

AMSER Case of the Month

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26-month-old female with knee pain



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Patient Presentation

- 26-month-old female presented to the ED with a chief complaint of left knee swelling and pain. The parents denied any recent trauma. She was also recently treated with antibiotics for a severe gingival mucositis.
- Her medical history is notable for global developmental delays secondary to neonatal glycine encephalopathy and epilepsy. She adheres to a strict ketogenic diet administered via a gastrostomy tube to help manage her seizures. She is non-ambulatory and non-weight bearing at baseline.
- Physical exam revealed a warm and swollen left knee and thigh. There was focal tenderness on palpation. Both lower extremities had chronic contractures but no visible erythema or ecchymosis. Oral examination revealed severe gingivitis and irritation on her upper and lower gums that spared the tongue and buccal mucosa.

Pertinent Labs

- Serology
 - White blood cells: 7.28 K/uL
 - Albumin: 3.6 g/dL
 - Hemoglobin: 9.3 g/dL
 - Hematocrit: 28.2%
 - C-Reactive Protein: 13.8 mg/dL
 - Glucose: 72 mg/dL
 - HSV of oral mucosa: Negative
- Urinalysis
 - +Leukocyte esterase
 - +Ketones
 - +Blood

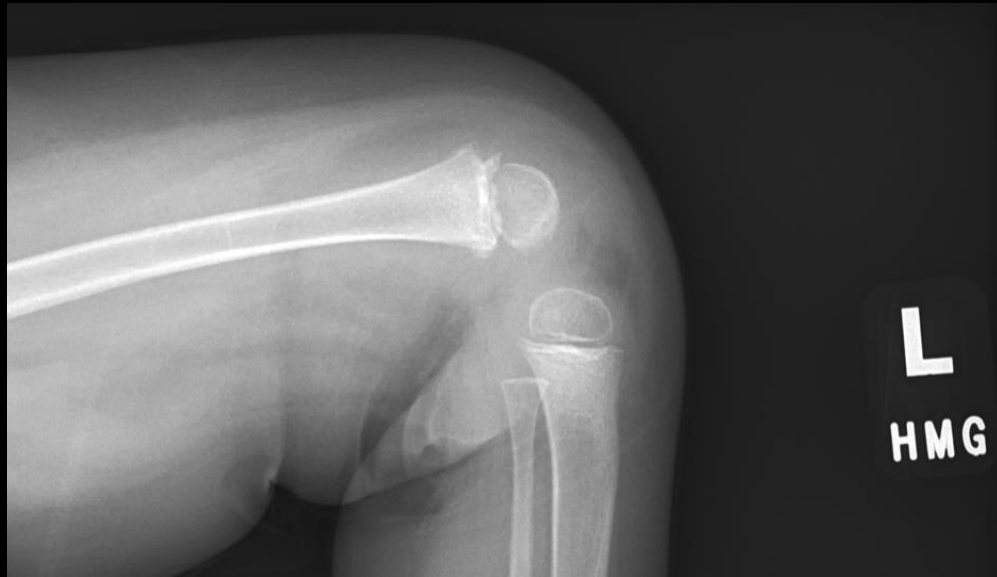
What Imaging Studies Should We Order?

Select the applicable ACR Appropriateness Criteria

Scenario	Scenario Id	Procedure	Adult RRL	Peds RRL	Appropriateness Category	
Septic arthritis suspected, knee, initial imaging	3194974	US knee	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
		Radiography knee	<0.1 mSv ⊕	<0.03 mSv [ped]..	Usually appropriate	●
		MRI knee without and with IV contrast	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
		MRI lower extremity without and with IV contrast	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
		MRI knee without IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
		MRI lower extremity without IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
		MRI whole body without IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
		MRI whole body without and with IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
		CT knee with IV contrast	<0.1 mSv ⊕	0.03-0.3 mSv [ped]..	Usually not appropriate	●
		CT knee without IV contrast	<0.1 mSv ⊕	0.03-0.3 mSv [ped]..	Usually not appropriate	●
CT knee without and with IV contrast	<0.1 mSv ⊕	0.03-0.3 mSv [ped]	Usually not appropriate	●		

These imaging modalities were ordered by the physician.

