OUTCOME OF MANAGEMENT OF MANDIBULAR THIRD MOLAR IMPACTION BY COMPARING TWO DIFFERENT FLAP DESIGNS

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ABSTRACT

The aim of this study was to compare the outcome of management of mandibular third molar impaction in terms of wound healing and periodontal probing depth of the adjacent second molar in patients treated by marginal flap versus paramarginal flap. This quasi experimental study consisted of sixty patients divided into two groups of thirty each (ages 18 to 30 years), who required surgical removal of impacted mandibular third molars. Periodontal probing depth of the adjacent second molar was recorded preoperatively. A marginal flap was used in one randomly chosen half of the patient’s sample, and a paramarginal flap was used in the other half. The influence of these flaps on wound healing and periodontal probing depth of the adjacent second molar was studied postoperatively. No wound dehiscence occurred with the use of marginal flap or the paramarginal flap at 1 and 2 weeks after surgery (P>0.05). The buccal and distal probing depths of the adjacent second molar showed no significant difference between marginal flap and paramarginal flap before surgery and at 2 weeks and 4 weeks after surgery (P>0.05). No significant difference was found with the use of paramarginal flap instead of traditional marginal flap in the removal of impacted mandibular third molar.

Key Words: Impacted mandibular third molar, marginal flap, paramarginal flap.

INTRODUCTION

The surgical removal of an impacted mandibular third molar is a common procedure associated with various techniques and anecdotal opinion. Though a large majority of impacted teeth are removed surgically1, many of them can be extracted through a closed technique using extraction forceps.

Surgical extraction of mandibular third molar involves the manipulation of both soft and hard tissues, due to which the patient usually experiences pain and limited mouth opening (trismus) in the early postoperative period. Some patients also have periodontal disease and even complicated wound healing in the later postoperative period.

Periodontal evaluation after the extraction of impacted mandibular third molars has raised the questions concerning the direct effect of extraction on the health of the adjacent second molar. There may be a periodontal pocket, loss of clinical attachment of the gingiva or the bone loss of the second molar.2,4 Several studies have been undertaken on the different flap techniques to prevent the periodontal complications to the adjacent second molar.5,6 The present study evaluates the outcome of management of mandibular third molar impaction by marginal flap versus paramarginal flap in terms of wound healing and periodontal probing depth of adjacent second molar after surgical removal of mandibular third molar.

METHODOLOGY

The current study consisted of sixty patients and was carried out at Oral and Maxillofacial Surgery Unit of Punjab Dental Hospital, Lahore from June 2006 to March 2007. Inclusion criteria: Patients with no history of medical illness or taking any medication that could influence the surgical procedure or postoperative wound healing, non-smokers, and healthy dental and periodontal status. An attempt was made to include only those mandibular third molars that were of comparable technical difficulty, positioning and angulations as seen on periapical and panoramic radiographs.

The demographic data were recorded and informed consent was taken. A thorough history was taken. Patients were assessed clinically and were divided into two groups, A and B randomly by using random
numbers table. Those patients operated by using the marginal flap and bone cutting were kept under group A. Patients operated by using the paramarginal flap and bone cutting were included in group B. Periodontal pocket depth was measured by using the periodontal measuring probe (UNC 15) from the free gingival margin to the bottom of the pocket in both groups.

Patients were operated under local anesthesia; 2% lidocaine with 1:100000 adrenaline (Medicaine®; Houns Co; Ltd; Korea). A standard surgical procedure was followed. The patients were operated by the same operator and operative protocol. The marginal flap incision started near the mesiobuccal edge of the second molar to its distal surface. A relieving incision was made in the mesial region without cutting the interdental papilla. Another relieving incision was made along the mandibular ramus. (Fig 1). The paramarginal flap incision was similar to that used with the marginal flap; however, instead of making a sulcular incision in the second molar, an incision was made while maintaining a distance of 2 mm from the free gingival margin (Fig 2).

Then, a full thickness mucoperiosteal flap was elevated. Minimum ostectomy and tooth sectioning was performed by using the round bur and the fissure bur respectively while preserving the distal bone adjacent to the second molar. The flap was approximated by interrupted sutures with 3/0 mersilk (Ethicon). After the procedure, the patients were given general instructions. All patients were given Amoxicillin (500mg 3 times a day for 7 days), diclofenac (50mg 3 times a day for 3 days) and 0.2% chlorhexidine gluconate mouth rinses for 7 days. Wound dehiscence was noted at seventh postoperative day. The wound was considered to be dehisced if there was gaping along the entire incision line. Periodontal pocket depth was measured from the free gingival margin to the bottom of the pocket at 2 and 4 weeks postoperatively.

**DATA ENTRY AND STATISTICAL ANALYSIS**

The data entry package was developed using SPSS version 17. Data collection and data entry were done simultaneously and tabulation plan was developed.

The qualitative variables in the demographic data like gender and mandibular side of impaction were presented as proportions and percentages and quantitative variable like age were presented as means and standard deviations. The comparison of the outcome of the two groups regarding wound healing was assessed by using chi square test. The periodontal pocket depth of the adjacent second molar was compared for the marginal flap and paramarginal flap and as there was a difference, it was tested for significance by t-test.

**RESULTS**

A total of 60 patients divided into 2 groups of 30 patients of marginal flap and paramarginal flap each were included in our study sample.

