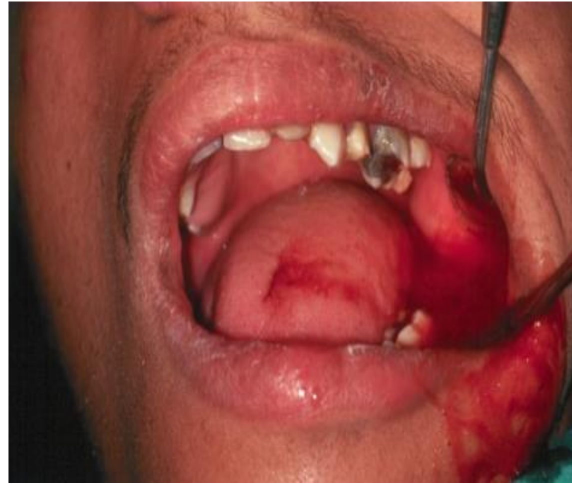
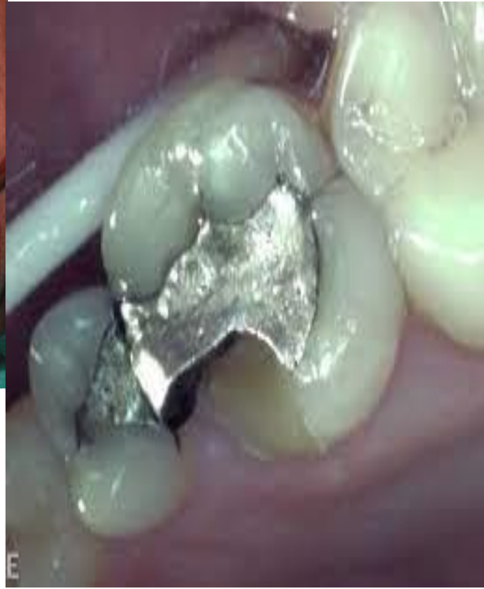
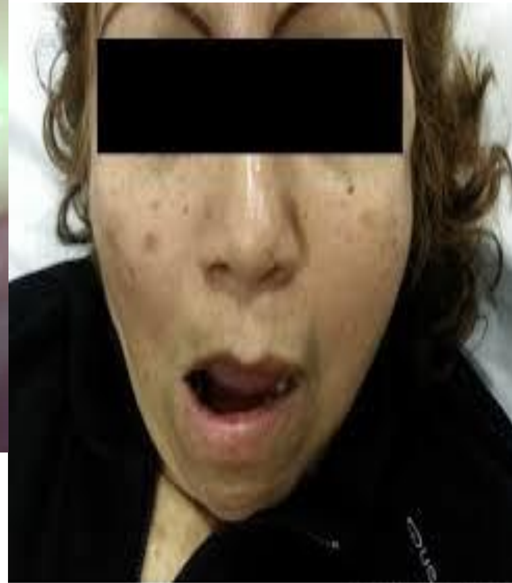
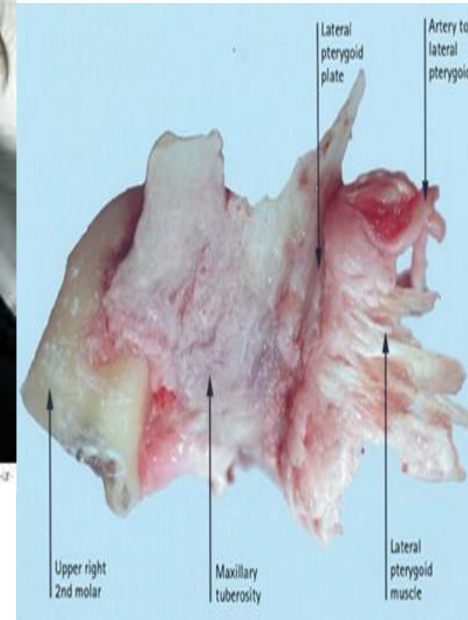
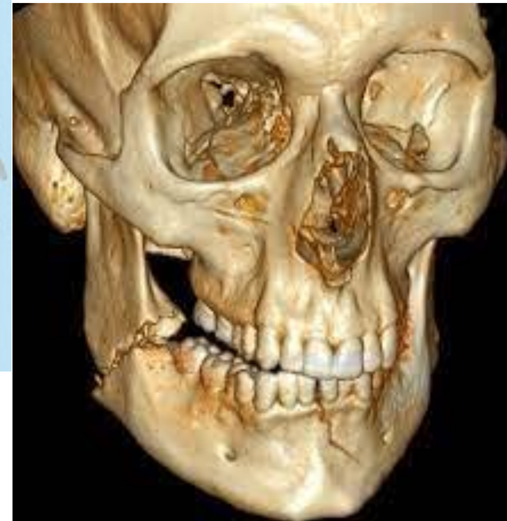
COMPLICATIONS OF EXTRACTION











PROF. ABBAS AY TAHER

Complications can arise during the procedure of extraction or may manifest themselves sometime following the extraction, so we have immediate complications and post-operative one. All these complications arise from **error in judgment**, **misuse of instruments**, **exertion of extensive force** or **from anatomic causes** or factors.

By **careful diagnosis** and **planning of the procedures** many complications can be avoided but some of these complications **may occur even when utmost**, **care is exercised**, so that the **dentist or the oral surgeon should be qualified to deal with each complication successfuly**

Extraction:

Extraction is the painless removal of whole tooth or tooth root with minimal trauma to the investing tissues, so that the wound heals uneventfully and no post- operative prosthetic problem is created

Complication :

Any adverse , unplanned events that tend to increase the morbidity above what would be expected from a particular operative procedure under normal circumstances.

Complications of exodontia are three types:

1-Pre-extraction Complications of Tooth Extraction

A. Difficulty in achieving anesthesia

Many factors **contribute to anesthetic failure**, including :

1-The operator factor -**inaccurate placement of the anesthetic solution**,

or **too small a dosage**), and

2-Patient factor .Anatomical variation like -**Bifid inferior alveolar nerve ,** double or bifid inferior alveolar nerve represents **a possible cause of failure in inferior alveolar nerve block**, **pathological** or **psychological**) related factors.

Local anesthesia constitutes routine practice for the dental professional, and all technically correct anesthetic procedures performed with an appropriate anesthetic must be effective

Local anesthesia fails in **10% for inferior alveolar nerve block** and **7% for the rest of anesthetic procedures**.

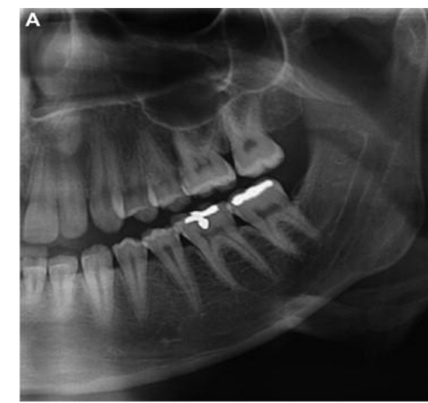
If symptoms of anesthesia are not identified after a prudent period of **10-15 minutes** following the anesthetic procedure, **then anesthetic failure can be assumed.**

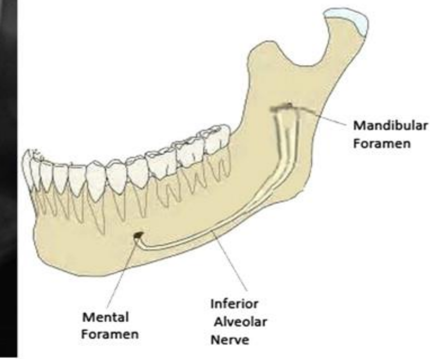
Consideration should be given to delivering anesthetic using alternative measures e.g. intra-ligamental injections.

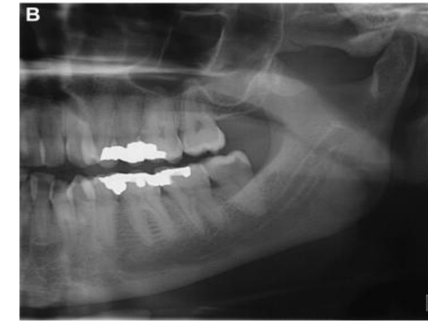
There may also be issues with pain during anesthetic delivery, which could be caused by excessively speed/pressure of injection, penetration of a nerve or subperiosteal injection.

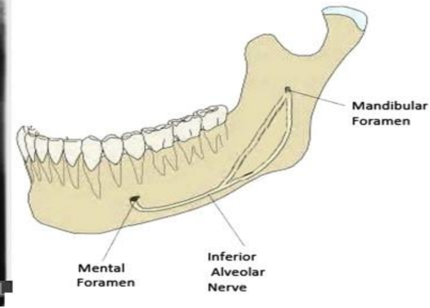
If anesthesia **cannot be secured** by using conventional techniques of infiltration or regional block

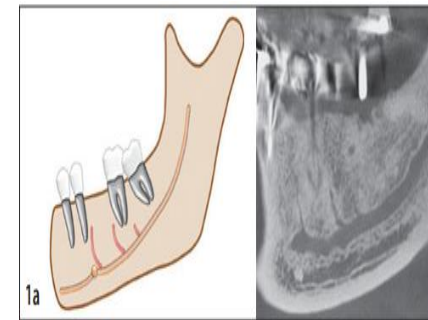
Intraligamental, The Intraligamentary Local Anaesthetic (ILA) or 'Periodontal Anaesthetic' technique has been described as a misnomer, as **it enters the cancellous bone through natural perforations and is, in effect, an intra-osseous, as opposed to a periodontal, local anaesthetic**

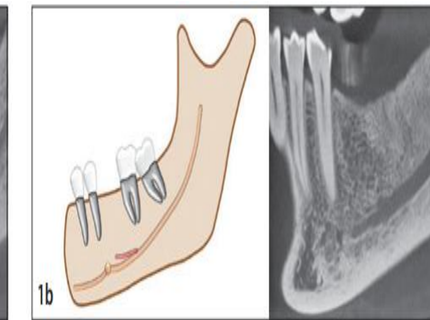


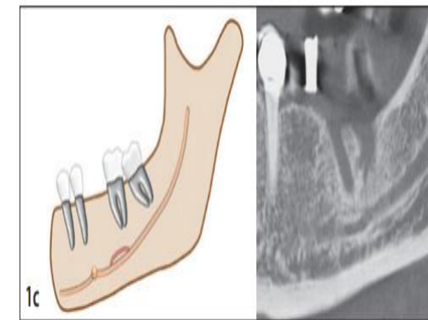


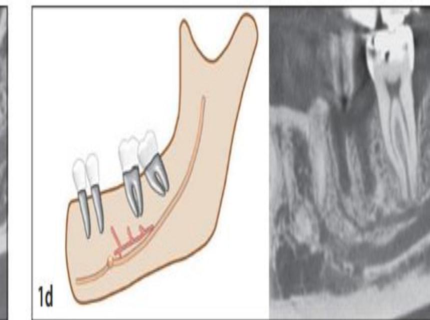










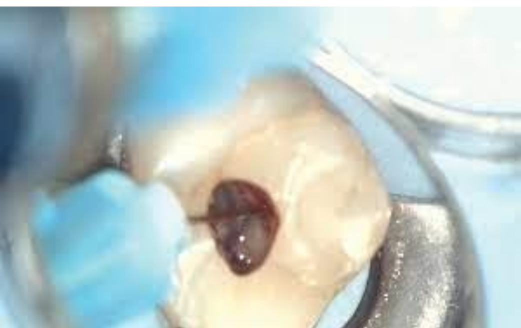


Intraraosseous

The intraosseous injection **allows placement of a local anesthetic solution directly into the cancellous bone adjacent to the tooth to be anesthetized**. There are two intraosseous systems that have been studied clinically—the Stabident® system (Fairfax Dental Inc., Miami, FL) and the X-tip® system (Dentsply, York, PA)

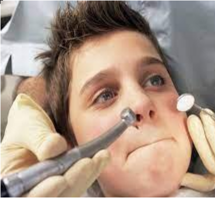
or

Intrapulpal injections he intrapulpal injection technique (IPI) is one of the commonly employed supplemental anesthetic technique adjuvant to conventional maxillary infiltration anesthesia or mandibular inferior alveolar block in situations, where patients encounter severe pain or discomfort during pulp extirpation, especially in acutely inflamed molarsmay be indicated, provided that the cause of the failure is not local infection around the tooth



B-Poor co-operation

A lack of patient co-operation will be a barrier to effective extractions. Prior to commencing the extraction, a discussion and judgement should be made to determine whether the patient will likely tolerate the procedure.



C-Complications associated with medical conditions

There are a whole host of medical conditions/medications that may introduce new complications or alter the risk of existing ones. **There are too many to discuss here**, but a careful assessment of a patient 's medical history should be completed. Common medications that may impact complications include **steroids**, **antiplatelets**/**anticoagulants** and **bisphosphonates.**

D-Difficulty in access

A **limited opening**, **trismus**, may be an obstacle to safe extraction.

This may due to **intra- articular factors** (abnormalities with the joint) or **extra-articular factors** (scars, such as with radiotherapy, or swellings, such as with an infection). If there is acute infection, a patient may require a course of **antibiotics before extraction can be attempted.**

Alternatively, patients may suffer from a **reduced mouth aperture**, **microstomia**, which may be **due to scarring** or a **congenital malformation**. Teeth may be poorly positioned or crowded, which may necessitate a surgical approach.

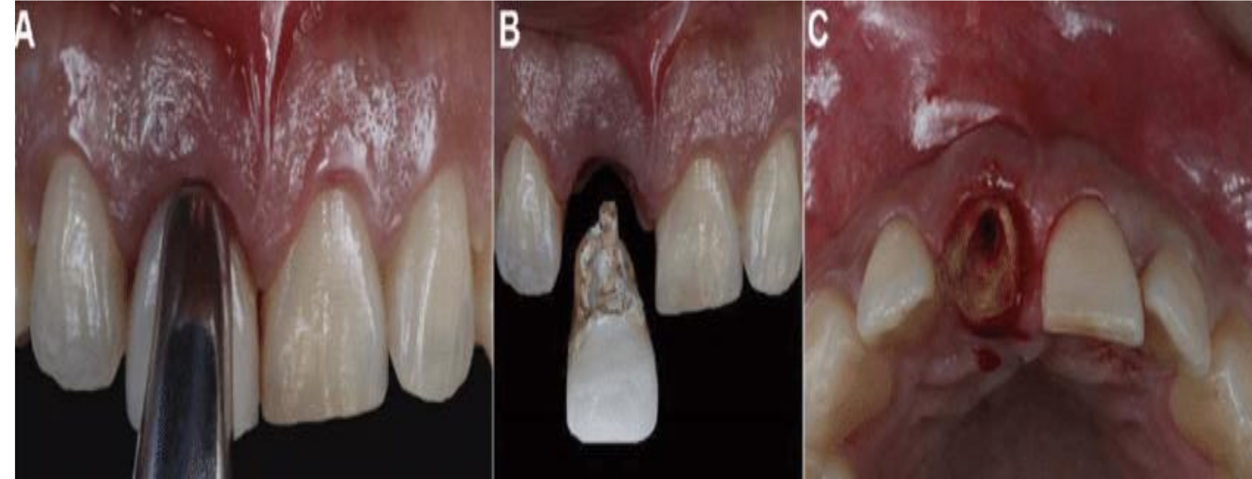
2-Intra-operative Complications of Tooth Extraction

Failure to remove the tooth with either forceps or elevator.

failure to remove the tooth after applying a reasonable amount of force without movement or yielding of the accused tooth need further clinical and radiological evaluation, because the tooth may be need surgical extraction.

