IMPACTED TEETH

SURGERY & COMPLICATIONS

DEFINITIONS:

IMPACTED TOOTH

IMPACTED TOOTH IS DEFINED AS THE TOOTH WHICH HAS ALREADY PASSED CHRONOLOGICAL AGE OF ERUPTION AND FAILED TO ERUPT INTO ORAL CAVITY INSPITE OF NORMAL ERRUPTIVE FORCES DUE TO SOME MECHANICAL OBSTRUCTION.

An impacted tooth is partially erupted or unerupted tooth and is positioned against another tooth , bone or soft tissue so that its further eruption is unlikely and will not eventually assume a normal arch relationship with the other teeth or tissues.

- Origin – Latin– Impactus

- Impactus: Cessation of eruption caused by physical barrier

CAUSES OF IMPACTION

LOCAL

- Lack of Space b/w 2nd molar and ramus.
- Overretained decidous teeth.
- Premature loss of deciduous teeth
- Ectopic position of tooth bud
- Cyst , tumor

- Obstruction for eruption
  - Irregularity in position and presence of an adjacent tooth.
  - Density of overlying and surrounding bone.
- Lack of space in dental arch –supernumerary teeth.
- Ankylosis of primary or permanent teeth.
- Non resorbing alveolar bone.

SYSTEMIC

Prenatal

- Heredity

Postnatal Causes

Parathyroid
Pituitary glands like hypothyroidism and **achondroplasia**

- Rickets
- Anemia
- Congenital Syphilis
- Tuberculosis
- Endocrine Dysfunctions
- Malnutrition

Rare Causes

- Clediocranial Dysostosis
- Oxychephaly
- Progeria
- Achondroplasia
- Cleft Palate

Commonly impacted teeth

maxillary third molars
mandibular third molars
maxillary cuspids
mandibular bicuspids
mandibular cuspids
maxillary bicuspids
supernumerary teeth mainly mesiodens

Theories of impaction (Durbeck)

- The Phylogenic theory
- The Mendelian theory
- The Endocrine theory
- The Pathological theory

PHYLOGENIC THEORY

- Over centuries maxilla and mandible have decreased in size leaving insufficient room for 3rd molars
- congenitally missing 3rd molars in some individuals supports the view that the 3rd molar is a vestigial organ without current purpose or function.

MENDELIAN THEORY

- Heredity is the most common etiologic factor in impaction. The transmission of small jaws from one parent and large teeth from the other would likely result in insufficient space for the teeth and instances of impaction.

Indications for removal

- Pericoronitis
- Dental caries
- Periodontal disease
- Prevention of root resorption
- Odontogenic cysts & tumours
- Fracture of the jaw/tooth in the line of fracture
- Prosthetic problems e.g. under prosthesis
- Orthodontic treatment
- Tooth interfering with orthognathic surgery
- Patients undergoing chemo/radio-therapy

Contraindications for removal

- Extremes of age
- Uncontrolled active pericoronal infection
- Poor systemic condition

CLASSIFICATION OF IMPACTED TOOTH

- Maxillary and mandibuar 3rd molars are classified radiographically by angulation, depth, and length or relationship to the anterior aspect of the ascending mandibular ramus.
- **Classification helps to the following**

  * Describe the general position of the impacted 3rd molar

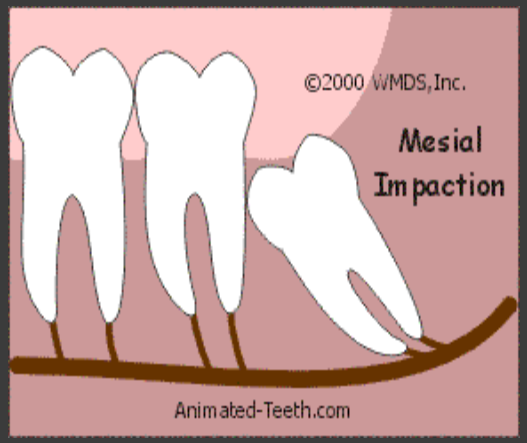
  * Aids in estimating the difficulty in removing the tooth.

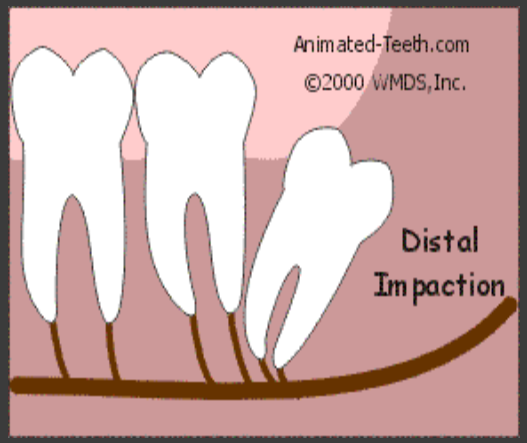
CLASSIFICATIONS OF MANDIBULAR THIRD MOLAR IMPACTION

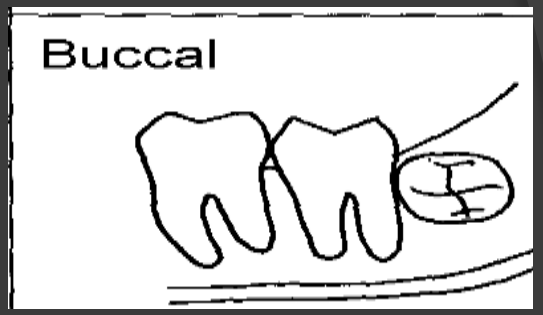
- **Winter's Classification** (1926):
- **Based on angulations :** according to the position of the impacted third molar to the long axis of second molar
  - Mesioangular
  - Horizontal
  - Vertical
  - Distoangular

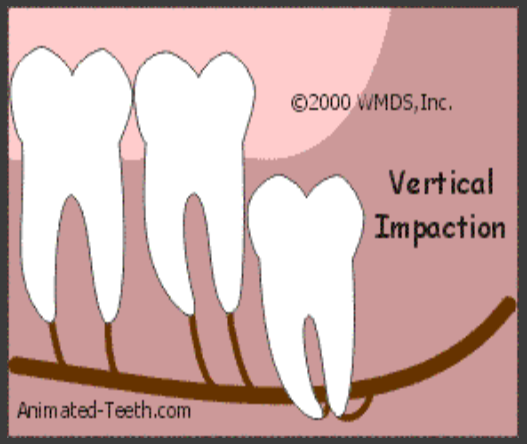
- These may occur simultaneously in:
  - Buccal version
  - Lingual version
  - Torsoversion

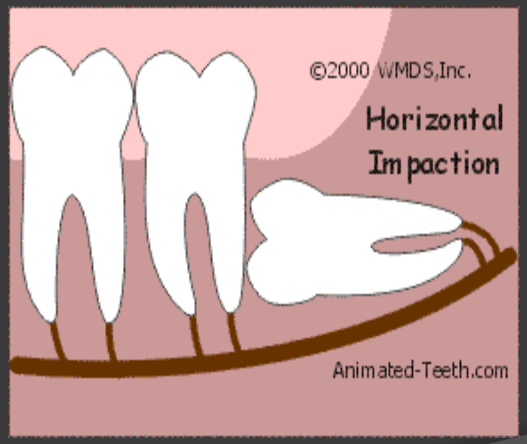
Classification of Impacted 3rd Molars (Winter)

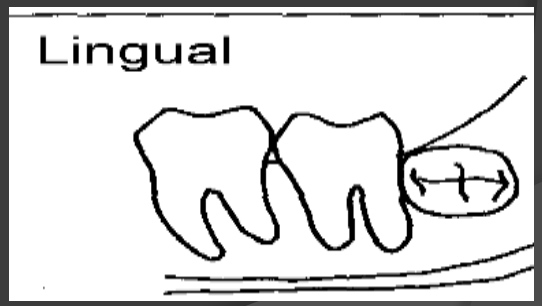






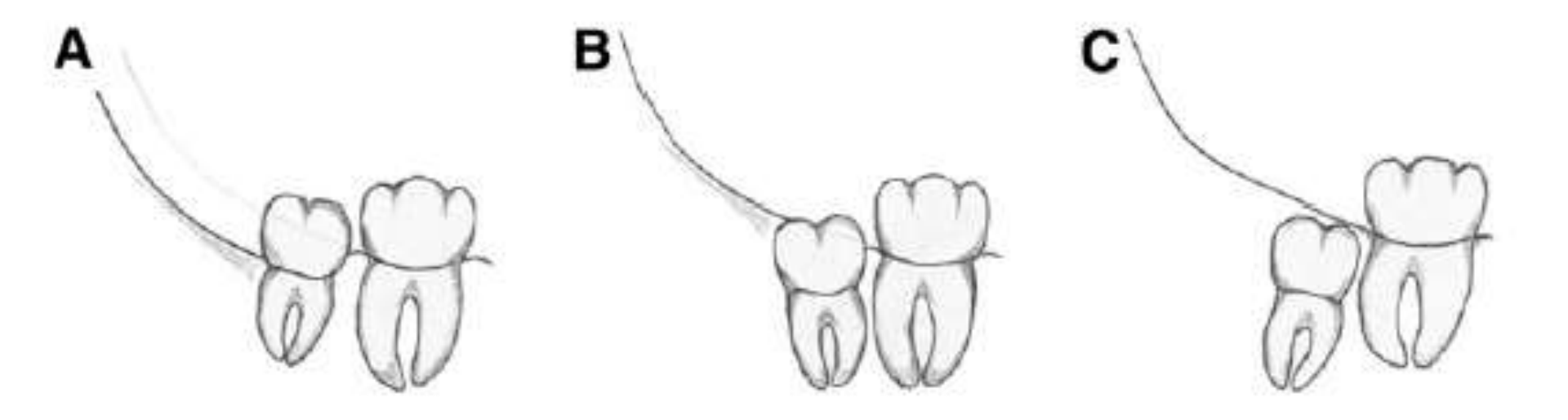






Pell and Gregory's Classification(1933)

