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Health Sciences Clinical Professor of Pediatrics
David Geffen School of Medicine at UCLA

What is this lecture about?

- Pediatric – exclusive to or commonly seen in kids
- Not a Zebra (ie something I've either seen during my career or know has been seen in our PED)
- Not a horse either – ie something you may make it through training without seeing
- Emergency practitioner can make the diagnosis or at least suspect it
- Emergency practitioner *should* make the diagnosis or at least suspect it, and can make a difference by either getting diagnostic studies, appropriate consultations, and starting initial management or by not doing unnecessary work-up

Quick info in 3 slides

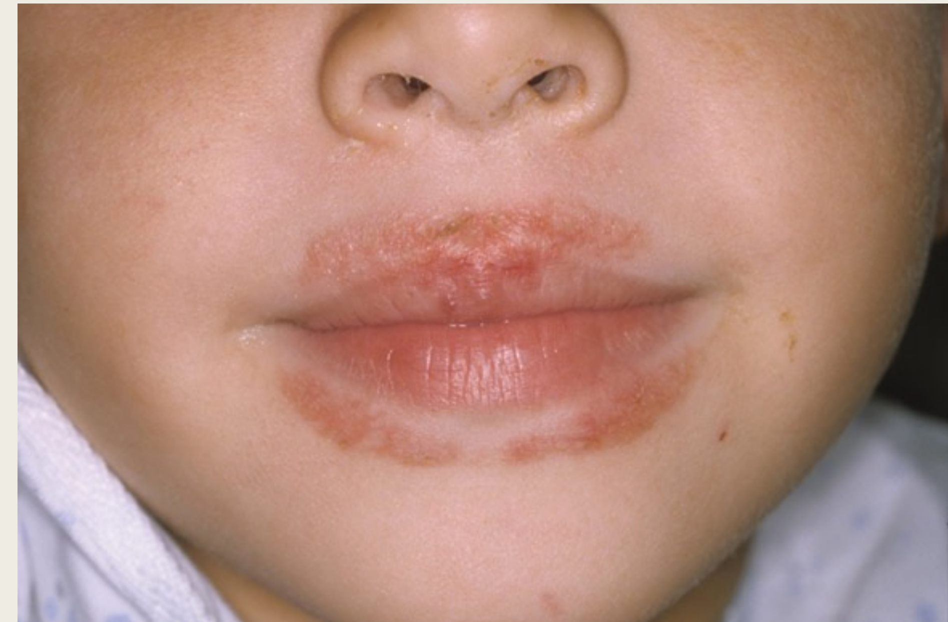
- Classic case – build on illness scripts to reinforce when you should suspect this entity
- What should make you suspect this diagnosis
- Basics of diagnosis and ED management
- You can look it up for more detail, but you can’t look it up until you at least suspect it
- FOAM resources for additional readings

How to use this lecture

- After the initial case presentation, think about the differential diagnosis
- Helpful framework: SPIT
  - *What is the most Serious diagnosis?*
  - *What is the most Probable diagnosis?*
  - *What is the most Interesting diagnosis?*
  - *What is the most Treatable diagnosis (ie what diagnosis should the EP do something about ASAP)?*
- Write down what you think is the diagnosis – commit!
  - *At the end, see how many you got right*

5 year old girl with rash around the mouth

- 5 year old girl presents with 2 weeks of worsening rash around her mouth
- It is not itchy or painful, no fever
- Previously healthy
- Denies new food, lotion, soap, etc.
- Temp 37.6, HR 90, RR 24, BP 86/40, exam other than rash as shown normal



http://www.crutchfielddermatology.com/caseofthemonth/studies/l_2008_012.asp

5 year old boy with altered mental status, seizure, cranial nerve palsies

- 5 year old previously healthy boy brought in by EMS for progressive altered mental status x 2 days, after having a 3 minute generalized tonic-clonic seizure that self-resolved. Blood sugar 100 in the field
- He had a viral URI 10 days ago with fever, cough, sore throat, and had recovered after 5 days of symptoms
- VS: temp 38.1, HR 120, RR 24, BP 85/43, O2 sat 99% room air
- PE significant for GCS 10 (E4, V2, M4), left abducens palsy, left facial palsy (ptosis, facial droop), weakness bilateral lower extremities with upgoing Babinskis

5 year old boy with sudden onset stridor

- 5yo boy brought in at 3am
- Awoke with sudden onset croupy cough and stridor at rest
- Similar event has happened twice before, and mom states, “he has the croup again”
- Non-toxic appearing, temp 37.5, HR 110, RR 24, BP 85/35, O2 sat 97% room air
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- 5 year old boy fell from monkey bars on first day of kindergarten
- Previously healthy, no fevers
- Has left forearm pain and mild deformity
  - *Distal neurovascular intact*
  - *Tender only at mid forearm; wrist, hand, elbow, humerus nontender*
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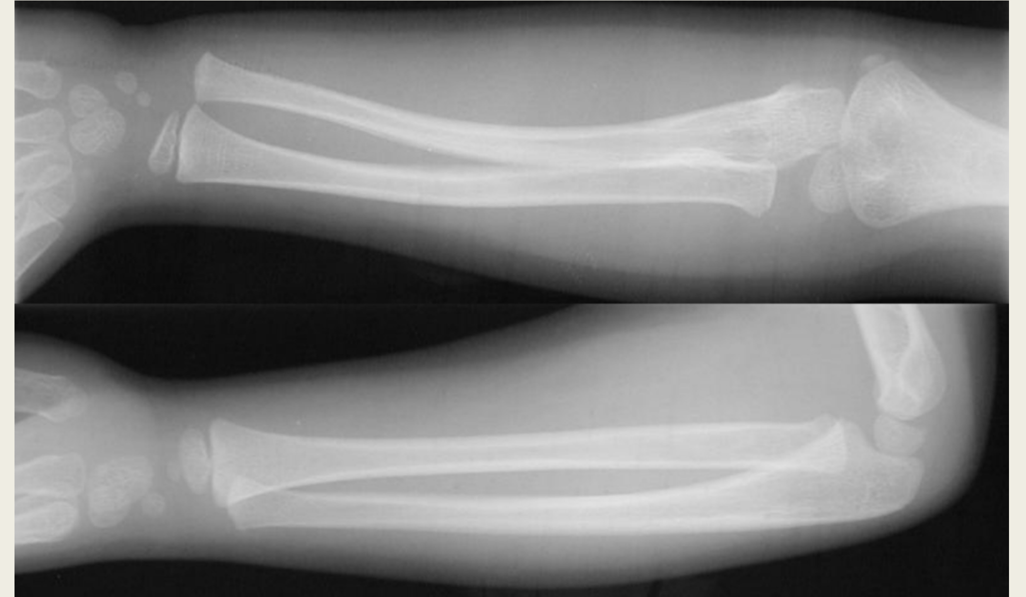

