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DOI:

[10.1111/ors.12608](https://doi.org/10.1111/ors.12608)

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Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Shah, PA, Ahmed, B, Chang, DJ & Fakitsas, D 2021, 'Surgical extractions of wisdom teeth at Tufts University, USA according to UK's NICE guidelines', *Oral Surgery*. <https://doi.org/10.1111/ors.12608>

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ORIGINAL ARTICLE

Surgical extractions of wisdom teeth at Tufts University, USA according to UK's NICE guidelines

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Abstract

Aims: To investigate the reasons for extraction of third molars (3Ms) at Tufts University School of Dental Medicine (TUSDM) and compare this to the UK's NICE guidelines.

Methods: Data were collected at TUSDM retrospectively from 99 patients who underwent surgery in 2019 under American Dental Association (ADA) codes D7220, D7230, D7240 and D7241 (removal of impacted tooth in soft tissue, partially bony, completely bony and with unusual surgical complications). Patient details of age, location of 3M, Winter's classification of impaction, reason for extraction, need for bony removal, type of anaesthesia or sedation, prescribed medications and complications were recorded.

Results: A total of 274 surgical extractions of teeth were recorded. Ages ranged from 15 to 39, with an average age of 24. Intravenous sedation (IVS) was used in 80% of patients with an average of 3.6 3Ms extracted in each of these patients, when local anaesthetic was used alone an average of two 3Ms were extracted. Ninety per cent and 78.7% of maxillary and mandibular 3Ms, respectively, were extracted with no pathology. Thirteen per cent of mandibular 3Ms were extracted due to pericoronitis (usually a single episode), 4% due to caries and 2.3% due to distal second molar (2M) caries. There were five instances of post-operative complications, the worst being hypoesthesia of the right inferior dental (ID) nerve for 3 months.

Conclusion: Wisdom teeth are removed earlier at Tufts for prophylactic reasons with the intention of preventing future problems and caries in the adjacent tooth. More evidence is required to decide which patients would benefit from prophylactic extractions.

Clinical Relevance

Funding of a healthcare system, whether its state funded or private/insurance based, has a bearing on how patients are managed. In the United Kingdom, wisdom teeth are removed at an older age once pathology has developed to comply with the NICE criteria. In many cases, this involves caries in the second molar and a more intimate relationship between the roots and inferior dental nerve. There may be merit in some cases for earlier removal of wisdom teeth to prevent pathology and reduce the chance of nerve injury. If wisdom teeth are retained, they should be regularly monitored for pathology.

INTRODUCTION

Third molars (3Ms) are the final teeth to erupt between the ages of 17 and 21; due to lack of space they are the most frequently impacted teeth. 3Ms were historically subject to prophylactic removal in the United Kingdom at a young age due to their common association with pathology in the form of pericoronitis, periodontal disease, unrestorable caries, pulpal or periapical pathology, abscesses and cysts, root resorption, crowding, temporomandibular pain and destruction of adjacent teeth via caries or external root resorption.¹ Approximately half of impacted 3Ms are associated with some pathology, and the number of 3Ms retained decreases

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rapidly with age, with only 31% remaining at 38 years.² The National Institute of Clinical Excellence (NICE) guidelines in 2000 highlight that 40% of 3Ms were removed with no clinical indication and recommended discontinuation of prophylactic removal of pathology-free 3Ms; a decision to reduce unnecessary surgery and expenditure. Following implementation, the number of 3Ms extracted in the United Kingdom declined immediately, then returned to previous levels.^{3,4}

In America, dental care is privatised, so the expense of treatment is not a factor in any guidelines. The American Association of Oral and Maxillofacial Surgery (AAOMS) evidence-based management guidelines highlight that surgery in younger patients is less complicated, with greater prognosis, and that the majority of 3Ms will experience pathology and may be related to the progression of periodontal disease at some point in the patient's life.^{5,6}

On the other hand, prophylactic extractions carry risks such as paresthesia. The American Journal of Public Health also identifies the risk of pathology in impacted 3Ms increasing with age as a myth.⁷

The Cochrane database of systematic reviews shows that there is insufficient evidence to determine if asymptomatic impacted 3Ms should be removed, with very low-quality evidence of 3Ms causing an increased risk of periodontitis in adjacent second molars (2Ms).⁸

The aim of this study is to compare standard practice at Tufts University in Boston, Massachusetts with the UK's NICE guidelines. Other objectives include investigation of post-surgical complications and preferred methods of anaesthesia.

