



**Challenge your diagnostic acumen:** Study the following x-rays, electrocardiograms, and photographs and consider what your diagnosis might be in each case. While the images presented here are authentic, the patient cases are hypothetical. Readers are welcome to offer their own patient cases and images for consideration by contacting the editors at [editor@juccm.com](mailto:editor@juccm.com).

## 30-Year-Old With Foot Inversion Injury



A 30-year-old man presents to urgent care with lateral ankle pain and swelling after a foot inversion injury he sustained while hiking. A mortise view x-ray of the ankle is ordered.

Review the images 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](http://www.experityhealth.com/teleradiology)).*



### Differential Diagnosis

- Lateral ankle sprain
- Fracture of the distal fibula
- Fracture of the lateral base of tibia at the syndesmosis

### Diagnosis

The correct diagnosis in this case is a fracture of the lateral base of tibia at the syndesmosis. The image reveals fragmentation of the lateral base of the tibia at the syndesmosis with diffuse ankle swelling. Syndesmosis injuries occur when there is a disruption of the distal attachment of the tibia and fibula. These injuries occur commonly, especially with athletic activity. There are 4 classic fracture fragments: medial malleolus; anterior malleolus; lateral malleolus; and posterior malleolus.

### What to Look For

- The syndesmosis is the articulation between the distal tibia and fibula and is comprised of 2 ligaments:

- The anterior-inferior tibiofibular ligament, which originates from anterolateral tubercle of tibia and inserts on anterior tubercle of fibula
- The posterior-inferior tibiofibular ligament, which originates from posterior tubercle of tibia and inserts on posterior part of lateral malleolus
- Evaluation of x-ray should inspect the origination and insertion points of these ligaments for disruption as a result of injury

### Pearls for Urgent Care Management

- Evaluate for neurologic or vascular compromise
- Initial treatment includes splint immobilization (ankle at 90 degrees)
- Pain management should include ice, elevation, and pain medications
- Stable joint patterns likely will heal with immobilization alone
- Unstable joint patterns likely will require surgical intervention, and orthopedic referral is indicated



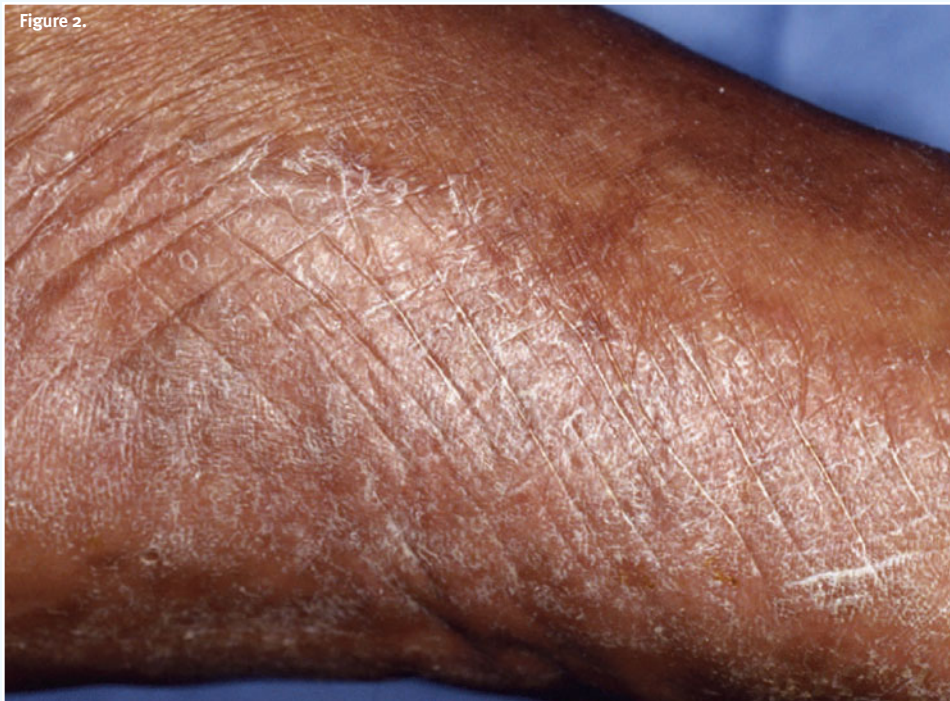
## 38-Year-Old With Foot Rash



A 38-year-old man presents to urgent care for a pruritic rash that developed on his feet over the last week. The rash is worse on his left foot than the right. He frequently works out and showers at the gym before going to work. On examination, fine, powdery, scaly plaques are seen on his soles and insteps. He otherwise appears well and has no systemic symptoms.