https://www.hawaii.edu

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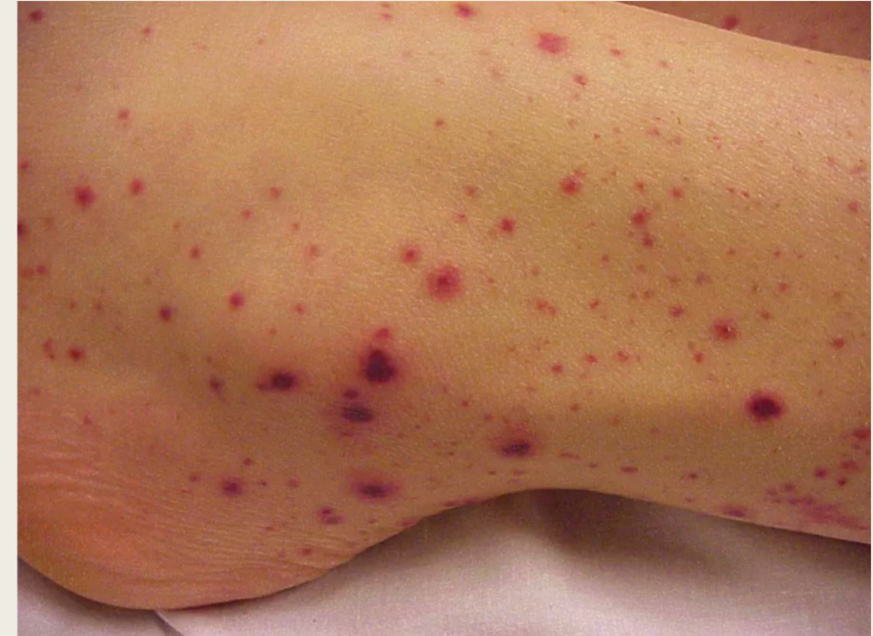
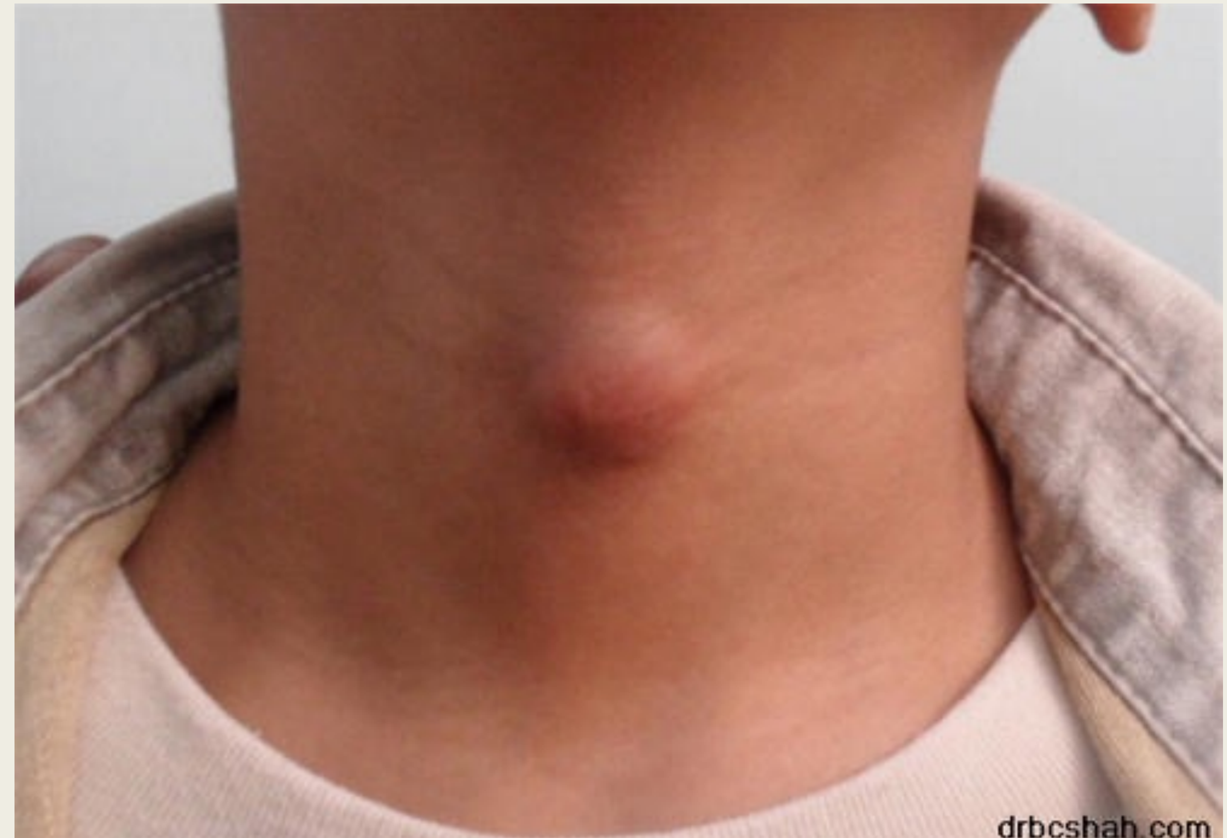


http://pemcincinnati.com/blog/briefs-itp/

6 year old with neck lump

- 6 year old boy with a neck lump x 4 days
- Nontender, mobile, cystic, midline, no drainage, no redness, no fever
- Patient has not had this before
- When patient sticks out his tongue, the mass moves upwards



indiamart.com

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- Still attending school and participating in activities, although limp is more prominent lately
- On exam, mild pain with passive range of motion, some limitation of internal rotation and abduction

6 year old girl with tongue lesions

- 6 year old girl sent home from school due to school nurse noted tongue lesions
  - *Note states rule out thrush, herpangina, or other contagious disease*
- Family is unsure how long her tongue has had these lesions
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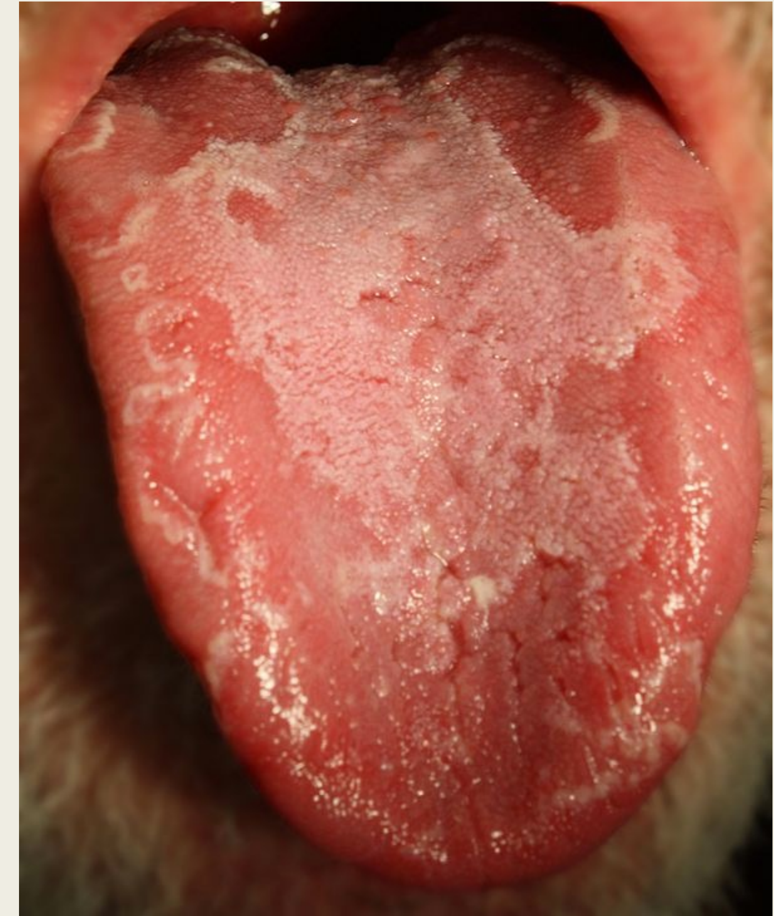

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- He complains of pain over the lumbar spine
- Tactile fevers only
- No h/o trauma, recent illness
- On exam, temp 37.9 C, HR 90, RR 20, BP 92/40
- Tender over lower lumbar spine at midline and paraspinal, no stepoff
- Lumbosacral spine series performed and shows only loss of normal lumbar lordosis

