Coronectomy vs total removal for third molar extraction: a systematic review

CRD summary
This review concluded that coronectomy appeared to be superior to total removal, for reducing inferior alveolar nerve damage, for third molar extractions, with a high risk of nerve injury. These conclusions reflect the evidence presented, but this was limited. The risk of bias inherent in a synthesis of low-quality trials, makes the reliability of the conclusions moderate to low.

Authors' objectives
To compare the effectiveness of coronectomy (removal of the tooth crown) and total removal of the third molar (wisdom tooth), in reducing extraction complications.

Searching
PubMed, EMBASE, Web of Science, Cochrane Central Register of Controlled Trials (CENTRAL), and SIGLE were searched for studies from January 1990 to October 2011, without language restriction. A search strategy was reported in an appendix.

Study selection
Randomised and non-randomised controlled trials that compared coronectomy, with total removal, of the third molar, were eligible for inclusion. Participants had to be at a high risk of nerve injury (as defined in paper), assessed by radiography. The primary outcomes of interest were inferior alveolar nerve injury, paraesthesia, dysthesia, analgesia, and anaesthesia. The adverse events included the rates of failed coronectomy, re-operation, root migration, and root exposure in the coronectomy group. Secondary outcomes of postoperative infection, dry socket, and pain at one week after surgery, were also included.

In the included trials, all patients had a high risk of nerve injury, except in one trial, where the total removal group were at low or no risk of nerve injury. Most trials reported on lower third molars. Two trials reported prescribing antibiotics.

Two reviewers independently selected studies for inclusion. Disagreements were resolved by discussion.

Assessment of study quality
Trial quality was assessed using the Cochrane risk of bias tool. The authors did not state how many reviewers assessed trial quality.

Data extraction
The data were extracted to calculate risk ratios, for dichotomous outcomes, and mean differences, for continuous outcomes, with their corresponding 95% confidence intervals. The absolute risk ratio and the number needed to treat were calculated.

Two reviewers independently extracted the data for the relevant outcomes.

Methods of synthesis
Pooled risk ratios and mean differences, with 95% confidence intervals, were calculated. The data were pooled using a fixed-effect model, unless there was substantial heterogeneity, where a random-effects model was used. Statistical heterogeneity was assessed using I², with values over 50% considered to be substantial.

Publication bias was assessed using funnel plots, Egger’s test and Begg’s test. Sensitivity analyses were conducted by comparing the results from fixed-effect and random-effects analyses, and by excluding lower quality trials.

Results of the review
Four trials (699 participants; range 120 to 231) were included. Two were randomised controlled trials (RCTs) and two were controlled clinical trials. The number of teeth assessed was 940 (range 175 to 349). The two RCTs reported...
adequate sequence generation and allocation concealment. Two trials were free of selective reporting; none reported adequate blinding, addressed incomplete outcome data, or were free from other bias. The two RCTs were rated as medium quality, and the two controlled trials were rated as low quality. The mean follow-up varied from 7.7 to 25 months.

There was a significantly reduced risk of inferior alveolar nerve injury, as a result of coronectomy, compared with total removal (RR 0.11, 95% CI 0.03 to 0.36; four trials, I²=0). The number needed to treat was 17 (95% CI eight to 100). There were no significant differences between coronectomy and total removal, for postoperative infection (four trials; I²=38%), dry socket (four trials; I²=47%), and pain one week after surgery (four trials; I²=72%).

Across the trials, the rates of failed coronectomy ranged from 2.3% to 38.3% (four trials), re-operation rates ranged from zero to 4.9% (four trials), root migrations ranged from 13.2% to 85.29% (three trials), and root exposure rates were zero and 1.3% (two trials).

The results were similar for the intention-to-treat analyses. There was no evidence of publication bias. The results of the sensitivity and subgroup analyses were reported.

**Authors’ conclusions**

Coronectomy appeared to be superior to total removal for reducing inferior alveolar nerve damage, and could be used in clinical practice for third molar extractions, with a high risk of nerve injury.

**CRD commentary**

The review question was clear, with defined inclusion criteria. Several relevant sources were searched, without restriction on language or publication status. The formal assessment of publication bias found no evidence of it, but the analysis might not be reliable with so few trials. Trial quality was assessed using a published tool.

Appropriate methods were used to reduce reviewer error and bias for the selection of studies and the extraction of data, but it was unclear whether similar methods were used for assessing trial quality. Appropriate methods were used for the analysis. There was substantial heterogeneity for some outcomes, and this was explored using sensitivity analyses. As the authors acknowledged, this review contained few trials (particularly in the subgroup analyses), and none were high quality.

The authors’ conclusions reflect the evidence presented, but this evidence was limited. The high risk of bias inherent in a synthesis of low-quality trials, means the reliability of the conclusions is moderate to low.

**Implications of the review for practice and research**

**Practice:** The authors stated that coronectomy could be used in clinical practice, for third molar extractions, with a high risk of nerve injury. The risks of failed coronectomy could be reduced by improving surgical procedures and by monitoring radiographic risk factors.

**Research:** The authors stated that future research should specify the exact methods and criteria for inferior alveolar nerve injury.

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