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Original Article

Contemporary Views Regarding Prophylactic Third Molar Extraction among Dental Practitioners in Mumbai and Navi Mumbai City: A Cross-sectional, Questionnaire-based Survey

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Abstract

Background: The literature pertaining to third molar extractions is widespread and considered to be the most frequent procedure in oral and maxillofacial surgery. The prophylactic removal of asymptomatic impacted third molars is defined as the surgical removal in the absence of local pathology. Consensus states that extraction of symptomatic and/or diseased third molars is an appropriate treatment, however, prophylactic removal of asymptomatic molars is controversial among dental practitioners. Systematic reviews suggest no evidence either in support or against the prophylactic removal of asymptomatic impacted third molars, particularly from India thereby giving rise to the need of this study.

Materials and Methods: A cross-sectional analytical study carried out among 407 general dental practitioners and specialists from Mumbai and Navi Mumbai city in the span of 2 months. Variables such as age, gender, and qualification of the respondents were compared with the answering pattern thereby reflecting the knowledge attitude and practice.

Results: The present study evaluates the contemporary views and practices regarding prophylactic third molar extractions and shows a significant disparity among younger, middle-aged, and older dentists regarding the age group, investigations, techniques, and etiology pertaining to prophylactic third molar extractions. Majority of the dentists justify prophylactic third molar extractions, among which the number is significantly higher of younger dentists suggestive of the attitudes of the upcoming dental practitioners. Similar differences are noted among the male and female dentists and also among general and specialty dental practitioners.

Conclusion: The dentists should have a greater scientific foundation from a clinical standpoint in the decision-making process regarding prophylactic third molar extraction before concluding the treatment protocol.

Key words: Prophylactic removal, Prophylactic third molar extractions, Third molar extractions, Third molars

INTRODUCTION

Retention of third molars denotes position in which the occlusal plane is not reached on completion of root growth. Tooth of which parts of crown reach the oral cavity or are connected with it through periodontal ligament apparatus of adjacent 2nd molar is said to be partially retained, whereas tooth which lacks connection with oral cavity are fully retained. Impaction refers to a tooth that has remained fully embedded in bone. Tooth is malpositioned of its axis or position deviates from normal direction. Third molar extraction is one of the most frequent procedures in oral surgery. Reported reasons for the third molar removal includes the risk of impaction as associated with caries, pericoronitis, periodontal defects in the distal surface of third molars, odontogenic cysts, and dental crowding.

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Prospective studies suggest that dentists recommend extraction of third molars in 59% of patients in view of reducing the future problems, but the power to predict third molar eruption is low as most of the prediction has not been scientifically proven, thereby cannot be reliable. Systematic reviews suggest no evidence either in support or against prophylactic removal of asymptomatic impacted third molar even in adults, which brings us to conduct this survey, even after extensive literature search, we could not find any study which clearly indicated any opinion about prophylactic third molar removal, particularly from India thereby giving rise to the need of this survey.

MATERIALS AND METHODS

The present study was a cross-sectional analytical study carried out among 407 general dental practitioners and specialists from Mumbai and Navi Mumbai city (aged from 21 to 70 years, mean 33.24 ± 9.35) in the months of January and February, 2017.

A total of 440 questionnaires were distributed of which 410 were returned back giving a response rate of 93.18%.

Before the start of the study, a study protocol was submitted to the Institutional Ethics Committee which was reviewed by two-blinded reviewers, and due clearance was obtained from the same. Furthermore, necessary permissions were obtained from the principal of the dental college.

The instrument to record responses was a self-designed questionnaire consisting of two parts: Section I collected the demographic data (such as age, gender, and qualification) of the respondents, whereas Section II comprising of questions collected information about knowledge, attitude, and practice regarding prophylactic third molar extraction. The language of questionnaire was English.

Before the start of the main study, a pilot study was conducted among 25 practicing dentists and faculty from the same institution to check validity and reliability of the questionnaire. These study participants were not included in the main study. After a thorough discussion, two questions were changed initially which were leading to loss of meaning. Thus, construct validity could be obtained for the final questionnaire (Cronbach's alpha = 0.92).

