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Orthopaedic concerns facing pediatric athletes during mid-pandemic return to play

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Disclosure

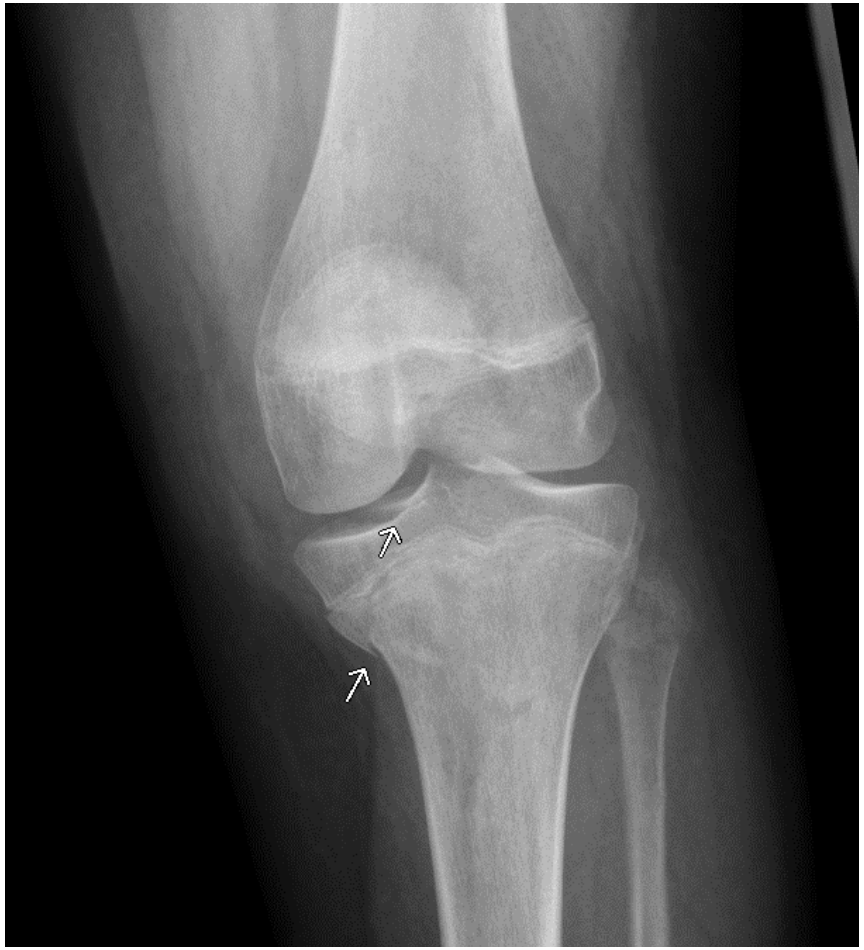
- Nothing to disclose

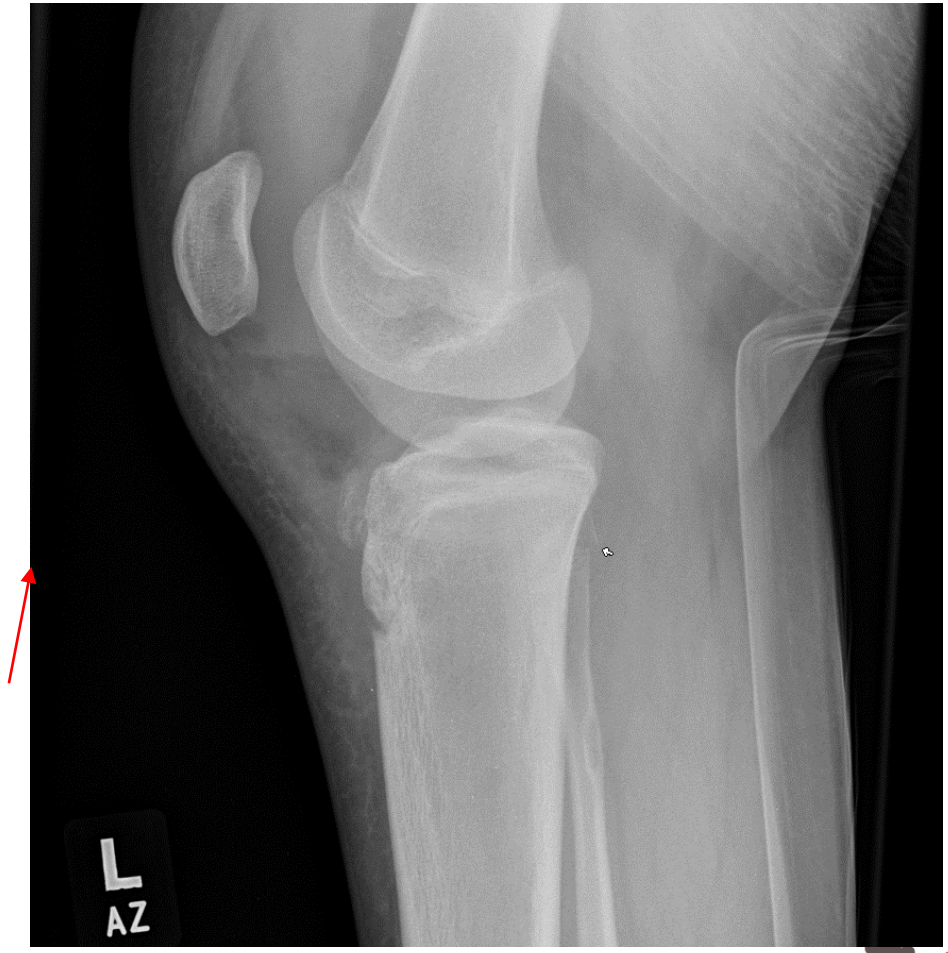
Objectives

- Understand the orthopaedic concerns of the pediatric athlete in return to play
- Recognize orthopedic injuries associated with vitamin D deficiency
- Develop a protocol for screening for and treatment of Vitamin D deficiency (probably outside the scope but we should be thinking about this from a public health standpoint)

