

Third Molar Surgery

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Disclaimer

- This talk is aimed to give a practical approach to cases seen in the Oral & Maxillofacial Surgery extraction clinics and potentially in future practice for graduating dentists.
- As accurate as possible (backed by literature) but please do not only rely on this lecture for your exams.
- Contents of the lecture are based on our clinical experience and what we were taught. There may be some discrepancies among preferences and approaches to treatment compared to other clinicians. There are multiple ways to do things.
- The authors of this talk do not accept any responsibility or liability relating to the use of this information.

Lecture Overview

Introduction

Indications for third molar extractions

History and examination for third molars

Assessment of difficulty

- IAN risk assessment
- Radiographic assessment

Surgical procedure

- Maxillary third molars
- Mandibular third molars

Coronectomy

Cases

Introduction

Why are third molars more difficult to extract?

- Indications tend to be different
- Always involve some form of hard or soft tissue impaction
- Mandibular third molars may be in close proximity to the IAN and lingual nerve
- Maxillary third molars are closely related to the maxillary sinus, maxillary tuberosity and related vascular structures
- Post-operative complications including infections can spread to surrounding deep neck spaces

Indications for third molar extractions

Soft tissue trauma

- Impingement of soft tissue

Periodontal health

- Pericoronitis

Damage to second molar

- Caries, external root resorption

Dental pathology – caries, periapical periodontitis

- Abscess

Odontogenic pathology

- Dentigerous cyst

Orthodontic treatment/orthognathic treatment

Prosthodontic treatment

?prophylactic removal

Contraindications for third molar extractions

Extremes of age

Complex medical history that can lead to significant postoperative morbidity

High risk of intraoperative complications

Where acute problems impacts access or LA e.g. acute odontogenic infection with trismus

Case



History and Examination

History of presenting complaint/reason for presenting

- Symptomatic, asymptomatic

Medical history, social history

Clinical examination

- Unerupted, partially erupted, fully erupted

Radiographic examination and further investigations

Diagnosis

Treatment

Assessment of difficulty

Local

Depth of impaction and type

Root formation

Proximity to inferior alveolar canal

Caries or periodontal disease

Mouth opening

Gag reflex

General factors

Patient psychological factors

Age

Sex

Ethnicity

Patient weight

IAN Risk Assessment

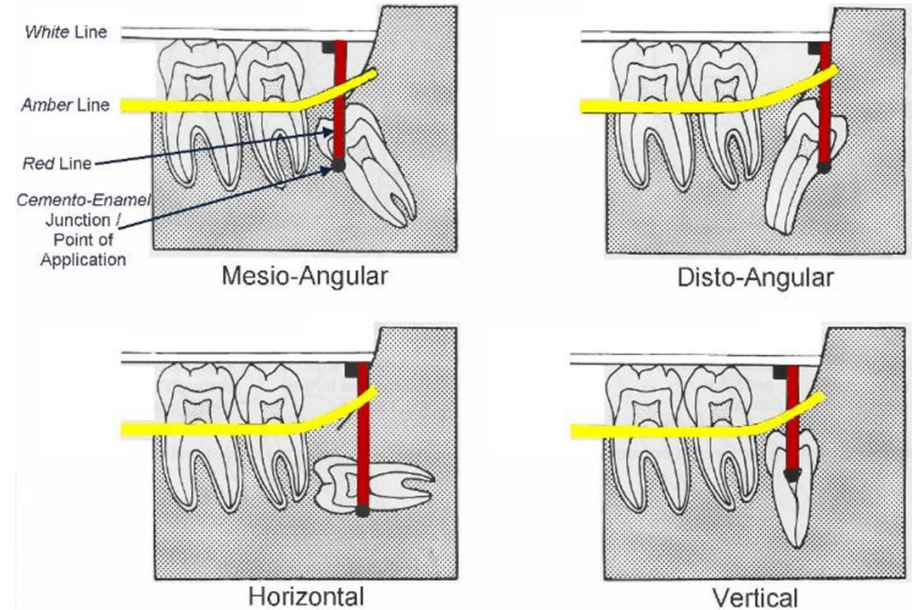
Winter's classification (1926)