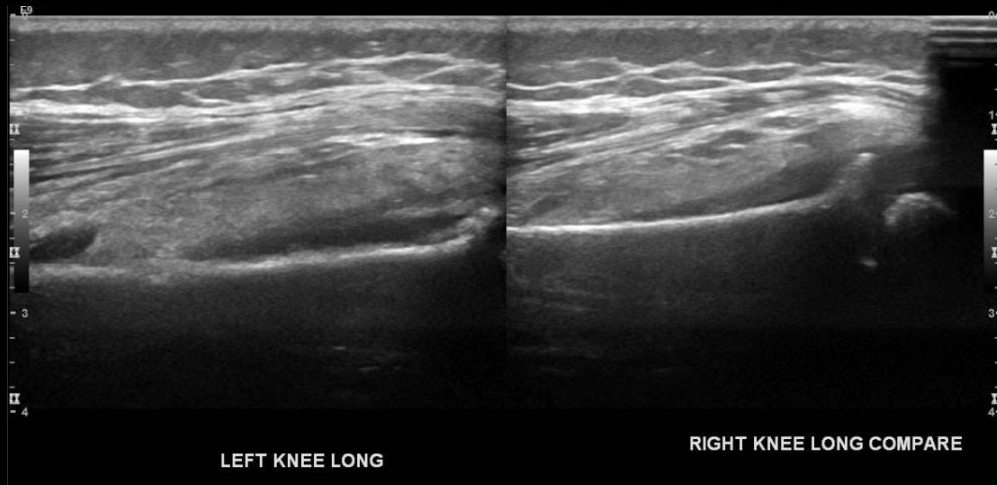
Findings (Unlabeled)



Lateral view of left knee

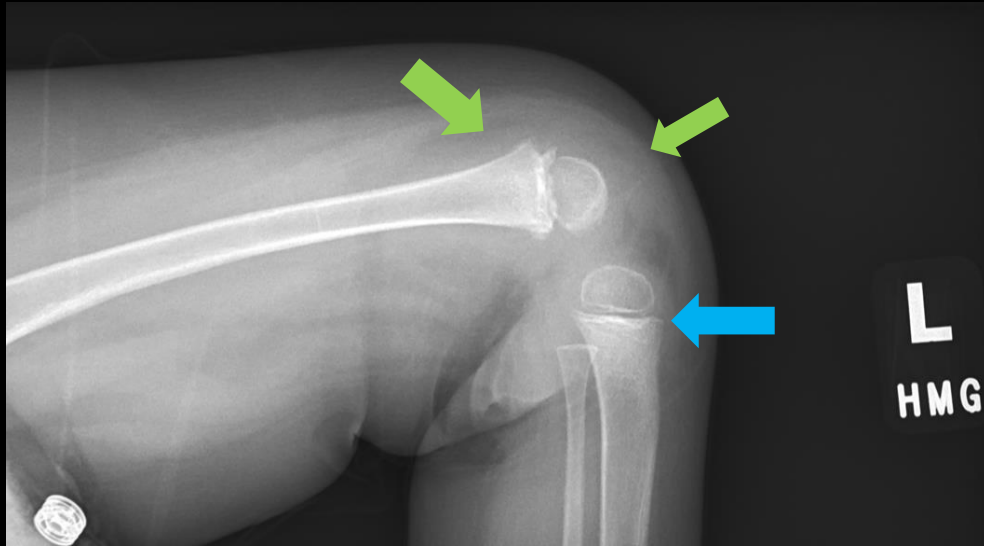


AP view of left knee

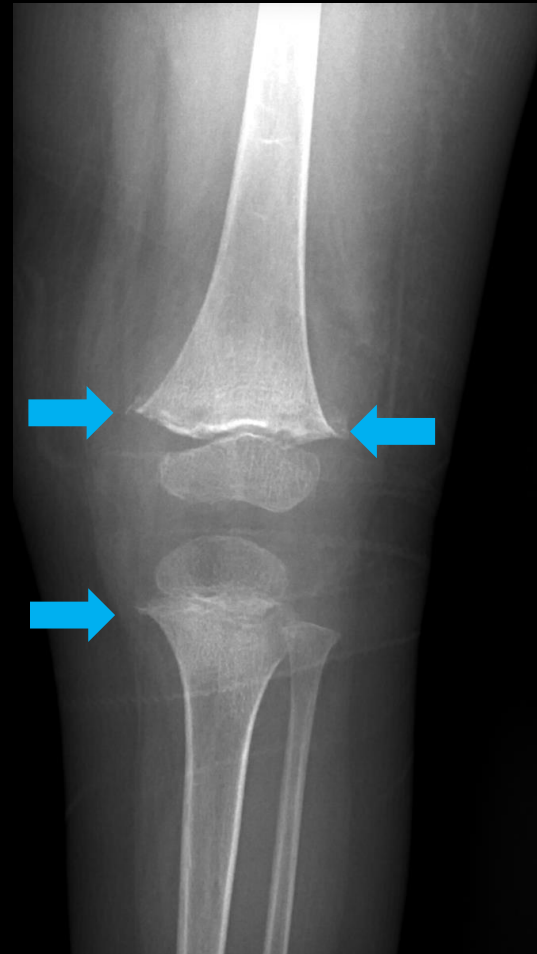


Ultrasound of knees

Findings (Labeled)