13 year-old male, ground level fall playing football, non-contact injury

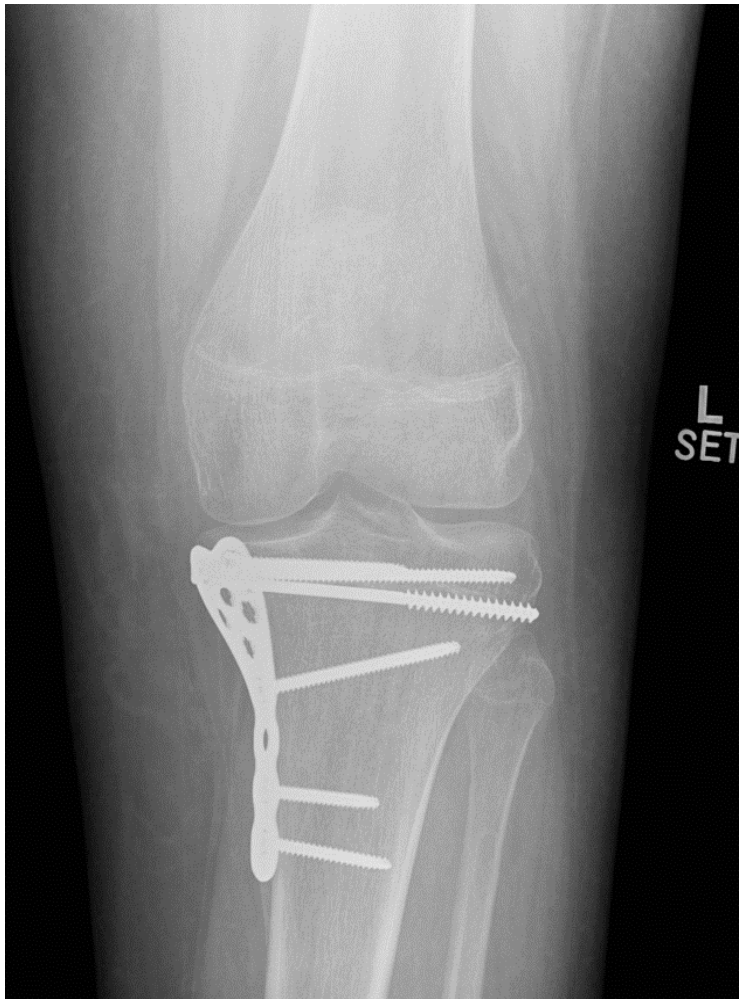
13 year-old male





CT SCAN

Treatment



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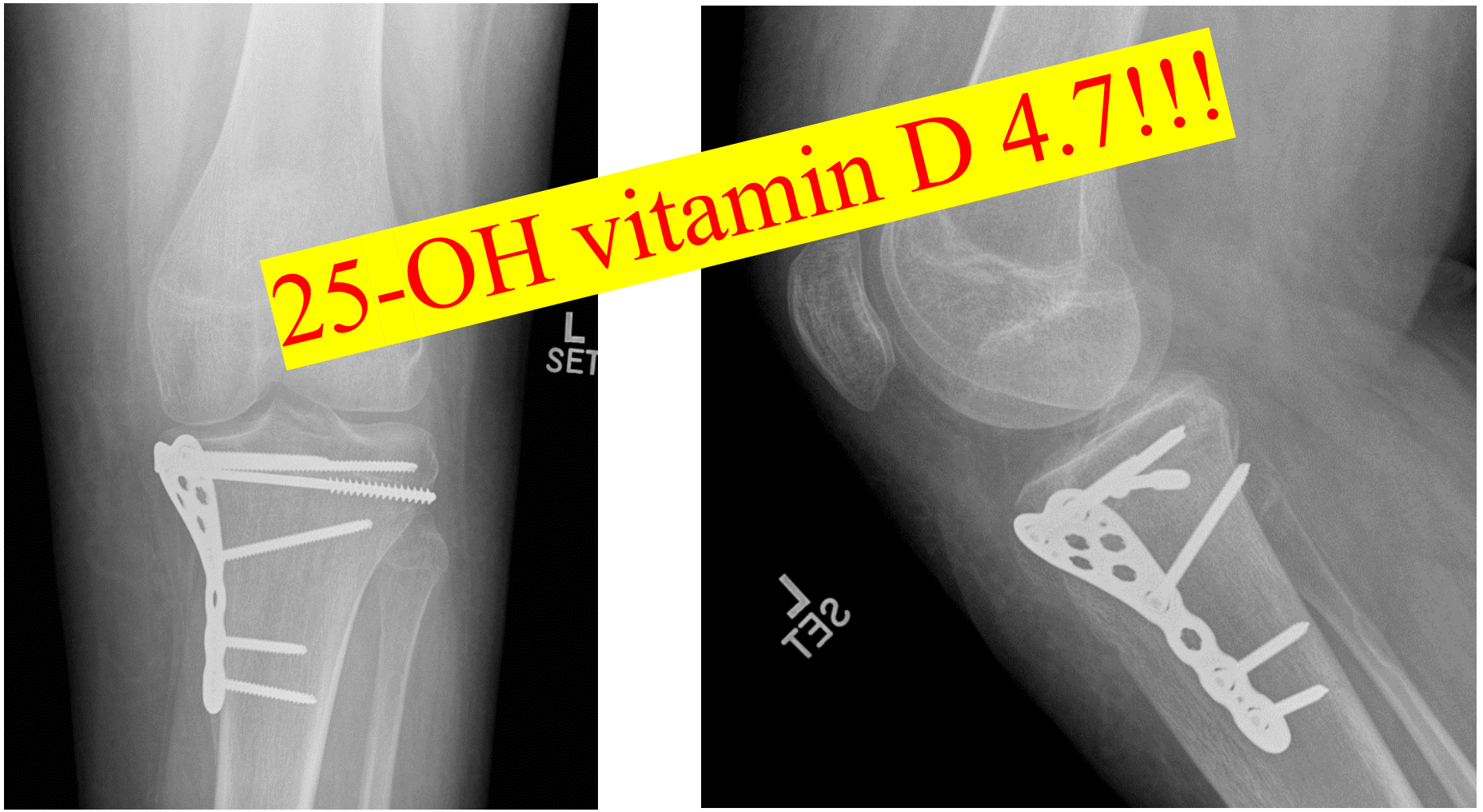

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Orthopedic challenges facing (pediatric) patient in the setting of a global pandemic

Deconditioning/Detraining

Vitamin D Deficiency

Deconditioning from increased sedentary lifestyle associated with pandemic restrictions on group play (both formal and informal)

- Increases tendency toward overuse from rapid ramp up of activity as they have returned to group play
- Theoretical consequence on bone density with the decrease in weight bearing activities, even in healthy patients

Detraining - degree of loss may be variable

Decreased cardiovascular performance, blood volume, etc.

Decrease in muscle mass

Decreased elasticity of tendon-muscle groups with neglect of stretching regimens (routinely used in organized sports and formal physical education)

Decrease in bone density

Decrease in psychomotor performance – balance, proprioception, "muscle memory"

Gradual and progressive return is key

Unlike evaluating cardiovascular readiness, evaluating musculoskeletal readiness is more subjective and difficult to measure

After injury, risk factors for reinjury and protective factors have been studied

There are few guidelines in the literature for return after deconditioning

AAP recommendation:
"Based on assessment of current and previous activity levels, children should return to activity at 25% to 50% of the volume and intensity at which they were participating previously. More relative time should be spent resting to allow adequate recovery between training activities."

