

Research Paper: Effect of asymptomatic erupted third molars on periodontal status and caries of adjacent second molars in Iranian population



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ABSTRACT

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Introduction: Third molars are the last teeth to grow and require more attention in the oral cavity because they can leave pathological effects. Considering the controversy clinical decisions about asymptomatic third molars, dentists' lack of attention to over third molars developed during therapeutic recommendations for patients, and limited evidence about the effects of asymptomatic third molars on adjacent teeth, the purpose of this study was an assessment of the effect of asymptomatic erupted third molar on periodontal status and a distal caries of the adjacent second molar.

Materials and Methods: In this cross-sectional study, the distal caries of second molars as examined using panoramic radiography, clinical examination and periodontal parameters including plaque index, gingival index, bleeding on probing, periodontal pocket depth and clinical attachment loss in 134 jaw quadrants patients. The patients were divided into two groups of asymptomatic erupted third molars and without erupted third molars. The independent samples t-test was used to compare periodontal parameters between the two groups while chi-square test was used to compare the frequency of caries.

Results: In periodontal parameters evaluation in mandible, periodontal pocket depth and clinical attachment loss in third molar group were higher than in without third molar group, whereas in maxilla all periodontal parameters in third molar group were higher than without third molar group. In the caries evaluation, both maxillary and mandibular distal caries of the second molar were significantly higher in the third molar group than in the without third molar group.

Conclusion: Erupted third molars increase the risk of periodontal disease and distal caries in the adjacent second molars, and dentists should be particularly attentive to the third molars in examination sessions.

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Introduction

In the permanent dentition, the last teeth found in the mouth are the third molars. The eruption time of these teeth is in the late second or early third decade of life. The onset of bud development of the third molars is about 8-9 years of age, which is visible on the radiographic view. The third molars tend to be impregnated and are therefore usually the first permanent teeth to be extracted. (1,2)

Third molar teeth need more attention in the oral cavity because of their clinical complications. Clinical evidence indicates that impacted third molars may develop caries, pericoronitis, cyst and tumor, and cause complications in adjacent teeth such as caries, root resorption, crowding in anterior teeth, and periodontitis (1). The fact that the third molar causes anterior irregularities in the dental arch after growth ages has been a subject of challenge for many years, but the presence of the third molar has been neglected in terms of the importance of its local aspect and its impact on the adjacent second molar. Therefore, whether the third molar to be erupted or unerupted, not only as an extra tooth but also as the distal contact site for the second molar, increases the risk of dental and periodontal problems and the presence of this tooth, although completely erupted and has a function but that influences the fate of the second molar. The maxillary third molars appear to be at greater risk of being overlooked in daily oral hygiene than the mandibular third molars and the toothbrush may be less likely to contact the tooth (2). We know that when the mouth is open, the coronoid process descends and is adjacent to the maxillary third molar, and this may cause the tooth to reach the buccal surface of the third molar when brushing with the open mouth. Therefore, it is controversial to keep a tooth that is tightly controlled and may also affect the anterior tooth if it is damaged. For this reason, achieving results that determine the adverse effects of having a third molar for dentists is an effective necessity (3).

Some third molars may be asymptomatic over time, but diseases associated with the presence

of these teeth, their effects, and their effects on adjacent tissues and teeth can persist (2). Studies have suggested that irrespective of whether the third molars are unerupted or erupted, periodontal defects can occur in the distal second molars (1). Given the importance of second molars in the health and function of chewing, studies have been conducted on different ways to investigate the relationship between the presence of third molars and their impact on adjacent second molars. These studies have shown that the third molar is a risk factor for the development of pathological conditions in the second molar (2). Elter et al showed that visible third molars can increase the risk of increased periodontal pocket depth and bleeding during probing in adjacent second molars (1). Balkey et al Reported that people with asymptomatic third molar teeth in the mouth were more likely to have a pocket depth of more than 2 mm in the first molar or second molar in the same quadrant (4). Studies have also shown that the third molar, which has a poor vegetative position, increases the risk of distal and cervical root caries in adjacent second molar. The issue of asymptomatic third molar and its therapeutic decision is a clinical and scientific issue that must be addressed. Usually clinical decisions about keeping or preventive extraction of asymptomatic third molars are controversial and it is not only the presence or absence of asymptomatic or symptomatic third molars that make decisions difficult but sometimes the consequences. The question arises as to the origin of these (4). Since there is a need for further investigations on the effects of third molar on adjacent teeth as well as on the lack of attention by dentists to third molar when providing therapeutic advice to patients, we conducted this study with the aim of investigating the association between asymptomatic erupted third molar with periodontal status, and of adjacent second molar caries in Iranian population.

