

Wisdom teeth: back to basics part 2

The second article in this series addresses complications of wisdom tooth surgery and management of common third molar problems.

Learning outcomes:

- to understand the risks and complications associated with mandibular third molar (Md3M) and maxillary third molar (Mx3M) surgery;
- to review alternative treatment modalities to Md3M removal; and,
- to revise immediate management of complications associated with Mx3M removal.

Introduction

Wisdom tooth removal is one of the most common surgical procedures carried out worldwide. General dental practitioners (GDPs) should not only be proficient at examining and diagnosing third molar disease, but should also be familiar with the various treatment options available.

The first part of this series focused on wisdom tooth disease, assessment, and referral criteria for third molar surgery.¹ This paper reviews the complications that can arise with wisdom tooth surgery, and outlines some alternative treatment options for management of third molars.

Clinical relevance

The GDP remains in a unique position to support early diagnosis and onward referral for assessment prior to third molar surgery. Where a dentist suspects that removal of third molars is indicated, counselling patients on the appropriate treatment options, alongside the risks and benefits of intervention, is a central part of the consent process.

Objective

The reader should gain an understanding of the risks of both Mx3M and Md3M surgery, and be able to counsel patients appropriately prior to undertaking third molar extraction, or arranging onward referral to oral surgery colleagues.

Morbidity of Md3M surgery

Patients undergoing third molar surgery will routinely be informed about the common postoperative sequelae of pain, swelling and trismus (limitation of mouth opening less than 30mm).² Despite ample discussion regarding these sequelae, patients can often be surprised at the protracted morbidity associated with third molar surgery, with a deterioration in quality of life (QoL) reported for an average of five days postoperatively.³

The clinical findings of swelling and trismus appear to be the main contributors to this deterioration in QoL. The effects of swelling and trismus on a patient's appearance and ability to masticate, respectively, have been reported as the

reasons for this finding.⁴ These functional and aesthetic limitations have been shown to peak at day one postoperatively, with a gradual improvement towards baseline pre-operative levels by day six.^{3,5}

Pain is considered a reliable indicator of patient satisfaction,⁶ and may be influenced by factors such as patient anxiety, intra-operative bone removal, and operative duration.^{2,6} Studies have shown a peak in postoperative pain experience three to five hours following third molar surgery,⁶ which lends support to the deterioration in QoL observed during this period.

Complications of Md3M surgery

Postoperative complications arise in up to 35% of cases of third molar surgery.⁷

The most common complication of any dental extraction, including third molar surgery, is alveolar osteitis (AO), more commonly referred to as dry socket. This is localised inflammation within a socket that may be partially or totally devoid of a blood clot, leading to persistent pain, malodour, and delayed wound healing.⁸ Factors such as smoking, female gender, poor dental hygiene, and concurrent oral contraceptive medication increase the likelihood of developing dry socket postoperatively.^{7,9} The use of antibiotics may reduce the risk by 38% but with a number needed to treat (NNT) of 38, the evidence supporting routine use of antibiotics is lacking.¹⁰

Nerve injury

The posterior mandible is a high-risk site for dentoalveolar surgery, due in no small part to its complex anatomy. Specific to the lower third molar tooth is the close, and occasionally intimate, relationship with the lingual and inferior alveolar nerves. Iatrogenic trigeminal nerve injury is the most problematic complication of dentoalveolar surgery, with considerable medicolegal implications.¹¹ Trigeminal nerve injuries can interfere with many day-to-day activities, such as speaking, eating, smiling, kissing, shaving, make-up application, toothbrushing, and drinking.¹¹ The negative impact on QoL, social interaction, and general psychological well-being is well documented, with up to 70% of affected patients reporting long-term chronic pain and disability.¹²

