

# Chapter 28, Face and Neck Injuries

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## 1. Introduction to Face and Neck Injuries

- The face and neck are very **vulnerable to injury** [9].
- Their position on the body is **relatively unprotected** [9].
- **Soft tissue injuries and fractures** are common [10].
- These injuries can vary in **severity** [10].
- Some injuries are **life-threatening** [11].
- An example is **penetrating trauma to the neck** [11].
- This type of injury may cause **severe bleeding** [11].
- An **open injury** may allow an **air embolism** to enter the circulatory system [11].
- Understanding the **anatomy and physiology** of these areas is important [12].
- This report covers managing **trauma related issues** with the face and neck [2].
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- It also helps in recognizing **life threats** associated with these emergencies [3].
- The correlation with **head and spinal trauma** is also discussed [3].

## 2. Anatomy and Physiology of the Head, Face, and Neck

Structure	Description	Location/Composition	Source
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<b>Cranium (Skull)</b>	Contains the brain	Posterior portion is the occiput, lateral portions are temples or temporal regions, forehead is frontal region <a href="#">[13]</a>	<a href="#">[13]</a>
<b>Nasal Bone</b>	One of the six major bones of the face	Part of the facial structure	<a href="#">[19]</a>
<b>Zygomas</b>	Two bones, part of the six major bones of the face	Part of the facial structure	<a href="#">[20]</a>
<b>Maxillae</b>	Two bones, part of the six major bones of the face	Part of the facial structure	<a href="#">[20]</a>
<b>Mandible</b>	Forms the jaw and chin	Part of the facial structure	<a href="#">[20]</a>
<b>Bony Orbit</b>	Protects the eye from injury	Composed of lower edge of frontal bone, zygoma, and nasal bones <a href="#">[21]</a>	<a href="#">[21]</a>
<b>Pinna</b>	External visible part of the ear	Composed entirely of cartilage covered by skin <a href="#">[23]</a>	<a href="#">[24]</a>
<b>Tragus</b>	Small, rounded, fleshy bulge immediately anterior to the ear canal	Located anterior to the ear canal <a href="#">[25]</a>	<a href="#">[25]</a>
<b>Mastoid Process</b>	Located posterior to the external opening of the ear	About 1 inch posterior to the external opening of the ear <a href="#">[27]</a>	<a href="#">[27]</a>

<b>Cervical Spine</b>	Supports many important structures of the neck	First seven vertebrae are C1 through C7 <a href="#">[29]</a>	<a href="#">[29]</a>
<b>Spinal Cord</b>	Exits from the foramen magnum	Lies within the spinal canal formed by vertebrae <a href="#">[31]</a>	<a href="#">[31]</a>
<b>Esophagus</b>	Upper part lies in the midline of the neck	Located in the midline of the neck <a href="#">[32]</a>	<a href="#">[32]</a>
<b>Trachea</b>	Upper part lies in the midline of the neck; connects to the lungs	Located in the midline of the neck; below the larynx <a href="#">[32]</a>	<a href="#">[32]</a>
<b>Carotid Arteries</b>	Found on either side of the trachea	Located along with jugular veins and nerves <a href="#">[32]</a>	<a href="#">[32]</a>
<b>Jugular Veins</b>	Found on either side of the trachea	Located along with carotid arteries and nerves <a href="#">[32]</a>	<a href="#">[32]</a>
<b>Larynx</b>	Adam's apple; voice box	Located in the center of the anterior of the neck <a href="#">[33]</a>	<a href="#">[33]</a>
<b>Cricoid Cartilage</b>	Firm ridge of cartilage below the thyroid cartilage	Part of the larynx structure <a href="#">[34]</a>	<a href="#">[34]</a>
<b>Cricothyroid Membrane</b>	Lies between the thyroid cartilage and the cricoid cartilage	Part of the larynx structure <a href="#">[35]</a>	<a href="#">[35]</a>

