

**PERIODONTAL STATUS OF SECOND MOLARS FOLLOWED BY THE EXTRACTION
OF THIRD MOLARS – A CLINICAL STUDY**

Running Title: Periodontal status of second molars after the extraction of third molars

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ABSTRACT:

BACKGROUND: Impacted third molars have the highest prevalence of 66–77 percent, making them the most frequent impacted teeth. Third molars are prone to recurrent wisdom tooth pericoronitis, adjacent tooth caries in the case of second molars, lower anterior arch crowding, periodontal defects of adjacent molars, tooth root resorption, and even temporomandibular joint disorders due to their abnormal position and blocked eruption.

AIM AND OBJECTIVE: The major goal of this research was to see how the periodontal health of the second molar changed after extraction of impacted third molars.

MATERIALS AND METHODS: The research was based on a three-month follow-up of 40 individuals who had their third molars surgically extracted. Clinical criteria including as plaque index, gingival index, and probing depth were used to evaluate the periodontal condition of the neighbouring second molars. All of the measurements were taken at the time of surgery and again one, three, and six months afterwards. The data was analysed statistically.

RESULTS: After 1 and 3 months, the values of probing depth, plaque index, and gingival index were considerably lower than the baseline value, according to the findings. The probing depth was from 5.6 ± 0.68 to 4.8 ± 0.66 and 3.2 ± 0.78 in correspondence to baseline, 1st month and 3rd month follow up respectively. In case of plaque index, heavy plaque was from 29.2 ± 0.58 to 10.4 ± 0.53 and 8.3 ± 0.98 in correspondence to baseline, 1st month and 3rd month follow up respectively. In gingival index, severe inflammation was from 25.0 ± 0.44 to 8.3 ± 0.49 and 6.3 ± 0.57 in correspondence to baseline, 1st month and 3rd month follow up respectively. All the results were statistically significant.

CONCLUSION: The current study reveals that when the third molar is removed, the periodontal health of the neighbouring second molar improves, leading to the conclusion that preventive removal of third molars can help patients maintain better oral hygiene.

KEYWORDS: Adjacent second molars, Periodontal status, Bleeding on probing, Probing depth, Surgical extraction.

INTRODUCTION:

Impacted third molars have the highest prevalence of 66–77 percent, making them the most frequent impacted teeth ^[1]. Pericoronitis, caries in the second molars, lower anterior teeth crowding, periodontal defects of the second molar, root resorption, and even temporomandibular joint disorders ^[2]. Most dentists think that third molars with pathological symptoms, particularly those with mesial inclination, should be extracted early in order to prevent future oral issues. ^[3].

Because of neighbouring teeth blockage and bone tissue embedding, surgical problems are more frequent with third molar extractions than with regular tooth extractions ^[4]. Pain, edoema, infection, and local bleeding are all common surgical consequences that can be adequately treated with prompt symptomatic treatment ^[5]. Other concerns, such as damage to other teeth, will have an effect on the tooth's mid-long-term prognosis if they arise. Dentists frequently overestimated the third molar extraction as the influence of periodontal health of the second molar since there were no obvious subjective complaints in the near term ^[6]. As a result, oral surgeons frequently only treat the second molar after the third molar has been extracted.

Chronic periodontitis is a progressive illness affecting the gingiva, periodontal ligament, and alveolar bone that occurs when gingival inflammation compromises the dental structure's supporting structures, resulting in alveolar bone resorption and tooth loss ^[7]. Adults are more likely to be diagnosed with periodontal disease ^[8]. The causal aetiology for periodontitis involves a variety of microbiological infections. *P. gingivalis* has long been thought to be a crucial factor in the development of adult periodontitis. ^[9]. *P. gingivalis* is a well-adapted pathogen that possesses a variety of potential virulence characteristics that allow it to cause disease ^[10].

Because lasting periodontal damage, such as alveolar bone loss, is difficult to heal, preventing periodontitis is crucial ^[11]. The negative effects of third molars on their neighbours are most likely caused by the interaction of the sub-gingival microbiome and the host response across the periodontium's local microenvironment ^[12]. Since periodontal diseases are caused by the colonisation of sub-gingival periodontal pathogens and resulting changes in the inflammatory-immune system, the negative effects of third molars on their neighbours are most likely caused by the interaction of the sub-gingival microbiome. In this view, it's reasonable to expect that extracting third molars will improve the immunological and microbial conditions around their neighbouring second teeth. ^[13].

