

EFFECTIVENESS

Matters

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*Prophylactic
removal of
impacted third
molars: is it
justified ?*

- Third molar surgery rates vary widely across the UK.
- Around 35% of third molars removed for prophylactic purposes in the UK are disease free.
- Surgical removal of third molars can only be justified when clear long term benefit to the patient is expected.
- It is not possible to predict reliably whether impacted third molars will develop pathological changes if they are not removed.
- There are no randomised controlled studies to compare the long term outcome of early removal with retention of pathology free third molars.
- In the absence of good evidence to support prophylactic removal, there appears to be little justification for the routine removal of pathology free impacted third molars.
- To ensure appropriate treatment, referrals and waiting lists for the surgical removal of third molars should be monitored through a process of audit.

Effectiveness Matters is an update on the effectiveness of health interventions for practitioners and decision makers in the NHS. It is produced by researchers at the NHS Centre for Reviews and Dissemination at the University of York, based on high quality reviews of the research evidence. *Effectiveness Matters* is extensively peer reviewed by subject area experts and practitioners.

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Background

Removal of third molars (wisdom teeth) is one of the most common surgical procedures within the UK. In 1994-95 there were over 36,000 in-patient and 60,000 day-case admissions in England for 'surgical removal of tooth'.¹ Third molar surgery has been estimated to cost the NHS in England up to £30 million per year,² and approximately £20 million is spent annually in the private sector.³ Around 90% of patients on waiting lists for oral and maxillofacial surgery are scheduled for third molar removal.³

There are wide variations in rates of third molar surgery across the UK.^{4,2} There is also some evidence that deprived populations with poor dental health are less likely to have third molars removed than more affluent populations with good dental health.^{5,2} However, the reasons for this are complex.

Little controversy surrounds the removal of impacted third molars when they cause pathological changes and/or severe symptoms such as 'infection, non-restorable carious lesions, cysts, tumours, and destruction of adjacent teeth and bone'.⁶ However, the justification for prophylactic removal of impacted third molars is less certain and has been debated for many years.

This issue of *Effectiveness Matters* summarises research evidence evaluating the appropriateness of prophylactic removal of impacted third molars.

Several reasons are given for the early removal of asymptomatic or pathology-free impacted third molars, almost all of which are not based on reliable evidence: they have no useful role in the mouth; they may increase the risk of pathological changes and symptoms; and if they are removed only when pathological changes occur, patients may be older and the risk of serious complications after surgery may be greater.

On the other hand, the probability of impacted third molars causing pathological changes in the future may have been exaggerated.^{3,7} Many impacted or unerupted third molars may eventually erupt normally and many impacted third molars never cause clinically important problems.⁸ In addition, third molar surgery is not risk free; the complications and suffering following third molar surgery may be considerable.⁹ Therefore, prophylactic removal should only be carried out if there is good evidence of patient benefit.

The proportion of third molar surgery which is carried out prophylactically in asymptomatic patients is difficult to estimate precisely and depends on the definitions used. A UK survey of 181 consultants, found that 35.1% of 25,001 third molars removed were disease free.¹⁰ Other,

reliable estimates of prophylactic removal suggest rates of between 20% to 40%,^{11,12,13} though rates as low as 4% have been reported.¹⁴

Pathological changes associated with impacted third molars

There has been no long term experimental evaluation of prophylactic removal. Therefore the decision to extract prophylactically depends on an estimate of the balance between the likelihood of the unoperated molars causing pathology in the future, the advantages of earlier versus later surgery, and the risks of surgery in those who would never need extraction.

Pericoronitis (inflammation of the gingiva surrounding the crown of a tooth) is the most common indication for third molar surgery,¹⁰ and mainly occurs in adolescents and young adults but less commonly in older people.¹⁵ A study reported that over 4 years of follow up, 10% of lower third molars develop pericoronitis.¹⁶

Very few impacted third molars cause dental caries (decay) of second molars,¹⁵ though estimates vary (1% to 4.5%)⁹. Fear of second molar caries is not a justification for prophylactic removal.

There is a low incidence (less than 1%) of root resorption of second molars with impacted third molars.^{16,17} One review concludes that the risk of second molar root resorption by impacted third molars is low, and is likely to occur in younger patients for whom surgery is claimed to be associated with less morbidity.¹⁵

The association between anterior (front) incisor crowding and impacted third molars is not significant and does not warrant the removal of third molars.^{18,19,20}

Cyst development is very rare and is not an indication for prophylactic removal.¹⁵ The risk of malignant neoplasms arising in a dental follicle is negligible and is not an indication for prophylactic removal.¹⁵

Complications and risks following surgery

The potential benefit of avoiding the relatively uncommon risks of pathology associated with leaving impacted third molars in place needs to be considered alongside the risks associated with their removal. Patients should be fully informed of the potential risks and benefits.