Fracture (#) of:

A. Crowns and roots.
B. Alveolar bone.
C. Maxillary tuberosity.
D. Adjacent or apposing tooth. ,
E. Mandible.



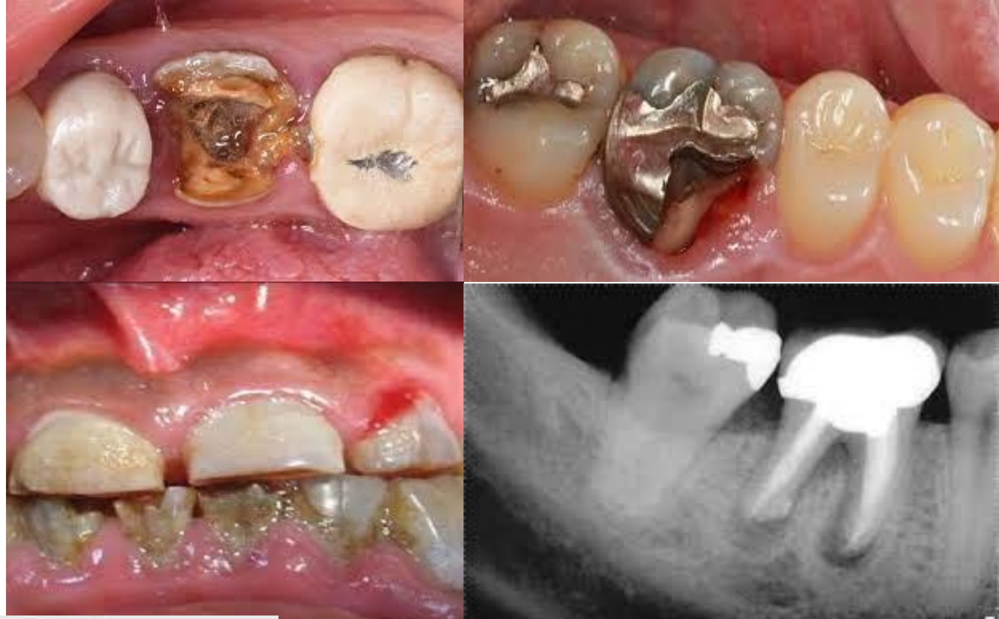
A-Fracture of crowns and roots: -

The most common complication during tooth extraction is fracture of the tooth crown or roots.
The factors that may lead to fracture of crown or roots may be **classified into three groups:**

1.Factors related to the tooth itself.

2.Factors related to the bone investing that tooth.

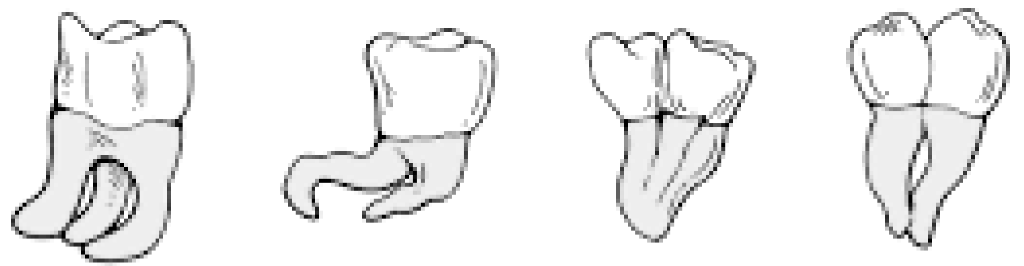
3.Factors related to the operator (dentist).

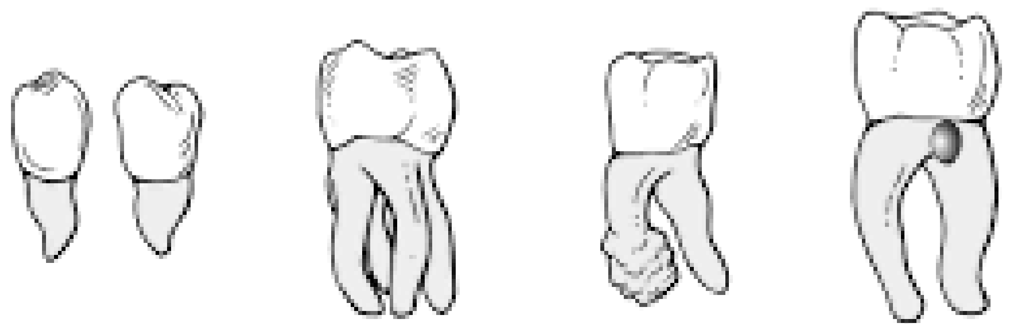


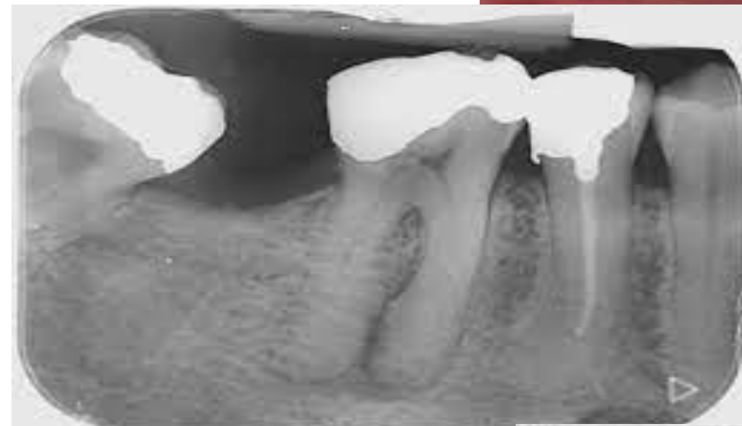
1- factors related to the tooth itself

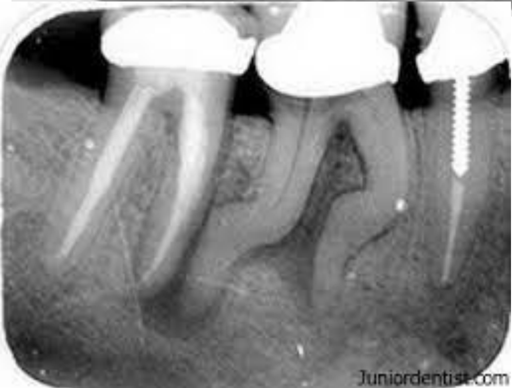
Means that the tooth may be **badly carious**, or **heavily filled**, **brittleness of the tooth due to age**, or non-vitality, root canal filled tooth.

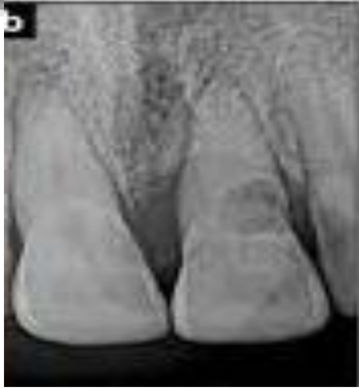
Also peculiar root or crown formation like dilacerated tooth, geminated tooth, **severely curved root**, **divergent roots**, **convergent roots**, **hyper-cementosis**, **accessory root** and **complex root shape**, **malposed tooth**, **insufficient space for the application of the extraction instrument**, **internal & external! resorption.**

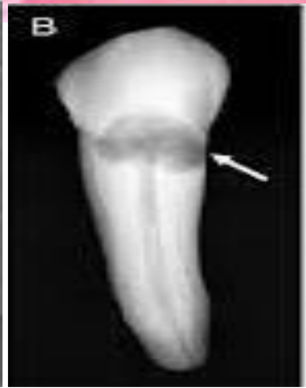


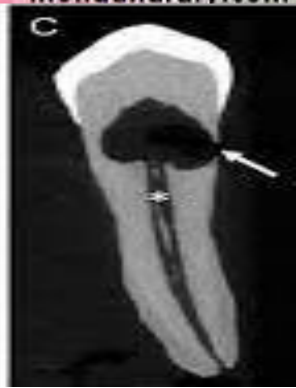












2-Factors related to the investing bone

means the surrounding bone might be excessively dense or sclerotic due to localized or systemic causes.
very important to avoid such complication or preventing it

3-factors related to the operators

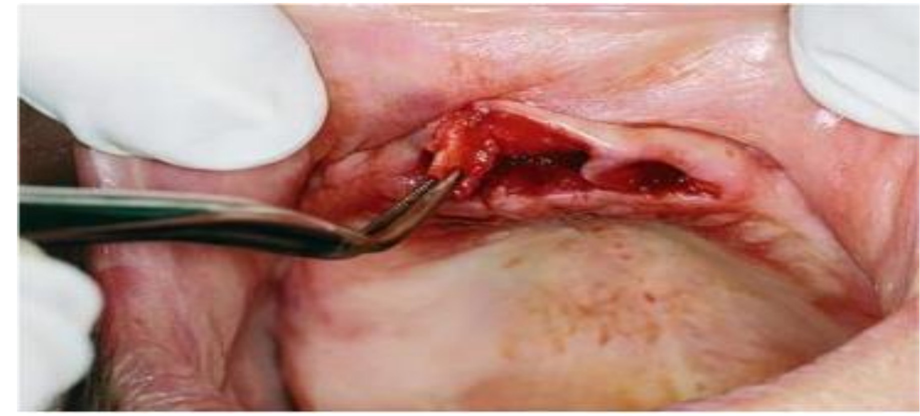
includes improper application of the beaks of the dental forceps or elevator on the tooth to be extracted; like the placement of the beaks of the dental forceps on the crown instead of the root or below the cemento-enamel junction, also the beaks are not parallel to the long axis of the tooth, also the use of wrong type of forceps.
Incorrect application of force during extraction by wrong direction in addition to that the use of twisting or rotational movement when not indicated like the use of twisting movement in extraction of upper 1st premolar or upper **1st and 2nd molar for example**.

B- Alveolar bone fracture:

Fracture of alveolar bone frequently occurs when extraction is difficult. The fractured bone may be removed with tooth to which it is firmly attached or it may be remain attached to the periosteum or it may be completely detached in the socket or wound. The application of excessive forces or inadequate **alveolar** support with the non-operative hand **during extraction** by the clinician can result in intraoperative **fracture** of the maxillary tuberosity.The use of the wrong or worn down instruments can also contribute to complications

Prevention

- Conduct thorough preoperative clinical and radiographic examinations.
- Do not use excessive force.
- Use surgical (i.e. open) extraction technique to reduce the force required.



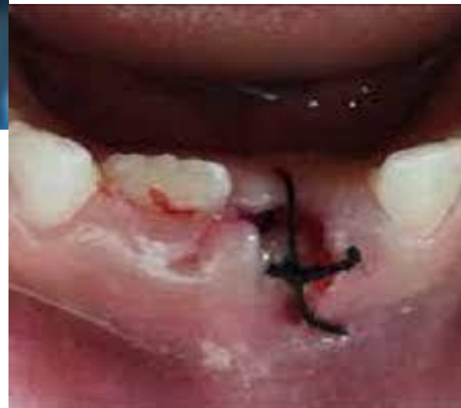
Management

1.If bone has been completely removed from the tooth socket along with the tooth :- tooth is not replaced- sharp margin should be smoothed, - soft tissue should be positioned and sutured

2.2. If bone remain attached to the periosteum:-

- bone is separated from tooth and left attached to overlying soft tissue

-tooth is removed -bone and soft tissue flap are re approximated and suturedIt is a common complication that especially occurs on labial(buccal) area during extraction of upper canine and upper and lower molar teeth.



This complication might be due to: -

1.The alveolar bone is very thin.
2. Accidental inclusion of the alveolar bone within forceps blades
3. Configuration of the roots.
4. The shape of the alveolus.
5.Pathological or physiological changes in the bone itself like Ankylosis (bony connection between the tooth and bone), the presence of destruction in the alveolar bone due to the presence of discharging sinus.

C- Maxillary tuberosity fracture: -

Fracture of the maxillary tuberosity sometimes can happen when pneumatization of the maxillary sinus extends between the roots of upper molars. Some factors may lead to this complication including prominent or curved roots, chronic periapical infection, hypercementosis, root ankylosis and tooth fusion.

Prevention from any complication during extractions of maxillary molars with large antral enlargement is possible with careful preoperative examination and accurate surgical planning

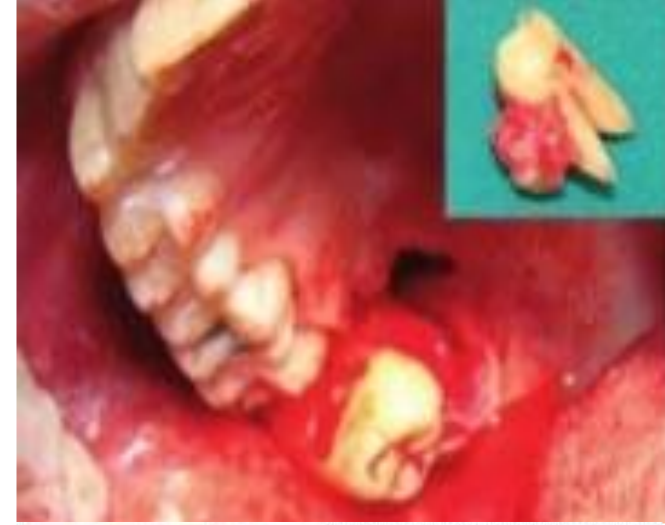
The complication may occur during the extraction of a posterior maxillary tooth especially the upper third molar and is usually due to the following reasons:

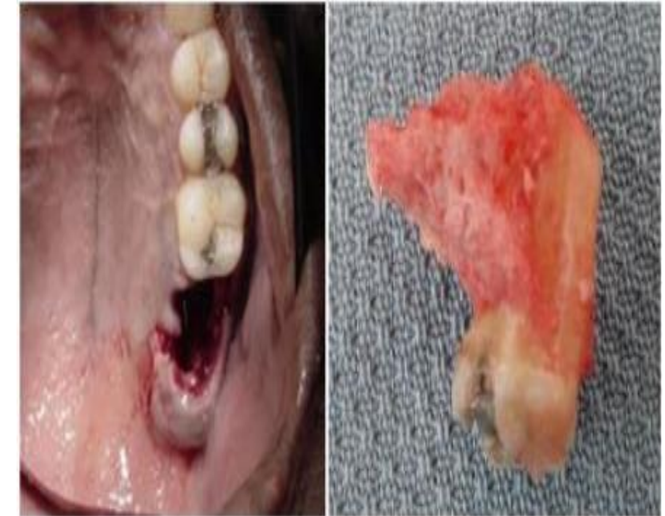
1 - Weakening of the bone of the maxillary tuberosity, due to the maxillary sinus pneumatizing into the alveolar process. In this case, risk of fracture is increased if the extraction of a **molar is performed with forceful and careless movements**.

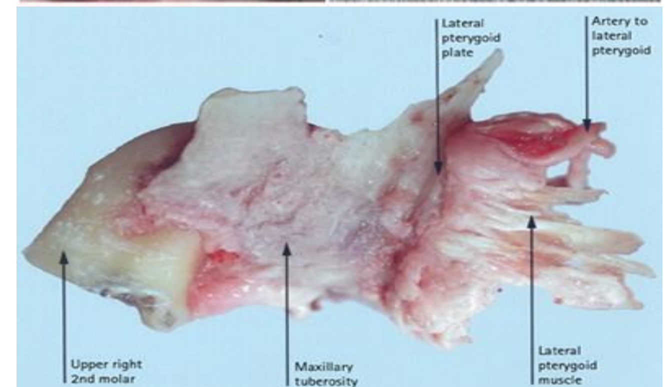
2- Ankylosis of a maxillary molar that presents great resistance to movements during the extraction attempt. An extensive fracture of the buccal bone or the distal bone surrounding the ankylosed tooth may occur.

3- Dilacerated roots of the upper third molar.

Most commonly occur due to **extraction of maxillary 2nd molar/ 3rd molar** , if it is the last tooth in the arch.

