Original Article

Pathologies Associated With Impacted 3rd Molar In Kathua Population: An Observational Study

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Abstract

Introduction- Complications associated with impacted 3rd molars include pericoronitis, cyst, tumours, abscess, periodontal problems, dental caries and root resorption on adjacent 2nd molar. Various types, positions and class of 3rd molars effect the surrounding soft tissues and hard tissues differently. Depending upon the location the complications may vary.

Material and Methods- Patients between the age of 15- 40 years who reported to department of dentistry, GMC Kathua, with complaint of impacted mandibular 3rd molar were included in the study. A total of 299 cases were examined. Pathologies around 3rd molars and those associated with 2nd molars due to impacted 3rd molars were evaluated clinically and radiographically.

Results- Mesio-angular impactions (73.6%) were the most common type of impaction present in our study followed by vertical (10.4%), horizontal (9.4%) and disto-angular (6.7%). Position B (Pell and Gregory classification) (63.5%) was most commonly present. Pericoronitis (18.10%) was the most commonly found pathology with mesio-angular impaction (17.40% of cases) being the most common type of impaction associated with pathologies.

Discussion- Knowledge about different type of impactions and the various pathologies associated with it helps in the decision making for prophylactic removal of third molars.

Keywords- 3rd molars, impaction, pathologies.

Introduction

The tooth which fails to erupt or not expected to erupt into the dental arch based on radiographic and clinical findings is stated to be impacted tooth.[1] Third molars are the most common impacted tooth in human dentition and their values have been on a rise.[2,3,4] Discussions of prevalence of third molar pathology and extraction are very commonly found in literature.[5] There are various pathologies associated with impacted third molars which include, cystic lesions, neoplasms, pericoronitis, periodontitis, and pathological root resorption as well as injurious effects on the lower second molar teeth.[6] In addition, impacted third molar can also be extracted to facilitate orthodontic movement or to perform orthognathic surgery.[7,8]

There are a lot of studies which support that extraction of third molars should only be carried out in the presence of pathology.[9,10,11] Whereas, American Association of Oral and Maxillofacial surgeon supports extraction of

asymptomatic third molars as they are a potential cause of chronic inflammation, affecting patients to a range of periodontal and systemic problems in the future. Prophylactic removal of third molars has been advocated as there is chance of possible pathologies that can be associated with it and thus is considered as evidence for its early removal.[12]

The aim of our current study is to evaluate the types of associated pathologies with impacted third molars in Kathua, north Indian population and to find out if there is any relationship between age group of patients, spatial position of the third molar, indication for extraction, and associated pathologies.

Objectives-

The objective was to evaluate clinically and radiologically the impacted mandibular 3rd and 2nd molar and to evaluate the various pathologies associated with it.

Materials and methods-

The study was conducted in the department of dentistry, GMC Kathua.

Patients between the age of 15- 40 years who reported to department of dentistry, GMC Kathua, with complaint of impacted mandibular 3rd molar were included in the study considering the inclusion and exclusion criteria.

A standard proforma was used to collect necessary information regarding each case. Written informed consent was obtained from all the patients and records were maintained. Mouth mirror, Williams Periodontal probe, explorer, various radiographs including OPG, IOPA, Bite wing radiograph was used for obtaining data. Case history of the patients were taken. Three observers analysed the data collected from each patient. With agreement of at least two observers the data was included in the study.

Winter's classification and Pell and Gregory classification using IOPA and Panaromic radiography (OPG) were used to determine the position and angulation of the impacted 3rd molar.

Winter's classification[13]

1. Vertical- The long axis of 3rd molar is parallel to the long axis of the second molar. (10 to -10 degree)

2. Mesio-angular- The impacted tooth is tilted towards the 2nd molar in mesial direction, (11 to 79 degree)

3. Disto-angular- The long axis of 3rd molar is angled distally posteriorly away from the 2nd molar. (-11 to -79 degree)

4. Horizontal- The long axis of the 3rd molar is horizontal. (80 to 100 degree)

Pell and Gregory classification[13]

1. Position A impaction- The occlusal plane of the impacted tooth is the same as the second molar.

2. Position B - The occlusal plane of impacted third molar is between the occlusal plane and the cervical line of the second molar.