METHODOLOGY

IRB approval was obtained from the Tufts University for this study. Data were collected at TUSDM from historic patient notes between January 2019 and July 2019, with a total of 99 records satisfying the inclusion and exclusion criteria. Inclusion criteria were the following American Dental Association (ADA) codes applied only to 3Ms: D7220 (removal of impacted tooth in soft tissue), D7230 (removal of partially bony impacted tooth), D7240 (removal of completely bony impacted tooth) and D7241 (removal of completely bony impacted tooth with unusual surgical complications). The exclusion criteria were pathological dentoalveolar conditions, craniofacial abnormalities and incomplete records without radiographs. Patients were found by searching through the appointment list for the oral surgery clinic. For each patient with an ADA code in the inclusion criteria, the medical notes and radiographs were analysed. Each patient was given a unique numerical identifier on an Excel spreadsheet to maintain anonymity. Details of age, location of 3M, Winter's classification of impaction, reason for extraction, need for bony removal, type of anaesthesia or sedation, prescribed medications and complications were recorded. For an extraction to be classified as surgical, soft tissue incision is required with or without bone removal.

The Tufts data were also compared with the Academic British Association of Oral and Maxillofacial Surgeons (ABAOMS) 3M audit on how wisdom teeth were extracted in the United Kingdom according to diagnosis.⁹

RESULTS

A total of 274 surgical extractions of wisdom teeth were recorded from 99 unique patients. The average age was 24 and ranged from 15% to 39. 63.5% of 3Ms requiring surgical extraction were mandibular.

Deep intravenous sedation (IVS) using a combination of midazolam, fentanyl or propofol, ketamine and local anaesthetic (LA) was used in 80% of patients, 19% were only given LA and 1% received relative analgesia using nitrous oxide and LA.

There were five instances of post-operative complications in this study: an oroantral communication, a residual cyst, hypoesthesia due to ID nerve damage for 3 months, subperiosteal infection and post-operative pain for over a week.

DISCUSSION

Age

Most patients were young; wisdom teeth usually erupt between the ages of 17 and 21, and at the age of 24 it would be easier to establish the likelihood of pathology experience based on angulation and space available. However, at the age of 15, the roots would not have fully developed and it is not possible to predict the likelihood of experiencing pathology. It could be argued that there is a good chance of these teeth not requiring extraction if oral hygiene is satisfactory and there is space for eruption. On the other hand, evidence clearly indicates that surgery is more difficult as patients age, and younger patients are usually able to recover faster. There is also a reduced chance of inferior dental (ID) nerve damage if the tooth has minimal root formation. AAOMS guidelines state that 3Ms should be extracted before the middle of the third decade, ideally while the bone and tooth are immature to limit known risks and complications.⁵

Guidelines, funding and costs

Discussion with oral surgeons and patients at TUSDM unearthed that many 3Ms were extracted at a young age due to insurance or dental cover provided by employers. Patients fear the idea of paying several hundreds of dollars just for IVS alone if surgery is required in later life and would rather have the procedure done when costs can be covered by insurance. Additionally, if one 3M requires extraction, patients usually opt to have the others extracted prophylactically in the same procedure under IVS; Figure 1 shows that under IVS, all 3Ms were usually extracted in the same procedure.

