



# Staying Out of Trouble in Pediatric Orthopaedics

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Chief, Division of Orthopaedic Surgery

Children's National Hospital

(BACK TO THE) **FUTURE OF PEDIATRICS**

# Disclosures

## **No conflicts to disclose:**

- No financial or business interest, arrangement or affiliation that could be perceived as a real or apparent conflict of interest in the subject (content) of their presentation.
- No unapproved or investigational use of any drugs, commercial products or devices.

# Speaker Bios



**Matthew Oetgen**

Chief, Division of Orthopaedic Surgery

- Grew up in Prince Georges County (Fort Washington, MD)
- Gonzaga College High School, Boston College, Georgetown, Yale Ortho, Texas Scottish Rite Hospital (Dallas)
- Two daughters – Grace (17 years old), Lucy (15 years old)
- Currently in the college prep/tour/concern weeds – ***any inside help would be appreciated!***
- Fight for Children's Sports Medicine Center now open!

# Musculoskeletal Complaints and Pain

- 6-8% of primary

Epidemiology of paediatric visits to pediatrician with musculoskeletal complaints more common

care Tan *et al. BMC Musculoskeletal Disorders*

Albert Tan<sup>1</sup>, Victoria Y. Strauss<sup>2</sup>, Joanne Protheroe

Musculoskeletal Pain in Primary Care Consecutive General Pediatric

Jaime de Inocencio, MD

Volume 102, Issue 6

1 December 1998



visits to pediatrician

complaints more common

for MSK **PAIN**

complaints most common

# Staying Out of Trouble – Pediatric Orthopaedics



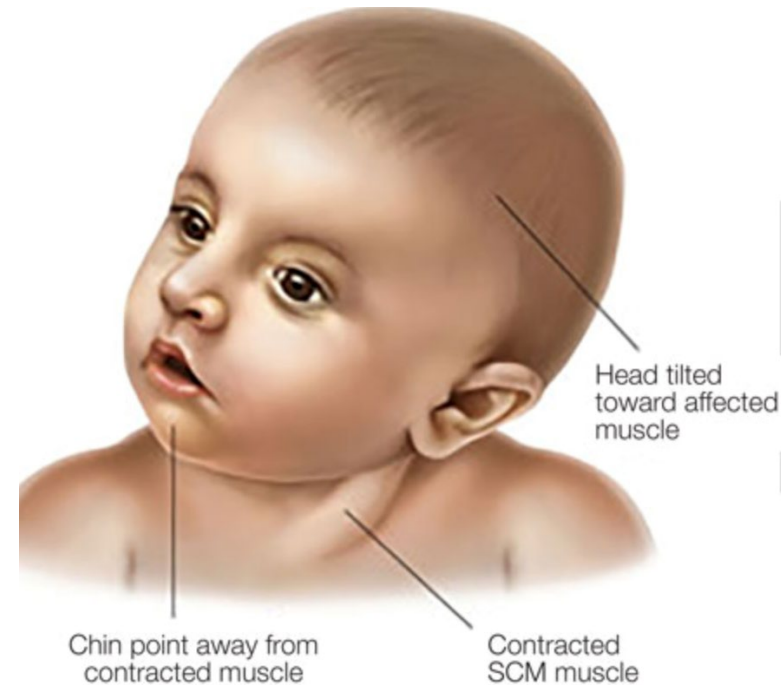
- Some common office presentations/issues
- What is appropriate for your patient
- How to ensure you “stay out of trouble”



# Torticollis



- Anatomy of SCM → dictates deformity in torticollis
- Congenital Muscular Torticollis
  - Present at birth, but sometimes not noticed until older
  - Tight SCM → tilts head to that side and turns to opposite side

