Dental Trauma

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Introduction: primary teeth — central incisors (both upper and lower) first to emerge at 6 mo to 15 mo of age; in most children, all teeth appear by 3 yr of age; include central incisors, lateral incisors, cuspids, and primary molars; adult teeth — include premolars, first, second, and third molars, and wisdom teeth; terminology — outer tooth surface called labial or buccal; on upper teeth, interior surface called palatal (lingual on lower teeth); for biting or chewing, occlusal surface; distance from root, apical vs coronal (more outward)

Anatomy of tooth: from outside in — enamel (hard clear to whitish covering); dentin (underneath enamel and more yellowish; often seen in dental fractures); pulp (where nerve and blood vessels go through); root (bottom portion of tooth that molds into bone); crown (portion of tooth above gingiva); from inside out — alveolar bone (encases root of tooth; where periodontal ligament comes out); nerves and blood vessels go through periodontal ligament which attach to cementum on tooth); gingiva (mucosal surface around tooth)

Epidemiology: most dental trauma in younger children minor; in older children and adults, usually sports-related or vehicle-related (eg, bicycles, cars) and more common in boys; usually involves front teeth; in permanent teeth, issues often lifelong (eg, discoloration, need for replacement or crown, interference with chewing or speech); sometimes sign of abuse

Types of dental trauma: concussion — painful or sensitive, but no displacement or loosening seen; thorough examination needed; generally benign, whether in primary or permanent teeth; managed with pain control, soft diet, and referral to dentist; subluxation — loosening of tooth, but not out of place; blood often present at gingival line; tender; splint possibly needed if tooth highly mobile; managed with pain control, soft diet, and referral to dentist; luxation — tooth out of place; damage to periodontal ligament present; 4 types of injury include intrusion, lateral luxation, extrusion, and avulsion; intrusion — often due to fall onto object; usually involves upper teeth; tooth shorter or intruded completely; damage to periodontal ligament or bone underneath present; tooth may disappear if displaced completely; with damage to underlying structures; if tooth intruded partially, determine whether tooth fractured and fragment of tooth lost or avulsion; root fracture — in intrusion or apparent shortening of tooth, determine whether tooth fractured; if crown present, but tooth very loose, question of whether due to alveolar fracture or tooth fractured under surface; x-rays possibly helpful

Educational Objectives

The goal of this program is to improve the management of dental and otolaryngologic emergencies. After hearing and assimilating this program, the clinician will be better able to:

1. Distinguish among the types of dental trauma and recognize when management is necessary.
2. Describe the Ellis classification of dental fractures.
3. Recognize the key presenting signs to diagnose otolaryngologic emergencies.
4. Discuss the pathophysiology of Ludwig angina and retropharyngeal abscess.
5. Prescribe the appropriate antibiotic and airway management for Ludwig angina and retropharyngeal abscess.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio-Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, the faculty and planning committee reported nothing to disclose. In his lecture, Dr. Witt presents information related to the off-label or investigational use of a therapy, product, or device.
Baltimore City Medicine, University of Maryland Medical School,

Case 1: 

Contents of dental kit: round dental mirrors to visualize every surface of every tooth; storage medium; gauze with attached strings or suture material to avoid losing (perform gauze count in emergency department); syringes and needles; lidocaine for alveolar block; topical anesthetic gel (20% benzocaine or 5% lidocaine); hemostatic products (eg, absorbable gelatin powder [Gelfoam]); calcium hydroxide paste; dry socket paste (to relieve discomfort from exposure of bone to air); temporary periodontal splint (Coe-Pak) holds soft tissue or teeth in place; possible to use cyanoacrylate tissue adhesive (Dermabond) for sealing fracture.

When to follow up: mostly on as-needed basis (eg, concussions, subluxations, minor injuries), especially with primary teeth (sometimes x-ray indicated to ensure that tooth underneath not injured); most recommend within 24 hr (not reasonable); only true dental emergency avulsion of permanent tooth; dental service usually not available on weekends.

Fracture of mandible: in children, more common in subcondylar area (in adults, angle and ramus); fracture in subcondylar area in children may still require that jaw wired shut (not necessarily emergent, but pain control needed).

Child abuse: because head disproportionately large in children, one of more common sites of injury; injury often subtle; perform adequate oral examination if abuse in differential diagnosis.

