

INCIDENCE OF MANDIBULAR 3RD MOLAR IMPACTIONS IN DIFFERENT FACIAL TYPES OF ORTHODONTIC PATIENTS SEEN AT KHYBER COLLEGE OF DENTISTRY

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ABSTRACT

Current study was performed to evaluate the incidence of mandibular 3rd molars impactions in patients of different skeletal facial types, seen at orthodontic department Khyber College of Dentistry Peshawar. Ninety pretreatment records of orthodontic patients (aged 16-35) including lateral cephalometric radiographs and orthopantomograms were assessed. The degree of impaction was determined by the Pell and Gregory classification system, and the facial type was categorized by the facial axis angle. Results showed that class II impaction was most common in mesiofacial and dolichofacial patients while in brachifacial class I impaction was mostly observed. Overall impaction rate was more in females and most impactions were in class I and II. The study concluded that brachyfacial subjects over dolichofacial and mesiofacials provides increased space for full eruption of the mandibular third molars, so decreased mandibular 3rd molar impactions were seen in brachyfacials as compared to the other two groups.

Key Words: *Third molar ,impaction, facial type.*

INTRODUCTION

Third molar is the most common impacted tooth in the jaws.¹ The term impaction can be defined as “a tooth which fail to erupt or develop in their proper functional location, obstructed by other tooth, bone or soft tissues within the expected time”.² The impaction rate of 3rd molar varies in different races, also, most authors claim that its incidence is higher in females.³

The impaction rate of 3rd molars is highest than any other tooth in modern population.⁴ Generally, if not impacted, third molars have been found to erupt between the ages of 17 and 21 years.⁵ Their eruption time have been reported to vary with races.⁶ The suggested etiology of the increased rate of impaction is inadequate space in the retromolar area, between the distal surface of 2nd molar and anterior border of ramus of the mandible.^{7,8} This space inadequacy can be the result of insufficient mandibular growth.⁹ But according to some studies, despite of sufficient growth, if dentition does not move forward because of lack of interproximal wear (as in modern population), will

cause 3rd molar impaction.¹⁰ In a previous study, it was shown that after 2nd molar extraction, 3rd molars are rarely observed impacted, suggesting an increase in the eruption space.¹¹ Similarly a recent study showed premolar extraction therapy as a part of orthodontic treatment resulted decrease in impaction frequency.¹² These studies indicate that 3rd molar impaction is basically due to lack of space for eruption.¹³

Space deficiency at retromolar area is due to reduced amount of growth. Also, it can be related to the direction/rotation of growth, which determine the type of face (mesiofacial, brachifacial, or dolichofacial).¹⁴ The facial skeleton grows in a forward and downward direction.¹⁵ In a “mesofacial” growth pattern, there is a relative harmony in these two directions, leading to a facial profile which is described cephalometrically by a 90(±3) facial axis angle.¹⁵ Brachyfacial is the term used to describe the person with a short anterior face height and a wide face, cephalometrically >93 facial axis angle.⁴

Dolichofacial is the term used to describe a long anterior face height and a narrow face (“the long face syndrome”). There is a clockwise rotation of the mandible leading to relatively short ramus. Cephalometrically <90 facial axis angle.⁴

If ramus increases in size by its anterior border

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resorption and deposition at its posterior (as in brachifacials) space will be adequate for 3rd molar eruption. but if resorption is limited (as in dolichofacials), the mandibular molars may be impacted.⁴ Therefore 3rd molar impaction can be associated with skeletal facial types. But this association is controversial and different among different populations.

The aim of this study was to evaluate the impaction of mandibular 3rd molars in the patients of different skeletal facial types, visiting orthodontic department of Khyber College of Dentistry. Finding the subjects of the facial type with high risk of impacted 3rd molars effect orthodontic treatment plan and also their timely management can be done.

METHODOLOGY

The data was taken from the pre treatment record of 90 subjects, (thirty patients of each facial type) .Inclusion criteria were

- 1 Pretreatment record of patients aged between 16-35 years with history of no previous orthodontic treatment or extractions.
- 2 Lateral cephalograms and OPGs with complete dentition and mandibular 3rd molar root formation at least two third completed.