Mode of delivery of questionnaires was hand-to-hand personal visit to respective clinics with two rounds of follow-up for non-responding participants in the city of Mumbai and Navi Mumbai. Participation in the present study was kept voluntary and anonymous. Only those who were willing to fill the questionnaire and thereby participating in the study were included. Practitioners absent/not willing to participate/not willing to meet the primary investigator were excluded and another practitioner was substituted in the same place from the same cluster.

To get a representative sample of the entire geographical area, the city, and suburbs of Mumbai and Navi Mumbai were divided into four blocks (clusters), and simple random sampling was followed in each of the clusters. This type of sampling technique ensured equal representation of older and newer clinics, clinics from main city and peripheral suburbs, involvement of general and specialty practitioners, young and old practitioners of both genders. Sample size was determined using single proportion formula with four cluster design as follows:

$$n = \frac{(Z\alpha)^2 [p(1-p)]^2}{d^2}$$

Where,

Zα is the Z variant of type I error which is equal to 1.96 (constant).

p is equal to expected proportion of knowledge level among study participants taken as 50%.

d is equal to expected error in the study taken as 5%.

Thus, a sample size of 100 per cluster was obtained giving a total sample size of 400.

Statistical Analysis

All filled questionnaire forms were scrutinized for completeness of responses. Those which had missing entries were excluded. A final set of 407 questionnaire forms were serially numbered. Data were compiled onto MS-office Excel sheet for Windows (version 2010) and subject to statistical analysis using Statistical Package for the Social Sciences Software (SPSS version 22.0 IBM) and primer of biostatistics software. Demographic details of the study participants and responses to each question have been depicted as frequency (n) and percentage (%). Association of answering pattern of each question with independent variables such as age, gender, and qualification was calculated using Chi-square test. In case of multiple responses, a sum total of frequency for each response was calculated. $P < 0.05$ was considered to be statistically significant keeping α error at 5% and β error at 20%.

RESULTS

The present study carried out among 407 dental practitioners in Mumbai and Navi Mumbai city during the months of January and February, 2017 had participants

with the mean age 28.42 ± 3.75 with 223 (54.79%) females and 184 (45.20%) males, 239 (58.72%) BDS, and 168 (41.27%) MDS. Frequencies and percentages of each of the 17 questions have been presented in Table 1.

Age Wise

In comparison of age with various responses, majority of the dental practitioners considered 18-30 years as the most commonly visiting age group for prophylactic third molar extractions among which the number of younger dentists ($n = 180$) was significantly greater as compared to middle-aged ($n = 100$) and older-aged ($n = 65$) dentists ($P = 0.002$). Most of the younger-aged ($n = 161$) and middle-aged ($n = 81$) dentists prefer consulting oral surgeons for prophylactic third molar extractions as compared to older dentists ($n = 46$), however, the number of younger dentists was significantly higher than middle-aged dentists. Whereas, majority of the older dentists ($n = 53$) prefer

Table 1: Responses to all 17 questions (frequency and percentage)

Questions	Responses	Frequency *n* (%)
Commonly encountered age group. For prophylactic third molar extraction	<18 years	24 (5.530)
	18-30 years	346 (79.724)
	>30 years	64 (14.747)
Referral of patient for prophylactic third molar extraction	Self	333 (72.078)
	Referred by dentists	80 (17.316)
	Referred by orthodontists	28 (6.061)
	Others	20 (4.329)
	No response	1 (0.216)
Prophylactic third molar extractions performed by	Self	161 (35.076)
	Oral surgeon	285 (62.092)
	Others	8 (1.743)
	No response	5 (1.089)
Awareness about any guidelines related to prophylactic third molar extraction	Yes	35 (8.600)
	No	345 (84.767)
	No response	27 (6.634)
Patients presenting any past history of pain/swelling	Yes	373 (91.646)
	No	30 (7.371)
	Sometimes	3 (0.737)
	No response	1 (0.246)
Common reasons for patients visiting the dental clinic for prophylactic third molar extraction	Undergoing orthodontic treatment	86 (18.182)
	Before orthodontic treatment	80 (16.913)
	Any pathology associated	242 (51.163)
	All patients willingly	40 (8.457)
	Others	13 (2.748)
	No response	12 (2.537)
Routinely carried out investigations before third molar extraction	IOPA	104 (16.801)
	RVG	92 (14.863)
	Lateral cephalogram	7 (1.131)
	Lateral oblique	1 (0.162)
	OPG	325 (52.504)
	CBCT	81 (13.086)
	Others	6 (0.969)
Preference of extracting opposing third molars for the patients who had undergone opposing third molar extractions	Yes	252 (61.916)
	No	155 (38.084)
Cost-effectiveness of prophylactic third molar extractions in view of complications	Yes	288 (70.762)
	No	107 (26.290)
	No response	12 (2.948)
Inclusion of post-operative complications in the consent form	Yes	307 (75.430)
	No	99 (24.324)
	No response	1 (0.246)
Abandonment of prophylactic third molar extraction cases in view of post-operative complications	Yes	128 (31.450)
	No	257 (63.145)
	No response	22 (5.405)
Variation in terms of charges for prophylactic and symptomatic third molar extractions	Yes	69 (16.953)
	No	331 (81.327)
	No response	7 (1.720)
Justifiability of prophylactic third molar extractions	Yes	317 (77.887)
	No	74 (18.182)
	Can't say	16 (3.931)

