Don’t Forget The Teeth

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- We do not intend to discuss an unapproved/investigative use of a commercial product/device in our presentation.
Learning Objectives

• Have a heightened awareness of the importance of dental findings on exam
• Understand several common presentations of dental disease
• Be familiar with dental presentations of medical diseases
• Be able to recognize dental complications of common pediatric illnesses
• Understand risk factors for dental complications

Who are We?

SRPAC
• 25 pediatric hospitalists
• 550+ admissions in 2015
• 42% of all CHOA SR admissions
• Saw the patients of 1400 different community pediatricians

Pediatric Dentistry
• 6 pediatric hospital dentists
• All also work in the community
• Dental home for medically compromised children
• See acute dental issues in healthy children and return to their dentist
**Chronic Disease**

- Dental Caries - the most common chronic disease of childhood
- Early childhood caries is 5 times more common than asthma
- Tooth decay
  - 41% of Hispanic children
  - 37% of African American children
  - 25% of white children.
- Higher numbers in poor and minority children
- 40% heritability for caries (BTF3 and NFKB1)

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**When We Work Together We Get Better Outcomes For Our Patients**
We have different skill sets

**Pediatrician**

**Dentist**

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**Children at Risk**

- Mom with active decay
- **Prolonged bottle use**
- Visible decay, prior treatment for decay
- Children with special health care needs
  - Cardiac
  - Chemo/radiation
  - Difficulty performing oral hygiene
  - GERD
  - Gingival hyperplasia
  - Prematurity
  - CP/MR
  - Multiple medications
  - Seizures
  - ADHD
  - Overcrowding of teeth
  - Prematurity
Facial Swelling

- 8 YO, 2 day hx facial swelling, fever
- No hx eye injury, cut, insect bite, tooth ache
- Pt saw PMD, was diagnosed with facial cellulitis, started on TMP/SMX
- No improvement, face continued to swell and redden

- Exam
  - T 102, P 95, R 20, BP 102/65
  - Teeth intact, no mucosal involvement
  - Shotty cervical adenopathy

Our Patient

- Treated with Ceftriaxone and Clindamycin overnight
- Taken to OR next day by Dentist
- Abscessed tooth extracted
- Home the following day on PO Clindamycin once pain was controlled and PO intake adequate
Treatment

• **CT not helpful.** Panorex may be of benefit. (4-6 weeks for bone changes!)
• Ceftriaxone, clindamycin
• Oral anaerobes, Staph aureus, Strep, Peptostrep
• Dental extraction after 24h antibiotics
• Medicated mouthwash post-operative, and 7-10 days of PO clindamycin
• **Blood cultures and socket cultures not done**

Dental abscess

• 50% of facial swellings are dental
• Most common in children with neglected dental caries
• Dental trauma
• Often symptoms are insidious in onset and progression and nonspecific in nature.
• Symptoms: Headaches, abd pain (draining pus), anorexia, avoidance of chewy foods, halitosis, toothache, a sensitive tooth
• Nonspecific complaints and complaints of referred pain are more common than a toothache in children
• Pain goes up and down but rarely crosses the midline
• Alveolar processes of the mandible and maxilla in young children are fenestrated anteriorly → early decompression of the abscess through the alveolus and gingiva.
• Later in childhood, abscessed maxillary teeth may intermittently decompress through the floor of a maxillary sinus → recurrent sinus infections.
• Mandibular tooth abscesses → submandibular sinus tract

Complications

• Infection may track through lateral pharyngeal, retropharyngeal, or sublingual spaces, threatening the airway and causing sepsis and/or mediastinitis.
• Septic thrombosis of the cavernous sinus
• Draining fistulous tract
• SBE
• Mandibular osteomyelitis
• Sinusitis
• Lemierre’s
• Ludwig’s angina
Follow Up

• Follow up appointments arranged before discharge.
• The risk for new disease does not go down after treatment for a long time and for some it will never go down.
• Discharge summary faxed to referring physician
• Phone call to referring physician
• Op note/phone call to dental home
• Additional follow ups with specialist or social work arranged

Dental Infections are Painful!
A More Serious Dental Infection

- 23 month old – 3 weeks of URI symptoms, 3 days NBNB emesis, no diarrhea. Poor PO intake, scant urine
- ED- IVF, discharged
- ED – tired, clinically dehydrated, IVF without improvement
- CT.....

