Traumatic injuries of teeth, jaws and soft tissues in maxillofacial region in children.

Pediatric surgical dentistry

Lector – Dolenko Olga

050-252-53-15

(Viber)

Plan of lecture and their organizational structure

№	Answers to possible questions. The main stages of the lecture and their content	Lecture type. Means of activating students. Methodological support materials	Time distribution
1.	Preparatory stage. definitionrelevance of the topic, educational goals of the lecture and motivation	look p 1 и 2	5 %
2.	The main stage. Teaching lecture material according to the plan: 1. Causes, statistics of child injuries. 2. Classification of injuries of the PMO. 3. Damage to the soft tissues of the maxillofacial region in children. 4. Primary surgical treatment of soft tissue wounds, rabies vaccination. 5. Traumatic injuries of teeth and bones of the maxillofacial region in children. 6. Diagnostics, treatment and consequences of traumatic injuries of teeth and bones of the maxillofacial region in children. 7. Burns, frostbite, electrical injuries. Burn disease. Treatment, prevention of complications.	Clinical lecture.	85 % -90%
1. 2. 3.	The final stage Summary of the lecture. General conclusions.	Answers to possible questions.	5 %

Background

- Approximately 30% of children have experienced dental injuries. Injuries to the mouth include teeth that are: knocked out, fractured, forced out of position, pushed up, or loosened. Root fracture and dental bone fractures can also occur.

  The peak period for trauma to the primary teeth is 18 to 40 months of age, because this is a time of increased mobility for the relatively uncoordinated toddler. Injuries to primary teeth usually result from falls and collisions as the child learns to walk and run.

  With the permanent teeth: school-aged boys suffer trauma almost twice as frequently as girls. Sports accidents and fights are the most common cause of dental trauma in teenagers. The upper (maxillary) central incisors are the most commonly injured teeth. Maxillary teeth protruding more than 4 mm are two to three times as likely to suffer dental trauma than normally aligned teeth.

Dentoalveolar injuries

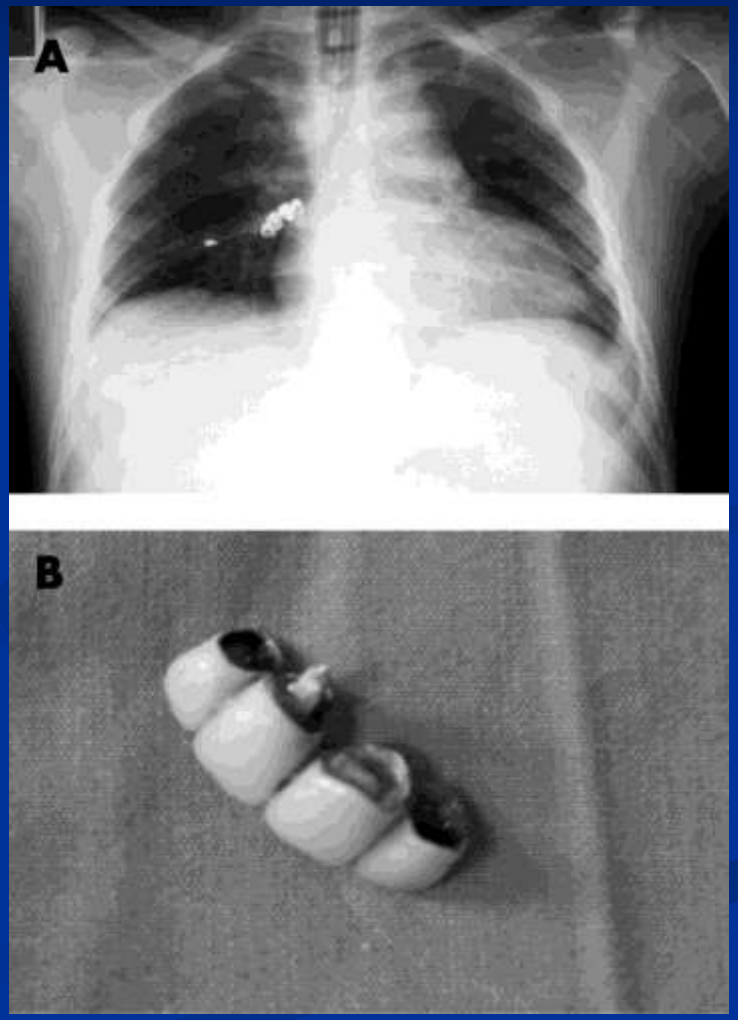
- Dentoalveolar injuries include fracture, subluxation or avulsion of teeth, and fractures of the alveolar processes of the maxilla and mandible. The alveolar processes are those portions of the maxilla and the mandible which house and support the dentition.
- Dentoalveolar injuries commonly result from falls, sports-related injuries, motor vehicle accidents, and assaults.
- Several studies have identified anatomical or morphological characteristics that may predispose certain children to traumatic injuries to the teeth. These include a **forward position of the maxilla and procumbent maxillary incisors with respect to the position of the lower jaw and teeth**, and inability of the upper and lower lips to meet when the teeth are interdigitated at the rest position; this is known as lip incompetence.

Dentoalveolar injuries

- Injuries to the teeth and dentoalveolar structures can potentially result in severe disfigurement. Disability as a result of injury or defects in the dentoalveolar apparatus may produce difficulty in phonation and masticatory function.

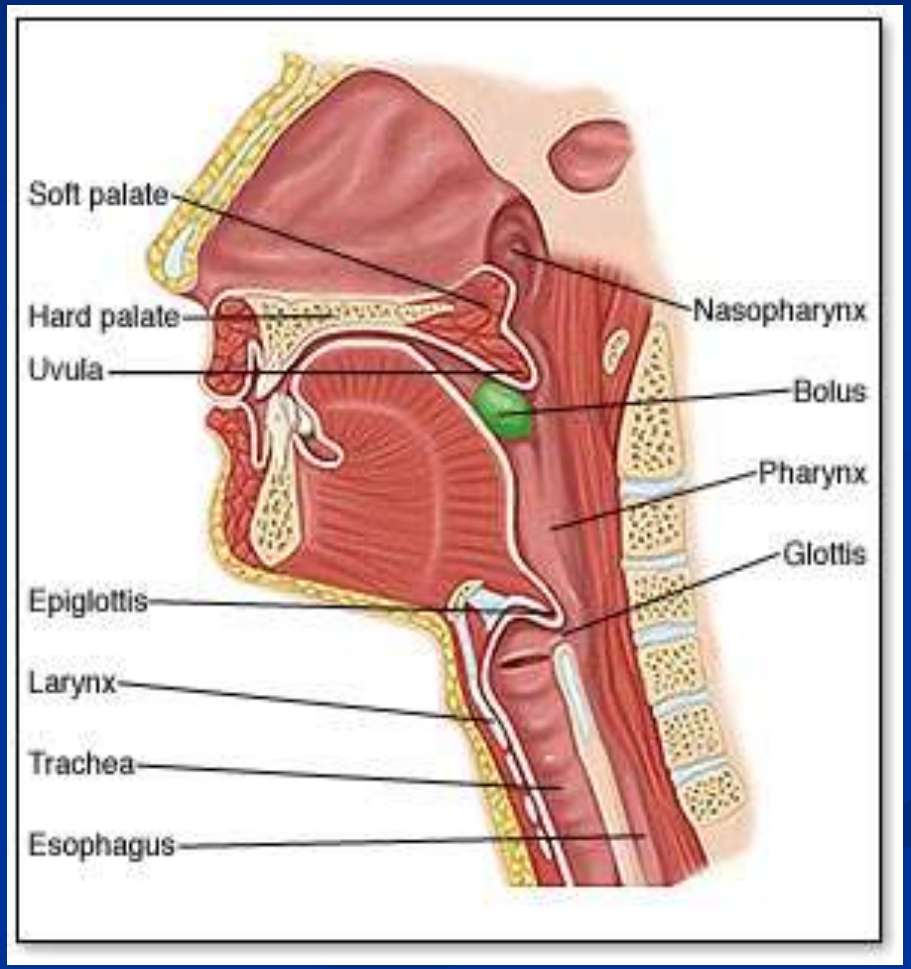
Dentoalveolar injuries

- Fractures of the teeth are rarely considered life-threatening emergency situations except in the case where there is **aspiration of a tooth**. If the tooth is not accounted for in the clinical examination, a chest radiograph is indicated to rule out this possibility. Prompt referral to a pulmonologist is required for retrieval in the case of aspiration.



