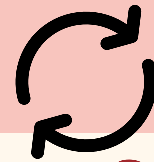
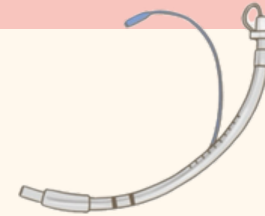
TRAUMA BASICS

Adjuncts:
E-FAST exam
chest x-ray
pelvic x-ray


repeat if pt's status changes

Primary Survey:



A — AIRWAY

- assess if patient is protecting airway
- **intubate** if needed
- check ET tube positioning
- can't intubate? **cricothyrotomy**
- don't forget C spine precautions

B — BREATHING

- check for bilateral breath sounds
- apply oxygen
- hemo/pneumothorax? **chest tube**

C — CIRCULATION

- assess pulses, vital signs
- stop hemorrhage - pressure, stitch, staple, **tourniquet**
- unstable pelvis/shock? pelvic binder
- unstable vitals? give blood products
- *start here if life-threatening bleeding

D — DISABILITY

- pupils
- neuro exam
- **GCS**

GLASGOW COMA SCALE

EYES

4. SPONTANEOUS
3. TO SPEECH
2. TO PAIN
1. NO RESPONSE

SPEECH

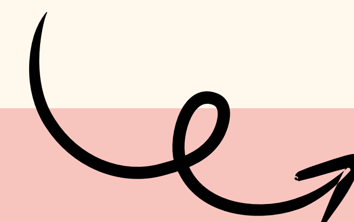
5. ALERT & ORIENTED
4. CONFUSED
3. INAPPROPRIATE RESPONSE
2. INCOMPREHENSIBLE
1. NO RESPONSE

MOTOR

6. OBEYS COMMANDS
5. LOCALIZES PAIN
4. WITHDRAWS PAIN
3. DECORTICATE
2. DECEREBRATE
1. NO RESPONSE

E — EXPOSURE

- remove all clothes
- check for wounds in groin, axilla, scalp
- avoid hypothermia



Secondary Survey:

head-to-toe assessment
roll the patient

GLASGOW COMA SCALE

MAX: 15, **MIN:** 3 (2T)

EYE OPENING

SPONTANEOUSLY (+4)

TO VOICE (+3)

TO PAIN (+2)

DO NOT OPEN (+1)

SPEECH

ALERT AND ORIENTED (+5)

CONFUSED (+4)
(APPROPRIATE BUT WRONG)

INAPPROPRIATE WORDS (+3)
(UNRELATED ANSWER)

INCOMPREHENSIBLE SPEECH (+2)
(GROANING)

NO SPEECH (+1)

INTUBATED (+0) (T)

MOVEMENT

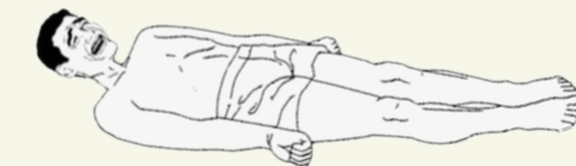
FOLLOWS COMMANDS (+6)

LOCALIZES PAIN (+5)
(MOVES ARM TO PAIN)

WITHDRAWS FROM PAIN (+4)

DECORTICATE POSTURING (+3)
(HANDS TO THE CORE)
(DAMAGE TO HEMISPHERES, THALAMUS, IC)

DECEREBRATE POSTURING (+2)
(DAMAGE TO BRAINSTEM/HERNIATION)



NO MOVEMENT (+1)