*Indicates overall percentages of each response exceeding/reduced the total because of multiple/non-response

extracting on their own ($P < 0.05$). Majority of dentists discern association of pathology as the most common reason for patient consultation among which the number of younger dentists ($n = 127$) is significantly greater followed by the number of older- and middle-aged dentists. In opinion of maximum number of dentists ($n = 325$), panoramic radiographs are the most widely used investigation technique in which the number was significantly high of younger-aged dental practitioners ($n = 170$) as compared to middle-aged ($n = 91$) and older-aged ($n = 64$) practitioners. Few of the younger dentists consider IOPA and RVG as the subsequent common investigation modality which is closely followed by middle- and older-age group of dentists. Few of the younger dentists also consider other investigation techniques, whereas only few of middle-aged and older-aged dentists consider opting other investigation techniques ($P < 0.05$). Significantly greater number of dentists ($n = 252$) prefer extracting opposing third molars prophylactically when the patient has undergone opposing third molar extraction among which the number of younger dentists ($n = 121$) is significantly higher than middle-aged ($n = 69$) and older-aged ($n = 62$) group of dentists ($P = 0.041$). Almost all of the dentists ($n = 347$) justify prophylactic third molar extraction among which younger dentists ($n = 170$) are significantly larger in number in relation to middle-aged ($n = 90$) and older-aged dentists ($n = 57$) ($P = 0.009$).

Gender Wise

In comparison of gender with various responses, majority of both female ($n = 148$) and male dentists ($n = 141$) prefer consulting an oral surgeon for prophylactic extraction of third molars, whereas few of the female dentists ($n = 88$) prefer extracting on their own and a relatively less number of male dentists ($n = 83$) prefer extracting on their own. A significantly higher number of male dentists prefer an OPG ($n = 150$) followed by IOPA and RVG as an investigatory modality in comparison to female dentists who prefer IOPA ($n = 54$) more commonly over RVG and OPG. Considerably higher number of female dentists ($n = 45$) opt for CBCT as compared to their male ($n = 35$) counterparts. A slightly larger number of male dentists ($n = 128$) prefer extracting opposing third molar in comparison with females ($n = 124$), but the female dentists have a much higher number ($n = 99$) of negative response as compared to males ($n = 56$). In the opinion of the oral surgeons carrying their own consent forms, most of the male dentists ($n = 105$) answered no, whereas in contrast, most of the female dentists ($n = 99$) answered yes ($P < 0.05$).

Qualification Wise

Significantly larger number ($n = 104$) of general dental practitioners (BDS) prefer extracting third molars on their own in comparison with the number ($n = 57$) of specialty dental practitioners (MDS). Majority of both consult oral surgeons for the same, however, the number of general dentists ($n = 152$) is significantly greater than their specialist counterparts ($n = 137$) ($P = 0.022$). Majority of the general dentists ($n = 108$) have their oral surgeons carrying their own consent form in comparison to very few specialty practitioners ($n = 47$) ($P < 0.05$).