Method and materials

In this cross-sectional comparative study, the samples were studied based on gradual referral

to the campus of Guilan University of Medical Sciences in Bandar-e Anzali in year 2018, which met the inclusion criteria to reach the designated sample size. (67 samples with third molar [M3+ group] and 67 samples without third molar[M3- group]). Inclusion criteria for M3+ group were patients with at least 20 permanent teeth, 17-35 years old, at least one quadrant with intact first and second molars adjunct with asymptomatic erupted third molar (with no pain, infection or deep caries). The erupted third molar was fully erupted and reached the occlusal plane, with no rotation, no soft tissue on the surface of the masticatory tooth and the axial angle between the second and third molar was 0-10 °. Patients with conditions like smokers , periodontal disease, systemic disease, autoimmune disease, antibiotic therapy in the last 6 months, pregnant women, lactating women, oral and facial tumors, improper oral prosthesis, periodontal surgery in the studied quadrant or removal of the third molar in 1 month before the study were excluded (1).The M3- group criteria included individuals aged 17–35 years with at least 20 permanent teeth and at least one quadrant with intact first and second molars without third molar, with conditions in which the third molar was absent or unerupted (in soft or hard tissue) or in more than a year had extracted. We examined the status of the adjacent third molar in the panoramic radiography to determine whether the root was not close to the second molar. Informed consent was obtained from all participants. Patients were categorized by sex (male / female) and jaw (maxilla/mandible). At first, the patient sat on the unit and after obtaining consent and completing the form preparation, We started the clinical examination in the quadrants with a mirror and metal explorer and periodontal Michigan “O” probe with Williams marking (JUYA, Pa-kistan). Periodontal clinical examinations in both groups were performed by a periodontist on second molars. These examinations included: PI (plaque index) , GI (gingival index) , BOP (Bleeding On Probing; observing hemorrhage 15 seconds after probing) , PPD (Probing Pocket Depth) and CAL (Clinical Attachment Loss) in six areas (Mesiobuccal - Midbuccal - Distobuccal - Distolingual - Midlingual - Mesiolingual). (1,2)Second molars caries was

evaluated clinically with the naked eye by explorer and mirror as well as observation of panoramic radiography. This study was accepted by the Ethics Committee of Guilan University of Medical Sciences (IR.GUMS.REC.1397.122)

After data collection, the data were entered into SPSS software (version 21).were used to determine the quantitative indices of PPD, CAL, PI, and GI using mean, standard deviation, median, minimum and maximum. Independent t test was used to compare these quantitative indices in two groups (Mann whitney U non-parametric test). Chi square test was used to compare the percentage of caries in two groups with and without third molar. Significance level of tests in this study with $P < 0.05$ was considered.

Results

In this study, 58 individuals (63.8% female [$n = 37$] and 36.2% male [$n = 21$]) with a mean age of 26.9 years were examined. According to the jaw quadrant, 134 samples (67 samples in M3+ group and 67 samples in M3- group) were studied for the periodontal parameters (CAL, PPD, BOP, GI, PI) and second molars distal caries. (Table 1)

Table 2 shows comparison of BOP, PPD, GI, PI and CAL between the two jaws and two group. Re-gardless of the jaw, all examined periodontal parameters were significantly higher in M3+ group. In mandible, just PPD and CAL were significantly higher in M3+ group. In maxilla all examined pa-rameters were significantly higher in M3+ group. (Table 2)