<b>Thyroid Gland</b>	Lies on either side of the lower larynx and upper trachea	Located on either side of the lower larynx and upper trachea <a href="#">[38]</a>	<a href="#">[38]</a>
<b>Sternomastoid Muscles</b>	Allow for movement of the head	Originate from the mastoid process and insert into collar bone and sternum <a href="#">[39]</a>	<a href="#">[39]</a>
<b>Eyeball (Globe)</b>	Globe shaped, approximately one inch in diameter	Located within a bony socket called the orbit <a href="#">[41]</a>	<a href="#">[41]</a>
<b>Vitreous Humor</b>	Clear, jelly-like fluid	Fluid near the back of the eye <a href="#">[48]</a>	<a href="#">[49]</a>
<b>Aqueous Humor</b>	Clear fluid	In the front of the lens <a href="#">[48]</a>	<a href="#">[50]</a>
<b>Conjunctiva</b>	A membrane that covers the eye	Covers the eye <a href="#">[51]</a>	<a href="#">[51]</a>
<b>Lacrimal Glands (Tear Glands)</b>	Produce fluid to keep the eyes moist	Part of the eye structure <a href="#">[52]</a>	<a href="#">[52]</a>
<b>Lacrimal Ducts</b>	Tear drains through these into the nasal cavity	Inner side of the eye <a href="#">[53]</a>	<a href="#">[53]</a>
<b>Sclera</b>	White fibrous tissue; maintains global shape and protects inner structures	Forms the white of the eye <a href="#">[54]</a>	<a href="#">[54]</a>

<b>Cornea</b>	Clear, transparent membrane on the front of the eye; allows light to enter	Replaces the sclera on the front of the eye <a href="#">[55]</a>	<a href="#">[55]</a>
<b>Iris</b>	Circular muscle behind the cornea	Part of the eye structure <a href="#">[57]</a>	<a href="#">[57]</a>
<b>Pupil</b>	Opening in the center of the iris; allows light to move to the back of the eye	Center of the iris <a href="#">[58]</a>	<a href="#">[58]</a>
<b>Lens</b>	Focuses images on the retina	Behind the iris <a href="#">[60]</a>	<a href="#">[60]</a>
<b>Retina</b>	Contains nerve endings which respond to light	At the back of the globe <a href="#">[60]</a>	<a href="#">[60]</a>
<b>Optic Nerve</b>	Transmits nerve impulses from the retina to the brain	Connects the retina to the brain <a href="#">[61]</a>	<a href="#">[61]</a>
<b>Choroid</b>	Layer of blood vessels nourishing the retina	Between the retina and the back of the globe <a href="#">[62]</a>	<a href="#">[62]</a>

### 3. Types of Face and Neck Injuries

Injury Type	Description	Common Causes	Signs/Symptoms	Source
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<b>Soft Tissue Injuries</b>	Injuries to skin and tissues	Blunt injury	Swelling, hematoma, heavy bleeding <a href="#">[70]</a>	<a href="#">[70]</a>
<b>Facial Fractures</b>	Breaks in the bones of the face	Vehicle collisions, assaults, blunt force, high-energy impacts <a href="#">[73]</a>	Misaligned teeth, numbness to the chin, inability to open mouth, facial swelling, instability <a href="#">[74]</a>	<a href="#">[72]</a>
<b>Dental Injuries</b>	Fractured or avulsed teeth	Facial trauma	Teeth fragments, bleeding, cracked or loose teeth <a href="#">[78]</a>	<a href="#">[72]</a>
<b>Eye Injuries</b>	Various types of trauma to the eye	Sports, foreign objects, chemicals, heat, light, blunt trauma, blasts <a href="#">[131]</a>	Irritation, pain, vision loss, abnormal pupil reactions, bleeding under conjunctiva, protrusion <a href="#">[133]</a>	<a href="#">[131]</a>
<b>Nose Injuries</b>	Trauma to the nose, including nosebleeds	Digital trauma, blunt trauma <a href="#">[177]</a>	Nosebleeds (anterior/posterior), fractures, soft tissue injuries, CSF leakage <a href="#">[178]</a>	<a href="#">[177]</a>
<b>Ear Injuries</b>	Trauma to the external, middle, or inner ear	Sudden pressure changes, insertion of objects, blunt force <a href="#">[186]</a>	Bleeding, severe pain, difficulty hearing, ringing in the ear, clear fluid <a href="#">[187]</a>	<a href="#">[185]</a>
<b>Neck Injuries</b>	Trauma to the neck structures	Blunt trauma, crushing injury, penetrating	Loss of voice, difficulty swallowing, airway obstruction, subcutaneous	<a href="#">[203]</a>