6 year old with bilateral leg weakness

- 6 year old boy first complained of fatigue and bilateral leg pain yesterday
- Progressed to increasing weakness to the point that he cannot walk now
- Parents also feel his face looks a little droopy R>L, and he is drooling some, which is not normal for him
- Negative PMH. No trauma, no fever, no headache except child did complain about a bump on his occipital scalp that bothered him, no vomiting. Went hiking with family 6 days ago.
- VS: Temp 37.5, HR 90, RR 24, BP 88/35, O2 sat 99% room air
- Alert, bilateral facial nerve palsy R>L, difficulty swallowing, bilateral lower extremity weakness with no deep tendon reflexes

Did you write down what you thought the answers were? Answers on following slides

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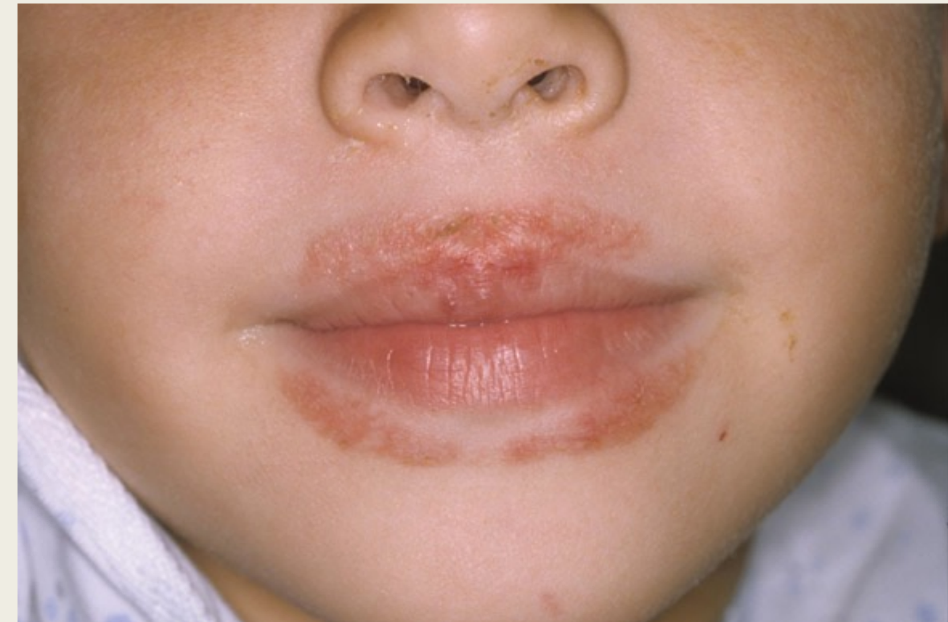

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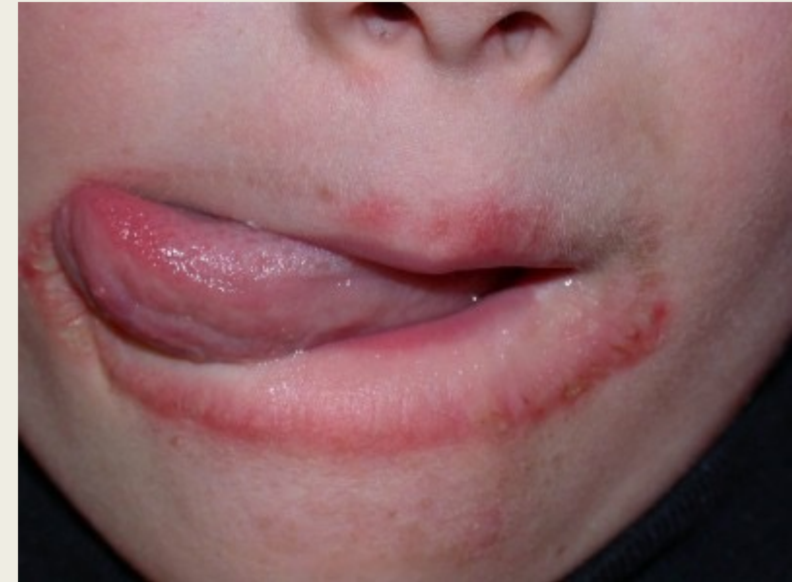
Liplicker's dermatitis – suspect it

- Usually dry winter months, child develops habit of licking chapped lips
  - *Observe for child licking lips during ED visit*
- Most common in preschool and early school age children
- Ddx includes perioral contact dermatitis to: pacifiers (trapped drool), musical instrument mouthpieces, lip balm & lipstick, foods, lotions, soaps, other topical agents
  - *Lip balm addiction can be similar to liplicker's dermatitis -> vicious cycle of dry chapped lips, patient applies lip balm to treat, dermatitis develops in reaction to lip balm, patient applies more lip balm*



http://www.dermatalk.com/blogs/skin-disorders/lip-lickers-dermatitis/

Liplicker's dermatitis – diagnose and manage it

- Must convince patient that the rash is due to lip-licking or lip balm
  - *They expect these things to help the rash, and they are actually causing the rash*
- Stop the offending activity
- Apply a mild topical corticosteroid
- Apply a bland emollient such as vaseline
  - *This will help serve as a reminder to not lick*
- Encourage hydration and moisturization through drinking sufficient water, using a humidifier
- Treat any nasal congestion or other symptoms leading to mouth breathing
- For more info: http://www.crutchfielddermatology.com/caseofthemonth/studies/l_2008_012.asp

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Acute disseminated encephalomyelitis (ADEM) – suspect it

- Incompletely understood autoimmune-caused demyelination of CNS
- Pre-pubertal children most commonly, peak at 6-8 years of age
- Usually recovered from a febrile illness in the last 4 weeks (or post-immunization)
  - *Especially associated after measles infection*
- Neurologic symptoms start 2-21 days after recovery
  - *Encephalopathy with altered mental status ranging from lethargy to coma*
  - *Cranial neuropathies, especially facial nerve, optic neuritis*
  - *Ataxia, weakness, paresis, sensory deficits*
  - *May have headache, seizures, meningismus, personality changes*

ADEM – diagnose and manage it

- CT scan are often normal but may show low density abnormalities
  - *Obtained in ED to r/o other causes of neurologic dysfunction*
- MRI bilateral asymmetric poorly demarcated lesions deep in subcortical white matter
- LP shows mild increase in WBC, RBC, protein
  - *IgG synthesis, CSF:serum IgG index, oligoclonal bands to r/o multiple sclerosis*
- Admit and consult neurology for further management
  - *Treated with high dose IV steroids, sometimes IVIG, plasma exchange*
- Prognosis is good with most sustaining complete recovery over 1-2 months
  - *Increased risk of developing multiple sclerosis in the future, however*

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Spasmodic croup – suspect it

Classic viral croup

- Toddlers
- Viral URI prodrome
  - *A few days of typical "cold" symptoms before develops barking cough and stridor*
- Worsened at night
- Parainfluenza most common etiology

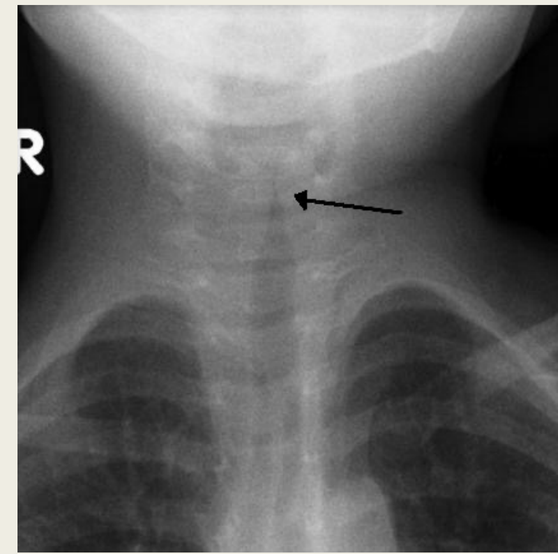
Spasmodic croup

- Often older children
- No viral URI prodrome
  - *Completely well before going to bed*
- Sudden onset, often middle of the night
- May be recurrent
- Possible allergic component

