





**AFFECTIVE OBJECTIVES**

None identified for this unit.

**PSYCHOMOTOR OBJECTIVES**

None identified for this unit.

**DECLARATIVE**

- I. Facial Injury
  - A. Introduction
    - 1. Incidence
    - 2. Morbidity and mortality
    - 3. Risk
  - B. Review of anatomy/ physiology of the face
    - 1. Arteries and nerves
    - 2. External carotid
      - a. Temporal artery
      - b. Mandibular artery
      - c. Maxillary artery
    - 3. Nerves
      - a. 5th cranial nerve - trigeminal
      - b. 7th cranial nerve - facial
    - 4. Bones
      - a. Nasal
      - b. Zygoma/ zygomatic arch
      - c. Maxilla
      - d. Mandible
  - C. Common mechanisms of injury
    - 1. Blunt
      - a. Motor vehicular crashes
      - b. Falls
      - c. Body-to-body contact
      - d. Augmented force (i.e. sticks, clubs, etc.)
    - 2. Penetrating
      - a. Gun shot wound, stabbing
      - b. Bites - dog, human, biting tongue
  - D. Other common associated injuries
    - 1. Airway compromise
    - 2. Cervical spine injury
    - 3. Brain injury
    - 4. Dental trauma or avulsion
  - E. Types of facial injuries
    - 1. Bony injury
      - a. Mandible
        - (1) Fracture
        - (2) Dislocation
      - b. Maxillary fracture
        - (1) LeFort I, II and III
      - c. Zygomatic fracture
      - d. Orbital fracture
        - (1) Eye
        - (2) Ear
        - (3) Nose
        - (4) Throat
        - (5) Mouth
      - e. Nasal fracture



- b. Cervical spine
  - (1) Cord
  - (2) Vertebra
- c. Major vessels
  - (1) Internal and external jugular veins
  - (2) Carotid arteries
  - (3) Vertebral arteries
- 2. Associated structures
  - a. Vagus nerves
  - b. Thoracic duct
  - c. Pharynx and esophagus
  - d. Thyroid gland and parathyroid glands
  - e. Lower cranial nerves
  - f. Brachial plexus - responsible for lower arm and hand function
  - g. Muscles - platysma is major muscle
  - h. Soft tissue and fascia
- C. Mechanism of injury
  - 1. Blunt - motor vehicle crashes, blow to the neck, hanging
  - 2. Penetrating - gun shot wound, stabbing, arrow
    - a. Lacerations or puncture
- D. Pathophysiology
  - 1. Transected trachea
    - a. Larynx separated from trachea or fractured
      - (1) Vocal cord swelling or contusion
      - (2) Disruption of normal airway landmarks
      - (3) Associated soft tissue swelling
    - b. Open wound to trachea
  - 2. Vessel lacerated or torn
    - a. Arterial interruption
      - (1) Hypoxia to brain tissue and infarct
      - (2) Open wound may cause an air embolism
    - b. Rapid exsanguination
  - 3. Cervical spine trauma
    - a. Vertebral instability
    - b. Cord interruption
      - (1) Paralysis or paresthesia
      - (2) Neurogenic shock
  - 4. Impaled object
    - a. Do not remove unless obstructing airway
    - b. Consider emergency cricothyrotomy
- E. Assessment
  - 1. Signs - pale or cyanotic face, bruising of neck, redness of area, hematoma in neck, with open wound will see frothy blood or sputum in wound; subcutaneous air may be present
  - 2. Symptoms - voice changes, tickle or feeling of fullness in throat, pain on palpation
  - 3. Signs of stroke with air emboli or infarct
  - 4. Signs of paralysis, paresthesia or neurogenic shock if spinal cord involved
  - 5. Assess for other injury
- F. Management
  - 1. Airway patency and adequate ventilation a priority
    - a. If open wound to trachea











