

Prolonged Missing of Molar Teeth and Risk of Temporomandibular Joint Disorders

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Abstract

Aim: The aim of this study was to determine the relationship between prolonged missing molar(s) (PMM) as a whole and each molar separately and the temporomandibular joint disorders (TMD) with third molars excluded.

Patients and Methods: one hundred and twenty participants were divided into two groups, 40 TMD patients of study group (SG) diagnosed by MRI or CT scan and Arthrography, 80 asymptomatic volunteers of control group (CG); Both SG and CG were subdivided into three subgroups: (1) prolonged missing molar (PMM) patients with missing of molars for ten years or more; (2) recently missing molar (RMM) patients with missing of molars less than ten years; and (3) no missing molars (NMM) patients with no missing of molars.

PMM of SG and CG were divided into five pairs; (pair 1) PMM of SG and CG; (pair 2) prolonged missing (PM) of 16 and/or 26 of SG and CG; (pair 3) PM of 17 and/or 27 of SG and CG; (pair 4) PM of 36 and/or 46 of SG and CG; (pair 5) PM of 37 and/or 47 of SG and CG.

Results: (1) Study group SG (a) NMM 28 patients (b) PMM 8 patients (c) RMM 4 patients.

(2) Control group CG (a) NMM 66 volunteers (b) PMM 4 volunteers (c) RMM 10 volunteers.

(Pair 1) PMM of SG 8 patients (20%) and CG 4 volunteers (5%)

(Pair 2) prolonged missing (PM) of 16 and / or 26 of SG 2 (5%) and CG 2 (2.5%)

(Pair 3) PM of 17 and/or 27 of SG 1 (2.5%) and CG 0 (0%)

(Pair 4) PM of 36 and/or 46 of SG 6 (15%) and CG 1 (1.25%)

(Pair 5) PM of 37 and/or 47 of SG 1 (2.5%) and CG 3 (3.75%)

Conclusions: Missing of molar teeth for ten years or more may contribute to TMD. Furthermore, the effect of prolonged missing of mandibular first molar(s) may increase the contribution to TMD. When both opposing molars were missing, tilting of distal molars towards the edentulous spaces may be more compared with the presence of the opposing molar.

Keywords: Prolonged missing molars; Temporomandibular joint disorder; Temporomandibular joint

Introduction

Disharmony of the occlusion repeatedly applied over a long period could disturb the relation between the cranium and the condyle of the mandible, which will increase the risk of temporomandibular joint disorders (TMD).

Typically people eat for a period ranging from half hour to one hour every day and in addition to that, the first molars seem to bear mastication more than other posterior teeth and therefore the individual prefer to chew on the side where the first molars exist and avoid chewing where the first molars are missing. This imbalance of occlusion and unilateral mastication over a long period could increase the risk of TMD.

Malocclusion such as missing posterior teeth, crossbite, deep bite, distal occlusion, anterior open bite, and occlusal interferences have been proposed to be risk factors for TMD [1].

Patients and Methods

The current study was exempt from review by the local institutional review board, which consists of 120 participants, 40 of which complained from TMD (such as TMJ pain, limited mouth opening, clicking sound and mouth opening deviation) and included as study group (SG) with age range 16-63 years with a mean of 38.32 years. 11 patients were male (27.5%) and 29 were female (72.5%). Of the total, 20 patients were diagnosed by MRI and the other 20 patients were diagnosed by CT scan and Arthrography to confirm TMD.

Meanwhile, the control group (CG) included 80 asymptomatic volunteers with age range 19-64 years with a mean of 40.38 years, 20 volunteers were male (25%) and 60 were female (75%).

Both SG and CG were subdivided into three subgroups including:

(1) Prolonged missing of first and/or second molar (PMM) subgroups that included individuals that have to miss of first and/or second molar for more than ten years with a period range from 10 years 7 months to 28 years.

(2) Recently missing molar (RMM) subgroups, including individuals that have to miss of first and/or second molar for a period of fewer than ten years with a period range from 4 months to 6 years 2 months.

(3) No missing molars (NMM) subgroups, including individuals that have all firsts and seconds molar teeth.

The recent study was concentrated on PMM of the SG, CG and the TMD. The relationship of PMM as a whole and each molar separately for the SG and CG was compared, excluding third molars. Additional subdivision into ten subgroups by five pairs (each pair of groups was one of SG were compared with its Counterpart of CG) as in table 1.

