



Editor's Note: While the images presented here are authentic, the patient cases are hypothetical.

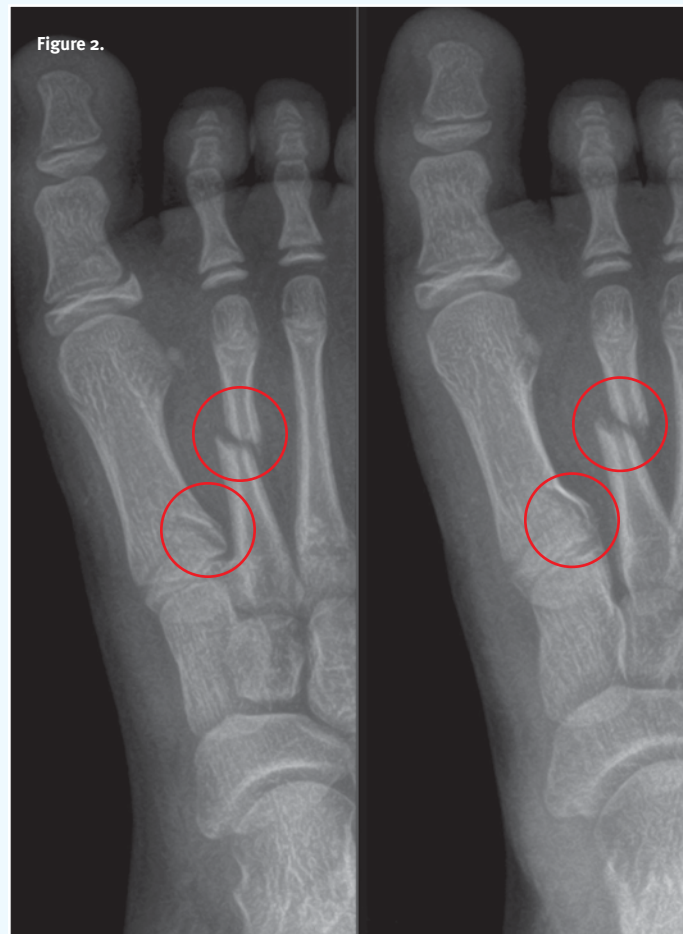
7-Year-Old With Playground Injury



A 7-year-old boy presents to urgent care with his worried mother after he fell off a swing at daycare. He is complaining of right foot pain and can't walk on the injured foot. Anterior, posterior and oblique foot x-rays are ordered.

Review the image and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Images and case provided by Experity Teleradiology (www.experityhealth.com/teleradiology).



Differential Diagnosis

- Fractures of the first and second metatarsals
- Midfoot sprain
- Second phalanx dislocation

Diagnosis

The correct diagnosis in this case is fractures of the first and second metatarsals. Oblique fracture at the mid-2nd metatarsal and an angled buckle fracture at the lateral base of the 1st metatarsal can be seen in the x-ray. The injury at the base of first metatarsal is concerning for a pediatric Lisfranc injury.

Metatarsal fractures are common foot injuries. Usually, there is a combination of direct axial loading forces and twisting forces. Typically, a buckle fracture results from axial loading forces being transmitted directly down the long axis of the bone. However, when there is any other force applied, such as a varus, valgus, hyperextension, or hyperflexion force, the axial load is shifted off center and angled buckle fractures of the metaphysis occur, although they are less common.

What to Look For

- The bones of children are soft, and therefore it is common for buckle rather than overt fracture to occur
- Look for complications from the fracture including neurovascular compromise and Lisfranc injury

Pearls for Urgent Care Management

- If nondisplaced or minimally displaced, treatment is immobilization with a posterior leg splint, non-weight bearing, and follow-up in 3-5 days
- Pain management with over-the-counter medications is usually sufficient once immobilization has occurred
- If significantly displaced, reduction is indicated
- If neurovascular complications exist, immediate referral to the emergency department is indicated



45-Year-Old With Painful Ankle Lesion



A 45-year-old woman presents to urgent care with a painful area that developed on her right ankle 2 weeks prior. The patient had a family history of venous thromboembolism. On examination, a variegated brown patch with a central pink angulated scar and an overlying thick crust on the lateral ankle was seen. There was also unilateral peripheral leg edema. On laboratory examination, anemia, thrombocytopenia and anticardiolipin antibodies were present.

View the image above and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Image and case presented by VisualDx (www.VisualDx.com/jucm).