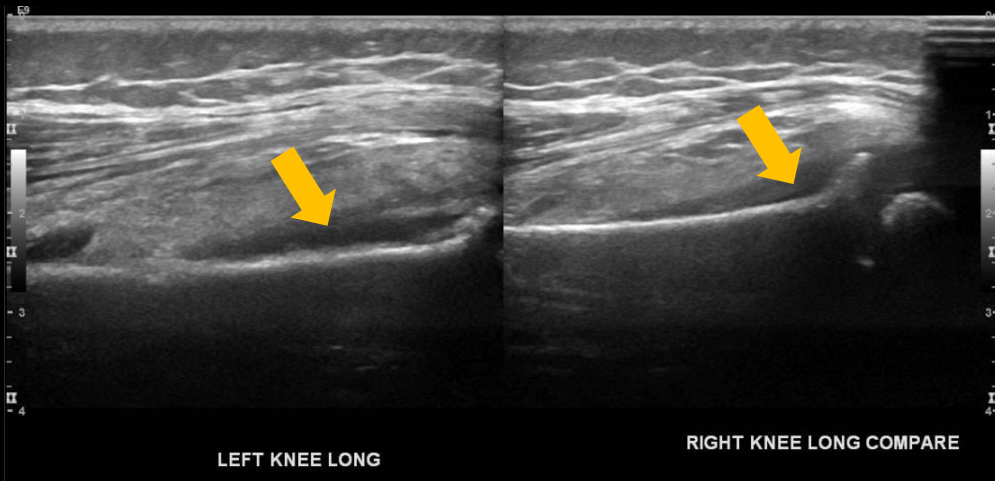


Lateral view of left knee



AP view of left knee

X-ray study showed possible small knee effusion and soft tissue swelling. There were also irregularities of the distal femoral and proximal tibial metaphyses.



Ultrasound of knees

Ultrasound of bilateral knees showed the suprapatellar spaces to be symmetric in appearance with no joint effusion.

What Additional Imaging Should We Order?

Findings (Unlabeled)



AP Views of bilateral humerus, radius, and ulna (as part of skeletal survey)

Findings (Unlabeled)