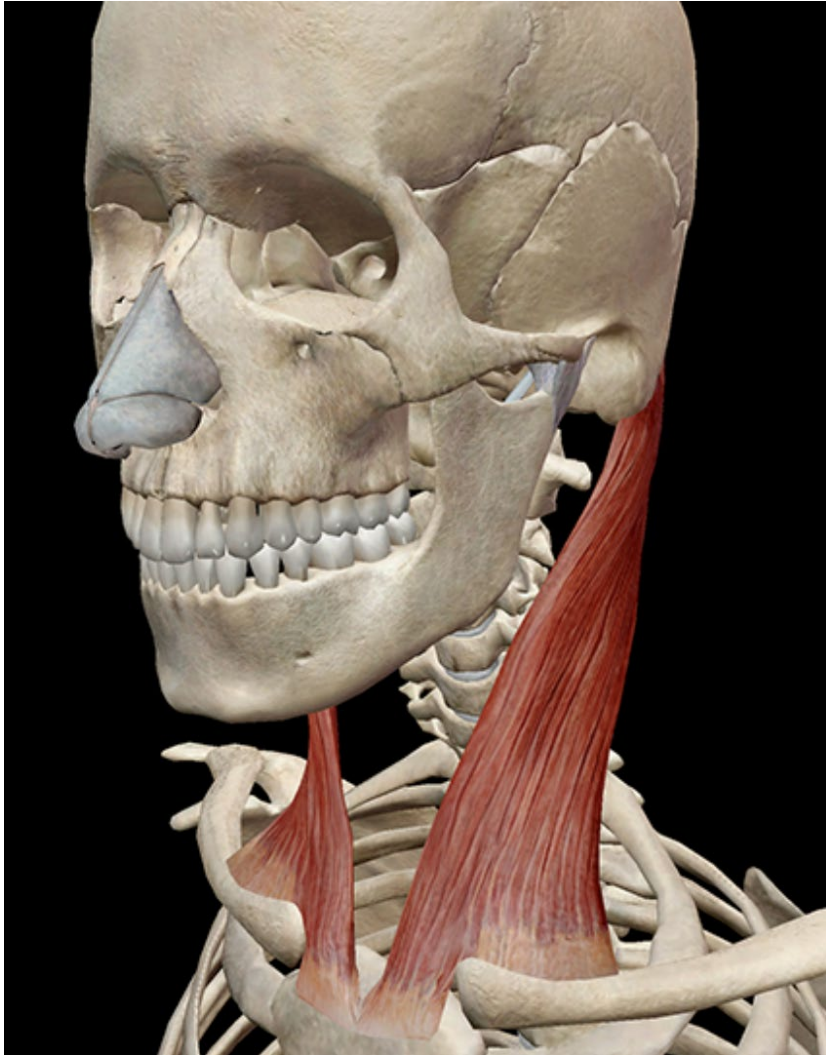




# Torticollis

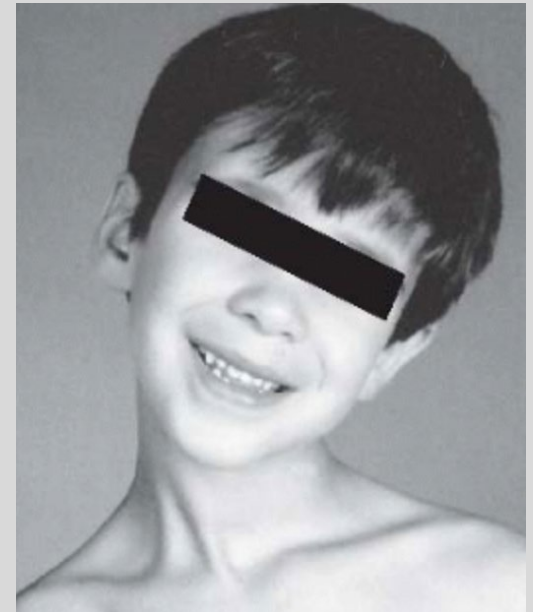


***STAY OUT OF TROUBLE***

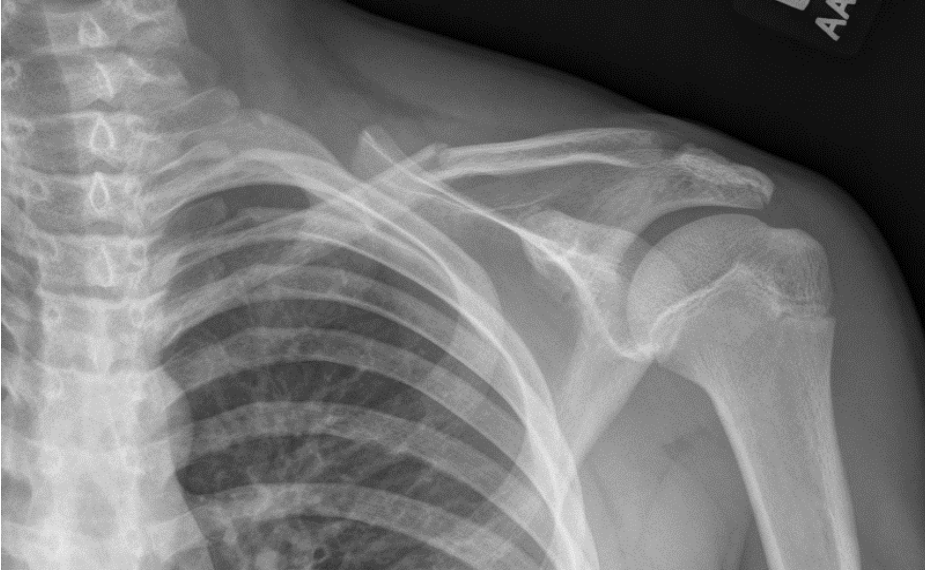


- Tight SCM with reverse deformity
  - SCM is working to stabilize some sort of pathologic deformity!
    - Atlanto-axial rotatory instability
    - Cervical fracture
    - Cervical instability
    - Infection

***Further work up needed!***



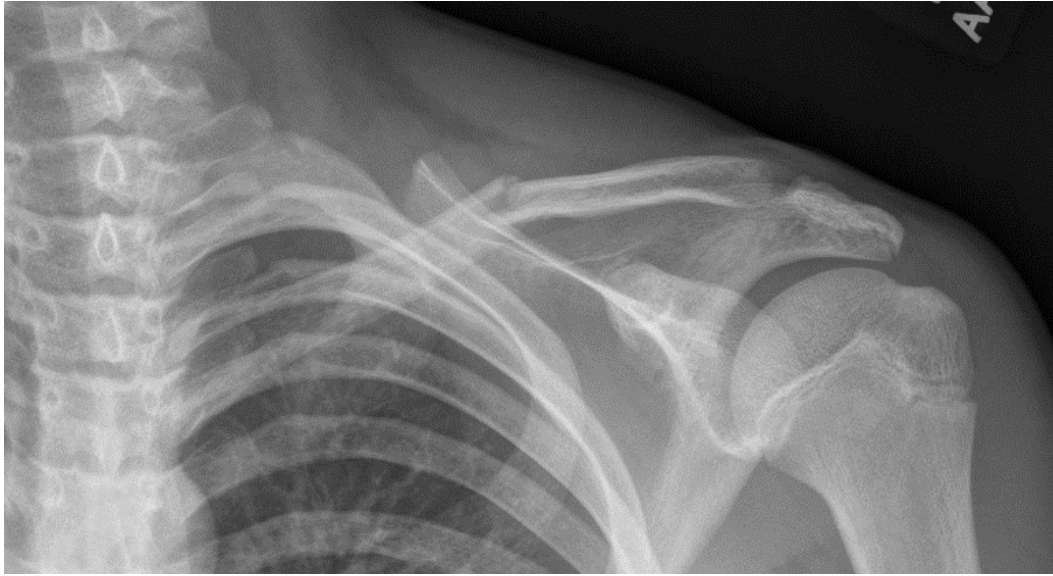
# Pediatric and Adolescent Clavicle Fractures



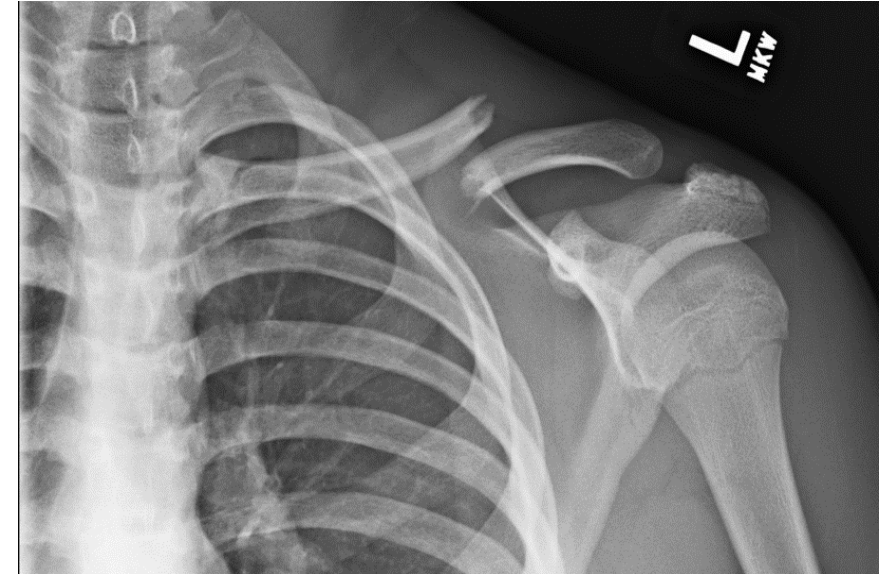
- Common injury
  - Very low incidence of non-union
  - Almost always completely remodel
  - No evidence angulation or shortening leads to long term disability in kids
  - Surgery will not shorten return to play time
  - If painful nonunion → can fix later



