Surgical Outcomes for Suture-Less Surgery in 366 Impacted Third Molar Patients

Peter D. Waite, MPH, DDS, MD,* and Sai Cherala, MD†

Purpose: The purpose of this study is to identify surgical outcomes in third molar surgery when no sutures are used for primary closure.

Patients and Methods: A total of 1,280 third molars were removed from 366 patients in an outpatient setting using intravenous sedation and local anesthesia. A small V-shaped flap was raised in all cases and no sutures were placed over a 2-year period (2001 to 2003). All people were contacted by a registered nurse within 24 hr. All records were reviewed by a medical investigator and IRB approval was obtained.

Results: The mean age was 22.14 years, males 39%, females 61%, white 75%, African American 22%, and Asian 3%. Ninety-three people of 366 experienced at least 1 complaint. Alveolar osteitis was 2.81% for the total teeth extracted and 10.7% for the mandibular Class IV impactions. A total of 652 mandibular third molars were removed (Class III, n = 113; Class IV, n = 522). Forty-eight of 366 patients (13.1%) had postoperative diagnosis of alveolar osteitis.

Conclusions: Small flap third molar surgery without sutures is less invasive and saves time. Delayed healing in oral surgery is not new. The outcome of 1,280 extractions demonstrates good results.

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The surgical removal of impacted third molars is a common procedure associated with a diversity of technique and anecdotal opinion. Most surgeons agree that surgical time, trauma, and difficulty are important factors in postoperative complications.1-5 The surgical objective is to quickly and carefully remove the impacted tooth with reduced complications. Over the years, there have been different opinions regarding primary and secondary closure techniques. Primary closure of a third molar flap is derived from basic surgical principles and recommended by Howe,6 Archer,7 Guralnick,8 Kruger,9 Waite,10 Thoma,11 Killey,12 and Peterson.13 Other authors such as Hunter,14 Bourgoyne,15 Blair and Ivey,16 Padgett,17 and Mead18 recommend secondary intention to facilitate irrigation and drainage. Some authors have recommended either primary or secondary closure and believe a small v-opening over the third molar facilitates drainage and irrigation.19-21 In 1982, Dubois reported a comparison of primary and secondary closure techniques after removal of impacted mandibular third molars in 46 patients but the differences were insignificant.22 Both techniques involved silk sutures, but one created a 6- to 7-mm round window in the flap just distal to the second molar. The findings suggested secondary closure as the treatment of choice.22

The purpose of this retrospective study is to report surgical outcomes of one surgeon’s standard third molar procedure (of a very small incision, and no sutures at all to reposition the flap) and compare results to the existing literature. An attempt was made to evaluate routine or average outpatient surgery carried out in a private practice setting.

Materials and Methods

A medical investigator confidentially reviewed the records of all third molar surgery patients for one surgeon for a 2-year period (2001 to 2003). Inclusion criteria consisted of: third molar out-patient surgery intravenous (IV) sedation/GA, ASA Class I, II, III complete operative records, nurses notes, and postoperative notes. All surgeries were carried out at the Kirklin Clinic with the same surgical team, equipment, and
technique. No sutures were selectively placed during the 2-year time period for difficult cases or larger flaps. No ambulatory operating room or hospital cases were included that might have had intubations, salivary control, or excessive irrigation. Patients with a medical history of smoking or birth control were not excluded. The objective was to evaluate this minimal invasive non-suture technique for the average outpatient third molar patient and not select low-risk cases. This was not an alveolar osteitis study.

The study group consisted of 366 subjects. The majority of people were healthy, as classified: ASA I (no disease) 247, ASA II (moderate disease) 117, and ASA III (severe disease) 2. The difficulty of third molars were classified, as defined by previous authors as Class I (erupted); Class II (tissue impaction); Class III (partial bony impacted); or Class IV (complete bony impaction).23,24

The standard surgical technique began with oral chlorhexidine 20-sec rinse, anesthetic monitoring, and IV sedation with 100 μg Fentanyl (Abbott Lab, Abbott Park, IL), 5 mg Midazolam (Bedford Lab, Bedford, OH), or Propofol (diprivan; Astra Zeneca Pharmaceuticals, Wilmington, DE) for a level of dental general anesthesia. Prophylactic IV antibiotics (1 g cephalosporin, or 900 mg clindamycin), and IV 8 mg Dexamethazone (Merck and Co, West Point, PA) was administered. Local anesthesia was achieved with 2% Lidocaine (HCL 2%; Abbott Labs) with epinephrine 1:100,000, and 1.5% etidocaine with epinephrine 1:200,000 for post-operative pain control. The surgical procedure began with the right and left maxillary third molars and the left and right mandibular third molars. A sponge was placed on the contralateral side to control secretions. In the maxilla an incision was made over the tuberosity at the distobuccal line angle of the second molar and extended into the gingival sulcus as a small envelope flap. The flap was raised only to expose the bone over the suspected location of the tooth. Bone was removed with a sharp periosteal elevator or bone gouge. The exposed tooth was then elevated in the standard fashion and sharp bone edges or follicle removed. The flap was pressed into position by the surgeon’s finger and stabilized with a new sponge while the surgery progressed to the next tooth.