Due to the risks of deep sedation, it is preferred to extract all wisdom at once; this eliminates the need for subsequent IVS and dental appointments for monitoring or treating 3M pathology, resulting in less time off work. The UK's wisdom tooth audit 2011 shows that fewer teeth were extracted per patient (1.86 teeth were referred per patient, many of which were not extracted). Deep IV sedation (day beds GA) was used in 57% of patients while local anaesthetic alone was used in 32%.⁴ In the United Kingdom, the current NICE guidelines (introduced in 2000) state that only 3Ms with evidence of pathology should be removed. McArdle and Renton evaluated the effects of this and found that the number of wisdom teeth extracted declined initially then returned to above previous levels in 2010. The guidelines changed the patient demographic of 3M management in the United Kingdom, with patients being older on average.³ There is no data following 2010 but it is likely that this trend has continued. This raises questions about whether the guidance is detrimental to patients and has increased costs to the NHS in the long term.

Reasons for extraction

Figure 2 shows that 86% of surgically extracted 3Ms had no evidence of pathology and were extracted prophylactically or prior to orthodontic treatment; in the United Kingdom, these 3Ms would not have been extracted according to NICE guidelines. The AAOMS guidelines justify prophylactic removal through citation of a systematic review from 2015, which shows that the incidence of extraction of retained 3Ms after 1 year was 5% and after 18 years was 64% due to various pathology—a cumulative statistic which will only increase with time.¹⁰ The fact that at least two thirds of 3Ms experience pathology at some point is good justification for patients to be given the opportunity to have 3Ms extracted at a young age and avoid the risk of needing surgery in later life.

Figure 3 shows that a greater proportion of maxillary 3Ms was prophylactically extracted at both Tufts and in the United Kingdom, since the removal of exclusively mandibular 3Ms would allow maxillary 3Ms to over erupt and require extraction later. Although these would be simple extractions, it is more convenient for patients to have compensating extractions in the same visit under IVS. Comparing reasons for extraction of mandibular 3Ms between the United Kingdom and Tufts, twice the proportion of 2Ms were affected by distal caries in the United Kingdom, and five times as many 3Ms were carious and suffered from pericoronitis compared to Tufts.

Orthodontic extractions

Figure 3 shows a large difference in the number of 3Ms extracted for orthodontic reasons between Tufts and the UK audit. In the United Kingdom, there is no guidance on this topic and orthodontic treatment is usually carried out with wisdom teeth untouched. The AAOMS whitepaper states that orthodontic removal of 3Ms is justified in some cases such as when the eruption of 2Ms is affected, which may contribute to the larger proportion of orthodontic referrals.⁵ There are few orthodontic cases where removal of 3Ms is a prerequisite; evidence shows that 3Ms do not cause crowding in anterior teeth.⁷ Figure 4 displays that a third of 3Ms extracted for orthodontic reasons did not have fully developed roots, and a quarter were classed as vertically impacted from analysis of radiographs, the majority of which would likely continue to erupt if retained. This statistic shows that most orthodontic referrals for 3M extractions at Tufts should be considered prophylactic.

Classification of impaction

The most common Winter's classification of extracted mandibular 3Ms was mesioangular (41%). Figure 5 shows that 2M distal caries was only seen in horizontal and mesioangular 3M impactions, accounting for 3% and 4% of extractions respectively. Studies have shown that distal caries in lower 2Ms can be seen in 42% of cases with a mesioangular 3M.¹¹ For these patients, their 2Ms have been irreversibly damaged by decay, which could have been prevented if the horizontal or mesioangular 3Ms were extracted prophylactically. Pericoronitis was the reason for extraction of 45% of distoangular mandibular 3Ms, this is significantly more than in any other type of impaction. In the United Kingdom, these 3Ms would only be extracted if severely or repeatedly affected by pericoronitis.⁴

Complications

There were no complications of permanent paraesthesia in our sample. The practice of prophylactic extractions of 3Ms puts patients at risk of swelling, pain and bruising in the short term; however, it avoids the high probability of requiring surgical extractions in later life. As patients age, they are likely to be on various medications for comorbidities that increase the risks associated with surgery such as excessive bleeding, delayed healing, bacterial endocarditis

	Surgically extracted 3Ms per patient	Total extracted 3Ms per patient
IV sedation (IVS)	3.0	3.6
Local anaesthetic (LA)	1.5	2
Relative analgesia (RA)	3	3

FIGURE 1 A table showing the average number of surgical extractions and total extractions of 3Ms per patient using various forms of anaesthesia at Tufts

The reasons for surgical extraction of 3Ms at Tufts.

