COMPARISON OF TWO SURGICAL TECHNIQUES FOR THE REMOVAL OF PARTIALLY IMPACTED MANDIBULAR THIRD MOLARS

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ABSTRACT

BACKGROUND: Impacted teeth remain unerupted or partially erupted due to lack of space, obstruction or other factors. Surgical removal of mandibular third molars require elevation of mucoperiosteal flap and ostectomy of the bone. Attempt has been made to extract the partially impacted mandibular third molar without the use of flap elevation and ostectomy of bone.

OBJECTIVE: To compare the two surgical techniques for the removal of partially impacted mandibular third molar namely with or without a buccal flap, in terms of mean postoperative pain and swelling score.

MATERIAL AND METHODS: Study was conducted on 150 patients after getting proper prior permission from hospital ethical committee. Demographic information and history were obtained. Patients were examined for partially impacted mandibular third molar. Patients were randomly divided into two groups to compare the outcome of the two procedures.

RESULTS: A total of 150 patients were divided in two equal groups, managed by with flap and without flap. Gender distribution among the groups was insignificant with p-value=0. 502. The overall average age of the patients was 31.39 years+ 9.93. The age distribution among the group was also insignificant with p-value 0. 491. Pain was significantly less in flapless procedure with p-value=0.005. Swelling was also significantly less in the flapless procedure with p-value=0. 003.

CONCLUSION: We found that flapless procedure is a safe and effective method with less swelling and pain as compared to with flap procedure.

KEY WORDS: Buccal flap, impacted mandibular, third molar, pain, swelling.

INTRODUCTION

Impacted teeth remain unerupted or partially erupted due to lack of space, obstruction or other factors. In human dentition, the third molars have the highest impaction rate among all teeth¹. Third molars are present in 90% of population with 33% having at least one impacted third molar². The incidence of mesioangular lower third molar impaction is 38% among all mandibular impactions³.

Surgical removal of impacted mandibular third molar is one of the most frequent operations in the field of oral and maxillofacial surgery⁴,⁵. Indications for surgical removal of these teeth range from prophylactic measures, to patients that present with large osteolytic lesions related to third molars, mainly mandibular. Potential complications associated with the surgical extraction ranges from episodes of postsurgical haemorrhage to in some cases, large maxillofacial infections that require more complex treatment⁶.

Surgical removal of lower third molar teeth are associated with post-operative sequel like pain, swelling and trismus which can often complicate the recovery period⁷. These symptoms in turn depends on a number of factors such as duration of operation, difficulty in surgery, magnitude of the ostectomy, lack of oral hygiene, or the expertise of the surgeon⁸.

To minimize these complications oral and maxillofacial surgeons have sought different surgical techniques for the removal of impacted mandibular third molar⁹. Surgical removal of mandibular third molars require elevation of mucoperiosteal flap and ostectomy of the bone. However, this type of surgery has been associated with a variety of complications. For this reason attempt has been made to extract the partially impacted mandibular third molar without the use of flap elevation and ostectomy of bone. Little information concerning flapless extraction is available. In one comparative prospective study it was observed that2 days after surgery, the mean pain level was 6.2 ± 2.3 in the flap group and 1.7 ± 0.6 in the flapless group. Similarly 2 days after surgery, the mean swelling score was 2.0 ± 0.8 in the flap group and 0.3 ± 0.1 in the flapless group.¹⁰

References:

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MATERIAL AND METHODS
A randomized control trial was conducted at the Oral & maxillofacial Surgery Department, Punjab Dental Hospital on the basis of history, clinical and radiographic examination for a period of six months (June 9 to December 9, 2010). Patients requiring surgical removal of partial impacted mesioangular mandibular third molar as assessed on radiographs of both genders, 18 years = age group with no active periodontal pathology associated with the tooth on clinical examination fulfilled the inclusion criteria. Also the distal surface of the crown of partially impacted tooth should be anterior to anterior border of mandibular ramus which is assessed clinically and radiographically (orthopantanogram) and the Occlusal surface of partially impacted mandibular tooth should level or nearly level with the occlusal plane of the second molar which is assessed clinically and radiographically (periapical radiograph and orthopantanogram). Patients with any bony pathology associated with third molar and medically compromised patients who contraindicate oral surgical procedures confirmed by patient history and blood tests were excluded from this study.