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The incidence of lingual nerve injury has remained more or less unchanged over the last 30 years, ranging from 0.4–1.5%.¹³ Third molar surgery remains the most common cause.¹³ Factors that increase the risk of lingual nerve injury include the depth of impaction, lingual flap retraction, vertical tooth sectioning, and operative duration.^{2,14} There is conflicting evidence to suggest that lingual nerve injuries are more likely to occur with an inexperienced operator and where surgery is performed under general anaesthesia;¹⁵ however, these speculations are not corroborated across the board. Recovery of lingual nerve injury within eight weeks is seen in 85–94% of cases,¹³ although spontaneous repair of sectioned lingual nerve axons is unlikely due to retraction and separation of nerve endings where there has been manipulation of the surrounding soft tissues.¹⁶ Early referral to a specialist centre for investigation and prompt surgical intervention is therefore recommended, preferably within three months of injury.¹³

Third molar surgery accounts for up to 3.6% and 8% of permanent and temporary cases of inferior alveolar nerve (IAN) injury, respectively.¹⁷ Local anaesthetic administration, dental implant placement, and endodontic treatment are also major contributors to IAN injury.¹³ The intraosseous anatomical course of the IAN within the confines of the mandibular canal makes it less amenable to surgical repair than the lingual nerve.¹³ Recovery of sensation is unlikely beyond six months of the injury.¹³

IAN injuries are more common in females, and show a positive correlation with operator inexperience. The incidence of IAN neurosensory deficit is highest in cases of horizontal Md3M impaction,² and lowest in vertical Md3M impactions.¹⁸

Mandible fracture

Iatrogenic fracture of the mandible is a rare, but potentially very serious, complication of third molar surgery, with a reported incidence of 0.0033–0.0049%.^{19,20} Males are twice as likely to be affected as females, with mesioangular Md3Ms most commonly implicated.²⁰ Mandible fracture secondary to third molar removal is more likely to occur in patients who are in their fifth or sixth decade.²¹ This complication will significantly prolong recovery time for those affected.

Alternatives to Md3M removal

For some patients, surgical removal of impacted Md3M may not be an appropriate first line of treatment. Reasons for alternative treatment modalities include significant medical comorbidities, increased risk of IAN injury, and patient choice. Alternative treatment modalities should be considered if the risk of delaying surgical removal of Md3M does not outweigh the benefit. Treatment options to consider include:

- enameloplasty;
- operculectomy;
- coronectomy; and,
- removal of opposing Mx3M.

Enameloplasty

In the case of overerupted Mx3M, enameloplasty is a minimally invasive treatment option for patients experiencing traumatic pericoronitis. Recontouring of prominent cusps of Mx3M can significantly reduce direct trauma to the soft tissue operculum of the opposing Md3M. Enameloplasty is useful for the immediate management of acute pericoronitis, and can serve as a temporary measure to manage symptoms while awaiting Md3M intervention.



FIGURE 1: Soft tissue operculum covering distal marginal ridge and distolingual cusp of mandibular molar (dotted line shows area of excision).

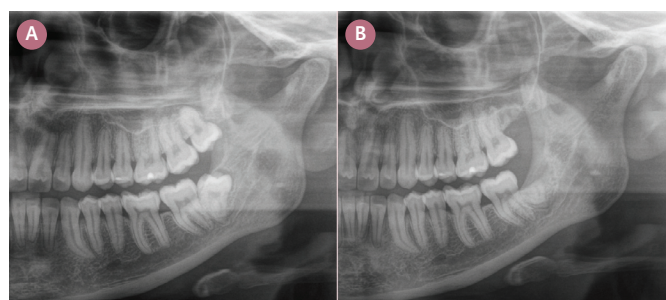


FIGURE 2: (a) Section of pre-operative orthopantomogram showing impacted distoangular LL8 with radiolucent banding across apices; and, (b) section of postoperative orthopantomogram three months post coronectomy showing coronal migration of LL8 roots and the absence of pathology.

Operculectomy

Operculectomy involves removal of the soft tissue flap overlying a partially erupted tooth (most commonly Md3M), and should only be performed by experienced clinicians trained in the procedure (Figure 1). Operculectomy should be reserved for select cases of soft tissue impaction, and avoided in teeth affected by bony impaction.