- OR- evacuation of abscess
- *Streptococcus intermedius, Eikenella corrodens, Prevotella*
- Dental consult- additional hx- fell and hit front teeth a week prior. Dental exam WNL
- Ceftriaxone, Metronidazole x 6 weeks
• 2 days after discharge, lethargic, vomiting
• Return to ED, abscess back

• MRI: Tooth abscess
• Tooth extraction
• Brain abscess drained—cultures negative
• Dental abscess culture—oral flora
• Tooth was the source
• Ceftriaxone, Metronidazole for many weeks.
Facial Cellulitis, with a Twist

• 3 YO Hispanic child, 2 days of fever and progressive facial swelling and redness
• Exam:
  – VSS, T 101
  – R cheek swollen, red, tender
  – R upper molar abscessed
• Labs:
  – WBC 17,000 (85s,15L), H/H 9.8/33, MCV 65
  – CRP 8
• Ceftriaxone and clindamycin started
• Dentist consulted
• During extraction, unusual teeth, and soft bones noted

![X-rays of teeth](attachment:image1)

• After surgery, noted to walk with unusual gait

![Child post-surgery](attachment:image2)
• **Enamel hypoplasia**
  – predisposing to increased caries development and rapid progression.

• **Formation of globular dentin**
  – no matrix, large pulp chambers, spontaneous abscess

• **Delayed formation**
  – baby teeth may not erupt until after one year.
  – when they erupt, they may be smaller than normal

• **Periodontal disease:**
  – With insufficient vitamin D, mandible and maxilla may not be sufficiently mineralized, leading to loose teeth
  – Periodontal disease is very rare in healthy children

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**Continued jaw pain**

• 15 YO healthy girl, 3rd molar (wisdom tooth) extraction x4
• 3 days later, admitted with extensive cellulitis
• MRI - small developing abscess just lateral to maxillary sinus
• Ampicillin/sulbactam, Vancomycin x 4 days, discharged on PO clindamycin
• 4 days later, readmitted with L jaw swelling
• MRI c/w L mandible osteomyelitis
• All cultures negative
• IV Clindamycin, followed by PO Clindamycin at home
• 2 weeks later R jaw swelling, MRI c/w R mandible osteomyelitis
• To OR: abscesses in both mandibles, had debridement, curettage, both mandibles.
• Cultures- Strep viridans, Veillonella sp
• PICC line, IV Meropenum
Mandibular Osteomyelitis

• Mandible > maxilla-
  – poor vascularization
  – dense mandibular cortical bone is more prone to damage
• Streptococci viridans, anaerobic cocci such as Peptostreptococcus spp, and anaerobic gram-negative rods such as Prevotella and Fusobacterium
• Antibiotics of choice include clindamycin, penicillin/metronidazole and fluoroquinolones
• Hospitalization for IV antibiotics, then PICC for home IV antibiotics, usually for at least 6 weeks
• Surgical treatment - early and aggressive -surgical debridement

Mycobacterium abscessus

• 19 cases of dental infections, presenting with unusual cervical lymphadenopathy
• Dentistry for Children, Jonesboro
• Rare!
• Multidisciplinary team- Dentistry, Infectious Disease, Pediatrics, Craniofacial Surgery
• Coordinated with State Epidemiologist, Health Department
• M. abscessus found in a water reservoir in the building and has been corrected.
Treatment

• Surgical cure best option
• Antibiotic treatment difficult and controversial
• For patients in whom a complete excision is not possible and/or there is evidence of disseminated disease
  – IV cefoxitin, IV amikacin +/- azithromycin for ~ 4 months
  – Routine monitoring of laboratory studies (CBC with differential, BUN/Cr, amikacin levels)
  – Monthly hearing screens.
• Will need long-term follow up
• Similar outbreak Anaheim, CA- 30 children
Infant with Fever

• 2 week old with 5 day history of fussiness with feedings and weight loss
• 1 day history of fever 100.5
• Exam:
  – L eye with mucoid discharge
• Labs:
  – CSF WNL
  – WBC 18.3 (67s, 2b, 10L, 21m), H/H 13.8/39 platelets 404k
  – CRP 8.9
  – UA WNL
• Ampicillin, cefotaxime started
• Ranitidine

• Day#2- facial redness, eye/nose drainage
• Day#3–
  – Staph aureus in blood culture, vanco
  – Ophthal consult re dacryostenosis
• Day#5- CT orbits/face
  – no dacryocele
Batman is out of the Bat Cave….