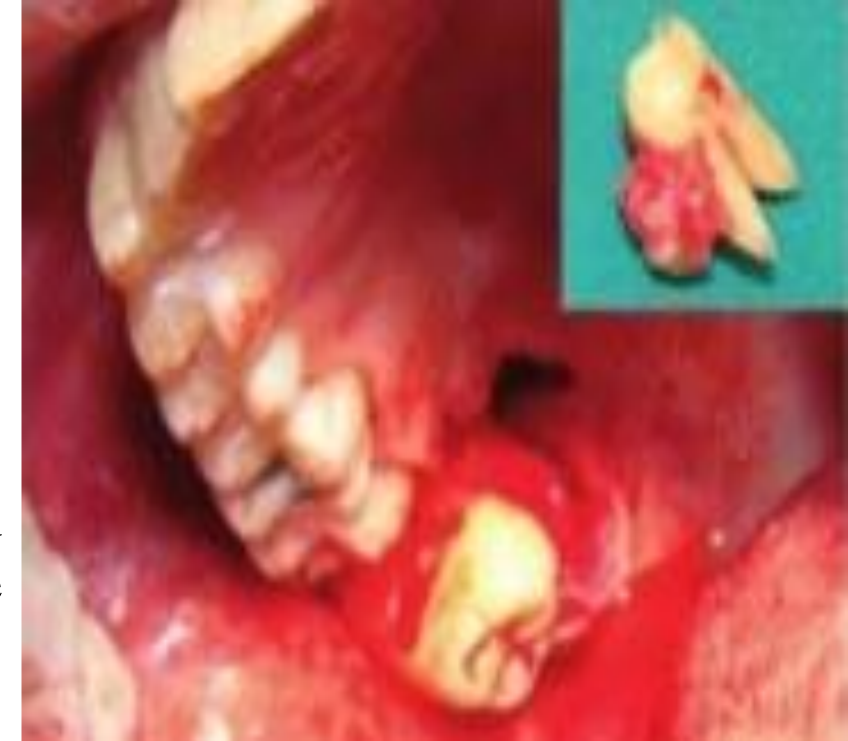






Sometime the tuberosity is completely fractured when we try to remove maxillary 3rd or 2nd molar.

Fracture of maxillary tuberosity may lead to a **wide opening into the antrum called Oro-antrum communication with irregular tearing in the covering soft tissue lead to profuse bleeding and post- operatively may lead to difficulties in the retention of upper denture.**



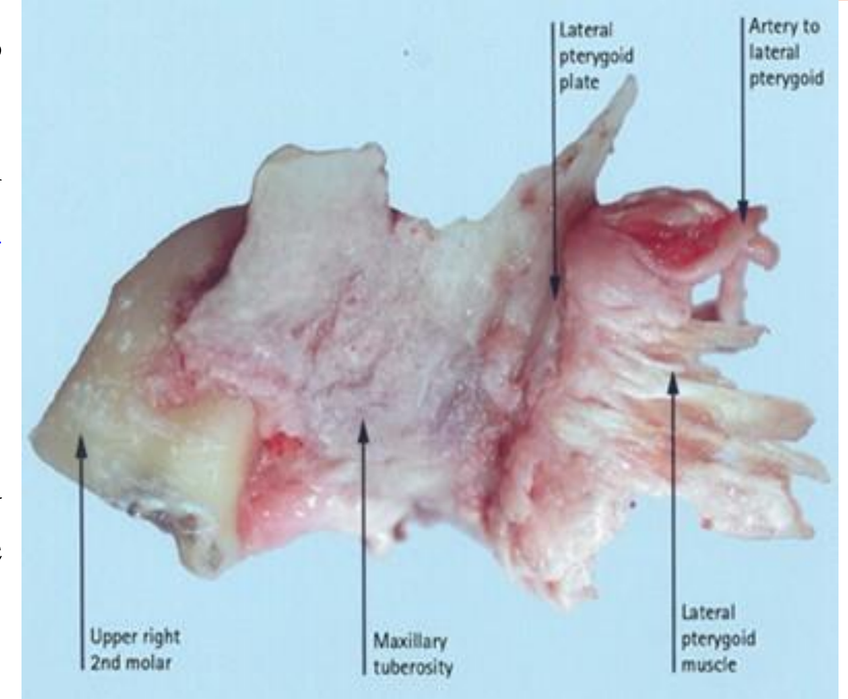
Treatment optiones.

1-For a small segment of bone dissect the segment from gingiva and periosteum and extract it with the tooth ,and smooth the sharp edges of the remaining bone and reposition and suture the remaining soft tissue.

2-If the bone segment is large and remains attached to the periosteum, should take measures to ensure the survival of that bony segment. If possible, the bony segment should be dissected away from the tooth, and the tooth should be removed in the usual fashion. **The tuberosity is then stabilized with mucosal sutures.**

3- If the bone segment is large and is excessively mobile and cannot be dissected from the tooth, the surgeon has several options:

a- The first option is to splint the tooth being extracted to adjacent teeth and defer the extraction for 6 to 8 weeks, allowing time for the bone to heal. The tooth is then extracted with an open surgical technique.



b- If the maxillary tuberosity is completely separated from the soft tissue, the usual steps are to remove the fractured segment with the tooth and then smooth the sharp edges of the remaining bone and then reposition and suture the remaining soft tissue.

The surgeon must carefully check for an oroantral communication and treat as necessary.

Advice:

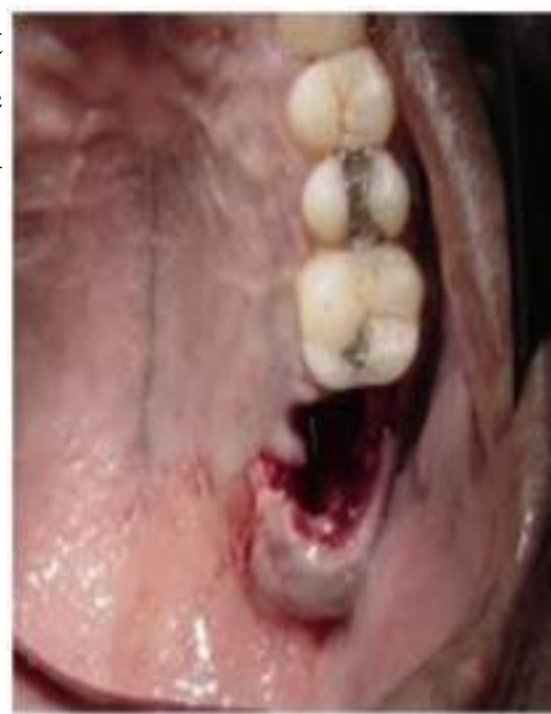
- If this occur patient should be warned this could occur in next similar extraction
- **If preoperative radiograph reveals such possibility extract tooth by careful dissection**

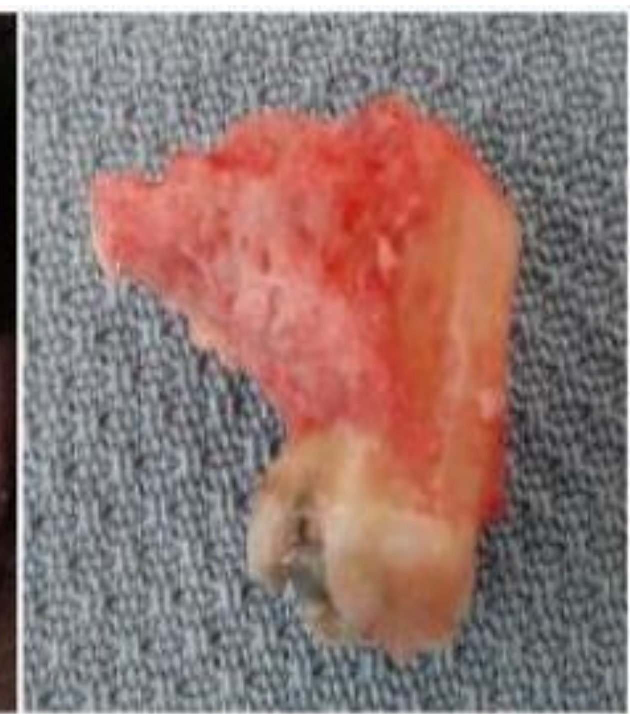
If the maxillary tuberosity is completely separated from soft tissue

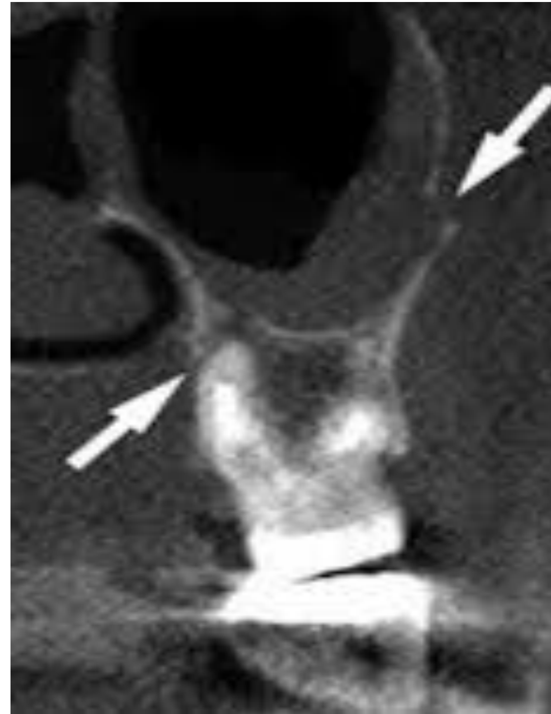
o Smooth the sharp edges of the remaining bone

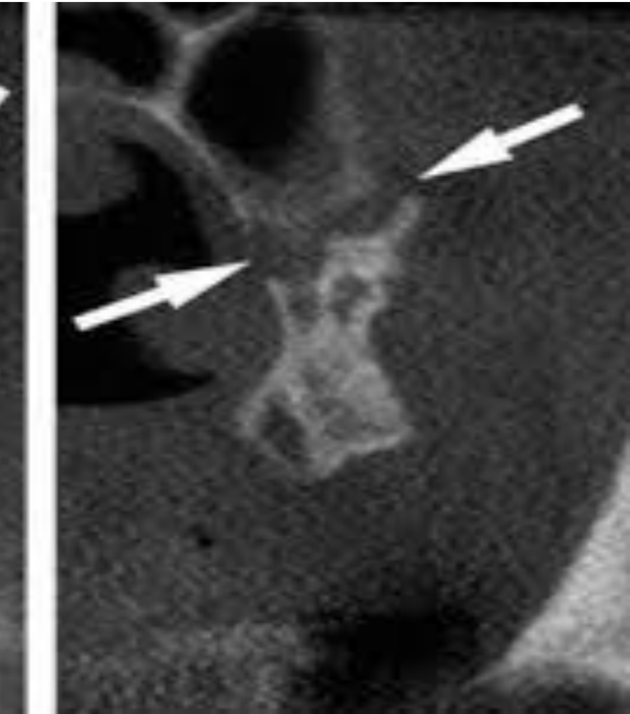
o Reposition and suture the remaining soft tissue

o Check for an oro-antral communication (if present provide the necessary treatment)



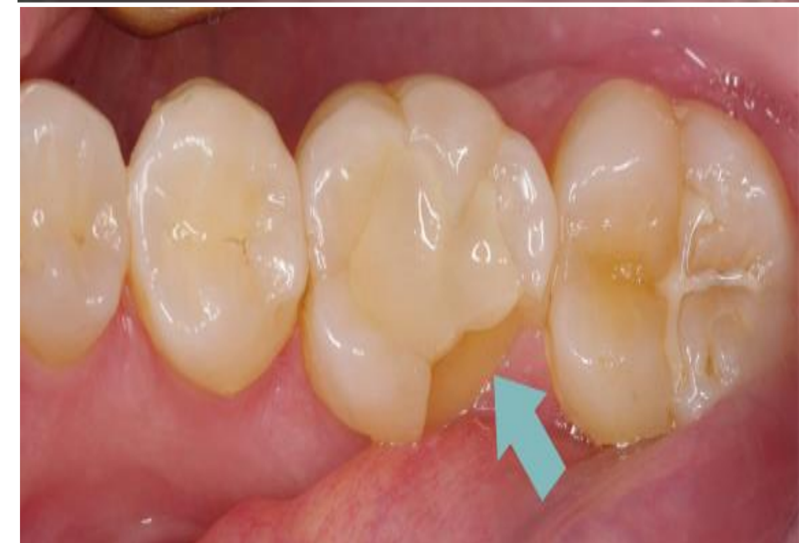






D-Fracture of the adjacent and opposing tooth;

Adjacent teeth occasionally may be damaged during extraction procedures, this may include loosening or dislocation or fracture of the adjacent teeth.
This misshapes occur mostly due to careless use of the dental forceps or elevator by wrongfully using the adjacent tooth as a fulcrum during the use of elevator or the application of the beaks of dental forceps, also fracture of the crown of adjacent tooth or fracture and dislodgment of its filling.



Fracture of adjacent or apposing tooth:- due to

Badly carious tooth
Heavily restored tooth with overhang filling
The use of adjacent tooth as a fulcrum for the elevator
The tooth removed from socket with uncontrolled force
In addition to that opposing teeth may be **chipped or fractured** if the tooth being extracted yield suddenly to uncontrolled force of the forceps striking the opposing tooth leads to this complication.

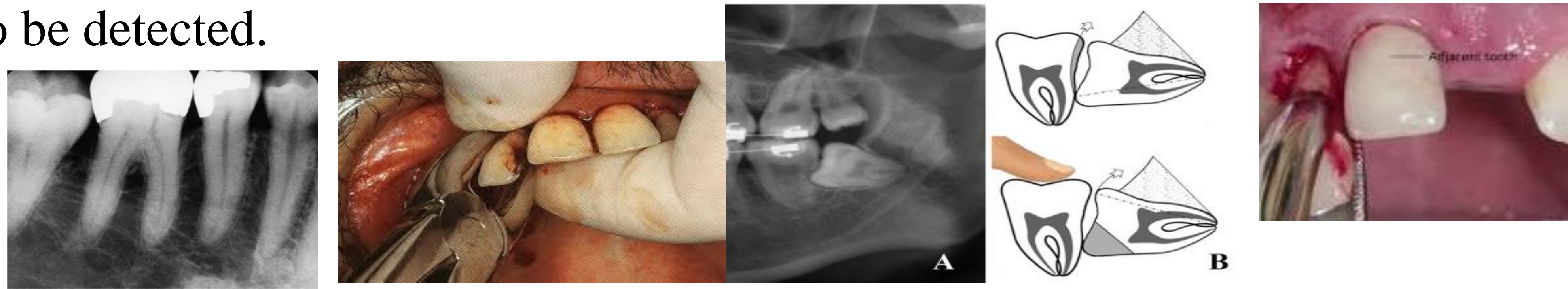
- Occur as a result of uncontrolled forces.
- Usually occurs when buccolingual forces inadequately mobilize a tooth, excessive tractional forces are used or both
- Tooth is suddenly released from the socket and the forceps strikes the teeth of the opposite arch, chipping or fracturing a cusp

□If a large restoration exists:

Patient should be warned about possibility of fracturing or displacing during extraction.

Straight elevator should be inserted entirely intothe periodontal ligament space, or not used at all to luxate the tooth before extraction

During elevation a finger should be placed upon the adjacent tooth to support it and enable any force transmitted to it to be detected.