Some benefits of operculectomy include ease of oral hygiene, prevention of food trapping, and promotion of eruption of the affected tooth. Operculectomies are not without risk; operculum regrowth and lingual nerve injury are possible. It is therefore recommended that patients are reviewed clinically a few months after completing this procedure.

Coronectomy

Coronectomy is an alternative surgical technique for management of high-risk Md3Ms, and involves removal of the crown of the tooth and deliberate retention of the roots (Figures 2a and 2b). Far from being a novel procedure, coronectomy was first described by Ecuyer and Debien²² in 1984, and the technique has gained popularity in recent years in an effort to mitigate the risk of iatrogenic trigeminal nerve injury. Coronectomy has been shown to reduce the risk of IAN injury in high-risk teeth by 84%.²³



FIGURE 3: Left hemi-orthopantomogram showing grossly overerupted UL8.

Failure is more likely to occur in horizontally impacted Md3Ms, lingually impacted Md3Ms, and in females with conical roots that narrow within the inferior alveolar canal.²⁴ Risks of surgery include root migration, infection, and a need for future root retrieval. Contraindications include pulpal caries, periapical pathology, poorly controlled diabetes mellitus, steroid therapy, and immunosuppression, while coronectomy might be favoured in patients with a history of bisphosphonate use and/or radiotherapy to the head and neck region.²⁵

Removal of opposing Mx3M

Mechanical trauma from the opposing Mx3M can result from occlusion onto the operculum overlying the erupting Md3M, or onto the adjacent buccal mucosa (Figure 3). Extraction of the overerupted Mx3M is indicated in such instances to eliminate this soft tissue trauma.

Maxillary third molar surgery

While the primary focus of this series has been the Md3M, the removal of upper wisdom teeth can often be carried out without complication by GDPs. In addition to the general risks associated with exodontia, consideration should be given to those risks specific to the removal of the Mx3M.

Judicious clinical and radiographic assessment are essential to reduce the risk of the following complications:

- tuberosity fracture; and,
- oro-antral communication (OAC).

Tuberosity fracture

The risk of maxillary tuberosity fracture during removal of Mx3M increases with age, by 3.1% per year.²⁶ Risk factors for tuberosity fracture include divergent or bulbous root morphology, tooth ankylosis, lone-standing maxillary molars, ectopic Mx3M, increasing patient age, and unsupported extraction technique.^{26,27} Signs of impending tuberosity fracture include soft tissue blanching, tearing of the palatal mucosa, excessive bleeding, mobility of the alveolar segment including adjacent teeth, and distinctive cracking sounds that may be

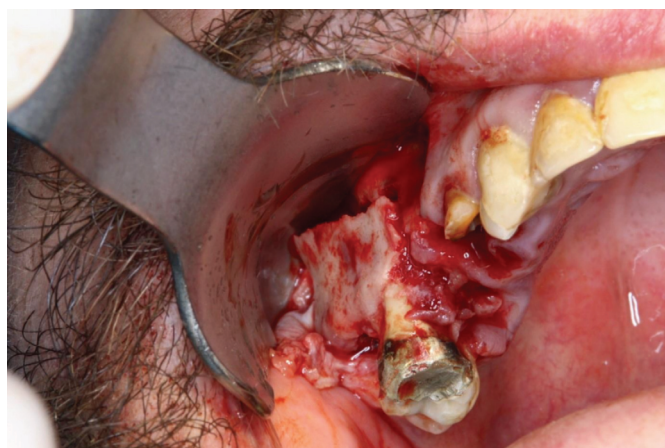


FIGURE 4: Right maxillary tuberosity fracture during routine extraction of UR7.