Gradual Return

Focus on skills, strength and agility first

Progress to competitive, “head-to-head” activities such as scrimmage and games later

Increased rest periods, intervals between training and competition

(Lang, 2021)

Rapid return…

Can lead to overtraining-related injury including apophyseal and physeal stress injury

e.g., Osgood-Schlatter's disease, medial epicondyle apophysitis, epiphysiolysis at the shoulder

Vitamin D deficiency

- Decreased environmental exposure to radiating sunlight which is a step in the synthesis of vitamin D
- Dietary changes associated with eating at home
  - For some patients, increased independence and poor food choices
  - For others, lack of access to school lunches

Relevance of Vitamin D?

We care because of the bones

Vitamin D is involved in a wide array of biological pathways…

Known association studies relating vitamin D deficiency and living at higher latitudes with increased risk for many chronic diseases:

- autoimmune diseases
- certain cancers
- cardiovascular disease
- infectious disease
- schizophrenia
- type 2 diabetes

(Wacker, 2013)

Why we (orthopedic surgeons) care?

We care because the fracture patterns are more complicated and therefore more difficult to treat.
They often mimic adult insufficiency patterns
There may actually be associated with increased incidence of certain fractures such as tibial tubercle injuries (Minkowitz, 2018).

15 year-old male basketball landing after layup

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25-OH vitamin D 14.6

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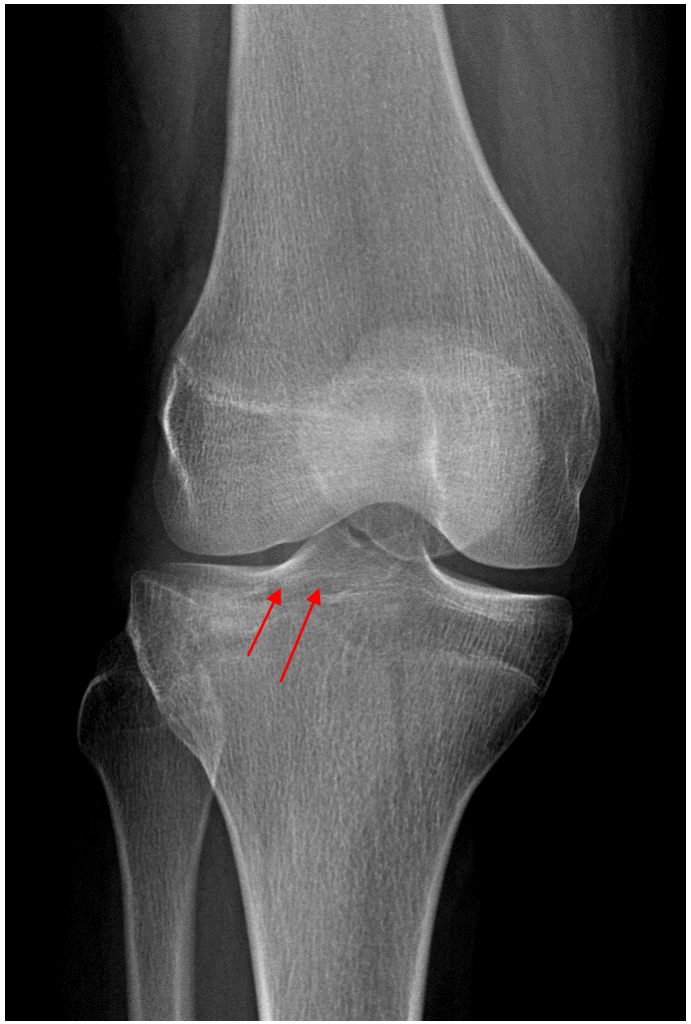
17 year-old slipped and fell