In the mandible, a small “V” shaped incision was made with 1 point at the distobuccal line angle of the second molar. One vertical limb followed the external oblique ridge, and the other avoided the gingival sulcus and extended down to the mucogingival junction (Fig 1). This provided soft tissue release and was much smaller than the incision described by Szymd.25
No attached gingival tissue was excised over the third molar area. The flap was reflected slightly toward the distal and lingual so that greater access could be achieved. The apex of the flap was reflected and protected with a Minnesota retractor (Figs 2, 3). Bone was removed with a rounded fissure bur under constant saline irrigation. The impacted tooth was exposed and distal bone was removed or the tooth sectioned as deemed necessary. The socket was briefly curetted and irrigated. The flap was repositioned and allowed to passively fall into a natural position often leaving the socket slightly open (Figs 4, 5). A sterile sponge was placed to obtund bleeding and stabilize the flap. The patient was allowed to recover for 20 to 30 minutes, and then rechecked for flap position and hemorrhage. The absence of suturing reduced surgical time and soft tissue manipulation.

All patients received written and oral postoperative instructions, a prescription for pain medication, a short course of antibiotics, and an emergency number. All patients received a 24-hour call by a registered nurse asking for complaints such as uncontrolled pain, nausea, or hemorrhage, which was recorded in the chart. All patients were encouraged to return for a postoperative visit at 1 to 2 weeks. Postoperative examinations evaluated pain (0 to 10), symptoms of alveolar osteitis, infection, and adjacent tooth/restoration damage. Fifty patients expressed such complaints (3.9%) associated with 51 of 1,280 teeth. These complaints occurred in 30 of 628 (4.77%) maxillary teeth and 22 of 652 mandibular third molars (3.37%). Hemorrhage was scored as a complaint if

Results

There were 366 patients in the study group (mean age, 22.14 years; male, 144 [39.3%]; female, 222 [60.7%]; white, 273 [74.6%]; African American, 79 [21.6%]; Asian, 12 [3.3%]; Hispanic, 2 [0.5%]). The majority of patients were very healthy, 247 ASA Class I, 117 ASA Class II, and only 2 ASA Class III. No patients were organ transplants, immuno-compromised, anticoagulant, or unstable diabetics. Most diseases were allergy, hypertension, mild pulmonary disease, and no insulin diabetics. Total teeth extracted by classification are presented in Table 1.

Ninety-three of the 366 people experienced at least 1 complaint after third molar surgery. A common complaint of alveolar osteitis (AO) occurred in 13.1% (48 of 366) of patients, as described by Blum. The overall rate of alveolar osteitis was 2.81% (63 of 1,280 third molars extracted). The incidence of mandibular third molar AO was 8.7% (57 of 652 teeth). Class IV mandibular third molars had the greatest rate of AO, 10.7% (57 of 522 teeth) (Table 2).

The average postoperative visit was 5 to 7 days. Not all asymptomatic patients returned for routine postoperative examinations. The complaint of pain occurred in 66 patients. Pain was identified as greater than 3 of 10 by visual analog scale in 29 of 628 maxillary third molar teeth (4.61%), and 39 of 652 mandibular third molar teeth (5.9%). The overall complaint of pain felt to be beyond the patient’s expectation was associated with only 68 of 1,280 surgical third molars.

The other general complaints that might have been complications were hemorrhage, bony spicules, infection, and adjacent tooth/restoration damage. Fifty patients expressed such complaints (3.9%) associated with 51 of 1,280 teeth. These complaints occurred in 30 of 628 (4.77%) maxillary teeth and 22 of 652 mandibular third molars (3.37%). Hemorrhage was scored as a complaint if
the patient called back with concern that the socket was still bleeding. This was treated by reassurance and local measures. No general complaints required emergent surgical intervention such as hospitalization or suturing.

Discussion

No previous third molar studies have reported on the surgical outcome of a suture-less technique. Although Dubois et al. and Stephens et al. have investigated the concept of primary and secondary closure, the prevailing surgical technique taught in modern textbooks is to reposition, and stabilize mucoperiosteal flaps with sutures. Stephens et al. reported on the periodontal evaluation of 2 mucoperiosteal flaps used in removing impacted mandibular third molars and found there was no significant difference. The type of closure is the surgeon’s choice. They described 2 flap techniques, both described by Szymd, which included a distal wedge excision and either an envelope flap in the gingival sulcus or a papilla sparring vertical release down to the mucogingival junction. Both flap designs were larger than our technique and sutured in at least 2 positions. Szymd recommended the second modification for the following advantages: 1) no need to detach the facial free gingival tissue around the second and first molar; 2) decreased amount of reflected periosteum; 3) broad based blood supply to the flap; 4) adequate exposure and visibility; 5) good bony support for the soft tissue flap; and 6) closure can be effected with a single suture and the distal aspect of the third molar socket. These principles still apply to our flap design, which is smaller, and without suturing essentially leaves an open area over the socket for secondary intention therefore not necessitating a distal wedge. Other studies by Magnus et al. and Woolf et al. found no significant difference in the periodontal status. Apparently, the flap design and suture technique even with an exposed area distal to the second molar did not result in a periodontal defect if properly carried out. This is an important point because in the suture-less flap technique attached gingiva is not pulled up tightly behind the second molar. Based on these reports this study did not evaluate the periodontal status after surgery. Szymd and Hester recommend the open techniques and often report less edema and reduced pain.