Data Analysis

Data was entered into a computer for statistical computation. Prolonged missing of molar teeth and risk of Temporomandibular Joint Disorders were analyzed for the entire sample as well as, for the two different study groups and control group. Paired-Sample t-Test was applied to the data to test for statistically significant (P-value <.05) of the relation between the five pairs of SG and CG. Bilateral missing of the same molar tooth has been mentioned.

Results

Out of the 40 patients of the study group SG, there were:

- (1) No missing molars (NMM) 28 patients (70%)
- (2) Prolonged missing molars (PMM) 8 patients (20%)
- (3) Recently missing molars (RMM) 4 patients (10%)

Meanwhile, the control group volunteers were 80

- (1) NMM 66 (82.5%)
- (2) PMM 4 (5%)
- (3) RMM 10 (12.5%)

In addition, it was observed that molars tilted towards the edentulous spaces while mesial tilting of the mandibular second molars seems to be the most sever. The most relevant results of the five pairs of the PMM of the SG and CG were summarized in diagram 1 and table 2.

Table 1: Summarization of the relations between the ten subgroups (five pairs) of SG and CG.

Pairs	SG patients	CG volunteers
Pair 1	PMM	PMM
Pair 2	PM of 16 and/or 26	PM of 16 and/or 26
Pair 2	PM of 17 and/or 27	PM of 17 and/or 27
Pair 4	PM of 36 and/or 46	PM of 36 and/or 46
Pair 5	PM of 37 and/or 47	PM of 37 and/or 47

Discussions

Mandibular first molar act as the cornerstone of the occlusion and seems to bear the maximum load of the mastication, therefore, the maximum malocclusion and teeth tilting caused by prolonged missing of a single tooth can occur by the prolonged missing of mandibular first molar (Figure 1).

CA Roberts, et al. [2] examined 222 joints (188 unilateral and 17 bilateral) of 205 patients. Arthrograms results showed that the tilted teeth on the contra lateral side were more common in cases of ADDWR than in cases of normal disc position or of ADDWOR. Loss of molar support has traditionally been considered to be an important etiological factor for TMD [3]. The results of this study suggest that missing of molar teeth for a period of ten years and more may contribute to causing TMD (P<.05).

MQ Wang, et al. [4] examined 741 participants, with missing posterior teeth, 386 with TMD and 355 without TMD. The result shows that participants with fewer missing posterior teeth in more quadrants have a higher prevalence of TMD than participants with more missing posterior teeth in fewer quadrants).

The masseter is the strongest muscle of the body based on its weight [5]; all the muscles of mastication together can close the teeth with a force of approximately 90.7 kilograms on the molars [6] and therefore proper bilateral occlusion contacts is essential for the stabilization of the mandible and temporomandibular joints.

On the other hand, patients with the unilateral missing of mandibular first molar prefer to chew on the side where the first molar exist which will lead to a load of mastication on one TMJ rather than on both TMJs which could lead to an imbalance of both condyles and the cranium. Such imbalance can cause TMD.

Ross H Tallents, et al. [7] examined 82 asymptomatic volunteers and 263 TMD patients and suggested that missing of mandibular posterior teeth may accelerate the development of degenerative joint disease. The results of this study suggest that prolonged missing of mandibular first molars could increase the contribution of causing the TMD (P<.05). A Brazilian study on 321 individuals shows that the most frequently missing teeth were the mandibular first molars [8]. This study shows fewer cases of missing maxillary first molars. Meanwhile, the results



Figure 1: A 35-year-old woman suffering from TMJ pain presented with missing of three molar teeth 16, 36 and 46 due to severe caries, all the molars have been extracted in childhood through frequent intervals, note tilting of tooth 46 more because missing of tooth 16.