BASED ON THE RELATIONSHIP OF THE THIRD MOLAR TO THE RAMUS OF THE MANDIBLE AND THE SECOND MOLAR

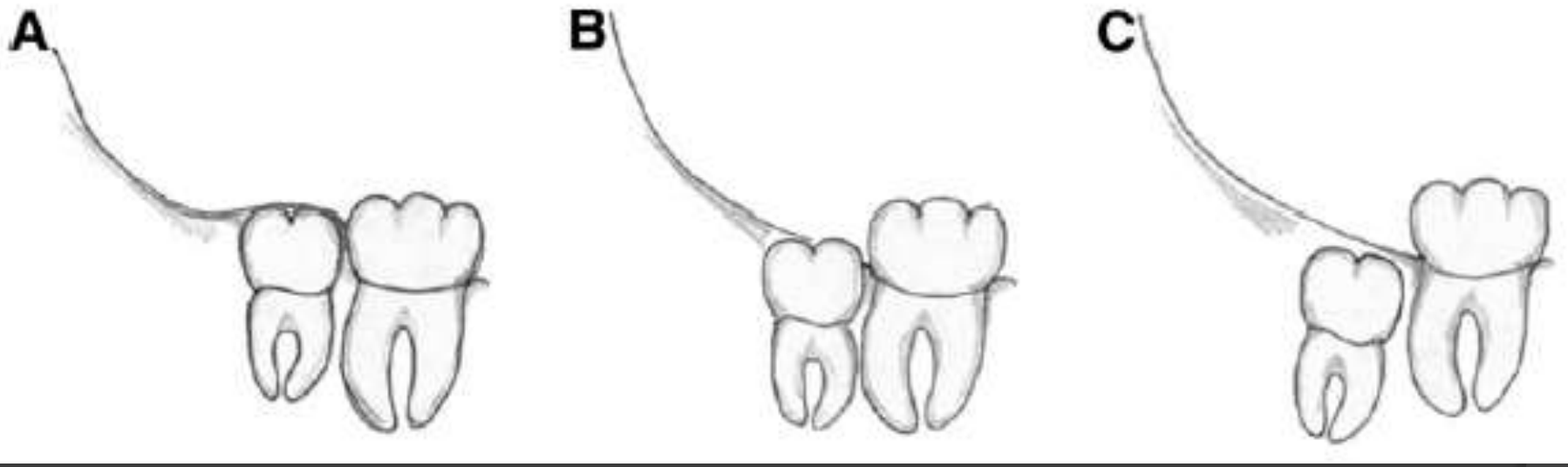


BASED ON POSITION OF HIGHEST PORTION OF THIRD MOLAR WITH OCCLUSAL PLANE

Class I- sufficient amount of space between the ramus and distal of the second molar for the accommodation of the mesiodistal diameter of the crown of the third molar.

Class II - the space between the ramus and distal of the second molar is less than the mesiodistal diameter of the crown of the third molar.

Class III – all or most of the third molar is located in the ramus.


A
B
C

Classifications

- **<u>Based on depth</u>:** according to relationship with the occlusal surface of adjoining second molar between long axis of 2 molar & ascending ramus.

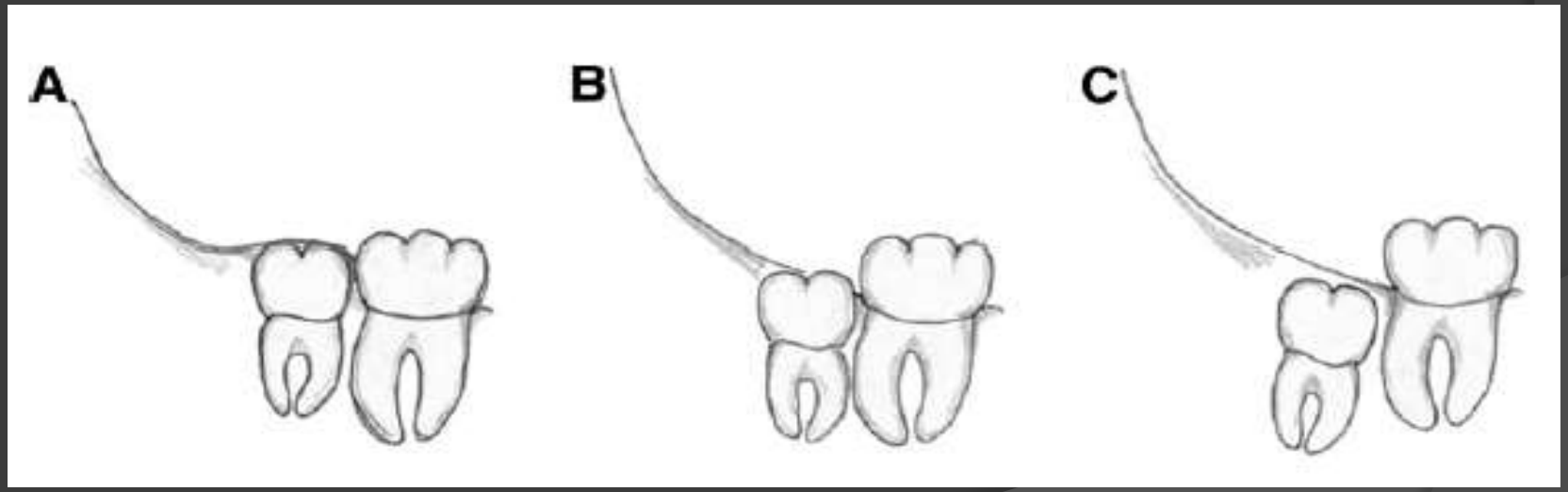
- Position A - highest position of the tooth is on a level or above the occlusal line.

- Position B - highest position is below the occlusal line but above the cervical level of second molar.

- Position C - highest position is below the cervical level of second molar.

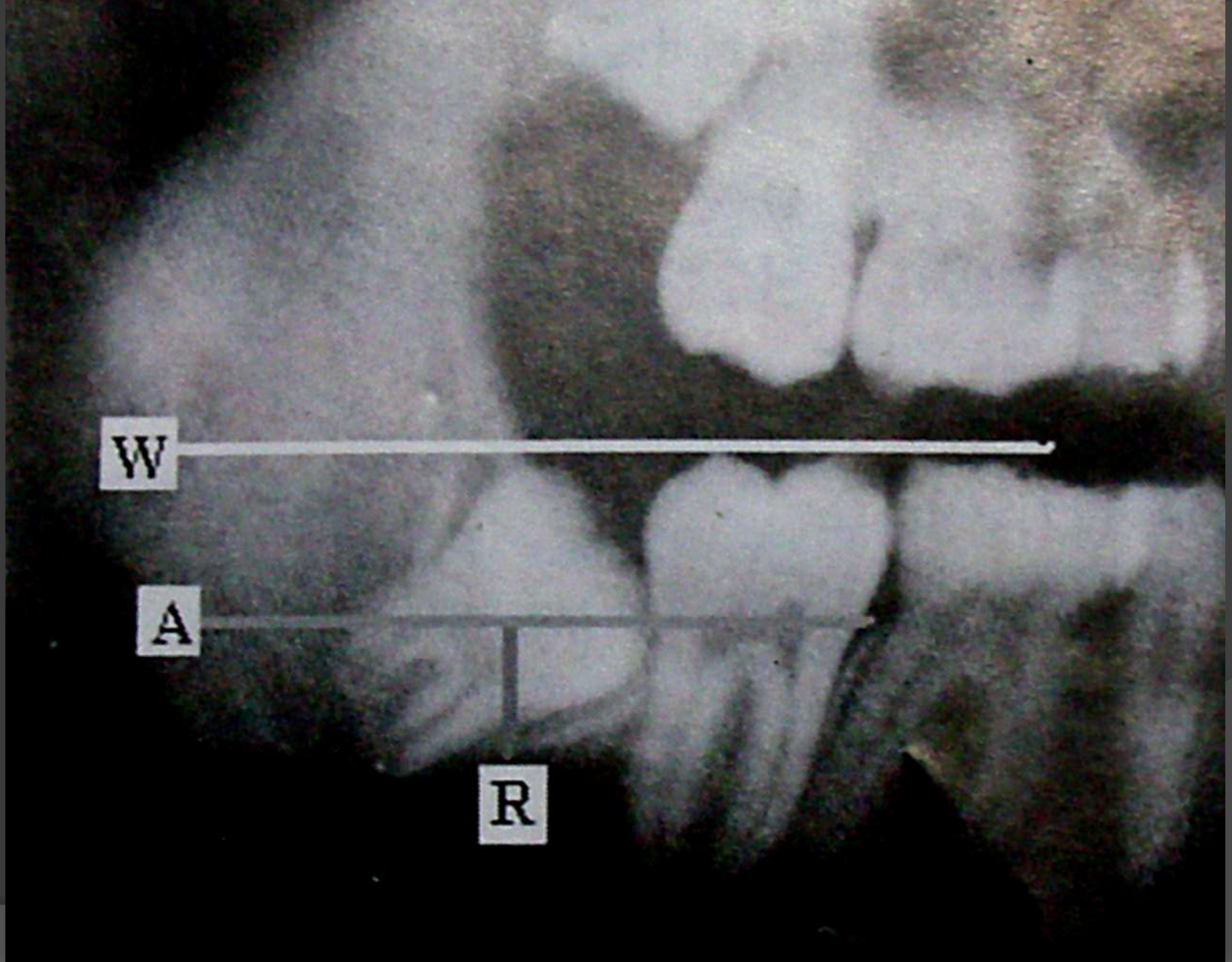
ADA CLASSIFICATION

- Soft tissue impactions
- Partial bony impactions
- Complete bony impactions



Winters "WAR" lines

- *White line*: Line joining the occlusal surfaces/heighest cusps tips of all erupted molars, extending up to the ramus. It indicates the difference in occlusal level of second and third molars.
- *Amber line*: Represents the bone level distal to the 3rd molar, extended anteriorly along the crest of interdental septum. This line denotes the alveolar bone covering the impacted tooth and the portion of the tooth not covered.
- *Red Line*: Drawn perpendicular from Amber line to the imaginary point of application of elevator on the 3rd molar. It indicates the amount that will have to be removed before elevation i.e. the depth of the tooth in bone and the difficulty encountered in removing the tooth