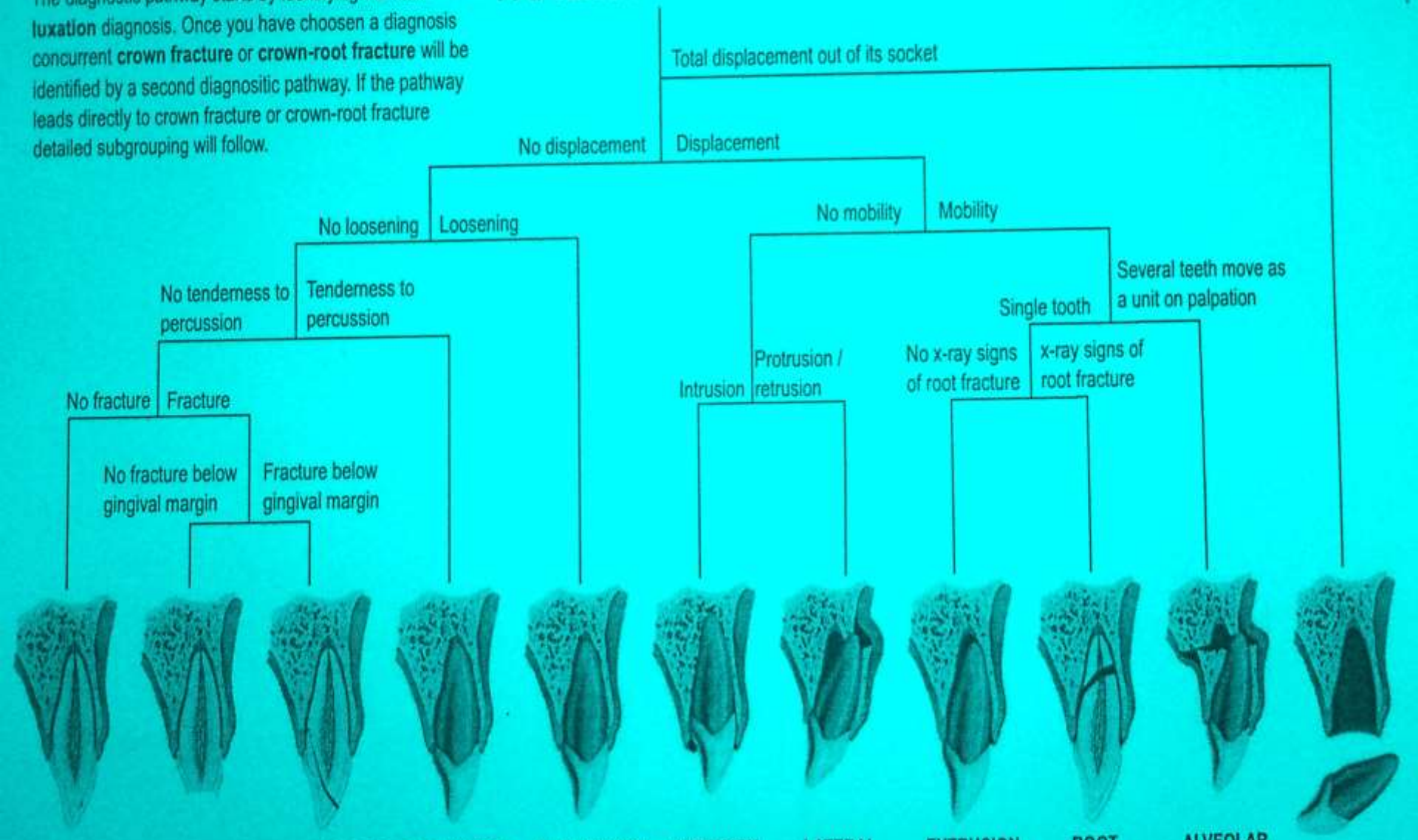
Dentoalveolar injuries

- **Swallowing of teeth** is also a possibility, but carries a significantly lower morbidity than aspiration.
- The swallowed foreign object may be visualized on abdominal radiograph, and intervention is seldom required. Serial radiographs will track the tooth as it progresses through the gastrointestinal tract.

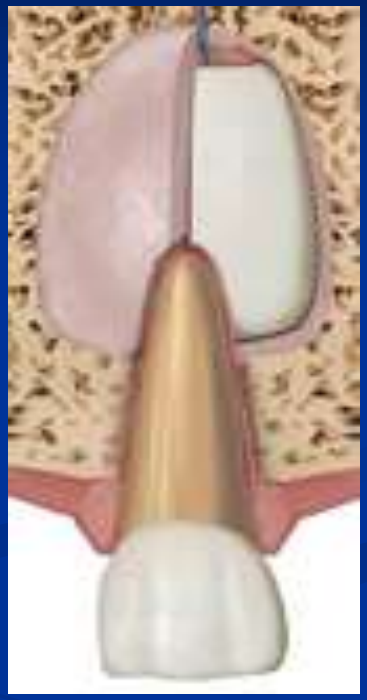


TRAUMA PATHFINDER

The diagnostic pathway starts by identifying the main **luxation** diagnosis. Once you have choosen a diagnosis concurrent **crown fracture** or **crown-root fracture** will be identified by a second diagnositic pathway. If the pathway leads directly to crown fracture or crown-root fracture detailed subgrouping will follow.



Concussion



- An injury to the tooth-supporting structures without increased mobility or displacement of the tooth, but with pain to percussion.

Concussion

- The neurovascular supply is usually intact
- In a few areas bleeding edema
- In most areas the periodontal ligament is without damage
- No damage to the follicle or permanent tooth germ

Concussion

- Visual signs - Not displaced.
- Percussion test - Tender to touch or tapping.
- Mobility test - No increased mobility.
- Pulp sensibility test - Usually a positive result. The test is important in assessing future risk of healing complications. A lack of response to the test indicates an increased risk of later pulp necrosis.
- Radiographic findings - No radiographic abnormalities, the tooth is in-situ in its socket.
- Radiographs recommended - As a routine: Occlusal, periapical exposure and lateral view from mesial or distal aspect of the tooth in question. This should be done in order to exclude displacement.

Subluxation

- An injury to the tooth supporting structures resulting in increased mobility, but without displacement of the tooth. Bleeding from the gingival sulcus confirms the diagnosis.

Subluxation

- Damage may have happened to the neurovascular supply
- In many areas separation of periodontal ligament with interstitial bleeding and edema
- Some areas have undamaged periodontal ligament
- Loosening of the tooth

Subluxation

- Visual signs - Not displaced.
- Percussion test - Tender to touch or tapping.
- Mobility test - Increased mobility.
- Pulp sensibility test - Sensibility testing may be negative initially indicating transient pulpal damage. Monitor pulpal response until a definitive pulpal diagnosis can be made.
- Radiographic findings - Usually no radiographic abnormalities.
- Radiographs recommended - As a routine: Occlusal, periapical exposure and lateral view from the mesial or distal aspect of the tooth.

Subluxation

- **Treatment objective**

  Usually no need for treatment.

- **Treatment**

  A flexible splint to stabilize the tooth for patient comfort can be used for up to 2 weeks.

Patient instructions

- Soft food for 1 week.
- Good healing following an injury to the teeth and oral tissues depends, in part, on good oral hygiene. Brushing with a soft brush and rinsing with chlorhexidine 0.1 % is beneficial to prevent accumulation of plaque and debris.

Follow-up

- Clinical and radiographic control at 4 weeks, 6-8 weeks and 1 year.
- Action related to endodontic treatment may be taken after 2-3 months.

Extrusion (extrusive luxation)

- Partial displacement of the tooth out of its socket
- An injury to the tooth characterized by partial or total separation of the periodontal ligament resulting in loosening and displacement of the tooth. The alveolar socket bone is intact. In addition to axial displacement, the tooth usually will have some protrusive or retrusive orientation.

Intrusion (intrusive luxation)

- Displacement of the tooth *into* the alveolar bone. This injury is accompanied by comminution or fracture of the alveolar socket.

A - No collision with permanent tooth bud

B - Collision with permanent tooth bud

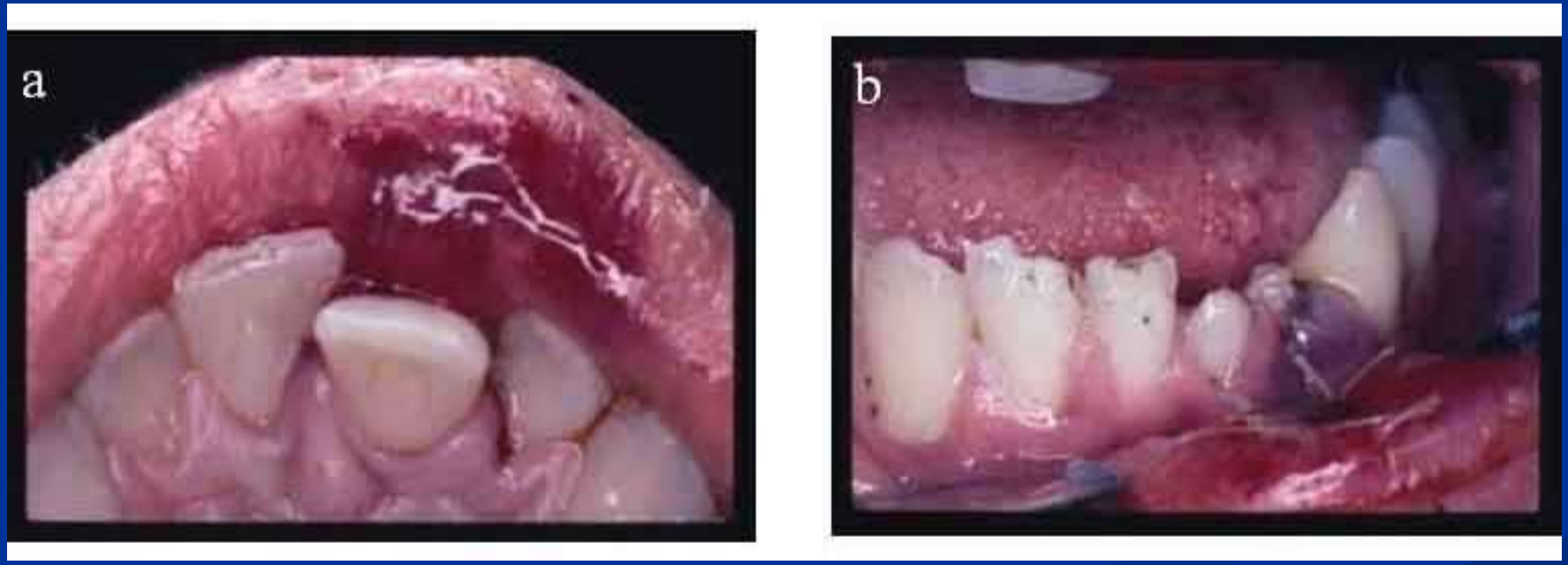
Lateral luxation

- Displacement of the tooth ***other than axially***. Displacement is accompanied by comminution or fracture of either the labial or the palatal/lingual alveolar bone.