		trauma, strangulation [203]	emphysema, bleeding, signs of shock [205]	
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## 4. Patient Assessment for Face and Neck Injuries

- **Scene safety** is the highest priority in patient assessment [80].
- Assess for **potential violence or environmental hazards** [80].
- Standard precautions include **eye protection and a face mask** [81].
- This is due to the potential for **projectile blood** [81].
- Determine the **number of patients** and consider additional resources [82].
- The **mechanism of injury (MOI)** is very important [83].
- Assess the scene for **indicators of the MOI** [84].
- Common MOIs include **motor vehicle collisions, sports falls, penetrating trauma, and blunt trauma** [85].
- The **primary assessment** focuses on identifying life-threatening concerns [86].
- Threats to **X, A, B, C's** must be treated immediately [86].
- **Life-threatening external hemorrhage** should be addressed before airway and breathing [86].
- Form a **general impression** to gauge the patient's condition seriousness [87].
- Injuries may be **obvious or hidden** [88].
- **Control blood loss** with direct pressure [89].
- Consider the need for **spinal immobilization** [89].
- Check responsiveness using the **AVPU scale** [89].
- Ensure a **clear and patent airway** [90].
- Consider an **oral pharyngeal airway** if the patient is unresponsive [91].
- Quickly assess the **adequacy of breathing** [92].
- Splinting or restricting chest wall motion is **contraindicated** [93].
- Assess the **pulse and quality** (Circulation) [95].
- Significant bleeding is an **immediate life threat** [95].
- Make a **transport decision (D)** [96].
- Quickly transport patients with airway/breathing problems or significant bleeding [96].

- Stabilization may be **difficult** [97].
- Consider **advanced life support backup** if transport is long [98].
- Patients with **internal bleeding** need rapid transport [99].
- Signs of **hypoperfusion** imply the need for rapid transport [100].
- Patients with a significant MOI appearing stable should also be transported promptly [101].
- A significant blow to the face or throat increases suspicion of **spinal or brain injury** [102].
- Even without signs of hypoperfusion or other life-threatening injuries, suspicion should be high [102].
- There is a possibility of **eye injuries** [103].
- In history taking, investigate the **chief complaint** and obtain medical history [103].
- Be alert for **injury specific signs and symptoms** [103].
- Be aware of **pertinent negatives** [103].
- Get a **SAMPLE history** [104].
- Attempt to gather history from friends or family if the patient is unresponsive [104].
- In unresponsive patients, only **signs of injuries** are noticeable [105].
- For the secondary assessment, if multiple systems are affected, start with an **entire body assessment** [105].
- Look for **decap btls** [105].
- Do not delay transport to complete a thorough physical exam in certain patients [105].
- Consider focusing the physical exam in responsive patients with isolated injuries [106].
- Ensure **control of bleeding is maintained** [106].
- Note the **location of the injury** [106].
- Inspect the wound for **foreign matter** and stabilize objects [107].
- Use both **eyes and hands** [108].
- Explain the examination process to a responsive patient [109].
- Assess all **underlying systems** [109].
- When evaluating the eyes, start with **outer aspects and work towards the pupils** [110].
- **visual acuity** is considered the vital sign of the eye [111].