Marginal flap group included patients of ages ranging between 18 to 30 years (mean/SD, 23.43+/−3.31). While patients in paramarginal flap group were of ages ranging between 18 to 30 years (mean/SD, 24.17+/−3.15). The results regarding the wound healing showed no statistical difference between the two groups at 1 week and 2 weeks after surgery as both groups showed the same results regarding uncomplicated wound healing and no wound dehiscence was found (Table 1).

<table>
<thead>
<tr>
<th>Wound Healing</th>
<th>Flap type</th>
<th>Uncomplicated Wound healing</th>
<th>Wound dehiscence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 1 &amp; 2 weeks</td>
<td>Marginal</td>
<td>30</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>At 1 &amp; 2 weeks</td>
<td>Paramarginal</td>
<td>30</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>0</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probing depths</th>
<th>Flap type</th>
<th>Before Surgery</th>
<th>2 weeks after surgery</th>
<th>4 weeks after surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buccal Probing Depth (mm)</td>
<td>Marginal (n=30)</td>
<td>2.56+/−0.31</td>
<td>3.23+/−0.29</td>
<td>2.28+/−0.28</td>
</tr>
<tr>
<td>(Mean/SD)</td>
<td>Paramarginal (n=30)</td>
<td>2.44+/−0.30</td>
<td>3.10+/−0.36</td>
<td>2.27+/−0.29</td>
</tr>
<tr>
<td>Distal Probing Depth (mm)</td>
<td>Marginal (n=30)</td>
<td>3.52+/−0.24</td>
<td>4.10+/−0.25</td>
<td>3.25+/−0.34</td>
</tr>
<tr>
<td>(Mean/SD)</td>
<td>Paramarginal (n=30)</td>
<td>3.43+/−0.31</td>
<td>3.98+/−0.31</td>
<td>3.23+/−0.31</td>
</tr>
</tbody>
</table>
Flap designs influence in lower third molar surgery

The values for periodontal probing depth on the buccal and distal surface of adjacent second molar before surgery and at 2 weeks and 4 weeks after surgery did not indicate significant differences between the marginal and paramarginal groups. However both techniques had the following evolution: a significant increase in probing depth at 2 weeks after surgery (P<0.001), and a significant decrease at 4 weeks after surgery (P<0.001). (Table 2)

DISCUSSION

Third molar surgery has been associated with a variety of complications. Flap design is one of the factors influencing the severity of these complications.\textsuperscript{7-10} For this reason, two different flap designs were compared: marginal flap, which is the traditional technique for third molar surgery, and paramarginal flap, which is a variation of the latter.

It was found that the results regarding primary wound healing were not different for each of these flap designs and also similar levels of periodontal pocket depth of the adjacent second molar were found for both techniques during the study.

The results of present study were not in agreement with Jakse et al\textsuperscript{7} study in regards that flap design influences primary wound healing after third molar surgery. His study confirmed evidence that the flap design in lower third molar surgery considerably influences primary wound healing.

In present study, no statistical difference regarding wound dehiscence was found on comparing the marginal and paramarginal flaps. This could be due to the use of triangular mucoperiosteal flaps used in both techniques.

Periodontal pocket formation in the second molar is a common postoperative complication in third molar surgery. Several explanations for this have been advanced.\textsuperscript{10-15} In the current study, the marginal and the paramarginal flap created a bigger postoperative pocket in terms of the distal and buccal probing depths at 2 weeks after surgery as compared to before surgery. With respect to probing depth, in both groups of patients, it was found that measurement before third molar surgery and 4 weeks after surgery did not change significantly. Nevertheless, several clinical studies have found an increase in pocket depth and a bony defect on the distal surface of the second molar after third molar removal.\textsuperscript{2,10} In a retrospective study, Kugelberg et al\textsuperscript{2} found that 2 years after lower third molar surgery, 43.3\% of the cases had probing depths of 7 mm or more and 32.1\% had intrabony defects of 4 mm or more on the distal aspect of the adjacent second molar. In contrast, Groves and Moore\textsuperscript{16} found a decreased pocket depth after surgery. Quee et al\textsuperscript{3} and Schofield et al\textsuperscript{4} also reported no differences in periodontal healing related to flap design. Other studies have reported that exposure of the alveolar bone to the buccal cavity, even without surgical procedures, causes bone resorption.\textsuperscript{6,17-19} Considering this, it would be expected that the paramarginal flap would provide better results, at least for bone level, because this flap preserves a strip of mucosa on the buccal surface of the second molars. There are two possible explanations for why this did not happen. First, it is possible that bone resorption is more intense and clinically important in areas where the alveolar bone is thinner, such as in the anterior region of the mandible and all of the maxilla, but not at the buccal region of the mandibular second molars. Second, during the extraction of teeth with a great mesiodistal or horizontal angulation, it was observed that both the ostectomy as well as the
application of dental elevators traumatized the strip of mucosa preserved by the paramarginal flap. It is possible that this contributed to delayed periodontal healing and explains the results observed with the flap.

Ash\(^{20}\) cautioned that periodontal pathology affecting the distal aspect of second molars with adjacent third molars had been overlooked. The absence of increased pocket depth at 4 weeks in this study was not a consequence of flap design. Instead, it might be caused by the conservative surgical technique used, which maintained the distal bone to the second molar in every case, and by the youthfulness of the study group. In accord with this, some authors\(^{10}\) suggested that increased second molar pocket depth is related to ostectomy. However, other authors\(^{21-24}\) believe that flap design and patient age might have an effect on second molar periodontal status. There could also be more complications when there was generalized inflammation.\(^{10}\) As the patients in our study were between 18 and 30 years of age and had no periodontal disease before surgery, these two variables did not interfere in the results.

REFERENCES