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[Intervention Review]

# Surgical techniques for the removal of mandibular wisdom teeth

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## ABSTRACT

### Background

The surgical removal of mandibular wisdom teeth is one of the most common operations undertaken in oral and maxillofacial surgery. The most common indication for surgery is infection about a partially erupted tooth that is impacted against bone or soft tissues. Other indications include unrestorable caries, pulpal and periapical pathology, fracture of the tooth and cyst development, amongst others. Most commonly the benefits of surgical removal of a wisdom tooth include alleviation of the symptoms and signs of pericoronitis and its potential consequences. However, surgery is frequently associated with postoperative pain, swelling and trismus. Less commonly complications include infection, including dry socket, trigeminal nerve injuries and rarely fracture of the mandible.

### Objectives

To compare the relative benefits and risks of different techniques for undertaking various aspects or stages of the surgical extraction of mandibular wisdom teeth.

### Search methods

We searched the Cochrane Oral Health Group's Trials Register (to 21 March 2014), CENTRAL (*The Cochrane Library* 2014, Issue 1), MEDLINE (OVID) (1946 to 21 March 2014) and EMBASE (OVID) (1980 to 21 March 2014). We searched ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform for ongoing trials. There were no restrictions regarding language or date of publication in the electronic searches.

### Selection criteria

RCTs comparing surgical techniques for removal of mandibular wisdom teeth.

### Data collection and analysis

Two review authors conducted assessment of relevance, risk of bias and data extraction. Study authors were contacted for additional information. RRs were used for dichotomous data and MDs for continuous data, unless the event rate was very low and Peto ORs were used. The pairing of the split-mouth studies was taken into account in the analysis for both dichotomous and continuous outcomes, and parallel group and split-mouth studies were combined using the generic inverse variance method. Random-effects models were used provided there were more than three studies (fixed-effect models otherwise).

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## Main results

A total of 35 trials (2569 patients) were included. The interventions under consideration fell into seven broad categories, with many comparisons including only a small number of trials. Twenty-one of the trials were assessed at high risk of bias, the remaining 14 as unclear. The results are described in the summary of findings tables.

Triangular flaps were associated with a 71% reduction in alveolar osteitis at one week (RR 0.29, 95% CI 0.11 to 0.78; three trials, moderate quality) and reduction in pain at 24 hours (MD -0.21, 95% CI -0.32 to -0.10; two trials, moderate quality) compared with envelope flaps. There was no evidence of a difference in overall infection rates, in maximum mouth opening or in permanent sensation. However, there was some evidence that residual swelling after one week was slightly increased in the triangular flap groups compared to envelope flap types (MD 0.66 mm, 95% CI 0.26 to 1.07; two trials, low quality). We found no data on temporary sensation, or adverse events.

There was low quality evidence from two studies, looking at the use of a retractor during third molar surgery, to indicate more cases of temporary altered sensation (up to one month) when a retractor was used (Peto OR 5.19, 95% CI 1.38 to 19.49; two trials, low quality). One study reported that this did not persist for more than six months in either group. We found no data for use of a retractor on other primary outcomes or adverse effects (including fracture of the mandible).

Due to the small number of studies, the different comparisons evaluated, the variable outcomes reported and the paucity of useful data for all primary outcomes we were not able to draw any conclusions concerning bone removal in third molar surgery.

There was insufficient evidence from single studies of very low quality on irrigation method (manual versus mechanical) or irrigation volume (low or high) to determine whether there were differences or not for the outcomes of alveolar osteitis or postoperative infection. We found no data for any of the other primary outcomes.

There was insufficient evidence (low to very low quality) that any wound closure technique (primary versus secondary) was superior to another for the outcomes of alveolar osteitis, postoperative infection or maximum mouth opening achieved after seven days, or reactionary bleeding. There was evidence that secondary wound closure was associated with reduced pain at 24 hours (MD 0.79, 95% CI 0.35 to 1.24; four trials, moderate quality) and slightly reduced swelling after one week (MD 0.33, 95% CI 0.09 to 0.57; seven trials, moderate quality). We found no data on other primary outcomes.

There was some evidence that the use of a surgical drain was associated with less postoperative swelling (MD -0.90, 95% CI -1.62 to -0.19; five trials, moderate quality) and greater maximum mouth opening one week after surgery (MD 3.72 mm, 95% CI 2.84 to 4.59; two trials, moderate quality). There was insufficient evidence from a single study (low quality) to determine whether the presence of a drain made any difference to pain at 24 hours postoperation. There were no data for the other primary outcomes.

Although two RCTs compared coronectomy with complete extraction, flaws in the design and the unit of analysis of these studies meant that there were no reliable data available for inclusion.

## Authors' conclusions

The thirty-five included trials looked at a range of different surgical techniques. The comparisons related to seven broad aspects of the surgical procedures for impacted mandibular third molars: type of surgical flap raised, use of retractors, techniques for bone removal, wound irrigation, wound closure, wound drainage, and complete/incomplete tooth removal. The quality of the body of evidence for each of these comparisons was very low to moderate due to the small number of trials and patients, and the majority of the trials being at high risk of bias (65%) with the remainder at unclear risk of bias.

The evidence for making changes to surgical practice is therefore limited. However, it is useful to describe the state of the research evidence supporting practice so that surgeons can make an informed choice in adopting new techniques, or continuing with established techniques.

## PLAIN LANGUAGE SUMMARY

### Surgical techniques for the removal of mandibular wisdom teeth

#### Review question

This review has been produced to assess the benefits and harms of the different surgical techniques in use for the removal of wisdom teeth from the lower jaw in order to reduce complications following surgery. The risks of surgery that are included in this review are:

pain following surgery, swelling, infection, being unable to open the jaw fully (trismus), damage to the nerves supplying sensation to the tongue and skin of the lower lip and chin (lingual or inferior alveolar nerve damage) and fracture of the jaw.

### **Background**

The removal of wisdom teeth from the lower jaw is one of the most common operations in dental surgery. Various techniques have been developed to enable the procedure to be carried out successfully. It is important to evaluate the best evidence about these techniques so that the risks and complications associated with the operation can be reduced and the patient experience improved.

### **Study characteristics**

The Cochrane Oral Health Group carried out this review and the evidence on which it is based was up to date on 21 March 2014. Thirty-five studies with 2569 participants were included, but the quality of these studies was not ideal and unlikely to make surgeons change their practice.

### **Key results**

-Slight changes to the position of the cut into the gum may reduce dry socket and pain after surgery.

-It is possible to protect a nerve to the tongue from damage by the placement of a special surgical tool, however there were no good quality trials available to show that this reduces permanent nerve injury and the consequent loss of or altered sensations.

-Some surgeons will just remove the top part of the wisdom tooth and leave the root in place when the roots are very close to a nerve in the jaw (supplying feeling to the lower lip and skin of the chin). Although it would seem likely that this should reduce the risk of nerve injury the two trials available had unreliable data to show this. They did however find later movement of the root in 13% to 24% of the patients within two years.

### **Quality of the evidence**

The quality of the 35 included studies was variable. None were assessed as at low risk of bias in all domains so they were unlikely to make surgeons change their practice.