Nightmarish ENT Emergencies

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Case 1: man, 32 yr of age, has left lower tooth pain, facial swelling, slight dysphagia and slurred speech; cognitive function satisfactory; past medical history negative; physical examination (PE) findings — alert and appears slightly ill; low-grade fever, with slight tachypnea and tachycardia; normal blood pressure; O₂ saturation acceptable; bilateral erythema (key diagnostic indicator); when man opens mouth, not lifting tongue; diagnosis Ludwig angina; anatomy — potential spaces under tongue include sublingual space and submaxillary space (together called submandibular space); infection in submandibular space becomes space-occupying lesion; infection by direct spread; when floor of mouth rises, tongue goes back, resulting in mechanical airway obstruction; lower teeth have direct route to submandibular space, acting as access for infections from mouth to spread downward; patient pushes head forward to bring tongue forward and open airway; diagnosis — imaging and clinical; avoid imaging if patient unable to lie flat or prop head far enough forward; bilateral occurrence key; if submandibular swelling unilateral, differential diagnosis includes Lemierre syndrome (thrombophlebitis of one of internal jugular veins), or dental abscess; pathophysiology — infection of mouth; lower back molar extends below myohyoid line and directly into submandibular space, providing easy route for infectious spread; incidence increasing in young healthy individuals due to tongue piercing; occurs in immunocompetent and immunocompromised individuals; polymicrobial etiology, including anaerobes; management — course highly variable; ~60% of patients require airway management (similar to intubating anaphylactic patient); better outcomes in children, compared to adults; rapidly progressive disease; intubation difficult; retrospective review showed 40% of individuals with Ludwig angina required advanced airway technique (defined as anything besides direct laryngoscopy); 9 yr ago, consensus of American College of Surgeons to perform tracheostomy in all patients; no consensus from other societies, except to use individual clinical judgment whether to intubate or observe at bedside; airway main challenge; mortality not due to sepsis but due to airway obstruction; broad-spectrum antibiotics indicated (gram-positive and gram-negative organisms and anaerobes); steroids controversial; retrospective studies show that steroids not beneficial but not harmful (no increase in recovery time and no increase or decrease in mortality); whether to hold in emergency department or transfer to otolaryngology referral hospital depends on transport time and stage of patient, but not on skills of paramedics; definitive treatment is incision and drainage to relieve pressure; drain usually left for continued drainage; mortality decreases with treatment; if not treated, mediastinitis, pericarditis, or empyema possible; mortality 8% to 10%, even with surgical intervention and antibiotics.

Case 2: boy presents with sore throat; unremarkable history; has cold and given acetaminophen; PE findings — febrile; vital signs (VS) within normal limits; avoids moving neck; inside of mouth unremarkable (no trismus; no exudates; midline uvula); diagnosis retropharyngeal abscess; pain with movement of neck key; pathophysiology — retropharyngeal space is potential space; in children, contains lymph nodes that atrophy by 6 yr of age; primarily disease of children; retropharyngeal space located anterior to vertebræ (7 mm in front of C3 and <21 mm in front of C7 on x-ray); easily detected on lateral neck x-ray; computed tomography (CT) shows heterogeneous appearance; ultrasonography (US) has increasing role in children; imaging shows fluid collection in retropharyngeal space; relatively rare occurrence; CT more sensitive than US; in some patients, retropharyngeal lymph nodes become suppurated, fill with fluid, and form abscesses; 90% of cases occur in children <6 yr of age; as incidence of community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA) becoming more common, retropharyngeal abscesses becoming more common; group A β-hemolytic streptococci second most common etiologic agent; often polymicrobial; management — operative definitive management not required in most patients; mortality low (acute intervention rarely required); if >1 yr of age, risk for airway compromise low; in children <6 yr of age, 50% of cases occur between 6 mo to 12 mo of age (risk for airway compromise high); incidence increasing due to increasing use of imaging studies and increasing awareness; antibiotics indicated (know own hospital sensitivities for CA-MRSA); vancomycin and clindamycin used; coverage for other mouth flora indicated; use clinical judgment whether to use steroids (neither harmful nor beneficial), or better antibiotics and knowledge of disease, invasive procedure not always indicated; fascial planes run from base of skull to mediastinum, and complications possible.