3. Position C - The occlusal plane of the impacted third molar is below the cervical line of the second molar.

The pathologies assessed were on 3rd molar and in the adjacent 2nd molar. Soft tissue pathologies including pericoronitis with bony pathologies including cyst, tumours were assessed. Pathologies including 2nd molar that are cervical caries, root resorption and changes in the periodontium due to impacted 3rd molar were assessed.

Dental caries was detected clinically by visual tactile examination.[14] IOPA radiograph was also taken at 70 kvp and 0.20 s time using Planmeca ProX™ intraoral X-ray unit to detect caries.

Periodontal pockets were checked and measured on six surfaces of second molars using a Williams periodontal probe. Highest value of periodontal probing depth was considered around 2nd molar. Periodontal bone loss greater than 4 mm below the cementoenamel junction was considered pathologic.[15]

IOPA and OPG were used to check root resorption as present and absent. Regular root surface was considered as having no resorption. Resorption identification was done as a small irregularity on root surface or advanced resorption which can lead to loss of root shape including pulp to complete root resorption.[16]

Inclusion Criteria: Patients between the age group of 15-40 years and requiring surgical extraction of mandibular 3rd molar.

Exclusion Criteria: Patients who were not willing to participate or having 2nd mandibular molar missing, were excluded. Patients with past history of any major systemic illness such as diabetes and hypertension, underlying immunocompromised conditions and with history of acute illness, infection or pregnancy were excluded.

Results

A total of 299 patients were examined in due course of time. Out of 299 patients 170 were males 56.86% and 129 were females 43.14%. Mesio-angular type of impaction was most prevalent in 220(73.6%) of cases followed by vertical 31(10.4%), horizontal 28(9.4%) and disto-angular 20(6.7%) cases. In Pell and Gregory Classification Position A was seen in 88(29.4%) of cases, Position B in 190 (63.5%) and Position C in 21(7%) of cases. Class of impaction include Class 1 in 152 (50.8%), Class 2 116(38.8%), Class 3 31(10.4%) cases. Grade of impaction were classified as slightly difficult 137(45.8%), moderately difficult 130 (43.5%) and severely difficult 32 (10.7%) of cases (table 1). Mean age group of the patients was 28.3946 years with standard deviation of 6.26095 (table 2). Table 3 shows the association of the impaction type with the various pathologies. Various type of impactions was significantly associated with pathologies p value- 0.058, mesio-angular consisting 17.40% of cases out of total 27.80% cases. Pericoronitis was present in 54(18.10%) of cases out of which mesio-angular constitute 34(11.40%) of cases (Table 3). In Pell and Gregory classification pericoronitis is mostly seen in Position B 33(11.00%), class 1 40 (13.40%) of total cases. Tables 3-6

Cyst was present in 20(6.70%) cases of which mesio-angular impaction accounts for 13(4.30%) of the cases. Position B of Pell and Gregory classification was associated with more cystic lesion and the results were statistically significant. Abscess was present in 6 of total cases which account for 2% of total cases. Tables 3-6

Pathologies associated with 2nd molar include dental caries, periodontal pockets and root resorption. In 11.70% of cases 2nd molars had different pathologies. Dental caries was the most commonly associated pathology that was associated with 2nd molars. Mesio-angular impaction accounts for 12(4%) of the carious 2nd molars whereas Position B and class 1 account for 9(3%), 7(2.30%) carious 2nd molars respectively. Periodontal pockets were seen in 8(2.70%) cases out of which all the cases were mesio-angular type of impaction and Position B accounts for 5(1.70%) of cases. Root resorption was seen in total 9(3.00%) cases out of which 7(2.30%) of cases had mesio-angular type of impaction. Tables 3-6

Table 1: Frequency distribution of parameters- gender, impaction type, classification, class and grade

		Frequency	Percent
Gender	Male	170	56.86
	Female	129	43.14
Impaction type	Mesioangular	220	73.6

	Vertical	31	10.4
	Horizontal	28	9.4
	Distoangular	20	6.7
Pell and Gregory Classification	Position A	88	29.4
	Position B	190	63.5
	Position C	21	7
Class	Class 1	152	50.8
	Class 2	116	38.8
	Class 3	31	10.4
Grade of impaction	Slightly difficult 3-4	137	45.8
	Moderately difficult 5-6	130	43.5
	Very difficult 7-10	32	10.7