Extracting mandibular third molars can cause various periodontal defects towards the distal root of the second molar, according to some authors ^[14], with these lesions are found to be more common in older patients in conditions where the distal surface of the second molar has periodontal defects prior to extraction of the impacted third molar. ^[15].

The goal of this study was to assess the periodontal health of mandibular second molars after surgical extraction of adjacent impacted third molars as there is still a lack of consensus in the scientific literature regarding the direct effect of third molar extraction on adjacent second molars and its periodontal health.

MATERIALS AND METHOD:

The study involved 48 patients from Saveetha Dental College's Department of Periodontics who had their third molars extracted. All of the participants were over the age of 18 with their consent were allowed to participate in the study. Borderline periodontal values could be acquired as no participants had active periodontal treatment. The university's ethical committee approved the study plan.

Using Pell and Gregory's classifications, an OPG radiograph was performed at the start of the study to establish the third molar in relation to the ascending ramus. (classes I, II, and III).

SURGICAL METHOD:

Third molars were removed by the surgeon with local anaesthetic, which was usually lignocaine in a 2% solution with 1:200,000 epinephrine. The operating room and all surgical supplies were sterile. In order to avoid soft tissue damage, the surgeon created a full-thickness flap, elevated the third molar, and extracted it atraumatically. No. 3-0 silk suture was utilised to seal the wound. The suture was removed after 7 days. In the short-term follow-up, healing and soft-tissue regeneration happened spontaneously with no intervention of biomaterials or membranes.

PERIODONTAL EVALUATION:

Plaque index (PI) and gingival index (GI) were measured on all the surfaces of second molars close to the removed third molars. The second molar measurements, on the other hand, were taken three times, most likely at baseline, one month later, and three months later.

The PI was coded in the following way: 0, no visible plaque; 1, a thin film of plaque; 2, a moderate amount of plaque; and 3, a heavy accumulation of plaque

The GI was scored as follows: 0, no visible inflammation ; 1, a slight colour change; 2, gingival inflammation with slight colour change; and 3, severe inflammation,

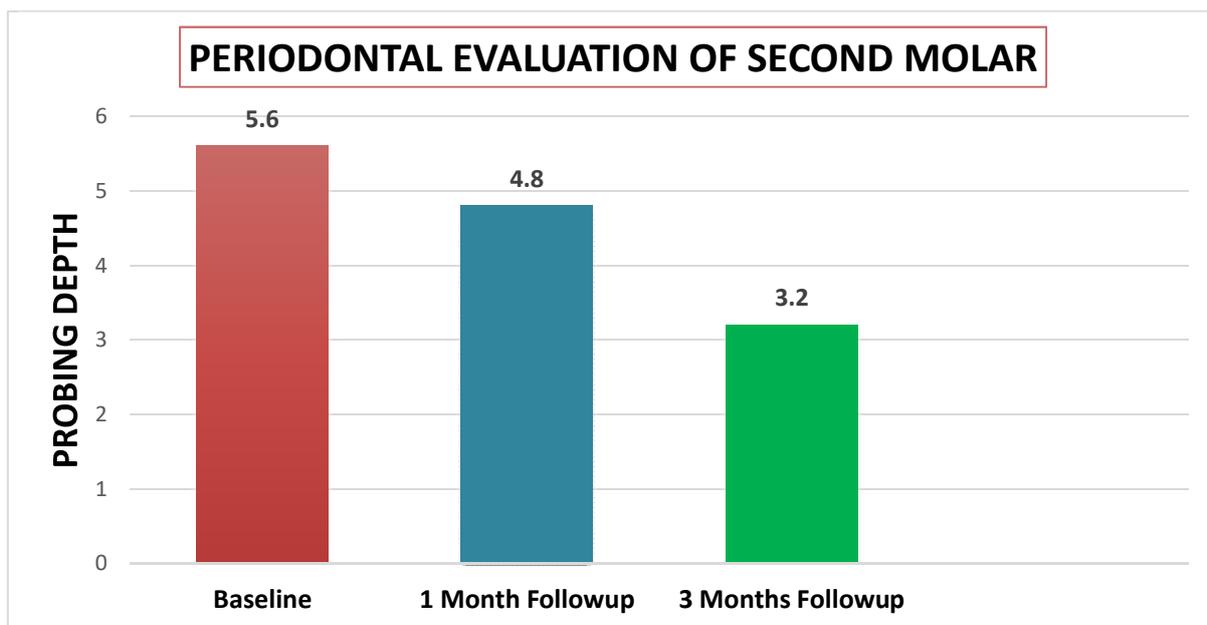
Researchers used a Michigan periodontal probe and Williams' marks to measure PD. The probe tip was kept as parallel to the long axis of the tooth into the gingival sulcus until a small amount of resistance was felt. Every metric was measured to the millimetre. In the statistical analysis, software (SPSS version 16) was utilised for data processing and analysis. Data was collected at baseline, one, and three months later, and compared using a paired t-test.