Table 3 shows the percentage comparison of distal caries of second molars in two group and two jaws. There was statistical differences based on percentage of distal caries of second molars be-tween two groups and two jaws. So, this number in M3+ group was more. (Table 3)

Table 1 : Demographic characteristics of the samples by study groups

		group			P
		M3-	M3+	Total	
		Number (%)	Number (%)	Number (%)	
Gender	Male	(23.9%) 16	(41.8%) 28	(32.8%)44	0.027
	Female	(76.1%) 51	(58.2%) 39	(57.2%)60	
	Total	(100%) 67	(100%) 67	(100%)134	
Age	Mean + SD	3.1 ± 26.58	4.48 ± 27.04	3.84 ± 26.91	0.488
Jaw	Maxilla	(49.3%) 33	(53.8%)36	(51.5%)69	0.710
	Mandibule	(50.7 %) 34	(46.2%)31	(48.5%)65	
	Total	(100%) 67	(100%)67	(100%)134	

Table 2 : Comparison of CAL , BOP , PPD , GI and PI indices in two groups and in two jaws

		Jaw								
		Madibule			maxilla			maxilla + mandibule		
		M3-	M3+	P	M3-	M3+	P	M3-	M3+	P
PI	Mean ± SD	0.641 ± 0.09	1.07 ± 0.45	0.84	0.66 ± 0.53	1.20 ± 0.53	0.001*	0.88 ± 0.62	1.14 ± 0.49	0.004*
GI	Mean ± SD	0.44 ± 0.56	0.69 ± 0.66	0.133	0.36 ± 0.43	0.95 ± 0.65	0.001*	0.40 ± 0.50	0.83 ± 0.64	0.001*
PPD	Mean ± SD	1.58 ± 0.61	2.42 ± 0.85	0.003*	1.91 ± 0.58	2.39 ± 0.64	0.002*	1.88 ± 0.59	2.40 ± 0.74	0.001*
BOP	Mean ± SD	23.89 ± 23.31	28.47 ± 28.91	0.663	21.12 ± 14.65	35.61 ± 28.48	0.002*	19.34 ± 22.57	32.31 ± 28.8	0.011*
CAL	Mean ± SD	1.94 ± 0.65	2.55 ± 0.89	0.002*	1.97 ± 0.68	2.78 ± 0.87	0.001*	1.96 ± 0.66	2.67 ± 0.88	0.001*

*means significant

Table 3 : Comparison of caries percentage in distal surface of second molar in two groups and in two jaws

		Jaw								
		Madibule			maxilla			maxilla+ mandibule		
		M3-	M3+	Total	M3-	M3+	Total	M3-	M3+	Total
Distal caries	+	14 (41%)	16 (52%)	30 (46%)	9 (27%)	14 (38%)	23 (33%)	23 (34%)	30 (45%)	53 (39%)
	-	20 (59%)	15 (48%)	35 (53%)	24 (72%)	22 (61%)	46 (66%)	44 (66%)	37 (55%)	81 (60%)
	P	0.02*			0.041*			0.035*		

Discussion

In the permanent dentition, the last teeth found in the mouth are the third molars. The time of eruption of these teeth is in the late second or early third decade of life. Third molars tend to have impaction (1,2) and require more attention in the oral cavity because of their clinical Complications. Studies have shown that impacted or semi-impacted third molar may increase the risk of periodontal problems and distal caries in the adjacent second molar (1), considering the need for further studies on the effects of the third molar on its adjacent tooth. We studied people who had an erupted third molar. In the present study, periodontal clinical examinations and second molar caries examinations were performed in 134 quadrants. 67 quadrants consisted of asymptomatic third molars in the vicinity of the intact second and first molars and 67 quadrants consisted of the intact second and first molars without presence of the third molar. The PI of the second molar was measured which was significantly different between the two groups and was higher in the group M3+ than in the group M3-, this finding was in agreement with which was studied by Hong Lei et al., Zbi-Bang Li et al and H. Balkey and his colleagues (1, 2, 5), but the study of Yu-Hsiang Chou and his colleagues contradicts our results. The difference in outcome may be due to a different statistical community and different method of study (2). Zbi-Bang Li et al Reported that the second molar gingival index in the third molar group was higher than that in the non-third molar group, which is consistent with the present study, which may indicate the impact of the third molar on the periodontal status of adjacent teeth (1). In our study, BOP of the second molar was significantly more in the group M3+ than in the group M3-, which is consistent with the study by Zbi - Bang Li and Heckar (1), in the Yu - Hsiang Chou et al. Found that BOP in the third molar group was higher than in the group M3-, but this difference was not significant because of differences in sample size and age of the patients studied (3). In our study, PPD in the distal second molar was