If an adjacent tooth is significantly luxated or partially avulsed

- Reposition in the tooth socket and left alone
- Occlusion should be checked to ensure that the tooth has not been displaced into a hyper occlusion and traumatic occlusion

If the luxated tooth is mobile

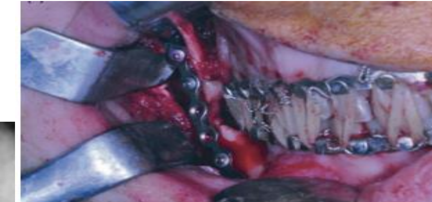
- The tooth should be stabilized with semirigid fixation to maintain it in its position
- For this a simple silk suture that crosses the occlusal table and is sutured to the adjacent gingiva is usually sufficient .**NOTE:** Rigid fixation with circumdental wires and arch bars should be avoided because it results in increased chances for external root resorption and ankylosis of the tooth.)

• Mostly occur with extraction of lower teeth because these teeth may require more vertical tractional forces for their delivery, especially when **using cowhorn forceps.**

E-Mandible fracture: -

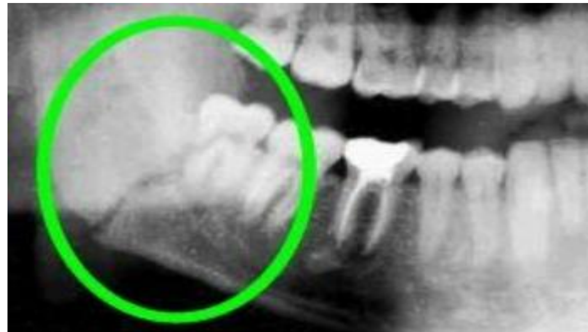
This is **a rare complication**, but it **might occur almost exclusively with the surgical removal of impacted lower third molar tooth.**

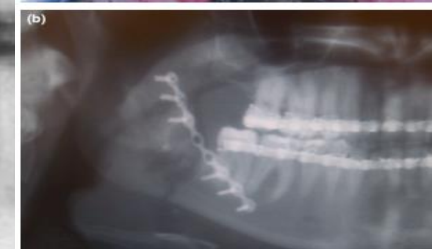
A mandibular fracture is usually the result of the **application of a force exceeding that needed to remove a tooth** and **often occurs during the use of dental elevators (winters elevator**), but sometimes pathological or physiological changes may lead to weakened mandible like:



1-Extraction of isolated lower 2nd & 3rd molars in edentulous mandible

2-Senile atrophy and osteoporosis of the bone.





3-Osteomyelitis e.g. osteoradionecrosis.

4-cystic lesion.

5-Impacted teeth.

6-Tumour, benign or malignant..

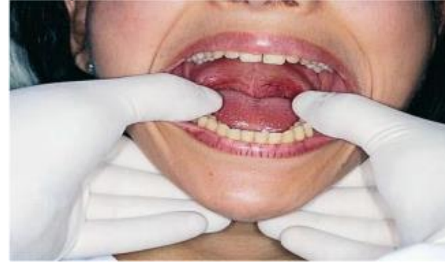
7-Presence of multiple impacted teeth at the same site.

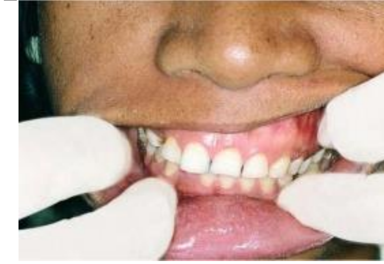
If such a fracture occurs, it must be treated by the usual methods used for jaw fractures. The fracture must be adequately reduced and stabilized. Usually this means that the patient should be referred to an oral and maxillofacial surgeon for definitive care.

Avoid using excessive tractional forces,• the surgeon or assistant should hold a finger or suction tip against them to absorb the blow of the forceps released in that direction.

G-Dislocation of the T.M.J.

The patient is unable to close his mouth (open bite) and movement is restricted. In order to avoid such a complication, the mandible must be firmly supported during an extraction and patients must avoid opening their mouth excessively, especially those with a history of "habitual temporo - mandibular joint luxation." This complication occurs due to





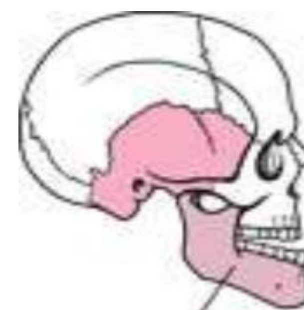
a. History of recurrent dislocation of T.M.J.

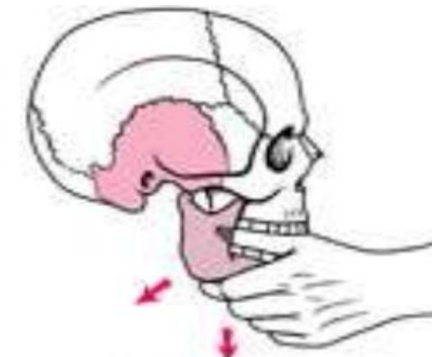
b. Poor support of mandible

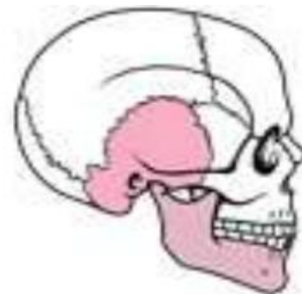
Treatment.

Immediately after the dislocation, the operator should stand in front of the patient and the thumbs are placed on the occlusal surfaces of the teeth, while the rest of the fingers surround the body of the mandible right and left (Fig. 4). Pressure is then exerted downward with the thumbs and simultaneously upwards and backward with the rest of the fingers, until the condyle is replaced in its original position. . After repositioning, the patient must limit any movement of the mandible that may lead to excessive opening of the mouth for a few days.

If the patient complains of pain in the T.M.J. immediately after the extraction procedure, the surgeon should recommend the **use of moist heat,** rest for the jaw, a soft diet, and **nonsteroidal anti- inflammatory drugs or acetaminophen.**





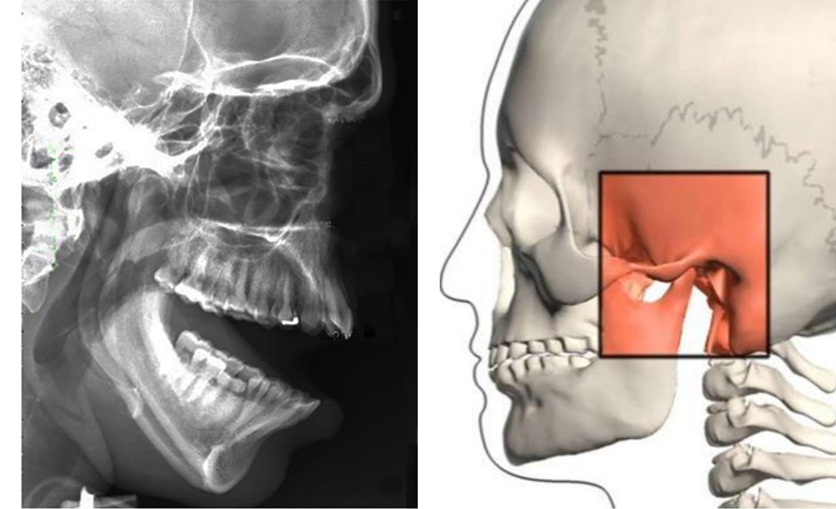


H-Injury to the Temporomandibular joint (T.M.J.)

Another major structure that can be **traumatized during an extraction procedure in the mandible is the temporomandibular joint**.

Removal of mandibular molar teeth frequently **requires the application of a substantial amount of force**.

If the jaw is inadequately supported during the extraction to help counteract the forces, the patient may experience pain in this region. Controlled force and adequate support of the jaw prevents this.



I-Displacement of root or tooth into the maxillary sinus

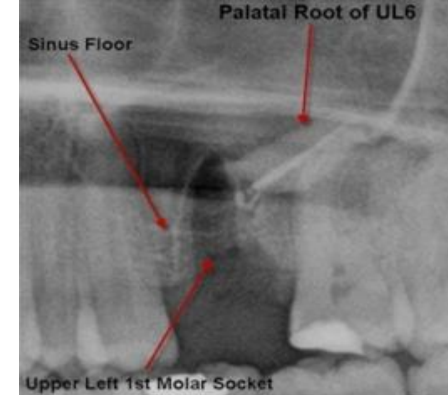
The maxillary sinuses sit above the upper posterior teeth, and therefore when extracting these teeth there is a risk of creating a communication between the mouth and the sinus. Again, effective clinical and radiographic assessment will help identify this risk e.g. chronic infection may erode the sinus floor and increase the risk of an OAC. An OAC may be identified during the procedure or as a later complication.

Signs and symptoms of an OAC include: Air passing from the nose into the mouth, Bubbling within the socket

Fluid may pass from the mouth to the nose and leak out, Inability to achieve an oral seal, Sinus lining may be visible through the socket if large perforation , An eggshell of bone may be present on the apex of the extracted tooth

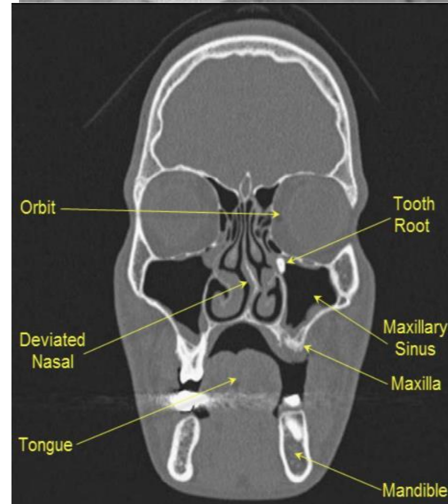
If an OAC is **identified immediately**, if it is small it may be feasible to close the wound by bringing the gingival tissue together with sutures or alternatively a decision may be made to leave and monitor the healing. Antibiotic therapy and decongestants may be considered.

Predisposing factor: □Presence of large antrum, □Reduced bone height, □Roots of maxillary molars(divergent) and premolars approaching antrum. close proximity of the roots of these teeth to the floor of the maxillary sinus, or □ when the surgical procedure has not been carefully planned



This complication occurs during the extraction of maxillary premolars and molars or surgical removal of impacted maxillary third molar

Pre extraction management: • Preoperative radiographs , • Decision is made to extract tooth either by **closed**/**open technique**



CT (Coronal view) showing a root of a tooth lodged within the Ostium of the L Maxillary Sinus

In closed technique:

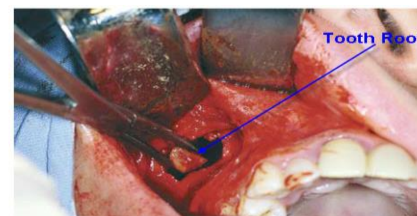
□ never apply excessive apical force , □ Leave apical one third of the palatal root of molars **if it is retained unless there is positive indication of extraction**

If a true OAC develops then patients may experience more significant symptoms than those above including a purulent discharge and bad taste. Management of this may be carried out with a buccal advancement flap or a palatal rotation flap to close over the wound.

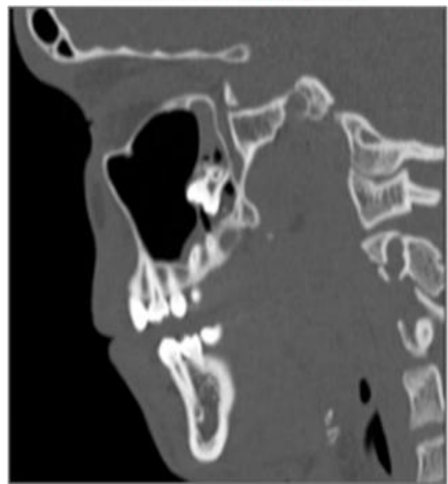
Over time, without treatment, this communication may epithelialise leading to formation of an oroantral fistula (OAF).

Diagnosis

- □ Presence of bone on apex of root
- □ Nose-blowing test



Removal of a root from the maxillary sinus using the Caldwell–Luc surgical technique



What to do After the diagnosis of oroantral communication has been established or a strong suspicion exists??

- If the communication is small (2 mm in diameter or less)
- No additional surgical treatment is necessary
- Measures to ensure the formation of a high-quality blood clot in the socket
- advise the patient to take sinus precautions to prevent dislodgment of the blood clot.

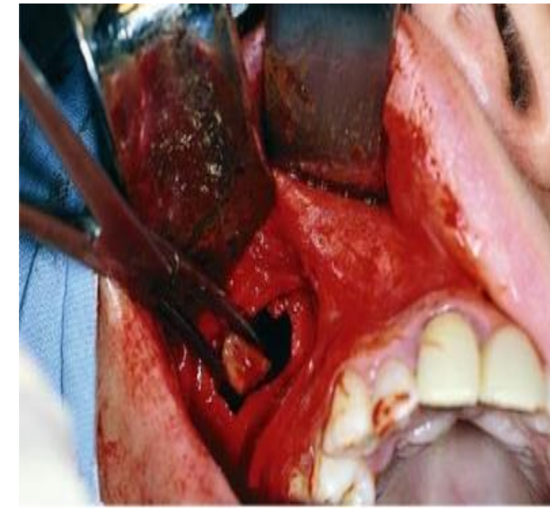
• Avoid blowing the nose, sneezing violently, sucking on straws, and smoking

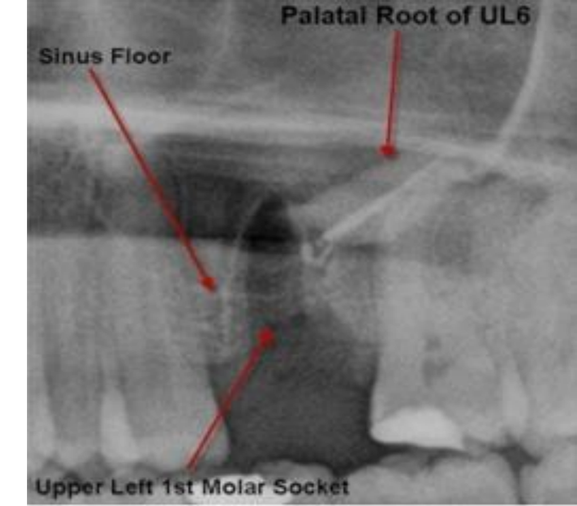
Patients who smoke and who are unable to stop (even temporarily) should be advised to take only small puffs, not deep drags

• Surgeon must not probe through the socket into the sinus with a dental curette or a root-tip pick

• **If the opening between the mouth and sinus is of moderate size (2 to 6 mm)**

- place some clot-promoting substances e.g. gelatin sponge
- A figure of "8" suture should be placed over the tooth socket
- Advise to follow sinus precautions



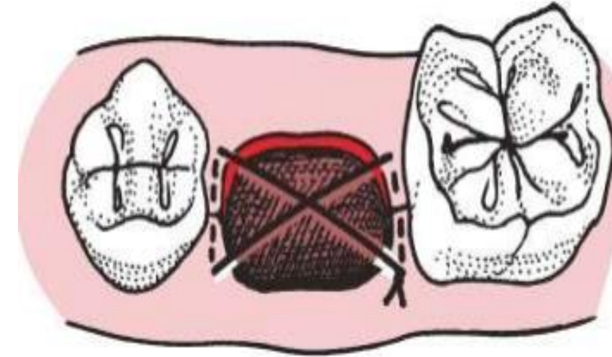


□Prescribed medications to reduce the risk of maxillary sinusitis

- Antibiotics—usually amoxicillin, cephalexin, or clindamycin— for 5 days
- In addition, a decongestant nasal spray should be prescribed to shrink the nasal mucosa to maintain ostium patency ,nasal mucosa to maintain ostium patency

□Follow up after 2 weeks

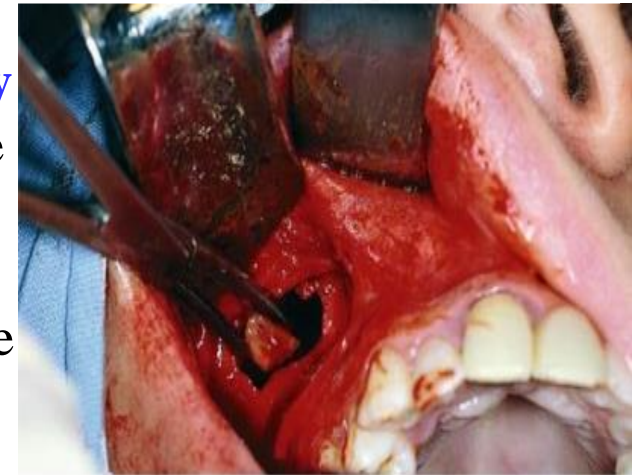
- **If the sinus opening is large (7 mm or larger):**



□Repair with buccal and with a flap

□Advise to follow sinus precautions

□Prescribed medications to reduce the risk of maxillary sinusitis• Antibiotics—usually amoxicillin, cephalexin, or clindamycin — for 5 days • In addition, a decongestant nasal spray should be prescribed to shrink the



Teeth, roots and other foreign bodies can occasionally be displaced into the maxillary sinus. Although they are sometimes seen as a chance, asymptomatic finding on routine X-rays, such foreign bodies are generally removed because of the possible complication of sinus infection or polyp formation. **Suction can be applied to the opening immediately after second manoeuvre is unsuccessful**, however, the procedure should be aborted, and the patient started on antibiotics and nasal decongestants.