Sutures in dentoalveolar surgery certainly have application and are often necessary. This study does not imply that sutures should not be used to reposition a flap. However, in the posterior area of the dental arch, the anatomy of the ramus, tuberosity, gingiva, and buccal mucosa will passively fall together during the healing phase of third molar surgery if a small “V” shaped incision is carried out. This may be due to decreased mobilization, soft diets, and surgical contracture. In general Halsted’s surgical principles of wound healing applies but there are often exceptions. It seems that tight closure over a large bony socket or defect does not facilitate drainage and oral hygiene. Suturing may create a one-way valve that allows food debris to enter the socket but not easily escape. This leads to local infection, inflammation, edema, clot necrosis, alveolar osteitis, and pain. Avoiding suture closure in this area is not illogical when one considers that the treatment for AO is irrigation, debridement, and dry socket dressing to create a constant opening. A small flap left open may actually facilitate drainage, improve hygiene, and reduce the risk of AO pain.

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**Table 1. TOTAL NUMBER OF TEETH EXTRACTED**

<table>
<thead>
<tr>
<th>Total Number of Teeth</th>
<th>Class I (%)</th>
<th>Class II (%)</th>
<th>Class III (%)</th>
<th>Class IV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary 628</td>
<td>32 (5.09)</td>
<td>76 (12.01)</td>
<td>406 (64.64)</td>
<td>114 (18.15)</td>
</tr>
<tr>
<td>Mandibular 652</td>
<td>1 (0.1)</td>
<td>16 (2.45)</td>
<td>113 (17.33)</td>
<td>522 (80.06)</td>
</tr>
</tbody>
</table>


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**Table 2. SURGICAL COMPLICATIONS FOLLOWING THIRD MOLAR EXTRACTION IN DIFFERENT TEETH**

<table>
<thead>
<tr>
<th>Class</th>
<th>Max (n = 628)</th>
<th>Mand (n = 652)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>Class II</td>
<td>Class III</td>
</tr>
<tr>
<td>Max (n = 32)</td>
<td>Max (n = 76)</td>
<td>Max (n = 406)</td>
</tr>
<tr>
<td>Mand (n = 1)</td>
<td>Mand (n = 16)</td>
<td>Mand (n = 113)</td>
</tr>
<tr>
<td>Alveolar osteitis (dry socket)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other complications including hemorrhage</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Max, maxillary (n = 628); Mand, mandibular (n = 652). Values are n (%).

Contemporary views on AO have been described in the literature by many authors.\textsuperscript{2,5,31,32} The term dry socket was first used by Crawford in 1896 and has become accepted lay terminology. Unfortunately, the literature and surgeons cannot agree on the definition and diagnosis of AO. The incidence after third molar surgery ranges from 1% to 45% representing the variability in diagnosis.\textsuperscript{5,36} AO by any definition remains a common postoperative problem resulting in pain, lost days of work, loss of productivity, and frequent clinic visits. AO is also costly to the surgeon in time and most patients require 4 additional postoperative visits. The etiology and prevention is therefore very important. Possible factors leading to AO supported in the literature are: microbiology, surgical trauma, surgical time, patient age, saliva contamination, root or bone fragments, clot dislodgement, local blood perfusion, smoking, and oral contraceptives.\textsuperscript{5,31} Good surgical principles have been implied as non-pharmacologic measures to prevent AO but no study until now has reported on the incidence of AO without sutures. The placement of sutures increases surgical time, soft tissue trauma manipulation, and direct costs. If resorbable sutures are not used then the postoperative clinical time even in the best of cases must be considered. In this study if one package of plain gut suture was opened for every patient, the cost would have been $1,098.00. This cost could be much more for a busy third molar practice.

It is important for all surgeons, and especially training programs, to assess surgical outcomes and test traditional logic. Anecdotal reasons for what we do should be tested and either justified or rejected. Evidence-based medicine is the academic charge. The aim of this study is to report the outcome of one surgeon’s technique, and compare the epidemiology to the existing body of literature. Throughout medical/dental history many traditional views have been turned upside down, such as the germ theory, blood letting, cerebral pressure, and peptic ulcer disease. Is it possible the surgical art of suturing in some situations is not as important as we have traditionally thought it to be? Perhaps the English dentist, Mr Hunter, was correct in his text, “It is also a common practice, to close the gum as it is termed: this is more for show than use: for the gum cannot be made to close as to unite by the first intention.”\textsuperscript{14}

References