DISCUSSION

According to the American Association of Oral and Maxillofacial Surgeons (AAOMS), "if there is no sufficient anatomical space for normal eruption, then extraction of such teeth at an early age is a valid and scientific management based on medical necessity."[1] It is seen that impacted third molars in adolescents are most likely to develop pathologic indication, whereas impacted third molars in adults are unlikely to undergo significant pathological changes.[2] The ideal age to determine whether or not to remove third molars is still under debate since impaction prediction has not been scientifically proven and it is a daunting task to predict this biological condition with any degree of reliability.[3] In our study, majority of the dentists consider 18-30 years (346) 79.72% as most common age group of patients undergoing prophylactic third molar extraction. Similarly, Blondeau and Daniel stated that these extractions should be done well before the age of 24 years particularly in female patients, and that older patients are at a greater risk of post-operative complications and permanent sequelae.[4] However, this is inconsistent with recent literature which suggests the treatment for asymptomatic impacted third molars in young adults, might be observation instead of prophylactic removal.[5] Approximately 75% of individuals who receive regular dental care have their third molars removed.[6] In our study, maximum dentists (333) 72% stated that majority of the patients come on their own for prophylactic third molar extractions rather than referred by other dentists or orthodontists. Whereas, in a prospective study, it was shown that 59% of the patients were recommended by the general dentists for prophylactic third molar extractions mainly to prevent the future problems or because a third molar had an unfavorable orientation or was unlikely to erupt.[7] It was also noted by some authors that routine removal of asymptomatic unerupted or impacted third molars should not be recommended as the incidence of pathologies associated with them is extremely low and insignificant.[7,8] In a study on prophylactic removal of mandibular third molars in late 1980s, the number of molars designated for removal varied between 0 and 26 for general dental practitioners and between 3 and 21 for oral surgeons.[9,10] A great variation was observed among general dental practitioners and oral surgeons regarding asymptomatic