Angulation formed between the lines corresponding to the long axis of the second and third molars

Impaction is described as vertical, mesioangular, horizontal or distoangular

Relation between pattern of impaction and injury to the IAN (Blondeau and Daniel, 2007; Juodzbalys and Daugela, 2013)

- Horizontally impacted molars – 1.7%
- Distoangular – 1.4%
- Mesioangular – 1.3%
- Vertically impacted molars 1.1%



Diagrams illustrating *Winter's Lines* when applied to unerupted Wisdom Teeth in different positions.

Radiographic Assessment: OPG

Type and orientation of impaction – access

Crown size and condition

Root numbers and morphology, apical hooks

Alveolar bone level

Follicle space

Periodontal status, together with that of the adjacent tooth

Relationship or proximity of upper third molars to the maxillary sinus and of the lower third molars to the inferior alveolar canal

Radiographic Assessment: OPG

Pre-operative assessment must be carried out radiographically to identify proximity of impacted 8s to the inferior alveolar nerve canal

Key signs (Rood and Shehab, 1990)

- **Darkening of the roots**
- Deflected roots
- Narrowing of the roots
- Dark and bifid root
- **Interruption of white line(s)**
- **Diversion of the IAN canal**
- Narrowing of the IAN canal

Radiographic Assessment: OPG

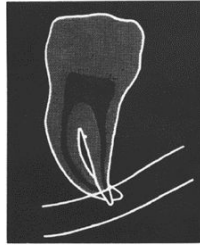


Fig. 1 - Darkening of root.

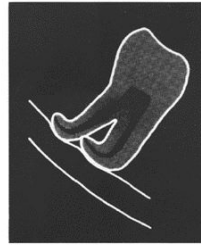


Fig. 2 - Deflection of root.

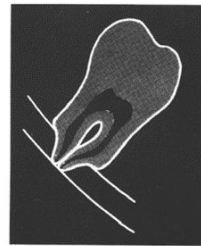


Fig. 3 - Narrowing of root.

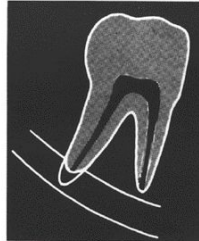


Fig. 4 - Dark and bifid apex of root.

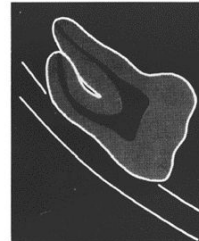


Fig. 5 - Interruption of white line of canal.

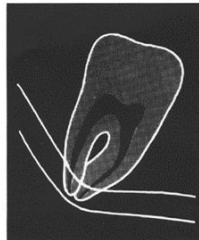


Fig. 6 - Diversion of canal.

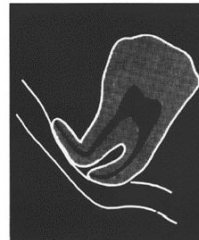


Fig. 7 - Narrowing of canal.









Radiographic Assessment: CBCT/CT

Accurate technique to measure proximity of mandibular molar apices to IAN by providing 3D views and visualisation

Contact of the molar and IAN canal results in increased risk of IAN injury, with lingually positioned third molars the most susceptible to IAN injury

Allows for surgical planning to be more accurate

Radiographic Assessment: CBCT/CT

Classification of relationship of the IAN to tooth (Pogrel, 2015):

- Low risk: separation of the nerve and the root with a covering of bone in between
- Medium risk: occurs when the nerve is directly adjacent to the roots of the tooth or is mildly grooving the root of the tooth
- High risk: deep grooving of the tooth by the nerve or even perforation of the tooth root by the nerve with the roots growing around the nerve