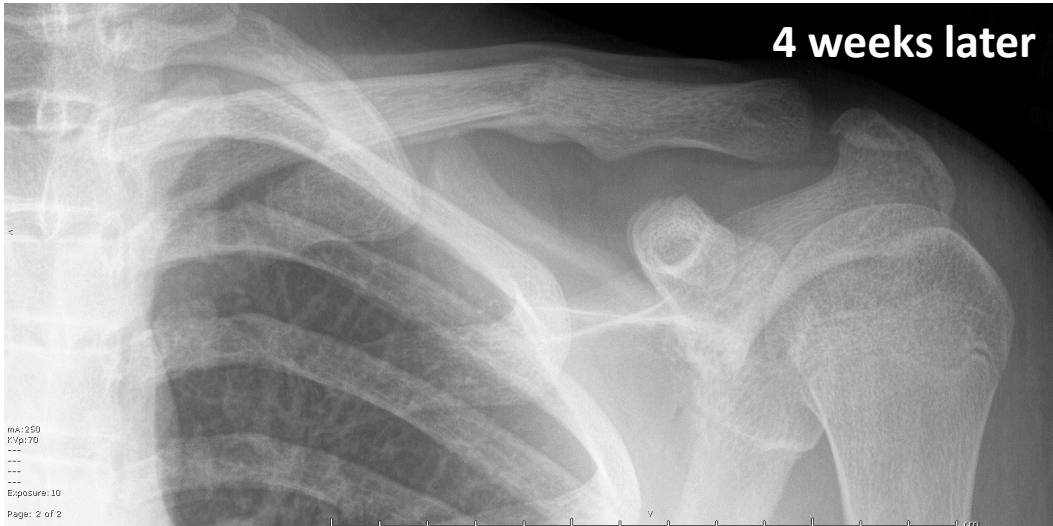
**13 yo boy – fall off scooter**



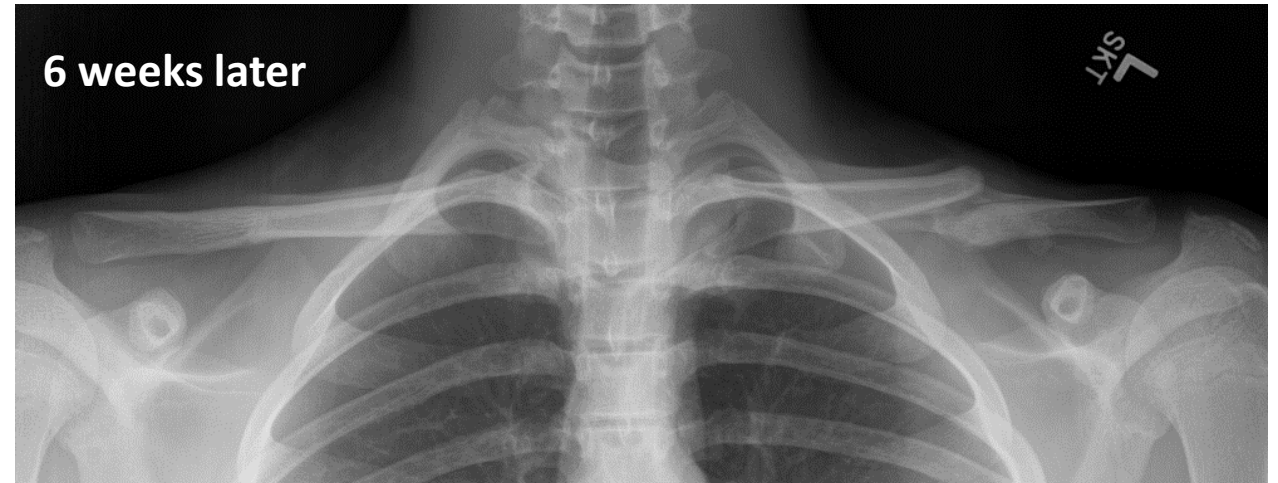
**15 yo boy – football injury**



**4 weeks later**

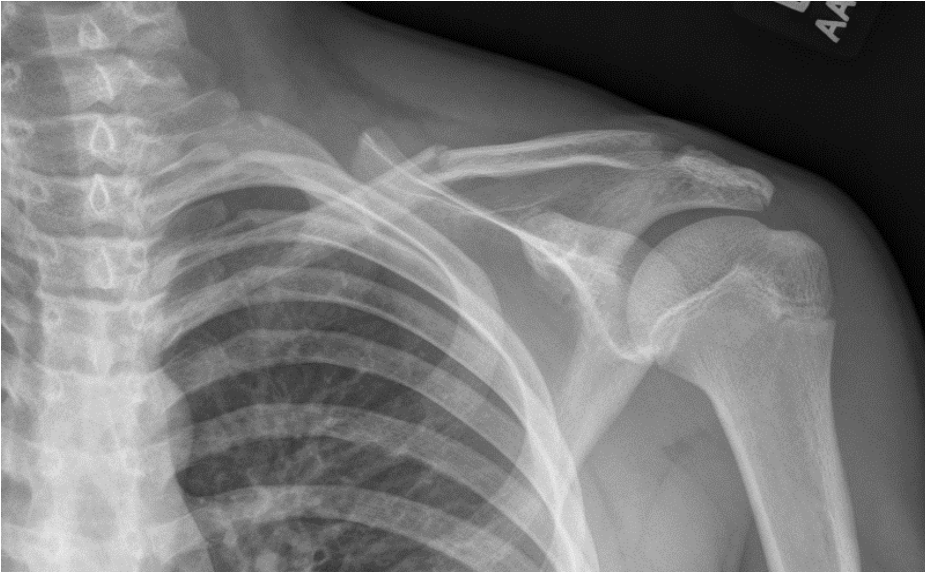


**6 weeks later**



**(BACK TO THE) FUTURE OF PEDIATRICS**

# Pediatric and Adolescent Clavicle Fractures



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(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***



- Almost no indication to operate!
  - Open fracture
  - Painful nonunion (3 mns)
- Activity modification for 4 weeks
- Reassess after 4 weeks → if non-painful, normal shoulder motion ok to gradually return to activity
- No need for follow up xray