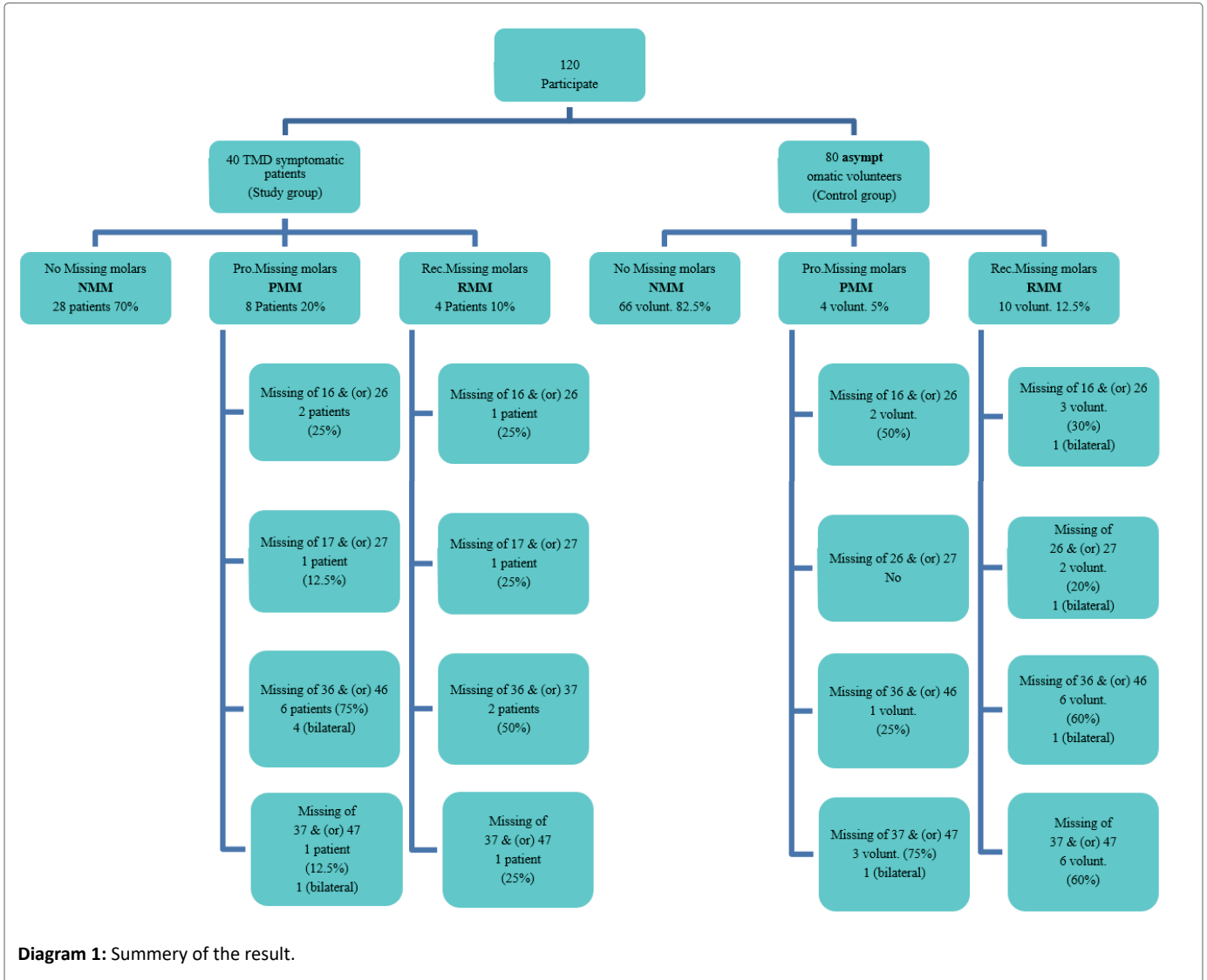


Table 2: Results summarization of the PMM of both SG and CG.

Pairs	SG	CG	Paired-samples t Test
Pair 1	PMM 8 (20%)	PMM 4 (5%)	P=.044
Pair 2	PM of 16 and/or 26, 2 patients (5%)	PM of 16 and/or 26, 2 volunteers (2.5%)	no correlation
Pair 3	PM of 17 and/or 27, 1 patient (2.5%)	PM of 17 and/or 27, 0 volunteer (0%)	P=.323
Pair 4	PM of 36 and/or 46, 6 patients (15%) (4 bilateral)	PM of 36 and/or 46, 1 volunteer (1.25%)	P=.023
Pair 5	PM of 37 and/or 47, 1 patient (2.5%) (1 bilateral)	PM of 37 and/or 47, 3 volunteers (3.75%) (1 bilateral)	P=.160

show more than half of the (study cases) of the molars involved in PMM were mandibular first molars.

Conclusions

The risk of temporomandibular joint disorders TMD could be more with missing of molar teeth for more than ten years compared with missing of molars for a lesser period. Furthermore, the effect of prolonged missing of mandibular first molars may increase the contribution of risk to TMD. Also when both opposing molars were missing, tilting of distal molars towards the edentulous spaces may be more compared with the presence of the opposing molar.

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