third molar extractions by Knutsson *et al.*[9] Fuster Torres *et al.* in their study noted that most common reason for patient reference to their service of oral surgery by primary care dentists for prophylactic removal of third molars was 51.0% versus 46.1% in case of oral surgeons.[11] On the contrary to our study (285), 62.09% of majority opted for consulting oral surgeons for performing prophylactic third molar extraction compared to general dental practitioners. This was consistent with the survey of Brazilian Oral and Maxillofacial Surgeons which stated that trainees in third molar surgery tended to recommend asymptomatic third molar extractions more frequently as compared to experienced oral and maxillofacial surgeons.[12] In 1979, the National Institutes of Health held a consensus conference to try and formulate the guidelines on indications for third molar removal.[13] It was a well-defined set of criteria for indications of third molar removal when there was evidence of pathology. Similarly, the National Institute for Clinical Excellence Guidance on third molar teeth describes the various complications which may occur from the extraction of third molar teeth but does not describe its benefits.[14] These guidelines are predominantly aimed at oral surgeons. In our study, maximum dentists (345) 84.76% were unaware about any guidelines regarding prophylactic removal of third molars. Only 4.29% of the dentists were aware about the guidelines among which all were oral surgeons. There are several reasons why most clinicians are not influenced by written practice guidelines. One reason is that these guidelines are focused not on clinicians but on the current state of scientific knowledge. There are no specific guidelines in literature which suggest prophylactic removal of third molars to avoid post-operative complications.[15] On the contrary, current UK guidelines for the treatment of third molars are against prophylactic removal of clinically asymptomatic impacted teeth.[14] Many asymptomatic third molars are discovered on routine panoramic radiographs but pain is the most frequent complaint. Alling and Alling recognized that there can be clinical or radiographic signs of pathosis associated with a third molar which seems asymptomatic clinically and no symptoms by the patient.[16] In our study, majority (373) 91.64%, answered "yes" for the past history of pain or swelling associated with the third molars. Thus, "asymptomatic" does not mean risk-free, which may only be used to describe the not-so-common condition of a third molar which has erupted in satisfactory functional occlusion without periodontal pathosis, or remained deeply embedded without signs of pathosis or eruptive movement over an extended period.[17] According to Adeyemo, some reports in the literature have estimated the proportion of impacted asymptomatic third molar extractions to be between 18.0% and 50.7%.[18] Similarly, in another study, it is evident that there was no difference between the mean number of molars scheduled for removal between gross domestic products and oral surgeons of Sweden and Wales. However, in both the countries, the number of molars scheduled for prophylactic removal varied widely.[19] In our study, for average number of extractions performed in 1 month, the mean for symptomatic extractions is 6.76 ± 5.67 and mean for prophylactic extractions is 2.49 ± 3.11. According to Friedman, 50% of maxillary third molars which are classified as impacted will erupt normally with minimal discomfort if not removed prematurely.[20] Only 12% of truly impacted teeth will develop pathological lesions such as cysts or damage to the adjacent teeth.[21,22] In our study, majority dentists opted association of pathology (242) 51.16% to be the most common reason for patients consulting dental clinics for prophylactic third molar extractions followed by undergoing orthodontic treatment by (86) 18.18% and before orthodontic treatment by (80) 16.91%. Similarly, in another study, the principal reason for patient consultation was pain (50%) and infection (30.8%), that is, association of pathology, whereas principal indication of third molar extraction was prophylaxis followed by orthodontic reasons according to both the primary care dentists and the oral surgeon.[11] However, in a study, it was stated that prophylactic extractions to prevent late anterior crowding was completely contradicted.[23] In our study, for the question, common complication after retention of prophylactic third molar extraction majority opted for pulpal or periapical pathology in relation to the second molars followed by orthodontic complications such as crowding/orthodontic relapse/malocclusion followed by pericoronitis followed by cyst formation followed by cheek biting/temporomandibular joint (TMJ) problem/nerve problem. Alling and Alling have cited observations of Goodsell - more 2nd molars are lost due to third molars being left in place than any other single reason. This includes unerupted and erupted wisdom teeth.[16] However, in another survey it was stated that tilted third molars may not always be the guilty factor for causing caries in the second molar.[24] Daley TD also stated that the incidence of dental caries of second molars varied from 1% to 4.5%.[25] Fear of second molar caries is not a justification for prophylactic removal.[2] According to David, the decision of removal or retention of third molars for orthodontic patients could be postponed until the end of treatment, except those cases where it is mandatory before treatment.[26] The association of lower incisor crowding and impacted third molars is not significant.[27] Lindqvist and Thilander concluded that "the space change on the extraction side was improved relation to the control side in 70% cases, hence extraction could be recommended in severe crowding.[28]" According to Dr. Safeena, pericoronitis is the most common indication for third molar surgery.[2] A study reported that over 4 years of follow-up, 10% of lower third molars develop pericoronitis.[5] Shafer *et al.* have

reported an incidence of cyst formation associated with impacted third molar of 2.31%.[29]