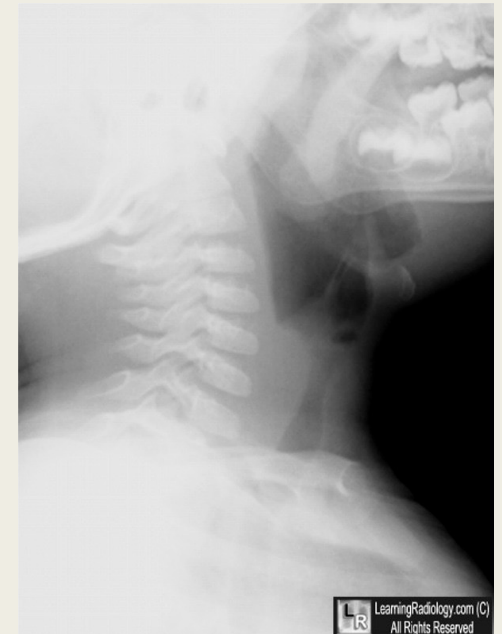
Listen to croup here: http://mommyhood101.com/croup-audio-clips

Spasmodic croup – diagnose and manage it

- Clinical diagnosis – no imaging necessary
  - *Ddx from bacterial tracheitis: ill-appearing, high fever*
- If xrays obtained (eg to r/o suspected complication such as concomitant pneumonia)
  - *AP: steeple sign shows narrowing of upper airway*
  - *Lateral: subglottic narrowing and ballooning (overdistension) of hypopharynx*
- Often rapidly responsive to racemic epinephrine nebulization +/- dexamethasone po
  - *Widen differential & admit if not responsive to therapy*
- For more info: https://www.youtube.com/watch?v=-1tPwNz628g&app=desktop



en.wikipedia.org



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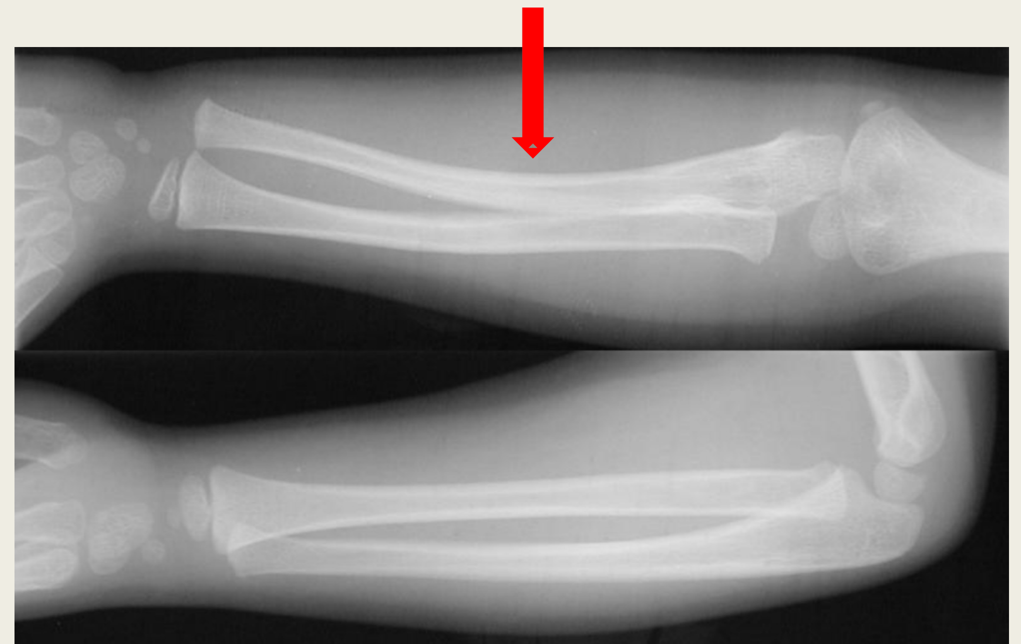
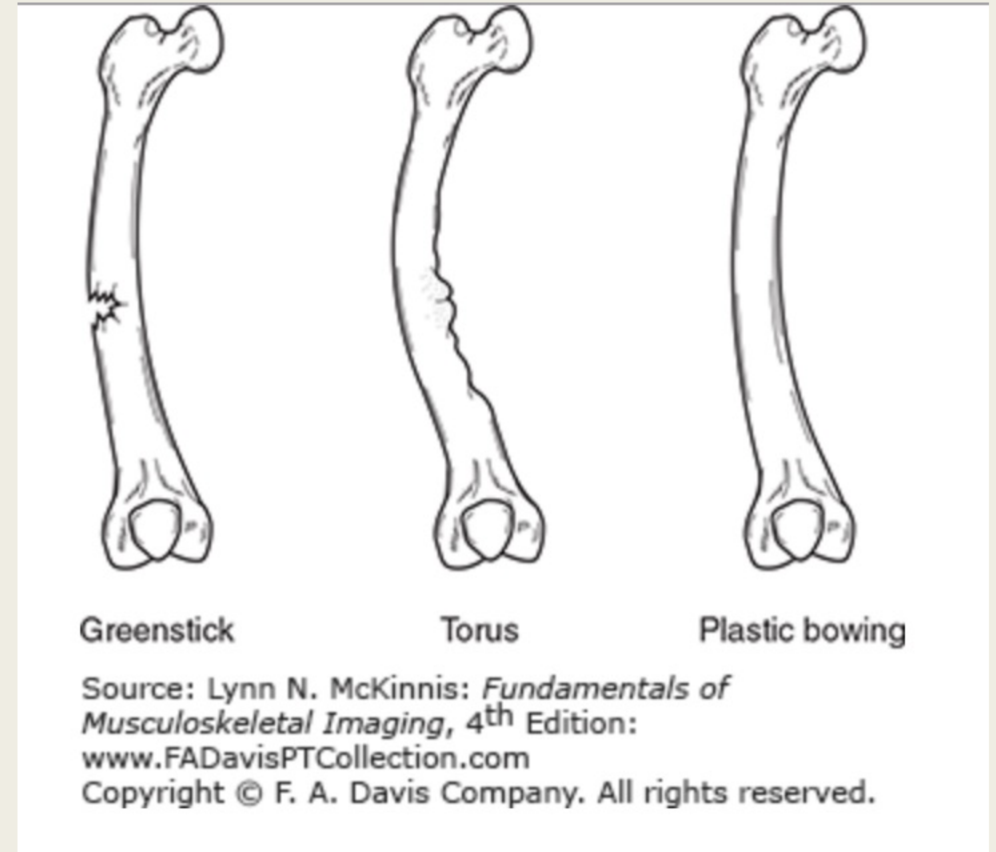


https://www.hawaii.edu

Plastic deformity / bowing fracture – suspect it

- Commonly in children
- Commonly involves the ulna
  - *May have visible fracture of the radius and bowing of the ulna*
- Mechanism of injury and physical exam suspicious for fracture but no cortical disruption seen on radiograph
  - *Look carefully for bowing*



