^0$ and $72\text{-}75^0$ respectively. The high angle cases exhibit more growth potential in vertical direction than the horizontal and can be diagnosed with the cephalometric values of basal plane angle greater than 25^0 ,FMPA greater than or equal to 30^0 and upper gonial angle greater than 55^0. The low angle individuals show more growth potential in the horizontal direction than vertical and exhibit cephalometric values of basal plane angle less than 25^0, FMPA less than 22^0 and lower gonial angle greater than 75°.

The role of impacted third molar has been found to be related to some dental and skeletal features that are controversial and differs with different population .Hence

this particular study was undertaken to delineate the mandibular third molar impactions across three facial types, both in angular and vertical eruption levels.

Materials and Methods

The study samples consisted of OPG's and lateral cephalograms of 72 cases of Patients who had undergone fixed orthodontic treatment from which 93 teeth were evaluated. Only mandibular third molars were taken into consideration. Radiographs of patients with incomplete 3rd molar root formation, pathological lesions around 3rd molar, syndromic anomalies, congenital disorders, and those under the age of 18 were excluded.

The lateral cephalograms where traced to find out the growth pattern of the patient using gonial angle (figure 1), basal plane angle (figure 2) and FMPA (figure 3) and based on their average values (table 1), the patients were divided into horizontal, vertical and average growers.

The third molar impactions were classified according to winter's classification [11](figure 4) based on the angulation of the third molar to the longitudinal axis of the second molars into vertical (10 to -10 degree) mesioangular (10 to 80 degree), horizontal (80 to 100 degree) and distoangular (-10 to -80 degree).

For determining the level of impaction based on P & G classification[12] (figure 5) , M3 were categorized to 3 (Figure 2); In level A, the highest part of the mandibular third molar was on the same level or below the occlusal plane of the adjacent second molar. In level B, the highest part of the mandibular third molar was below the occlusal plane but above the cervical line of the second molar. In level C, the highest part of the mandibular third molar was beneath the cervical line of the second molar.

Growth pattern is determined and the impacted teeth are classified according to winters and P and G classification and evaluated. The chi square test was used to determine the relationship between third molar impactions and different growth patterns. p values < 0.05 were considered significant.

Results

In this study, 72 OPGs and cephalograms with 93 impacted teeth were evaluated. Chi square test was performed to test the significance. High angle cases showed maximum number of impactions (48.5%) followed by low angle cases (31.4%) (Table 2). Mesioangular impaction was the most common type of impaction (40.8%), followed by vertical (29%) and horizontal (21.5%) (Table 3). Based on winter's classification, there was a significant correlation between the growth pattern and angulations of impacted third molars (P_V of .007) (Table 4). Mesioangular impactions were most common in horizontal growth patterns whereas horizontal growth patterns were more common in average and low angle cases (53.3 and 54% respectively). P and G classification showed no significant correlation between the height of impactions and growth pattern (P_V of .928) (Table 5)

Discussion

Third molars are the last erupted tooth in the oral cavity, the age of eruption being 17-22 years. Since they are the last to erupt, the chances of getting impacted is more due to space deficiency or other obstructions[13]. In this study lower third molar impactions were considered. Most of the lower third molar impactions are due to decreased retro distal space[14-16]. Also during remodeling, the decreased resorption of the anterior border of ramus can also lead to obstruction of the third molars[17].the growth pattern of the mandible also plays a major role in third molar eruption. The molars tend to erupt more forward during the functional phase in patients with anterior growth rotation, compensating partly for the limited resorption at the anterior ramal border[17]. An important factor affecting the retromolar space is mandibular rotation which

simultaneously determines the facial growth pattern [1,18] . There are numerous complications associated to third molar impactions and hence knowledge about etiology is relevant to aid in early elimination of etiology[19,20]. This study aims to find any correlation between lower third molar impaction and mandibular growth pattern. Skeletal growth pattern is determined by cephalometric tracing of Gonial angle, FMPA and basal plane angle. Winters classification was used classify the types of impaction and P and G classification was employed to determine the height of impaction.