MINOR HEAD TRAUMA

SCALP LACERATION

check for galeal involvement

anchors frontalis muscle and can lead to asymmetric facial movement

repair with absorbable sutures

CONCUSSION

keep out of sports until primary or specialist follow up

if symptoms worsen or do not resolve in 14-21 days - specialist

avoid re-injury

CANADIAN CT RULE

GCS <15 at 2 hours post-injury

open/depressed skull fx

signs of basilar skull fx

$\geq$ 2 episodes of vomiting

$\geq$ 65 years old

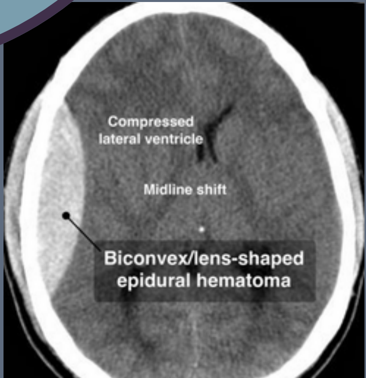
retrograde amnesia at $\geq$ 30 mins

dangerous mechanism: ped struck, ejection, >3 feet fall, >5 stairs fall

HEAD TRAUMA

Intracranial Hemorrhage

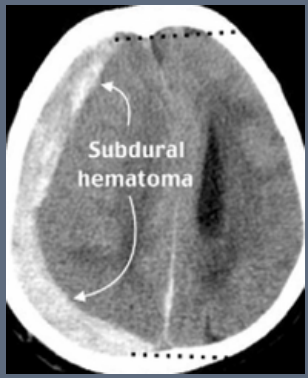
SBP <140-160 (nicardipine)
reverse anticoagulation
use BIG criteria
neurosurgery consult PRN



epidural

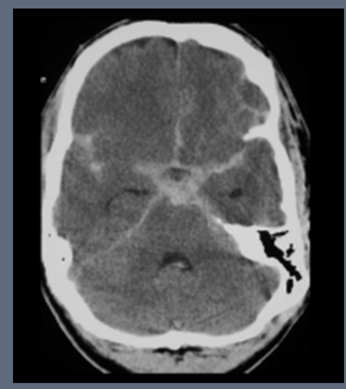
between dura and skull
temporal - petrous part
disruption of MMA
LOC, lucid, deteriorate
lens-shaped, does not cross sutures

subdural



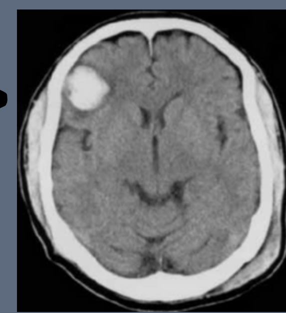
between dura and arachnoid mater
atrophy - alcohol, elderly
rupture of bridging veins
crescent, crosses sutures
neurosx for >10 mm size, >5 mm midline shift

subarachnoid



between arachnoid and pia mater
tear of subarachnoid vessels
prevent vasospasm with nimodipine

intraparenchymal



Severe Brain Injury

can cause increased ICP

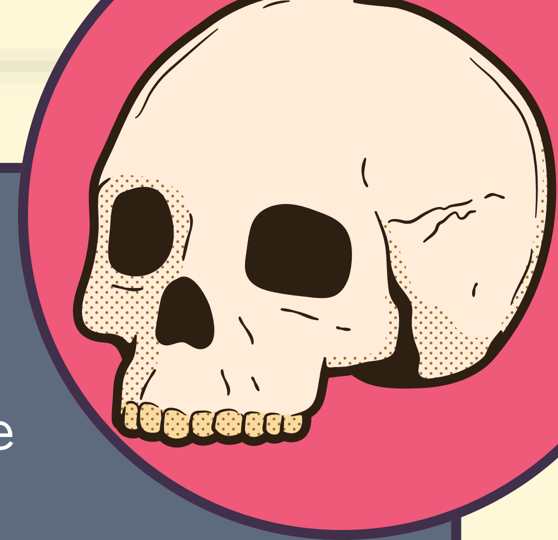
CPP = MAP - ICP
normal ICP ~15 mm Hg

Cushing reflex - bradycardia, hypertension, irregular respirations

avoid hypotension/hypoxia/hyperthermia
MAP goal ~80

prevent **herniation** - uncal (temporal lobe compresses CN III) blown pupil, posturing

elevate the HOB 30 degrees
BP management
euvolemia
consider seizure prophylaxis
mannitol (hypovolemia)
hypertonic saline (hypernatremia)
burr hole