Differential Diagnosis

- Antiphospholipid antibody syndrome
- Cryoglobulinemia
- Livedoid vasculopathy
- Polyarteritis nodosa

Diagnosis

The correct diagnosis in this case is antiphospholipid antibody syndrome (APS)—an acquired autoimmune disease characterized by the formation of autoantibodies against various phospholipids. These antibodies cause an increased propensity for clotting by interfering with the function of proteins C and S, as well as directly interacting with platelets and the endothelium. APS is commonly attributed to an underlying autoimmune disease, such as systemic lupus erythematosus or less commonly HIV or hepatitis C. Additionally, several medications are associated with APS, including chlorpromazine, hydralazine, and procainamide.

Symptoms vary depending on the organ system involved. The most common thrombotic events occur in the deep venous system, usually in the leg. Respiratory compromise may signal a pulmonary embolism. Obstetric complications include premature delivery, unexplained fetal loss beyond 10 weeks of gestation, or 3 or more episodes of unexplained consecutive spontaneous abortions before

10 weeks of gestation. Neurologic deficits include severe migraine headaches, visual disturbances, and stroke. In rare cases, catastrophic antiphospholipid antibody syndrome can develop, characterized by rapid development of widespread thrombotic disease involving at least 3 organ systems, which can include the skin.

What to Look For

- APS may present with painful cutaneous ulcers and necrosis
- Look for evidence of thrombosis in the organ system affected (for example, leg swelling indicating a deep vein thrombosis or shortness of breath indicating a pulmonary embolism)

Pearls for Urgent Care Management

- In this case, appropriate wound care for the cutaneous ulcer depending on location and depth is needed
- Pain management considering topical anesthetic agents is indicated
- Refer to rheumatology for further evaluation and treatment
- Referral to the emergency department is advisable if evidence of severe disease is observed (eg, deep vein thrombosis, pulmonary embolism, stroke)



57-Year-Old with Left Foot Pain

Figure 1.

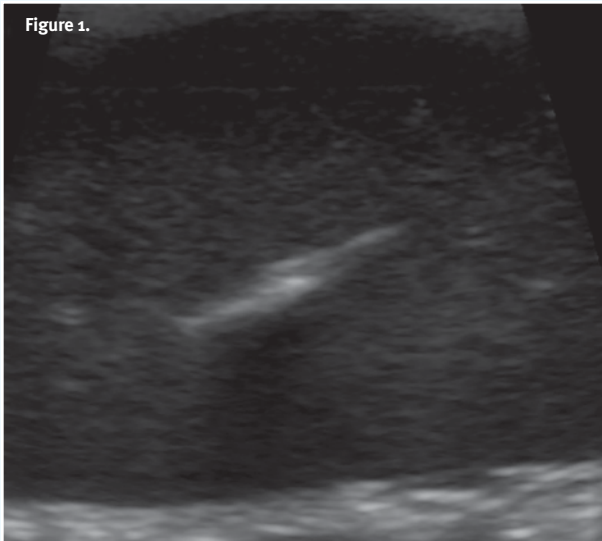
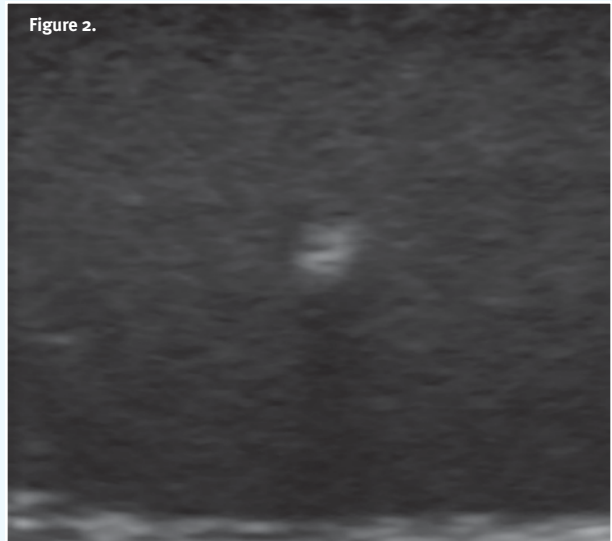


Figure 2.



A 57-year-old man presents to the urgent care with a 3-day history of left foot pain and swelling after walking barefoot on a wooden deck under construction. He recalls feeling a sharp pain in the affected foot at the time but could not see any foreign object. On examination, he has mild erythema, tenderness, and induration over the plantar surface of the midfoot. There is no visible puncture wound or foreign body present. Plain radiographs (XR) of the foot reveal no radiopaque foreign body or bony abnormalities. A point-of-care ultrasound (POCUS) of the foot is performed in 2 planes.

