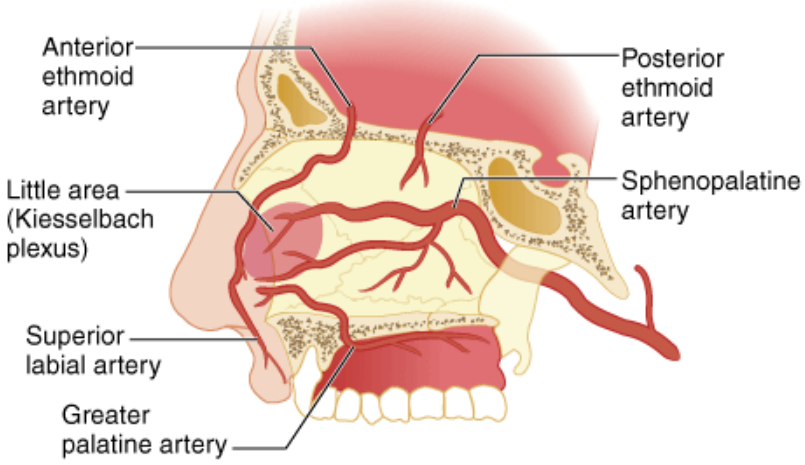
EPISTAXIS, NASAL FRACTURES AND RHINOSINUSITIS

EPISTAXIS:

ANATOMY:

- Vascular anatomy of the nasal cavity is shown below:



- The ophthalmic artery (supplied by ICA) branches into anterior and posterior ethmoidal arteries
- External carotid system supplies the internal maxillary artery and superior labial artery
    - Superior labial branch and terminal branch of sphenopalatine form Kiesselbach plexus on the anterior nasal septum, WHICH IS THE SOURCE OF 90% OF NOSEBLEEDS

CLINICAL FEATURES AND GENERAL ASSESSMENT:

- Causes of epistaxis are numerous
- LOCAL CAUSES:
    - Digital trauma
    - Deviated septum
    - Neoplasia
    - Chemical irritates
    - Rhinosinusitis ➔ causes mucosal irritation and friable vasculature
- SYSTEMIC FACTORS:
    - CRF
    - Alcoholism
    - HT
    - Vascular malformations
    - Coagulopathy
    - Malignancy
- Initial assessment in ED begins with a rapid primary survey addressing haemodynamic instability and reversal of coagulopathy if present
    - ENT specialists may advise gentle reduction in BP if hypertensive

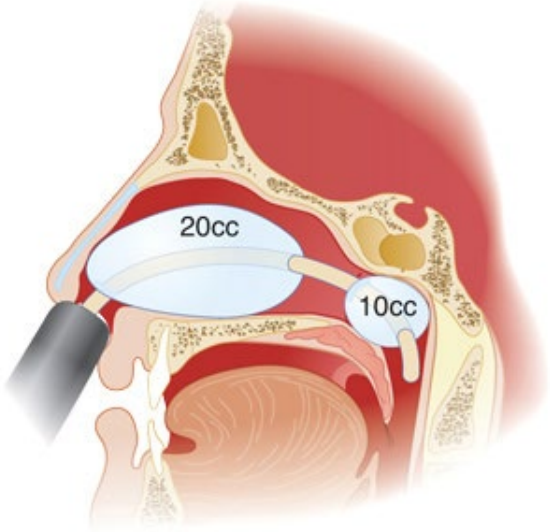
NASAL EXAMINATION:

- Main aim is to differentiate between ANTERIOR VERSUS POSTERIOR source of bleeding → crucial in treatment and disposition
    - The diagnosis of posterior haemorrhage is only made in ED once measures to control anterior bleeding have failed ➔ consider if elderly patient with acquired or congenital coagulopathy, if significant haemorrhage is visible in posterior nasopharynx, haemorrhage form bilateral nares, or epistaxis uncontrolled with anterior packing
- Nasal speculum with good light-source and have patient seated in the "sniffing position" with nose straight ahead