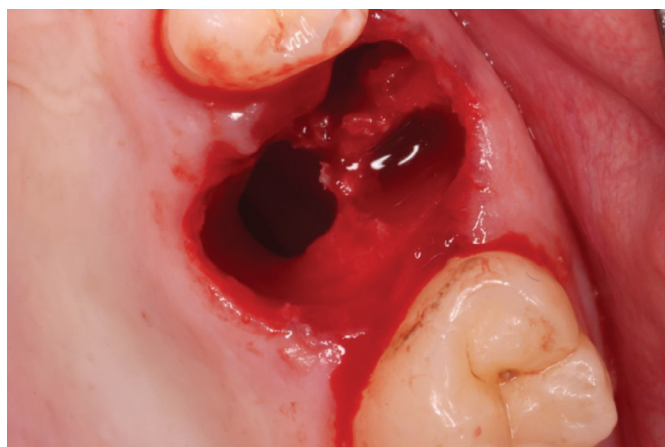


FIGURE 5: Breach of antral floor at palatal aspect of socket following routine extraction of UL6 in a healthy 23-year-old patient.

indicative of a bony fracture (Figure 4). Immediate management options depend on the size of fracture and communication with the maxillary sinus, as well as clinical expertise, and include clinical monitoring, dissection of the alveolar segment from soft tissue, and splinting.²⁷ Large tuberosity fractures or those resulting in an OAC may require immediate rigid fragment stabilisation, analgesia, and onward referral to an oral surgeon for assessment and surgical repair.

Oro-antral communication

OAC can arise in isolation during an otherwise routine extraction of a maxillary permanent molar (Figure 5), or in combination with a fractured tuberosity. 'Beware the lone-standing molar' is a phrase with which many dentists will be familiar, and not without reason. The complications of tuberosity fracture and OAC are most commonly associated with the lone-standing maxillary molar, due to the dual processes of alveolar resorption and pneumatisation of the neighbouring maxillary sinus.

Complex root morphology, low-lying maxillary sinus floor, hypercementosis, excessive force, and unsupported extraction technique increase the risk of developing an OAC. However, it can arise in the most experienced of hands and during the most routine of extractions. At the time of surgery, an OAC can be