Radiographic Assessment: CBCT

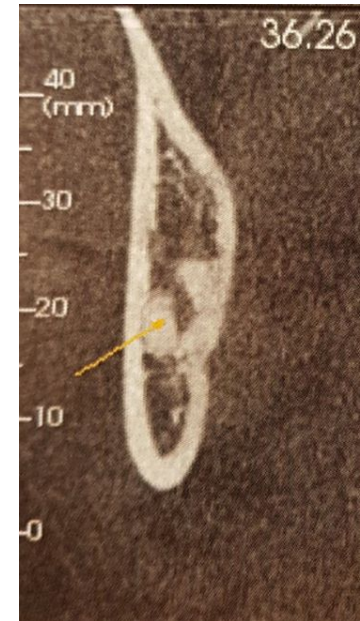
Low Risk



Medium Risk



High Risk



Surgical approach: Maxillary third molars

Erupted

Often indicated for removal due to buccal or palatal positioning, difficulty in cleaning or non-functional and causing soft tissue damage

Anatomy: variable crown size and root configuration

Approach: similar to maxillary second molars

Surgical approach: Maxillary third molars

Unerupted/partially erupted

Soft tissue exposure: two-sided flap with mesial relieving flap

Elevation of tooth in a distobuccal direction to deliver tooth

If bone removal is required, it should be sufficient to provide an application point to the mesiobuccal aspect between crown and alveolus

Assessment of socket for remaining tooth fragment, debris and OAC. Irrigation with saline

Closure of flap with sutures

Surgical approach: Mandibular third molars

Mesioangular

Soft tissue access: two-sided flap with distal relieving incision

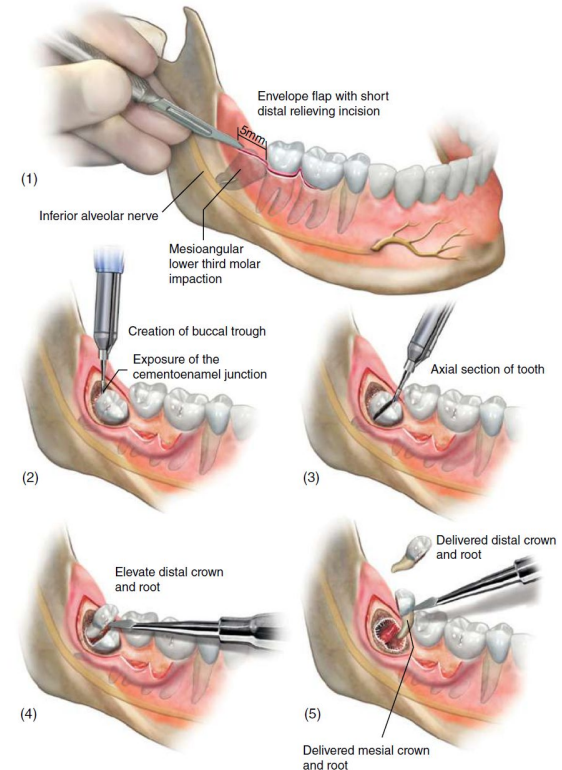
Bone removal: buccal gutter along the mesiobuccal to distobuccal surface of the crown and below the CEJ

Tooth sectioning: axial section to separate the mesial and distal halves of the tooth. Can consider decoronation if axial sectioning is difficult. An elevator is used to separate and mobilise the tooth segments

Delivery: elevate the most distal part of the crown +/- root first, then the mesial portion

Assessment of socket for remaining tooth fragment, debris, soft tissue trauma, alveolar bone fracture. Irrigation with saline

Reposition the flap, using at the distal of the 7 to repose this section first, followed by additional sutures on the relieving incisions