METHODS OF HAEMOSTASIS:

- **DIRECT NASAL PRESSURE:**
    - Ask patient to blow the nsoe to expel clots → if clots present, topical vasoconstrictors may not reach the nasal mucosa (apply phenylephrine)
    - Ask patient to lean forward and pinch the nares between thumb and forefinger for 10-15 minutes
- **CHEMICAL CAUTERISATION:**
    - Attempt with silver nitrate after appropriate anaesthesia with cotton wool instilled with 4% lignocaine
    - If source is found, apply silver nitrate sticks judiciously just proximal to the bleeding source on the anterior nasal septum
- **THROMBOGENIC FOAMS AND GELS:**
    - If using non-absorbable materials for packing, may cause discomfort and requires antibiotics
    - Use bioabsorbable gels/dressings e.g. SURGICEL, so removal is not needed
- **ANTERIOR NASAL PACKING:**
    - Use if above methods fail or are not available
    - ANTERIOR EPISTAXIS BALLOONS:
        - E.G. rapid rhino. These are coated with cellulose or other materials that promote platelet aggregation. Soak it with water and insert it along floor of the nasal cavity
        - Gently inflate with air until the bleeding stops. Do not use saline, as rupture could lead to aspiration
    - PREFORMED NASAL TAMPONS:
        - Expands after hydration
        - Need to be coated with water-soluble antibiotic ointment
        - Gently irrigate with saline once in place to promote expansion
    - RIBBON GAUZE PACKING → LAST OPTION
- **POSTERIOR NASAL PACKING:**
    - Failure to control haemorrhage with above measures suggests, but is not diagnostic of, posterior bleeding
    - Posterior packing is associated with higher complications rates ➔ pressure necrosis, infection, hypoxia and cardiac dysrhythmias. Generally a temporizing measure while waiting ENT support

- Rapid rhino has both an anterior and posterior balloon that can be inflated to tamponade bleeding as required
    - Same result can be achieved with IDC with 30cc balloon ➔ advance and then inflate balloon in nasopharynx slightly and draw back until it stops and then inflate until haemostasis is achieved
- EARLY ENT CONSULTATION BENEFICIAL AS THERE ARE MANY OPTIONS AVAILABLE (IMA embolisation, open surgical approaches or endoscopy)



DISPOSITION AND FOLLOW UP:

- If haemorrhage is controlled and haemodynamic stability is ensured over a period of observation (~1hour), patients with epistaxis can be discharged
    - Patients with therapeutic INR can continue warfrain
- If patient has non-absorbable material placed, start augmentin and provide ENT follow up
- If posterior packing required ➔ admit

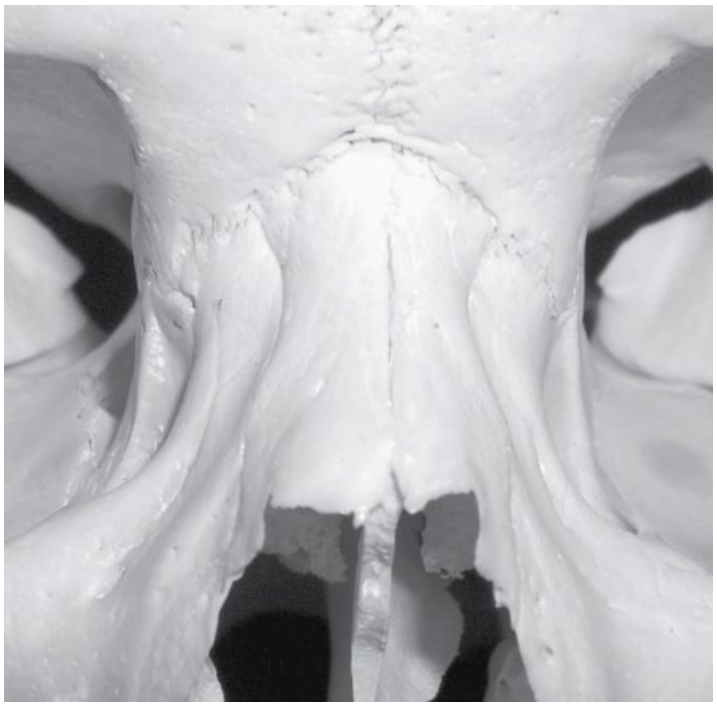
<u>NASAL FRACTURES AND SEPTAL HAEMATOMA:</u>