Source: Lynn N. McKinnis: *Fundamentals of Musculoskeletal Imaging*, 4th Edition: www.FADavisPTCollection.com
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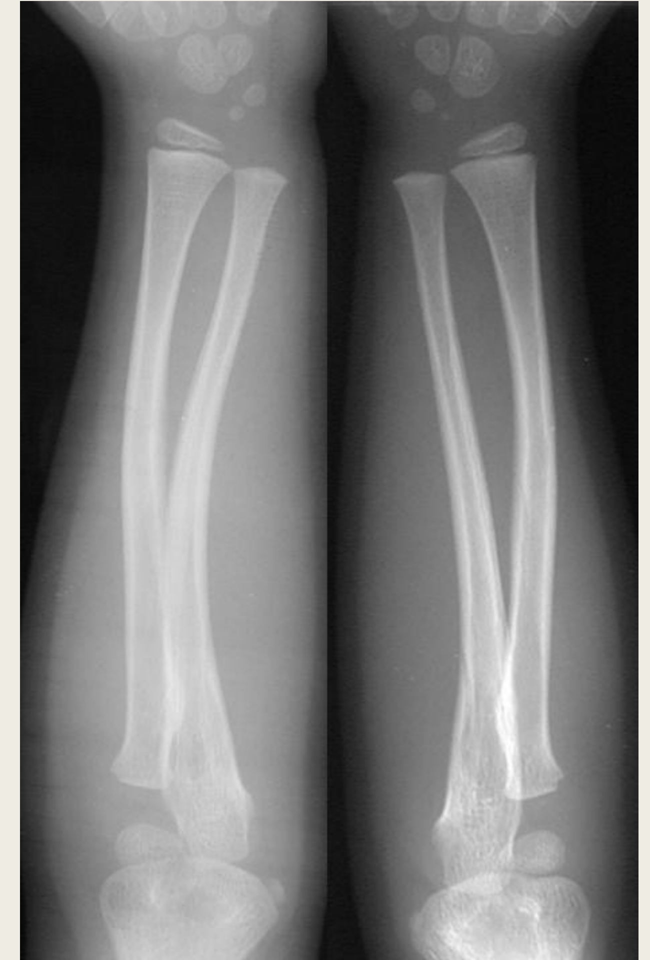
Plastic deformity / bowing fracture – diagnose and manage it

- If unsure, consider comparison film of unaffected side to compare degree of bowing
- Consult orthopedist for further management
- Younger (< 6 years old) and < 20 degrees bowing less likely to require reduction
- May require closed reduction, casting
- For more info: https://www.hawaii.edu/medicine/pediatrics/pemxray/v6c16.html and https://musculoskeletalkey.com/diaphyseal-radius-and-ulna-fractures/



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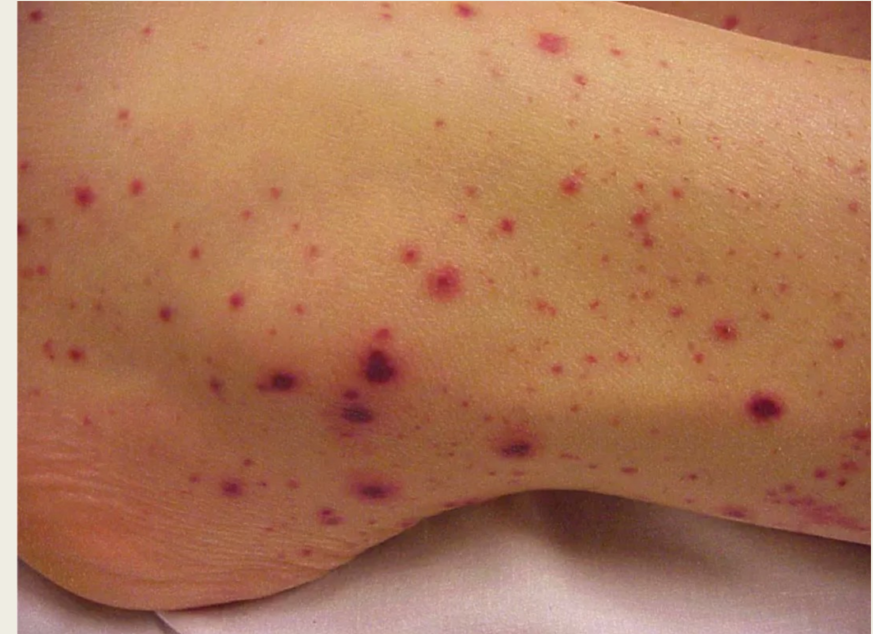

http://pemcincinnati.com/blog/briefs-itp/

Immune thrombocytopenic purpura – suspect it

- Due to autoantibodies destroying patient’s own platelets
- In children, often a few weeks after a viral illness
- Peak incidence age 1-6 years (but any age), boys > girls
- Defined as platelet count < 100,000 with normal hemoglobin, WBC and differential, and no other discernible cause for thrombocytopenia
- >80% children recover spontaneously without treatment
  – *Small percentage develop chronic ITP*
- Serious complications (eg intracranial hemorrhage, fatal bleeding) in 3%
  – *Higher risk if “wet purpura” = mucosal purpura*

Immune thrombocytopenic purpura – diagnose and manage it

- CBC with differential and peripheral smear shows isolated thrombocytopenia
- If at risk for alternative cause (eg HIV, SLE), work-up for those
- CT head if suspect possible intracranial hemorrhage, and manage accordingly
- Consult with hematologist for management
- If asymptomatic and no active bleeding, may observe
- Treatment may include corticosteroids, IVIG or IV Rhogam in Rh+ patient
- For more info: http://pedemmorsels.com/itp-immune-thrombocytopenia-purpura/ and http://pedemmorsels.com/wet-purpura-and-itp/ and http://www.emdocs.net/immune-thrombocytopenic-purpura-pearls-pitfalls/