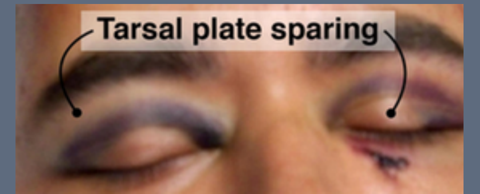
skull fracture

minor, linear - can observe

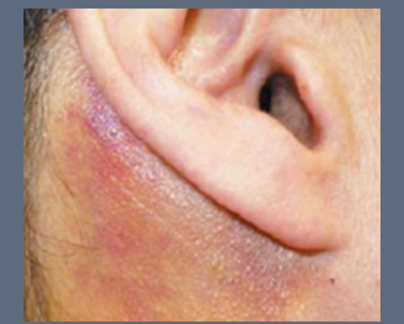
infants - MC is parietal

depressed/displaced - antibiotics

basilar

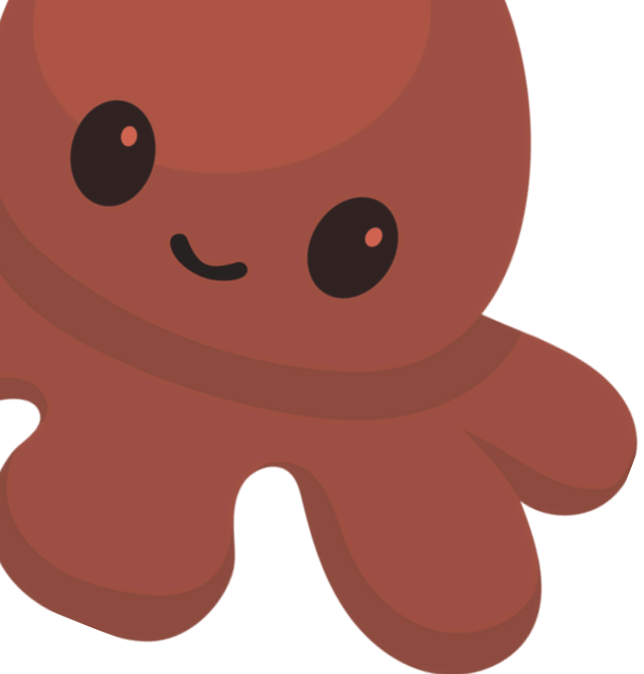


usually temporal bone
associated with bleed
hemotympanum
CSF rhinorrhea/otorrhea
Battle's sign
raccoon eyes
epidural hematoma