Subtle on x-ray



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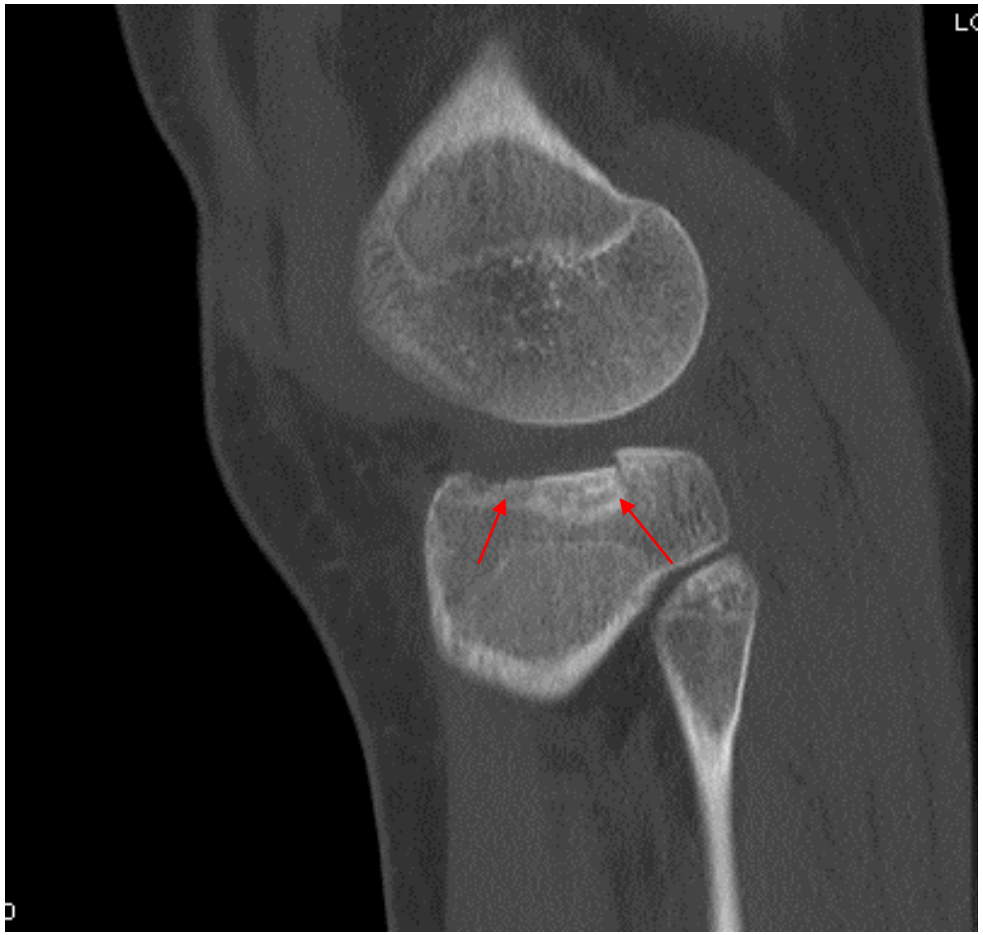
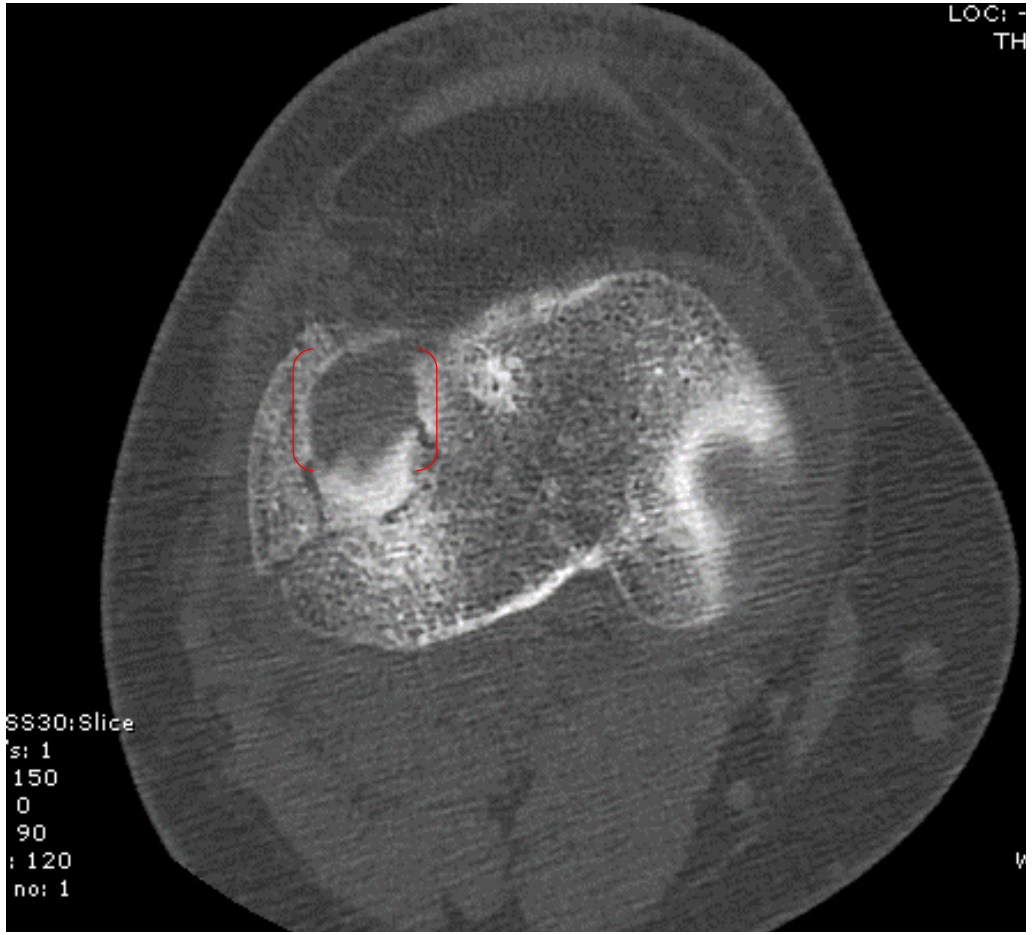
17 year-old female slipped and fell





