

Periodontal Status of Mandibular Second Molar after Surgical Removal of Mandibular Mesio-Angular Impacted Third Molar

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Abstract

Background & Objectives: The impacted third molars should be surgically removed in such a way that minimal destruction of periodontium of second molar occurs. Various studies with conflicting results are available. We evaluated the changes in the periodontal health parameters of second molar following surgical removal of adjacent mesio-angular impacted third molar.

Method: We evaluated the difference in periodontal status of mandibular second molar at baseline and at third, sixth and ninth month after surgical removal of mandibular mesio-angular impacted third molar. The parameters assessed were clinical attachment loss, periodontal pocket depth, OHI-S, GI, radiographic assessment of bone loss, mobility of second molar.

Results & Discussion: There was a significant difference in scores for CAL distal to 2nd molar (P value 0.000) and

for OHI-S before surgical removal and after 9months (P value 0.001). No significant difference in scores for gingival index was noted. Persistent bleeding on probing in few cases was seen. Radiographic assessment showed that there is increase in bone fill obliterating the defect distal to 2nd molar.

Conclusion: Surgical removal of impacted mandibular mesio-angular third molar significantly improves the periodontal status of mandibular second molar and patient should be placed on a properly tailored periodontal maintenance programme to ensure it.

Keywords: Periodontal status, clinical attachment loss, oral hygiene index simplified, gingival index

Introduction

Impacted third molars are wisdom teeth which do not fully erupt into the mouth because of blockage from other teeth. Wisdom teeth are likely to become impacted because of

mismatch between the size of the teeth and the size of the jaw. Surgical removal is the most common treatment for impacted wisdom teeth. Surgical removal of impacted mandibular third molar may compromise periodontal health of mandibular second molar in many situations. Due to loss of attachment on the distal aspect of distal root of second molar associated symptoms like sensitivity and non-specific pain may persist after removal of impacted third molar.

The impacted third molars should be surgically removed in such a way that minimal destruction of periodontium of second molar occurs. Ideally after removal of third molar, regeneration of periodontal tissue distal to second molar is to be expected. But the regeneration of periodontal tissue distal to second molar depends on factors like angulation of third molar and positional relationship with second molar before removal, type of bone defect present after removal of third molar, oral hygiene maintenance of the patient, type of new attachment procedures and property of bone graft used.

Since 1980s, several studies have focused on the relationship between impacted third molars and periodontal health¹. There are studies which assess the effect of removal of third molar on the periodontal status of second molar with conflicting results. There exists a dilemma over the effect of surgical removal of mandibular third molar tooth on the periodontal condition of the adjacent second molar. Zeigler and Kugelberg et al⁸ demonstrated prominent improvement of periodontal indices in distal part of second molar in after surgery. In contrast, Stephens et al⁹. and Knutsson et al¹⁰ reported attachment loss and attenuation in alveolar ridge height following extraction of wisdom tooth in second molar distal part.

Here we evaluated the changes in the periodontal health parameters of second molar following surgical removal of

adjacent mesio-angular impacted third molar. Research hypothesis was set which stated that surgical removal of mandibular mesio-angular impacted third molar affects the periodontal status of mandibular second molar.

Materials and Methods

Study was conducted in patients with mesio-angularly impacted mandibular third molar reporting to the department for surgical removal of third molars. The patients included for study were within the age group of 18 - 30 years (ASA 1) with mesio-angular third molar impactions of Pell & Gregory classification class II and III and type B and C without clinical attachment loss in all sites except distal aspect of mandibular second molar, who have given consent for the study.

Patients with missing, carious mandibular second molars, Local pathologies associated with impacted mandibular third molar such as cysts, tumours, alveolar bone defects (dehiscence and fenestration) associated with mandibular second molar were excluded from study. The study was conducted over a period of 12 months after ethical clearance.