RESULTS:

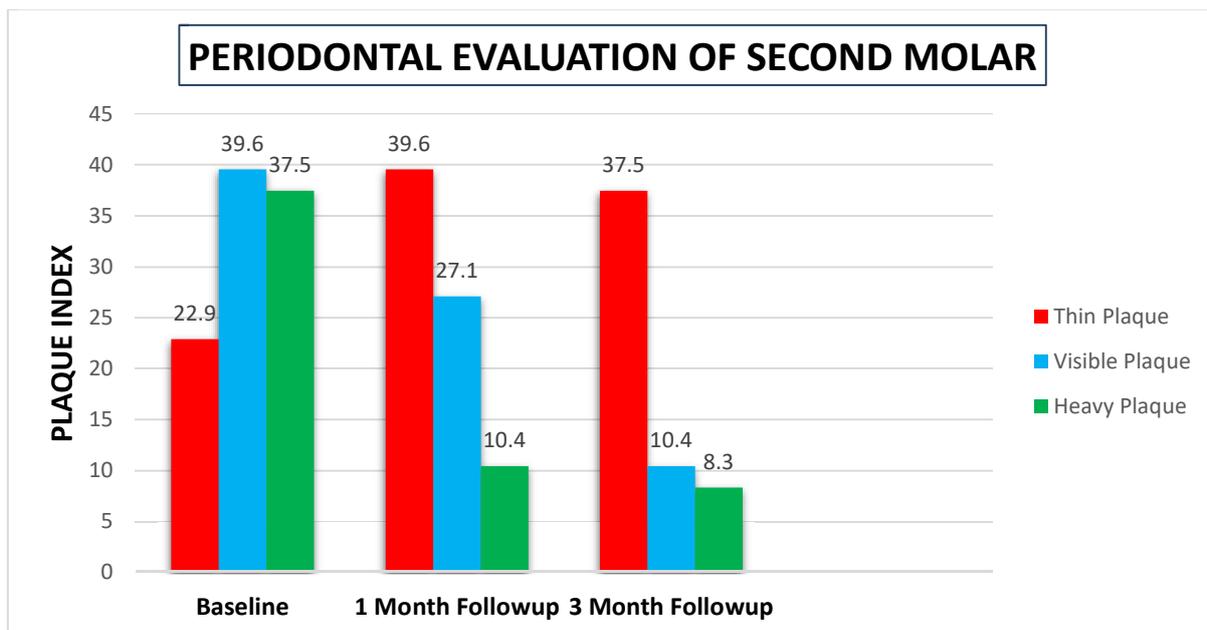
This research comprised 48 patients, 21 men and 27 women, ranging in age from 18 to 29, with a mean age of 23.1±6.1 years at the start. The common reason for the removal of third molar are pain, infection, follicular cyst, buccoverted, and orthodontic purposes. The periodontal health of the second molar improved following third molar surgery, with a steady decrease in periodontal disease over the follow-up period. The probing depth was from 5.6±0.68 to 4.8±0.66 and 3.2±0.78 in correspondence to baseline, 1st month and 3rd month follow up respectively. In case of plaque index, heavy plaque was from 29.2±0.58 to 10.4±0.53 and 8.3±0.98 in correspondence to baseline, 1st month and 3rd month follow up respectively. In gingival index, severe inflammation was from 25.0±0.44 to 8.3±0.49 and 6.3±0.57 in correspondence to baseline 1st month follow-up, and 3rd month follow-up [TABLE 1]. For each observation period, the differences between PD values improved significantly [GRAPH 1]. The PI [GRAPH 2] and GI [GRAPH 3] values of the second molar close at the surgery sites improved steadily over the follow-up period. The degree of impaction of the molars are, the value increases the baseline probing, but also the larger the difference. When we used repeated analysis of variance to evaluate subsequent test periods, we found that the constant increase with all clinical indices of periodontal health was significant statistically. (results not shown).