  Lateral luxation injuries, similar to extrusion injuries, are characterized by partial or total separation of the periodontal ligament. However, lateral luxations are complicated by fracture of either the labial or the palatal/lingual alveolar bone and a compression zone in the cervical and sometimes the apical area. If both sides of the alveolar socket have been fractured, the injury should be classified as an alveolar fracture (alveolar fractures rarely affect only a single tooth). In most cases of lateral luxation the apex of the tooth has been forced into the bone by the displacement, and the tooth is frequently non-mobile.

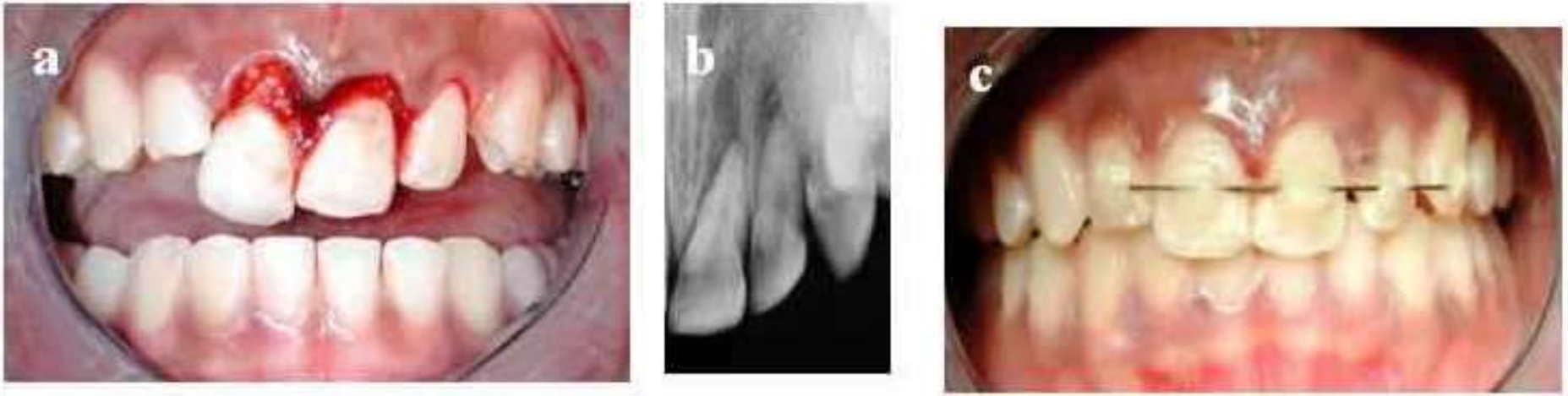
Intrusion and lateral (palatal) luxation

Lateral luxation (tooth 21), uncomplicated (tooth 31) and complicated (tooth 32) with laceration injury of upper and lower lip



Lateral luxation

Figure 5. Clinical (a) and radiographic (b) presentation of lateral luxation injuries. (c) Immobilization of reposition teeth with non-rigid splint for 1-2 weeks.



Avulsion

- Even though it is possible for primary teeth to be fractured, intrusion, luxation or avulsion injuries are more common. The root and alveolar bone support of the primary teeth are minimal and may predispose the primary dentition to avulsion and luxation injuries.

- The tooth is completely displaced *out* of its socket. Clinically the socket is found empty or filled with a coagulum.

First aid for avulsed teeth

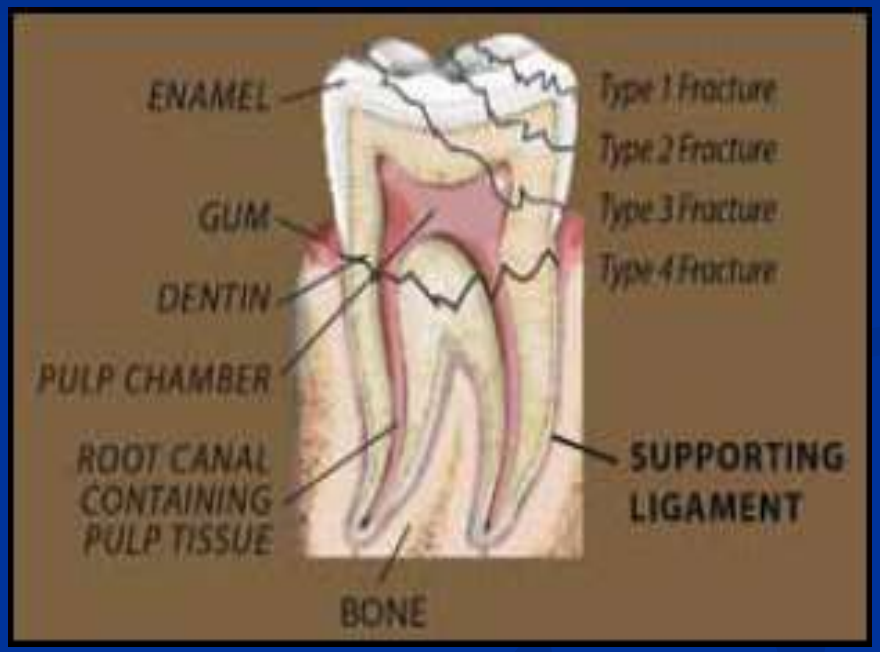
- Dentists should always be prepared to give appropriate advice to the public about first aid for avulsed teeth. An avulsed permanent tooth is one of the few real emergency situations in dentistry. In addition to increasing the public awareness by mass media campaigns, healthcare professional, parents and teachers should receive information on how to proceed following these severe unexpected injuries. Also, instructions may be given by telephone to parents at the emergency site.

First aid for avulsed teeth

- If a tooth is avulsed, make sure it is a permanent tooth (**primary teeth should not be replanted**).
- Keep the patient calm.
- Find the tooth and pick it up by the crown (the white part). Avoid touching the root.
- If the tooth is dirty, wash it briefly (10 seconds) under cold running water and reposition it. Try to encourage the patient / parent to replant the tooth. Bite on a handkerchief to hold it in position.
- If this is not possible, place the tooth in a suitable storage medium, e.g. a glass of milk or a special storage media for avulsed teeth if available. The tooth can also be transported in the mouth, keeping it between the molars and the inside of the cheek. Avoid storage in water.
- Seek emergency dental treatment immediately.

Classification of injures of the permanent teeth at children (CARTFUL).

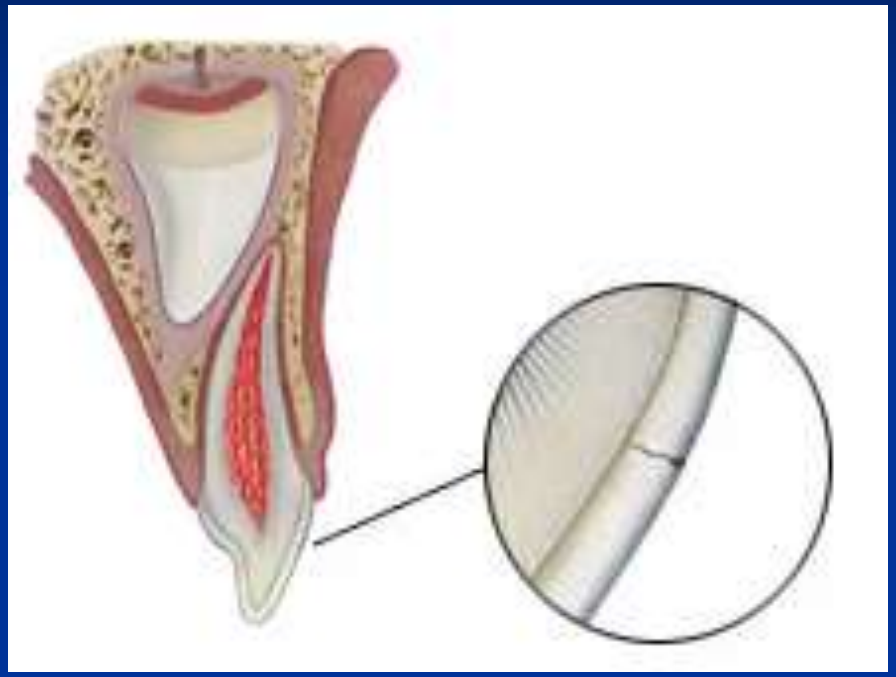
- Class I. Blow of tooth with the insignificant structural damages (cracks of enamel).
- Class II. Uncomplicated break of crown of the tooth.
- Class III. Complicated break of crown of the tooth.
- Class IV. Complete break of crown of the tooth.
- Class V. Longitudinal break of crown and root of tooth.
- Class VI. Break of root of tooth.
- Class VII. Complete dislocation of tooth.