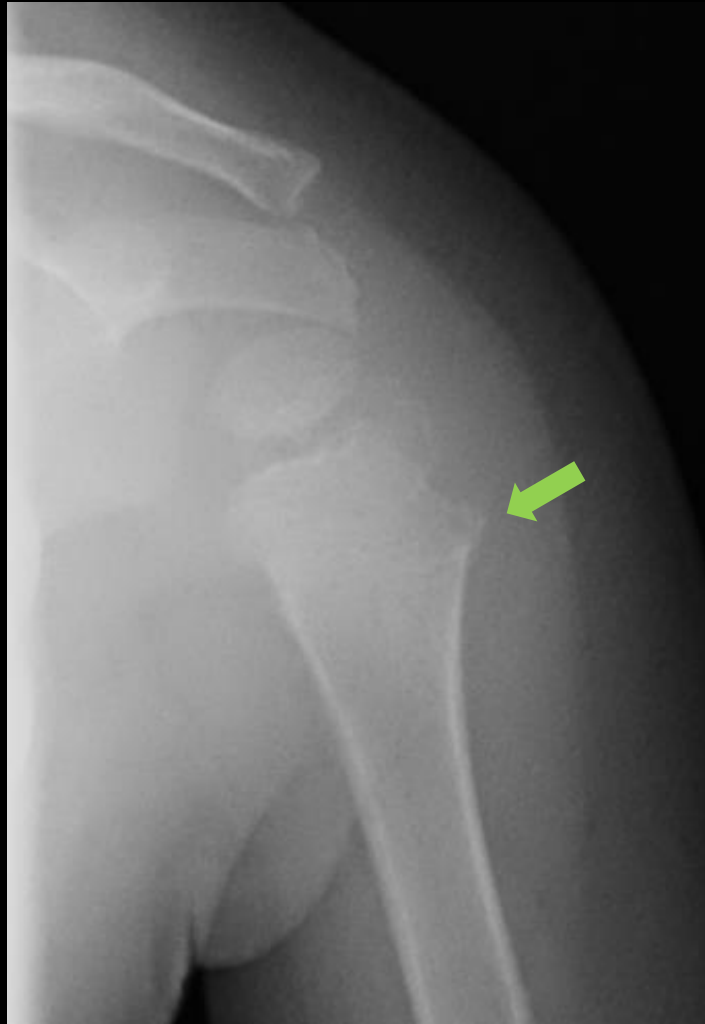
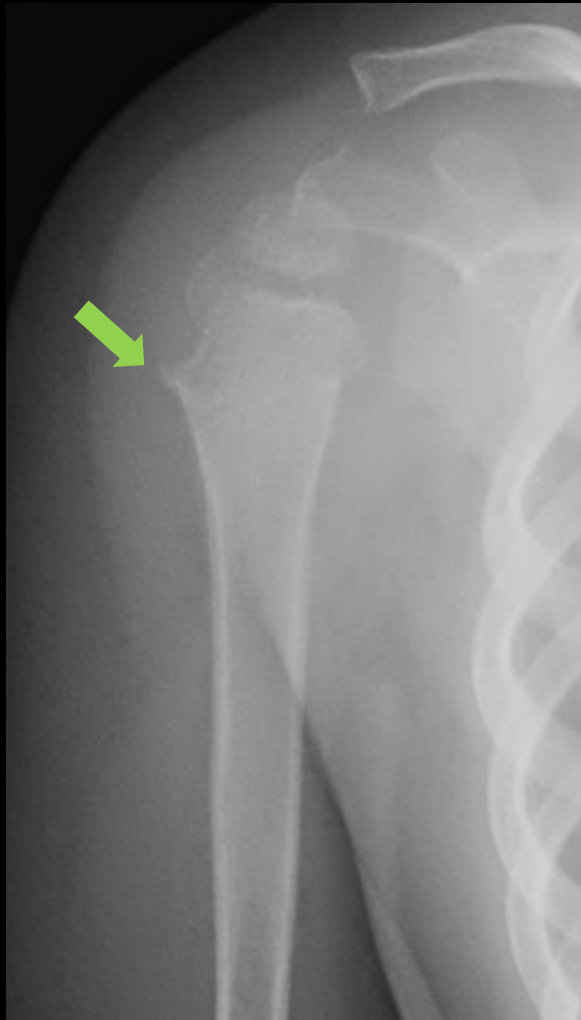


AP views of bilateral femur, fibula, and tibia (as a part of skeletal survey)

Findings (Labeled)

Generalized osteopenia with symmetric beaking and irregularity of the metaphyses with adjacent ill-defined areas of calcification along the peripheral margins.

Findings most compatible with osseous findings of scurvy. No evidence of acute or healing traumatic injury.

