

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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## Metatarsal Fractures

A 90-year-old white female with a PMH of hypothyroidism and Alzheimer's disease presents with right foot discoloration and swelling first noticed this morning. Per her niece, she first noticed the patient's right foot was red and swollen when the patient was visiting her. The patient denies any falls or trauma. Patient is able to ambulate without difficulty. Patient endorses some mild discomfort to touch and occasionally with walking. Patient is on baby aspirin and is not on any anticoagulation. She denies weakness or numbness of that extremity. She denies any chest pain, shortness of breath, fevers, chills, nausea, and vomiting. She lives alone in a 2-story house. Vitals: BP 114/67, Pulse 92, Temp 36.9 °C (98.5 °F), Resp 18, SpO2 95% On exam, she has a soft right foot compartment. The entire foot is swollen and confluent erythematous with bruising spanning the dorsum of the 2nd-5th metatarsal region extending laterally. The same ecchymosis distribution is found on the plantar surface. Dorsal pedis and posterior tibial pulses are intact. She has equal sensation bilaterally. There is no increased warmth. She has mild tenderness to palpation in the distal metatarsal region. She has slightly limited passive range of motion in the ankle and toes. **Which of the following foot exam findings should prompt urgent intervention?**

- A. Severe pain aggravated by passive motion
- B. Paresthesia
- C. Weakness
- D. Tense, shiny skin
- E. All the above



These images show comminuted displaced and posterior angulated fractures involving the distal segments of the 2nd, 3rd, 4th and 5th metatarsal bones with extension into the metatarsal phalangeal joint seen at the 2nd and 3rd digit.

*EM Case of the Week is a weekly "pop quiz" for ED staff.*

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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*The correct answer is E. All the above*

These exam findings are all indicative of possible development of compartment syndrome. A condition of acutely elevated pressures in an osseofascial compartment. Most often associated with trauma and fracture. Individuals on anticoagulation therapy are at an increased risk of this complication. Urgent surgical decompression is a mainstay of therapy with the intention of decreasing tissue pressure, restoring blood flow, minimizing tissue insult, and associated functional deficit. Delay in diagnosis and treatment can result in permanent nerve damage, ischemic contractions, or may even require amputation.

## Discussion

Metatarsal fractures are the second most common foot fracture with the exception of the toes. Most metatarsal fractures are caused by direct blows or twisting force to the foot such as heavy objects dropped on the foot and traumatic injury to the sole of the foot as in falls or motor vehicle collisions. The most common metatarsal fracture patterns are either oblique or transverse with minimal displacement. Multiple fractures, displacement, and comminution can be seen more often in high-force injuries.

## Fifth metatarsal fracture

A subset of metatarsal fractures worth discussing involves the proximal end of the fifth metatarsal bone. The three main fractures at this site include avulsion fractures, stress fractures, and acute proximal diaphyseal fractures also known as Jones fractures. The prognosis and treatment for these three fractures are considerably different making proper diagnosis vital. The diagnosis between acute proximal diaphyseal and stress fractures tends to be most difficult. Compared to other fifth metatarsal fractures, acute proximal diaphyseal fractures are prone to non-union (estimated around 30-50%) and almost always take longer than two months to heal.



(via <https://radiopaedia.org/articles/jones-fracture-1?lang=us>)

## Treatment

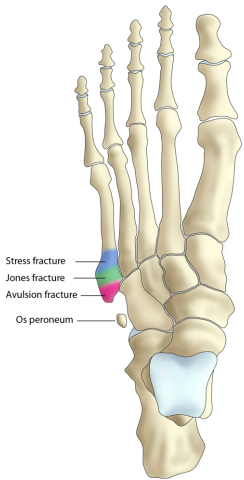
In the case of acute proximal diaphyseal fractures, displacement of the fracture can be increased with persistent weight bearing, proper immobilization is a crucial step of the initial therapy with a non-weight bearing cast for 6-8 weeks. Internal fixation and even bone grafting may be required in cases of non-union or where the fracture is significantly displaced.

Minimally displaced metatarsal fractures like those discussed in the case generally heal well without the need for cast immobilization. Treatment often consists of a firm, supportive shoe and progressive weight-bearing as tolerated. A post-operative hard sole boot is recommended if the patient does not have suitable shoes or the foot is too swollen to fit in supportive shoes.

Fractures displaced greater than 3-4 mm in the dorsal or plantar direction or with angulation greater than 10 degrees will likely require reduction and non-weight bearing casting with crutches.

For a list of educational lectures, grand rounds, workshops, and didactics please visit [BrowardER.com](http://BrowardER.com) and **click** on the **"Conference"** link.

*All are welcome to attend!*



F. Gaillard  
2009  
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## ABOUT THE AUTHOR

This month's case was written by Ian Jennings. Ian is a 4<sup>th</sup> year medical student from NSU-COM. He did his emergency medicine rotation at Broward Health North in September 2019. Ian plans on pursuing a career in Emergency Medicine after graduation.

## REFERENCES

Catherine Farrow, Acute limb compartment syndromes, Continuing Education in Anaesthesia Critical Care & Pain, Volume 11, Issue 1, February 2011, Pages 24–28

UpToDate :Metatarsal shaft fractures  
UpToDate: Proximal fifth metatarsal fractures

Courtesy of A.Prof Frank Gaillard, Radiopaedia.org, rID: 7644 L-R diagram, avulsion, and stress fracture

## Take Home Points

- Metatarsal fractures are the second most common foot fracture behind the toes.
- On average, one-third involve the shaft or distal portion of the bone.
- Careful neurovascular assessment should be performed in metatarsal fractures resulting from crush injury for concern of developing compartment syndrome.
- A majority of distal shaft fractures can be treated without the need for reduction or casting depending on the degree of displacement and angulation.
- An exception to standard treatment is the case of acute proximal diaphyseal fractures where a non-weight bearing cast may be necessary for 6-8 weeks.