diffuse axonal injury

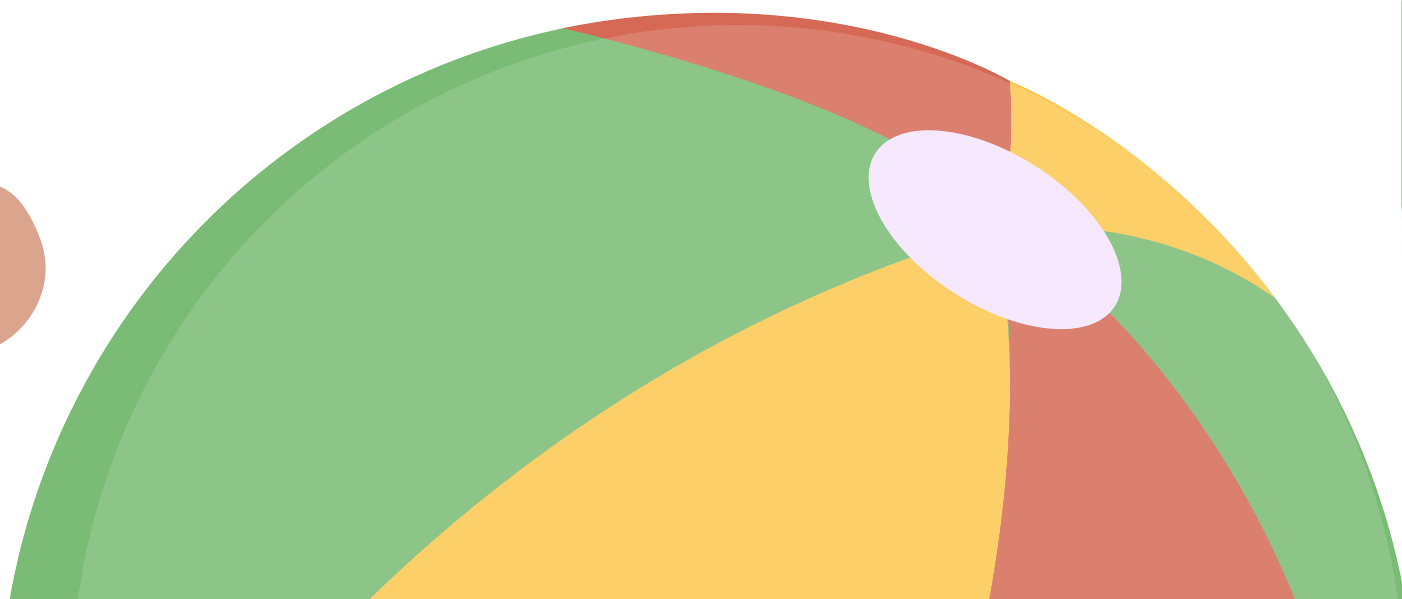
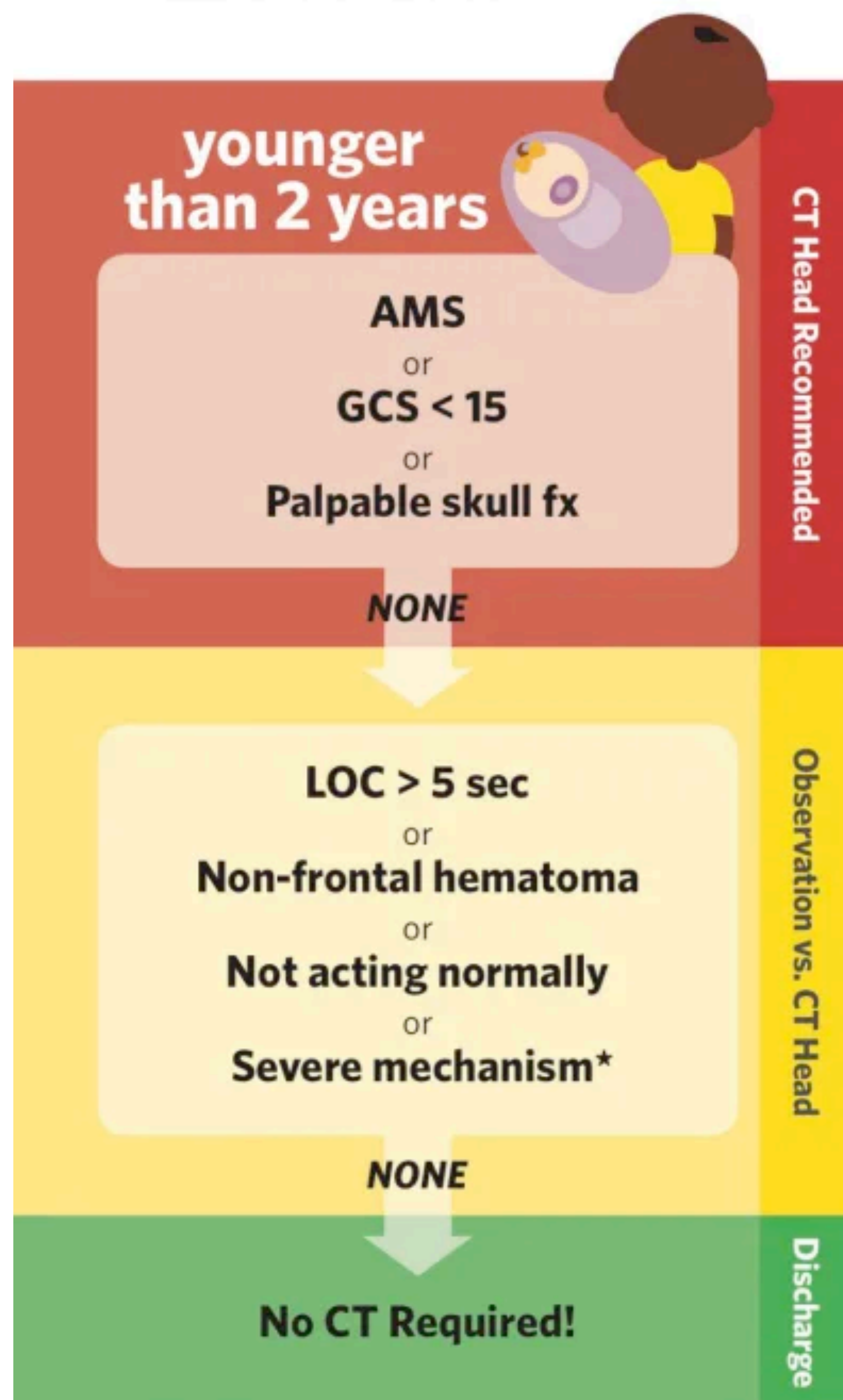
lesions at gray-white junction
delayed imaging findings
very poor prognosis