The foreign body should be removed via a Caldwell-Luc antrostomy as a **secondary procedure coupled with surgical closure of the oro-antral opening** and a temporary intra-nasal antrostomy to aid surgical drainage of the sinus

Soft tissues injuries could be:

- **Cuts , Bruises, Lacerations, Punctures**

Tear of a mucosal flap

The most common soft tissue injury , as the surgeon tries to gain needed surgical access

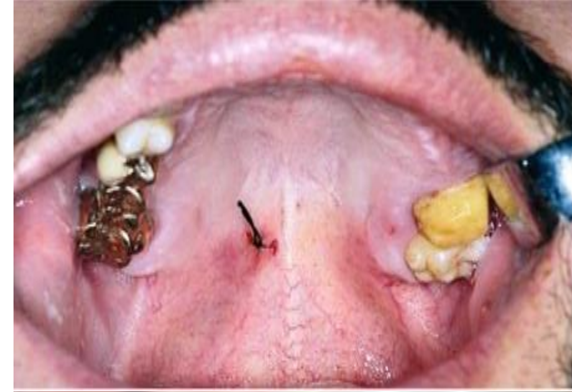
Puncture wound

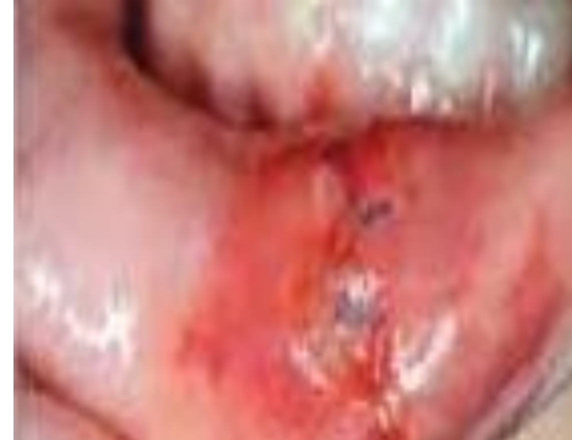
This injury is the result of using uncontrolled force . Instruments such as a straight elevator or a periosteal elevator may slip from the surgical field and puncture or tear into adjacent soft tissue

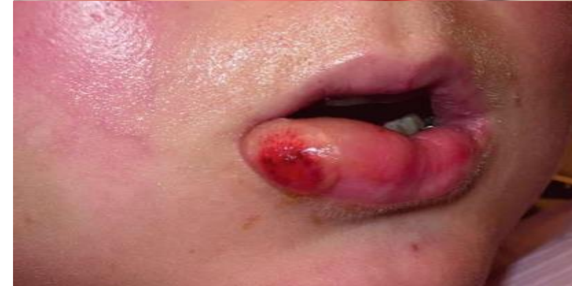
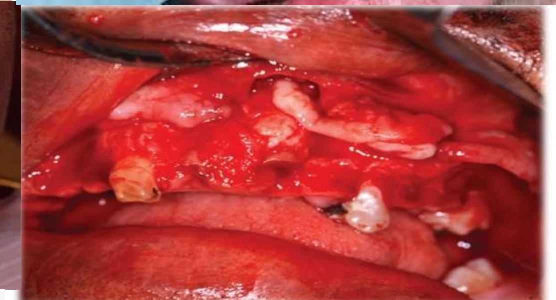
Stretch or abrasion

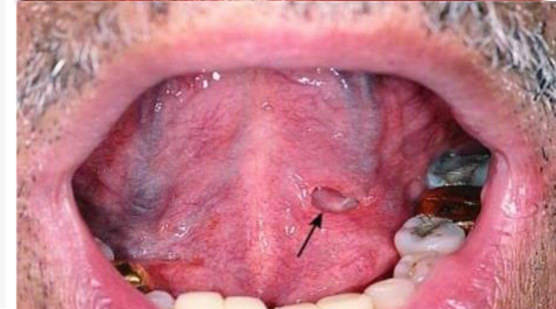
Abrasions or burns to lips, corners of the mouth, or flaps usually result from the rotating shank of the bur rubbing on soft tissue or from a metal retractor coming in contact with soft tissue .

Careless tissue retraction with a tissue retractor (such as an *Austins* or *Rake Retractor*) can lead excoriation and swelling, mainly around the lips and especially at the *ommissure*.





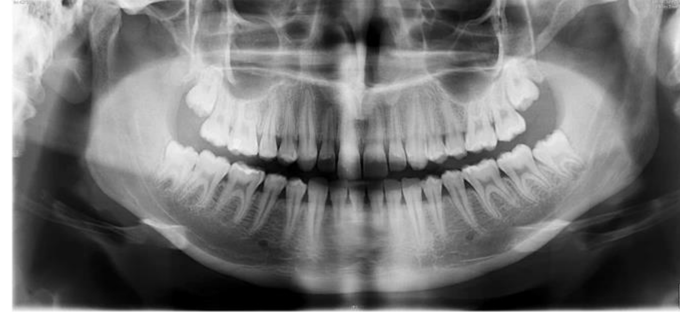
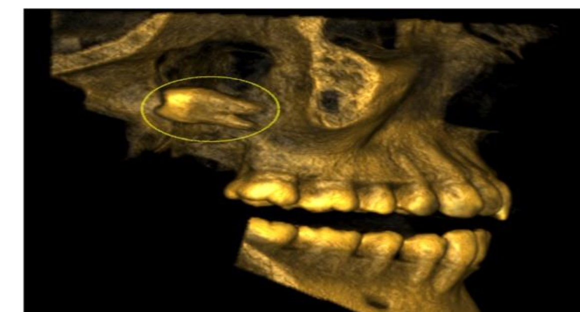
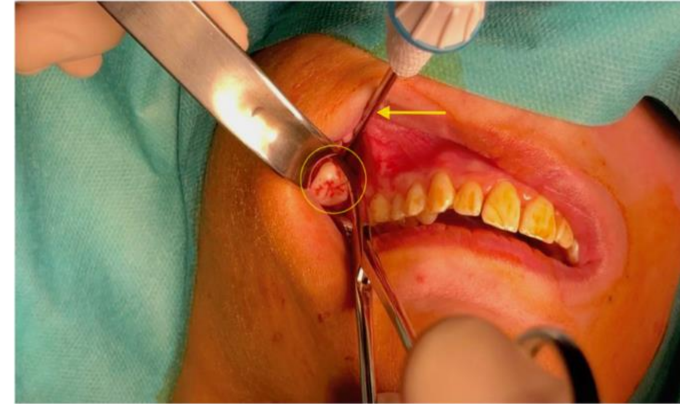
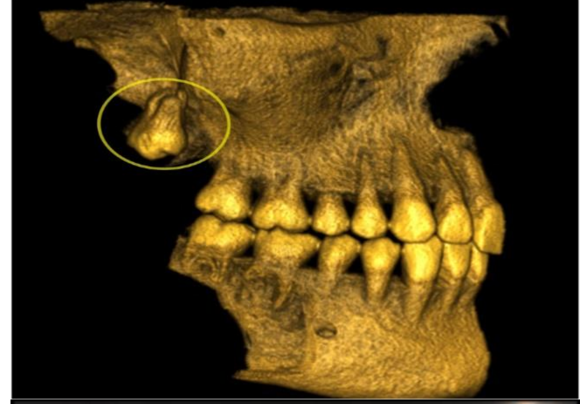
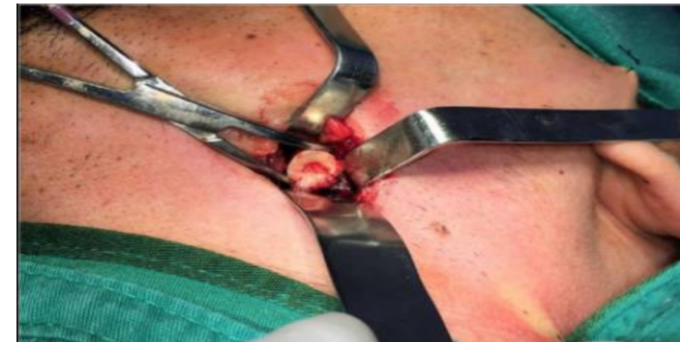
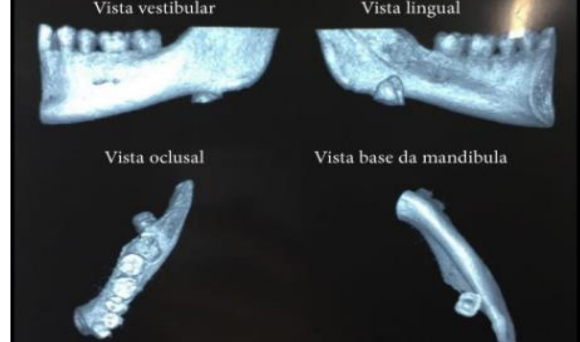


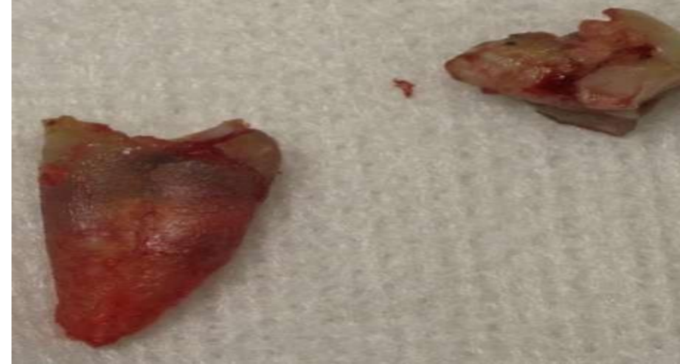
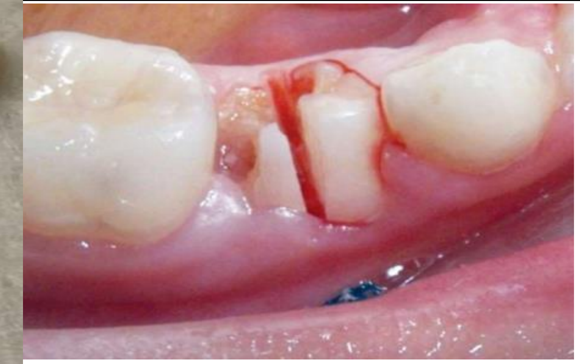
Tissue Spaces

Unerupted upper wisdom teeth in particular, are at risk from being displaced into adjacent tissue spaces but no tooth is immune.

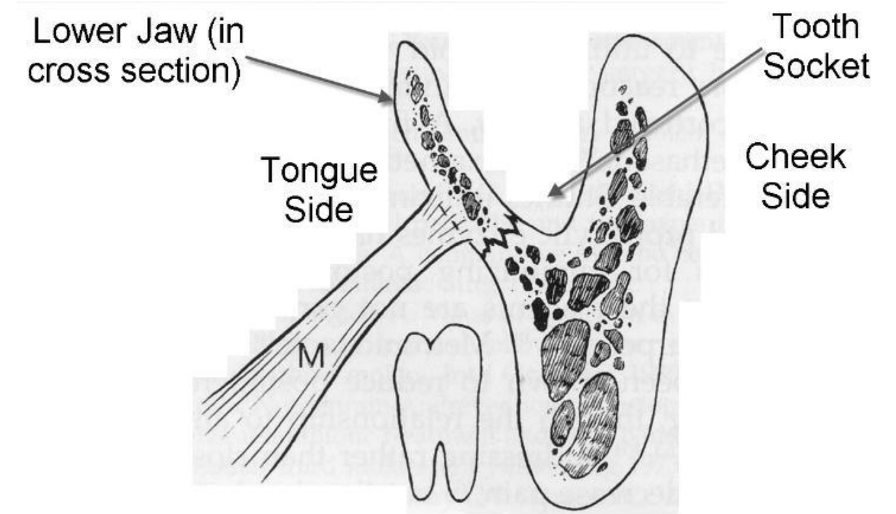
When, for instance, the upper wisdom tooth is unerupted and a flap has been raised (find OPG), the tooth may slip behind the maxillary tuberosity and into the pterygomaxillary space, infra temporal fossa, from where it may migrate into the deep structures of the neck.

Lower teeth are less prone to displacement than uppers but they can be so affected. *Lingually placed* (teeth tilted in the direction of the tongue)
lower wisdom teeth and their roots may occasionally be pushed through a thin / absent lingual plate into the floor of the mouth or below the *mylohyoid*
from where they can migrate into the neck.