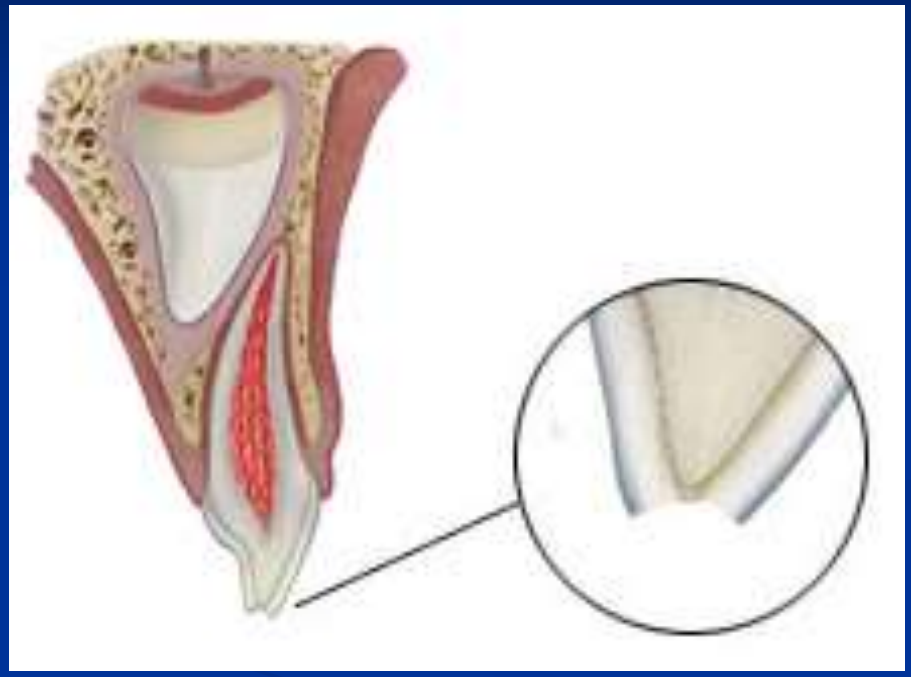


Dentoalveolar injuries

- The permanent teeth are more firmly embedded in alveolar bone and may be more likely to fracture. Fractures of the teeth limited to the enamel do not generally produce pain, but the tooth may feel rough and irritate the tongue, lip or mucosa. If exposure of the tooth to air or cold fluids causes mild to moderate sensitivity, these stimuli should be avoided.

Dental trauma





A - **Enamel infraction** (an incomplete fracture (crack) of the enamel without loss of tooth structure)

B - **Enamel fracture** (A fracture confined to the enamel with loss of tooth structure)

Dental trauma

A **Enamel-dentin fracture** (a fracture confined to enamel and dentin with loss of tooth structure, but not involving the pulp)

B **Enamel-dentin-pulp fracture** (Complicated crown fracture)

(a fracture involving enamel and dentin with loss of tooth structure and exposure of the pulp)

Dental trauma

Dental trauma

- **Crown-root fracture without pulp involvement**

  A fracture involving enamel, dentin and cementum with loss of tooth structure, but not involving the pulp.

Dental trauma

- **Crown root fracture with pulp involvement**

  A fracture involving enamel, dentin, and cementum with loss of tooth structure, and involving the pulp.

Dental trauma

Figure 4. Reposition and splinting of displaced tooth with root fracture. (a) Radiographic presentation of root fracture. (b) Immobilization of coronal fragment with rigid splint for 1-3 months. (c) Radiographic examination of repositioning after splinting.

Dental trauma

- Fractures involving the enamel and dentin may be exquisitely sensitive, especially when exposed to cold air or liquids. Unless there is a contraindication, pain can be alleviated temporarily by infiltration of 1-2 ml of local anesthetic solution, such as 1% lidocaine, into the buccal gingival mucosa over the root apices of the injured tooth. This technique will reliably produce pulpal anesthesia in most teeth. Mandibular molars may require a dental nerve block of the inferior alveolar nerve to alleviate pain.

Dental trauma

- Fractures of the crown of the tooth, in which the dental pulpal tissues are exposed, may also be painful. The administration of local anesthesia will alleviate pain temporarily and allow for careful examination. The direct exposure of the pulpal tissues to the oral cavity provides an entry route for bacteria. Infection of the pulpal tissues will ensue if treatment is delayed beyond several days.

Dental trauma

- **Vertical fractures** of teeth may be painful as a result of movement of loose portions that will stimulate pain fibers in the periodontal ligament system. On examination, bleeding from the sulcus of the tooth is usually minimal. This bleeding stops spontaneously and requires no intervention. If the fractured portion of the tooth is quite mobile, it may become dislodged. In this case, the tooth should be removed to prevent possible aspiration.

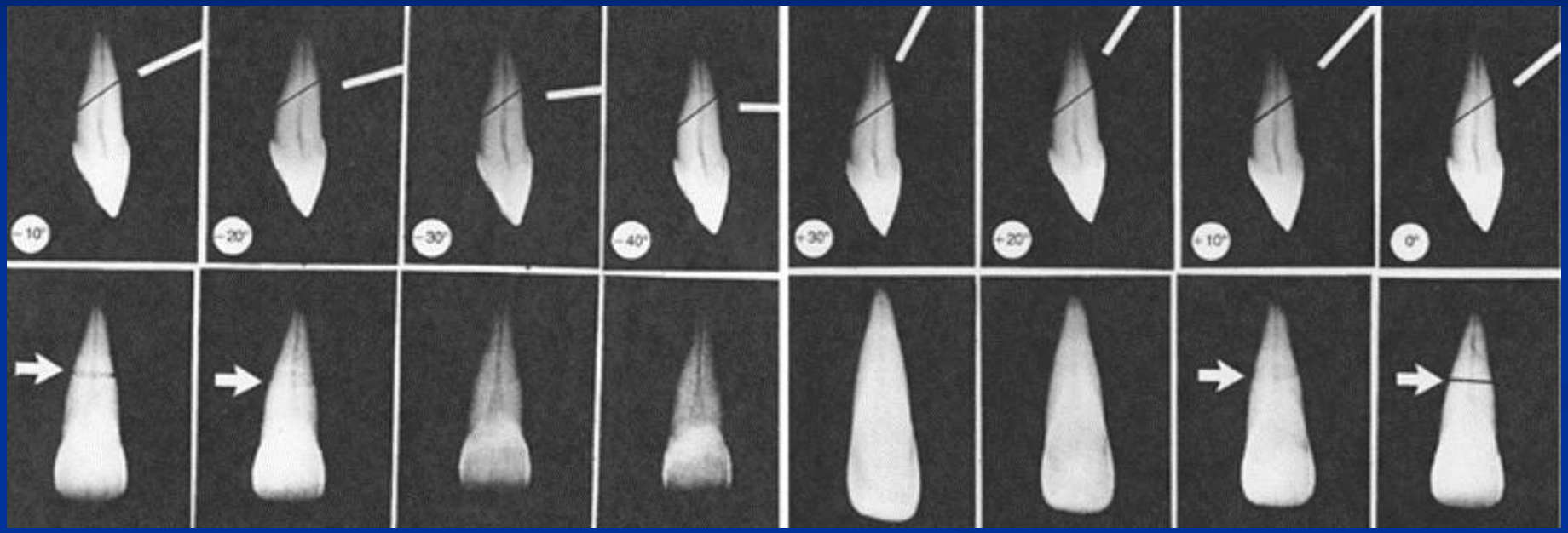
Dentoalveolar injuries

- Infiltration of local anesthetic is administered to relieve pain and allow for removal of the fragment. The airway should be protected ith a gauze screen and the tooth fragment grasped with a small rongeur or hemostat for removal.
- The prognosis of restoring the tooth depends on the extent of damage to the tooth. In general, the further the vertical fracture extends toward the apex of the root, the poorer the prognosis.