W
A
R

WHARFE'S ASSESSMENT

DIFFICULTY INDICES FOR REMOVAL OF IMPACTED MANDIBULAR THIRD MOLARS

WHARFE ASSESSMENT

CRITERIA		SCORE
Winters Classification	Horizontal	2
	Distoangular	2
	Mesioangular	1
	Vertical	0
Height of Mandible	1 to 30 mm	0
	31 to 34 mm	1
	35 to 39 mm	2
Angulation of Third Molar	1 to 59 degrees	0
	60 to 69 degrees	1
	70 to 79 degrees	2
	80 to 89 degrees	3
	90 + degrees	4

CRITERIA		SCORE
Root Shape	Complex	1
	Favorable Curvature	2
	Unfavorable Curvature	3
Follicle Size	Normal	0
	Possibly Enlarged	1
	Enlarged	2
Path of Exit	Space Available	0
	Distal cusp covered	1
	Mesial cusp covered	2
	Both covered	3

PEDERSON DIFFICULTY INDEX

Difficulty Index for the Removal of Impacted *Mandibular* 3rd Molars, as described by **Pederson**

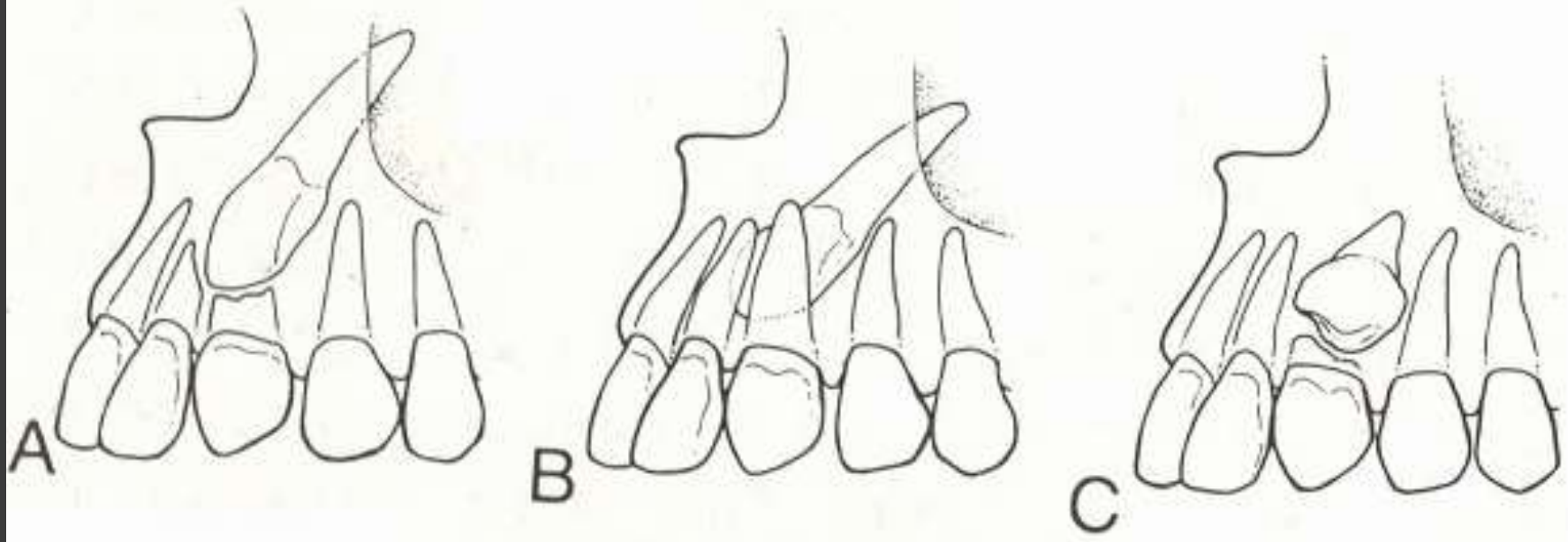
Classification	Value
Spatial relationship	
Mesioangular	1
Horizontal/transverse	2
Vertical	3
Distoangular	4
Depth	
Level A: high occlusal level	1
Level B: medium occlusal level	2
Level C: deep occlusal level	3
Ramus relationship/space available	
Class 1: sufficient space	1
Class 2: reduced space	2
Class 3: no space	3
Difficulty index	
Very difficult	7–10
Moderately difficult	5–6*
Slightly difficult	3–4

*In the original index, moderately difficult was graded as 5–7.

Classification of maxillary canine impaction

- FIELD & ACKERMAN (1935)

- Labial position
  - Crown in intimate relationship with incisors
  - Crown well above apices of incisors
- Palatal position
  - Crown in intimate relationship with incisors
  - Crown well above apices of incisors
- Intermediate position
  - Crown between lateral incisor & 1st premolar root
  - Crown above lat incisor & 1st premolar with crown labially placed and root palatally placed or vice versa
- Unusual position
  - In nasal or antral wall
  - In infraorbital region



The usual positions of impacted cuspids. *A*, Impinging on and damaging the permanent lateral incisor. *B*, Impacted cuspid in the hard palate. *C*, Transverse imported cuspid in the alveolar process.

Assessment of impaction

- Preoperative assessment
  - Clinical assessment
    - General
    - Local
  - Radiological assessment

Clinical assessment

- General assessment
  - Age
  - General examination
  - Systemic condition
  - Medical risk

Local assessment

- Intra oral Examination
  - Mouth opening
  - Extensibility of lips and cheeks

Assessment of impacted teeth

- State of eruption
- Periodontal status
- Condition of soft tissue covering the impacted tooth
- Position and occlusal relation of opposing tooth

RADIOGRAPHIC ASSESSMENT

- RADIOGRAPHIC VIEWS
  - INTRAORAL PERIAPICAL RADIOGRAPH (IOPA)
  - OCCLUSAL
  - ORTHOPANTOMOGRAPH (OPG)
  - CONE BEAM COMPUTED TOMOGRAPHY (CBCT)

RADIOLOGICAL ASSESSMENT AIDS IN DETERMINING

- CLASSIFICATION OF IMPACTED TOOTH
- ORIENTATION OF IMPACTED TOOTH
- DEPTH OF THE TOOTH
- ROOT SHAPE
- RELATIONSHIP TO INFERIOR ALVEOLAR CANAL
- RELATIONSHIP TO ADJACENT TOOTH
- LOCALIZATION OF IMPACTED TOOTH

ROOD'S CRITERIA

Sign	Number of signs seen on OPG	Number of contact seen on CBCT	Number of no contact seen on CBCT
Darkening of root	14	9	5
Deflection of root	9	5	4
Interruption of white line of canal	11	5	6
Narrowing of the inferior alveolar canal	2	1	1
Diversion of the inferior alveolar canal	2	1	1
Dark and bifid root	0	0	0
Narrowing of root	0	0	0
Two or more signs [*n* (%)]	9 (19)	9	0
Total [*n* (%)]	47	30 (63.8)	17 (36.2)

CBCT, cone beam computed tomography;
OPG, orthopantomogram.