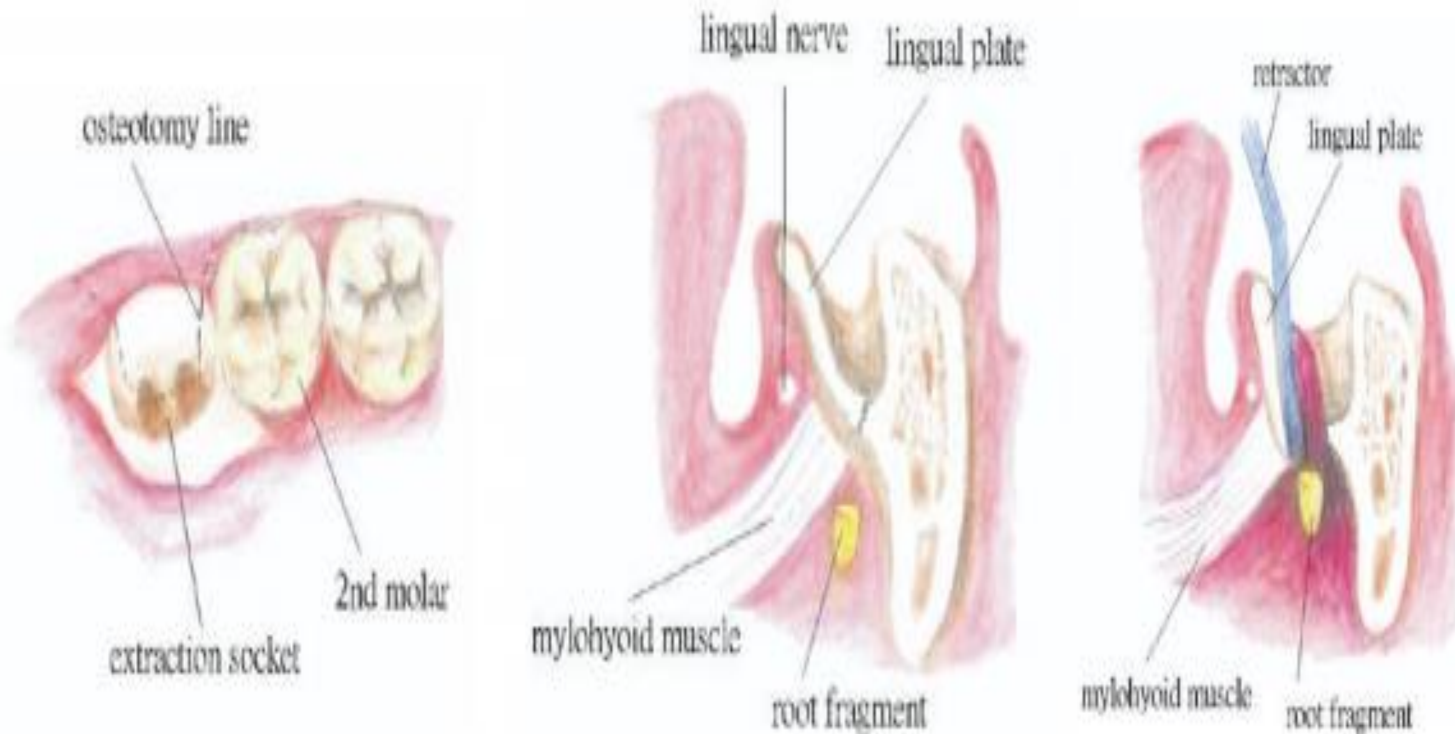







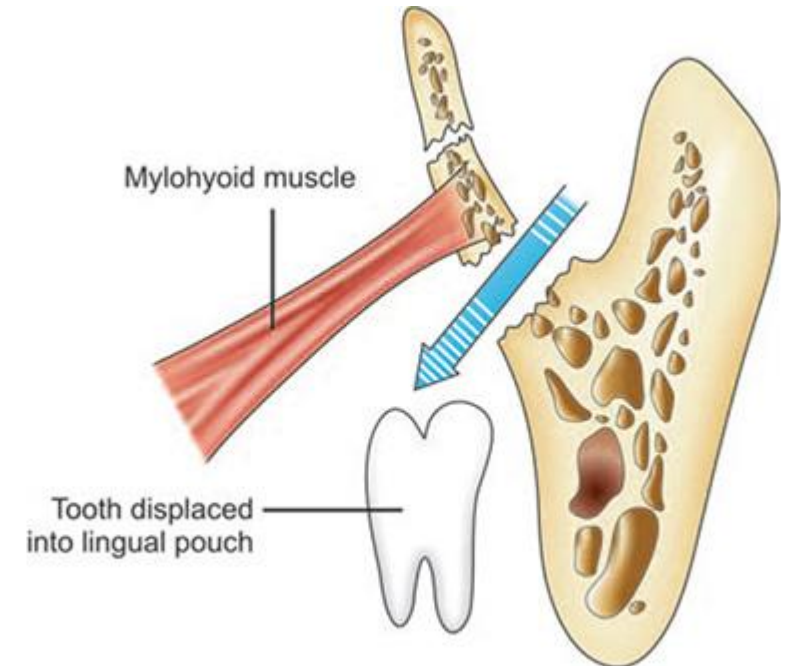



Similarly, *lingually placed* lower premolars (find OPG), particularly when unerupted, may be displaced into the lingual tissues. The latter situation is prone to occur if these teeth are "tapped out lingually" using a mallet and elevator



Tooth displaced into the *Lingual Pouch*. Note the usual site of fracture of the thin *Lingual Plate* and position of the tooth below the *Mylohyoid Muscle* (M).



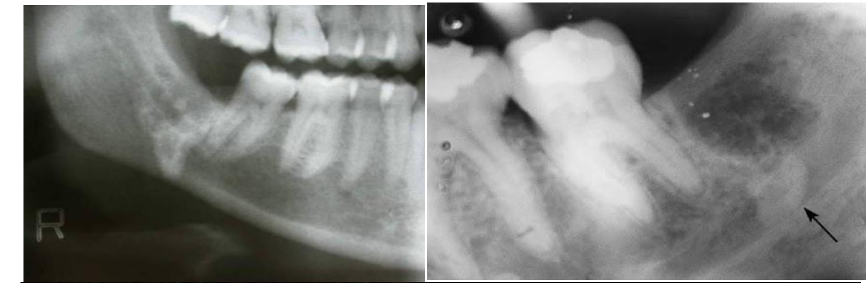


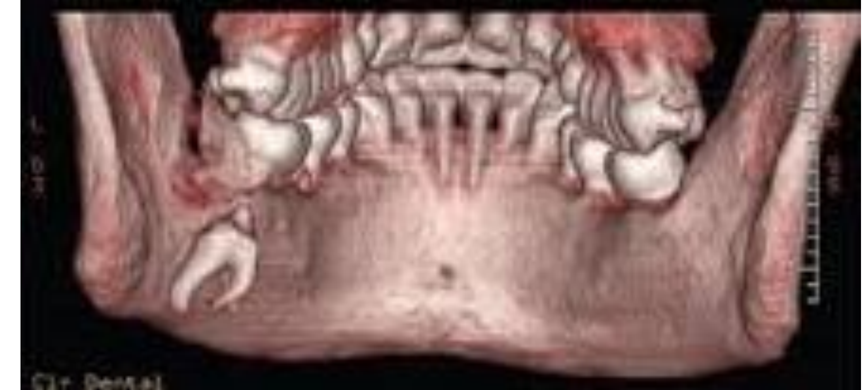
Inferior Dental Canal

If lower molar roots are fractured **during removal. Do not push too hard** to the ID canal ,it is important to lifted out root of the socket rather than displaced further.

If a root **fragment** is displaced and not readily visualised, **X-rays in 2 planes should be taken. Once localised, judicious removal of the roof of the *ID canal* is undertaken** until the retained fragment is found.

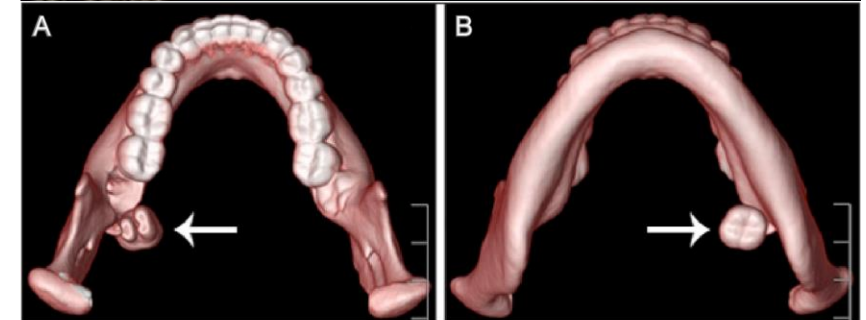
Thereafter, a blunt instrument **such as** a *curved Warwick James elevator* can be insinuated beneath the fragment which is carefully **lifted off the neuro-vascular bundle.**





Root displaced in submandibular space

Root of the 2 and 3 molar may be pushed through a perforation in the lingual surface of the mandible into the region of the submandibular fossa



Periapical infection may facilitate root displacement during instrumentation

The index finger of the left hand is inserted onto the **lingual aspect of the floor of the mouth.** To place pressure against lingual aspect of the mandible and force the root back into the socket.Then be grasp it with the root tip elevator or small hemostat

If this fails, reflect a soft tissue flap on the lingual aspect of the mandible and gently dissect the overlying mucoperiosteum and remove the root tip. **Antibiotic may need after removal**

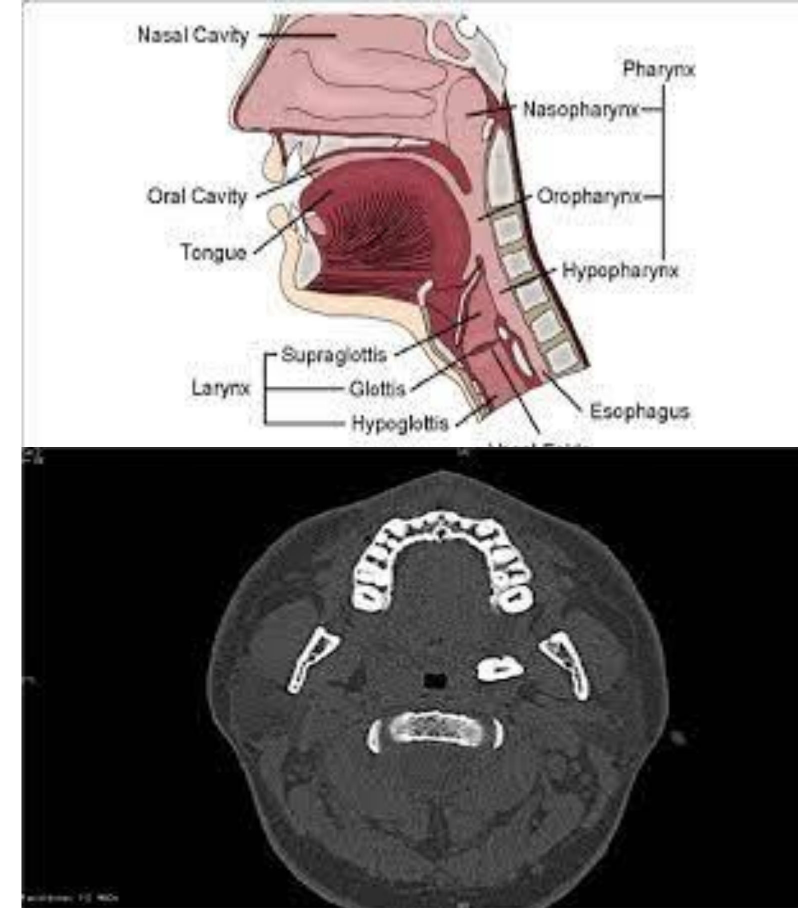
Aero-Digestive Tract:

Is the combined organs and tissues of the **respiratory tract** and the **upper part of the digestive tract** (including the lips, mouth, tongue, nose, throat, vocal cords, and part of the esophagus and windpipe).

It is all to easy for an extracted tooth or dislodged fragment to be swallowed or worse still inhaled. Teeth with single conical roots are sometimes ejected from their sockets unexpectedly during *exodontia* and patients will occasionally move violently just as a tooth is being delivered (especially if they are nervous and / or the depth of analgesia is inadequate).

If **a tooth is dislodged into the unprotected *pharynx***, with any luck, the patient will swallow it and it will pass naturally in several days time.

bronchus. This situation will usually be greeted by violent fits of coughing but may be silent. **If such a situation occurs or the tooth cannot be immediately accounted for an urgent chest and abdominal X-ray should be ordered.**

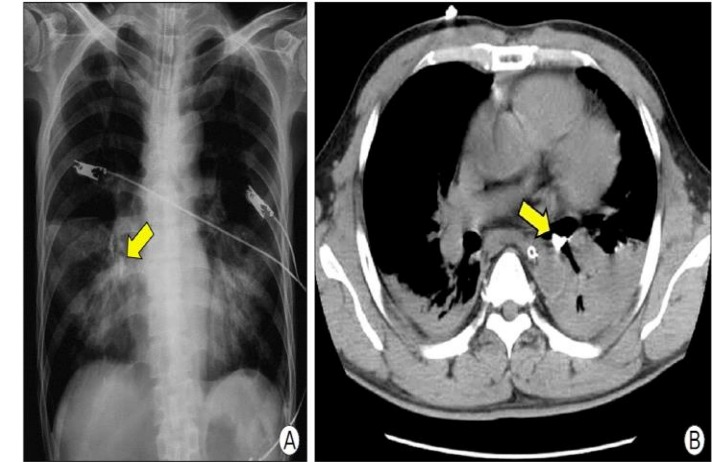


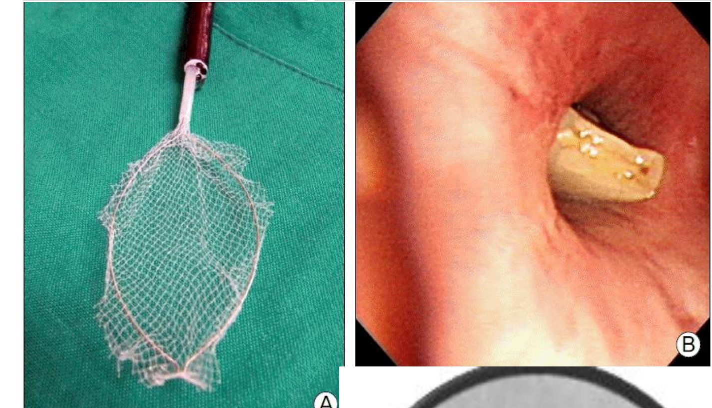
If the patient is being treated outside of a hospital environment, they should be immediately referred via telephone to the local **A&E** or **OMFS** Department .

If the tooth is seen to be **lying in the lung the patient is urgently referred to either** a *cardio-thoracic surgeon* or *respiratory physician* for bronchoscopy. If the tooth is seen within the stomach, the patient is reassured that all should be well and is recalled for repeat abdominal x-ray in a weeks time. If the tooth has failed to pass, a general surgical opinion should be obtained as soon as possible

Tooth aspiration:

Tracheobronchial aspiration of tooth can happen following the displacement of the tooth from its alveolar socket. That is, the tooth can be displaced by the laryngoscope blade during intubation, and the displaced tooth can be aspirated into the airway. A tooth can be also displaced by trauma and aspirated into the airway during intubation. All patients had a history of at least one endotracheal intubation.



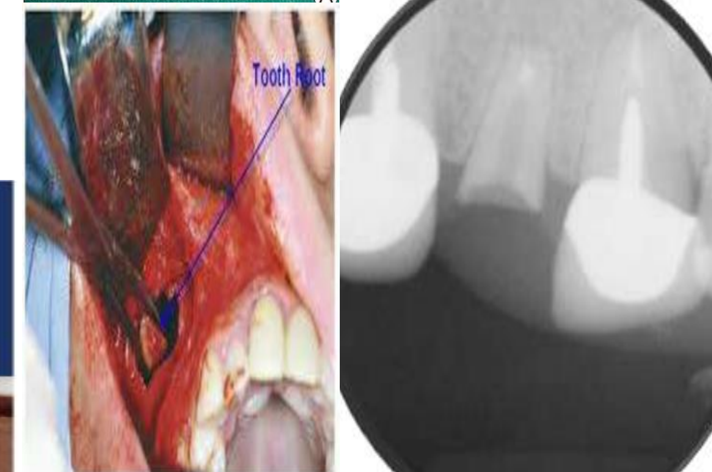


Root Fracture and Displacement to:

To prevent dislodgment of the broken root

Use surgical extraction if high probability of fracture exists. Do not use strong apical force on a broken root area .