MOST COMMON FACIAL FRACTURES

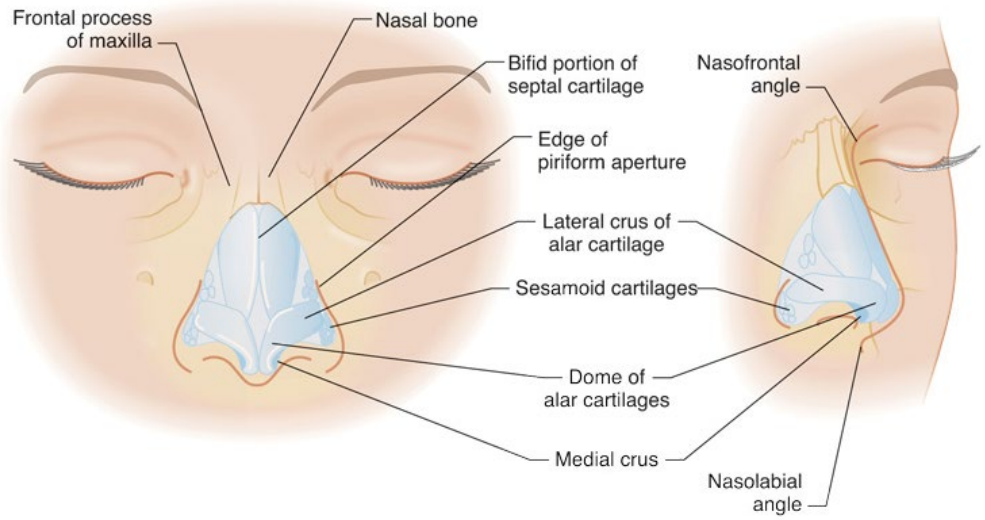
NEED TO ASSESS FOR ASSOCIATED TRAUMATIC BRAIN INJURY, CERVICAL SPINE FRACTURE, CSF LEAK DUE TO CRIBRIFORM PLATE DISRUPTION AND OTHER FACIAL FRACTURES

ANATOMY:

- Nasal pyramid is formed by two rectangular bones that articulate with the frontal bones



- Large proportion of structural integrity is maintained by a cartilaginous framework of the nasal septum, lateral processes and alar cartilages



CLINCIAL FEATURES:

- TRAUMA SURVEY:
  - Assess other structures, including the midface, zygomatic arch, orbits, sinuses, teeth and cervical spine
- NASAL EXAMINATION:
  - EXTERNAL ASSESSMENT ➔ bony crepitus, deformity and oedema
    - Periorbital ecchymosis in the absence of other findings of orbital injury is suggestive of nasal fracture
    - Profuse epistaxis also suggests nasal fracture