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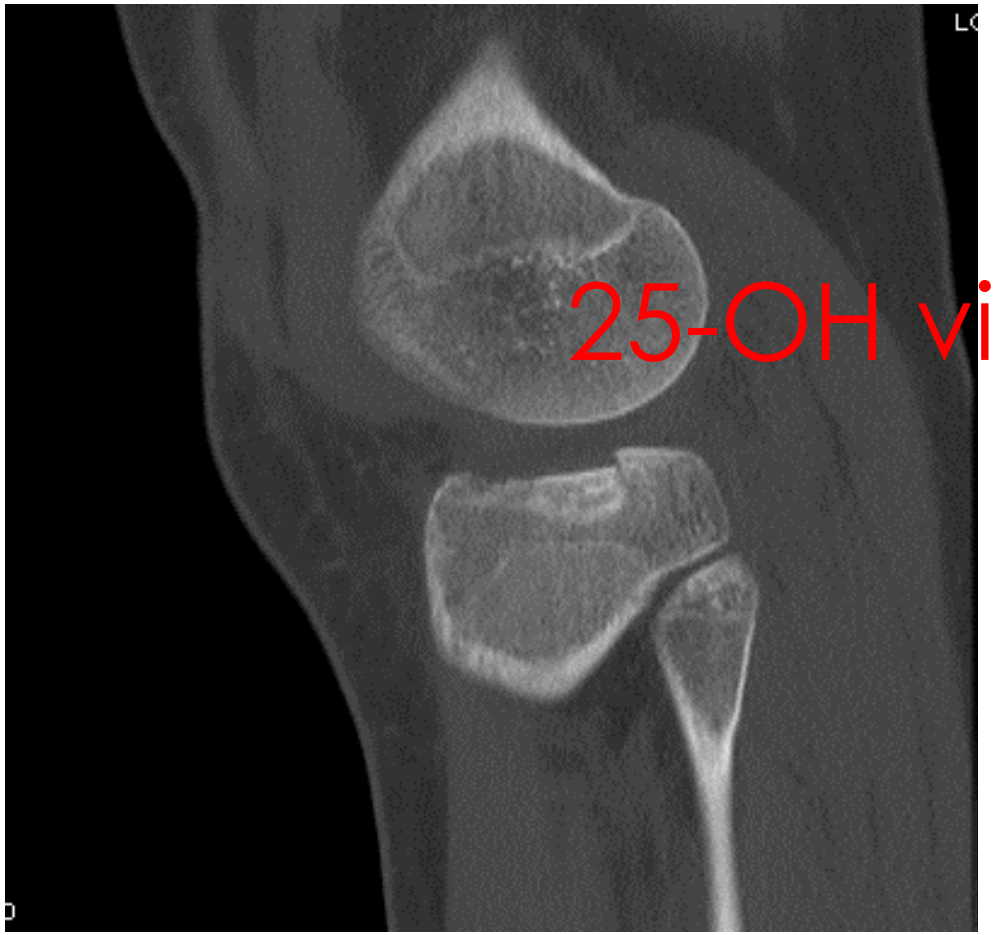
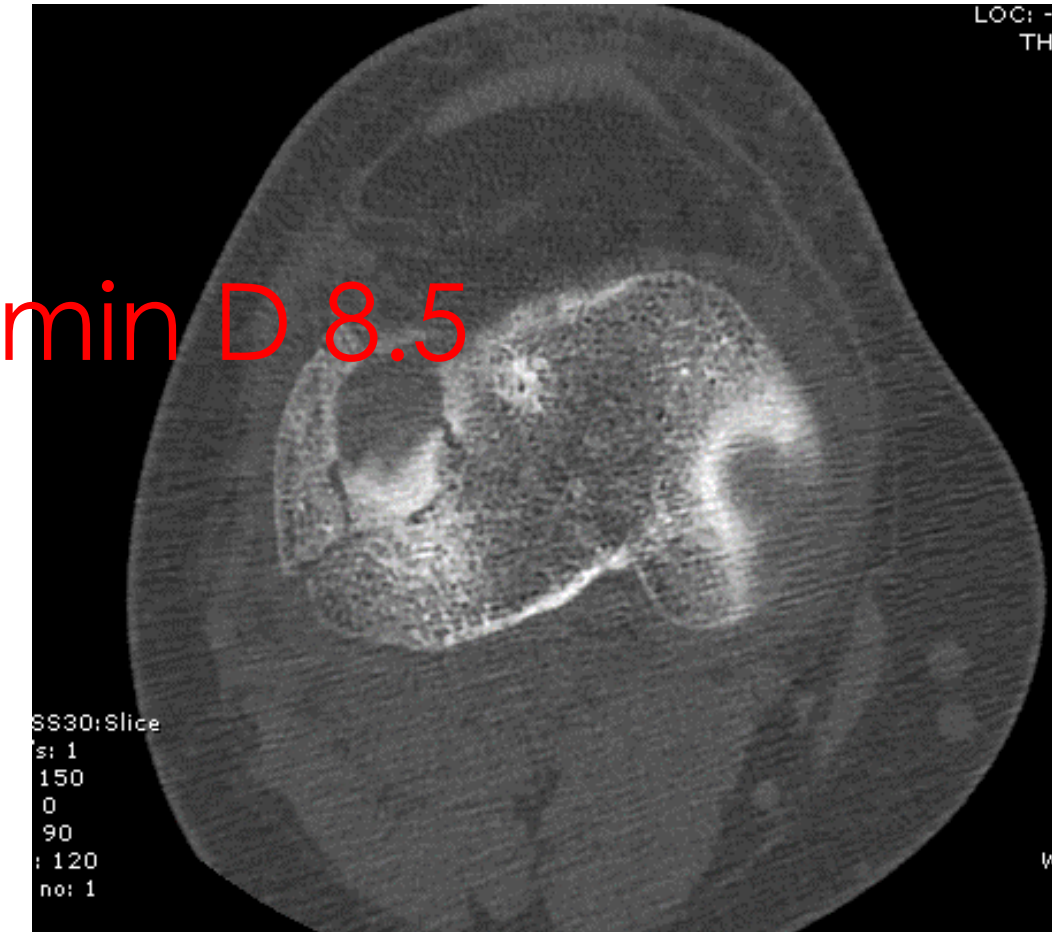