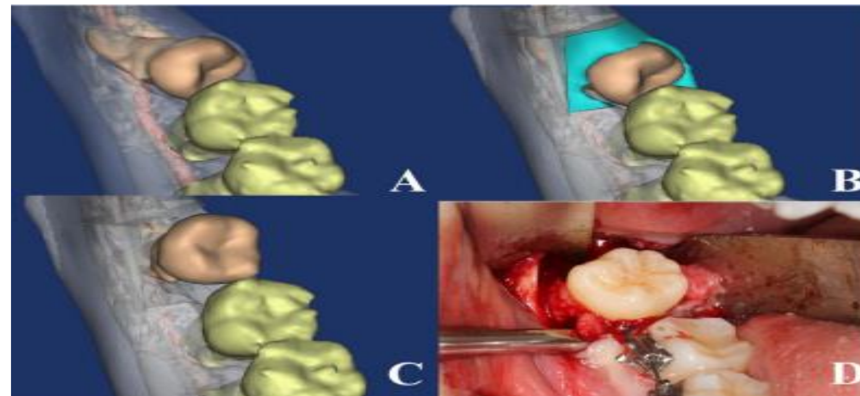
If small apical piece left in very CLOSE dangerous area , like IDN ,leave it and observe it



Removal of a root from the maxillary sinus using the Caldwell-Luc surgical technique

Injuries to adjacent tooth

dislodgement of adjacent restoration • Luxation of adjacent tooth



Extraction of the Wrong Tooth

Causes

- A dentist removes a tooth for another dentist
- Use of differing tooth numbering systems
- Differences in the mounting of radiographs

Prevention

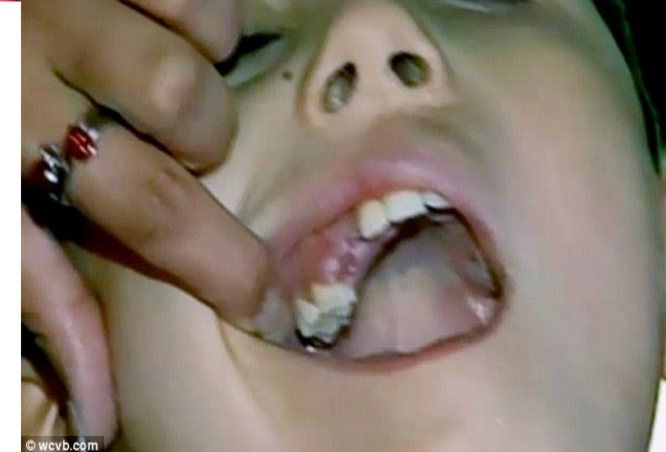
- Focus attention on the procedure.
- Check with the patient and the assistant to ensure that the correct tooth is being removed.
- Check, then recheck, images and records to confirm the correct tooth

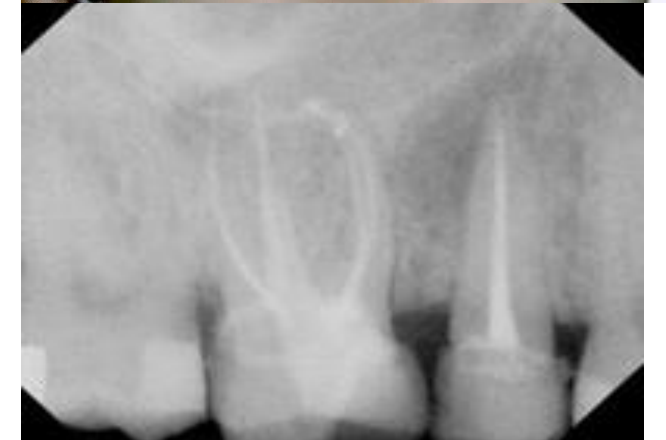
Management ,Immediately

- The tooth should be replaced quickly into the tooth socket • Splinting is done
- Endodontic treatment after successful reattachment

Wrong extractions and reimplantations must all meet the following criteria to be successful:

(1) informed consent
(2) all roots need to be conically shaped
(3) teeth need to be somewhat mobile
(4) a good knowledge of oral surgery is needed with respect to extractions

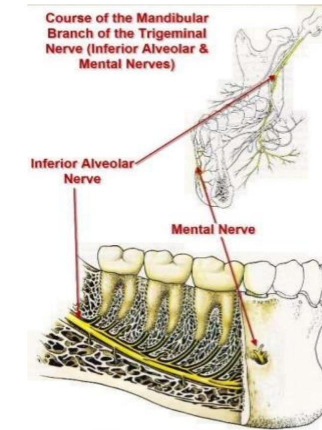


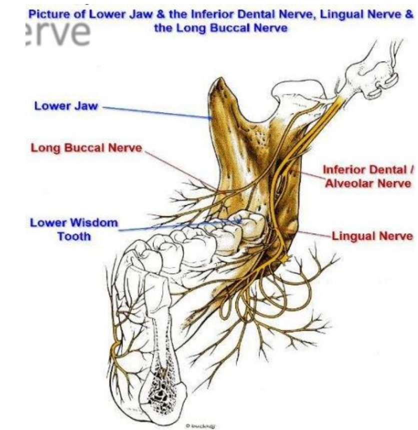


Injury of the inferior alveolar nerve

Causes

- Uncommon occurrence in the extraction of erupted mandibular teeth.
- Injudicious curettage or improper use of elevators to remove root apices.
- Result in paresthesia and sometimes anesthesia of half the lower lipand chin

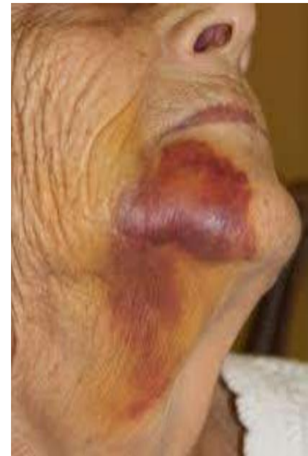




. Management

- **Most cases - the nerve regenerates within 6 weeks to 6 months.**
- If the nerve does not regenerate, the bony walls of the mandibular canal may have been displaced, impinging on it.
- This condition sometimes can be remedied by a decompression operation.
- Traumatic neuroma – excised and the nerve reanastomosed or grafted.

ECCHYMOSIS AND HEMATOMA



Mild ecchymosis especially in elderly patient with increased capillary fragility and poor tissue elasticity

Extensive ecchymosis and hematoma formation result from improper hemostasis during surgery

Management

- Intermittent ice pack(30 min per hour)for the 1 24 hour after surgery
- Following which intermittent hot moist packs are used to resolve the condition
- Patient should be advised that discoloration is from bleeding into the tissues and is not a bruise or **a gangrenous process.**

POSTOPERATIVE COMPLICATIONS

Trismus

Trismus usually is characterized by a restriction of the mouth opening due to spasm of the masticatory muscles.

The causes of trismus are:

a.Injury of the medial pterygoid muscle caused by a needle (repeated injections during inferior alveolar nerve block)

b. By trauma of the surgical field, especially when difficult lengthy surgical procedures are performed.

c. Inflammation of the wound with postoperative edema and swelling will lead to a reflex spasm of the muscles of mastication's such as masseter muscle and medial pterygoid muscle. such as following surgical removal of impacted mandibular third molar.

d-Hematoma

This is a quite frequent postoperative complication due to prolonged capillary hemorrhage when the correct measures for control of bleeding are not take (ligation of small vessels, etc.). In this case blood accumulates inside the tissues, without any escape from the closed wound or tightly sutured flaps under pressure. **The hematoma may be submucosal, subperiosteal, intramuscular**

Treatment.

management of trismus depends on the cause. Most cases do not require any particular therapy. When acute inflammation or hematoma is the cause of trismus, it is treated by:

a. Hot mouth rinses are recommended to reduce the inflammatory edema, and this could be done after 24 hours following the surgical procedure.

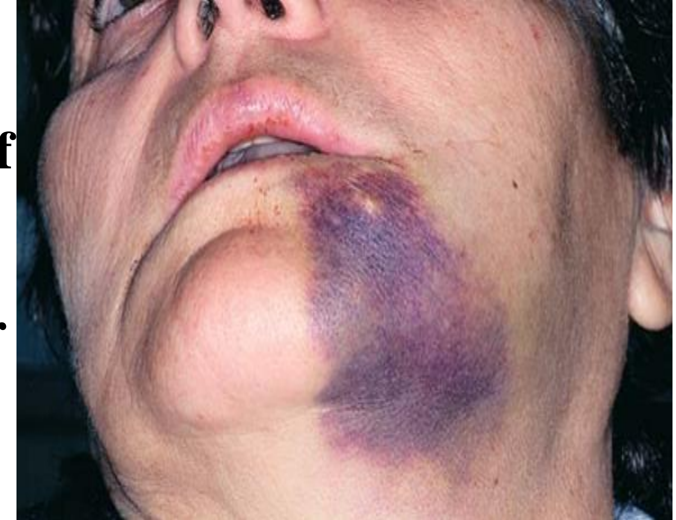
b. Heat therapy, i.e., hot packs are placed extra-orally for A few minutes every hour until symptoms subside

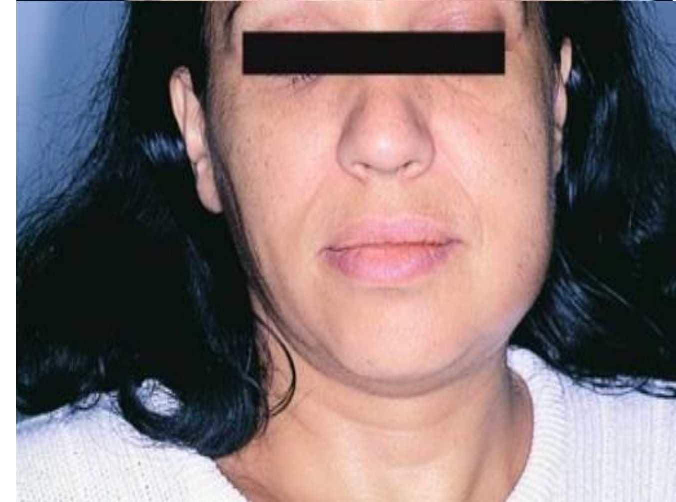
c. Gentle massage of the temporomandibular joint area

d. Administration of analgesics, anti-inflammatory and muscle relaxant medication

e. Physiotherapy which includes movements of opening and closing the mouth in order to increase the extent of mouth opening, also we can use the tongue blades to Gradually increase the mouth opening.

Ecchymosis





Occure when the correct measures for control of bleeding are not taken (ligation of small vessels, etc.).

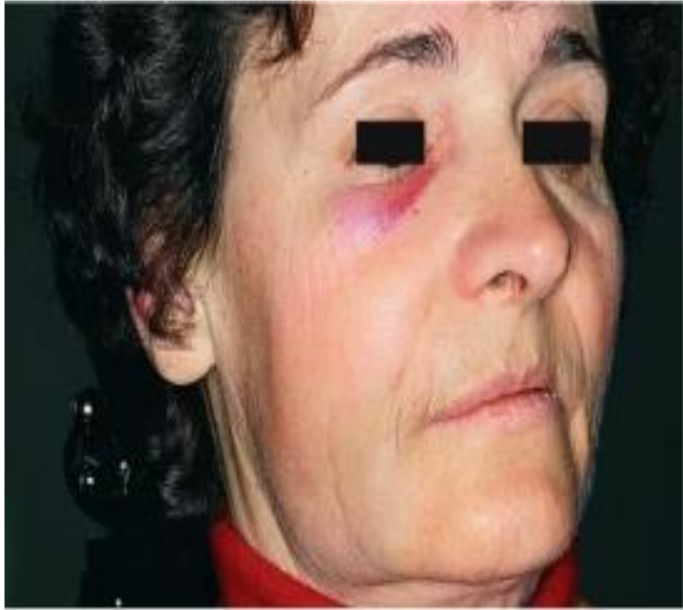
Blood accumulates inside the tissues, without any escape from the closed wound or tightly sutured flaps under pressure.

Treatment : If a hematoma is formed during the first few hours after the surgical procedure, therapeutic management consists of placing cold packs extraorally during the first 24 h, and then heat therapy to help it to subside more rapidly. Some people recommend the administration of antibiotics to avoid suppuration of the hematoma, and analgesics for pain relief.

Oedema

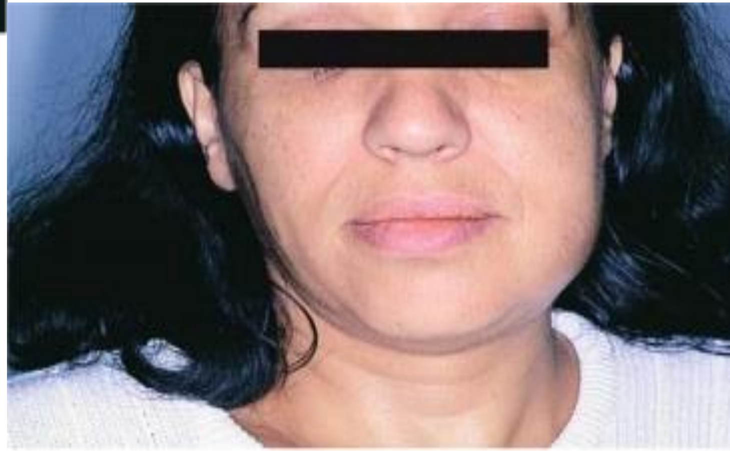
Occur secondary to soft tissue trauma.It is the result of extravasation of fluid by the traumatized tissues because of destruction or obstruction of lymph vessels, resulting in the cessation of drainage of lymph , which accumulates in the tissues. Swelling reaches a maximum within 48 –72 h after the surgical procedure and begins to subside on the third or fourth day postoperatively. Depending on the amount of tissue injury in the area, the edema ranges from small to **moderate and, rarely, severe.**

Treatment : A small-sized edema does not require any therapeutic management. For preventive reasons, cold packs should be applied locally immediately after surgery. **Sever edema must be treated carefully, because if edema present for a prolonged period may lead to fibrosis, and if extend to facial and pharyngeal spaces may lead to asphexia . treatment here include intravenous administration of 250–500mg hydrocortisone and broad spectrum antibiotics .**



Edema of the lower eyelid as a result of the surgical removal of an ankylosed maxillary canine.

Edema as a result of a difficult surgical procedure to remove an impacted mandibular third molar.



Pain:

Postoperative pain due to dry socket, pain in the adjacent tooth, and pain from other causes were present.

• Begins after the effects of anesthetic have left.

• **Intermittent application** of cold to surgical site during 1/ 24 hours helps to reduce **pain in two ways:**

-Diminishes nerve conduction and thereby has an anesthetic effect -Helps to reduce swelling and thus decreases pain associated with tissue distention.

• Small doses of an **analgesic drug** at short intervals rather than **large doses infrequently.**

Post extraction swelling:

Swelling is normal after oral surgery and is proportional to the degree of manipulation and trauma. An ice pack (or a plastic bag of frozen peas or corn, which adapts to facial contours) should be used for the first day. Cold is applied for 25-minute periods every hour or 2. If swelling does not begin to subside by the 3rd postoperative day, infection is likely and an antibiotic may be given (eg, **penicillin VK 500 mg orally every 6 hours or clindamycin 300 mg orally every 6 hours) until 72 hours after symptoms subside**

.Direct proportion to the degree of surgical trauma.

• 1 step to reduce swelling – Careful handling of the tissues.

• Application of cold to the operated site – Produce vasoconstriction and thereby reduces the exudation of fluid and blood into the tissue spaces.

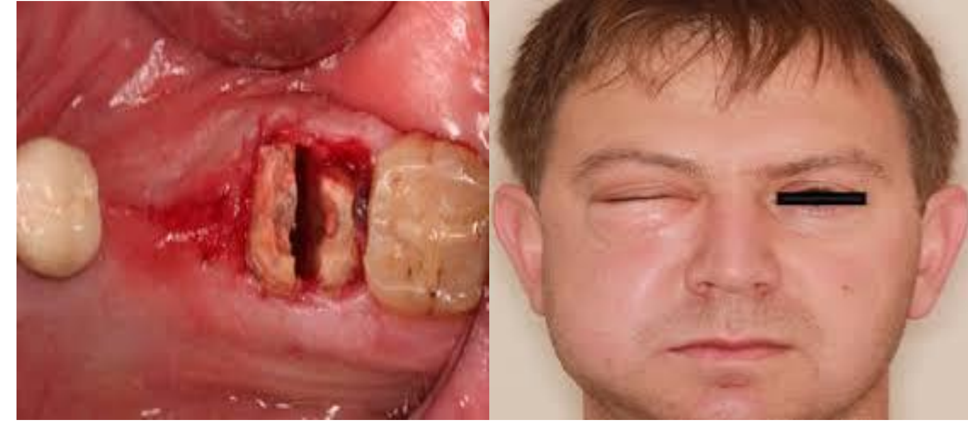
• Prolonged use – Compensatory vasodilation.