higher in group M3+ than in group M3-, which was in agreement with studies by Yu - Hsiang Chou et al And Robert D Mar-ciani, Zbi - Bang Li, Hong Lei are in line (1-4). In the present study, the CAL in the distal second molar was evaluated and this parameter was higher in the group M3+ than in group M3-, which inconsistent with study by Zbi - Bang Li et al (1).

In our study, there were 69 samples in maxilla and 65 in mandible. The values of all periodontal parameters measured in maxilla were higher in group M3+ than group M3-. But in the mandible, only two parameters ,PPD and CAL, in group M3+ is higher than group M3-, which still reflects the higher risk of periodontal disease in patients with third molar , because as It was said that although BOP is strongly associated with disease progression and the PI is a reliable indicator of daily plaque control in patients, both parameters are not specific indicators to indicate disease and on the other hand, the GI is related to the BOP, and there was no significant difference between two groups in GI (3).

The prevalence of caries in distal surface of mandibular second molar near the mandibular third molar in the study of Yu - Hsiang Chou et al 35, 7%, the study Chang SW et al 17. 2%, the study Ozec I et al 20%, the study of van der linden W et al, 32% have been reported (3, 6-8). In the present study, this rate was 53% in M3+ group. The causes of the difference in the reports may be due to differences in age (distal caries in the second molar will be increased with aging), socioeconomical status of patients and the position of the third molar to second molar in the occlusal plane.

Few studies have examined the distal caries of second molar surface in the presence of third molars in the maxilla. In our study, distal caries of second molar in M3+ group of maxilla was 38% that is in agreement with Yu - Hsiang Chou et al study (34.8%) (3). Regardless of the position of the jaw, the second molar distal caries in group M3+ was higher than group M3-. This can indicate the impact of erupted third molars on the distal surface of adjacent second molar Which is also the result of a

study by Yu - Hsiang Chou et al. Yu- Hsiang Chou et al have reported even when the second and third molars are in the occlusal plane and occlusal function is normal, there was a high risk for distal caries of second molar. (3)

T. Pepper et al and Luis McRdel et al examined distal surface of second molars in the mandible. The amount of caries in the presence of third molars were higher and erupted third molars is a risk factor for caries in the distal surface of second molar which were in agreement with our results (9, 10). Toedtling V et al also reported that the caries of second molar teeth significantly associated with the duration of eruption of wisdom teeth. Also the position of third molars can also affect the formation of caries in second molar (38). Knutsson K, et al reported in a study that mesial and horizontal position of third molars are more associated with the formation of caries in the second molar (11). Based on the results of our study, the presence of erupted third molar can cause difficulty in cleaning and accumulate more plaque on distal surface of second molar, thus can increase the risk of periodontitis, and caries in adjacent teeth. According to the criteria of entry confounding factors (smoking and systemic disease), the effect of third molar eruption in caries and periodontal disease of distal surface of the second molar reveals proper decision-making for the removal of asymptomatic third molar prophylaxis requires regular follow-up visits and examinations of the dentist, and further prospective studies are recommended.

Conclusion

According to the results of this study, the rate of periodontal parameters of second molar such as GI, PI, PPD, BOP, CAL and distal caries of second molar increased with adjacent third molar.

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