Table 2: Descriptive statistics of age of the participants

Descriptive Statistics	Minimum	Maximum	Mean	Std. Deviation
Age	18	44	28.3946	6.26095

Table 3: Association of the impaction type with the various pathologies

			Impaction type					
			Mesioangular	Vertical	Horizontal	Distoangular	Total	Sig.
Pathologies associated	Yes	Count	52	11	12	8	83	0.058
		% of Total	17.40%	3.70%	4.00%	2.70%	27.80%	
	No	Count	168	20	16	12	216	
		% of Total	56.20%	6.70%	5.40%	4.00%	72.20%	
Pericoronitis	Yes	Count	34	6	10	4	54	0.072
		% of Total	11.40%	2.00%	3.30%	1.30%	18.10%	
	No	Count	186	25	18	16	245	
		% of Total	62.20%	8.40%	6.00%	5.40%	81.90%	
Cyst	Yes	Count	13	3	1	3	20	0.347
		% of Total	4.30%	1.00%	0.30%	1.00%	6.70%	
	No	Count	207	28	27	17	279	
		% of Total	69.20%	9.40%	9.00%	5.70%	93.30%	
Abscess	Yes	Count	3	2	0	1	6	0.167

		% of Total	1.00%	0.70%	0.00%	0.30%	2.00%	
	No	Count	217	29	28	19	293	
		% of Total	72.60%	9.70%	9.40%	6.40%	98.00%	
Pathologies associated with 2nd molars	Yes	Count	31	1	1	2	35	0.157
		% of Total	10.40%	0.30%	0.30%	0.70%	11.70%	
	No	Count	189	30	27	18	264	
		% of Total	63.20%	10.00%	9.00%	6.00%	88.30%	
Dental caries	Yes	Count	12	0	0	1	13	0.341
		% of Total	4.00%	0.00%	0.00%	0.30%	4.30%	
	No	Count	208	31	28	19	286	
		% of Total	69.60%	10.40%	9.40%	6.40%	95.70%	
Periodontal pocket	Yes	Count	8	0	0	0	8	0.399
		% of Total	2.70%	0.00%	0.00%	0.00%	2.70%	
	No	Count	212	31	28	20	291	
		% of Total	70.90%	10.40%	9.40%	6.70%	97.30%	
Root resorption	Yes	Count	7	1	0	1	9	0.761
		% of Total	2.30%	0.30%	0.00%	0.30%	3.00%	
	No	Count	213	30	28	19	290	
		% of Total	71.20%	10.00%	9.40%	6.40%	97.00%	

Table 4: Association of the Pell and Gregory classification with the various pathologies

			Pell and Gregory Classification				
			Position A	Position B	Position C	Total	Sig.
Pathologies associated	Yes	Count	18	54	11	83	**0.013***
		% of Total	6.00%	18.10%	3.70%	27.80%	
	No	Count	70	136	10	216	
		% of Total	23.40%	45.50%	3.30%	72.20%	
Pericoronitis	Yes	Count	12	33	9	54	**0.007***
		% of Total	4.00%	11.00%	3.00%	18.10%	
	No	Count	76	157	12	245	
		% of Total	25.40%	52.50%	4.00%	81.90%	
Cyst	Yes	Count	5	13	2	20	0.81
		% of Total	1.70%	4.30%	0.70%	6.70%	
	No	Count	83	177	19	279	
		% of Total	27.80%	59.20%	6.40%	93.30%	
Abscess	Yes	Count	1	5	0	6	0.564
		% of Total	0.30%	1.70%	0.00%	2.00%	