- He completed a 10 day course of cefotaxime and was discharged on another 7 days of cephalexin.

Dental Facts

- Child was a traumatic forceps delivery.
- Gingival abrasions were present
- The enamel of the teeth never attaches to the gingiva.
- A tear in the tissue creates a pocket that is open to bacteria, warm, wet, has a food source, and a baby with a weak immune system.
Recurrent Parotitis

- 5 Y F – hx of recurrent episodes of facial swelling
- 2 days of R sided facial swelling and pain
- ENT- Clindamycin
- Continued R facial/cheek/jaw pain, intermittent fever, trismus
- ED-
  - Notable swelling to right side of face from preauricular area extending below mandible and slightly posteriorly. Pain of face when attempts to open mouth; no obvious drainage from Stensen’s duct
• PMH- countless episodes of parotid pain and swelling in the past 2 years.
• Multiple Strep throat infections and ear infections, had myringotomy/tubes and T&A.
• Followed by ENT, with no etiology for her recurrent swelling identified
• Multiple physicians have diagnosed recurrent parotid gland infections. On one occasion, pus was expressed from Stensen’s duct.
• Over 2 years, ~5 courses of antibiotics for the swelling/pain, but there are also many many episodes that were controlled with warm/cool compresses and pain control alone.

• FH- Autoimmune history notable:
  – Hyperthyroidism, PGM with similar episodes as a child and vasculitis as an adult
• ROS:
  – Drinks a lot of water but are unsure if she has dry mouth.
  – She has had a few dental fillings for cavities
  – No report of dry eyes, no arthralgias/arthritis
• Labs
  – WBC 16.2 (72s, 20 L) H/H 11.4/32.4, plate 264
  – Amylase 543 elevated
  – CRP 11.3
• Imaging
  – US: Numerous small hypoechoic foci within both parotid lobes are noted. Some of these appear cystic. There is parotid enlargement, right greater than left.
Course in Hospital

- Clindamycin, Ceftriaxone
- ENT consult- consider CT sialogram
- Rheum consult- ANA, ds DNA, anti-La, anti-Ro, complement, etc etc
- Dental consult-
  - Panorex- large restorations close to the pulp, teeth A and J. Child points at these teeth and says they hurt.
  - OR-
    - Probe teeth A and J 7 mm bone loss, failing restorations, necrotic pulps, A > J
    - Extractions of teeth A and J, extensive drainage of pus and blood. More drainage from the right side.

- 24h later, swelling almost totally done
- No longer taking any pain meds
- No trismus
- Feels great
- Discharged to complete another week of Clindamycin
- Subsequently, all Rheumatology labs WNL
What did we learn?

• Partially treated dental abscesses “go sideways” and don’t act typical
• Trismus can be from dental pain as well as other causes of jaw/facial pain
• Restorations are the same color as teeth!

Failure to Thrive

• 18 month old, with no weight gain in 6 months
• Refusing to eat more than occasional mouthfuls. Took formula as infant, but refusing solid foods for several months.
• Followed by WIC for 6 months, on Pediasure
• Wt 7.1 kg (<5%ile), Ht 71 cm (<10%ile)
• Exam: VSS, emaciated, miserable no SQ fat, otherwise exam unremarkable.
• Labs:
  – Platelets >1,200,000
  – H/H 10.8/33.3, MCV 66 (Hx of Barts)
  – BMP, LFTs, UA WNL
  – ESR 37
  – CXR c/w RAD
• GI consulted- NG feeds started and well-tolerated
• Feeding Team evaluated her- severe feeding aversion- recommended intensive OP feeding therapy
• More labs :
  – HIV neg, PPD neg
  – Thyroid WNL
  – Vit D 25-OH 20 (low), iron WNL
  – UGI, abd US WNL
• Noted to suck sippy cup constantly, regardless of contents.
• Caries noted- dentist consulted
• 8 abscessed teeth extracted, 2 teeth sealed
• Uneventful post-op course
• Eating small amounts of solids at discharge, still requiring NG feeds
• For OP feeding therapy