SEQUENCE OF PROCEDURE

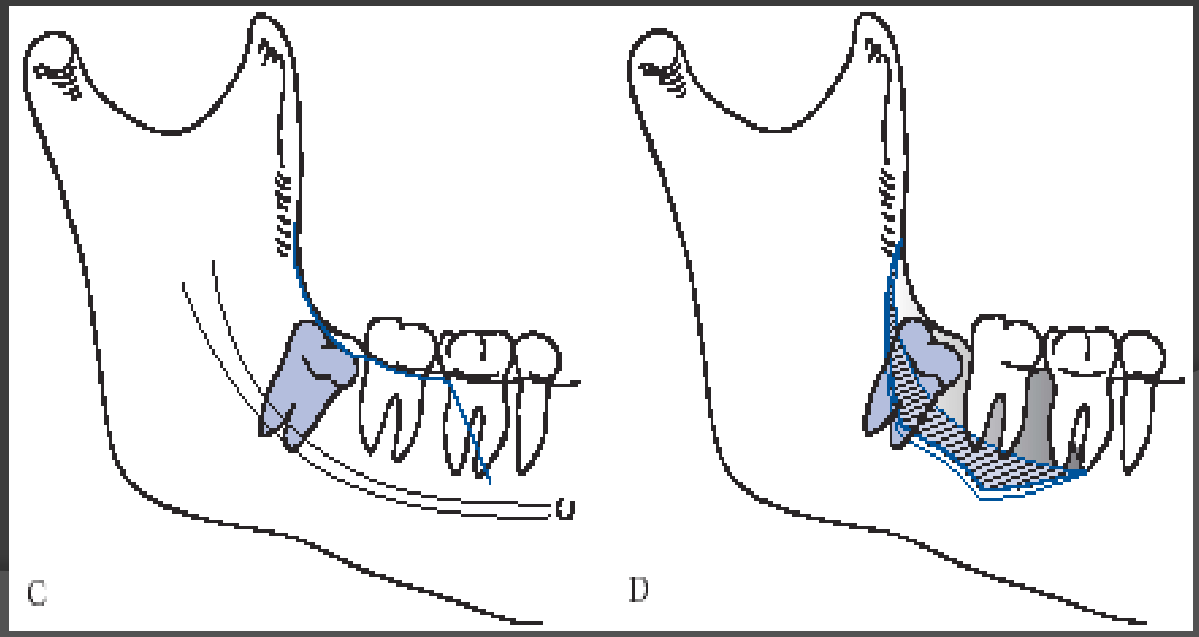
1) Isolation.
2) Anaesthesia
3) Incision- Flap design.
4) Removal of overlying bone.
5) Sectioning of tooth.
6) Delivery of sectioned tooth.
7) Smoothening & debridement of socket.
8) Arrest of haemorrhage
9) Closure of wound.
10) Follow up

INCISIONS AND FLAPS

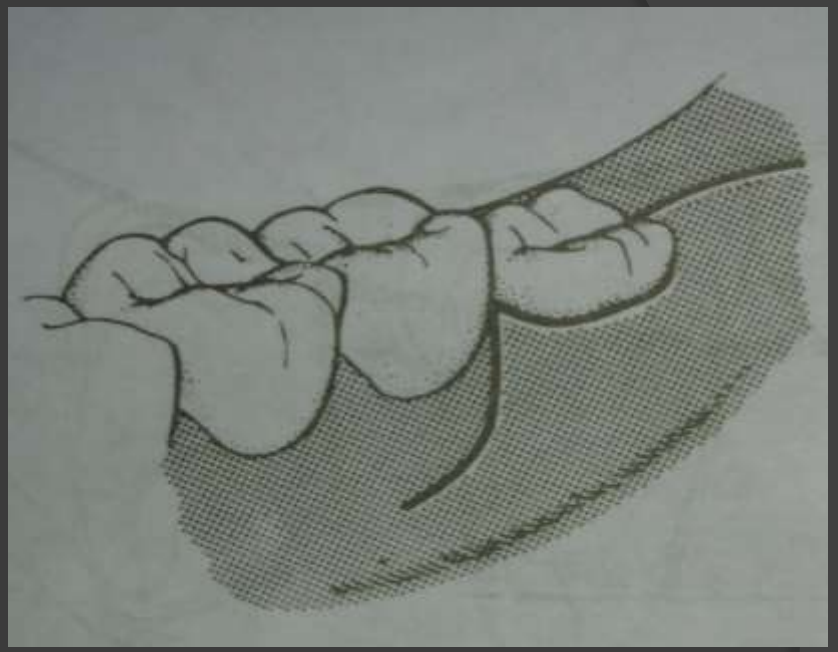
- Triangular shaped incision
- Envelope flap
- Ward’s incision and Modified Ward’s incision

Incision-flap design

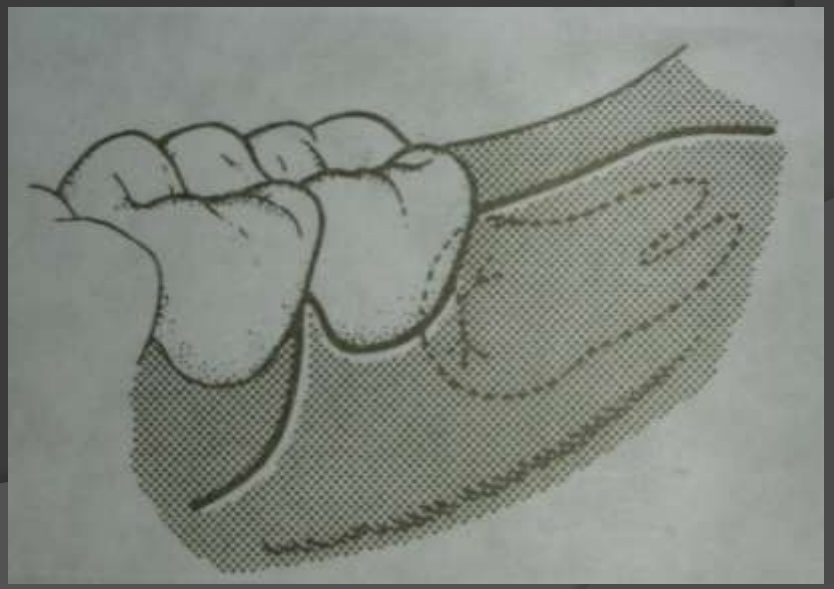
- Must be of adequate dimensions to allow adequate exposure.



3. Ward’s incision

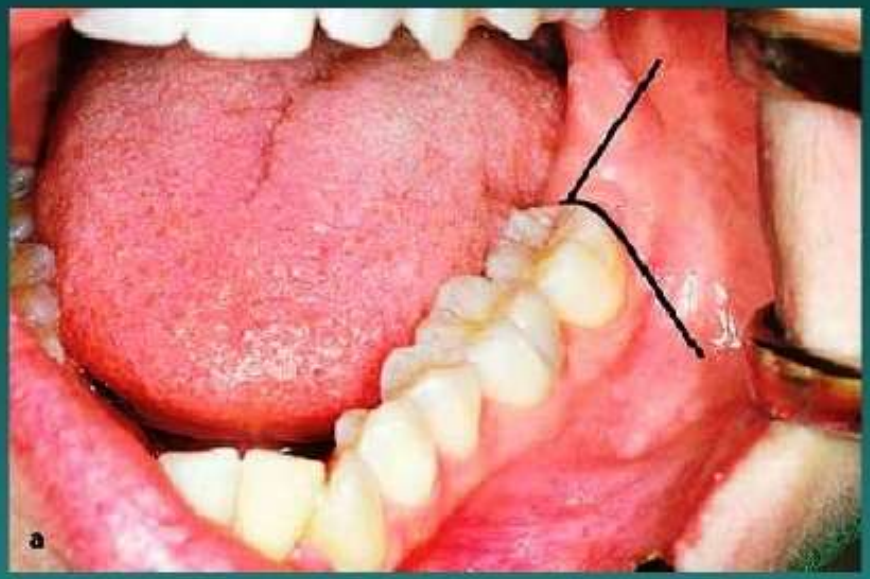


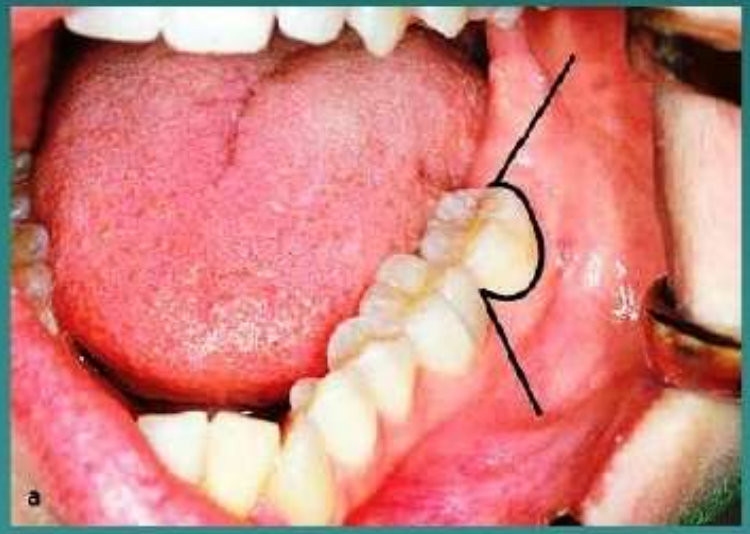
4. Modified ward’s incision



ENVELOPE FLAP

TRIANGULAR FLAP





BONE REMOVAL

- BUR TECHNIQUE

Moore and Gillby’s guttering technique

- CHIESEL AND MALLET

REMOVAL OF OVERLYING BONE

- ONCE THE SOFT TISSUE IS ELEVATED AND RETRACTED, THE SURGEON MUST MAKE A JUDGMENT CONCERNING THE AMOUNT OF BONE TO BE REMOVED.

- BONE MUST BE REMOVED IN AN ATRAUMATIC, ASEPTIC, AND NON–HEAT-PRODUCING TECHNIQUE, WITH AS LITTLE BONE REMOVED AND DAMAGED AS POSSIBLE.

THE AMOUNT OF BONE THAT MUST BE REMOVED VARIES WITH THE DEPTH OF IMPACTION, THE MORPHOLOGY OF ROOTS, AND THE ANGULATION OF TOOTH.