Many techniques have been applied for the prediction of asymptomatic third molar impaction or eruption among which are panoramic radiographs, intraoral periapical radiographs, lateral cephalograms, and cone-beam computed tomography (CBCT) estimating the relationship between the third molars and space available for eruption. Panoramic radiograph is the standard imaging technique used widely. However, magnification and distortion defects are common which may lead to difficulty in assessing the exact position of wisdom tooth, whereas CBCT is the most appropriate technique. In our study, most common investigation done before prophylactic third molar extraction, majority answered it to be OPG (325) 52.50% followed by IOPA (104) 16.80% followed by RVG (92) 14.86% followed by CBCT (81) 13.08% followed by lateral cephalogram (7) 1.13% followed by others (including blood investigations) (6) 0.96% followed by lateral oblique (1) 0.1%. In a study of Brazilian OMFS, it was shown that few oral surgeons tended to extract impacted deep third molars based only on the findings of panoramic radiographs and also performed coronectomy twice as frequently to access deep lower third molars without resolving to CBCT.[12] White and Proffit suggested that an asymptomatic third molar does not always mean pathology free. Hence, radiographic assessment is mandatory before indicating extraction to exclude existence of underlying pathologies.[30] Reviews suggest that mandibular third molars are scheduled more commonly for extraction as compared to maxillary third molars. However, this is likely to be accompanied by subsequent extraction of maxillary third molars for the prophylactic benefit of avoiding sequelae resulting from the unopposed supraeruption of the opposing tooth.[17] In our study, majority answered yes (252) 61.91% for extracting opposing molar if the opposing molar has been extracted. Furthermore, Adeyemo *et al.* corroborated this for the avoidance of the risk of increased morbidity following pathology associated with retained impacted third molar.[3] In a study sponsored by AAOMS seems to conclude that it may be cost-effective to remove third molar before patient's 25th birthday. The United States nearly spends some 3 billion dollars annually to remove impacted third molars. According to Hill, even a 30% reduction on that figure would represent huge saving.[31] In our survey, for the question of cost effectiveness of prophylactic third molar extraction in view of complications in the future, majority answered option yes (288) 70.76%. This is inconsistent with the review of Kandaswamy where it is stated that extraction of third molar without pathology involves more expenditure to the patients as well as risk of post-operative complications.[32] Rate of complications according to Dr. Safeena after removal of third molars was 11.8% in youths (age 12-29) and 21.5% in older age (age 25-81). Furthermore, there will be more complications following prophylactic third molar extraction rather than pathologically involved third molars.[2] Baqain has stated pain, swelling and trismus to be the most common post-operative complications.[32] Whereas, in our study, most common was pain/swelling followed by dry socket followed by paresthesia followed by trismus. In a retrospective study, it was stated that mandibular third molars requiring osteotomy have a greater risk of post-operative complications.[33] According to Navvab *et al.*, pain was the most common complication whereas mandibular fracture was the least common. Furthermore, horizontally angled molars posed the most complications.[34] In our study, although angulation of molars was not taken into consideration and it was a drawback. In a study, incidence of paresthesia has been reported to occur in 1-5% of patients undergoing third molar removal, whereas the rate of TMJ symptoms was much higher.[35-37] According to Song *et al.*, rate of dry socket varies from 0% to 35%.[8] It was shown in some health-care institution audits that the patients having their third molar removed for no valid reason ranged from 18% to 60%.[38-41] Whereas, in our study, the mean response for patient agreement for prophylactic third molar extraction was 40.73 $\pm$ 28.56. It is of paramount importance to inform the patient about the possible complications that may occur during and after the treatment, making them aware of the fact that any unexpected situation should be dealt with best possible way before any surgical procedure. The four most common post-operative complications reported in the literature of third molar removal are localized alveolar osteitis, infection, bleeding, and paresthesia.[42,43] Incidence of inferior alveolar and lingual nerve injuries reported ranged from 0.4% to 22% but most of these injuries undergo spontaneous recovery.[44] In our survey, majority (307) 75.43% answered yes for inclusion of post-operative complications in the consent form among which pain/swelling was most commonly included as a complication in the consent form followed by trismus, paresthesia, post-operative bleeding, and fracture/TMJ problems. In our study, majority of the dentists/oral surgeons (257), 63.14% did not agree in abandoning prophylactic third molar extractions in view of post-operative complications. Most authors agree that each particular situation should be analyzed and impacted third molar removal should not be generalized.[11] According to the literature, the probability of pathological changes caused by impacted third molar seems to be exaggerated, also the surgery is not risk free, it includes both personal and economic costs associated with the removal of asymptomatic third molar teeth. In our study, majority opted for similar charges for prophylactic and symptomatic third molar extractions (331) 81.32%, whereas few (69) 16.9% agreed for varying charges in view

of associated complications, underlying pathologies, and requirement of pre-medication and investigations before third molar extractions. Consensus states that extraction of symptomatic and/or diseased third molars is an appropriate treatment; however, prophylactic removal of asymptomatic molars is controversial among practitioners. Although exceptions should be recognized, the elective removal of asymptomatic third molars limits the establishment of pathology and minimizes adverse outcomes. In our study, majority (317) 77.88% considered prophylactic extraction of third molars to be a justified procedure, however, (74) 18.18% disagreed and (16) 3.93% did not respond.

CONCLUSION

The dentists should have a greater scientific foundation from a clinical standpoint in the decision-making process regarding prophylactic third molar extraction. Our charge, as dentists, is to thoroughly assess the patient's unique circumstances, to educate our patients on their condition, utilize the existing evidence, and to provide our best advice and care for the management of the particular oral condition.[45]

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