Dentoalveolar injuries

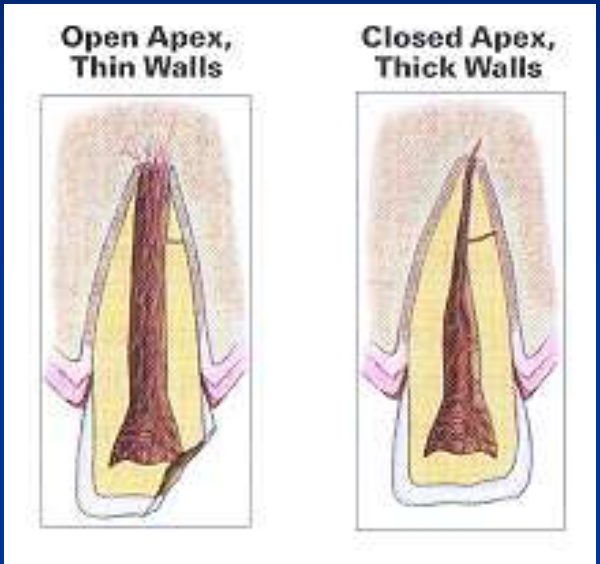
- **Horizontal fractures** involving the roots of teeth are suspected when there is mobility of a tooth following a blow to the mouth or teeth. The tooth may be displaced and there may be bleeding from the gingival collar of the tooth. These injuries may cause pain due to stimuli within the periodontal ligament structure and the dental pulp. Dental radiographs may be used to confirm suspicion of root fracture. Interim care includes relief of pain and stabilization of the tooth if it is very mobile.

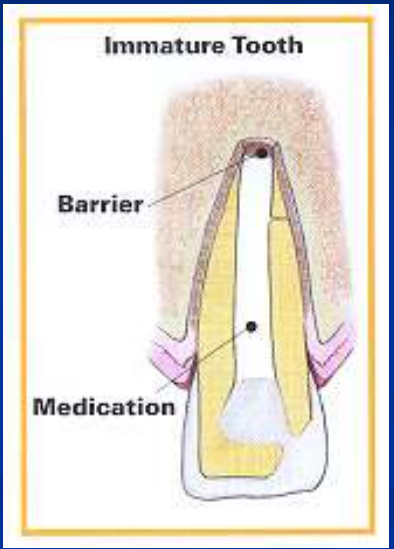
X-ray diagnostics



- Radiographs taken at various angles to a fracture (top row) produce images that reveal the fracture to varying degrees—or not at all

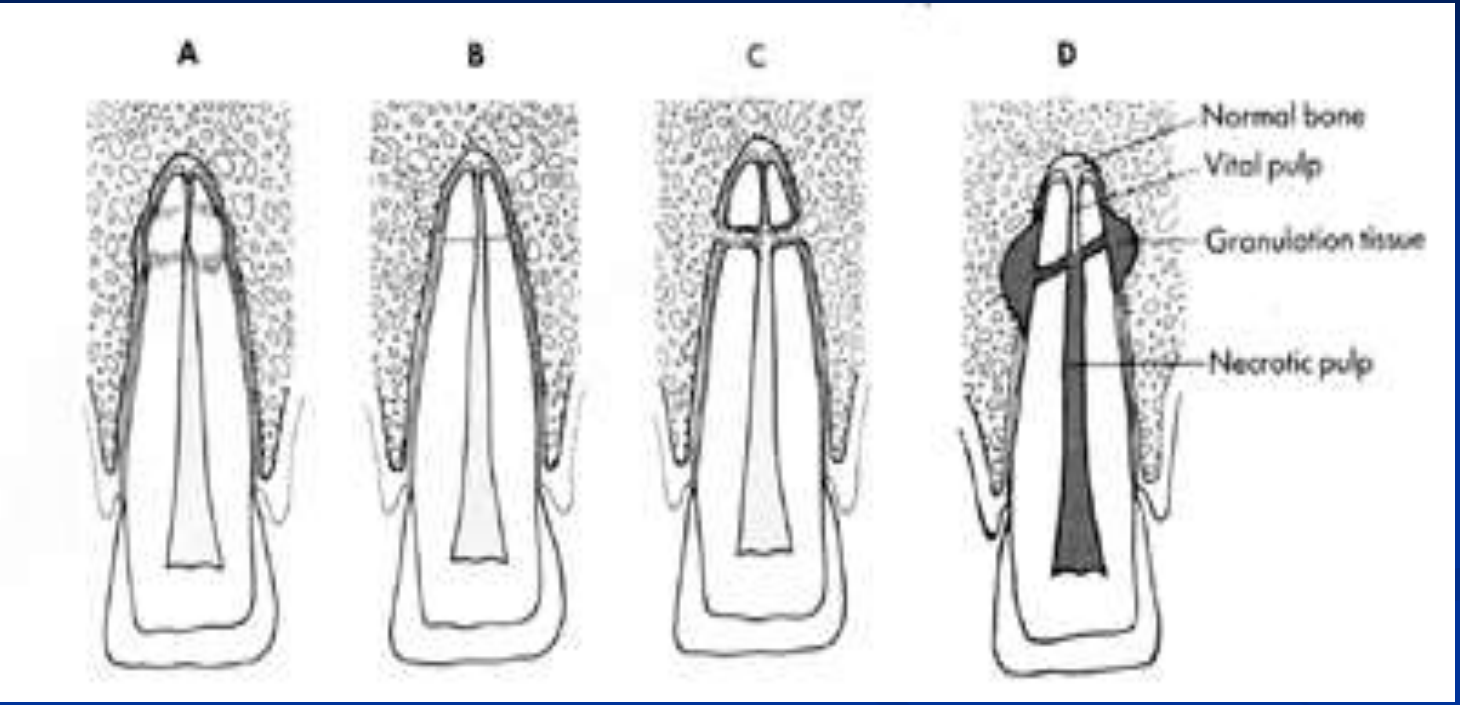
Features of treatment





- **Apexification**
  During apexification, the unhealthy pulp tissue is removed. The endodontist places a medication into the root to help a hard tissue form near the apex, or root tip. This hard tissue provides a barrier for the permanent root canal filling. In spite of appropriate treatment, the root canal walls of a tooth treated by apexification will not continue to develop or thicken, making the tooth susceptible to crown or root fractures. Proper restoration will minimize this possibility and maximize protection of your tooth.

Root fracture of permanent tooth



Different forms of healing:

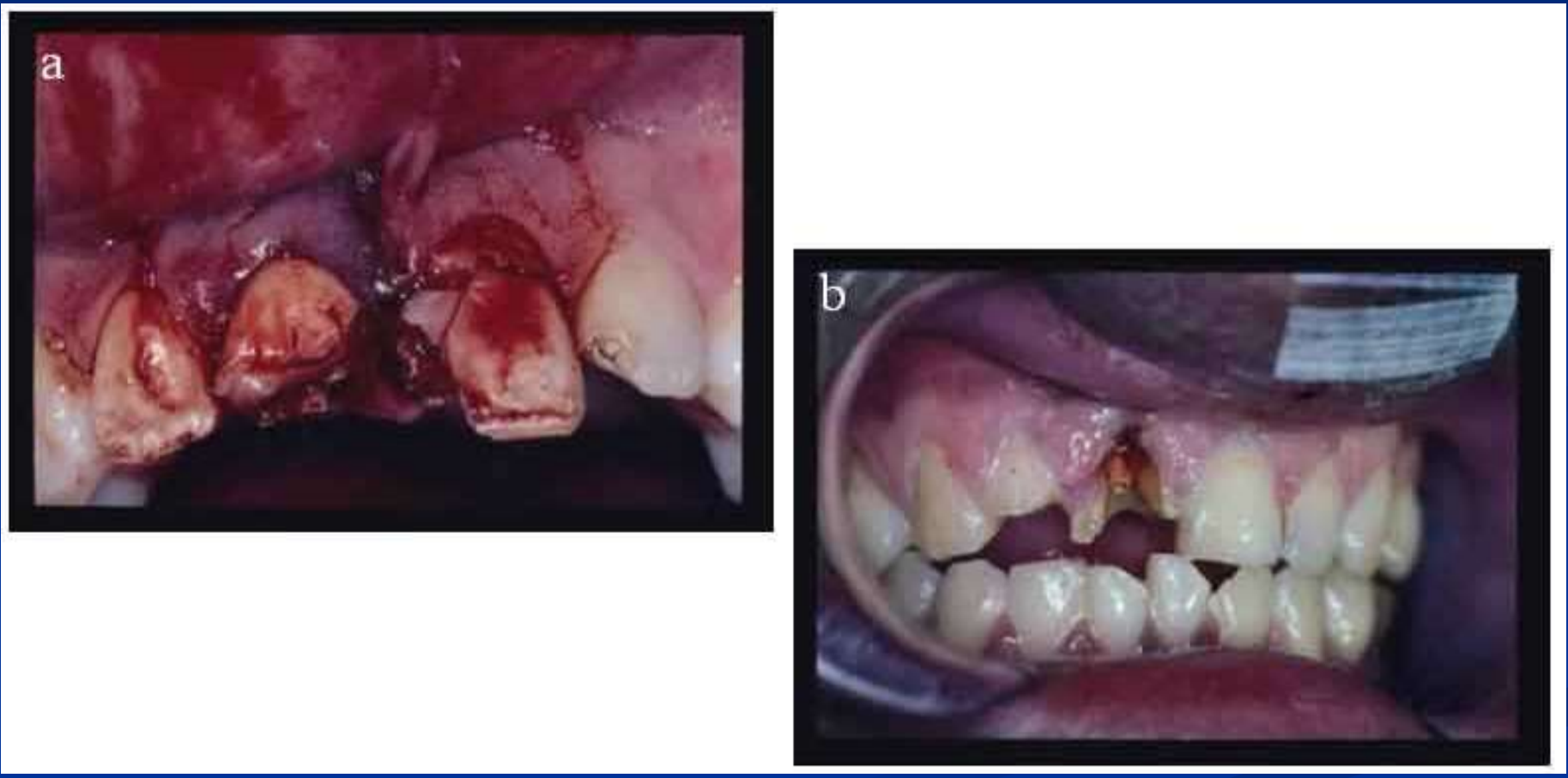
A, Calcific callus;