View the POCUS image above and consider the likely diagnosis and next steps. The resolution of the case is described on the following page.

Case provided by Tatiana Havryliuk, MD, an emergency physician based in New York, New York, and the founder of Hello Sono.

Differential Diagnosis

- Puncture wound
- Retained organic material foreign body
- Contusion
- Abscess
- Cellulitis
- Osteomyelitis
- Plantar fasciitis

Diagnosis

The correct diagnosis in this case is a retained wooden splinter in the plantar soft tissues. While the physical exam and XR are non-diagnostic, the POCUS exam reveals a hyperechoic (white) structure in the plantar soft tissues with posterior shadowing (black), consistent with a wooden foreign body; this was confirmed after removal in urgent care. The shape of the object is linear, as evidenced by the punctate appearance in one plane and linear appearance in the other. A slight surrounding hypoechoic (light gray) halo was also observed, indicative of inflammatory changes. No fluid collection was identified, indicating that no abscess was present.

Discussion

Retained wooden splinters are commonly missed on initial evaluation due to their radiolucency and nonspecific associated symptoms. XR has limited sensitivity for detecting radiolucent foreign bodies (eg, wood and plastic) with sensitivities reported as low as 5-20%.^{1,3} Ultrasound offers a significant advantage in identifying radiolucent materials, with sensitivities ranging from 78-100% for wood.^{1,4} On ultrasound, wooden foreign bodies appear as hyperechoic structures with posterior acoustic shadowing. A hypoechoic halo is seen when the foreign body has been retained for over 24 hours, indicating inflammation.⁵ Visualization in multiple planes can help determine the shape of the object. The water bath technique can improve visualization of small foreign bodies in small or superficial structures, such as digits and hands.⁶

Additional advantages of POCUS for evaluating soft tissues for retained foreign bodies include its ability to assess for associated abscess formation, and the function of Color Mode to identify superficial vasculature structures. Furthermore, POCUS can provide real-time guidance during the foreign body extraction process, which can enhance precision and reduce the risk of discomfort and complications.

Despite its utility, POCUS does have limitations: Sensitivity will be reduced in the hands of inexperienced operators; acoustic artifacts such as gas shadows from infections or overlying tissues can obscure visualization; and differentiation between foreign bodies and other hyper-

echoic structures, like calcifications, may be challenging. Despite these limitations, when used in conjunction with clinical context and proper technique, ultrasound can be a valuable tool for assisting in identification and removal of soft tissue foreign bodies.

What to Look For

- Retained foreign bodies often present with localized pain, swelling, and erythema. A visible puncture wound may not always be present.
- On ultrasound, wooden foreign bodies appear as hyperechoic structures with posterior acoustic shadowing.
- Look for an associated anechoic (black) fluid collection which may represent an abscess.
- Measure the size and depth of the foreign body to guide removal.

Pearls for Urgent Care Management

- Employ POCUS to detect radiolucent foreign bodies. Familiarity with sonographic characteristics of various foreign body materials can enhance diagnostic accuracy.
- Promptly remove foreign bodies once identified (under ultrasound guidance when feasible) to prevent complications such as deep space infection/osteomyelitis, granuloma formation, and chronic pain.
- Ensure tetanus vaccination status is up-to-date and consider antibiotics when signs of infection are present.
- Urgent referral to a podiatrist is indicated for cases with deep (eg, embedded near tendons, joints, or neurovascular structures) or complex foreign bodies (eg, irregularly shaped or multiple fragments), failed removal attempts, or in high-risk patients and those with severe pain/functional impairment.