TABLE 1: Table showing the periodontal evaluation of second molars under Probing depth, plaque index, and gingival index

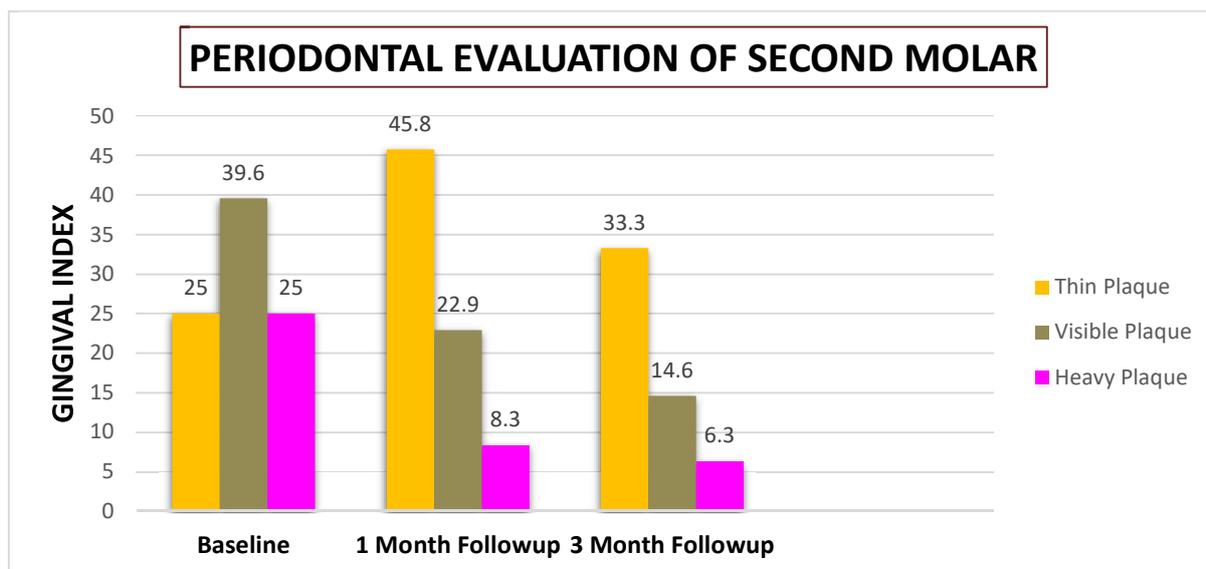
PERIODONTAL EVALUATION OF SECOND MOLARS					
CLINICAL PARAMETERS		MEAN VALUE BASELINE	MEAN VALUE 1st Month follow up	MEAN VALUE 3rd Month follow up	p value Inference
PROBING DEPTH		5.6	4.8	3.2	SIGNIFICANT
PLAQUE INDEX	THIN PLAQUE	22.9	39.6	37.5	SIGNIFICANT
	VISIBLE PLAQUE	39.6	27.1	10.4	SIGNIFICANT
	HEAVY PLAQUE	29.2	10.4	8.3	SIGNIFICANT
GINGIVAL INDEX	MINOR INFLAMMATION	25.0	45.8	33.3	SIGNIFICANT
	MODERATE INFLAMMATION	39.6	22.9	14.6	SIGNIFICANT
	SEVERE INFLAMMATION	25.0	8.3	6.3	SIGNIFICANT



GRAPH 1: Graph showing the decrease in the probing depth value after the extraction of third molar only periodic follow-up.