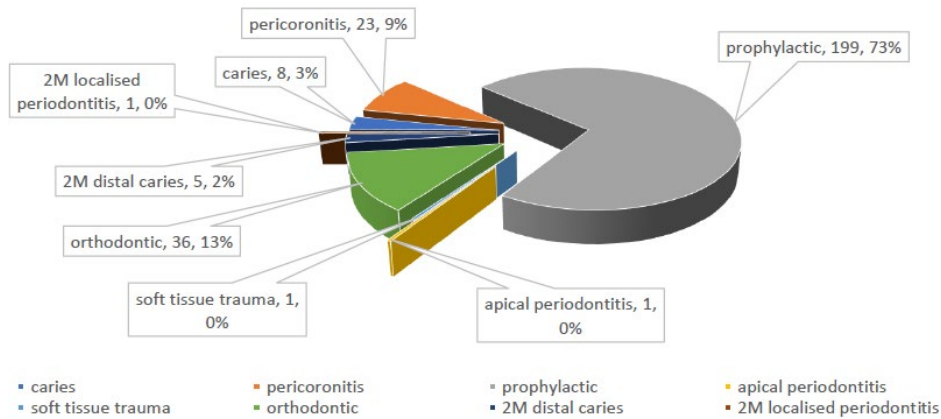


FIGURE 2 A pie chart showing the reasons for extraction of 3Ms using data collected from TUSDM

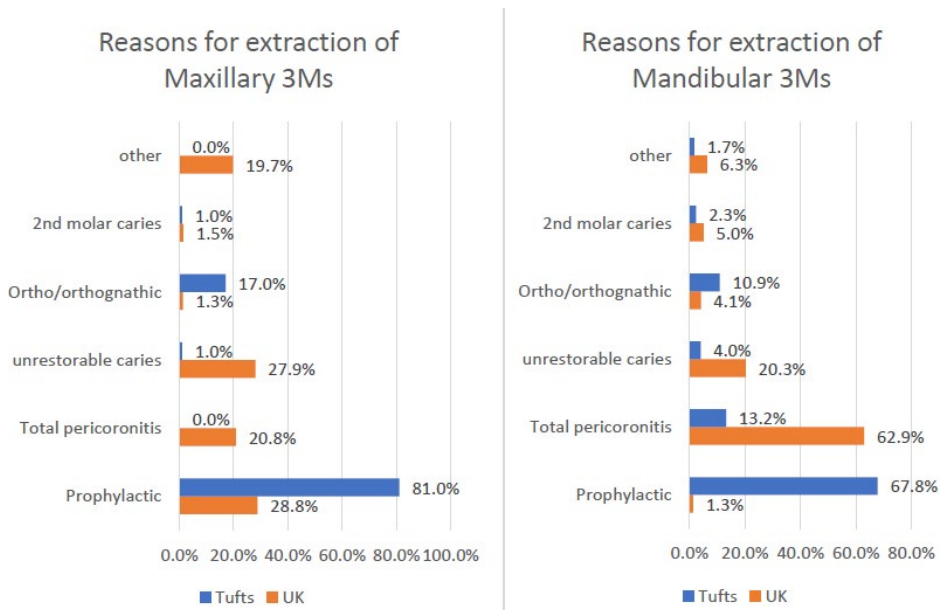


FIGURE 3 Bar charts displaying the percentage of extracted 3Ms for various reasons using data from TUSDM and the ABAOMS third molar audit (excluding 3Ms that were not extracted). Maxillary 3Ms were extracted at Tufts with no pathology 98% of the time, compared to mandibular 3Ms which were extracted with no pathology in 78-79% of cases