• Pressure dressing are also beneficial.

• After 24 to 48 hours – heat in the form of moist compresses.

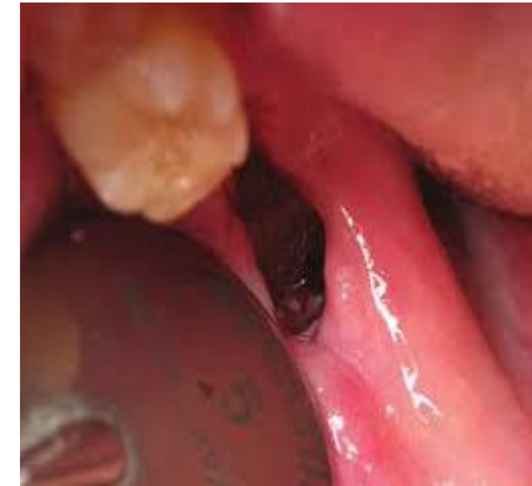
Subcutaneous emphysema:

□**Causes :**Air forced into the connective tissue of intramuscular or facial spaces. • Most often after air-driven dental hand piece or a compressed air spray bottle for irrigation. Swelling – rapid onset, elastic consistency. Such air is absorbed very slowly, **in 1 to 2 weeks, and no treatment is needed**.



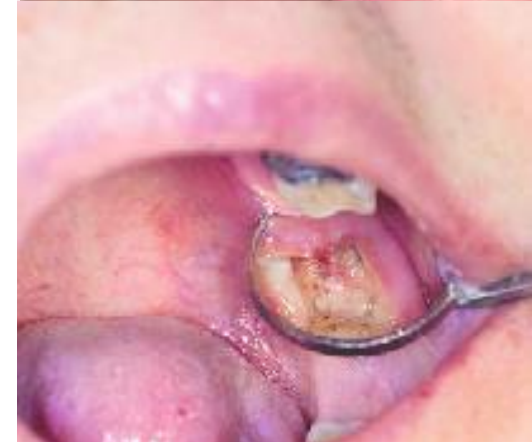
Post extraction infection (Dry socket):

***Dry Socket*, also known as *dento-alveolar osteitis*, *alveolar osteitis*, *alveolitis*, *focal osteomyelitis without suppuration*, *alveolalgia*, *alveolitis sicca dolorosa* and *alveolar periostitis*, is a well-recognised complication of tooth extraction.**



It is characterised by increasingly severe pain in and around the extraction site usually starting on the **2 – 4** post-operative day and **can last for 10 – 40 days**.

The pain radiates typically **to the ear**. The normal post-extraction blood clot is absent from the tooth socket; the bony walls of the socket are bare and exquisitely sensitive to even gentle probing. Bad breath and an unpleasant taste in the mouth are invariably present.



The condition probably arises as a result of a complex interaction between surgical trauma, local bacterial infection and various systemic factors.

The incidence rate probably lies somewhere between **3 - 20%** of all extractions with lower pre-molar

RISK FACTORS OF DRY SOCKET :

Extraction of 'wisdom teeth' especially impacted lower 'wisdom' teeth
Traumatic & difficult extractions
Oral / depot contraception
Immunosuppressant drugs such as *steroids*, *cyclosporine* & *methotrexate*
Active / recent history of *Acute Ulcerative Gingivitis* ('Trench Mouth') or Pericoronitis (infection / inflammation around the crown of a tooth) associated with the tooth to be extracted
Smoking (> 20 cigarettes per day)
Increased bone density either locally or generally (eg. ***Paget's Disease & Osteopetrosis***)
Previous history of '***dry sockets***' following extractions

PREVENTIVE MEASURES FOR THE PATIENT

Wherever possible pre-operative oral hygiene measures to reduce plaque levels to a minimum should be instituted, such as using an **antiseptic mouthwash**.
Patients who **smoke should stop before the tooth extraction** and for at least 2 post-extraction whilst the socket(s) heals.
Patients should **avoid vigorous mouth rinsing** for the **first 24 hours** post-extraction and to use **gentle tooth brushing** and mouth rinses for **7 days post-extraction.**
Patients should return to the **Oral Surgeon / Dentist** immediately they develop **increasing pain from the extraction socket**, awful taste in the mouth or bad breath.

DRY SOCKET TREATMENT:

The infected socket is **gently irrigated with an antiseptic mouthwash.**

The socket is **packed with a dressing that contains sedative and antiseptic ingredients**.

The dressing prevents the accumulation of food debris in the extraction socket, protects the exposed bone from **local irritation** and **calms down the inflammation-infection** within the extraction socket walls.

A dry socket treatment which, when placed provides **rapid pain relief**. It is self **eliminating and has three active ingredients**:

1-Butamben(Anaesthetic) 2-Iodoform: Antimicrobial **3-Eugenol:** Analgesic

Antibiotics may be prescribed or changed (if already on painkillers will still need to be taken **until the effects of the sedative dressing** become apparent and the infection has started to clear.

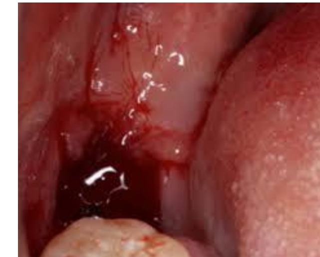
If the pain does not **settle within 48 hours,** patient should back to Oral Surgeon / Dentist

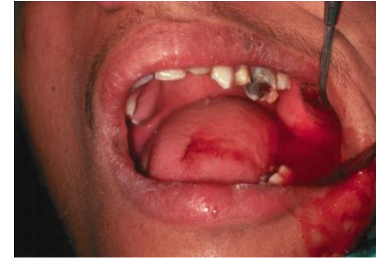
BLEEDING AFTER EXTRACTION :

Bleeding diathesis in dental surgery are : **acquired**, **autoimmune**, or **genetic**

Bleeding during and after surgery can be troublesome for both patient and the surgeon and if uncontrolled can lead to serious consequences.

It may also compromise visibility and possibly the procedure itself. Bleeding normally occurs when a vessel is cut or interrupted during surgery or due to trauma which can be managed successfully in most cases by applying pressure.





The source of bleeding can be either :

Soft tissue (gum)

Hard tissue (bone), or

Vascular(Arterial,venous, or capillary),based on the source of the vessel involved. Identification of the source of the bleeding requires good illumination, adequate retraction, and thorough suctioning.

Prolonged or uncontrolled bleeding is often referred to as hemorrhage. The amount of blood loss can range from minimum to significant quantities.

Hemorrhage can occur to a **greater or lesser degree during all surgical procedures** and it's management depends upon whether the patient is **hematologically normal** or suffers from some **disturbance in the normal clotting mechanism.**

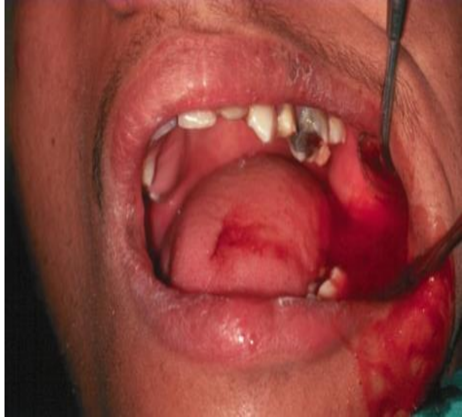
Types of post-extraction hemorrhage: ○ Primary hemorrhage – the bleeding occurs at the time of the surgery.

○ Reactionary hemorrhage – **2–3** hours after the procedure as a result of cessation of vasoconstriction.

○ Secondary hemorrhage – up to 14 days after the surgery. The most likely cause of this is infection.

Types of bleeding after dental extractions

Normal bleeding	Post-extraction bleeding		
	Primary	Reactionary	Secondary
• Normally persists for up to half an hour • Oozing and blood tinged saliva for up to 8 hours • Controlled by pressure pack	• Occurs during and immediately after extraction • Typically presents as blood filling up the mouth • Usually due to infection or trauma to blood vessels • Often controlled by local techniques like pressure packs, haemostatic agents, etc	• Begins two to three hours post extraction, after the vasoconstrictor effect of local anaesthesia wears off • Usually due to underlying systemic conditions such as bleeding or clotting disorders • Not controlled by local measures and may require systemic interventions	• Usually begins 7 to 10 days post extraction • Mainly due to secondary infection • Rare in dental extractions, compared to the other two types of post-extraction bleeding



When faced with a post extraction hemorrhage the dentist should ensure that the area can be well **visualized**. This will allow the best opportunity to make the **correct diagnosis**, identifying the type of **post extrac**tion **hemorrhage** and the **site of the hemorrhage**, therefore **enabling quick and effective management.**

Immediate post-extraction management

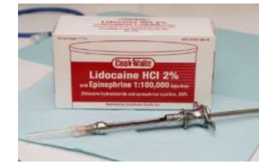
1.Once a tooth has been removed, pressure should be placed on the buccal and lingual/palatal surfaces of the alveolus around the socket .

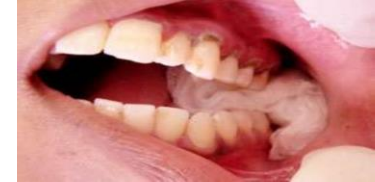
Extraction of a tooth via the intra-alveolar approach causes expansion of the alveolus around the root(s) of the tooth.

2. A piece of sterile gauze may then be rolled up so that it is big enough to cover the socket. This can be placed directly over the socket area and the patient asked to bite down to apply the pressure.

3. Whilst waiting for haemostasis to occur, or once haemostasis is confirmed, the patient should be given clear instructions on his/her post-

operative management of the socket.





If immediate pressure to the socket does not control bleeding, a diagnosis needs to be made regarding the aetiology and the dentist can proceed as follows:

4. A local anaesthetic containing a vasoconstrictor may minimize the bleed initially. Or use a cotton pellet soaked with adrenaline in the bleeding area.

5. Sutures will aid socket closure and help bring the tissues together.

6. Based on the clinical evidence, topical hemocoagulase is an effective **hemostatic agent after** dental **extractions**. It also reduces pain and swelling and promotes wound healing by rapid formation of healthy tissue agents may help haemostasis .

Local hemostatic agents can be classified into:

1-Passive agents , and

2-Active agents

The passive hemostatic agents provide a framework where platelets can aggregate so that a **stable clot can form**. The central mechanism of passive hemostatic agents is to form a **physical, lattice-like matrix** that adheres to the bleeding site; **this matrix activates** the extrinsic clotting pathway and provides a platform around which platelets can aggregate to form a clot.

Because passive hemostats rely on **fibrin production to achieve hemostasis**, they are only appropriate for use in patients who have an intact coagulation cascade.

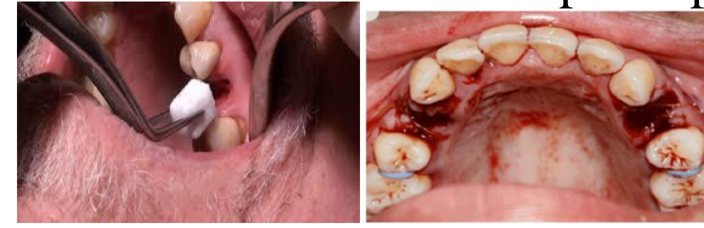
Passive hemostats are generally used as first-line agents because they are immediately available, require no special storage or preparation, and are relatively inexpensive.

Passive topical hemostatic agents do not **adhere strongly** to wet tissue and thus have little effect on actively bleeding wounds; however, they can be effective in the presence of **heavier bleeding** because of their larger absorption capacity and the greater mass provided by their more **fibrous/dense structures.**

Since they have the potential to expand many times than their mass when they come in contact with fluids, it is recommended to use the minimum amount of the agent required to achieve hemostasis and remove as much of the agent as possible once hemostasis has been achieved. If not they can compress the surrounding structures (nerves, vessels, etc.).

Passive topical hemostatic products include collagens, cellulose, gelatins, and polysaccharide spheres.

7. Cancellous bone can be burnished with a flat plastic instrument or a Mitchell's trimmer to help compress the bone in the area.



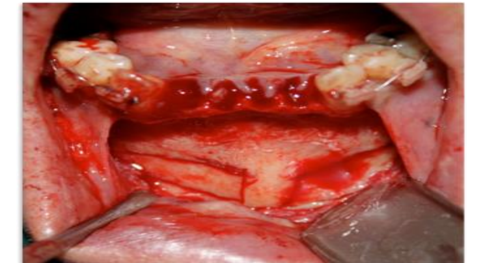
8. The availability of resorbable haemostatic dressing materials means that, in many instances, the clinician will choose to pack the socket with a d**ressing and then place asuture**.

9.Bone wax consists of beeswax, **paraffin** and a **softening agent**.

It may be used to **control bleeding within cancellous bone**. The origin of the bleed must be confirmed, and the wax is packed into the spaces within the bone

The pressure provided from the wax aids haemostasis.

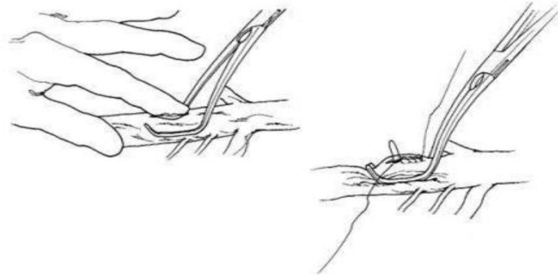
Bone wax is non-resorbable and the host may treat it as **a foreign body**.

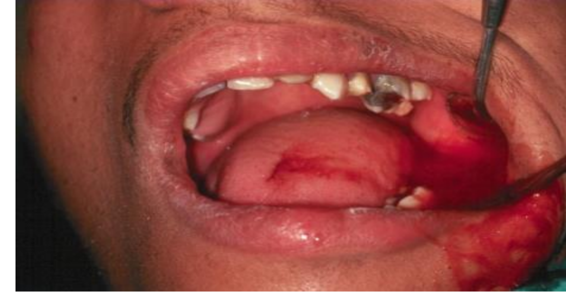


This means preferably bone wax should be removed after placement when **haemostasis has occurred**, although it often remains in situ, as

complete removal can be difficult. Wax placement is usually followed by placement of haemostatic gauze and a suture to maintain pressure on the socket

10. Vascular hemorrhage may cause the most distress to a patient given the excessive amount of blood flow. **A large vessel may require ligation**, whereas smaller vessels can be **cauterized**. If the vessel is not visible, a **flap may to be raised** to allow access and **identification.**



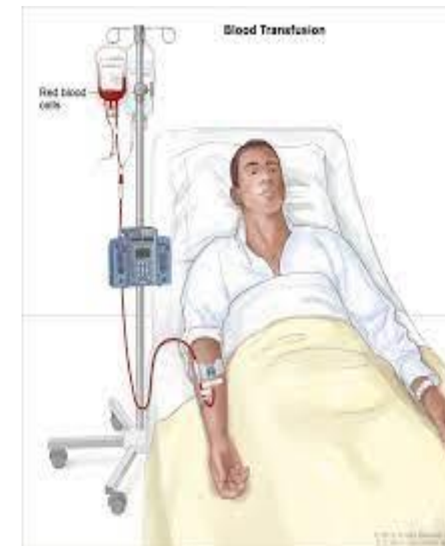


11-**Electrocautery** is the process of sealing the exposed end of the vessel with heat conduction, the **hemorrhaging vessel** should be identified and cauterized

12.Vital sign montoring

Monitoring equipment is helpful in assessing the significance of the bleed on the patient's systemic health.

This is of particular importance when dealing with a **secondary hemorrhage**. Although the above methods may manage the hemorrhage, one must consider how much **blood the patient may have already lost** . May need blood transfusion .



THANK YOU!