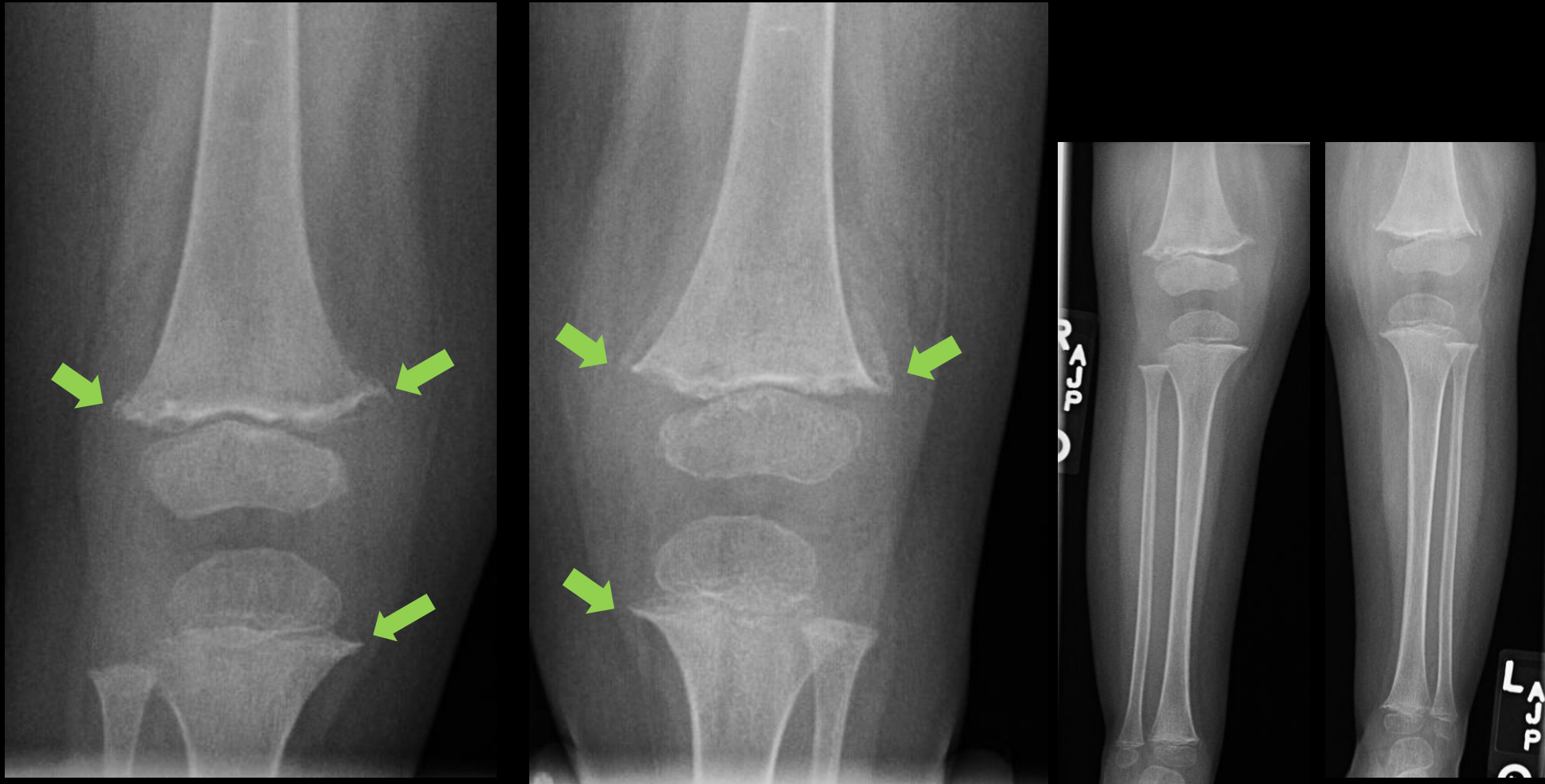


AP Views of bilateral humerus, radius, and ulna (as part of skeletal survey)

Findings (Labeled)

Generalized osteopenia with symmetric beaking and irregularity of the metaphyses with adjacent ill-defined areas of calcification along the peripheral margins.

Findings most compatible with osseous findings of scurvy. No evidence of acute or healing traumatic injury.



AP views of bilateral femur, fibula, and tibia (as a part of skeletal survey)

Final Dx:

Scurvy (Vitamin C Deficiency)

Case Discussion

- The patient presented with chief complaint of **pain in her left knee**. No reported history of trauma. Initial concern was for septic joint. X-ray and ultrasound studies were done, revealing soft tissue swelling in the knee but no joint effusion.
- On the initial knee radiographs, there was concern for **classic metaphyseal corner fractures** in the patient's distal femurs which are highly specific for non-accidental trauma in a non-weight bearing child. Follow-up skeletal survey was done to investigate the remainder of the skeleton.
- Skeletal survey revealed **bilateral and symmetric osseous abnormalities** in the upper and lower extremities, which is **not consistent with non-accidental trauma**. After clinical correlation of the patient's **gingivitis and strict ketogenic diet**, the osseous findings suggested that the patient had a **vitamin C deficiency (scurvy)**. The diagnosis was confirmed with an ascorbic acid test.
- Two weeks after the encounter, the patient had an additional bone survey done as per protocol. The osseous findings were relatively stable and **included increased calcifications** along the medial and lateral margins of the distal left femur. The rest of the bone survey was unremarkable. There was **no evidence of acute or healing traumatic injury**, further supporting a diagnosis of **scurvy**.

Case Discussion - Management

- The patient was discharged with instructions to increase vitamin C intake while continuing her ketogenic diet.
- The caregivers were instructed to administer 150 mg of Vitamin C via gastric tube twice daily (300 mg/day) for 2 weeks and to subsequently reduce the dosage to 150 mg daily.
- Additionally, they were instructed to arrange follow-up appointments with the patient's pediatrician and dentist.

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