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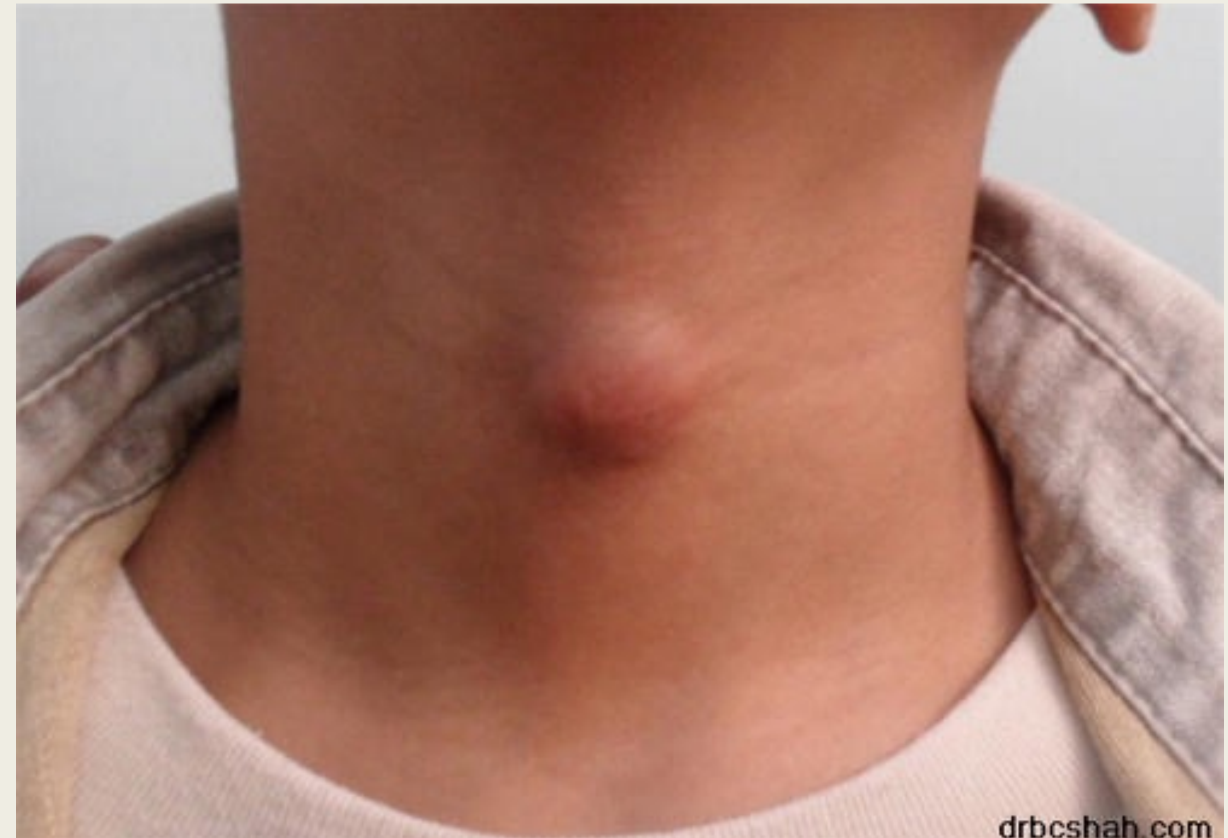
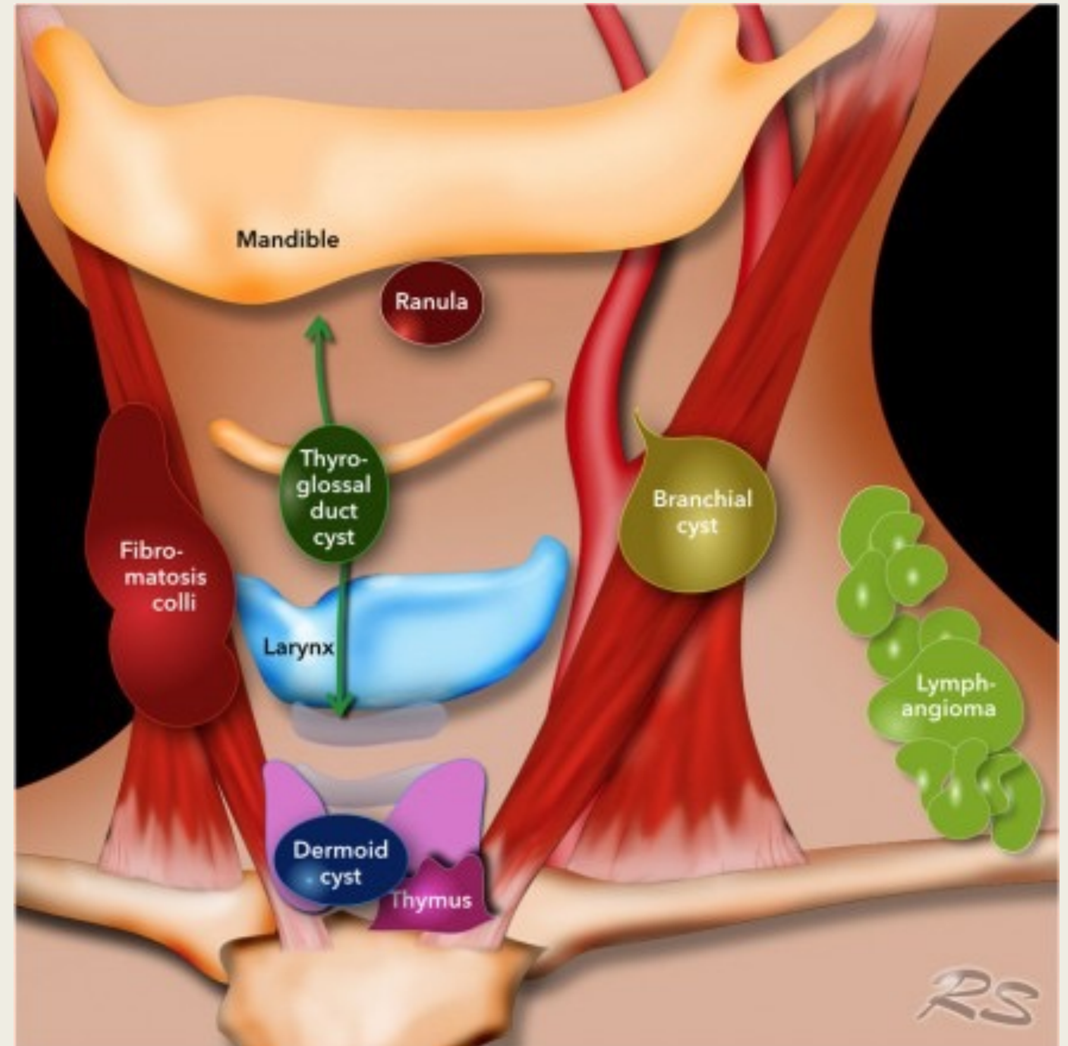


indiamart.com

Thyroglossal duct cyst – suspect it

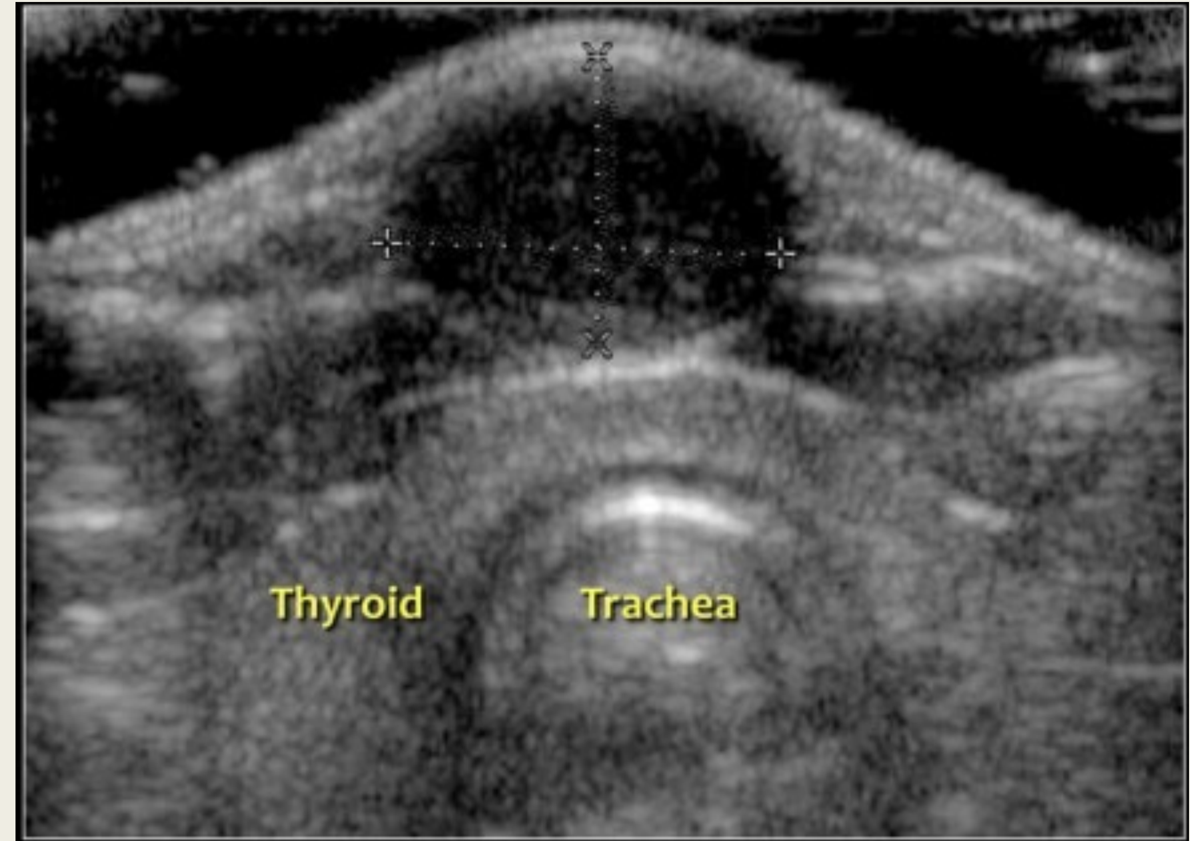
- Midline neck cyst, often moves with swallowing or tongue protrusion
- 90% present at < 10 years old, peak age 6 years
- May present with acute infection – redness, warmth, tenderness
- Branchial cleft cysts lateral
- Ranula floor of mouth
- Cystic hygroma usually posterior triangle
- Dermoid cyst midline but lower