According to this study, high angle cases are shown to have the most number of impactions the percentage being 48.5% compared to 31.4% in low angle cases and 20% in average cases,(table 2)which is in agreement with studies of Breik et al[1] who showed more incidence of third molar impactions in long faces4 .this study is also in agreement with their findings that mesioangular impactions were most common types of impactions , the percentage being 40.8% compared to 29% horizontal, 21.5% vertical and 8.6% distoangular.(Table 3)

Winters classification (Table 4) showed mesioangular impaction to be most common in low angle (57.4%) cases whereas horizontal impactions were more common in average and low angle cases (53.3 and 54% respectively) .Distoangular impactions were least common, the values being 11.1%,0% and 8.3% in high angle ,average and low angle cases respectively. These values were significant with a p value of .007.

P and G classification showed that level B was most common in all the growth patterns, level A being the second most common and level C being the least common (table 5) .The values were not significant (p value .928) according to chi square test.

Conclusion

According to this study, lower third molar impactions are seen more in high angle cases compared to low angle and average cases. Mesioangular impactions were the most common type of impactions. According to this study, winters classification showed a significant relation between the growth pattern and types of impactions. There is no significant relation between levels of impactions and growth patterns.

References

1. Breik O, Grubor D. The incidence of mandibular third molar impactions in different skeletal face types. Aust Dent J. 2008 Dec; 53(4): 320–4.
2. Sadeta Šečić SP, Sanja Komšić, Amra Vuković. Incidence of impacted mandibular third molars in population of Bosnia and Herzegovina: a retrospective radiographic study. Journal of health science. 2013: 3: 151-158
3. Hassan AH. Pattern of third molar impaction in a Saudi population. Clin Cosmet Investig Dent. 2010 Oct; 2: 109–13.
4. Kaomongkolgit R, Tantanapornkul W. Pattern of impacted third molars in Thai population: retrospective radiographic survey. J Int Dent Med Res. 2017; 10: 30–5
5. Kruger E, Thomson WM, Konthasinghe P. Third molar outcomes from age 18 to 26: findings from a population-based New Zealand longitudinal study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2001 Aug; 92(2): 150–5.
6. Bjo¨rk A, Jensen E, Palling M. Mandibular growth and third molar impaction. Acta Odont Scand 1956;14:231–271.
7. Shilling G. Development and eruption of the mandibular third molar and its response to orthodontic therapy. Angle Orthod 1973;43:271–278.

8. Broadbent BH. The influence of the third molars on the alignment of teeth. Am J Orthod 1943;29:312–330.
9. Begg PR. Stone age man's dentition. Am J Orthod 1954;40:298– 312, 373–383, 517–531.
10. Kim T, Artun J, Behbehani F, Artese F. Prevalence of third molar
11. Winter G.B. Impacted mandibular third molars. St Louis: American Medical Book Co.; 1926. p. 241–79.
12. Pell GJ, Gregory BT. Impacted mandibular third molars: classification and modified techniques for removal. Dent Digest 1933;39:330–338.
13. Richardson ME. The etiology and prediction of mandibular third molar impaction. Angle Orthodontics. 1977; 47: 165-172.
14. Dachi SF, Howell FV. A survey of 3,874 routine full-mouth radiographs. II. A study of impacted teeth. Oral Surgery Oral Medicine Oral Pathology. 1961; 14: 65-69. 16.
15. Bishara SE Andreasen G. Third molars: A review. American Journal of Orthodontics. 1983; 83: 1-7.
16. Grover PS LL. The incidence of un-erupted permanent teeth and related clinical cases. Oral Surgery Oral Medicine Oral Pathology. 1985; 59: 420-425.
17. Arne Björk EJ, Mogens Palling: Mandibular growth and third molar impaction. Acta Odontologica Scandinavica. 1956; 14: 231-272.
18. Wu H, Zhou L, Li J, Wang YM. [Maxillary and mandibular rotation type in normal and II (1) malocclusion adolescents with different growth patterns]. 2010; 28: 48-56.
19. Elter JR, Offenbacher S, White RP, Beck JD. Third molars associated with periodontal pathology in older Americans. Journal of Oral Maxillofacial Surgery. 2005; 63: 179-184.
20. Eliasson S, Heimdahl A, Nordenram A. Pathological changes related to long-term impaction of third molars. A radiographic study. International Journal of Oral Maxillofacial Surgery. 1989; 18: 210-212