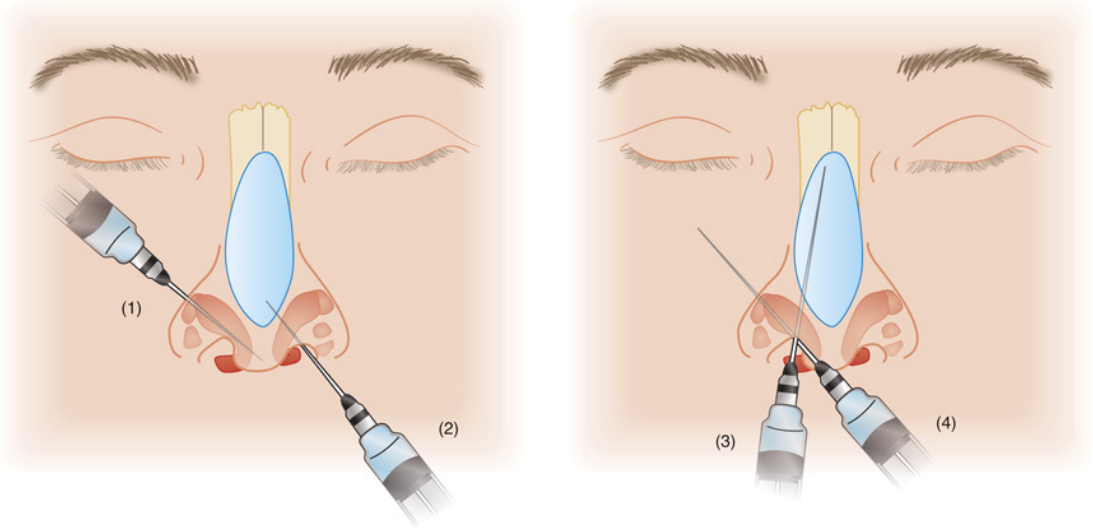
- INTERNAL ASSESSMENT:
  - Assessment for mucosal lacerations, septal fractures or deviation and SEPTAL HAEMATOMA

- IMAGING:
  - Imaging is largely unnecessary as the RESULTS OF PLAIN FILMS OVERWHELMINGLY DO NOT CHANGE MANAGEMENT
  - The indications for closed reduction are limited to alleviation of nasal obstruction and correcting deformity to improve cosmesis and these are best assessed at the bedside
    - REDUCTION IS NOT USUALLY AN EMERGENCY PROCEDURE
  - Can use US

- TREATMENT:
  - Main priority is exclusion of other traumatic injuries and nasal septal haematoma
  - Nasal fractures and associated overlying lacerations should be treated as open fractures

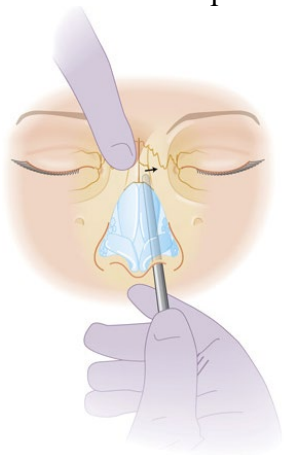
- Concern for CSF fluid rhinorrhoea or otorrhoea requires further imaging and ENT/neurosurgery consultation
- Nasal septal haematoma should be promptly incised and drained
- Once serious injury has been excluded, management is dictated by timing of examination in relation to the injury
    - If immediately presents post injury, can reduce displaced fracture before significant oedema sets in, otherwise, defer for 6-10 days for elective ENT reduction
    - If not performed in this time frame, may result in unacceptable cosmetic outcome and ultimately may require rhinoseptoplasty

- CLOSED REDUCTION OF NASAL FRACTURE:
    - Infraorbital and supratrochlear regional block