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](http://www.VisualDx.com/jucm)).*



#### Differential Diagnosis

- Allergic contact dermatitis
- Candidiasis
- Pitted keratolysis
- Tinea pedis

#### Diagnosis

The correct diagnosis in this case is tinea pedis, more commonly known as “athlete’s foot,” which is a localized, superficial fungal infection. The dermatophytes responsible for most cases of tinea pedis include *Trichophyton rubrum*, *Trichophyton mentagrophytes*, and *Epidermophyton floccosum*. The condition is more common in men and in athletes who use community showers in locker rooms and/or wear occlusive footwear that creates humid conditions around the foot.

#### What to Look For

- Tinea pedis has a varied clinical presentation but most often involves the web spaces and soles of the foot
- The rash may be asymptomatic or have varying degrees of pruritis
- *Trichophyton rubrum* may present with a red, scaly, moccasin-like plaque on the sole
- Interdigital cracking and maceration may be present and lead to secondary bacterial infection

#### Pearls for Urgent Care Management

- Consider performing a KOH (potassium hydroxide) evaluation for confirmation of the diagnosis
- Initial treatment should be with an antifungal agent with antidermatophyte activity
- Examples include azoles, allylamines, ciclopirox, butenafine, and tolnaftate



# 16-Year-Old With History Of Orchiopexy

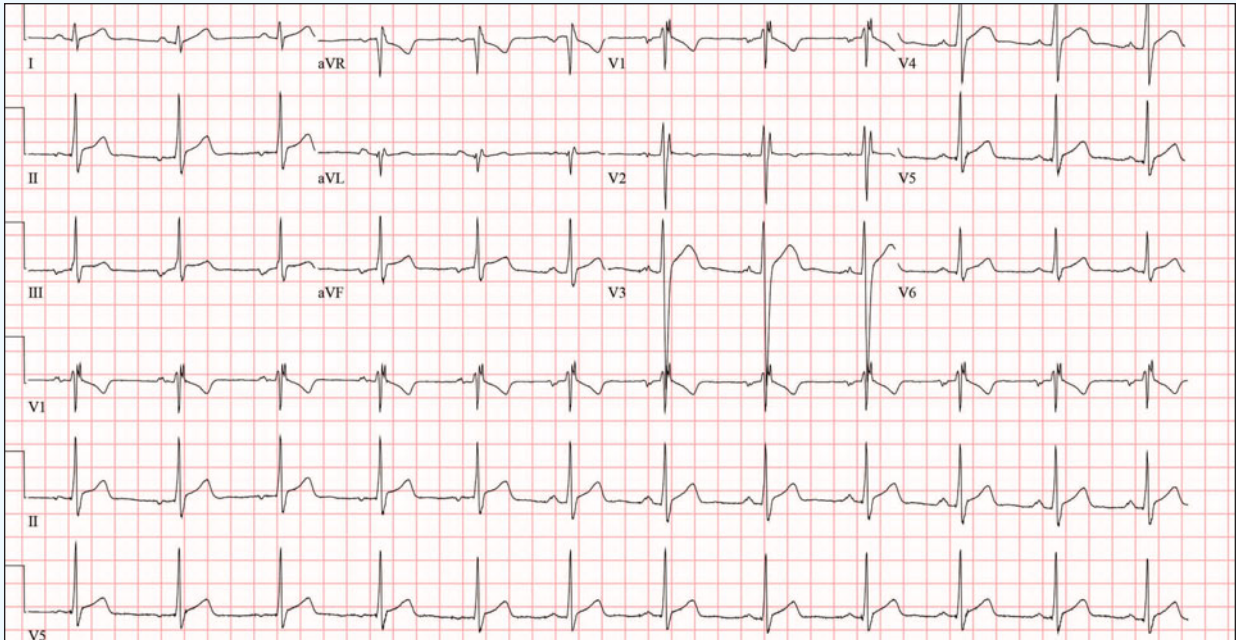


Figure 1: Initial ECG