Surgical approach: Mandibular third molars

Distoangular/vertical

Soft tissue access: two-sided flap with distal relieving incision

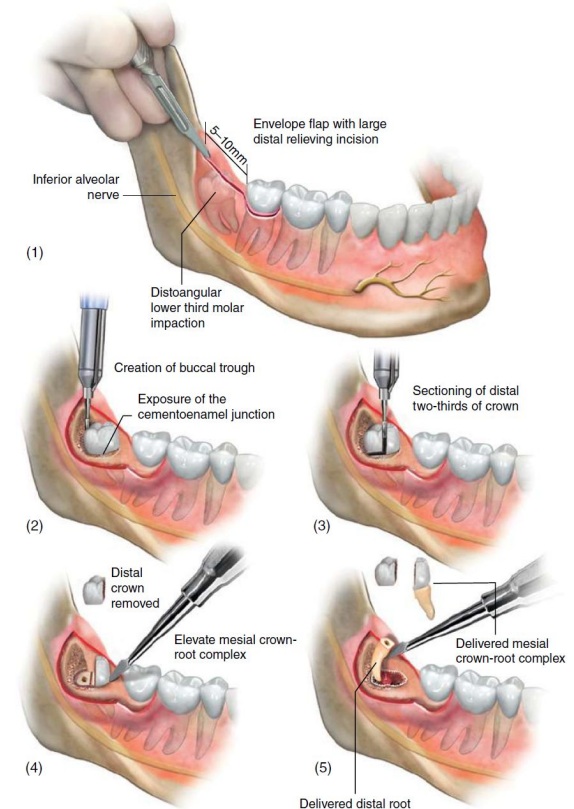
Bone removal: buccal gutter along the mesiobuccal to distal surface of the crown and below the CEJ

Tooth sectioning: removal of the distal two-thirds of the crown is the first step in tooth sectioning. Leave the mesial portion to provide an application point for elevation

Delivery: remove the distal portion of the crown with a straight elevator. Then elevate the remaining crown-root complex into the space using a straight elevator wedged between the mesial edge of the third molar and alveolus. If the tooth is multirooted, the roots may require individual sectioning prior to elevation.

Assessment of socket for remaining tooth fragment, debris, soft tissue trauma, alveolar bone fracture. Irrigation with saline

Reposition the flap, using at the distal of the 7 to repose this section first, followed by additional sutures on the relieving incisions



Surgical approach: Mandibular third molars

Horizontal

Soft tissue access: two-sided flap with distal relieving incision

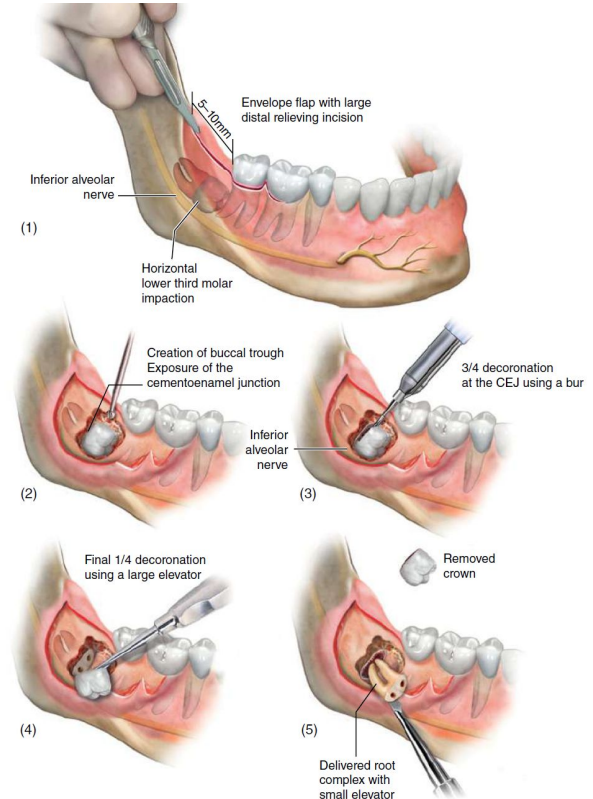
Bone removal: remove alveolar bone from the superior surface of the tooth. Deep buccal gutter to the depth of below the CEJ.