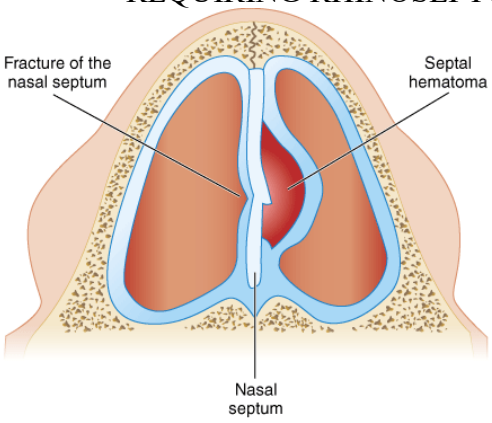
Infiltrative anesthesia for closed nasal reduction. Intranasal injection of local anesthetic solution: (*1*) nasal spine, (*2*) nasal tip, (*3*) nasal dorsum along outside of nasal bones, and (*4*) infraorbital nerve. Insert the needle into the nasal cavity. Infiltrate along the nasal floor to anesthetize the superior alveolar nerve and ganglion. Infiltrate posterior to the inferior and middle turbinates to block the sphenopalatine nerve and ganglion. Allow 10 to 15 minutes for the local anesthetic agent to take effect. (Reproduced with permission from Reichman EF, Simon RR: *Emergency Medicine Procedures.* © 2004, Eric F. Reichman, PhD, MD, and Robert R. Simon, MD.)

- After informed consent, insert blunt elevator ~1cm less than measured depth until contact is made with depressed nasal bon and lift it anteriorly



- A common caused of failed closed reduction leading to unacceptable cosmetic deformity is occult nasal septal fracture

- NASAL SEPTAL HAEMATOMA:
  - If identified, incision and drainage should be performed urgently to AVOID NECROSIS OF THE ANSAL SEPTUM, WHICH CAN LEAD TO SADDLE DEFORMITY AND OBSTRUCTION, ULTIMATELY REQUIRING RHINOSEPTOPLASTY



  - If left, can develop into an abscess
    - If a patient presents late with systemic symptoms of infection ➔ surgical drainage and IV antibiotics are indicated
  - COMPLICATIONS ➔ saddle deformity and poor functional outcome, contiguous spread of infection leading to osteomyelitis, cavernous sinus thrombosis, meningitis and intracranial abscess

- DRAINAGE OF A NASAL SEPTAL HAEMATOMA:
  - In sniffing position
  - Properly anaesthetize the mucosa with soaked cotton wool with 4% lignocaine
  - Make a horizontal incision superficially through the mucosa and perichondrium, making sure you do not incise the cartilaginous septum
  - Evacuate clot and insert gauze wick to avoid premature closure

- Pack nose bilaterally and discharge on oral antibiotics to follow up in 24 hours with ENT

PAEDIATRIC NASAL FRACTURES:

- Children have less develop bony anatomy and are more prone to greenstick fractures and cartilaginous injuries and are at higher risk of poor cosmetic outcome than adults
- Small nasal passages can result in obstruction and synechiae
- Should be reduced in 4 days due to higher healing rates
- Optimally managed with ENT involvement

NASAL FOREIGN BODIES:

- Morbidity of undiagnosed nasal foreign bodies includes aspiration, infetion, pressure necrosis or perforation
- Consider a nasal foreign body in patient with UNILATERAL NASAL DISCHARGE OR RECURRENT UNILATERAL EPISTAXIS
  - It is CRUCIAL TO IDENTIFY BUTTON BATTERN IMPACTION EARLY DUE TO RISK OF LIQUEFACTION NECROSIS AND SEPTAL PERFORATION
- Can use alligator forceps
- In those that cannot be visualized or retrieved, consult ENT

SINUSITIS AND RHINOSINUSITIS:

DEFINITION:

- Sinusitis is inflammation of the mucosal lining of the paranasal sinuses
- Rhinosinusitis is defined as an inflammation of the paranasal sinuses and the nasal cavity (the two almost always coexist)
- Can be defined as acute (<4 weeks), subacute (4-12 weeks) and chronic (>12 weeks)

PATHOPHYSIOLOGY:

- Paranasal sinuses are not fully developed until ~12 years
- All six paranasal sinuses are coated by respiratory mucociliary epithelium and the sinuses drain through the ostial into the nose
- Any type of acute inflammation of the mucosa leads to obstruction of the ostia, accumulation of secretions within the sinuses and reabsorption of air
  - Results in the negative pressure that induces symptoms
- Common organisms ➔ Haemophilus influenzae, Steptococcus pneumoniae (acute infection), chronic infection ➔ Staph, anaerobes, gram negative bacteria and occasionally FUNGI