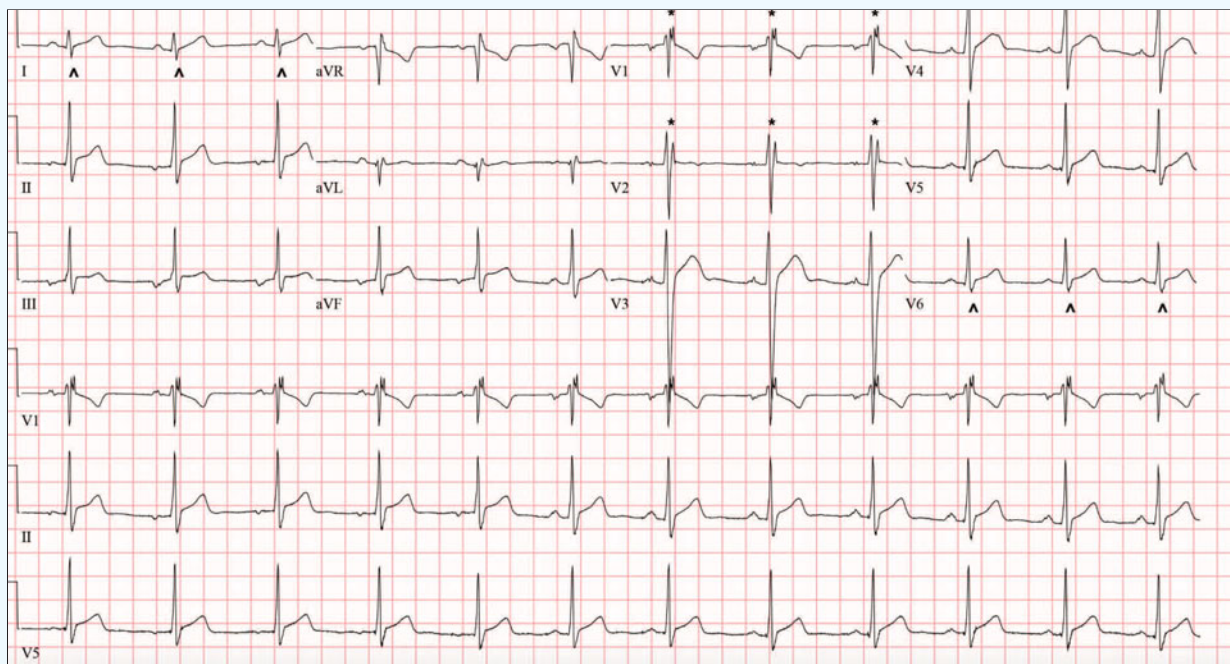
A 16-year-old male with a history of orchiopexy presents with syncope. He denies chest pain or shortness of breath. An ECG is obtained.

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 Catherine Reynolds, MD, McGovern Medical School at UTHealth Houston.

Case courtesy of ECG Stampede ([www.ecgstampede.com](http://www.ecgstampede.com)).





**Figure 2:** rSR' pattern in V1-V2 (asterisks) and wide/slurred S wave in the lateral leads (I, V6) (arrowheads) indicates the presence of a right bundle branch block morphology. QRS duration less than 120 msec makes this an incomplete right bundle branch block.

### Differential Diagnosis

- ST-elevation myocardial infarction (STEMI)
- Left ventricular hypertrophy (LVH)
- Right bundle branch block (RBBB)
- Incomplete right bundle branch block (iRBBB)
- Left bundle branch block (LBBB)

### Diagnosis

The diagnosis in this case is incomplete right bundle branch block. The ECG reveals a regular rhythm at a rate of 70 beats per minute. There is a normal axis. The axis of the p wave appears to be different in the first 5 beats, likely from an ectopic atrial focus, whereas the remaining beats appear to be sinus. The QRS complex duration is between 100-110 msec. There is an rSR' pattern in V1-V2 and a wide/slurred S wave in the lateral leads (I, V6). The RBBB morphology with a QRS duration less than 120 msec indicates the presence of an incomplete right bundle branch block. There are no signs of ischemia.