All the patients fulfilling the inclusion criteria were selected from the Out Patient Department of Oral and Maxillofacial surgery, Punjab Dental Hospital on the basis of history, clinical and radiographic examination. Study protocol, use of data for research and risk-benefit ratio was explained to the patients to take a written informed and understood consent. The Hospital and college ethical committee reviewed and approved the synopsis of this study. A structural proforma was used to record the Patients demographic details like name, age and gender.

The patients were divided into two groups, by using random number table, Group A and Group B. In Group A patients, marginal flap were used for surgical removal of partially impacted mandibular third molar while in Group B Patients, no mucoperiosteal flap were raised. Before extraction, all the patients rinsed their mouths for 1 minute with a 0.2% chlorhexidine mouthwash. All surgical procedures were performed with the patient under local anesthesia. The marginal flap for group A patients, consists of a sulcular incision starting 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. A second relieving incision was made in the mandibular ramus, allowing for elevation of a mucoperiosteal flap.

A minimal ostectomy were performed using a round bur with alow-speed handpiece and sterile saline irrigation. The tooth was sectioned into 2 parts with a carbide fissure bur mounted on a low-speed hand piece. The tooth was not sectioned completely through in the lingual direction, because this was more likely to result in injury to the lingual nerve. After sectioning, the 2 fragments were removed, and the socket was rinsed with physiologic saline. The flap was repositioned with 4-0 silk sutures.

In the group B patients, no mucoperiosteal flap was raised, avoiding exposure of the alveolar bone. Tooth sectioning was performed using the same method as for the group A patients. After removing the segments, the soft tissues were approximated with 1 interrupted suture, if necessary. After the surgical procedure, all the patients were treated for 4 days with amoxicillin (500 mg 3times daily) and mefenamic acid (Ponstan, 250 mg 3 times daily).

Pain and swelling were assessed in terms of mean pain and swelling score. The patient was asked to record the pain intensity and swelling on 100mm Visual Analog Scale (VAS) on the second postoperative day. For pain, 0 measures no pain, 1-30 mild pain, 31-70 moderate pain and 71-100 severe pain similarly for swelling, 0 measures no swelling, 1-30 mild swelling, 31-70 moderate swelling and 71-100 severe swelling. The procedure described was carried out by the researcher himself.

The outcome variables were mean pain and swelling. All the data were entered in Statistical Package for Social sciences (SPSS) version 17.0 (SPSS, Inc, Chicago, IL, USA) and results were analyzed as following.

The qualitative variables in data like gender were presented as frequency and percentage. The quantitative data like age, pain and swelling were presented as mean ± standard deviation. T-test was used to test the significance of difference of mean pain and swelling between the two groups. P-value < 0.05 was considered significance.
RESULTS
A total of 150 patients for the removal of partially impacted mandibular third molar were treated, which were divided in two equal groups. Patients in one group were managed by with flap and another group of patients were going through without flap.

Gender wise distribution shows that 27(36%) were male and 48(64%) were female in Group A with female to male ratio was 1.78:1 while without flap group contains 31(41.3%) were male and 44(58.7%) were female with female to male ratio was 1.42:1. Overall female to Male ratio was 1.59:1. Sex distribution among the groups was insignificant with p-value=0.502 (Table 1).

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Flap</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>With out flap</td>
<td>31</td>
<td>0.502</td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>36.0%</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>64.0%</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Average age was 32.44 years + 10.25SD in group A and that of group B was 31.38 years +9.44SD. The overall average age of the patients was 31.39 years + 9.93SD. The age distribution among the group was also insignificant with p-value 0.491. (Table 2).