Case 3: woman, 49 yr of age, presents with acute onset of nasal hemorrhage; past medical history of hypertension and hypercholesterolemia; on β-blocker and statin but not on anticoagulant; PE findings — VS within normal limits; on inspection, blood streaming down posterior oropharynx; patient vomits significant amount of bright red arterial blood; diagnosis posterior epistaxis; dramatic presentation, with large-volume bleeding; sagittal view of nose shows Kiesselbach (Little) area where majority of anterior bleeding occurs; sphenopalatine artery usually source of posterior bleeding and noncompressible; accounts for 90% of mortality from epistaxis; management — posterior epistaxis balloon easy to use; important to determine which ports go into anterior or posterior balloon; inserted all the way to hub and inflate posterior balloon first, allow balloon to sit where arteries originate to feel tension, then inflate anterior balloon; if posterior balloon not available, use alternative technique with Foley catheter (insert Foley catheter and look into oropharynx until able to visualize tip of Foley catheter, slowly inflate 10-mL balloon until resistance felt; once resistance felt, stop inflating and withdraw Foley catheter until wedged in posterior nasopharynx, and apply epistaxis...
balloon tampons (Epi-Stat) or packing; secure balloon adequately to avoid migration downward into larynx; using Foley catheter good temporizing technique; interventional radiology embolization indicated if rebleeding occurs

**Case 4:** patient presents with sudden onset of vertigo (“room spinning”); history and PE unremarkable, but unable to walk (due to perforated tympanic membrane [TM] from penetrating trauma); if ear penetrated, may disrupt ossicles, causing vestibular symptoms (eg, ataxia, vertigo, vomiting); can discharge patient as long as symptoms controlled (urgent but not emergent ENT issue); requires nonemergent operative repair; if perforated TM not repaired, can lead to hearing loss and vestibular symptoms

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**Suggested Reading**


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- Review Educational Objectives on page 1: 5 minutes
- Take pretest: 10 minutes
- Listen to audio program: 60 minutes
- Review written summary and suggested readings: 35 minutes
- Take posttest: 10 minutes
DENTAL AND ENT EMERGENCIES

To test online, go to www.audiodigest.org and sign in to online services. To submit a test form by mail or fax, complete Pretest section before listening and Posttest section after listening.

1. The following statements about concussion of a tooth are true, except:
   (A) Painless and nonsensitive
   (B) No displacement or loosening of tooth
   (C) Generally benign, whether tooth primary or permanent
   (D) Managed with soft diet and referral to dentist

2. Which of the following types of injury is often due to a fall onto an object and usually involves the upper teeth?
   (A) Lateral luxation
   (B) Extrusion
   (C) Intrusion
   (D) Avulsion

3. In which of the following injuries is damage to the periodontal ligament present?
   (A) Luxation
   (B) Intrusion
   (C) Avulsion
   (D) All the above

4. An Ellis _______ fracture of the tooth involves the dentin and is painful if exposed to air or temperature.
   (A) Class I
   (B) Class II
   (C) Class III

5. The only true dental emergency is the avulsion of a permanent tooth.
   (A) True
   (B) False

For questions 6 to 8, match the condition in column I with its corresponding characteristic in column II.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
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<tbody>
<tr>
<td>6. Ludwig angina</td>
<td>(A) Involves sphenopalatine artery</td>
</tr>
<tr>
<td>7. Retropharyngeal abscess</td>
<td>(B) Increasing incidence of community-acquired methicillin-resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>8. Posterior epistaxis</td>
<td>(C) Tongue piercing</td>
</tr>
</tbody>
</table>
| 9. Corticosteroids have been found _______ in the management of Ludwig angina and retropharyngeal abscess. | (A) Harmful
   (B) Beneficial
   (C) Neither harmful nor beneficial |
| 10. In _______, the patient pushes his or her head forward to bring the tongue forward and open the airway, while in _______. the patient has pain with movement of the neck. | (A) Ludwig angina; retropharyngeal abscess
   (B) Retropharyngeal abscess; Ludwig angina |

Answers to Audio-Digest Emergency Medicine Volume 30, Issue 24: 1-D, 2-A, 3-D, 4-C, 5-B, 6-B, 7-C, 8-A, 9-C, 10-C

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