The effectiveness and cost-effectiveness of prophylactic removal of wisdom teeth
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Authors’ objectives
To provide a summary of existing evidence on the prophylactic removal of impacted wisdom teeth, in terms of the incidence of surgical complications associated with prophylactic removal and the morbidity associated with retention.

Searching
An existing review formed the basis of the report (see Other Publications of Related Interest). In addition, the following databases were searched with no language restrictions: the National Research Register, DARE, NHS EED, MEDLINE (from 1984 to 1999), EMBASE (from 1984 to 1999, the Science Citation Index, and the Cochrane Controlled Trials Register. The search strategies used for the latter four databases were provided in the paper. The paper sources searched included Clinical Evidence; the web-based resources searched were listed in the paper. Other sources of information included the Faculty of Dental Surgery of the Royal College of Surgeons of England and the British Dental Association. The reference lists of the included articles were also checked for additional relevant studies.

Study selection
Study designs of evaluations included in the review
Literature reviews published in full, or randomised controlled trials (RCTs) published as a full paper, abstract, editorial or letter, were considered for inclusion. The literature reviews could include both RCTs and other studies designed to address the long-term outcomes.

Specific interventions included in the review
The prophylactic removal of impacted wisdom teeth.

Participants included in the review
People with unerupted or impacted third molars, and those undergoing surgical removal of unerupted or impacted third molars, either as prophylaxis or because of pathological changes, were eligible for inclusion.

Outcomes assessed in the review
The reported outcomes had to include either the pathological changes and/or symptoms associated with unerupted or impacted third molars, or the outcomes following the surgical removal of third molars.

How were decisions on the relevance of primary studies made?
Relevance was assessed by two independent reviewers. Any disagreements were resolved by discussion, and failing this, by recourse to a third reviewer.

Assessment of study quality
RCTs were assessed on the basis of the following: participant selection criteria; sample size; the reported use of a priori power calculations; the method of randomisation; the baseline comparability of the treatment groups; the use of blinded outcome assessment; appropriate data analysis; the reporting of withdrawals; and the use of intention to treat analysis. Literature reviews were assessed on: the clarity of the review aims; the literature search; the selection criteria; the validity assessment; presentation of details relating to the primary studies; and the methods used to summarise the data. Articles were assessed by two reviewers independently, with any discrepancies resolved by discussion.

Data extraction
The data were extracted into a structured table and the accuracy was checked by a second independent reviewer. Any discrepancies were resolved by discussion.
The data extracted from the RCTs included: study aims; the method of randomisation; the use of a priori power calculations; the selection criteria for the participants; the baseline characteristics of the groups; intervention details; the numbers allocated to each group; treatment setting; outcome measurements; statistical methods; results per group for each outcome; follow-up; withdrawals; and the authors' main conclusions. Data extracted from literature reviews included review aims, total number of references, and authors' main conclusions. The following data were extracted for the decision analysis studies: strategies compared, outcome and utility estimating, probability estimating, cost estimating, main findings, and sensitivity analysis.

**Methods of synthesis**

How were the studies combined?
The RCTs were not sufficiently similar to allow the results to be pooled statistically, therefore these data were summarised descriptively. The data from the literature reviews and decision analysis papers were also summarised descriptively.

How were differences between studies investigated?
The results from the RCTs, literature reviews and decision analysis papers were discussed separately.

**Results of the review**

A total of 40 studies were included: 2 RCTs (n=364), 34 literature reviews and 4 decision analysis papers.

One RCT concluded that the removal of third molars to reduce or prevent late incisor crowding cannot be justified. Preliminary results from an ongoing RCT, which compared the effects and costs of prophylactic third molar removal with those of removal according to morbidity, suggested that watchful waiting may be a promising strategy. The results from a third RCT comparing removal with retention of third molars are not yet available.

The literature reviews were generally of a poor quality. The authors stated that it was difficult to draw a balanced conclusion from the reviews about the appropriateness of third molar removal, partly because of the different outcomes of retention and removal that were used. The literature reviews that concluded that prophylactic removal was inappropriate appeared to be of a better methodological quality than many other reviews.

The findings of the decision analyses consistently indicated that the patients' well-being is maximised if surgical removal is confined to those impacted third molars that are associated with pathological changes. Retention was the most cost-saving and cost-effective strategy in comparison with prophylactic removal of all impacted third molars. However, it should be noted that these decision analyses were mainly based on research evidence from primary studies that were of a poor design quality.

**Cost information**

Yes. It is estimated that the total cost of prophylactic removal of molars in England and Wales for 1995 to 1996 was approximately £5.2 million, although the authors state this cost needs to be interpreted with caution. The average cost of the prophylactic removal of an impacted mandibular third molar was about 33% higher than the cost of retention: £226 compared with £170. The compensation awarded for permanent nerve damage after third molar surgery ranges from £5,000 to £14,000 per case, or higher.

**Authors' conclusions**

There was no reliable research evidence to support the prophylactic removal of disease-free impacted third molars. The available evidence suggested that retention might be more effective and cost-effective than prophylactic removal, at least in the short to medium term. The results of two ongoing RCTs, one based in Denmark and one in the USA, are awaited with interest.

**CRD commentary**

This was a well-conducted systematic review. The research question was stated clearly with specified inclusion criteria.
The literature search was reasonably comprehensive, non-English language papers were included, and efforts were made to identify unpublished research. Decisions on the relevance and quality of the studies were made independently by two reviewers, and there were procedures in place to deal with any disagreements. Similar procedures were used for the data extraction. It was appropriate to use a narrative synthesis given the heterogeneity of the studies. The three types of studies (RCT, literature review and decision analysis) were discussed separately. Validity was assessed according to the study type.

The results were clearly discussed within the context of study quality. The conclusions are appropriately based on the evidence presented.

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

**Practice:** The authors state there is no reliable research evidence to support the prophylactic removal of disease-free impacted third molars.

**Research:** The authors state that there is a need for well-designed RCTs to compare prophylactic removal with management by deliberate retention, using long-term follow-up. They also state there is a need for decision analysis models that could be used to compare long term outcomes of prophylactic removal with retention of impacted third molars.

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**Bibliographic details**


**Original Paper URL**

http://www.ncchta.org/execsumm/summ415.htm

**Other publications of related interest**


This additional published commentary may also be of interest. Hicks EP. There is no evidence to support the prophylactic removal of disease-free impacted third molars. Evidence-based Healthcare 2001;5:81-82.

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Cost-Benefit Analysis; Molar, Third /surgery; Postoperative Complications; Tooth Extraction /economics; Tooth, Impacted /surgery; Tooth, Unerupted /surgery

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.