The study was conducted in the department during 2017 – 2018. Demographic data were collected and IOPA radiograph procured to determine the position of impacted mandibular third molar according to Pell and Gregory classification [with respect to the ascending ramus (classes I, II, and III) and with respect to the occlusal plane (types A, B, and C)]. All patients underwent oral prophylaxis preoperatively. Baseline parameters like OHI-S, gingival index, periodontal pocket depth, clinical attachment loss at 7 sites around the second molar (the mesio-lingual, lingual, disto-lingual, mid-distal, disto-buccal, buccal, mesio-buccal sites), mobility of second molar, intra-operative bone defect measurement from distal cervical line of 2nd molar to the bone level were noted. All measurements were taken by a periodontal probe with a

William's probe by an experienced examiner preoperatively and post operatively. Post-operative measurements were noted at 3, 6, 9 months respectively by the same examiner. Bone defect measurements at 9 months with IOPA were also noted.

Statistical analysis was done by SPSS software using with paired t test.

Results

Parameter	Improved	No Change	Worsened
OHI-S	85.71% (12/14)	7.14% (1/14)	7.14% (1/14)
GI	57.14% (8/14)	35.71% (5/14)	7.14% (1/14)
PPD(7 Sites)	73.46%	22.44%	3.05%
Cal(7 Sites)	68.36%	20.36%	10.20%
Actual Cal	100%	---	---

Table 1: Percentage change in each parameter after 9month follow up

OHI-S of 12 patients (85.17%) out of 14 patients improved. One patient didn't have any change (7.14%) while in one patient (7.14%) it worsened (Graph 4). There was statistically significant difference in scores for OHI-S before surgical removal (M=1.46, SD=0.88) and after 9months (M=0.70, SD=0.34) follow up. (P value=0.001) Gingival index of 8 out of 14 were improved (57.14%) and in 5 it worsened (35.71%) while there was no change in one (7.14%). This was not statistically significant. (P value 0.571). Base line (M=0.85, SD=0.29) and after 9months (M=0.81, SD=0.12).

Improvement was noted in periodontal pocket depth of 7 sites in 73.40%, no change in 22.44% and worsened in 3.05%.

Gain in clinical attachment of 7 sites is seen in 68.36% with no change in 20.36% and loss was seen in 10.20%. In all these cases attachment loss were less than 2mm which is clinically considered as healthy attachment. This was

statistically significant (P value 0.000). Base line (M=1.46, SD=0.88) and after 9months (M=5.14, SD=1.44).

Comparison of the baseline IOPA with 9month follow up radiograph revealed that there is increase in bone fill obliterating the defect distal to 2nd molar.



Fig 1: Radiographic assessment - Patient A



Fig 2: Radiographic assessment - Patient B

There was no mobility of 2nd molar at baseline or during any of follow up assessments.

Discussion

Parameters in our study were clinical attachment loss around second molar, periodontal pocket depth, radiographic assessment of bone defect distal to second molar, mobility of second molar, and overall oral hygiene status by OHI-S and gingival status by gingival index. Javier Montero's¹ found that there was initial periodontal breakdown on the distal surfaces of the second molars but periodontal health of the 4 posterior sextants were significantly improved one year after surgical removal of the ipsilateral lower third molar. Many other authors also showed similar results. Giglio et al¹⁸ investigated the effect of removal of partially erupted mandibular third

molars on the plaque and gingival indices and showed that removing impacted teeth may provide some benefit in terms of improved gingival health.

Some other studies showed a worsening of the gingival and periodontal health after surgical removal of impacted third molar. Kan KW et al³⁰ suggested that periodontal breakdown initiated and established on the distal surface of a mandibular second molar in the vicinity of a 'mesio-angular' impacted third molar evidenced by pre-extraction crestal radiolucency in association with inadequate plaque control after extraction can predispose to a persistent localised periodontal problem.

OHI-S showed a significant improvement (85.71%) in patients' overall oral hygiene (P value 0.001). The improvement in oral hygiene measures following surgical removal of impacted third molar may have contributed to improvement in periodontal parameters.