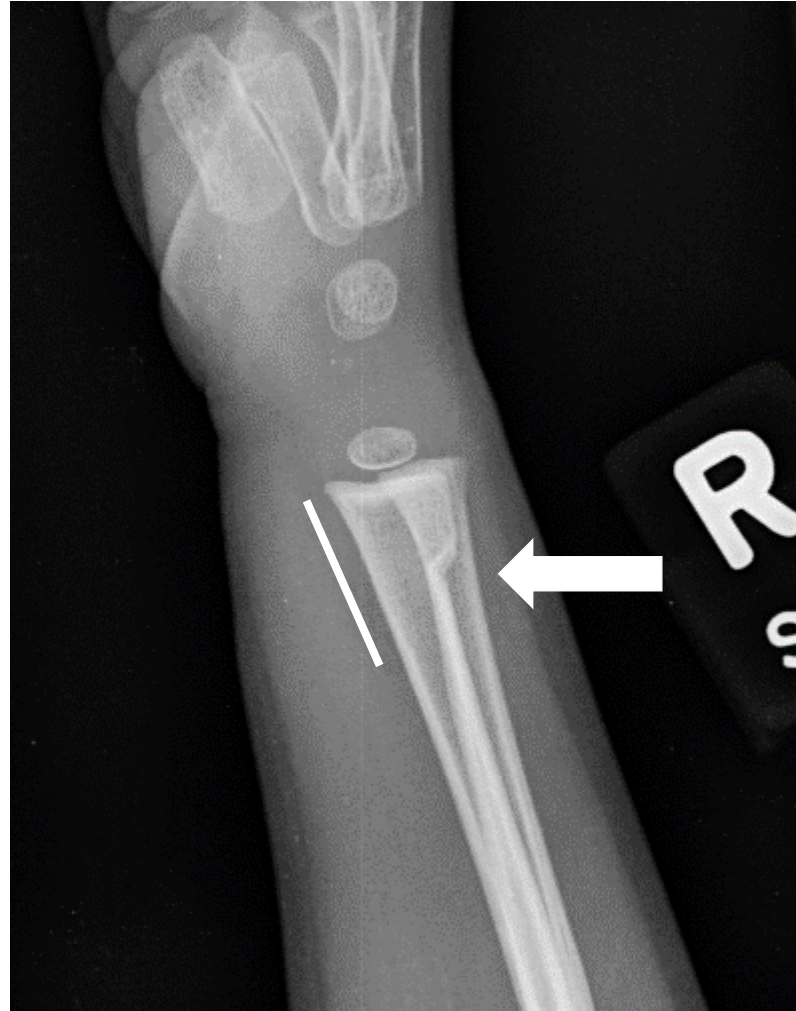
***Don't trade a scar for a bump!***



# Distal Radius Buckle Fracture

3 yo boy – fall on trampoline

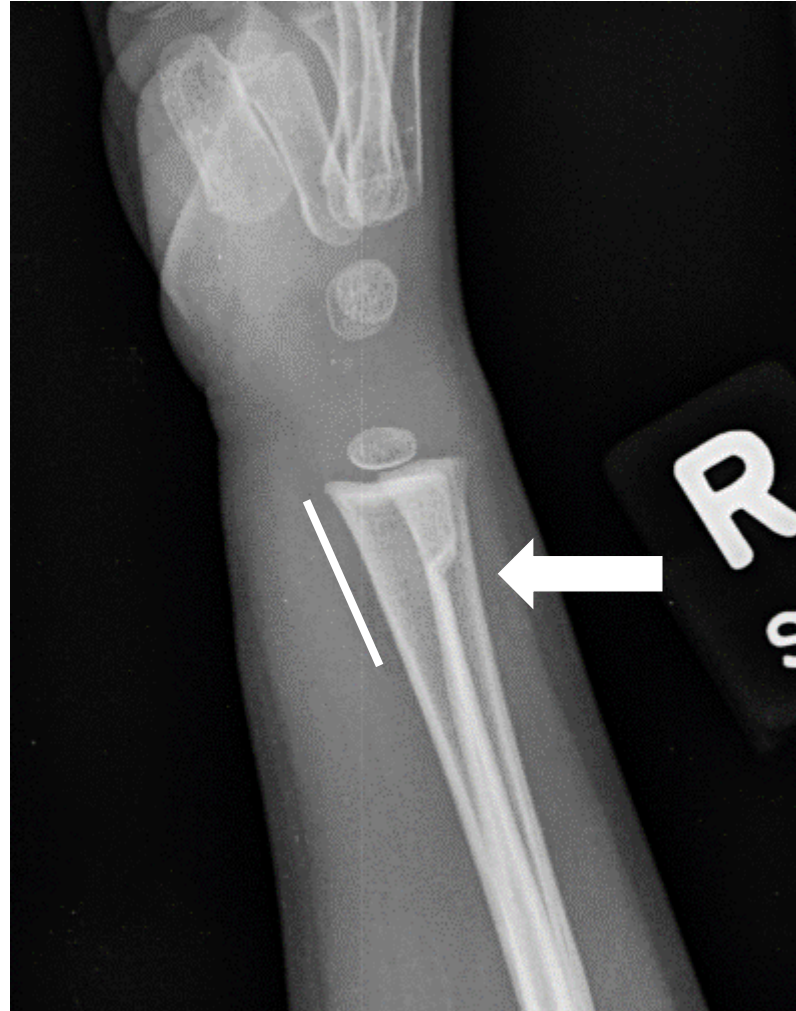
- What is a buckle fracture?
- Also known as Torus Fracture
- One cortex is compressed
- The other cortex is intact
- Inherently stable fracture
- Heals without issues very quickly (3-4 weeks)



# Distal Radius Buckle Fracture

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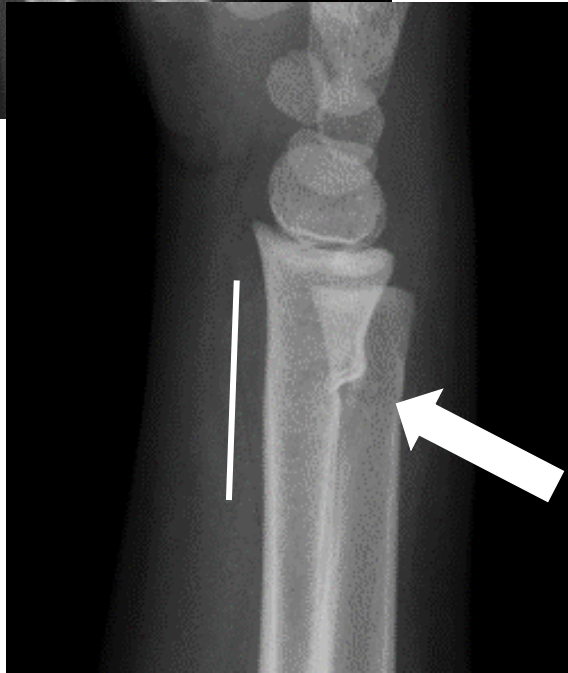
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6 yo boy