References

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68-Year-Old With Dyspnea

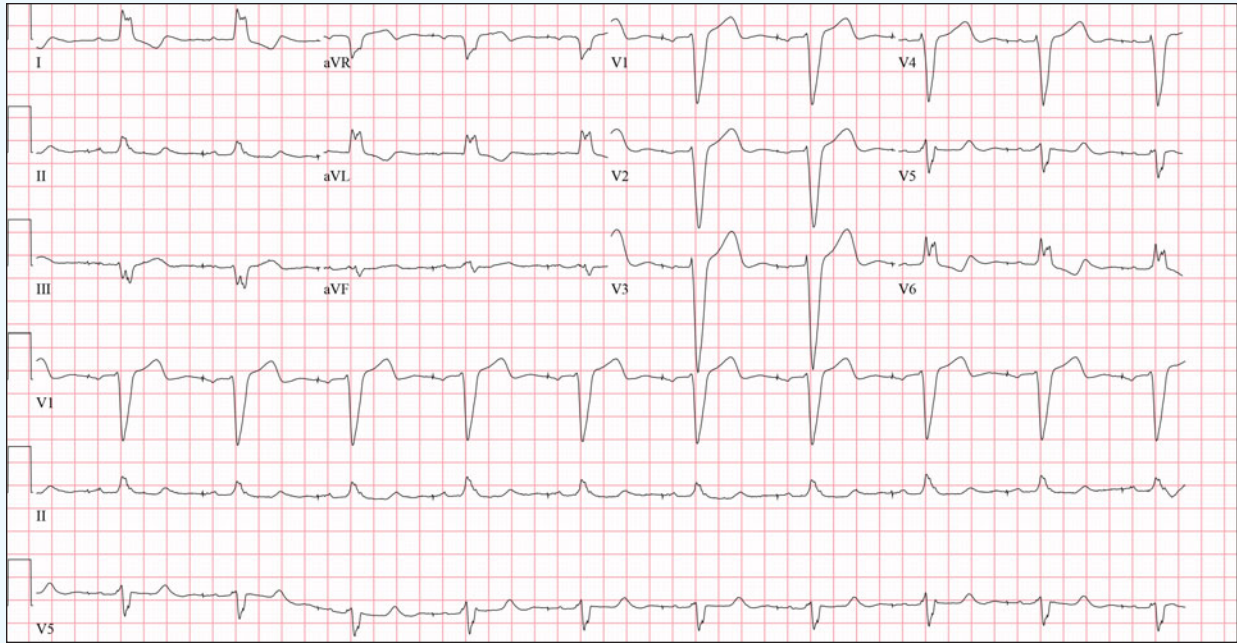


Figure 1: Initial ECG

A 68-year-old female presents to urgent care with dyspnea for 2 days. She has a medical history of heart failure. An ECG is obtained.

View the ECG captured above and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.

Case presented by Benjamin Cooper, MD, McGovern Medical School, The University of Texas Health Science Center at Houston, Department of Emergency Medicine.

Case courtesy of ECG Stampede (www.ecgstampede.com).

ECG STAMPEDE

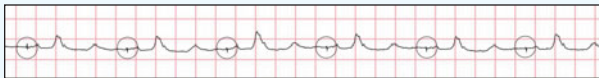


Figure 2: Pacer spikes seen preceding the atrial complexes in the lead II rhythm strip (circles)

I	II	III
Chamber paced	Chamber sensed	Response to sensing
O = none A = atrium V = ventricle D = dual (atrium and ventricle)	O = none A = atrium V = ventricle D = dual (atrium and ventricle)	O = none T = triggered I = inhibited D = dual (trigger and inhibition)

Figure 3: Pacemaker code

Differential Diagnosis

- Atrial fibrillation
- Ventricular paced rhythm
- Atrial paced rhythm
- Sinus bradycardia

Diagnosis

The diagnosis in this case is atrial paced rhythm, left bundle branch block. This ECG shows an atrial paced rhythm with a rate of 60 beats per minute. There is a left bundle branch block without signs of ischemia. For more information regarding left bundle branch blocks, see the ECG

case in the May 2023 issue of *JUCM*.¹

Pacer spikes are visualized preceding the atrial complexes (**Figure 2**), indicating that the pacemaker initiated the impulse. Implantable pacemakers are indicated for a range of electrophysiologic issues including (but not limited to) sinus node dysfunction, high-grade atrioventricular block, syncope and bundle branch block, and cardiac resynchronization therapy for severe systolic heart failure.^{2,3} They are programmed with 5 variables, 3 of which are relevant for urgent care providers. The 3 variable code indicates: 1) the chamber paced; 2) the chamber sensed; and 3) the response to sensing (**Figure 3**).⁴

The presence of atrial pacer spikes indicates that an atrial lead is present. A ventricular lead is likely present (ie, dual chamber pacemaker), although ventricular spikes are not seen. The most common pacemaker mode is DDD, which indicates that both chambers (ie, right ventricle and right atrium) have the potential to be paced and sensed, and the response to sensing can be either inhibitory or triggering. When the intrinsic rate drops below a certain threshold (eg, 60 beats per minute), the pacemaker triggers a signal. In this case, an atrial signal is triggered, and the ventricular contraction is allowed to occur naturally provided that the atrioventricular delay does not exceed a predefined threshold. If the atrioventricular delay were to exceed the predefined threshold, the ventricular lead would also trigger a signal resulting in a pacer spike preceding the ventricular (ie, QRS) complex. Atrial pacing