• Chicken or Egg?
• Pediasure or caries?
• Treatment was almost a full mouth extraction
• Failure to thrive; usually rebound within 30 days if dental and get treatment
• Require close follow up
• Risk level for new disease does not go down
• Coverage for prevention is limited in Georgia
• Eliminate dental as a possible cause of FTT
• Do not look past the teeth with feeding problems

Urgent Call to the ED for Dental Trauma

• 13 YO female.
• A little overweight
• She fainted at school, fell down, and has an Ellis class II fracture of tooth 8. The tooth was stained on the lingual and thin.
• The lingual sides of all maxillary and some mandibular teeth show significant erosion.
Medical Eval

- Labs pending; no diagnosis as to cause of fainting.
- Showed MD the erosion
- We interviewed the patient alone. She admitted to self vomiting.
- Parents were clueless
- Child admitted to Pediatrics
- Child fainted a second time in ED while we were discussing the issues.
Medical Issues

- Labs now available
- Hypokalemic hypochloremic metabolic alkalosis, c/w repetitive vomiting
- Borderline hypoglycemia
- EKG- sinus bradycardia

Plan for dental treatment once medically stabilized
- Currently not a good anesthesia candidate
- Cardiovascular complications account for most of the morbidity and mortality associated with anorexia nervosa.
- May see:
  - Prolonged QT
  - Sinus bradycardia
  - ST-segment elevation
  - T-wave flattening
  - Low voltage
  - Rightward QRS axis.
Dental damage characteristic of eating disorders

- Mechanical wear
  - Tooth grinding
  - Excessive brushing
  - Receding gums, so far to expose roots of teeth to acid

- Chemical damage
  - Enamel thins from exposure to excess acid
  - Molars eventually lose shape and height and become flattened.
  - Bulimia- stomach acids in contact with teeth, usually inside of lower molars.
  - Over time, the enamel will disappear totally on the insides of the teeth.

Urgent Call To the ED

- Child screaming in pain and pointing to mouth.
- 5 year old, otherwise healthy.
- VSS
- Multiple caries and fractured teeth seen.
- Asymmetric dental eruption pattern.
- Pain seems to be excessive for dental findings.
- Labs unremarkable
- x-rays showed periodontal disease all over posterior.
Treatment

- Anterior teeth extracted due to caries.
- Canines restored.
- All 8 primary molars needed extraction due to caries and lack of bone support.
- First molar extraction was too easy. Second one done with fingers and not forceps.
- Teeth were “Floating.”
- Took lateral skull film in OR...

Clinical Presentation
Lytic Skull Lesions

- Dental lesions were well curetted, irrigated, and closed in the areas of the bone loss.
- Biopsies done
- Heme/Onc consulted

Langerhans Cell Histiocytosis
Eosinophilic granuloma, Letterer-Siwe syndrome and Hand-Schüller-Christian syndrome

- Important! Oral manifestations may be among the earliest signs of the disease
- Asymmetric eruption of complete dentition and ectopic eruption of permanent molars.
- Pain and swelling of face
- Loosening or loss of teeth
- “Floating” teeth
- Mouth ulcers, swollen or bleeding gums
- Cervical lymphadenopathy
• Bacterial milieu of the mouth predisposes to secondary infections, so lesions of histiocytosis are often erroneously diagnosed as periodontal disease
• When these lesions occur in children, they may be mistaken for prepubertal periodontitis

-Lesions in the mandible show a definite radiolucent image which may mimic both juvenile and severe periodontal disease.
-The mandible is more frequently affected than the maxilla, with most of the lesions occurring in the molar area.
-Destruction of lamina dura results in the radiographic appearance of "floating teeth"
He always spits up

- 18 month old, ex-premie
- Long history of spitting up and formula intolerance as infant
- Followed by GI, on omeprazole
- UGI normal
- At 18 month check up, poor appetite for solid food noted
- Bottle gone, but sippy cup popular
- Exam unremarkable except........