B, Connective tissue;

C, Combination of bone and connective tissue;

D, Nonunion and granulation tissue formation

Dental trauma



- Tooth with poor prognosis should be extracted

Alveolar Injuries

- Alveolar injuries often occur in conjunction with injuries to the teeth. The concussion is a blow to a tooth and the surrounding alveolus and usually requires only pain control and follow-up in a few weeks to check for pulpal death. Intrusions are most often left alone to re-erupt, with an exception being a tooth believed to be against the developing permanent tooth bud.
- A dislocated primary tooth, if mobile and accompanied by circumferential bleeding, should be extracted. A slightly mobile dislocated tooth can be observed over time; no immediate treatment is required. Avulsed primary teeth should not be re-implanted.

Facial trauma

- **Facial trauma**, also called **maxillofacial trauma**, is any physical trauma to the face. Facial trauma can involve soft tissue injuries such as burns, lacerations and bruises, or fractures of the facial bones such as nasal fractures and fractures of the jaw, as well as trauma such as eye injuries. Symptoms are specific to the type of injury; for example, fractures may involve pain, swelling, loss of function, or changes in the shape of facial structures.

Facial trauma

- The face allows recognition and communication among people. No other part of the body is as aesthetically important as the face. Facial injuries can range from a minor inconvenience to a lifetime disfigurement. For this reason, any injury to this area requires particular care and attention during treatment.

Facial trauma

- The nasal bones and mandible (jaw) are the two most frequent sites of facial fracture. Mandibular fractures occur in 7.7% of children younger than 16 years of age. An equal incidence of mandibular fractures exists between both sexes. Trauma to the condylar growth center (the neck of the jaw) beneath the articular disk may cause delayed growth of the affected side of the jaw.

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- First, perform a primary survey and assess **airway, breathing and circulation**. Note that mobile fracture segments, edema (swelling), hemorrhage (bleeding), vomitus, bone fragments, and foreign bodies may cause obstruction of the airway. The airway is always the first priority in treatment of the trauma patient. In any trauma patient, be sure to obtain cervical spine x-rays to rule out neck injury.
- A complete set of **vital signs** including: temperature, pulse, blood pressure, and pulse oximetry should be obtained on every patient.

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- Second, the face inspected for symmetry, swelling, or ecchymosis (bruising). The face is palpated bimanually in an orderly fashion – beginning at the cranial vault, then proceeding to the forehead, orbital rims (bone surrounding the eyes), zygomatic arch (cheek bone), maxillary alveolus (upper jaw bone), and the mandible (lower jaw). Numbness of the infraorbital, supraorbital, and mental nerve distributions may indicate a cut or stretched nerve. Gently palpate the nasal area for crepitus, tenderness, or subcutaneous emphysema (air).

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- Swelling, ecchymosis (bruising), crepitation (fine crackling), and facial asymmetry may indicate an underlying fracture. Look for enopthlalmus (sunken-in eyes), exopthalmus (protruding eyes), periorbital ecchymosis, and postauricular ecchymosis (bruising behind the ears - Battle's sign). Note that Battle's sign is associated with basilar skull fractures. Examination of the inside of the ear with an otoscope may reveal a hemotympanum (bleeding of the eardrum), which indicates either a basilar skull or temporal bone fracture.

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- Third, check for maxillary, mandibular, and zygomatic fractures.
  Check for maxillary Le Forte fractures by grasping the maxilla intraorally, and attempt to gently "rock" it back and forth. Movement of the maxilla indicates a fracture.
  Check for mandibular fractures by having the patient attempt to bite on a tongue depressor while you gently twist it – mandibular fracture patients cannot accomplish this task.
  Examine the zygomatic (cheekbone) region by visual inspection, external palpation, and intraoral palpation. Palpate intraorally above the buccal surface of the upper molars to differentiate a zygomatic arch fracture from tenderness.

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- Fourth, perform an intraoral examination. Check the oral cavity for dentoalveolar trauma. It is important to account for all teeth, since the patient may have aspirated or ingested them. Check to see that the patient's bite is normal. The mandible should not deviate to any side during opening.

EMERGENCY EVALUATION OF FACIAL TRAUMA:

- Fifth, inspect for signs of nerve deficit. Cranial nerve VII (facial nerve) controls the muscles of facial expression and should be checked by having the patient smile, frown, wrinkle the forehead, and close the eyes tightly. The three branches of cranial nerve V (trigeminal nerve) should then be examined, since it controls sensation to the face.
  Eyebrows that cannot be raised, and eyelids that cannot be closed – injury to the temporal and zygomatic branches of the facial nerve.
  Inability to frown – injury to the marginal mandibular branch of the facial nerve.
  Inability to smile – injury to the buccal branch of the facial nerve.
  Wrinkles on the cheek – infraorbital nerve injury (a branch of the trigeminal nerve).

WOUND DECONTAMINATION, EXPLORATION, AND CLOSURE:

- Removing bacteria and devitalized tissue is critical in wound treatment. Irrigation with an 18-gauge catheter attached to a 60 ml syringe is required for wound irrigation. Use normal saline to irrigate facial wounds. Wounds that have gross contamination should be carefully scrubbed with a fine-pore sponge, because foreign particles which are allowed to remain in the skin can cause "tattoing." Devitalized tissue needs to be removed, using a number-15 blade or iris scissors. The skin surrounding the wound may then be prepared with a 1% solution of provodine iodine, and the laceration area draped in a sterile fashion before suturing.

Soft tissue injuries

- **Soft tissue injuries** can be classified under categories according to the type of wound. The general types of soft tissue injuries that will be discussed are: **contusion, abrasion, laceration, burns, and penetration injuries.**

Soft tissue injuries

- A **contusion** results from injury to the soft tissues in which the epithelium or epidermis remains intact.
- **Abrasions** are soft tissue injuries in which the epithelium or epidermis is removed, leaving the dermal elements exposed.
- **Lacerations** are wounds created by tearing of the soft tissues; these wounds may extend through all layers of the epidermis, dermis, and muscle layers, and into the fascial planes of the head and neck region.

WOUND DECONTAMINATION, EXPLORATION, AND CLOSURE:

- After adequate anesthesia and wound cleansing has been provided, explore the wound with tissue forceps or tip of a scalpel blade to search for foreign bodies and sources of bleeding. Radiographic film can be used to visualize foreign bodies – especially glass and gravel.

Wound treatment

- All lacerations should be considered contaminated by the time of evaluation in the Emergency Department. The rate of wound infection in sutured lacerations is 1-30%, depending on the study series.
- Antibiotic administration does not substitute for the proper cleaning of wounds.
- Wound cleansing is of paramount importance and cannot be overemphasised. Wound irrigation should be copious. High pressure irrigation is more effective than low-pressure irrigation in reducing bacterial wound counts and wound infection rates. Most authorities recommend impact pressures generated by a 30-60cc syringe and a 18-gauge needle.
- Normal saline is the most common choice of solution and should be used until the wound appears clean. Hydrogen peroxide and poviodine should NOT be used for irrigation.

Wound treatment

- **Conservative debridement**
  Devitalised pieces of skin and subcutaneous tissue are excised. Viable tissue should be conserved and this is especially important in the face and hands.