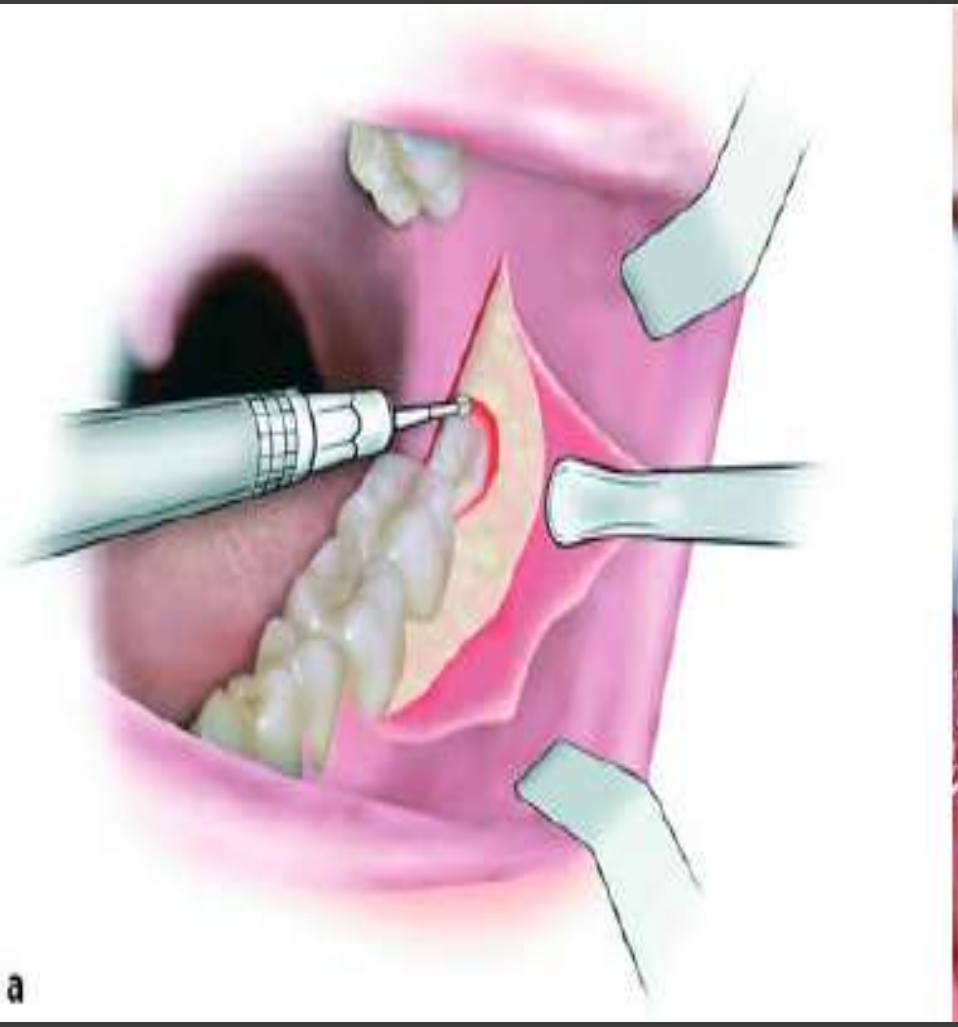
- THE SPEED OF MICROMOTOR SHOULD BE 12000- 20000 RPM.

REMOVAL OF OVERLYING BONE

- A large round bur (No. 8) is desirable, because it is an end cutting bur and can be effectively used for drilling with a pushing motion.

- The tip of a fissure bur (No. 703) does not cut well, but the edge rapidly removes bone and quickly sections teeth when used in lateral direction.

- The bone on the occlusal aspect of the tooth is removed first to expose the crown of the tooth.



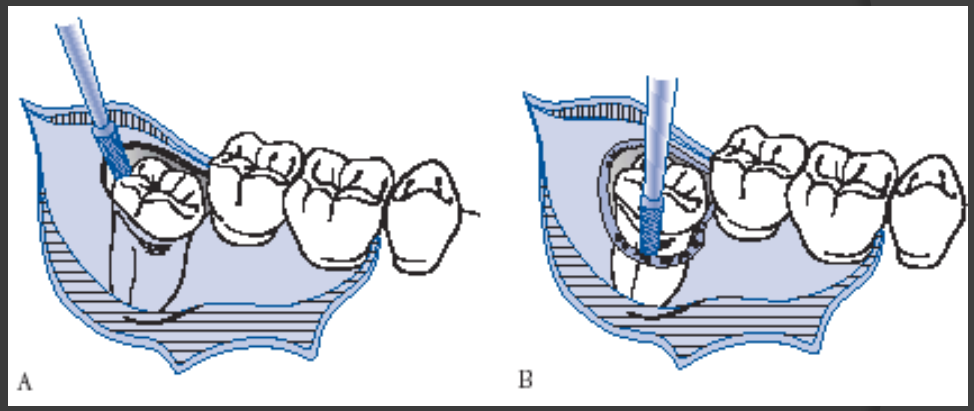
Exposure of the crown of the tooth using a round bur.

REMOVAL OF OVERLYING BONE

NEXT, THE BUR CAN BE USED TO REMOVE BONE B/W THE TOOTH AND THE CORTICAL BONE IN THE CANCELLOUS AREA OF THE BONE

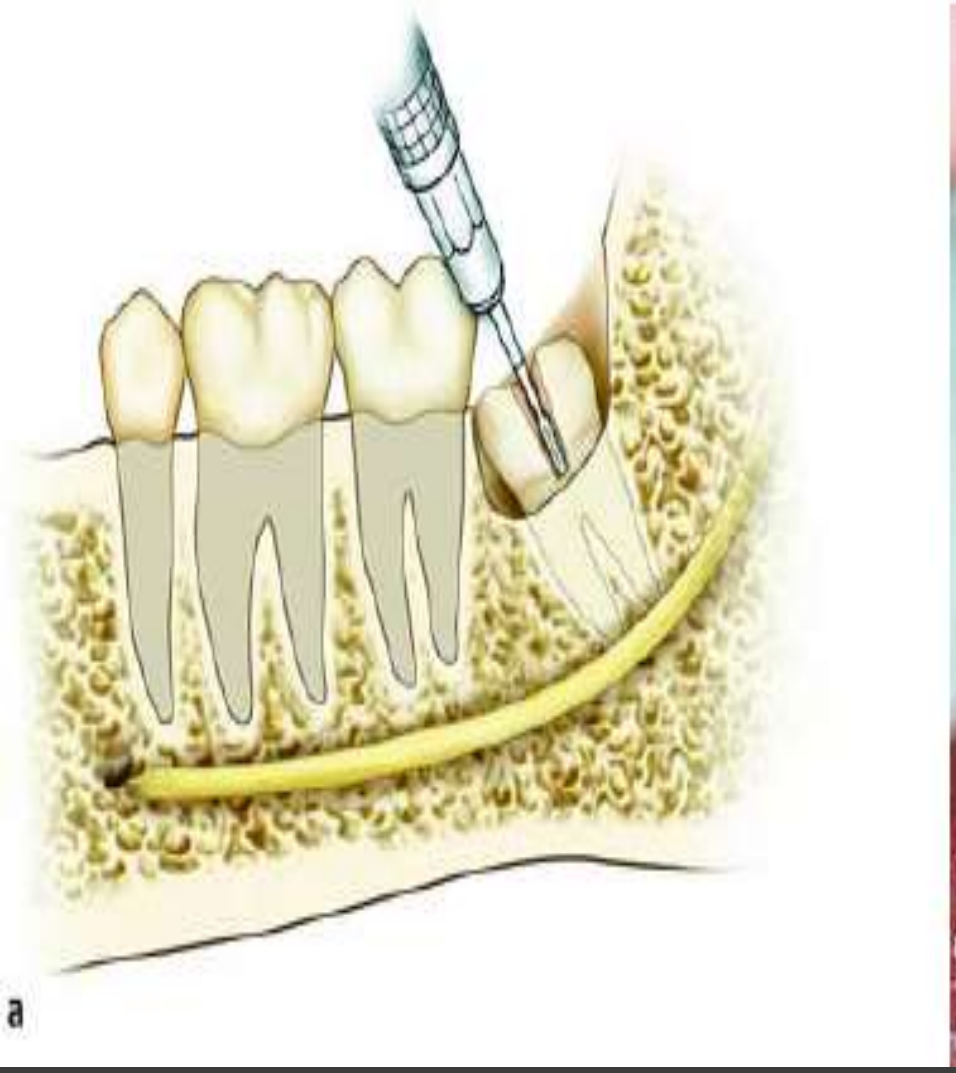
- THIS PROVIDES ACCESS FOR ELEVATORS TO GAIN PURCHASE POINTS AND A PATHWAY FOR DELIVERY OF TOOTH.

- NO BONE SHOULD BE REMOVED FROM LINGUAL ASPECT SO AS TO PROTECT THE LINGUAL NERVE FROM INJURY.