Giglio JA¹² showed improvement in GI score in their follow up study. Kugelberg³² et al. have shown a significant decrease in GI distal to the second molar 1 year following extraction of the third molar. Krausz et al¹⁸ study shows no significant change in GI. Ash and Osborne¹⁴ et al have also demonstrated no significant changes in these clinical parameters following third molar extraction regardless of curettage and root planning of the adjacent second molar. To the contrary, Ferreira et al³³ have shown an advantage in curettage and root planning of the adjacent distal second molar, with regard to periodontal health. Their follow-up period lasted only 2 months, during which reinforcements in oral hygiene were given in the experimental sites. In our study GI was assessed and found that 57.14% cases showed an improvement in gingival health which was not statistically significant (P value= .571). Although statistically insignificant, 57.14% showed less bleeding on probing distal to mandibular second molars following surgical

removal of mesio-angularly impacted third molars. Persistent bleeding on probing sites in few cases may be attributed to inadequate personal plaque control measures by the patients in the site during post-operative period. Reinforcement in the oral hygiene measures may positively influence the outcome.

Reduction in periodontal pocket depth is shown by 73.46% of sites around mandibular 2nd molar in our study. This is in accordance with the results obtained by Thomas B Dodson et al³², Krausez et al¹⁸, Carolyn Dicus²⁵ and Elisabetta Vignudelli²⁰. Chin Quee et al³² however, have shown no significant changes in pocket depths following third molar extractions. The findings have further been supported by Osborne¹⁴ et al and Ash et al. Similar findings have also been shown by Ziegler and Kugelberg⁸ et al.

There was significant improvement in the CAL (< 2mm, p value .000) after 9 months follow up. Similar results were shown by Thomas B Dodson et al³², Krausz et al¹⁸, Elisabetta Vignudelli²⁰. In contrast loss of attachment distal to the second molar following third molar extraction was described by Ash et al, Stephens et al⁹ and Chin quee¹⁹ et al. Ziegler and Osborne¹⁴ et al, however have shown no significant loss of attachment following third molar extraction in a group of young patients.

Radiographic assessment of baseline and 9month follow up of bone defect distal to 2nd molar showed bone fill distal to mandibular second molar. Krausz et al¹⁸, C. E Kugelberg⁸, E Vignudelli²⁰ and Ana Inocencio Faria³⁰ showed improvement of bony defects after surgical removal of impacted 3rd molar. Hans-Goran Grondahl and Ulf Lekholm¹⁷ found no significant difference in the supporting bony tissue between age matched groups of patients with and without impacted or semi-impacted third molars, but the clinical condition of the periodontium was significantly worse in the group with third molars. So,

authors advice prophylactic removal of impacted and semi-impacted mandibular third molars.

This shows the importance of proper oral hygiene measures distal to mandibular second molars following surgical removal of mesio-angular impacted third molars. In order to maintain periodontal health around mandibular second molar after surgical removal of mesio-angular impacted mandibular third molar on a long-term basis and in order to maintain or improve periodontal parameters, patient should be placed on a properly tailored periodontal maintenance programme.

Conclusion

This study looked in to the changes in periodontal status of adjacent second molar in routine surgical removal of mesio-angular impacted mandibular third molar. Improvement was noted in all the parameters assessed except gingival index. Persistent bleeding on probing sites in few cases was noted. This study highlights the need for proper oral hygiene measures around mandibular second molars to reinforce the added benefit of surgical removal of impacted third molars. Oral and maxillofacial surgeons should stress this aspect and ensure to put the patient on tailored periodontal programme in order to prevent deterioration of periodontal health after surgical removal of impacted mandibular third molar.

Ethical Clearence

Study was subjected to ethical clearance from Institutional Ethic Committee, Govt. Dental College, Calicut. Informed consent was taken from each individual.

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