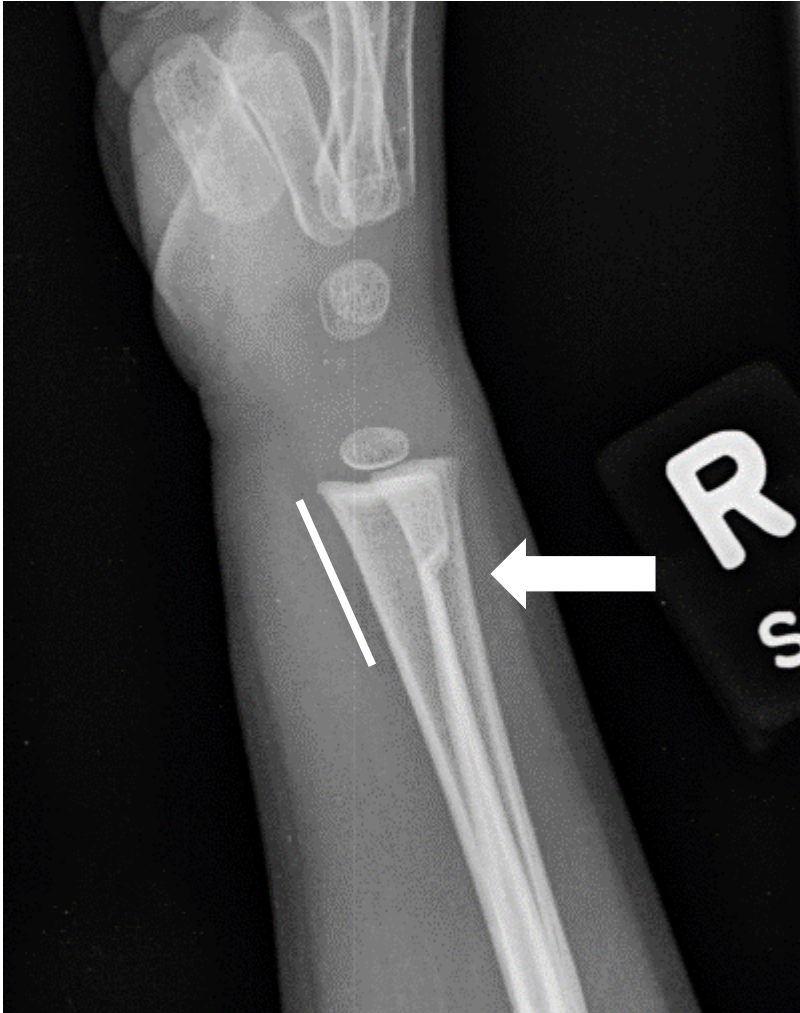
6 weeks later – wrist splint



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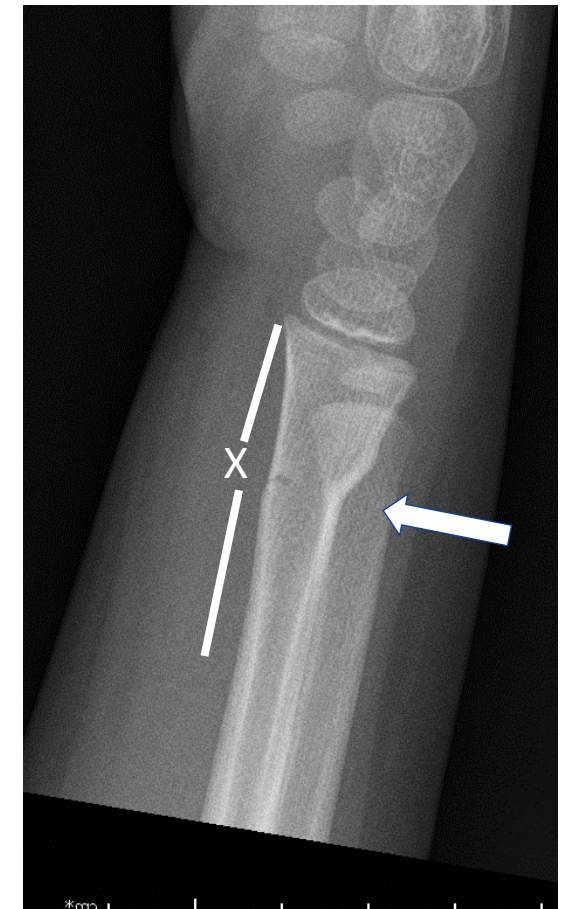
Buckle Fracture



NOT a Buckle Fracture



7 yo boy fall off slide



(BACK TO THE) **FUTURE OF PEDIATRICS**

# Distal Radius Buckle Fracture

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(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***

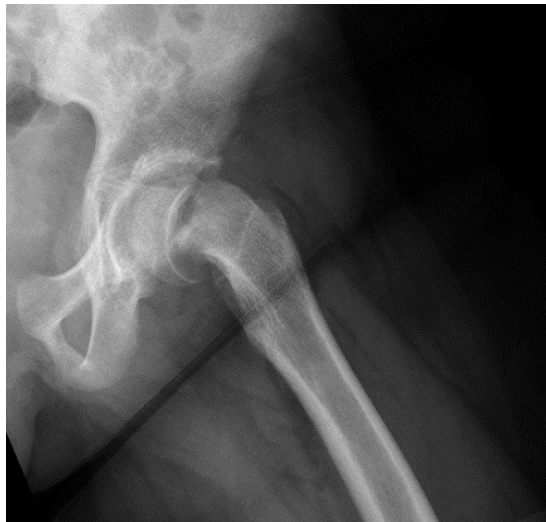


- Multiple studies have confirmed **minimal treatment is necessary!**
  - Treat with velcro wrist splint or even just a loose Ace wrap for 2-3 weeks until non-tender
  - No need for cast, further xray, or (any) follow up
  - Don't treat wrist fracture like a buckle fracture if it is not!