- Assess and maintain **baseline vital signs** [112].
- Observe for **any changes** during treatment [112].
- Be concerned with **visible and unseen bleeding** [113].
- Baseline information about **respirations and pulse** is important [114].
- Use **monitoring devices** and perform reassessment [114].
- Repeat the primary assessment, reassess vital signs and chief complaint [115].
- Continually reassess the adequacy of **airway, breathing, and circulation** [115].
- Recheck **patient interventions** [116].
- Reassessment is particularly important in facial/neck injuries [116].
- Patient condition should be reassessed at least **every 5 minutes** [116].

## 5. Emergency Medical Care for Face and Neck Injuries

Injury Type	Key Emergency Care Interventions	Source
<b>General Care</b>	Complete spinal immobilization if suspected spinal injuries; Maintain open airway; Prepare to suction; Consider oral/nasal airway; Provide high-flow oxygen; Control significant visual bleeding; Treat for shock if hypoperfusion signs; Rapid transport if seriously injured.	[117]
<b>Soft Tissue Injuries</b>	Assess X ABC's and life threats first; Follow standard precautions; Open and clear airway (avoid neck movement if cervical injury suspected); Control bleeding with direct pressure and sterile dressing; Do not apply excessive pressure if skull fracture suspected; Cover exposed structures with moist sterile dressing; Apply ice to injuries that do not break skin; Check for bleeding inside the mouth; Save avulsed skin wrapped in sterile dressing and keep cool; Place loose skin flaps close to normal position.	[123]

<b>Eye - Foreign Objects</b>	Irrigate with sterile saline solution; For objects on the eyelid, remove with a moist, cotton-tipped applicator; For impaled objects, stabilize and transport, bandage both eyes.	<a href="#">[137]</a>
<b>Eye - Burns</b>	Stop the burn and prevent further damage; For chemical burns, flush with water or sterile solution continuously (20+ mins for strong acids/alkaloids); Apply clean dry dressing and cover eye; For thermal burns, cover both eyes with sterile dressing moistened with saline; For light burns, cover each eye with sterile moist pad and eye shield.	<a href="#">[143]</a>
<b>Eye - Lacerations</b>	If globe laceration, apply no pressure; Gently apply moist sterile dressing; Cover with a protective metal shield, cup, or sterile dressing; Apply soft dressing to both eyes; If eyeball dislodged, do not reposition, cover and stabilize with moist sterile dressing, cover both eyes, keep patient supine.	<a href="#">[156]</a>
<b>Eye - Blunt Trauma</b>	Protect injured eye with metal shield; Cover the other eye to minimize movement.	<a href="#">[164]</a>
<b>Eye - Blast Injuries</b>	Management depends on severity.	<a href="#">[169]</a>
<b>Eye - Contact Lenses/Artificial Eyes</b>	Generally do not remove (except chemical burns); Remove hard lenses with suction cup; Remove soft lenses by pinching gently after adding saline; Place lenses in saline and advise hospital; Care for artificial eye like a normal one.	<a href="#">[171]</a>
<b>Nosebleeds (Epistaxis)</b>	For non-trauma patient bleeding heavily, place in sitting position leaning forward and pinch nostrils; For trauma-related bleeding, apply sterile dressing.	<a href="#">[183]</a>