Facial profile was categorized on the basis of facial axis angle which is created by the lines Ba-Na and Pt-Gn. Its mean value is 90° ± 2 (mesiofacial), if value >93o regarded as brachifacial and if <83o it's regarded as dolichofacial.⁴

Impacted 3rd molar was classified according to Pell and Gregory classification system involving mainly classes I, II, III.¹⁵ It is Based on the amount of tooth covered by the anterior border of the ramus. Class I 3rd molar impaction: Situated anterior to the anterior border of the ramus. Class II 3rd molar impaction: Crown ½ covered by the anterior border of the ramus. Class III 3rd molar impaction: Crown fully covered by the anterior border of the ramus.¹⁵

RESULTS

Results showed that class II impaction was most common in mesiofacial and dolichofacial patients while in brachifacial class I impaction was mostly observed. Overall impaction rate was more in females and most impactions were in class I and II. In mesiofacial patients it's revealed that inspite of relatively harmonious growth pattern Increased impaction rate is found which suggest that impaction is not only related to space provision but many other factors like angulation and position of tooth bud, density of overlying bone etc.

TABLE 1: FACETYPE IMPACTION CROSSTABULATION

		Impaction			Total
		Class 1	Class 2	Class 3	
Face type	Mesofacial	8	20	2	30
	Brachyfacial	25	5	0	30
	Dolichofacial	11	17	2	30
Total		44	42	4	90

TABLE 2: GENDER IMPACTION CROSSTABULATION

		Impaction			Total
		Class 1	Class 2	Class 3	
Face type	Male	20	18	2	40
	Female	24	24	2	50
Total		44	42	4	90

DISCUSSION

Among the different causes of mandibular 3rd molar impaction, space deficiency is considered the most important and common cause.¹³ Lack of space in the alveolar arch between the distal of the second molar and the ascending ramus, result in impaction.¹⁴ Bjork et al noted that in cases of mandibular third molar impaction, the alveolar arch space behind the second molar was reduced in 90 percent of cases.^{7,8} Provision of adequate space is associated with mandibular growth. In a previous study it was demonstrated that premolar extractions had a positive influence on the developing maxillary third molar angulations both on right and left.¹³

Previous studies demonstrate space deficiency for 3rd molar eruption by 3 separate skeletal factors⁴, which are

- 1 Short mandibular length.⁴
- 2 Vertically directed condylar growth.⁴
- 3 Backward directed eruption of dentition.⁴

The most dominant factor in them is the vertically directed condylar growth which is seen in dolichofacial subjects. The growth was in a predominantly vertical component in those with impacted mandibular third molars.¹⁶

The results of the present study showed increased incidence of mandibular third molar impaction in patients with a facial axis angle that is < 87 with dolichofacial (long face) profile. Which is consistent with the result of a previous study by Eroo et al.¹⁷ According to that study the patients with short mandibular length

were in an increased risk of third molar impaction.¹⁷ A previous study demonstrated that crowding was associated with larger mandibular plane angle and occlusal angles to Sella turcica–Nasion (S–N) compared with patients of spacing.¹⁸ Spacing was associated with the anterior segment of the mandible being positioned further forward or less downward implying a smaller mandibular plane angle.¹⁴ Similar results have been described by Sakuda et al.¹⁹

The above studies also demonstrate that in short faced patients, in whom the direction of growth is more forward than downward, there is a more horizontal occlusal plane length requiring greater resorption from the anterior border of the ramus during growth, and subsequently resulting in a less crowded occlusion and greater space for the eruption of third molars. Nanda et al also noted that the amount of time of growth differed between different facial types.²⁰ It was shown that brachyfacial patients exhibited a prolonged period of facial growth in contrast to dolichofacial patients. This may also account for the greater amount of resorption of the anterior border of the ramus.⁴

Limitation in the present study was the number of subjects and the sample type. Being orthodontic patients, they are more likely to suffer from a malocclusion and potential crowding, and so are likely to have a higher incidence of mandibular third molar impaction than a random population sample. Eruption time and impaction status is an unpredictable phenomenon.

CONCLUSIONS

Within the limitations of the current study, it was concluded that the greater horizontal facial growth pattern of brachyfacial subjects over dolichofacial and mesiofacial subjects provides increased space for full eruption of the mandibular third molars. So decreased mandibular 3rd molar impactions are seen in them as compared to the other two groups.

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- 4 **Nayab Hassan:** Spss of data. Results compiling