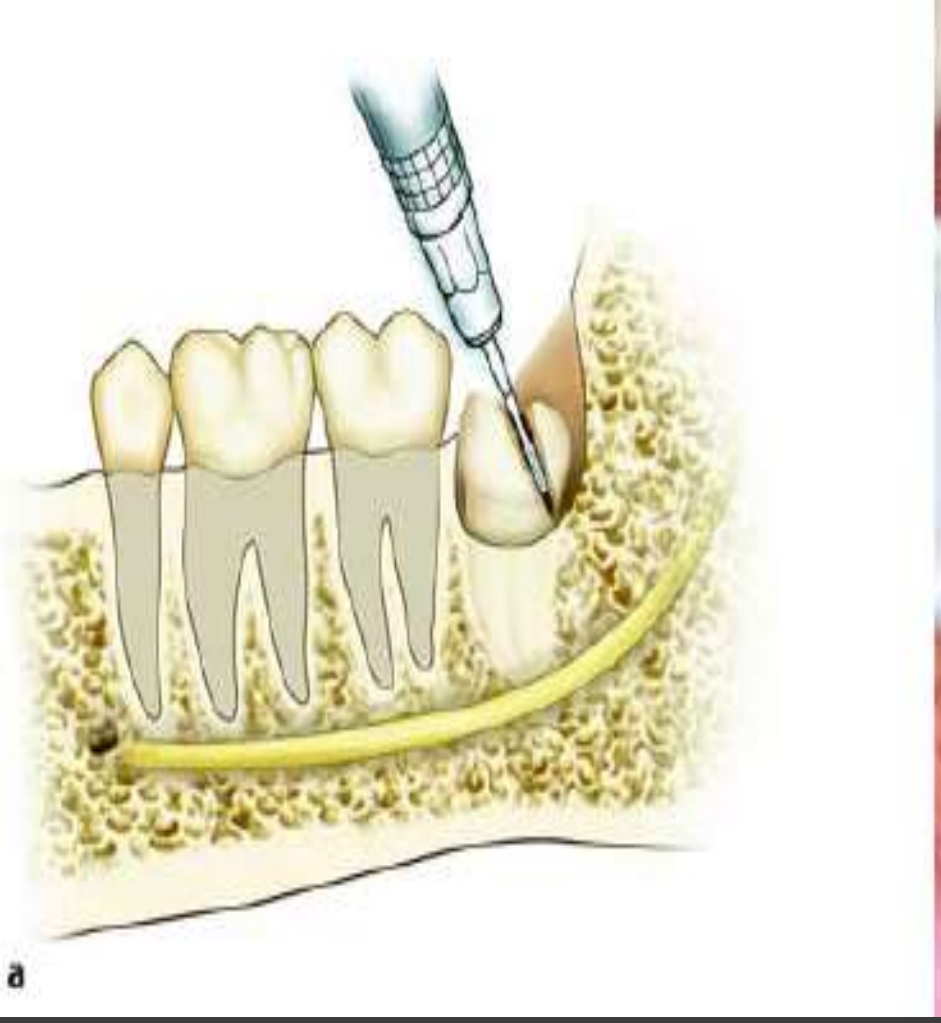


SECTIONING OF TOOTH

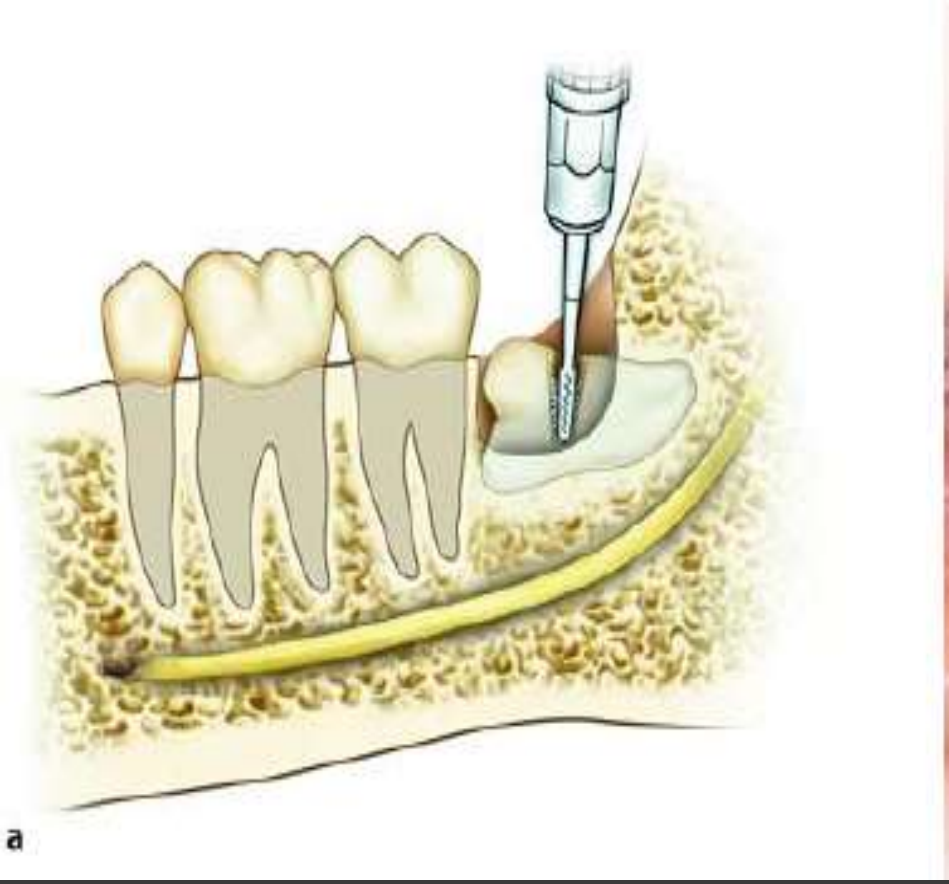
- Reduces the amount of bone removal required prior to elevation of tooth.
- Reducing the risk of damage to the adjacent tooth.
- Once sufficient amount of bone removed, the surgeon should access the need to section the tooth.
- The direction in which the impacted tooth should be divided depends primarily on the angulation of the impacted tooth & root curvature.

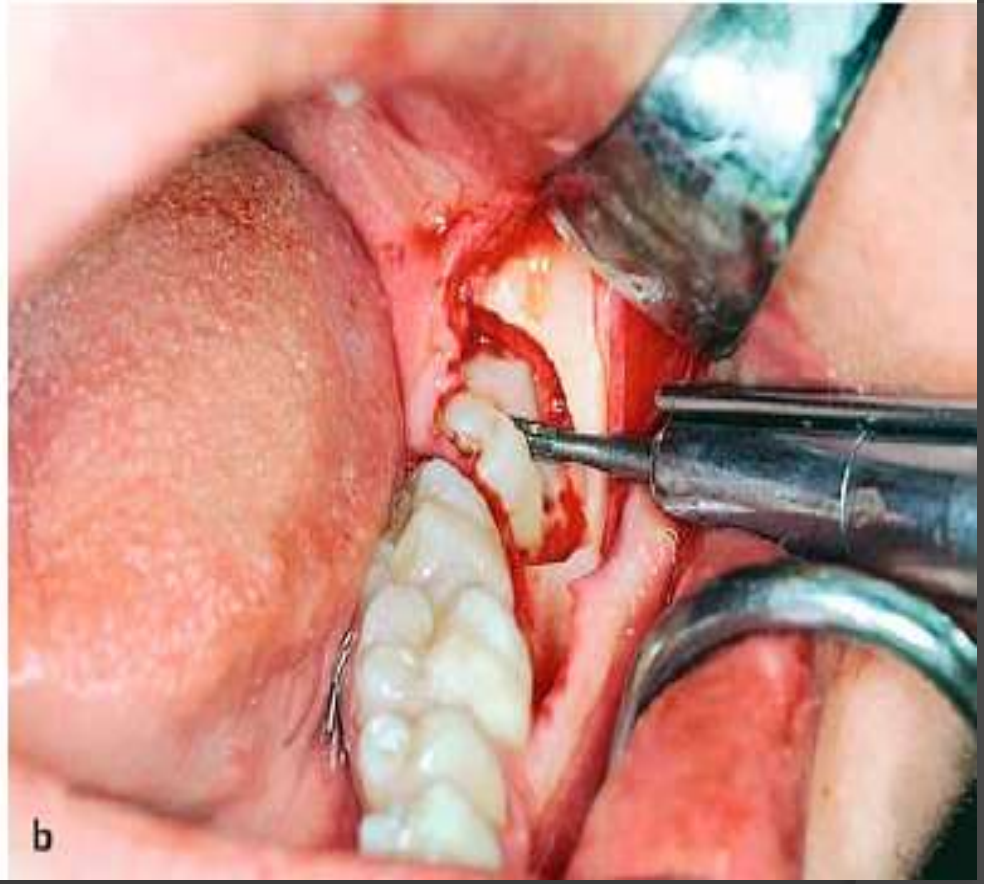


Sectioning of the crown of an impacted tooth, in the buccolingual direction, which extends as far as the intraradicular bone.
a Diagrammatic illustration. **b** Clinical photograph



Sectioning of the distal portion of the crown of the impacted tooth using a fissure bur.