Tooth sectioning: decoronation followed by sectioning of the roots.

Delivery: deliver the tooth in one or more pieces using a straight elevator. Further sectioning between the roots may be required to deliver each root individually.

Assessment of socket for remaining tooth fragment, debris, soft tissue trauma, alveolar bone fracture. Irrigation with saline

Reposition the flap, using at the distal of the 7 to repose this section first, followed by additional sutures on the relieving incisions



Surgical approach: Mandibular third molars

Full bony impaction (early root development)

Soft tissue access: two-sided flap (triangular flap)

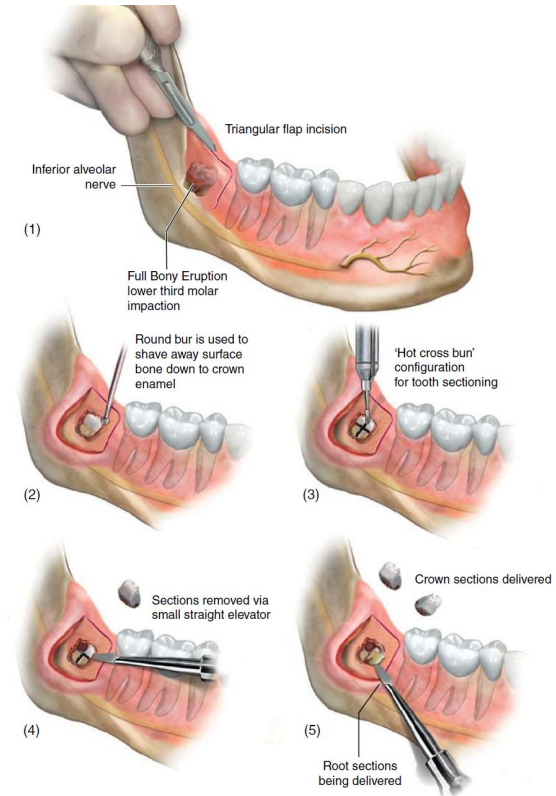
Bone removal: remove alveolar bone (feathering) until enamel is visualised, then expose the occlusal surface of the crown.

Tooth sectioning: sectioning of the crown (to reduce bone drilling) using a “hot-cross bun” pattern

Delivery: remove the tooth pieces individually using a straight elevator.

Assessment of socket for remaining tooth fragment, debris, soft tissue trauma, alveolar bone fracture. Irrigation with saline.
Removal of dental follicle and remaining tooth bud.

Reposition the flap using a single suture at the corner of the triangular flap.



Coronectomy

What is it?

Involves removing the crown and leaving the roots in situ in teeth that are intimately related to the IAN to reduce the possibility of nerve injury (Pogrel et al., 2004; Renton et al., 2005)

Retained roots are left 2-3 mm below the alveolar crest to allow bone to form above the transected tooth

Lower incidence of IAN injury (Dalle Carbonare et al., 2017)

- Incidence of injury of IAN with coronectomy 0.5%
- Failed coronectomies have a similar risk of IAN injury compared to complete removal of third molars