Erosion Vs Attrition

- Acid Erosion
- Attrition
Gastroesophageal Reflux Disease

- Chronic regurgitation of gastric acids ⇒ dental erosion
- Dental enamel begins dissolving at a pH of 5.5 (pH of stomach acid is 2 or less).
- Chronic exposure to the acid begins to thin and dissolve dental enamel, exposing sensitive inner dentin layer of the tooth
- Exposed dentin leads to:
  - Pain or irritation in the mouth
  - Sensitivity to certain foods and drinks, especially hot, cold, or sweet
  - Sharp tooth edges
  - Thinning or shortened teeth
  - Darkening teeth

- 15 of 17 children newly diagnosed with GERD had erosive lesions, and half had dentin exposure.
  - Aine, Baer, and Maki, 1993
- 17% of children receiving treatment for GERD had dental erosions
  - O'Sullivan, Curzon, Roberts, Milla, & Stringer, 1998
- In both studies, the dental erosion affected the lingual surfaces of the maxillary teeth
  - Alfaro et al., 2008
Developmental Delay

• For many kids with DD a smile is their most effective way of interacting with the world.
• More likely to have unmet dental needs
• Greater risk of developing dental disease

Developmental Delay

• On liquid medications (high in sugar) for a long time
• Cannot use tongue to clean teeth
• Difficult to adequately brush
• Rely on caregiver for dental hygiene
• Can’t tell you if they have dental pain
• Pureed foods stick to teeth
• May have G tube, so oral pH may be different, may have inadequate saliva
• Bruxism, leading to occlusal trauma, tooth fractures, gum recession
• Difficult to adequately examine in the office
• Oral aversion
• Transportation difficulties
Developmental Delay- Barriers to care

• 5000 pediatric dentists in US
• 11.2 million children with special healthcare needs in US
• Many dentists do not accept Medicaid
• Other healthcare needs seem more urgent to caregivers
• Sedation often needed, and kids with DD may have exaggerated unpredictable responses to sedation and anesthesia

Natal Teeth

• Present in about 1-2,000-3,000 live births.
• Can interfere with nursing or feeding.
• Can be a swallowing or aspiration risk
• Teeth can be extracted with nothing, sugar water, or topical only.
• Must watch them feed after extractions. Warn parents if child does not feed, then there is a chance of going to ED or hospital. Weak, premature, and sick babies have a higher chance of issues.
Granular Cell Tumors
Granular Cell Tumors (congenital epulis)

- Rare soft-tissue mass arising from alveolar ridge
- Usually incisor-canine area of the maxilla
- 98% benign, 2% malignant
- Interferes with feeding and breathing
- May spontaneously regress
- Recommended treatment is surgical excision

Alveolar Fractures

- 8 YO F fell off slide, landed on mouth
- Saw dentist, teeth loose but OK
- ED 2 days later, dehydrated, won’t eat or drink due to pain
- Be suspicious of an alveolar fracture, if you see pain out of proportion to oral injury
- Often missed on exam in ED or office
- Radiologist are MDs (not dentists) and may miss alveolar fx on x-rays
Alveolar Fracture
Alveolar Fracture Management

- Correct dehydration, electrolyte imbalances first
- Primary teeth
  - extraction
  - collagen to keep width
  - finger reposition bone, and suture.
- Adult teeth
  - splint or braces
  - possible root canals, and suture lacerations.
- Delayed treatment leads to poor dental outcomes, dehydration, and pain.

Organ Transplant Dental Complications

- Waiting on a heart... must come off the transplant list
- After an acute liver, one extraction can be deadly..
- During oncology treatment, dental issues can cause a central line infection, blood stream infection, or confuse the diagnosis of the patient.
Organ Transplant Complications

Infant Mandibular Distraction

- Accepted treatment for micrognathia/airway obstruction
- Pierre Robin Sequence
- Treacher Collins
First Long-Term Follow Up 2015- CHOA

- There is a zone of risk that includes the primary second molar and the 6 year adult molar.
- Iatrogenic damage is highly likely.
- Radiographs need to be done by age 5 and a plan made.
- Delay of diagnosis and treatment leads to poor or less favorable outcomes.
- Each child must have a plan.
PHM 2016 Top Ten Articles- Dental Implications

• Hollis, B.W., et al., Maternal Versus Infant Vitamin D Supplementation During Lactation:


What should you remember?

• Don’t forget to look at the teeth!
• There are dental clues to medical illness.
• There can be hidden dental illnesses that masquerade as medical illnesses.
• There can be medical illnesses that were triggered by dental infections.
Conclusion

- Pediatric dental care is a team sport
- Pitcher and catcher
- Different skill sets
- Can’t work without each other