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Randomized Controlled Trial

Trauma

Removal versus retention of asymptomatic third molars in mandibular angle fractures: a randomized controlled trial

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Abstract. The treatment dilemma provided by asymptomatic third molars in mandibular angle fractures remains controversial. This prospective randomized controlled trial was undertaken to determine whether there is an advantage to extraction or retention of the third molar whilst repairing a mandibular angle fracture. Sixty-four patients were allocated randomly to the two treatment groups. All underwent open reduction and internal fixation (ORIF) with standard postoperative care. The primary outcome measure was uncomplicated fracture healing. Secondary measures were surgical duration, malocclusion, wound healing, nerve injury, and return to theatre. All patients had uncomplicated fracture healing. The incidence of nerve injury was 16% for the retention group compared with 39% for the removal group ($P = 0.038$). The average operating time for ORIF and third molar retention cases was 58.5 min and for ORIF and third molar removal cases was 66.3 min ($P = 0.26$). There was no statistically significant difference between groups for wound healing, occlusion outcomes, or return to theatre. Given the additional risk of nerve injury and the additional operating time required for removal of a third molar, in the absence of an absolute indicator for removal of the third molar, it appears justifiable to advise retaining the tooth in the line of a mandibular angle fracture.

Key words: randomized controlled trial mandibular angle fractures; internal fixation; third molars.

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The treatment of mandibular angle fractures has evolved over the years from closed reduction with a period of intermaxillary fixation, to open reduction with internal fixation (ORIF).[1] One aspect of the ORIF procedure that remains controversial at present is the management of an asymptomatic wisdom tooth in the line of an angle fracture.

This issue is important as this treatment dilemma is common. A study by Ellis showed that out of 402 angle fractures, 85% contained a third molar.[2] Historically, extraction of the tooth in the fracture

line was advocated, as this was thought to decrease the risk of infection and the need for removal of the wisdom tooth and plating at a later date.[3,4] However, over the years this view has been challenged with the counter-argument that extraction of the third molar risks loss of bone, making reduction and plating more difficult, increases the surgical time, and increases the risk to the inferior dental nerve.

At present there is conflicting information in the literature concerning the question of extracting or retaining an asymptomatic third molar in the line of a mandibular angle fracture, with no prospective randomized controlled trials conducted.[2,5–12] Thus clinicians have to use their best judgement rather than evidence-based medicine in weighing the benefits and risks of removing a third molar in the line of an angle fracture against the benefits and risks of retaining it.[2] The aim of this study was to compare the outcomes of fractures of the mandibular angle with random allocation to removal or retention of the third molar tooth.

Methods

Trial design

A prospective randomized controlled trial was performed. There were no changes to the methods after trial commencement.

All patients presenting to the maxillofacial unit with a mandibular angle fracture requiring ORIF (Table 1) and who were 18 years of age or older were considered for inclusion in the study. Patients who could not give informed consent and patients with absolute indicators for the removal of third molars in angle fractures (Table 2) were excluded.

Table 1. Indicators for open reduction and fixation of a mandibular angle fracture.

1	Unfavourable fracture
2	Inability to obtain adequate occlusion by closed techniques
3	Infection (peri-apical/pericoronitis)
4	Fracture of tooth/roots

Table 2. Absolute indicators for removal of third molars.[12]

1	Caries
2	Mobile tooth
3	Infection (peri-apical/pericoronitis)
4	Fracture of tooth/roots
5	Pathology associated with third molar
6	Preventing adequate fracture reduction

Randomization was accomplished by sealed envelopes containing allocation to one of the two study groups. Sixty-four patients gave consent and were deemed eligible for the trial.

Ethical approval for the study was granted by the necessary human research and ethics committee.

Participants

Patients were assessed on presentation and standard imaging was obtained (panoramic radiographs and postero-anterior mandible X-rays). Demographic data including age, sex, smoking status, diabetes, and indigenous ethnicity were documented. Examination findings related to post-trauma alveolar nerve function were also recorded. Randomization then occurred by the participant drawing one of two possible envelopes, indicating which arm of the trial they would be included in. Participants were not blinded to their allotted treatment.

Surgical details

Surgery was performed under general anaesthesia predominantly by a maxillofacial surgeon (GF). If not the primary operator, the surgeon (GF) was present as an assistant. All angle fractures were secured with a single 2.0-mm miniplate via a combined transoral incision and transbuccal trocar. The fractured segments were approximated visually with the dentition held in occlusion by the assistant whilst fixation was applied. Resorbable sutures were utilized for wound closure. Standard clinical and radiographic postoperative follow-up was undertaken.

Outcomes

The primary outcome measure was uncomplicated fracture healing. The secondary measures were wound issues (wound breakdown/infections/collections), operative duration, malocclusion, inferior dental nerve (IDN) injury, and return to theatre.

Surgeons undertook each postoperative patient assessment, but they were not blinded to which group patients had been allocated. Patients who did not attend clinic review appointments were deemed to have had nil negative outcomes.

Categorical data were summarized as frequencies, and comparisons across allocated groups were done by cross-tabulations and χ^2 tests for significance. Continuous variables were summarized as the mean and range, and comparisons between groups were done using the independent samples *t*-test or the Mann–Whitney *U*-test. All significance tests used a two-sided *P*-value of 0.05.

Results

Participant flow

Sixty-four patients were enrolled in the study. The randomization process allocated 31 patients to the retention group and 33 patients to the removal group. All allotted patients underwent treatment as per their group.

Patient demographics (Table 3)

There was no statistically significant difference between the groups regarding sex ($P = 0.19$), mean age at injury ($P = 0.78$), or the average number of fractures treated ($P = 0.56$). Furthermore, there was no statistically significant difference between the groups regarding smoking status ($P = 0.86$), diabetic comorbidity ($P = 1.00$), or indigenous ethnicity ($P = 0.28$).

Primary outcome

The primary outcome measure was uncomplicated fracture healing. Each group, removal and retention, had one return to theatre for non-union. Both return cases had an uneventful postoperative recovery following the second surgery. Therefore all 64 cases had eventual complete fracture healing.

Secondary outcome measures (Table 4)

The average surgical time for retention cases was 58.5 min and for removal cases was 66.3 min; however this difference between the groups was not statistically significant ($P = 0.26$).

All patients underwent X-ray postoperatively. Furthermore, all patients had at least one postoperative review. The follow-up period for the removal and retention groups was similar: follow-up ranged from 1 to 164 days (mean 27 days, median 12 days) in the removal group and from 1 to 164 days (mean 26 days, median 27 days) in the retention group ($P = 0.49$, Mann–Whitney *U*-test).

With regard to wound issues, the removal group (9.1%) had a higher rate than the retention group (0%), but this difference between the groups was not statistically significant ($P = 0.09$). The incidence of malocclusion was similar in the retention group (12.9%) and removal group