Legend Figures and Tables

Table 1: average values of angles measured

Basal Plane Angle	25°
FMPA	22-30°
Upper Gonial Angle	52-55°
Lower Gonial angle	72-75°

Table 2: growth patterns and its percentages

Growth Pattern	Percentage
High Angle	48.5%
Average	20%
Low Angle	31.4%

Table 3: types of impactions and its percentage

TYPE OF IMPACTION	PERCENTAGE
Mesioangular	40.8%
Distoangular	8.6%
Horizontal	29%
Vertical	21.5%

Table 4: Percentage of different types of impactions in different growth patterns

Growth Pattern	Winters Classification Of Impaction			
	Mesioangular	Distoangular	Horizontal	Vertical
High Angle	57.4%	11.1%	11.1%	20.3%
Average	13.3%	0%	53.3%	33.3%
Low Angle	20.8%	8.3%	54%	16.6%
P value	.007			

Table 5: percentage of different levels of impactions in different growth patterns

Growth Pattern	P And G Classification of Impaction		
	Level A	Level B	Level C
High Angle	36.8%	41.4%	16%
Average	28.5%	57.1%	14.2%
Low Angle	35.8%	46.6%	17.5%
P value	.928		

Figures

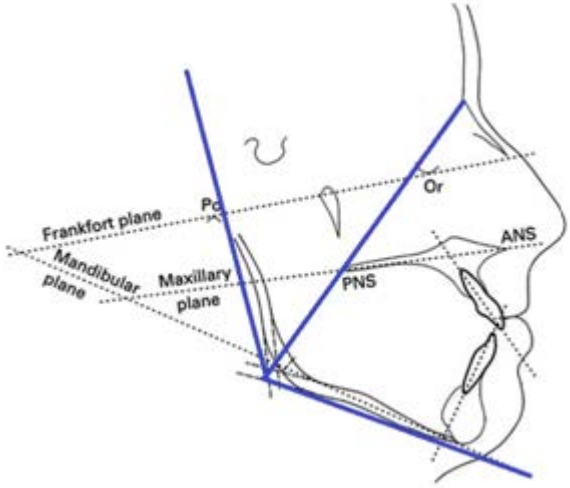

Figure 1: Gonial angle

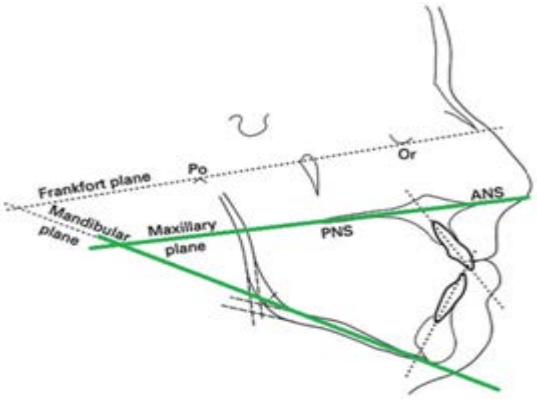

Figure 2: Basal Plane Angle

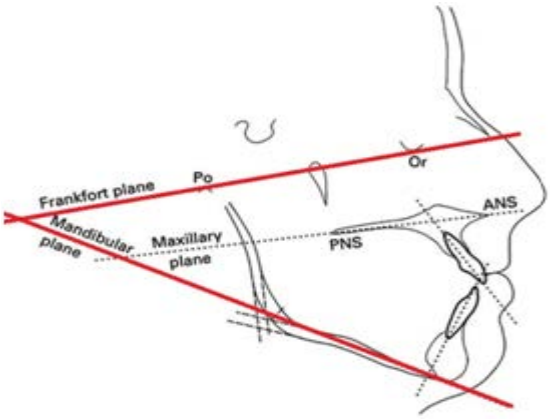

Figure 3: Frankforts Mandibular Plane Angle

Figure 4: winters classification

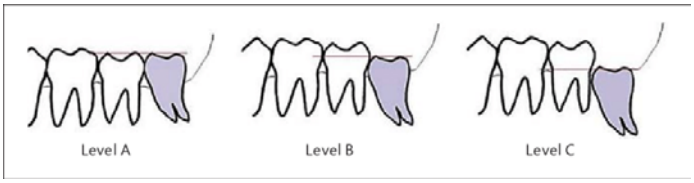

Figure 5: Pell and Gregory Classification