Table No. 02: Age wise distribution in both groups

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Procedure</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=20.00</td>
<td>With Flap</td>
<td>15</td>
<td>20.0%</td>
</tr>
<tr>
<td></td>
<td>Without flap</td>
<td>12</td>
<td>16.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>27</td>
<td>18.0%</td>
</tr>
<tr>
<td>21.00 - 30.00</td>
<td>With Flap</td>
<td>12</td>
<td>16.0%</td>
</tr>
<tr>
<td></td>
<td>Without flap</td>
<td>19</td>
<td>25.3%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>31</td>
<td>20.7%</td>
</tr>
<tr>
<td>31.00 - 40.00</td>
<td>With Flap</td>
<td>30</td>
<td>40.0%</td>
</tr>
<tr>
<td></td>
<td>Without flap</td>
<td>30</td>
<td>40.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>60</td>
<td>40.0%</td>
</tr>
<tr>
<td>41.00+</td>
<td>With Flap</td>
<td>18</td>
<td>40.0%</td>
</tr>
<tr>
<td></td>
<td>Without flap</td>
<td>14</td>
<td>18.7%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>32</td>
<td>21.3%</td>
</tr>
<tr>
<td>Total</td>
<td>With Flap</td>
<td>75</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Without flap</td>
<td>75</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Pain wise distribution has been shown in table 3 which compare the intensity of pain in both groups. There is significantly less pain in group without flap with p-value=0.005. (Table3)

Table No. 03: Pain wise comparison in both the groups

<table>
<thead>
<tr>
<th>Pain</th>
<th>Procedure</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With Flap</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td>With out flap</td>
<td>6</td>
<td>8.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
<td>19.3%</td>
</tr>
<tr>
<td>Mild</td>
<td>With Flap</td>
<td>28</td>
<td>50.7%</td>
</tr>
<tr>
<td></td>
<td>With out flap</td>
<td>38</td>
<td>30.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66</td>
<td>44.0%</td>
</tr>
<tr>
<td>Moderate</td>
<td>With Flap</td>
<td>49</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>With out flap</td>
<td>22</td>
<td>27.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>49</td>
<td>32.7%</td>
</tr>
<tr>
<td>Sever</td>
<td>With Flap</td>
<td>6</td>
<td>4.0%</td>
</tr>
<tr>
<td></td>
<td>With out flap</td>
<td>2</td>
<td>36.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2.7%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>75</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>75</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Swelling wise distribution has been compared between the two groups in Table 4 outlining the number of patients having variable degree of swelling. As is evident from this table the Swelling was significantly less in the flapless group with p-value=0.003. (Table 4)
DISCUSSION:
Removal of impacted mandibular third molars is the most frequently performed surgical procedure in oral surgery.\textsuperscript{11,12} This is because the molars are often associated with a highly diverse range of disorders, such as pericoronitis, periodontal defects in the distal aspect of the second molar, caries of the third or second molars, different types of cysts and odontogenic tumors, and neurogenic pain.\textsuperscript{13-15} In addition to the pathologic features sometimes caused by these teeth, other criteria can also justify their removal, including orthodontic and prosthodontic or restorative considerations and preventive or prophylactic removal.\textsuperscript{16}

A wide variety of different surgical techniques for third molar removal have been reported.\textsuperscript{11,17,18} In these reports, surgical removal of mandibular third molars has required creation of a flap and performance of ostectomy. This type of surgery has been associated with a variety of complications.\textsuperscript{11,12,19-24}

Third molar surgery is associated with a variety of complications. Flap elevation is one of the factors influencing the severity of the complications.\textsuperscript{24-25} For this reason, we attempted to extract partially impacted mesioangular or horizontal third molars without the use of flap elevation. We found that it was possible to extract these molars without flap elevation when the distal surfaces of the crowns were completely anterior to the anterior border of the mandibular rami and the occlusal surfaces of the impacted teeth were level or nearly level with the occlusal planes of the second molars.