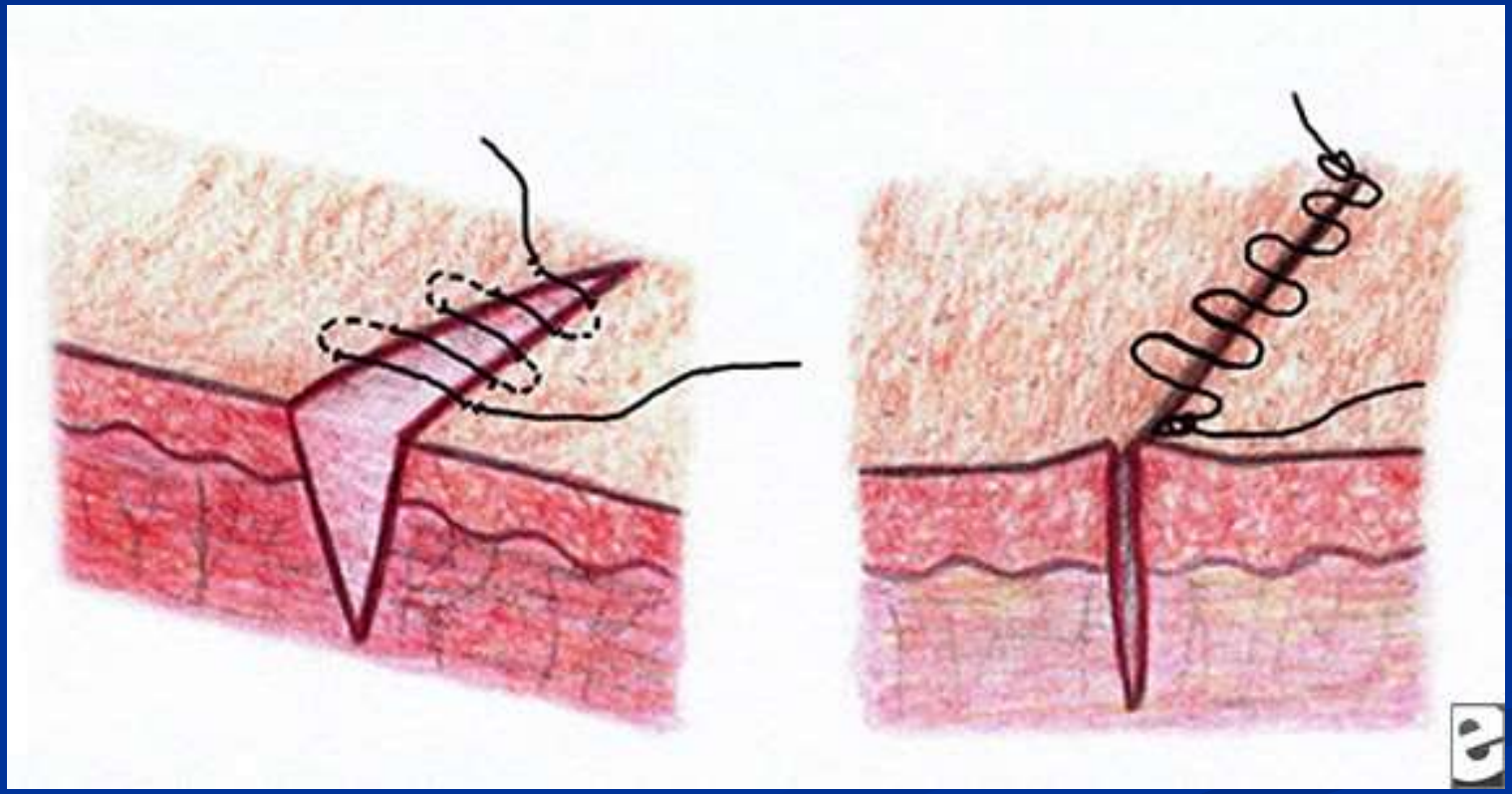
- **Local anaesthetics**

  Prior to the administration of local anaesthetics, check the sensory and motor nerve response, and for allergy (very rare). The pediatric literature supports the use of a topical anesthetic such as LET (a combination of lidocaine, epinephrine and tetracaine) prior to needle infiltration to reduce the pain. Slow injection by a small needle (such as a 25 Gauge) will reduce the pain of infiltration.

Wound Closure – Choice of suture material

- Absorbable suture material is utilised below the skin (except dermal sutures may be used for high tension lacerations), inside the mouth for example, or in other awkward areas where suture removal would be difficult. Plain catgut has high tissue reactivity. Chromic catgut is less problematic and is absorbed in about 10-14 days. Dexon or Vicryl last 90-120 days.
- Non-absorbable suture material is used for most skin closures. The synthetics are likely best as these have less tissue reactivity. Monofilaments, for example, nylon (Ethilon, Prolene) or braided materials (Ethibond, Surgilon) may be used. Knots must be "well locked", and there should be only minimal tension on the tissues themselves.
- A suture size of 5:0 or 6:0 is used on the face, whereas 4:0 or sometimes 3:0 (if more strength is required) is used on the trunk or extremity.

Wound Closure



Wound dressings and follow-up

- Dressings are important to maintain sterility and absorb blood and serum. Moisture improves the rate of epithiliazation. The goal is a state of optimal hydration of the wound margins – not too wet or too dry. Sutured or stapled lacerations should be covered with a nonadherent dressing for the first 1 to 2 days to also allow sufficient epithelization to prevent gross contamination.
  There is some suggestion that topical antibiotic ointments, such as Polysporin or bacitracin, are helpful in reducing infection of the wound. However, these are NOT used if a tissue adhesive is applied as the glue is weakened.
- Abrasions are treated in much the same way as burns. An occlusive or semi-occlusive antibiotic or Vaseline dressing will minimize pain and help prevent infection. Some full thickness abrasions may require skin grafting, and Plastic Surgery should be consulted.
- When there is a potential "dead space" in a wound, then a pressure bandage – a bolus dressing of gauze held firmly by tape, can be used to minimize serum and blood collection in the "dead space" by putting pressure on the wound area.

WOUND DECONTAMINATION, EXPLORATION, AND CLOSURE:

- Wounds of the face may be closed up to 24 hours, but ideally within 8 hours after the injury, in healthy children. Wound edges should not be ragged or irregular, so it may be necessary to remove a small amount of devitalized tissue to create perpendicular wound edges prior to suturing. To avoid tension on the skin sutures, the wound edges may need to be undermined with a scalpel blade before they can be approximated. Simple interrupted sutures (6- monofilament) should be used for most skin closures. The wound edges should be everted during suturing to prevent a future wound edge concavity. Small wounds that are under minimal tension may be closed with "skin glue" (butyl-2-cyanoacrylate).

WOUND DECONTAMINATION, EXPLORATION, AND CLOSURE:

- Prophylactic coverage with a cephalosporin is usually necessary to prevent infection of the face after trauma. A first-generation cephalosporin acts on most skin flora.
  If bone has been exposed through an intraoral or cutaneous laceration, then antibiotics are definitely indicated. A sinus blow-out fracture also required antibiotics. Penicillin acts on most mouth flora.
- Antibiotic ointment should be applied for the first 2 days after the skin repair. Washing and showering can begin 24 hours after the repair. Facial sutures are removed 4-5 days after placement, but eyelid sutures are removed 3-4 days after placement. Sutures placed in the ear are left in place for 11-14 days.

PAROTID GLAND INJURY:

A. Evaluation:

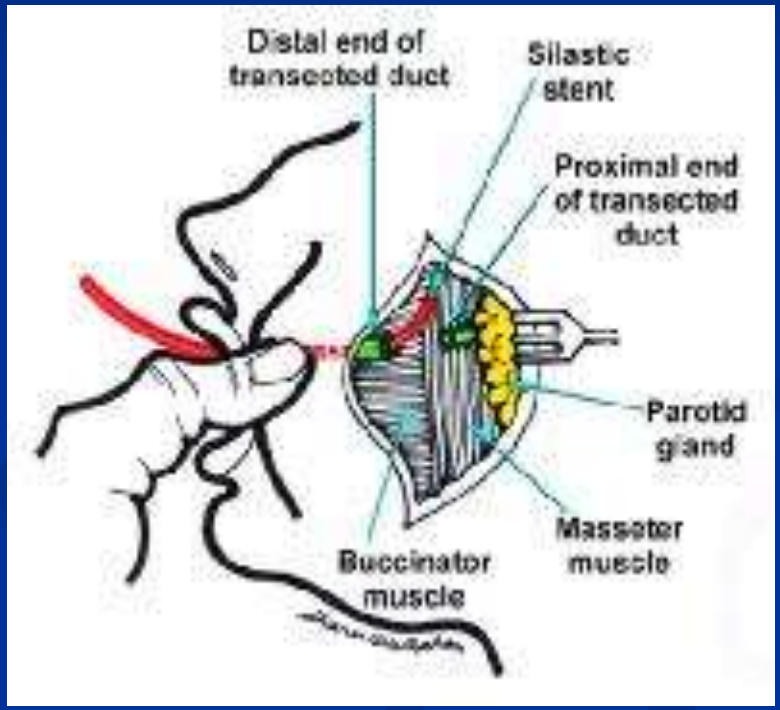
- The parotid gland is located superficially in the cheek, and is vulnerable to facial trauma. A clear discharge from a cheek wound indicates parotid gland injury. Patency of the parotid duct should be ensured by milking the parotid gland, and observing the flow of saliva from Stensen's duct (located in the cheek opposite the upper first molar).

PAROTID GLAND INJURY:

- To determine if the parotid duct was transected, a small catheter is placed in the parotid duct orfice. If there is duct transaction, the cathether will exit out of the distal end of the duct and become visible in the wound area. The proximal end of the severed duct may be identified by massaging the gland to express saliva. The severed ends can then be reconnected.

B. Definitive care:

- A severed parotid duct can be anastamosed over the exploratory catheter using 7-0 monofilament sutures. The catheter may be left in place for 5-7 days to ensure duct patency.



LIP INJURY

A. Evaluation:

- Be sure to inspect the inside of the lips for through-and-through lacerations.

B. Definitive care:

- Lacerations across the vermilion border require an exacting technique, because a 1mm step-off at the lip border is apparent at a conversational distance. Therefore, the edge of the vermilion border should be marked with a surgical marker before performing any injection or cleansing of the area.