- b. (2) Frontal, occipital, temporal, parietal, and mastoid  
Middle meningeal artery
    - (1) Lies under temporal bone, if fractured can tear artery
    - (2) Source of epidural hematoma
  - c. Skull floor - many ridges
  - d. Foramen magnum - opening at base of skull for spinal cord
3. Brain - occupies 80% of intracranial space
- a. Divisions
    - (1) Cerebrum - each lobe named after skull plates that lie immediately above
      - (a) Cortex controls
        - i) Voluntary skeletal movement - interference with will result in extremity paresthesia, weakness and/ or paralysis
        - ii) Level of awareness - part of consciousness
      - (b) Frontal lobe - personality, trauma here may result in placid reactions or seizures
      - (c) Parietal lobe - somatic sensory input, memory, emotions
      - (d) Temporal lobe - speech centers here, 85% of population has center on left, long term memory, taste and smell
      - (e) Occipital lobe - origin of optic nerve, trauma here may cause complaints of seeing "stars", blurred vision or other visual disturbances
      - (f) Hypothalamus - centers for vomiting, regulating body temperature and water
    - (2) Cerebellum - coordination of voluntary movement started by cerebral cortex
    - (3) Brain stem - connects the hemispheres of the brain, cerebellum and spinal cord responsible for vegetative functions and vital signs
      - (a) Parts - midbrain, pons and medulla oblongata
      - (b) Cranial nerves
        - i) CN III - oculomotor, origin from midbrain - controls pupil size - pressure on nerve paralyzes nerve, pupil unreactive
        - ii) CN X - vagal, origin from medulla - a bundle of nerves, primarily from parasympathetic system, that supply SA and AV node, stomach and GI tract - pressure on nerve stimulates bradycardia
        - iii) Reticular activating system - level of arousal and responsible for specific motor movements
  - b. Level of consciousness
    - (1) Reticular activating centers - level of arousal
    - (2) Intact cortical function - level of awareness
  - c. Meninges - protective layers the surround and enfold entire CNS
    - (1) Dura mater - outer layer, tough and fibrous; literally two layers, inner layer serves to divide and separate various brain structures, forms the tentorium that surrounds the brain stem and separates the cerebellum below from the cerebral structures above, used as a landmark to describe intracranial lesions or when swelling is involved
    - (2) Arachnoid - middle layer, web-like with venous blood vessels that











- iv) Pupil changes
- v) Pulse, respiration and BP changes
- (4) Management
  - (a) Cervical spine precautions
  - (b) Assuring clear airway and adequate ventilation with good tidal volume
  - (c) Hypoxia must be prevented to prevent secondary injury to brain tissue
  - (d) Cerebral perfusion pressure can be maintained with a systolic pressure of at least 70 mm Hg
- b. Cerebral contusion - a focal brain injury in which brain tissue is bruised and damaged in a local area; may occur at both the area of direct impact (coup) and/ or on the opposite side (contrecoup) of impact
  - (1) Epidemiology
    - (a) Relatively common in blunt head injury resulting in prolonged confusion
    - (b) Most commonly found in frontal lobes
    - (c) Often associated with a serious concussion
    - (d) Patients may have multiple sites of contusion
  - (2) Assessment
    - (a) Airway patency and breathing adequacy a priority
    - (b) Alteration in level of consciousness
      - i) Confusion or unusual behavior common
    - (c) May complain of progressive headache and/ or photophobia
    - (d) May be unable to lay down memory - repetitive phrases common
    - (e) Assess for signs and symptoms of increased intracranial pressure
      - i) Altered LOC
      - ii) Glasgow coma scale
      - iii) Vomiting
      - iv) Pupil changes
      - v) Pulse, respiration and BP changes
  - (3) Management
    - (a) Cervical spine precautions
    - (b) Assuring clear airway and adequate ventilation with good tidal volume
    - (c) Hypoxia must be prevented to prevent secondary injury to brain tissue
    - (d) Keep warm and comfortable
    - (e) May need to repeat information
- c. Intracranial hemorrhage
  - (1) Types
    - (a) Epidural
    - (b) Subdural
    - (c) Intracerebral
    - (d) Subarachnoid
  - (2) Epidemiology
    - (a) Epidural hematomas almost always result from arterial tears, usually from the middle meningeal artery; they amount to about