These conditions provided sufficient accessibility to section the teeth into 2 portions. We determined that the best method to section the teeth was to start at the buccal groove and work toward the furcation of the roots using a fissure bur, because the bur removes bone rapidly and sections teeth quickly when used in a lateral direction. When the sectioning was completed, it was possible to remove the tooth without flap elevation.

Just as the root morphology of the erupted tooth has a major influence on the degree of difficulty of a closed extraction; it also plays a major role in the success of removing a partially impacted third molar using a flapless procedure. The possibility of a root tip fracture during extraction is increased for severely curved roots. In the previous study, the success rate of flapless extraction was 90%. The main reason for failure was fracture of the root tips. We recommend that surgeons should examine radiographs of the apex area of the tooth carefully to assess the presence of small, abnormal, and sharply hooked roots, because these are indications that the tooth could fracture. In a comparative prospective study it was observed that at 2 days after surgery, the mean pain level was 6.2 ± 2.3 in the flap group and 1.7 ± 0.6 in the flapless group. Similarly at 2 days after surgery, the mean swelling score was 2.0 ± 0.8 in the flap group and 0.3 ± 0.1 in the flapless group.\textsuperscript{10}

Pain and swelling after surgical removal of impacted third molars is related to inflammation consequent on surgical trauma.\textsuperscript{26} Previous studies show that pain and swelling are influenced by the reflection of a mucoperiosteal flap, the method of wound closure,\textsuperscript{29} and the duration of the procedure.\textsuperscript{30-35}

Considering that the open flap procedure always causes postoperative discomfort of patients undergoing exodontia, Kim et al. (2011) showed, that flapless removal of third molars significantly reduced postoperative swelling, reduced use of analgesics and duration of pain.\textsuperscript{16}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
                     & Procedure          & Total    & p-value  \\
\hline
                      & With Flap | With out flap |   \\
\hline
No Swelling          &            &            &   \\
\hline
Mild                 & 7          & 24         & 31         & 0.003   \\
\hline
                     & 9.3%       & 32.0%      & 20.7%      &   \\
\hline
                     & 36         & 20         & 56         &   \\
\hline
                     & 48.0%      & 26.7%      & 37.3%      &   \\
\hline
Moderate             & 30         & 28         & 58         &   \\
\hline
                     & 40.0%      & 37.3%      & 38.7%      &   \\
\hline
Sever                & 2          & 3          & 5          &   \\
\hline
                     & 2.7%       & 4.0%       & 3.3%       &   \\
\hline
Total                & 75         & 75         & 150        &   \\
\hline
                      & 100.0%     & 100.0%     & 100.0%     &   \\
\hline
\end{tabular}
\caption{SWELLING WISE COMPARISON IN BOTH THE GROUPS DISCUSSION}
\end{table}
The most important finding of the present study is that the greater percentage of pain and swelling on the flap extraction side compared with that of the flapless extraction side in the same patient. When a flapless procedure was used, the patients had a low incidence of postoperative complications and experienced minimal disruption in their quality of life after third molar surgery. These findings are in accordance with those of other investigators. Shevelet al found that when a small incision with minimal reflection of the mucoperiosteum was made, the postoperative pain and swelling were significantly less than when a larger incision was used. Also, a flapless procedure facilitated faster extraction, and hence a shorter operative time, than the flap procedure. The authors concluded that a flapless procedure with tooth sectioning instead of conventional flap based removal resulted in lower postoperative morbidity. Different studies have shown, that large defects of the original buccal plate, which have occurred due to periodontal disease or a traumatic extraction procedure do not heal completely, if a bone graft technique is not applied.

CONCLUSION
The use of a flapless procedure to remove partially impacted mesioangular or horizontal third molars significantly decreased postoperative pain, swelling, and pocket depth compared with a flap procedure.

These findings support the clinical use of flapless extraction when the distal surface of the crown is completely anterior to the anterior border of the mandibular ramus and the occlusal surface of the impacted tooth is level or nearly level with the occlusal plane of the second molar. Additional studies with larger patient numbers are required to confirm the findings reported in the present study.

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