LIP INJURY

- The first anchoring suture should approximate the two sides of the laceration at the white roll. Since the area of the philtrum (Cupid's bow) is irreplaceable, this area should also be marked before edema sets in – to prevent improper suture placement. Regional blocks (of the infraorbital and mental nerve) are preferred to infiltration to prevent lip distortion during suturing. The musculature is closed first, then the mucosal surface of the lip (absorbable sutures), and the outside of the lip last (6-0 interrupted nonabsorbable sutures).

Tongue injure

- Tongue lacerations may present in young children. In most cases, pressure and cold will stop bleeding, so a parent should fill a washcloth with a few ice cubes and place the ice pack against the laceration. The edges of a laceration, unless it is extremely large, will self-approximate and heal without sutures. In most cases, suturing does nothing to improve outcomes. Minimal treatment is usually the best option.

ANIMAL BITES

ANIMAL BITES

A. Evaluation:

- The nose, mouth, and parotid gland areas are the primary targets for dog bites. The better the blood supply to the wound, and the easier it is to clean the wound – the lower the risk of infection. Most deaths in children occur due to hemorrhage from the great blood vessels of the neck.

B. Emergency care:

- Copiously irrigate the facial wound with isotonic sodium chloride solution. Excise macerated or necrotic tissue.
- Check the child's shot record to see when the last tetanus shot was given. If child has not had a tetanus booster within 5 years, another one will need to be administered within 3 days. If there is any possibility of rabies, the dog should be carefully observed for 10 days for any signs of sickness.

ANIMAL BITES

C. Definitive care:

- The dog bite injury should be documented with photographs and diagrams, if necessary. Proper medical treatment for dog bites requires an understanding of the canine oral bacteria which cause infections. The most common aerobic bacteria in bite wounds are: Pasturella, alpha-hemolytic Streptococci, and Staphylococcus aureus – occurring in 20 to 30 percent of infected dog bite wounds. The most common anaerobic organisms are Bacteroides and Fusobacterium – which are found in up to 41% of dog bite wounds.
- X-rays may be necessary to determine underlying bone or joint injury, because dogs can exert a tremendous force when biting.
- Animal bites should be separated into high risk and low risk groups when deciding on whether to suture the wounds or provide antibiotic coverage. Proper bite wound care includes: inspection, debridement, irrigation, and if indicated – closure.

ANIMAL BITES

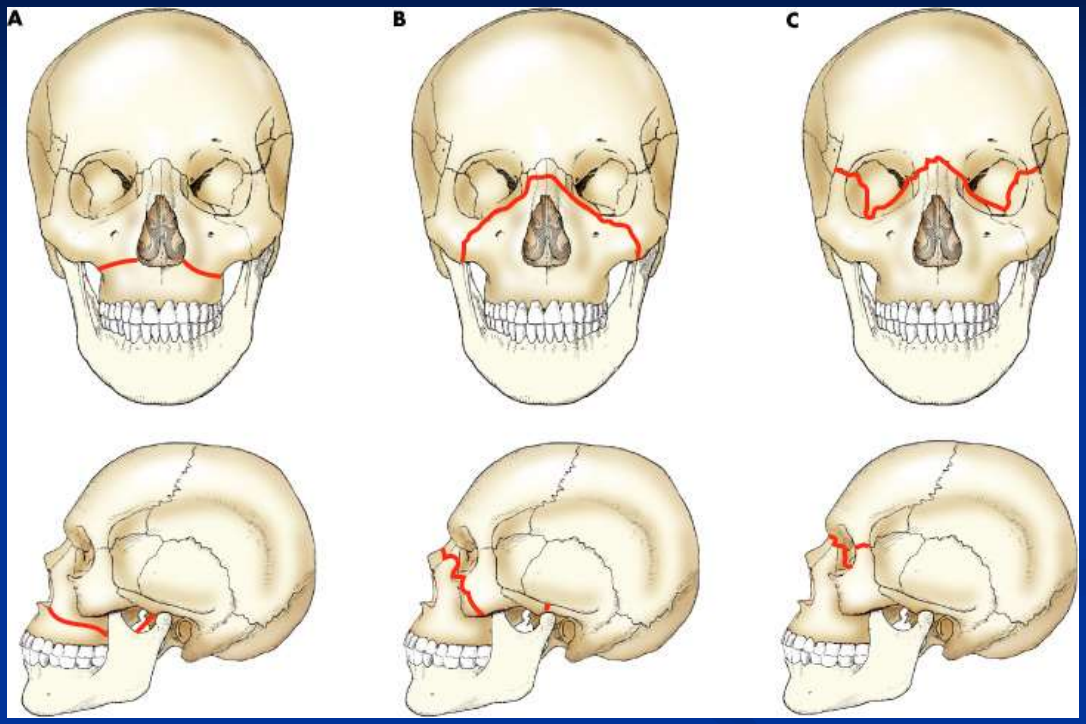
- High-risk wounds generally require antibiotics. The bite wound should be cleansed carefully and irrigated with normal saline under pressure using a 19-gauge blunt needle, and a large syringe. Bacterial cultures obtained at the time of injury are not useful, because they do not predict infections. High-risk wounds include: wounds of the hand or foot; deep puncture wounds; surgically debrided wounds; wounds involving the joints, ligaments, tendons, and bones; dog bites where treatment has been delayed more than 12 hours; and bites in immunocompromised patients. High-risk wounds should not be sutured, but should receive antibiotic treatment. In that case, a beta-lactam antibiotic, such as Augmentin, should be prescribed for at least 10 days.

ANIMAL BITES

- Low-risk wounds include bites to the face and body. After a thorough search for damaged salivary ducts, facial nerve, and blood vessels – many facial wounds can be sutured. Low-risk wounds may be sutured, especially in the face.
- If the wound is less than 6 hours old, and the margins of the wound are clearly delineated – then close the wound with fine interrupted sutures. If the wound is more than 6 hours old, closure of the wound may be deferred to prevent infection and wound dehiscence.
- Appropriate tetanus and rabies prophylaxis should be provided based on the child's medical history. Rabies vaccine must be administered, unless it can be proven that the animal was not rabid. If the animal can be observed, it will develop signs of rabies in 10-14 days – if it is rabid. Antibiotics are always administered in cases of animal bites.

Circum-oral electrical burn

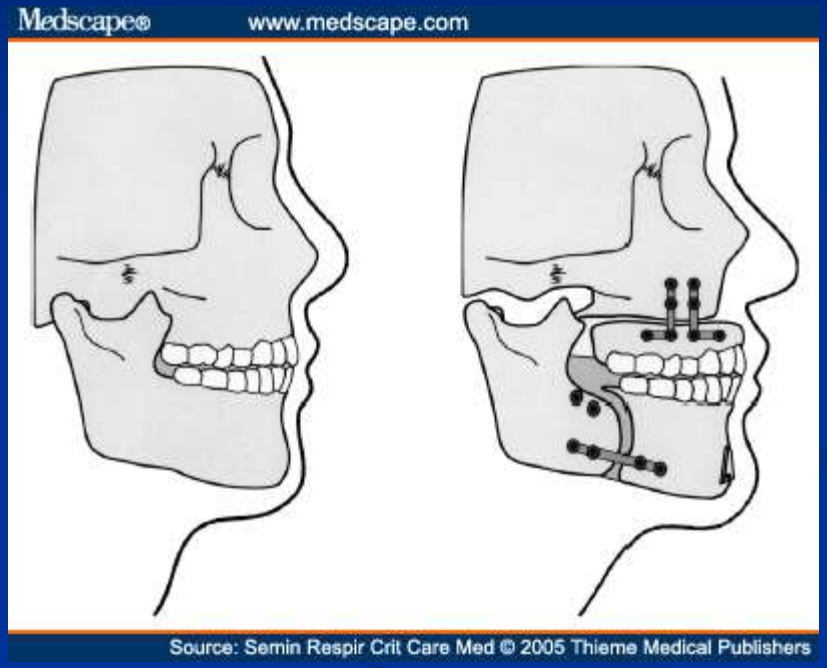
Midface injury



- *Le Fort I* – maxilla
- *Le Fort II* – maxilla, nasal bones, and medial aspects of orbits (pyramidal disjunction)
- *Le Fort III* – maxilla, zygoma, nasal bones, ethmoids, vomer, and all lesser bones of the cranial base (craniofacial disjunction)
- Usually in combination

Definitive care:

- Rapid healing occurs in pediatric bone. Therefore, perform definitive rigid fixation of the mobile bony segments within 5 days after the injury. Strive to establish normal occlusion, facial proportions, and facial symmetry. To avoid disturbing long-term growth and development, the surgeon needs to fixate malposed fragments using as little dissection as possible.



Mandibular fracture

- View of occlusal step off
- Bridle wire is used for temporary stabilization of a fractured segment. This provides some patient comfort by minimizing mobility of the fracture segments.

Mandibular fracture

Interarch elastics may be used for maxillomandibular fixation. They also may be used loosely for guidance during postoperative care.

Mandibular fracture

- Open reduction rigid internal fixation of left mandibular body fracture.
- Postoperative radiograph demonstrating reduction and fixation.