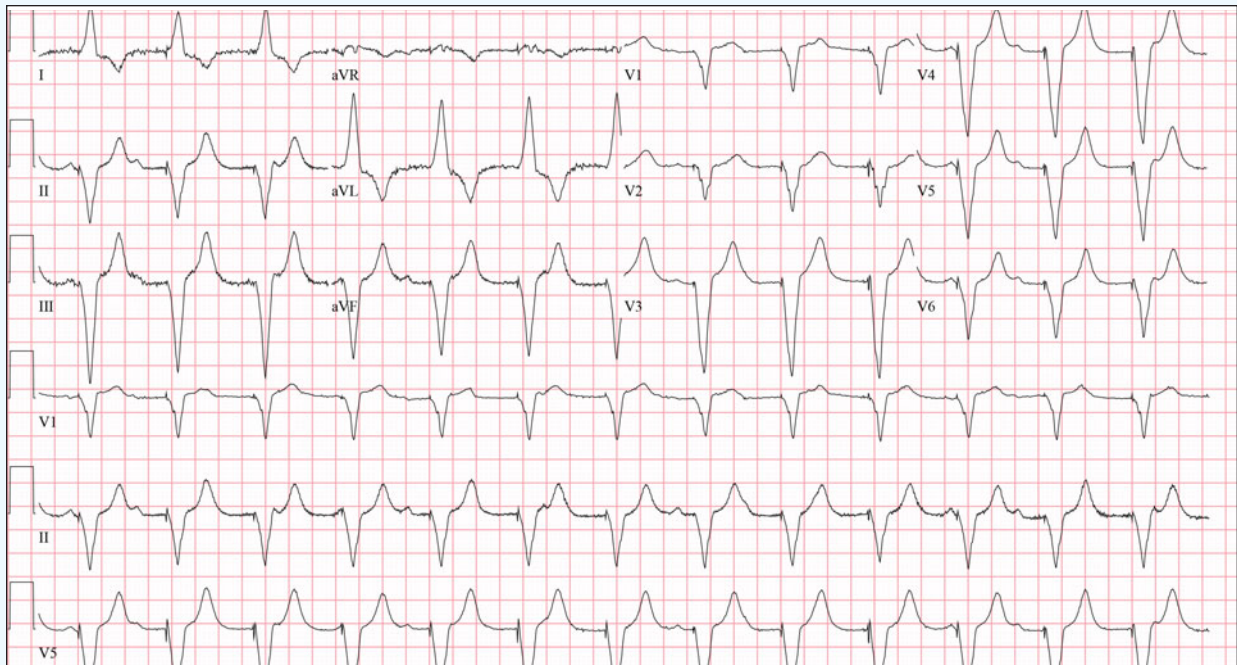


Figure 4: Pacer spikes preceding the ventricular complexes in VVI mode.

does not interfere with recognition of ischemic patterns.

Another common pacemaker mode is VVI. In this mode, the ventricle is sensed and paced via a single right ventricular lead, and the response to sensing is inhibition. If intrinsic activity is sensed and the rate is above the threshold, then the pacemaker will inhibit the response; otherwise, the pacer will initiate a signal resulting in a pacer spike preceding the ventricular (ie, QRS) complex (**Figure 4**).

The presence of an implantable pacemaker itself is not an indication for emergency department (ED) referral; however, it is an indicator of electrophysiologic pathology, and the urgent care provider should maintain a low threshold to refer someone to the ED with cardiopulmonary complaints and a known pacemaker to a cardiac capable ED.

What to Look For

- Pacer spikes preceding the atrial (eg, P waves) or ventricular (eg, QRS complexes) indicate the presence of a pacemaker.
- Pacemaker modes are indicated by a 3-code system which refers to: 1) the chamber paced; 2) the chamber sensed; and 3) the response to sensing.
- Atrial pacing does not interfere with recognition of ischemic patterns.

Pearls for Management, Considerations for Transfer

- Maintain a low threshold to refer patients with pacemakers that present with cardiopulmonary complaints (eg, chest pain, dyspnea, syncope) to a cardiac capable ED.

References

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