<b>Ear Injuries</b>	Apply local pressure to control bleeding; If severe ear avulsion, wrap avulsed part in moist sterile dressing, place in labeled plastic bag; Do not remove foreign objects from the ear canal; Do not try to manipulate foreign bodies.	<a href="#">[187]</a>
<b>Facial Fractures</b>	Remove and save loose teeth or bone fragments from the mouth; Remove loose dentures and dental bridges to protect airway; Swelling can be a source of obstruction.	<a href="#">[196]</a>
<b>Dental Injuries</b>	Apply direct pressure to stop bleeding from displaced teeth; Perform suctioning if needed; Save and transport avulsed tooth by the crown; Place tooth in storage solution, milk, or sterile saline.	<a href="#">[200]</a>
<b>Cheek Injuries</b>	If unable to control bleeding compromising airway, consider removing the object; Provide direct pressure on both sides (inside and out); Bandaging should not occlude the mouth.	<a href="#">[202]</a>
<b>Neck Injuries (Blunt Trauma)</b>	Maintain airway; Immediately transport; Consider advanced life support early; Consider spinal motion restriction.	<a href="#">[207]</a>
<b>Neck Injuries (Penetrating Trauma)</b>	Direct pressure over the bleeding site; Assess for signs of shock; Immediate spinal motion restriction if indicated; Apply high-flow oxygen; Do not remove penetrating or impaled objects unless interfering with CPR; Stabilize all impaled objects if not obstructing airway.	<a href="#">[213]</a>
<b>Laryngeal Injuries</b>	Maintain airway; Immediately transport; Consider advanced life support early; Consider spinal motion restriction; Do not remove penetrating or impaled objects unless interfering with CPR; Stabilize impaled objects if not obstructing airway; Provide oxygen and	<a href="#">[207]</a>

ventilate; Keep patient supine; Avoid use of a rigid collar.
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## 6. Complications and Considerations

- Injuries to the face and neck can frequently cause **airway obstruction** [65].
- Several factors can contribute to this obstruction [65].
- These include **blood clots** from heavy facial bleeding [66].
- Direct injuries to the **nose, mouth, larynx, and trachea** can cause bleeding and respiratory compromise [66].
- **Dislodged teeth or dentures** can become an airway obstruction [67].
- **Swelling** from soft tissue injury can also cause obstruction [68].
- Airway can be affected by turning the patient's head [69].
- Brain and cervical spine injuries may interfere with **normal respirations** [69].
- **Facial fractures** also carry the danger of blood clots obstructing the airway [195].
- Swelling can be **extreme** within 24 hours after injury [198].
- A life-threatening complication is an **air embolism** [11].
- This may result from an **open injury** allowing air into the circulatory system [12].
- It can occur if a **vein has been punctured** in the neck [211].
- **Rapid transport** is crucial for certain patients [96].
- This includes patients with **airway or breathing problems** or significant bleeding [96].
- Patients with **internal bleeding** must be transported quickly [99].
- Signs of **hypoperfusion** imply the need for rapid transport [100].
- Even patients appearing stable but with a significant MOI should be transported promptly [101].
- **Advanced life support (ALS)** should be considered [98].
- This is important if transport is too long [98].
- Consider ALS early for **neck injuries** [208].

## 7. Review of Key Concepts

- Question: Which statement about the Adam's apple is false? [221]

- Answer: It is inferior to the cricoid cartilage. [221]
- Question: The eye is also called what? [222]
  - Answer: The eyeball. [222]
- Question: When a person looks at an object up close, what should the pupil do? [222]
  - Answer: Constrict. [222]
- Question: When caring for a chemical burn to the eye, what should the EMT do? [222]
  - Answer: Flush it away from the uninjured eye. [222]
- Question: Which sign is least indicative of a head injury? [222]
  - Answer: pupillary constriction to bright light. [222]
- Question: What is the purpose of the Eustachian tube? [222]
  - Answer: To equalize pressure in the middle ear when external pressure changes. [222]
- Question: When caring for facial trauma, what should the EMT be most concerned with? [223]
  - Answer: Airway compromise. [223]
- Question: subcutaneous emphysema following trauma to the face and throat suggests what? [224]
  - Answer: Crushing injuries of the larynx, or tracheal injuries. [224]
- Question: A 21-year-old male has a large laceration to his neck with spurting bright red blood. What should you do? [225]
  - Answer: Place a gloved hand over it first, then apply a dressing bandage. [227]
- Question: Which MOI would most likely cause a crushing injury to the larynx or trachea? [228]
  - Answer: Attempted suicide by hanging. [228]