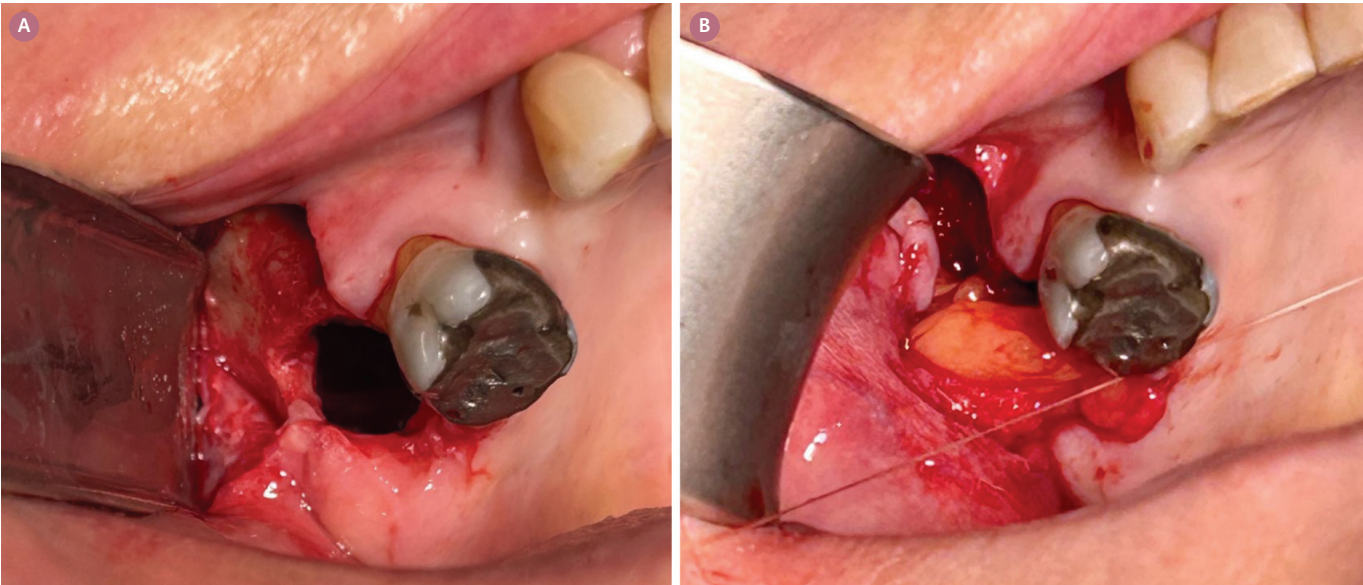


FIGURE 6: (a) Intraoperative view of large oro-antral communication at the site of a recent UR7 extraction; and, (b) closure of the defect using a combination of buccal fat pad and buccal advancement flap.

identified by a clear discontinuity of the socket apex (Figures 5 and 6), observation of 'bubbling' at the base of the extraction socket, or visualisation of movement of the antral lining during patient respiration. Clinicians may also note bony fragments indicative of a tuberosity fracture or concave bone attached to the roots of the extracted Mx3M.²⁸

Small communications of <5mm are likely to close spontaneously and require conservative management only (Table 1). For defects of >5mm, immediate surgical repair by an oral surgeon is advised.²⁹

Early repair of OACs using the buccal advancement flap with/without the buccal fat pad is the technique of choice for surgical management (Figure 6). In rare cases of failed buccal advancement flap repair, consideration can be given to closure of the defect using a palatal rotational flap if the affected site is accessible. This technique should be reserved for select cases only, due to the increased discomfort experienced by patients during the healing process.

In cases of late surgical repair, OACs will typically have undergone epithelialisation and matured into an oro-antral fistula (OAF). The fistula will require careful complete excision prior to closure using buccal advancement flap with/without buccal fat pad advancement or autogenous bone grafting.^{28,29}

Table 1: Conservative management of OAC.

- Haemostatic agent (communications <5mm only) and suture of site;
- antibiotics and decongestant to prevent onset of sinusitis;
- avoid Valsalva manoeuvre (nose-blowing, sneeze suppression, ear popping);
- regular warm salt water mouthrinses to promote healing; and,
- steam inhalations twice daily to maintain sinus patency.

Conclusion

GDPs should have an understanding of their essential role in the assessment and diagnosis of third molar pathology. Awareness of the risks and benefits of third molar surgery will help patients during the decision-making process.

By recognising and knowing how to effectively manage complications associated with molar extractions, the GDP should be well equipped to select cases appropriate for management in primary care and know when to refer for intervention.

References

1. O'Sullivan L, Martin K. Wisdom teeth: back to basics part 1. *JIDA*. Published online January 19, 2026.
2. Hill CM, Mostafa P, Thomas DW, Newcombe RG, Walker RV. Nerve morbidity following wisdom tooth removal under local and general anaesthesia. *Br J Oral Maxillofac Surg*. 2001;39(6):419-422.
3. McGrath C, Comfort MB, Lo EC, Luo Y. Changes in life quality following third molar surgery – the immediate postoperative period. *Br Dent J*. 2003;194(5):265-268.
4. Savin J, Ogden GR. Third molar surgery – a preliminary report on aspects affecting quality of life in the early postoperative period. *Br J Oral Maxillofac Surg*. 1997;35(4):246-253.
5. Duarte-Rodrigues L, Miranda EFP, Souza TO, de Paiva HN, Falci SGM, Galvão EL. Third molar removal and its impact on quality of life: systematic review and meta-analysis. *Qual Life Res*. 2018;27(10):2477-2489.
6. Coulthard P. Post-operative oral surgery pain: a review. *Oral Surg*. 2009;1(4):167-177.
7. Anjrini AA, Kruger E, Tennant M. International benchmarking of hospitalisations for impacted teeth: a 10-year retrospective study from the United Kingdom, France, and Australia. *Br Dent J*. 2014;216(7):E16.
8. Daly BJM, Sharif MO, Jones K, Worthington HV, Beattie A. Local interventions for the management of alveolar osteitis (dry socket). *Cochrane Database Syst Rev*. 2022;9(9):CD006968.