radiologyassistant.nl

Thyroglossal duct cyst – diagnose and manage it

- Clinical diagnosis based on location
- Ultrasound may help demonstrate cystic nature
- Treat superinfection if present with antibiotics
  - *Augmentin or Clindamycin*
- Refer to ENT for surgical removal
- For more info: https://radiopaedia.org/articles/thyroglossal-duct-cyst and http://pedemmorsels.com/pediatric-neck-mass/



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- No fever, limp was initially intermittent, is described as a lurching gait
- Still attending school and participating in activities, although limp is more prominent lately
- On exam, mild pain with passive range of motion, some limitation of internal rotation and abduction

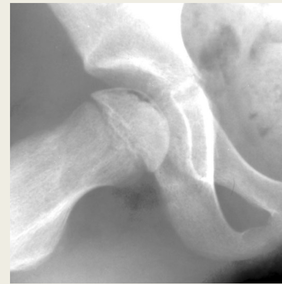
Legg-Calves-Perthes - suspect it

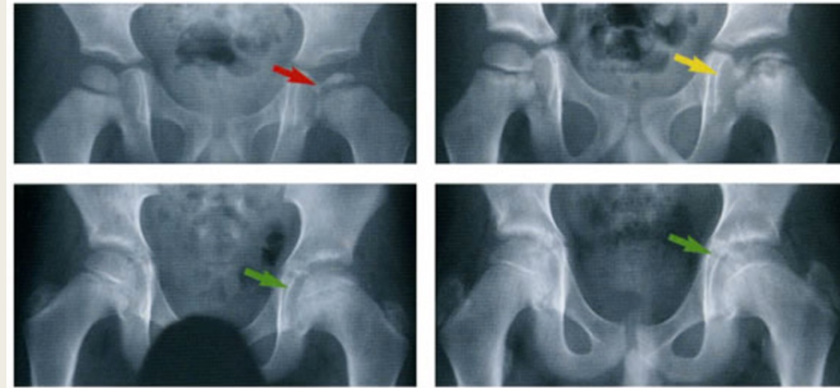
- Idiopathic avascular necrosis of the femoral head, usually unilateral (90%)
- Age 4-10 years, boys 4:1, often painless intermittent limp (especially after exertion)
- Gradual onset over weeks to months of hip pain, limp, antalgic gait, decreased range of motion
- Most kids in general have h/o minor trauma – may be red herring
- No fever, may remain active, gait often described as abductor lurch (trunk tilts toward the affected side) aka Trendelenburg gait
- Hip pain may refer to knee or thigh (always suspect the hip when a child c/o knee or thigh pain)
- Decreased ROM, particularly of internal rotation and abduction

http://www.oandp.org

Legg-Calves-Perthes – diagnose and manage it

Crescent lucency: https://www.med-ed.virginia.edu/courses/rad/peds/ms_webpages/ms3eleggcalve.html





http://www.seattlechildrens.org/medical-conditions/bone-joint-muscle-conditions/hip-conditions-treatment/hip-disorders/legg-calve-perthes-disease/

- Order AP and frog-leg lateral views of the pelvis
  - *Do not order unilateral hip xrays, because you need to compare to the unaffected side*
  - *Early findings: widened joint space due to effusion, crescent-shaped subchondral lucency in femoral head, asymmetry of the femoral heads*
  - *Later findings: flattening and increased density of the femoral head, fragmentation*
- Consult orthopedics, make non-weight bearing while in the ED (including if highly suspected, as you send patient to the xray suite)
- For more info: http://pedemmorsels.com/legg-calve-perthes-disease/ and https://radiopaedia.org/articles/perthes-disease and on limp http://pemplaybook.org/podcast/please-just-stop-limping/

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  - *Note states rule out thrush, herpangina, or other contagious disease*
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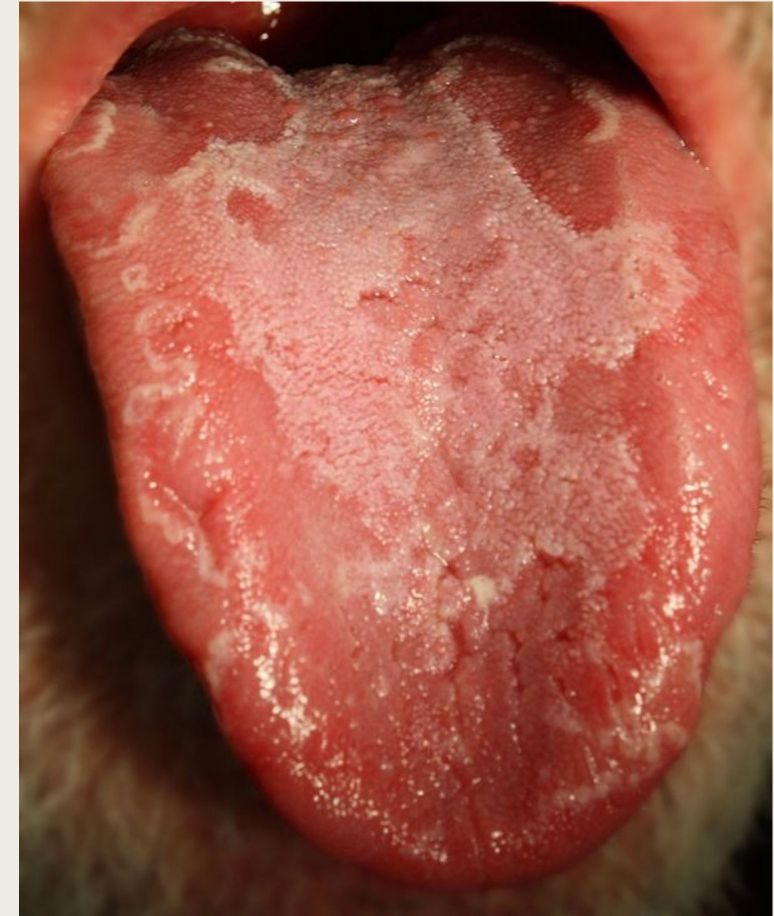
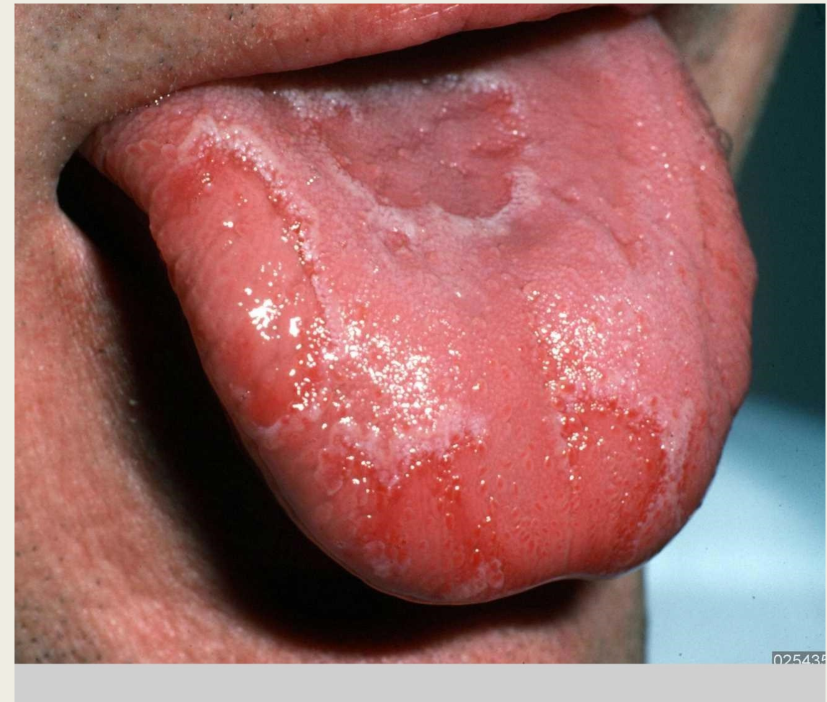