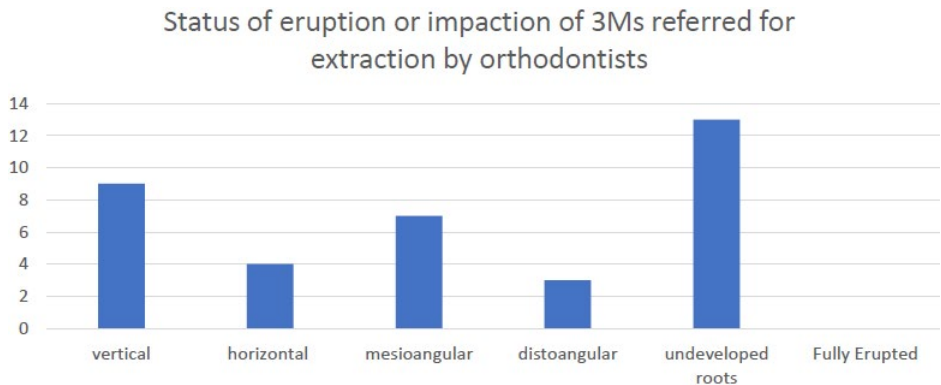


FIGURE 4 Bar chart showing Winter's classification of impaction or status of development and eruption of 3Ms extracted through orthodontic referral using data from TUSDM

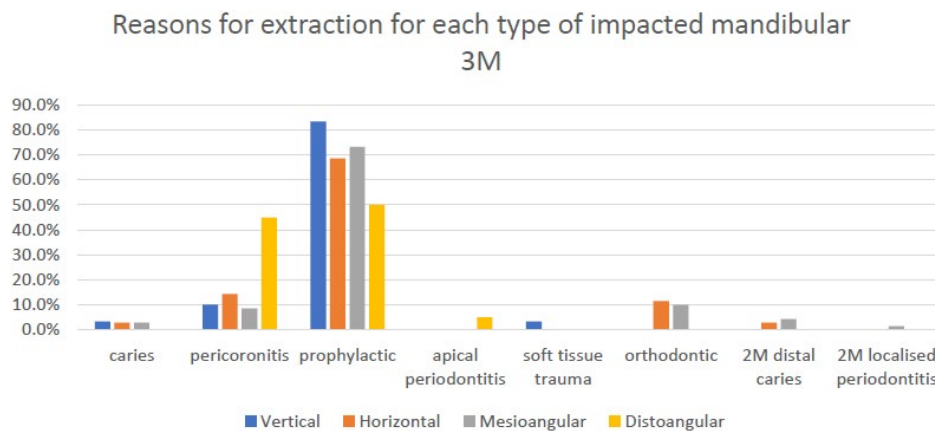


FIGURE 5 Bar chart showing the reasons for extraction for four types of impacted mandibular 3Ms using data from TUSDM

and osteonecrosis to name a few. In the United Kingdom, retention of 3Ms into old age may result in greater expenses and strain on NHS services in the long term as treatment becomes more difficult and adjacent teeth are affected by caries. In addition, in the United States, if 3Ms are retained they should be monitored at regular intervals, as per AAOMS guidance since they are at high risk of pathology.

Limitations

Comparison with data from the UK's 3M audit is limited since it was completed in 2011, and there is no specification of the type of impaction and whether the extractions were surgical. It would also be interesting to see how the dynamics of 3M management have continued to change in the United Kingdom 20 years after the guidelines were introduced.