***Don't over treat this injury!***

# Slipped Capital Femoral Epiphysis

- Displacement of proximal femoral epiphysis through the growth plate
  - Boys 12-16 yo, Girls 10-14 yo
  - Typically obese children
  - Can be seen with endocrinopathy
  - Can lead to **progressive deformity, AVN, severe hip disability**



(BACK TO THE) FUTURE OF PEDIATRICS



***STAY OUT OF TROUBLE***

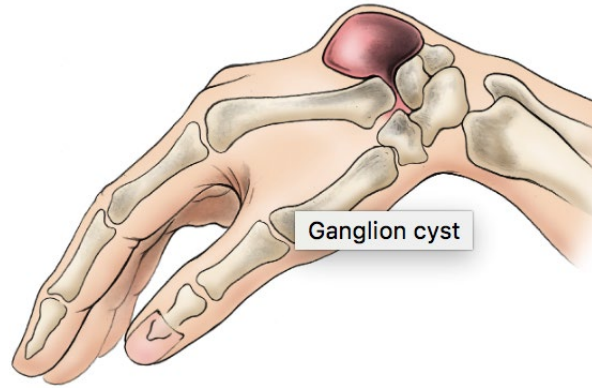


1. Often presents as knee pain!
  - Overweight, pre-teen with complaints of knee pain needs a hip Xray to check for SCFE
2. SCFE → surgical fixation immediately
  - Non-weight bearing (crutches)
  - Directly to emergency room

***Don't miss the presentation (knee pain) and treat as emergency!***



# Ganglions



***STAY OUT OF TROUBLE***



- What is it?
  - Out-pouching of joint lining with gel-like fluid inside
  - No danger, non-cancerous
  - Most common mass in hand
- Arise in typical locations
  - Dorsum of wrist
  - Radial volar wrist (anatomic snuff box)
  - Dorsum of foot
  - Posterior medial knee (Baker's Cyst)
- Treatment
  - No treatment necessary
  - Can wax and wane in kids
  - Injection/aspiration with high recurrence

## 1. Diagnosis

- Typical location
- Non-tender, semi-firm, mobile
- U/S is easy confirmation
- No need for MR

## 2. Treatment

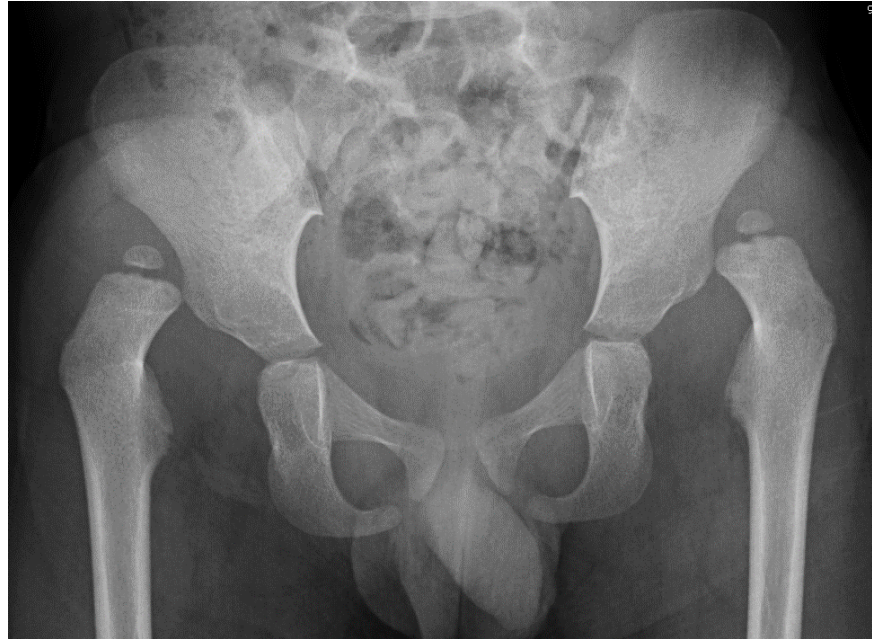
- Education and supportive care

***Don't need to over-treat or over investigate!***

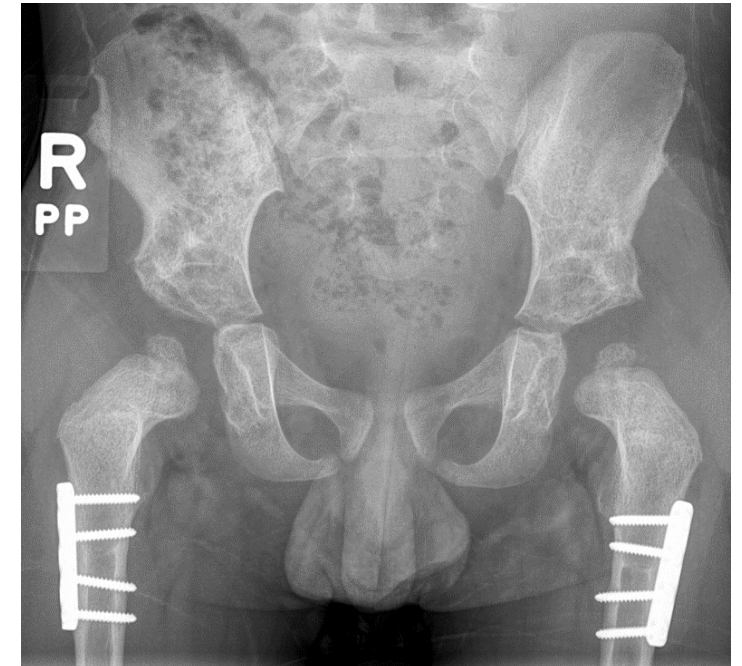
# Hip Dysplasia

- Have an algorithm
  - Age, risk factors, and exam
  - Better to err on the side of caution
  - Image as needed...appropriately
- Risk Factors
  - First born female
  - Family hx of DDH
  - Breech presentation
- Infant with risk factors and normal exam
  - US at a reputable location at 6 weeks
    - US quality highly tech dependent
    - US earlier than 6 weeks → many false +
- Infant with instability on exam
  - US right away and refer
  - High likelihood of treatment

(BACK TO THE) **FUTURE OF PEDIATRICS**



3 yo girl  
*(first born female,  
breech – no US)*  
with persistent  
non-painful  
Trendelenberg gait





# Hip Dysplasia

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(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***



1. Non-painful limp in toddler
  - Get a pelvis xray!
  - Hip dislocation until proven otherwise
2. Risk factors, but no instability
  - US at 6 weeks of age
  - No problem treating stable dysplasia at 6 weeks of age
  - Earlier US → radiographic dysplasia

***Err on the side of early,  
appropriate imaging!***

# Scoliosis

- Treatment → maturity and magnitude
  - $<20^\circ$  = observation
  - $20-45^\circ$  with growth = brace
  - $20-45^\circ$  without growth = observation
  - $>50^\circ$  = surgery
- Scoliometer is a great tool for surveillance
  - 5-7° threshold
    - 7° - **95% of braceable curves detected**
    - 5° - **may be better threshold for obese**
- Skeletal Maturity
  - Deformity  $<50^\circ$  with no growth remaining
    - **2 years post-menarchal**
  - No need for further treatment or monitoring