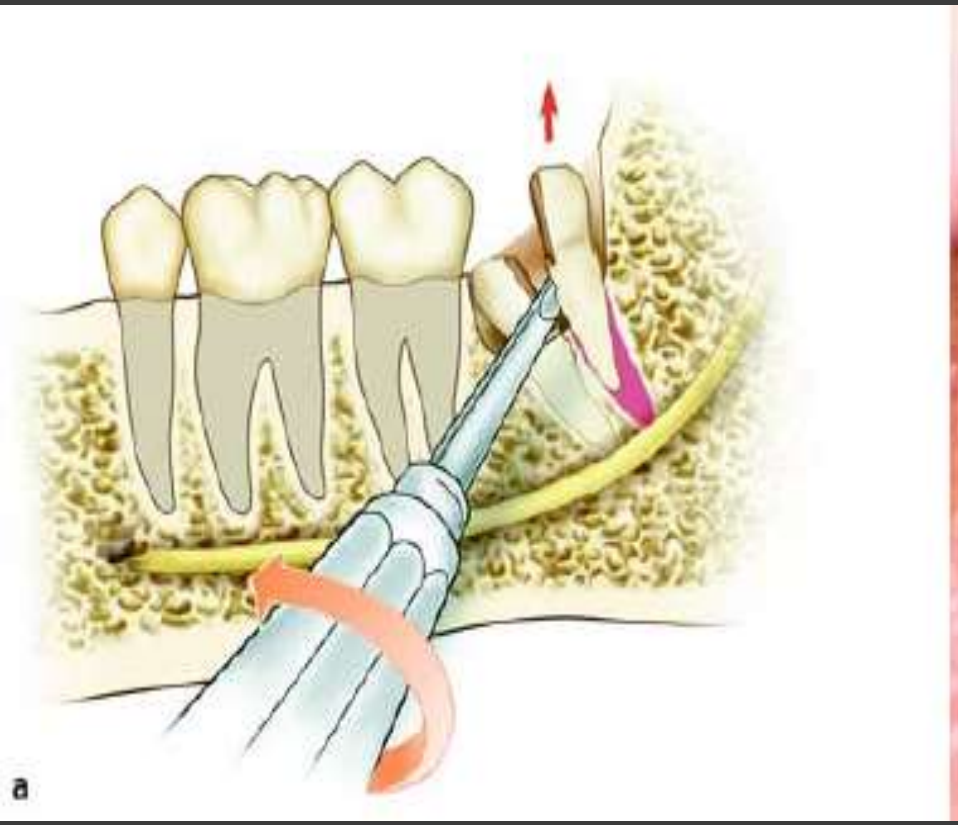
Sectioning of tooth at the cervical line using a fissure bur.
The diagrammatic illustration (**a**) shows the position beyond which the bur must not proceed, to avoid injury of the inferior alveolar nerve

DELIVERY OF SECTIONED TOOTH

- Once adequate bone has been removed to expose the tooth and the tooth has been sectioned in the appropriate fashion, the tooth is delivered from the alveolar process with elevators.

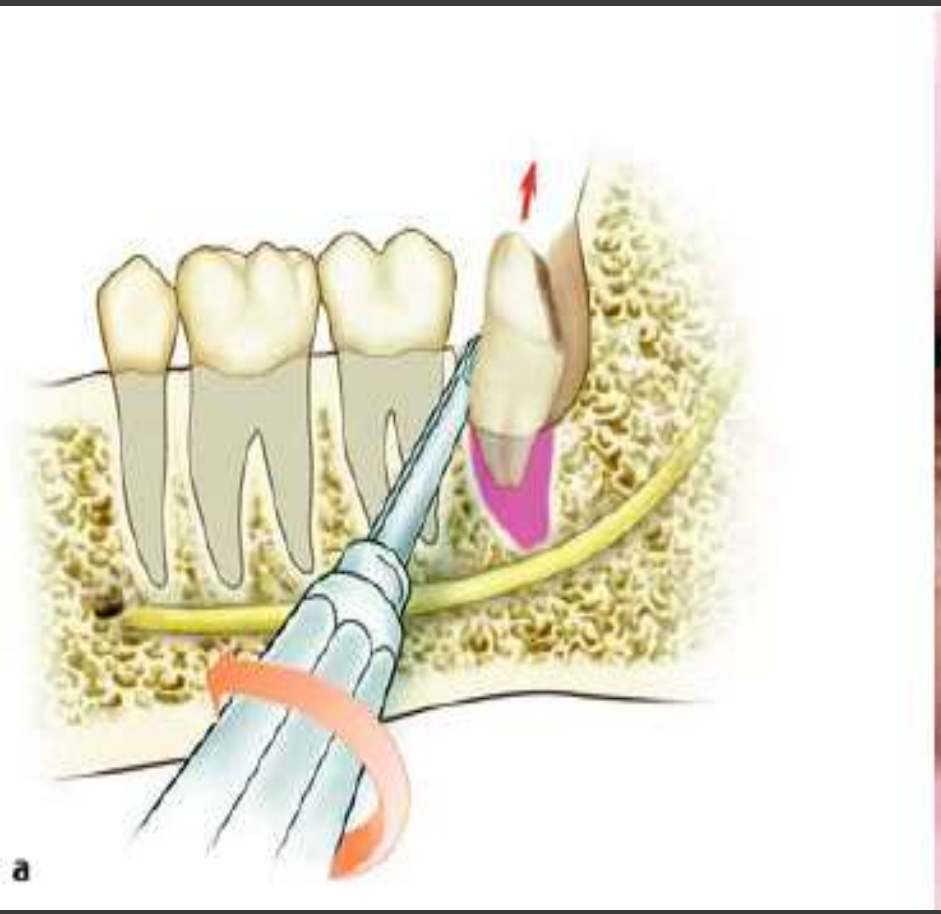
- Application of an excessive force may result in unfavorable fracture of the tooth, buccal bone, the adjacent second molar or possibly of the mandible.

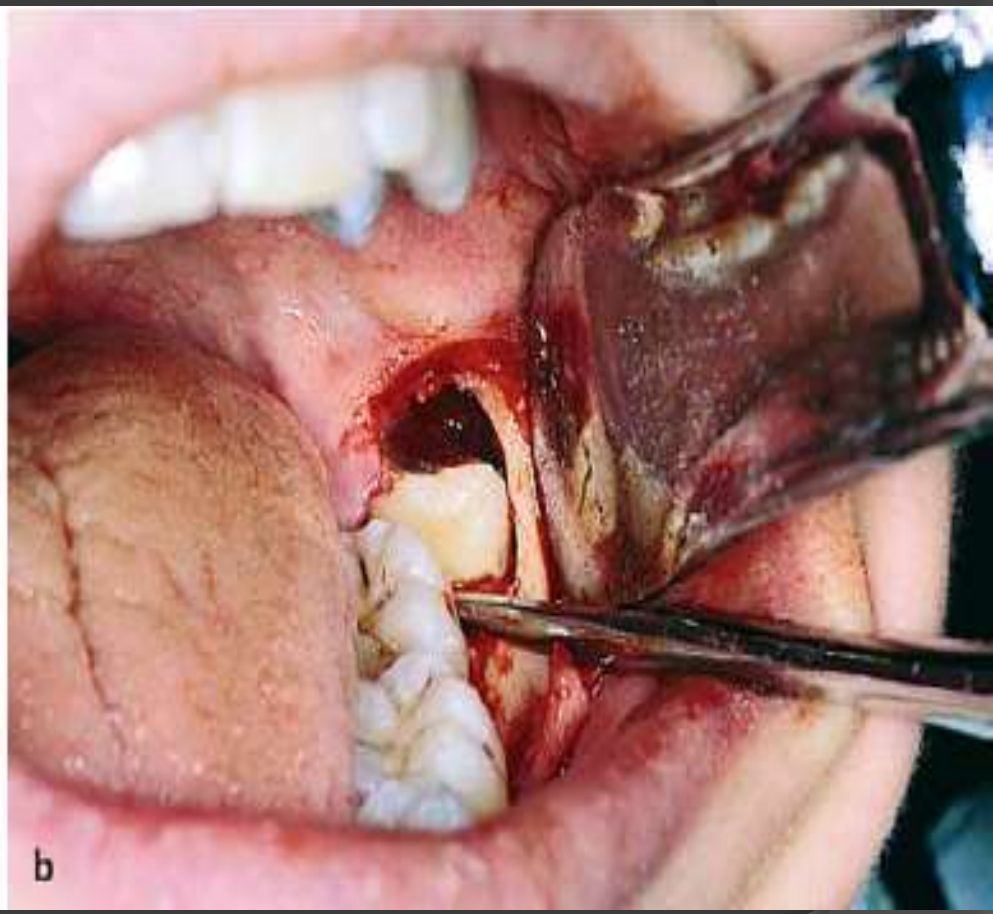
DELIVERY OF SECTIONED TOOTH



Luxation of the distal segment of the tooth with rotation of the elevator distally.

DELIVERY OF SECTIONED TOOTH

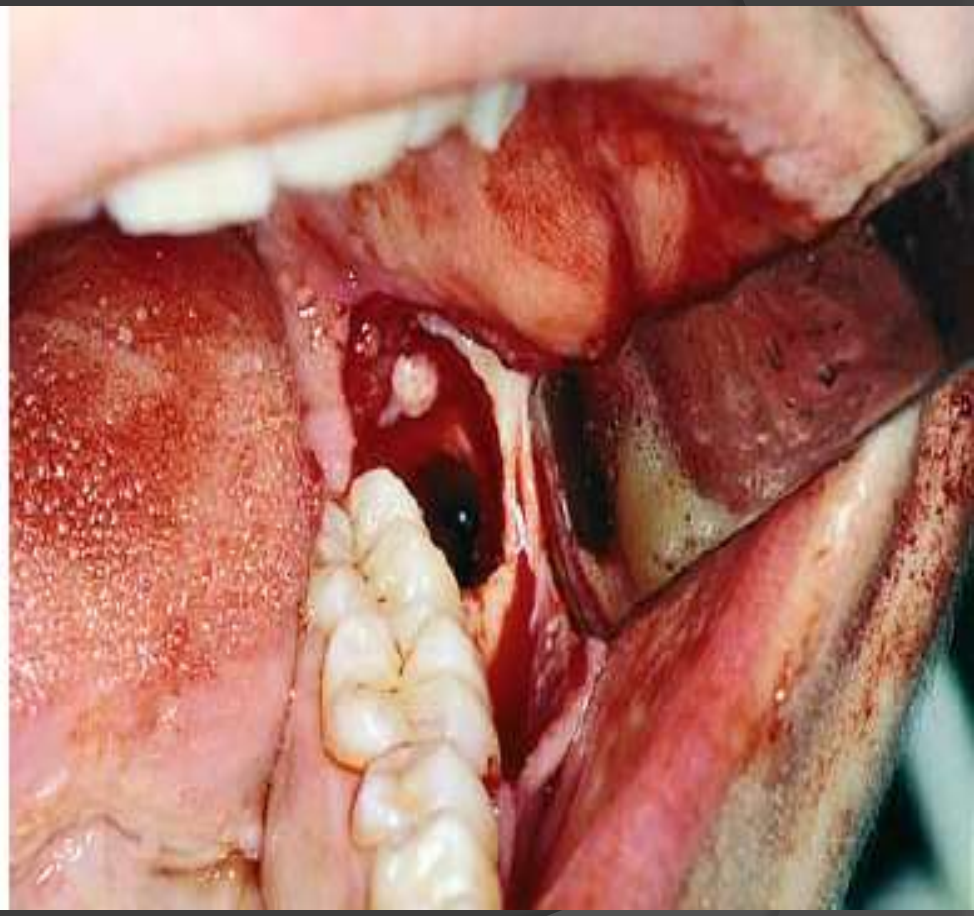




Luxation of the impacted tooth in the distal direction, after creating a pathway for removal.