Geographic tongue – suspect it

- 3% of the population affected
- Females > males 2:1, no ethnic differences
- Often noted incidentally
- May c/o burning or irritation to tongue with ingestion of spicy foods
- Well-demarcated smooth (due to loss of papillae) areas of erythema on the tongue with yellow—white serpiginous borders (may resemble countries on a map)



www.dermquest.com

Geographic tongue – diagnose and manage it

- Diagnosis is clinical based on presentation (asymptomatic or only discomfort with spicy foods) and characteristic clinical features
- Ddx from thrush: white coating, typically inside cheeks and sometimes on tongue, usually in infants through age 6-9 months old, occasionally in immunocompromised older patients
  - *Does not rub off when scraped with a tongue blade; neither does geographic tongue, but milk residue does*
- Reassurance and education are the main treatments for geographic tongue
- For more info: http://pemcincinnati.com/blog/geographic-tongue/

Thrush

http://thrushtreatmentcenter.com/oral-thrush-symptoms/

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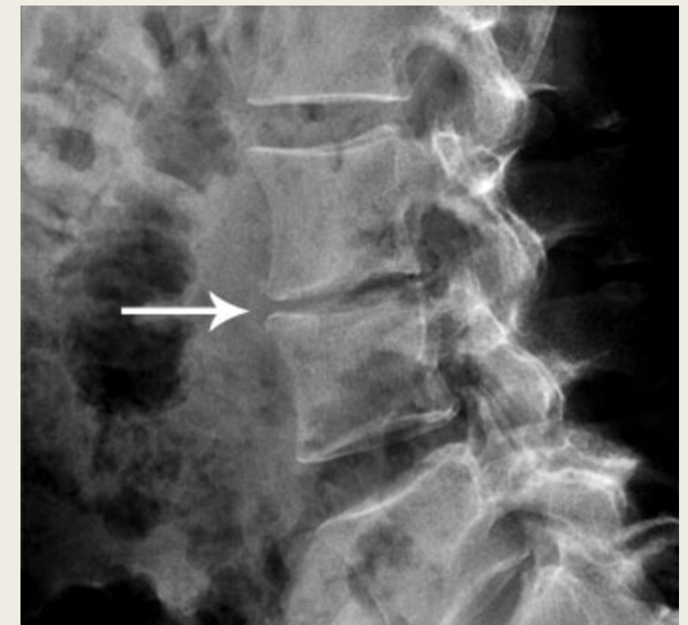
- Tender over lower lumbar spine at midline and paraspinal, no stepoff
- Lumbosacral spine series performed and shows only loss of normal lumbar lordosis

Discitis – suspect it

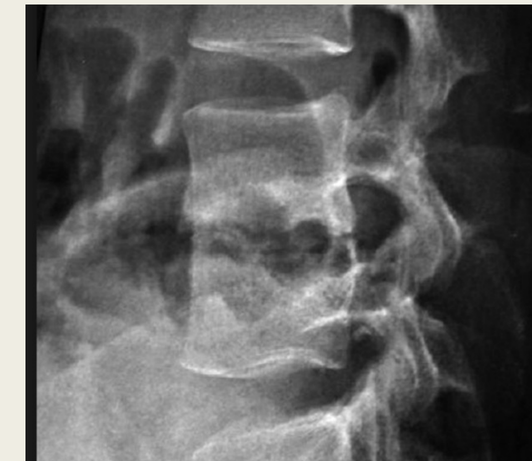
- Inflammation and sometimes infection of disk space
  - *If due to a bacterial infection, thought to be from hematogenous spread*
- Pediatric diskitis occurs in young children, mean age 7 years
- Lumbar spine by far most common, although may occur in cervical, thoracic spines
- Back pain, reluctance to walk, stiffness / refusal to flex back
- Younger children may present with irritability and refusal to walk
- Fever either not present or low-grade
- On exam, localized tenderness to lumbar spine, may have spasms and tenderness to paraspinal muscles, decreased range of motion, holding back in straight position and resisting flexion

Discitis – diagnose and manage it

- Plain films don't show much until 2-3 weeks after onset
  - *Earliest: loss of normal lumbar lordosis*
  - *Disk space narrowing and endplate erosion*
- Diagnosis confirmed by MRI
- CBC, ESR/CRP, Blood cultures (rarely positive)
- Empiric anti-staphylococcal antibiotics as inpatient
  - *Diskitis not always thought to be bacterial infection etiology, but can't ddx from vertebral osteomyelitis initially*
- Bed-rest, immobilization if possible, orthopedics and infectious diseases consult, pain management
- For more info: http://www.learningradiology.com/archives05/COW%20140-Discitis/discitiscorrect.htm and http://www.orthobullets.com/spine/2028/disk-space-infection--pediatric



http://www.massgeneral.org/imaging/news/radrounds/nov_dec_2006/



Sethi S et al. Indian Journal of Orthopedics 2012;46(2):246

6 year old with bilateral leg weakness

- 6 year old boy first complained of fatigue and bilateral leg pain yesterday
- Progressed to increasing weakness to the point that he cannot walk now
- Parents also feel his face looks a little droopy R>L, and he is drooling some, which is not normal for him
- Negative PMH. No trauma, no fever, no headache except child did complain about a bump on his occipital scalp that bothered him, no vomiting. Went hiking with family 6 days ago.
- VS: Temp 37.5, HR 90, RR 24, BP 88/35, O2 sat 99% room air
- Alert, bilateral facial nerve palsy R>L, difficulty swallowing, bilateral lower extremity weakness with no deep tendon reflexes

Tick paralysis – suspect it

- Thought due to effects of toxins released by an actively feeding tick
  - *Symptoms begin 4-7 days after tick attaches*
- Seen more commonly in < 10 years old (more toxin / body ratio)
- Usually begins with fatigue, irritability, muscular pain & weakness, paresthesias
- No altered mental status, headache, fever
- Progresses to ataxia, paralysis, lack of deep tendon reflexes
- May involve facial, ocular, lingual & pharyngeal muscles leading to diplopia, dysphagia, dysarthria, drooling
- Often mistaken for Guillain Barre (but typically progresses more rapidly than Guillain Barre syndrome)

Tick paralysis – diagnose and manage it

- Meticulous search for a tick is essential to diagnosis
- Look especially at scalp, axillae, interdigital spaces, buttocks
- Most patients will improve rapidly (within hours) after tick removal
  - I. holocyclus ticks are the exception
- Admit for observation – if progresses may need imaging, LP to r/o other causes, supportive care possibly including mechanical ventilation
- For more info: http://pedemmorsels.com/tick-paralysis/ and https://lifeinthefastlane.com/ccc/tick-paralysis/

http://www.southpawanimalclinic.com