CLINICAL FEATURES:

- Acute sinusitis is defined by two or more of the following:
  - Blockage or congestion of the nose

    - Facial pain or pressure
    - Hyposmia (↓smell)
    - Anterior or posterior nasal discharge lasting <12 weeks
- On exam ➔ pain and tenderness over the sinuses with percussion
- Also perform a neurologic exam and examine the ears, eyes and teeth to evaluate for extension of disease
- COMPLICATIONS:
    - Mostly related to extension of infection beyond usually anatomic boundaries ➔ meningitis, cavernous sinus thrombosis and intracranial abscesses
    - Orbital cellulitis (up to 75% cases) ➔ can lead to blindness thorugh venous congestion and ischaemia of the optic nerve
    - Frontal sinusitis can lead to osteomyelitis (POTT'S PUFFY TUMOUR, doughy swelling associated with extradural or subdural empyema)
- DIAGNOSIS:
    - Diagnosis is clinical
    - CT if complications are suspected in a toxic patient to evaluate invasion of neighbouring tissues and neoplasms

TREATMENT:

- ACUTE, UNCOMPLICATED RHINOSINUSITIS:
    - Generally supportive
    - Nasal irrigation in conjunction with nasal decongestants may decrease symptom severity. Can add corticosteroids intranasally
    - RECENT COCHRANE SYSTEMIC REVIEW ➔ analysed efficacy of antibiotic therapy. Authors concluded that antibiotics may provide a small treatment effect in patients with symptoms lasting <7 days
        - Because 80% of patients improved within 2 weeks when treated with placebo, it is unclear whether this is clinically significant
        - They recommended treatment for those with purulent nasal secretions or severe symptoms lasting >7 days

Consider antibiotic therapy, as well as intranasal corticosteroids, for patients with severe rhinosinusitis symptoms (purulent nasal discharge, nasal congestion and/or facial pain or pressure) for more than 5 to 7 days *plus any* of the following features:

- high fever (38.4 ºC or more)
- unilateral maxillary sinus tenderness
- severe headache
- worsening symptoms after initial improvement.

Use:

amoxycillin 500 mg (child: 15 mg/kg up to 500 mg) orally, 8-hourly for 5 to 7 days.

For patients hypersensitive to penicillin (excluding immediate hypersensitivity, see Table 2.2), use:

1 **cefuroxime 500 mg (child: 10 mg/kg up to 500 mg) orally, 12-hourly for 5 to 7 days [Note 3]**

OR

2 **cefaclor 375 mg orally, 12-hourly (child: 10 mg/kg up to 250 mg orally, 8-hourly) for 5 to 7 days**

OR

2 **doxycycline 100 mg (child more than 8 years: 2.5 mg/kg up to 100 mg) orally, daily for 5 to 7 days.**

For patients with immediate penicillin hypersensitivity (see Table 2.2), use:

doxycycline 100 mg (child more than 8 years: 2.5 mg/kg up to 100 mg) orally, daily for 5 to 7 days.

A poor response to amoxycillin may indicate infection due to beta-lactamase–producing *H. influenzae* (for which clavulanate gives increased activity) or penicillin-resistant *S. pneumoniae* (for which amoxycillin in high doses has increased activity). Use:

amoxycillin+clavulanate 875+125 mg (child: 22.5+3.2 mg/kg up to 875+125 mg) orally, 8-hourly. [Note 4]

Treat for 7 to 14 days depending on the patient's response. Urgent specialist referral is indicated for any of these associated symptoms: diplopia or reduced vision, mental status deterioration or periorbital oedema.

- CHRONIC SINUSITIS:
  - Intranasal steroids
  - Referral for functional endoscopic sinus surgery and drainage