CONCLUSION

Most surgical extractions of 3Ms undertaken at Tufts would not be justified in the United Kingdom due to NICE guidelines. The United States and United Kingdom have different approaches to prophylactic removal of wisdom teeth formed by their health policy on what is and is not funded. The UK's government funded healthcare system is reluctant to fund treatment, which may not be necessary. However, we note that in the UK cohort, significant patients are referred in their 30s with secondary caries affecting 2Ms, and thus the patient ends up losing the wisdom tooth as well as the 2M. Perhaps these patients would benefit from prophylactic removal after a risk assessment is made. In the United Kingdom, dental treatment is fully subsidised by the NHS, so to reduce expenditure and risks to the health of patients, any treatment that is unnecessary at the time is not performed. For some patients, this may not be ideal in the long term if surgery is required at an older age. On the other hand, in America, the long-term

risks are emphasised, and patients are given the option to avoid the hassle and risks associated with retention of 3Ms. Unfortunately, in many cases, 3Ms are not given enough time to erupt for better judgement of the chance of pathology, and some of these patients may be unnecessarily subject to the risks associated with surgery. Retained 3Ms must be monitored regularly, and in some high-risk cases, prophylactic extractions are justified to avoid damage to adjacent teeth and risks of surgery in older age. Further research is required to better judge the need and optimal stage for extraction of 3Ms on an individual basis for the best patient-centred care.

CONFLICT OF INTEREST

Parus Amit Shah, Bilal Ahmed, David Joey Chang and Dimitrios Fakitsas declare that they have no conflict of interest.

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REFERENCES

- Shoshani-Dror D, Shilo D, Ginini J, Emodi O, Rachmiel A. Controversy regarding the need for prophylactic removal of impacted third molars: an overview. *Quintessence Int.* 2018;49(8):653–62.
- Ventä I, Ylipaavalniemi P, Turtola L. Clinical outcome of third molars in adults followed during 18 years. *J Oral Maxillofac Surg.* 2004;62(2):182–5.
- McArdle L, Renton T. The effects of NICE guidelines on the management of third molar teeth. *Br Dent J.* 2012;213(5):E8.
- National Institute of Clinical Excellence. Guidance on the extraction of wisdom teeth. London; [Internet]. 2000. <https://www.nice.org.uk/guidance/ta1/resources/guidance-on-the-extraction-of-wisdom-teeth-pdf-63732983749>. Accessed 15 Sept 2019.
- American Association of Oral and Maxillofacial Surgeons. Supporting information for the management of Patients with Third Molar Teeth. https://www.aaoms.org/images/uploads/pdfs/management_third_molar_supporting_information.pdf. Accessed 15 Sept 2019.
- American Association of Oral and Maxillofacial Surgeons. Management of Third Molar Teeth (White Paper). [internet]. 2016. https://www.aaoms.org/docs/govt_affairs/advocacy_white_papers/management_third_molar_white_paper.pdf. Accessed 15 Sept 2019

7. Friedman J. The prophylactic extraction of third molars: a public health hazard. *Am J Public Health*. 2007;97(9):1554–9.
8. Ghaemina H, Perry J, Nienhuijs M, Toedtling V, Tummers M, Hoppenreijts T, et al. Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth. *Cochr Database Syst Rev*. 2016; <https://doi.org/10.1002/14651858.CD003879.pub4>.
9. British Association of Oral and Maxillofacial Surgeons. Third national audit in support of revalidation report (wisdom tooth audit) [Internet]. 2011. https://www.baoms.org.uk/_userfiles/pages/files/Council%20Sub-Committees/Clinical%20Effectiveness/3rd_Nat_audit_in_support_of_revalidation__wisdom_tooth_doc
10. Bouloux G, Busaidy K, Beirne O, Chuang S, Dodson T. What is the risk of future extraction of asymptomatic third molars? A systematic review. *J Oral Maxillofac Surg*. 2015;73(5):806–11.
11. Allen R, Witherow H, Collyer J, Roper-Hall R, Nazir A, Mathew G. The mesioangular third molar—to extract or not to extract? Analysis of 776 consecutive third molars. *Br J Oral Maxillofac Surg*. 2009;47(7):e48.

How to cite this article: Shah PA, Ahmed B, Chang DJ, Fakitsas D. Surgical extractions of wisdom teeth at Tufts University, USA according to UK’s NICE guidelines. *Oral Surg*. 2021;00:1–6. <https://doi.org/10.1111/ors.12608>