25-OH vitamin D 8.5



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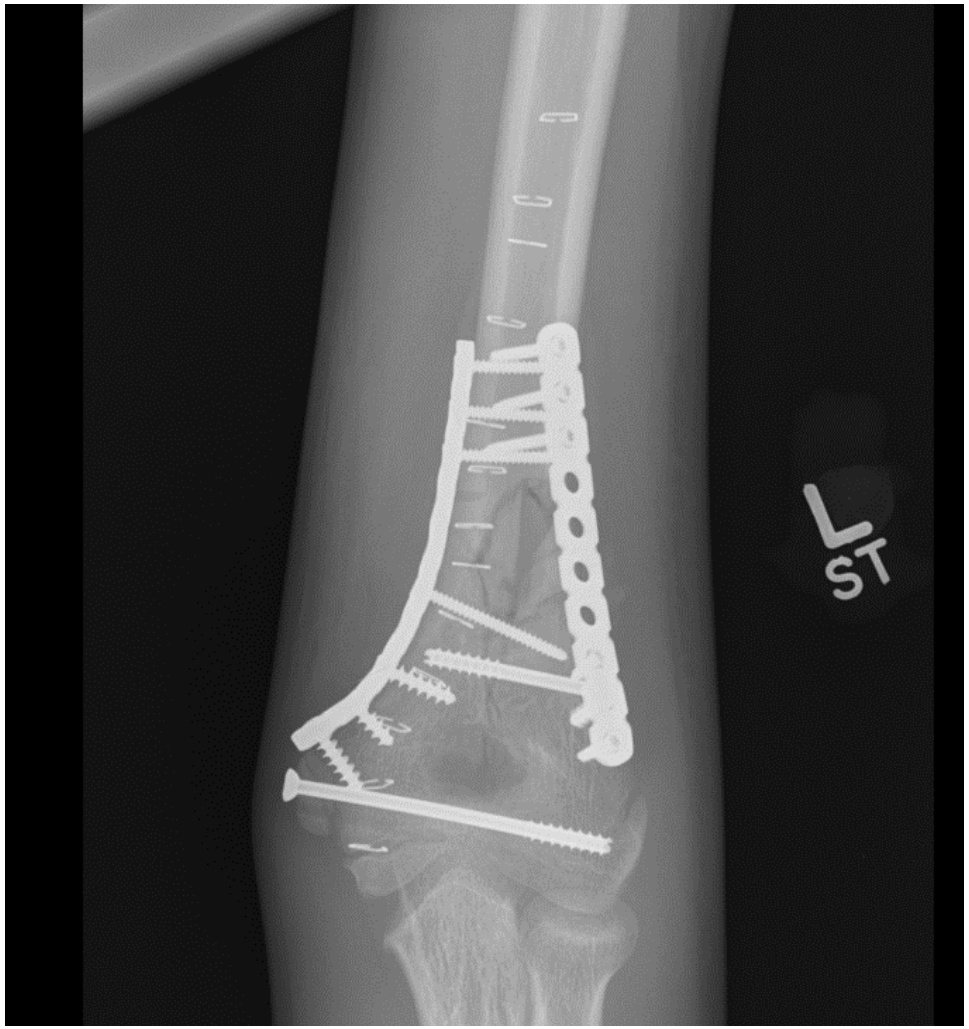
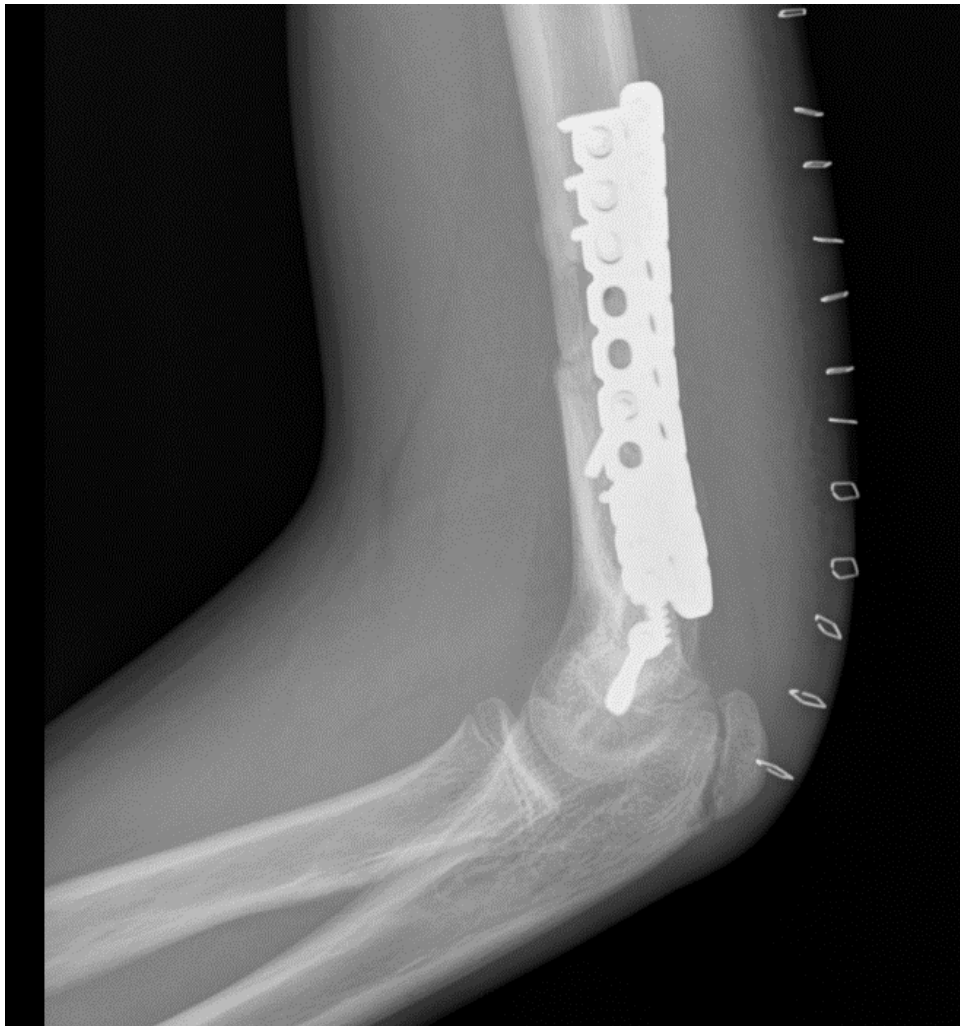
13 year-old male non-contact fall in football

25-OH vitamin D of 15





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For further reading

https://www.uptodate.com/contents/covid-19-return-to-play-or-strenuous-activity-following-infection

https://publications.aap.org/aapnews/news/7369

Thank You!