(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***



## 1. Use the scoliometer to monitor

- App for phone



## 2. Refer for assessment/xray

- Scoliometer 7° with growth remaining

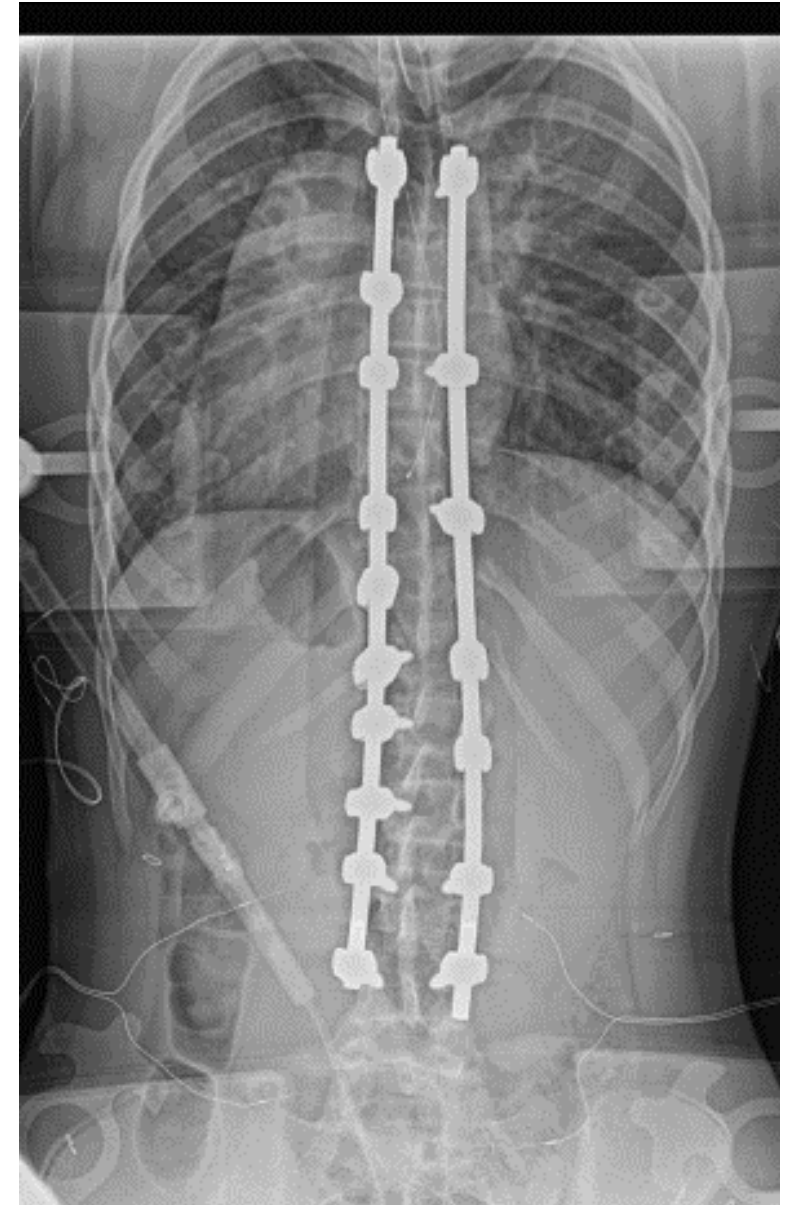
***Document scoliometer yearly and  
refer at 7°!***

12 yo girl

*(1 year post-menarchal)*

27 degree thoracic and  
57 degree thoracolumbar  
scoliosis (scoliometer: 32°)

- *Deformity > 50 degrees*
- *Limited growth remaining*



# Toe Walking



- Physical exam is key
  - Normal ankle ROM
    - **Habitual toe walking**
  - Limited ankle dorsiflexion
    - **Tight Achilles**
- Habitual Toe Walking
  - No long term sequela for toe walking
  - Limited efficacy for non-operative treatment
    - **Braces**
    - **Inserts**
    - **Casting**
- Achilles Tightness
  - Therapy and dynamic bracing
  - Surgery as last resort

(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***



1. Detailed birth hx, neurologic exam
  - High percentage of kids with ITW found to have some underlying issue
    - **CP, ADHD, autism spectrum, neurologic**
2. Normal ROM
  - ROM is maintained, most kids will improve on their own
  - No danger to follow

***Document exam and don't over treat!***

# Multiple Fractures

- Vitamin D status and fracture risk
  - Conflicting reports in literature
  - Low Vit D correlated with fx severity
  - Low vitamin D risk factor for surgical need
  - *? Low vitamin D leads to increased incidence of fractures ?*
- Race and Vitamin D
  - Varying association of race and vitamin D levels
  - There may be some racial differences in optimal vitamin D levels
- Serum 25-OH Vitamin D

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(BACK TO THE) **FUTURE OF PEDIATRICS**



***STAY OUT OF TROUBLE***



1. After second fracture check the Vitamin D
  - Treat for low levels
2. Children with darker skin at increased risk of low vitamin D when presenting with forearm fracture