9. Jerjes W, Upile T, El-Maaytah M, *et al.* Experience in third molar surgery: a prospective study. *Br J Oral Maxillofac Surg.* 2009;47(7):e11.
10. Lodi G, Figini L, Sardella A, Carrassi A, Del Fabbro M, Furness S. Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev.* 2012;11:CD003811. Update in: *Cochrane Database Syst Rev.* 2021;2(2):CD003811.
11. Renton T. Prevention of iatrogenic inferior alveolar nerve injuries in relation to dental procedures. *Dent Update.* 2010;37(6):350–363.
12. Renton T. Risk assessment of M3Ms and decisions on ordering a CBCT and prescribing a coronectomy. *Dent Update.* 2017;44(10):957–976.
13. Renton T. Oral surgery: part 4. Minimising and managing nerve injuries and other complications. *Br Dent J.* 2013;215(8):393–399.
14. Valmaseda-Castellón E, Berini-Aytés L, Gay-Escoda C. Lingual nerve damage after third lower molar surgical extraction. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2000;90(5):567–573.
15. Brann CR, Brickley MR, Shepherd JP. Factors influencing nerve damage during lower third molar surgery. *Br Dent J.* 1999;186(10):514–516.
16. Loescher AR, Smith KG, Robinson PP. Nerve damage and third molar removal. *Dent Update.* 2003;30(7):375–382.
17. Renton T. Notes on coronectomy. *Br Dent J.* 2012;212(7):323–326.
18. Smith WP. The relative risk of neurosensory deficit following removal of mandibular third molar teeth: the influence of radiography and surgical technique. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2013;115(1):18–24.
19. Libersa P, Roze D, Cachart T, Libersa JC. Immediate and late mandibular fractures after third molar removal. *J Oral Maxillofac Surg.* 2002;60(2):163–166.
20. Ethunandan M, Shanahan D, Patel M. Iatrogenic mandibular fractures following removal of impacted third molars: an analysis of 130 cases. *Br Dent J.* 2012;212(4):179–184.
21. Krimmel M, Reinert S. Mandibular fracture after third molar removal. *J Oral Maxillofac Surg.* 2000;58(10):1110–1112.
22. Ecuyer J, Debien J. Dédutions opératoires [Surgical deductions]. *Actual Odontostomatol (Paris).* 1984;38(148):695–702.
23. Pitros P, O'Connor N, Tryfonos A, Lopes V. A systematic review of the complications of high-risk third molar removal and coronectomy: development of a decision tree model and preliminary health economic analysis to assist in treatment planning. *Br J Oral Maxillofac Surg.* 2020;58(9):e16–e24.
24. Renton T, Hankins M, Sproate C, McGurk M. A randomised controlled clinical trial to compare the incidence of injury to the inferior alveolar nerve as a result of coronectomy and removal of mandibular third molars. *Br J Oral Maxillofac Surg.* 2005;43(1):7–12.
25. Dhanrajani P, Smith M. Coronectomy: a recognised procedure? *Oral Surg.* 2018;11(4):273–281.
26. Shmuly T, Winocur-Arias O, Kahn A, Findler M, Adam I. Maxillary tuberosity fractures following third molar extraction, prevalence, and risk factors. *J Craniofac Surg.* 2022;33(7):e708–e712.
27. O'Sullivan L. Management of the fractured maxillary tuberosity. *JIDA.* 2024;70(4):189–190.
28. Renton, T, Durham, J, Hill, C. Oral surgery II: Part 2. The maxillary sinus (antrum) and oral surgery. *Br Dent J.* 2017;223:483–493.
29. Visscher SH, van Minnen B, Bos RRM. Closure of oroantral communications: a review of the literature. *J Oral Maxillofac Surg.* 2010;68(6):1384–1391.