DELIVERED TOOTH & EMPTY SOCKET

Segments of tooth after removal



Empty socket after extraction of tooth

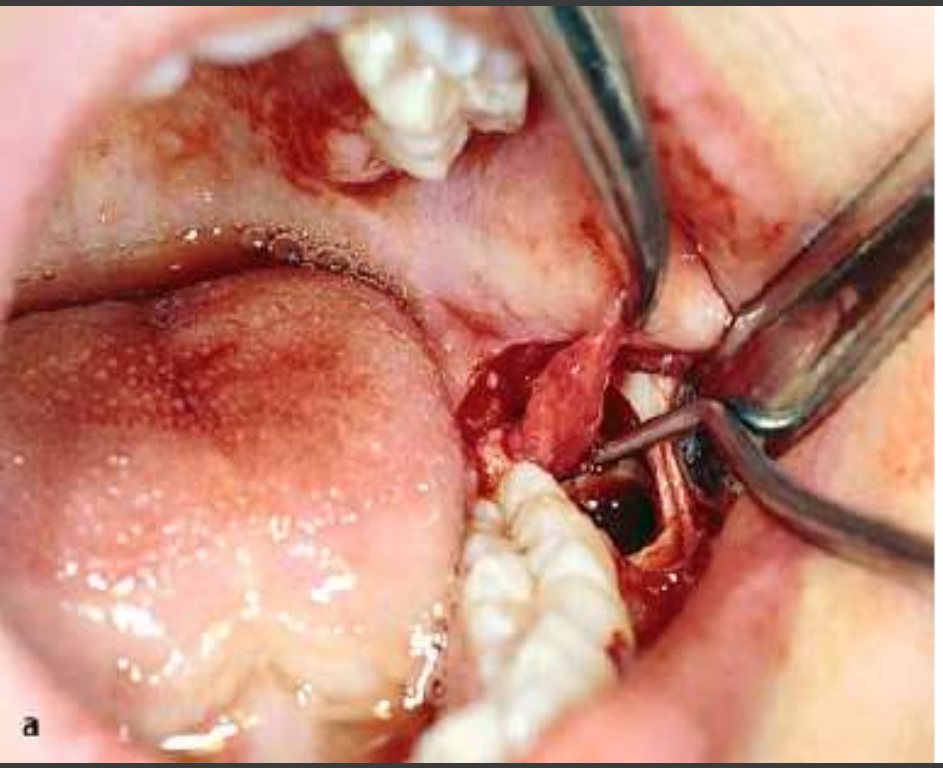
SMOOTHENING & DEBRIDEMENT OF SOCKET

- Attention must be given to debriding the wound of all particulate bone chips and debris.
- Wound should be irrigated with sterile saline, taking special care to irrigate thoroughly under the reflected soft tissue flap.
- Remove any remaining dental follicle and epithelium.
- Smoothen any sharp, rough edges of bone.
- A final irrigation and a thorough inspection should be performed before the wound is closed.

CLOSURE OF WOUND

- The initial suture should be placed through the attached tissue on the posterior aspect of the second molar.
- Additional sutures are placed posteriorly from that position and anteriorly through the papilla on the mesial side of the second molar.

CLOSURE OF WOUND



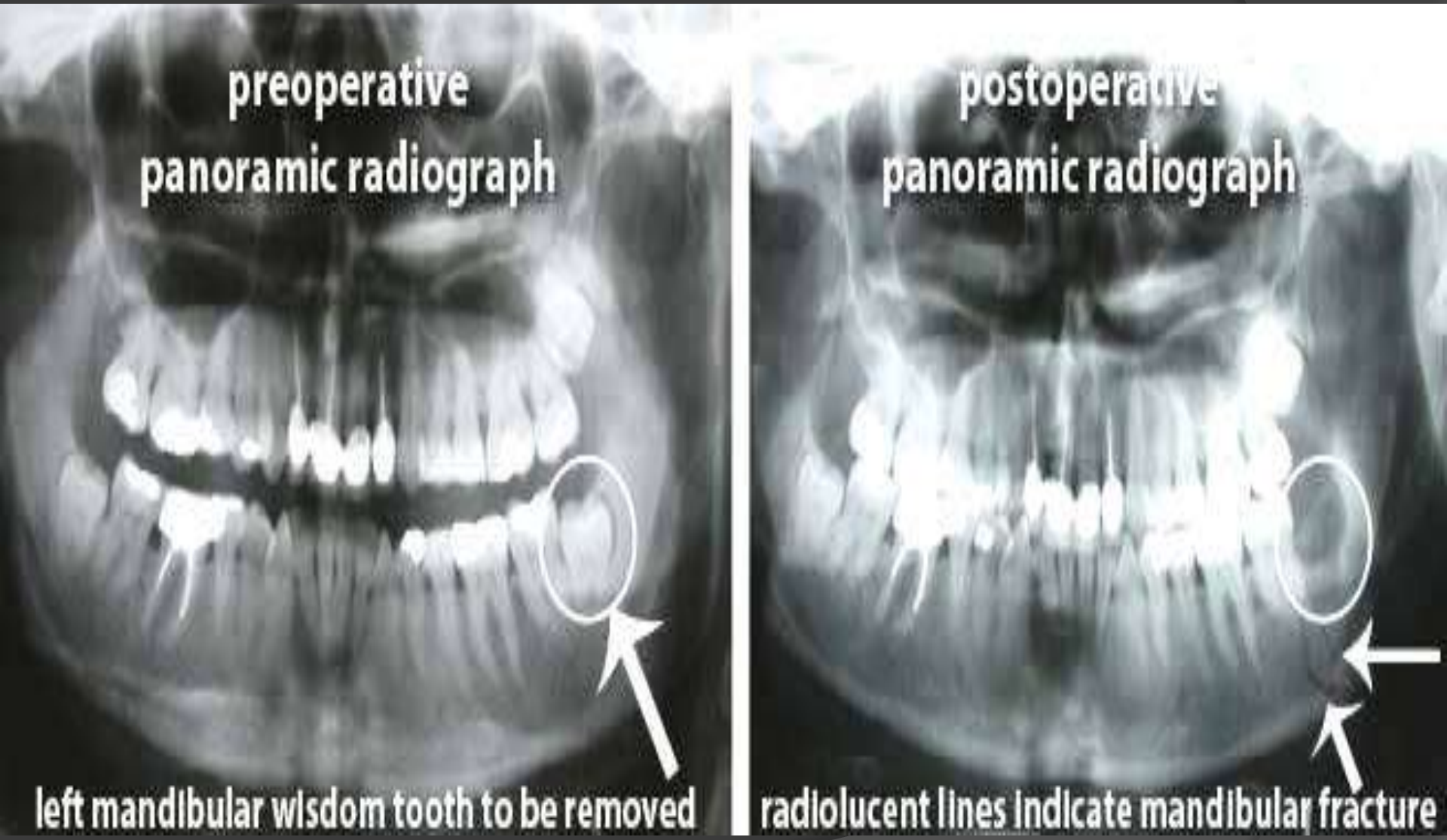
a Removal of follicle using a hemostat and periapical curette.
b Surgical field after placement of sutures

CONSEQUENCES OF REMOVAL

- 5-10% incidence of developing dry socket which increases with increased trauma and difficulty of extraction.
- The reported incidence of lingual nerve damage is 0.1% to 22%.

  The reported incidence of inferior alveolar nerve damage is 0.26% to 8.4%.
- Post op. exessive Swelling, Discoloration, Pain, Malaise, Bruising, and/or Discomfort due to improper handling of soft tissues.
- Iatrogenic pocket formation distal to 2nd molar
- Post op complications of pyrexia, pain, Swelling up to 5th post op day.
- Iatrogenic # in edentulous jaws.

Mandible fracture



-Secondary Infection

About 1 or 2 %

Signs of infection include fever, abnormal swelling, pain or a salty or prolonged bad taste, with or without evidence of discharge from the surgical site.

-Injury to Adjacent Teeth

any fillings, crowns, bridges adjacent tooth etc.

-Displacement of Root Fragments into adjacent facial spaces or may be swallowed or aspirated

Exessive bleeding.

Trismus

Dislocation


Thank you