	No	Count	87	185	21	293	
		% of Total	29.10%	61.90%	7.00%	98.00%	
Pathologies associated with 2nd molars	Yes	Count	9	20	6	35	**0.045***
		% of Total	3.00%	6.70%	2.00%	11.70%	
	No	Count	79	170	15	264	
		% of Total	26.40%	56.90%	5.00%	88.30%	
Dental caries	Yes	Count	3	9	1	13	0.876
		% of Total	1.00%	3.00%	0.30%	4.30%	
	No	Count	85	181	20	286	
		% of Total	28.40%	60.50%	6.70%	95.70%	
Periodontal pocket	Yes	Count	1	5	2	8	0.101
		% of Total	0.30%	1.70%	0.70%	2.70%	
	No	Count	87	185	19	291	
		% of Total	29.10%	61.90%	6.40%	97.30%	
Root resorption	Yes	Count	3	3	3	9	**0.005***
		% of Total	1.00%	1.00%	1.00%	3.00%	
	No	Count	85	187	18	290	
		% of Total	28.40%	62.50%	6.00%	97.00%	

Table 5: Association of the class with the various pathologies

			Class				
			Class 1	Class 2	Class 3	Total	Sig.
Pathologies associated	Yes	Count	40	34	9	83	0.851
		% of Total	13.40%	11.40%	3.00%	27.80%	
	No	Count	112	82	22	216	
		% of Total	37.50%	27.40%	7.40%	72.20%	
Pericoronitis	Yes	Count	26	23	5	54	0.812
		% of Total	8.70%	7.70%	1.70%	18.10%	
	No	Count	126	93	26	245	
		% of Total	42.10%	31.10%	8.70%	81.90%	
Cyst	Yes	Count	9	8	3	20	0.743
		% of Total	3.00%	2.70%	1.00%	6.70%	
	No	Count	143	108	28	279	
		% of Total	47.80%	36.10%	9.40%	93.30%	
Abscess	Yes	Count	5	1	0	6	0.262
		% of Total	1.70%	0.30%	0.00%	2.00%	

	No	Count	147	115	31	293	
		% of Total	49.20%	38.50%	10.40%	98.00%	
Pathologies associated with 2nd molars	Yes	Count	17	14	4	35	0.952
		% of Total	5.70%	4.70%	1.30%	11.70%	
	No	Count	135	102	27	264	
		% of Total	45.20%	34.10%	9.00%	88.30%	
Dental caries	Yes	Count	7	5	1	13	0.942
		% of Total	2.30%	1.70%	0.30%	4.30%	
	No	Count	145	111	30	286	
		% of Total	48.50%	37.10%	10.00%	95.70%	
Periodontal pocket	Yes	Count	3	4	1	8	0.745
		% of Total	1.00%	1.30%	0.30%	2.70%	
	No	Count	149	112	30	291	
		% of Total	49.80%	37.50%	10.00%	97.30%	
Root resorption	Yes	Count	5	3	1	9	0.943
		% of Total	1.70%	1.00%	0.30%	3.00%	
	No	Count	147	113	30	290	
		% of Total	49.20%	37.80%	10.00%	97.00%	

Table 6: Association of the grade of impaction with the various pathologies

			Grade of impaction				
			Slightly difficult 3-4	Moderately difficult 5-6	Very difficult 7-10	Total	Sig.
Pathologies associated	Yes	Count	26	44	13	83	**0.006***
		% of Total	8.70%	14.70%	4.30%	27.80%	
	No	Count	111	86	19	216	
		% of Total	37.10%	28.80%	6.40%	72.20%	
Pericoronitis	Yes	Count	16	31	7	54	**0.03***
		% of Total	5.40%	10.40%	2.30%	18.10%	
	No	Count	121	99	25	245	
		% of Total	40.50%	33.10%	8.40%	81.90%	
Cyst	Yes	Count	7	9	4	20	0.318
		% of Total	2.30%	3.00%	1.30%	6.70%	
	No	Count	130	121	28	279	

		% of Total	43.50%	40.50%	9.40%	93.30%	
Abscess	Yes	Count	3	2	1	6	0.83
		% of Total	1.00%	0.70%	0.30%	2.00%	
	No	Count	134	128	31	293	
		% of Total	44.80%	42.80%	10.40%	98.00%	
Pathologies associated with 2nd molars	Yes	Count	16	16	3	35	0.899
		% of Total	5.40%	5.40%	1.00%	11.70%	
	No	Count	121	114	29	264	
		% of Total	40.50%	38.10%	9.70%	88.30%	
Dental caries	Yes	Count	6	6	1	13	0.933
		% of Total	2.00%	2.00%	0.30%	4.30%	
	No	Count	131	124	31	286	
		% of Total	43.80%	41.50%	10.40%	95.70%	
Periodontal pocket	Yes	Count	3	5	0	8	0.43
		% of Total	1.00%	1.70%	0.00%	2.70%	
	No	Count	134	125	32	291	
		% of Total	44.80%	41.80%	10.70%	97.30%	
Root resorption	Yes	Count	4	4	1	9	0.996
		% of Total	1.30%	1.30%	0.30%	3.00%	
	No	Count	133	126	31	290	
		% of Total	44.50%	42.10%	10.40%	97.00%	