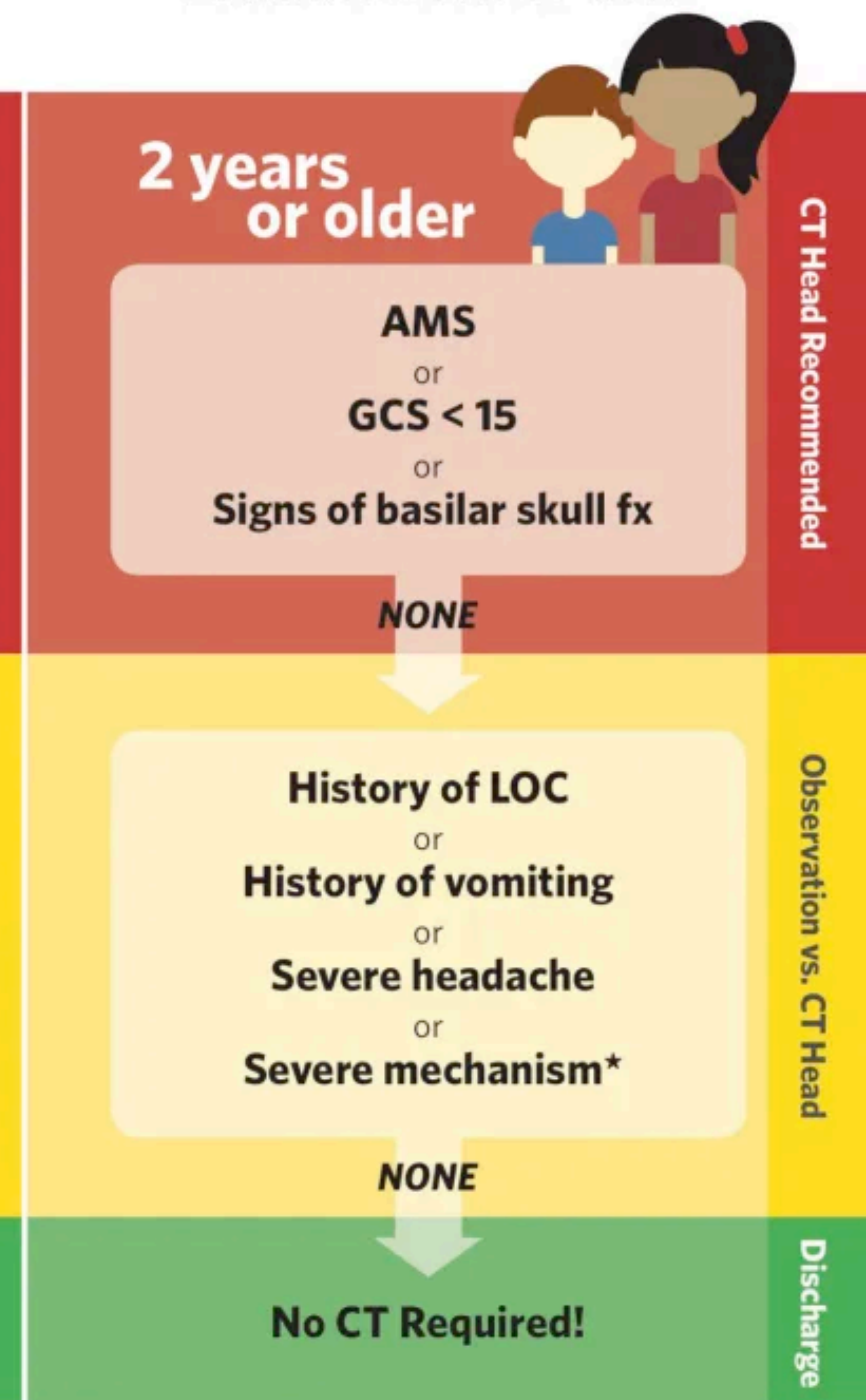


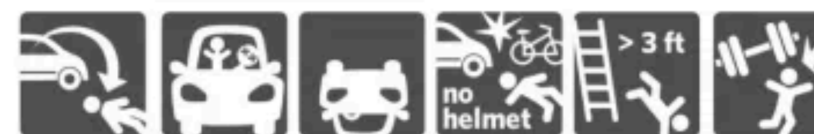
Pediatric Head Trauma

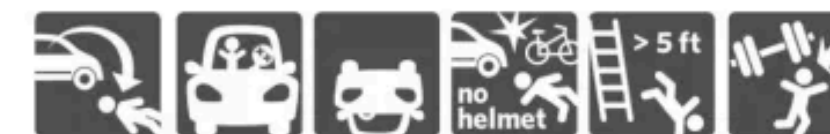
observe ~2 hours

AMS/somnolence = best predictor

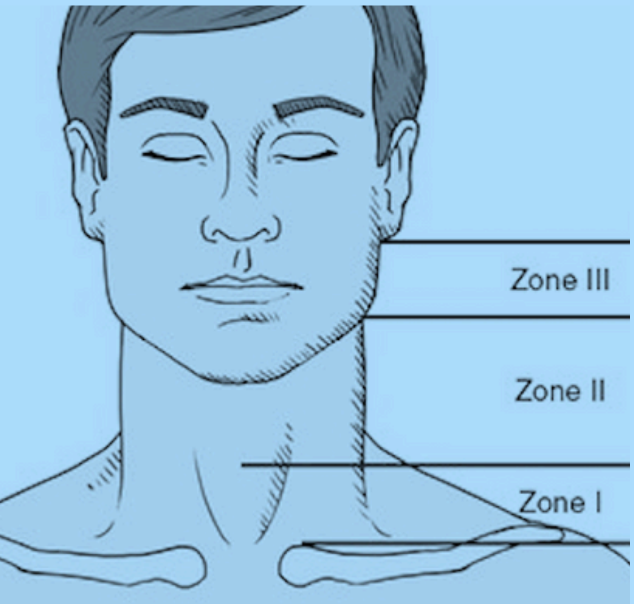



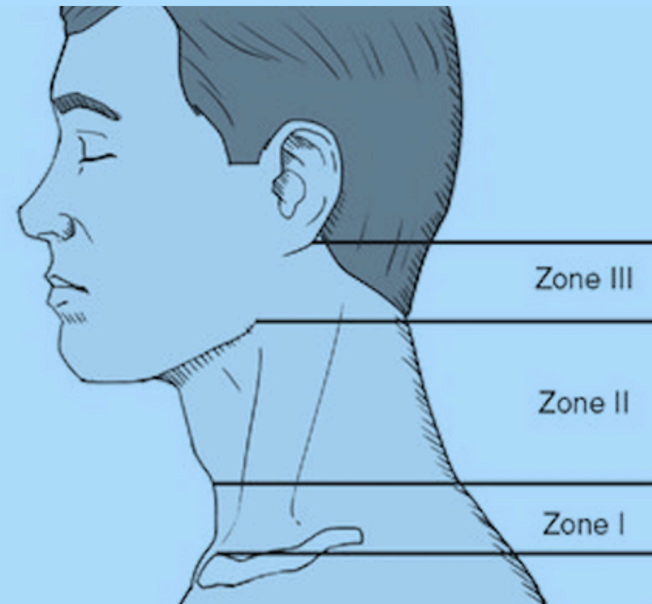






NECK TRAUMA





PLATYSMA VIOLATION

HARD SIGNS → OR

EXPANDING/PULSATILE HEMATOMA	AIRWAY COMPROMISE
NEURO DEFICIT/PARALYSIS	PULSE DEFICIT
BRUIT/THRILL	MASSIVE SUBQ EMPHYSEMA
MASSIVE HEMATEMESIS	DIMINISHED/ABSENT RADIAL PULSE
UNRESPONSIVE SHOCK	SEVERE HEMORRHAGE
AIR BUBBLING FROM WOUND	

SOFT SIGNS → CTA

ZONE 3

ANGLE OF THE MANDIBLE TO BASE OF THE SKULL

PAROTID GLANDS
CAROTID/VERTEBRAL ARTERIES
SPINAL CORD

ZONE 2

ANGLE OF THE MANDIBLE TO CRICOID CARTILAGE

CAROTID/VERTEBRAL ARTERIES
JUGULAR VEINS
ESOPHAGUS
TRACHEA, LARYNX
SPINAL CORD

*MC INJURED

ZONE 1

CRICOID CARTILAGE TO CLAVICLE