GRAPH 2: Graph showing the decrease in the plaque index value after the extraction of third molar only periodic follow-up.



GRAPH 3: Graph showing the decrease in the gingival index value after the extraction of third molar only periodic follow-up.

DISCUSSION:

When mesio-angular impacted third molars cause periodontal destruction at the distal surface of the neighbouring 2nd molar, they have been regularly excised for a long time [16]. Surgical extraction of third molar impaction accompanied by pain, edoema, infections, and other symptoms is a clear option for patients [17]. However, the impact of surgical operations towards the periodontal health of the neighbouring 2nd molar, where there is a lack of consensus towards the scientific proven literature regarding the treatment of asymptomatic third molars [18]. It is important to protect the neighbouring 2nd molar when surgically removing impacted mandibular third molars. [19].

The GI and PI assessed after the surgical extraction of impacted third molars were examined in this study, as well as periodontal disorders at three distal surfaces of 2nd molars. According to the findings of this study, all of the periodontal parameters assessed improved gradually but considerably from baseline to the final examination 3 months following the extraction. This improvement was substantially greater than the mean values obtained at the time of surgery at neighbouring second molar sites. Furthermore, We are well aware that patients' oral health habits may have been influenced positively by quarterly check-up visits, and hence the advantage of third molar removal towards the periodontal indices may has been overstated. It has previously been studied the impact of maintaining good dental hygiene post extraction of impacted third molars.

According to other research [20,21], periodontal breakdown that begins and develops on the distal surface of a mandibular 2nd molar are in contact with a mesial angulated third molar and is associated with worse plaque control can lead patients to a persistent localised periodontal defects after extraction. The risk of lowering the attachment level, according to various authorities, is a cause to carefully assess the case for third molar extraction. [22,23].

Several authors [24,25] have suggested that wedged food particles in a hard-to-clean region, combined with plaque accumulation within the inter-proximal space of second and third molar, can cause gingival inflammation at the third molar region but also in the posterior sextants. This has been proven in prior samples [26], where the presence of a visible third molar was connected to the severe periodontal disease on the adjacent teeth as compared to individuals without visible third molars. [27].

As patients tend to chew on the other side, the clinical assumption of that removing the partially erupted third molars will tend to improve the gingival health and plaque level. These symptoms not only affect patients' ability to perform proper oral hygiene, but also play a important role of the oral tissues' ability to self-clean [28]. According to various authors, in both the symptomatic and asymptomatic research groups, in which removing the partially erupted third molars is associated to plaque level reduction when compared to a control group. [30]

In young, non-periodontal individuals, proper oral instruction following the extraction of an impacted third molar may be enough in order to increase the periodontal health [31]. Other studies have offered a variety of therapeutic methods for reducing periodontal issues following mandibular third molar extraction. Root planning has been advocated as a strategy for enhancing periodontal healing after the removal of a third molar [32]. Nonetheless, patients who got root planning following surgical extraction had mixed results, including equivalent or greater periodontal healing [33]. The reasons for this discrepancy have been linked to the certain effects of age and their influence of recall during follow-up frequently. According to our data [34], the flap design has no discernible effect on the probing depth on the distal surface of the 2nd molar following third molar surgery. Preoperative periodontal health, third molar extraction length, affected type, design of the flap, extraction technology, and type of suture tend to influence the periodontal state of the 2nd molar near to the impacted third molar [35]. Preoperative assessment, clinical, and radiographic examination should be performed on the third molar extraction to minimise periodontal damage to the surrounding second molars.

However, the main limitations of this study were a single centered study with a geographical limitation and provided with the lesser sample size. The study when it is done with a higher sample size and with various ethnicities can provide better results for the study.

CONCLUSION:

The current study's findings reveal that extracting the third molar improves the health of the periodontium of the neighbouring 2nd molar, implying that third molar extraction can help patients maintain better oral hygiene.

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