Common complications following third molar surgery include sensory nerve damage (paraesthesia), dry socket (dry appearance of the exposed bone in the socket accompanied by severe pain and foul odour), infection,

haemorrhage and pain. Rarer complications include severe trismus, oro-antral fistula, buccal fat herniations, iatrogenic damage to the adjacent second molar, and iatrogenic mandibular fracture.

The rate of sensory nerve damage after third molar surgery has been shown to range from 0.5% to 20%.^{9,15,21,22} The overall rate of dry socket varies from 0% to 35% among studies.^{9,23} The risk of dry socket increases with lack of surgical experience and tobacco use,²⁴ though this does not justify prophylactic removal.

Prophylactic removal: is it justified ?

A recent evaluation of published reviews¹⁹ has concluded that there is little reliable evidence to support prophylactic removal of impacted third molars. Two decision analyses also concluded that, on average, patients' longer term well being is more likely to be maximised if only those impacted third molars with pathology are removed.^{22,25}

Two reviews from North America also confirm this conclusion. One acknowledged a lack of reliable evidence to support the prophylactic removal of impacted third molars.²⁶ The other concluded that 'routine prophylactic third molar extraction is unjustifiable'.¹⁵ It showed that impacted third molars in adolescents are most likely to develop pathological indications, while impacted third molars in adults are unlikely to undergo significant pathological changes. This review also indicated that 'older patients, for whom third molar extraction is necessary, generally tolerate the procedure well'.

Given the lack of reliable evidence, a general anaesthetic for the removal of a symptomatic third molar should not normally be sufficient justification for removing pathology-free third molars at the same time.

Risks: pathology versus surgery

In a comparison of the risk of pathological changes in retained third molars and

Recommendations

- Research evidence suggests that impacted third molars should not be removed unless pathological changes are evident.
- Ideally, a long term rigorous experimental evaluation of prophylactic removal is required. More practically, high quality observational studies in some countries where this practice has not been routine may shed light on the natural history of impacted third molars.
- Referrals and waiting lists for the surgical removal of third molars should be monitored through a process of audit. (To ensure appropriate treatment).

complications after third molar surgery,¹⁵ the rate of complications after removing third molars was 11.8% in youths (age range 12-29) and 21.5% in older age (age range 25-81). In addition, results from several studies showed that the risk of pathological changes in older adults ranges from zero to 12%.

Using these figures, it can be calculated that there will be more complications after prophylactic removal of pathology free third molars than after removing only those third molars with pathological changes (see Table 1). For every 100 young people who would undergo prophylactic removal 12 may be expected to suffer from clinically significant complications. Without prophylactic removal, 12 of these 100 people will require surgical removal of third molars at older ages, of whom only 3 will experience surgical complications.

Table 1: Number of complications after surgical removal of third molars: a comparison of two strategies+

Strategies	Number of people who undergo procedures	Number of complications
Prophylactic removal of pathology free impacted third molars	100	12 (i.e., 100*11.8%)
Removal of impacted third molars when pathology developed	12 (i.e., 100*12%)	3 (i.e., 12*21.5%)

+Based on a hypothetical cohort of 100 young people with pathology free third molars. The rates of complications and pathological changes are based on the results of Daley.¹⁵

These estimates of the risks of leaving impacted third molars and the risks of prophylactically extracting them are necessarily approximate because of the relatively poor quality of research in this area and different methods used by studies.

Dental surgeons will tend to see (and remember) those patients who experience long term problems with impacted third molars rather than patients with no complications. The perceived risks of impacted third molars and the benefits of prophylactic removal will therefore tend to be exaggerated.

Overall, there appears to be little justification for the removal of pathology-free impacted third molars.