***Check the Vitamin D!***



13 AA yo boy – fall from bike



10 weeks later – slipped on ice



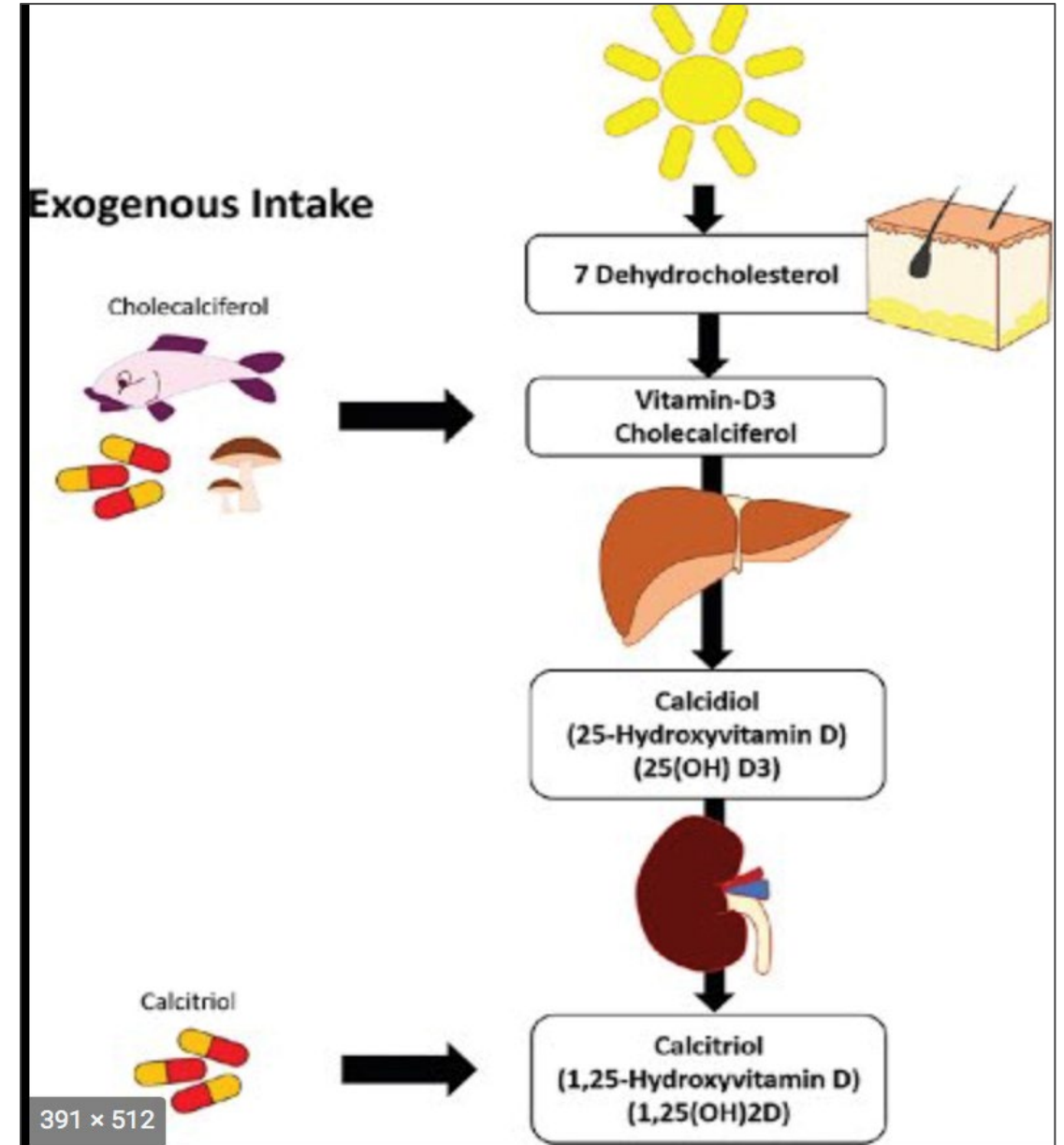
25-OH Vitamin D level:19



(BACK TO THE) **FUTURE OF PEDIATRICS**

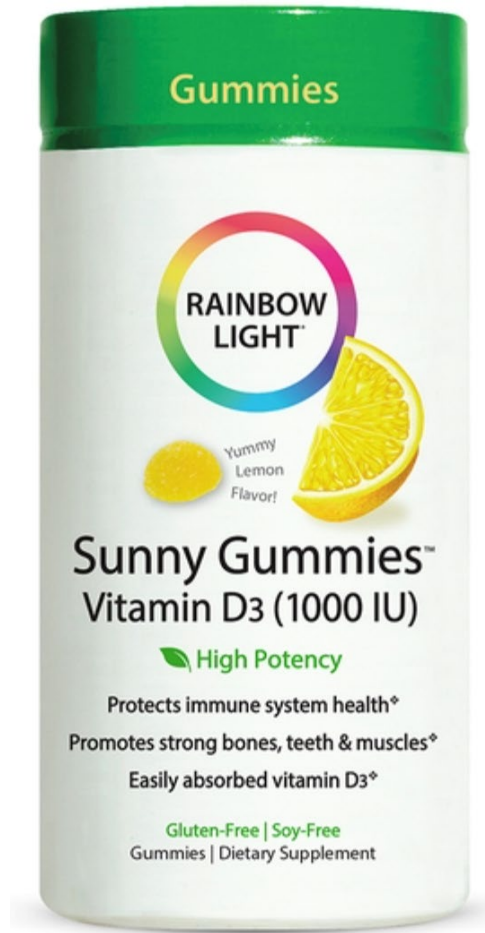
# Vitamin D – Cheat Sheet

- Vitamin D
  - Recommended serum level – 32 ng/ml
- Vitamin D<sub>3</sub>
  - Cholecalciferol
  - Recommended supplement
  - Over the counter at drug store
  - Take with food
- Sunlight and Vitamin D
  - Cheese, egg yokes, fortified milk, OJ
  - Sunlight (converted in the skin)



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## Range 20-32 ng/ml

- 2000 IU Vitamin D<sub>3</sub> daily for 2 months
- Follow up with repeat 25-OH Vit D level

## Range 11-19 ng/ml

- 4000 IU Vitamin D<sub>3</sub> daily for 2 months
- Follow up with repeat 25-OH Vit D level

## Range <10 ng/ml

- Refer to bone health clinic



# Staying Out of Trouble – Pediatric Orthopaedics



- Hard to have a comprehensive list
- Ok to treat locally
- Refer when needed
- Ask – “Consequences to waiting?”
- Always happy to triage questions



Children's National.

## Fight For Children Sports Medicine Center

The **Fight For Children Sports Medicine Center** at Children's National is a world-class pediatric facility designed to help young athletes across the region achieve their fullest potential.



### HELPING STUDENT ATHLETES PLAY, GROW AND EXCEL

This 11,000-square-foot center brings together a multidisciplinary team of orthopaedic surgeons, sports medicine physicians, physical therapists, athletic trainers and a motion capture lab engineer to provide targeted sports-related rehabilitation programs. On-site diagnostic imaging enables our clinical experts to plan and implement treatment quickly and effectively, all under one roof!

To ensure that young athletes function at their peak performance, the Fight For Children Sports Medicine Center offers a range of services such as

- Sports Medicine
- Sports Physical Therapy and Rehabilitation
- 3D Motion Capture and Gait Analysis
- Ultrasound-Guided Therapeutic Injections
- Imaging
- Injury Prevention
- Sports Performance Training



#### REHABILITATION AND STRENGTHENING GYMNASIUM:

Sports physical therapists and athletic trainers help student athletes regain mobility and improve their skills as they heal. The brand new gym is equipped with top-of-the-line equipment and smart technology.



#### MOTION CAPTURE LAB:

State-of-the-art motion and gait analysis technology aids in evaluating and assessing precise movements. Student athletes can focus on learning to avoid injuries and improve their performance in their particular sport.



**Fight For Children  
Sports Medicine Center**  
1 Inventa Place, Suite 150  
Silver Spring, MD 20910

**301-576-2000**

[ChildrensNational.org/SportsMedicineCenter](https://ChildrensNational.org/SportsMedicineCenter)



# Q&A