Coronectomy

Indications

Moderate or high risk of damage to IAN

Consideration of age > 25 years old

Not medically compromised

FSHx

Contraindications

Teeth with active infection

Caries

Teeth that are horizontally impacted

Teeth that are mobilised during the procedure

When not all enamel of the tooth can be removed

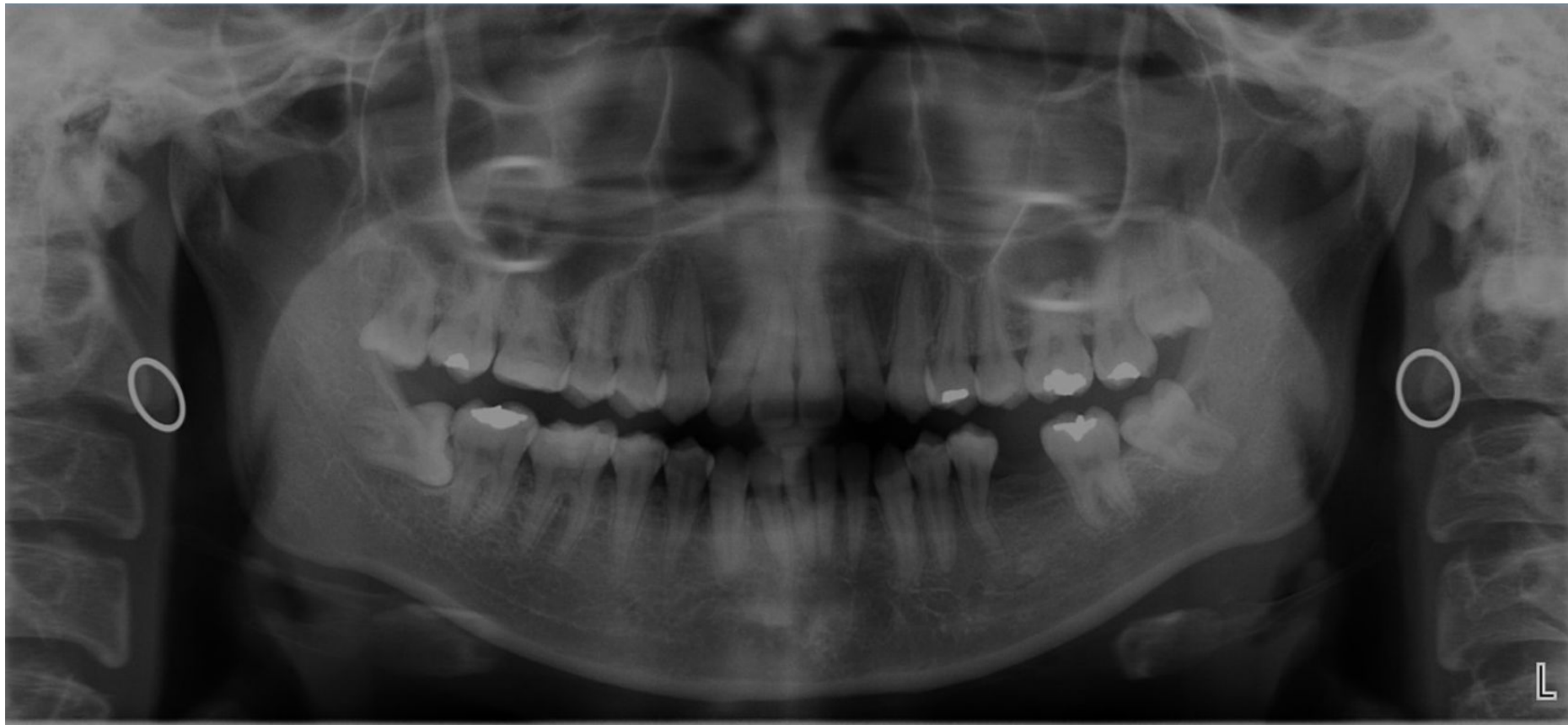
Teenagers

Orthodontic treatment

Medically compromised – immunocompromised, potential poor healing



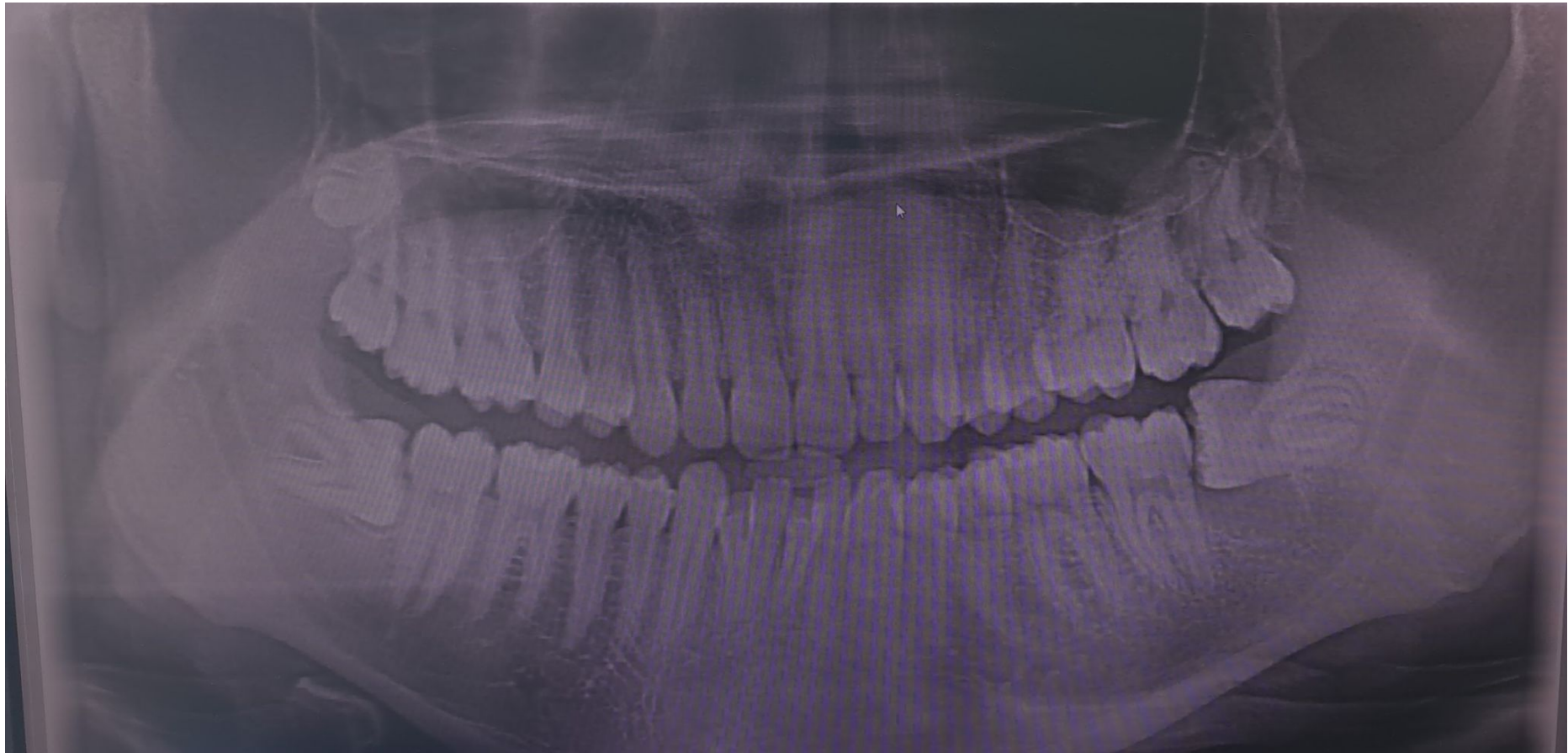
Cases















Recommended Reading

DALLE CARBONARE, M., ZAVATTINI, A., DUNCAN, M., WILLIAMS, M. & MOODY, A. 2017. Injury to the inferior alveolar and lingual nerves in successful and failed coronectomies: systematic review. *Br J Oral Maxillofac Surg*, 55, 892-898.

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POGREL, M. A., LEE, J. S. & MUFF, D. F. 2004. Coronectomy: a technique to protect the inferior alveolar nerve. *J Oral Maxillofac Surg*, 62, 1447-52.

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