REFERENCES

1. Department of Health. Hospital Episode Statistics. England: financial year 1994-95 Volume 1: finished consultant episodes by diagnosis and operative procedure. London: 1996.
2. Landes DP. The relationship between dental health and variations in the level of third molar removals experienced by populations. *Community Dental Health* 1998; 15: 67-71.
3. Shepherd JP, Brickley M. Surgical removal of third molars. *British Medical Journal* 1994; 309: 620-621.
4. Toth B. *The appropriateness of prophylactic extraction of impacted third molars. A review of the literature.* Health Care Evaluation Unit, University of Bristol 1993.
5. Gilthorpe MS, Bedi R. An exploratory study combining hospital episode statistics with socio-demographic variables, to examine the access and utilisation of hospital oral surgery services. *Community Dental Health* 1997; 14(4): 209-213.
6. NIH. Consensus development conference for removal of third molars. *Journal of Oral Surgery*. 1980; 38: 235-236.
7. Stephens RG, Kogon SL, Reid JA. The unerupted or impacted third molar - a critical appraisal of its pathologic potential. *Journal of the Canadian Dental Association* 1989; 55(3): 201-207.
8. Ahlqvist M, Grondahl HG. Prevalence of impacted teeth and associated pathology in middle-aged and older Swedish women. *Community Dentistry and Oral Epidemiology* 1991; 19(2): 116-119.
9. Mercier P, Precious D. Risks and benefits of removal of impacted third molars. *International Journal of Oral and Maxillofacial Surgery* 1992; 21: 17-27.
10. Worrall SF, Riden K, Haskell R, Corrigan AM. UK National Third Molar project: the initial report. *British Journal of Oral and Maxillofacial Surgery*. 1998; 36(1): 14-18.

11. Lopes V, Mumenya R, Feinmann C, Harris M. Third molar surgery: an audit of the indications for surgery, post-operative complaints and patient satisfaction. *British Journal of Oral and Maxillofacial Surgery* 1995; 33: 33-35.
12. Brickley M, Shepherd J, Mancini G. Comparison of clinical treatment decisions with US National Institutes of Health consensus indications for lower third molar removal. *British Dental Journal* 1993; 175: 102-105.
13. Brickley MR, Shepherd JP. Performance of a neural network trained to make third-molar treatment-planning decisions. *Medical Decision Making* 1996; 16(2): 153-160.
14. Pratt CAM, Hekmat M, Barnard JDW, Zaki GA. Indications for third molar surgery. *Journal of the Royal College of Surgeons of Edinburgh* 1998; 43(2): 105-108.
15. Daley TD. Third molar prophylactic extraction: a review and analysis of the literature. *General Dentistry* 1996; 44(4): 310-320.
16. Von Wowern N, Nielsen HO. The fate of impacted lower third molars after the age of 20. A four-year clinical follow-up. *International Journal of Oral and Maxillofacial Surgery* 1989; 18(5): 277-280.
17. Lindqvist B, Thilander B. Extraction of third molars in cases of anticipated crowding in the lower jaw. *American Journal of Orthodontics* 1982; 81(2): 130-139.
18. Vasir NS, Robinson RJ. The mandibular third molar and late crowding of the mandibular incisors - a review *British Journal of Orthodontics* 1991; 18: 59-66.
19. Song F, Landes DP, Glenny AM, Sheldon TA. Prophylactic removal of impacted third molars: an assessment of published reviews. *British Dental Journal*. 1997; 182(9): 339-346.
20. Harridine NWT, Pearson MH, Toth B. The effect of extraction of third molars on late lower incisor crowding: A randomised controlled trial. *British Journal of Orthodontics* 1998; 25: 117-122.
21. Carmichael FA, McGowan DA. Incidence of nerve damage following third molar removal: a West of Scotland Oral Surgery Research Group study. *British Journal of Oral and Maxillofacial Surgery* 1992; 30(2): 78-82.
22. Brickley M, Kay E, Shepherd JP, Armstrong RA. Decision analysis for lower-third-molar surgery. *Medical Decision Making* 1995; 15(2): 143-51.
23. Chiapasco M, Crescentini M, Romanoni G. Gernectomy or delayed removal of mandibular impacted third molars: the relationship between age and incidence of complications. *Journal of Oral and Maxillofacial Surgery* 1995; 53(4): 418-422.
24. Larsen PE. Alveolar osteitis after surgical removal of impacted mandibular third molars. Identification of the patient at risk. *Oral Surgery, Oral Medicine, Oral Pathology* 1992; 73(4): 393-397.
25. Tulloch JF, Antczak Bouckoms AA. Decision analysis in the evaluation of clinical strategies for the management of mandibular third molars. *Journal of Dental Education* 1987; 51(11): 652-660.
26. ECRI. Removal of third Molars. *Executive Briefings; Health Technology Assessment Information Service* 1994.

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