Discussion

There is a controversy among the surgeons for removal of third molar impaction. Prophylactic extraction of asymptomatic impacted third molars remain controversial but impacted 3rd molar associated with pathology should be removed. [17,18] There is a potential for complications such as postoperative swelling, trismus, fracture, and nerve injury due to the procedure for removal of 3rd molar.[19,20] Surgery of third molar removal should be carried out immediately when there is non-restorable caries of adjacent or impacted teeth, follicle disease, bone destruction and infections.[18]

The pathologies associated with the third molar impaction were categorised in our study as hard tissue pathology which included dental caries of adjacent tooth, cyst, abscess, distal periodontal pathologies and root resorption of mandibular 2nd molar and soft tissue disease mainly refers to pericoronitis.

In our study the mean age for the prevalence of impacted 3rd molar was 28.3946 years which was in accordance with the previous studies. [21,22] Our study accounts for 73.6% of mesio- angular type of impaction which is also stated in previous literature as the most common impaction[23,24] whereas some authors have found vertical impaction to be the most common type. [25] In our study vertical impaction only consists of 10.4% of the cases with disto-angular being the least common type of impaction.

Impaction level assessed based on the Pell and Gregory classification showed that Position B was the most common impacted position with 63.5% of cases whereas class 1 level of impaction was seen in 50.8% of cases. These results were in accordance with other studies conducted previously [26,27] whereas other studies showed level A to be the most common one.[28,29]

In our study position B of Pell and Gregory classification had a highest incidence of pathologies associated which was contrary to the literature which showed position A to have the highest pathologies as it was less deep.[30,31] Pericoronitis is an inflammation that occurs in the soft tissues around an erupting tooth, in our study pericoronitis was most commonly associated with mesio-angular type of impaction. Related to Pell and Gregory classification position B was having maximum cases of pericoronitis but the total pericoronitis cases in position A were 12 out of 18 total cases of pathology, which showed pericoronitis to be present mostly in erupted or half erupted tooth. [30,31]

The incidence of cysts occurring around impacted third molars differ among various studies and was reported to be low in literature[32,33] in our study the incidence of cystic changes around impacted 3rd molar was high 6.70% of cases with mesio-angular impactions only accounting for 4.30%. Position B, Class 1 cases were most commonly seen to be having cystic lesion. The cause for such high incidence of cystic lesion in our study remains unknown.

Dental caries on 2nd molars were seen in 4.30% of cases which is relatively low compared with previous literature. The most commonly involved impaction type being mesio-angular, position B, class A type. [34,35,36,37]

Root resorption of the mandibular second molar is affected by the pressure exerted by mandibular third molar, pericoronitis, periodontal disease of the second molar. Completely impacted 3rd molar cause more root resorption than the partially impacted 3rd molar.[38] The resorption of the root is inflammatory in nature and is due to the obstruction of blood vessels.[39] In our study 3% of the cases showed root resorption with mesio-angular impaction being the most common cause of root resorption.

Impacted third molars that are clinically visible have greater periodontal probing depths and are associated with greater periodontal problems.[40] Gröndahl et al[41] showed that after third molar extraction, periodontal conditions of adjacent second molars improved, many studies contradict to that.[42,43] In our study, the prevalence of pocket formation was 2.70% with mesio-angular being most common cause.

Conclusion

Mandibular third molar impaction of a particular type affects the bone and soft tissues surrounding it. Detailed knowledge of the various type of impaction and the various pathologies associated with it should be there before prophylactic removal of it. Our study provides knowledge about the various type of impactions and the various pathologies associated with it. This will help in the decision making of prophylactic removal of third molars.

Conflict of interest- none.

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