CAROTID/VERTEBRAL ARTERIES
MAJOR THORACIC VESSELS
SUPERIOR MEDIASTINUM
LUNG, TRACHEA
ESOPHAGUS
THORACIC DUCT
SPINAL CORD

*HIGHEST MORTALITY

OTHER INJURIES:

MC BLUNT INJURY - CRICOID CARTILAGE (A/P)
LARYNGOTRACHEAL INJURY - PERSISTENT HYPOXIA AFTER INTUBATION, STRIDOR, HOARSENESS

CAROTID/VERTEBRAL DISSECTION - TRAUMA + NEURO DEFICIT/HORNER SYNDROME - CTA, HEPARIN

MANUAL STRANGULATION - WITH HANDS (CRICOID FRACTURE)
LIGATURE STRANGULATION - WITH ROPE (VASCULAR INJURY)
IN HOSPITAL DEATH - PULMONARY EDEMA

TYPICAL HANGING - KNOT BEHIND NECK
ATYPICAL HANGING - KNOT IN FRONT OF NECK

INCOMPLETE HANGING - PARTIALLY SUSPENDED
COMPLETE HANGING - FULLY SUSPENDED

NEAR HANGING - NO IMMEDIATE DEATH (HYPOXIC/ISCHEMIC BRAIN INJURY)

JUDICIAL HANGING - BODY FALLS GREATER THAN PT'S HEIGHT (C SPINE FX/SPINAL CORD INJURY)
NON-JUDICIAL HANGING - BODY FALLS LESS THAN PT'S HEIGHT (VENOUS CONGESTION)