### Discussion

With a right bundle branch block, conduction through the right bundle is compromised, while the left bundle is unaffected. As the ventricles depolarize, conduction passes through the left bundle normally, across the left ventricle and through the myocardium to depolarize the right ventricle. Electrocardiographically, this creates a normal ap-

pearing early part of the QRS followed by a second R-wave (R') in the anterior precordial leads, and a slurred S-wave in lateral leads as the conduction moves slower through the right ventricle.<sup>1</sup> This slower-than-normal conduction results in a wide QRS (greater or equal to 120 msec). RBBB can be caused by a variety of problems including ischemia, fibrosis, calcifications, infiltrative disease, electrolyte disturbance, or impaired vascular supply.

Alternatively, an incomplete right bundle branch block has the same morphology as a right bundle branch block but with a QRS duration less than 120 msec. It is relatively common, especially in young people and males, but can affect people of all ages. One study on Swiss military conscripts with a mean age of 19 found an iRBBB prevalence of 13%.<sup>2</sup> While a RBBB has many dangerous causes, causes of iRBBB are most commonly benign. Often, iRBBB in the young, healthy population results from exercise-induced right ventricular remodeling and increased right ventricular free wall thickness, especially in athletes doing endurance exercise.

Because iRBBB is rarely pathologic, the clinical context is important to consider. Rare causes of iRBBB are structural abnormalities like atrial septal defect or conduction defects like Brugada syndrome or pre-excitation. In cases with a negative personal and family history and normal physical exam, iRBBB does not need further evaluation. However, if abnormalities are found on clinical exam, a

*“A patient with iRBBB and a negative personal and family history for cardiac disease, as well as a normal physical exam, does not need further evaluation.”*

transfer should be initiated to further evaluate for cardiac disease.<sup>2</sup>

#### What to Look For

- RBBB is defined by RSR' in V<sub>1</sub> or V<sub>2</sub>, S-wave of greater duration than R-wave or 40ms in leads I and V<sub>6</sub>, and QRS duration greater than or equal to 120 msec.
- An incomplete RBBB shares the same morphology as a RBBB, but with a QRS duration less than 120ms.

#### Pearls for Initial Management, Considerations for Transfer

- Incomplete right bundle branch block is typically benign but should be interpreted in the clinical context.
- A patient with iRBBB and a negative personal and family history for cardiac disease, as well as a normal physical exam, does not need further evaluation.
- Patients with an iRBBB and abnormalities on clinical exam that could be related to cardiac disease should be transferred to a hospital for cardiology consultation and an echocardiogram.

#### References

1. Surawicz B, Childers R, Deal BJ, Gettes LS. AHA/ACCF/HRS Recommendations for the Standardization and Interpretation of the Electrocardiogram. Part III: Intraventricular Conduction Disturbances A Scientific Statement From the American Heart Association Electrocardiography and Arrhythmias Committee, Council on Clinical Cardiology; the American College of Cardiology Foundation; and the Heart Rhythm Society. *J Am Coll Cardiol*.
2. Kobza R, Cuculi F, Abächerli R, Toggweiler S, Suter Y, Frey F, et al. (December 2012). Twelve-lead electrocardiography in the young: physiologic and pathologic abnormalities. *Heart Rhythm*. 9 (12): 2018–2022.
3. Floria M, Parteni N, Neagu AI, Sascau RA, Statescu C, Tanase DM (June 2021). Incomplete right bundle branch block: Challenges in electrocardiogram diagnosis. *Anatolian Journal of Cardiology*. 25 (6): 380–384.

# SHARPEN YOUR X-RAY VISION

Learn new, or improve existing clinical x-ray skills — and boost your career — with basic training presented by leading radiology experts.

- Case reports with diagnostic tools, tips, and takeaways
- 25 AMA PRA Category 1 Credits™
- Additional 15 case bundle available annually
- Unlimited access for one year
- Group pricing available, with free training and onboarding



**IUCM**<sup>®</sup>  
INSTITUTE OF URGENT CARE MEDICINE

LEARN MORE

