

# Ankle trauma *Soft tissues.....*

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# Disclosure

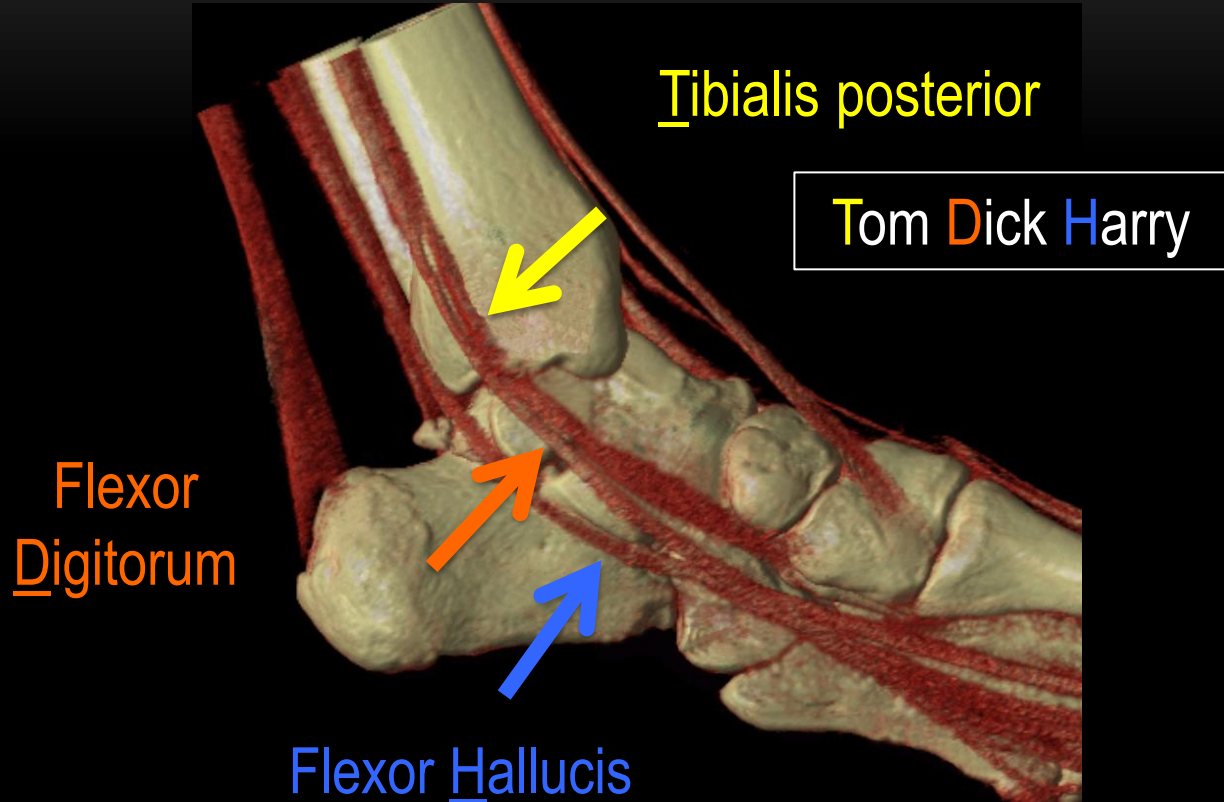
- No financial conflict of interest

# Learning objectives

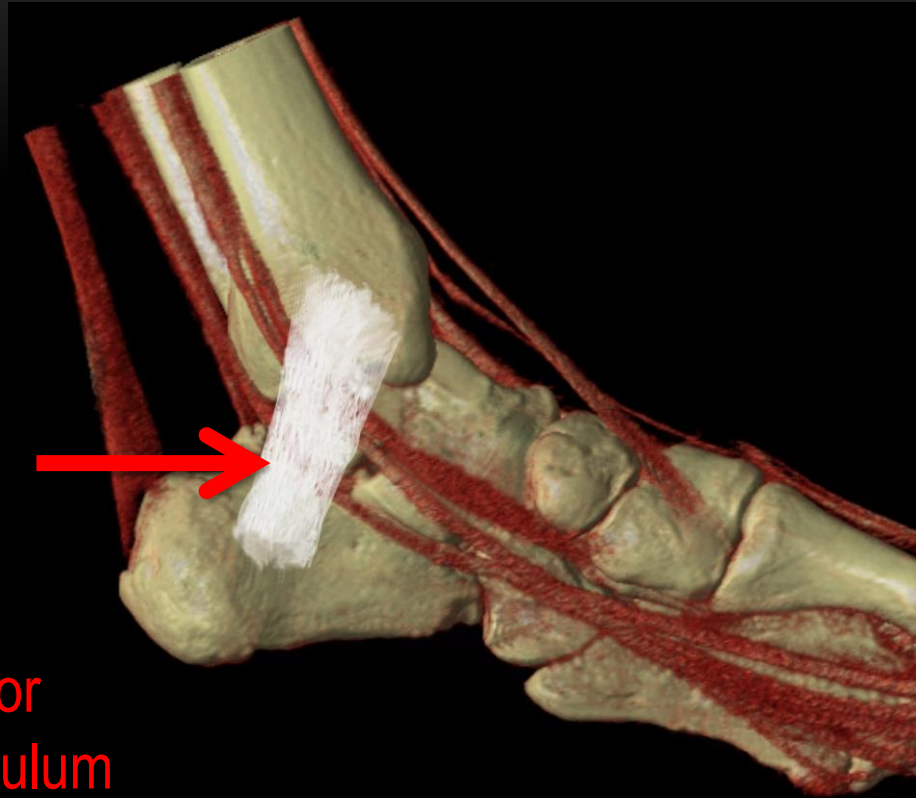
- Review ankle / hind foot soft tissue anatomy
  - Understand subtle injury patterns
  - Recognize injuries and augment diagnosis with CT and MRI
  - Be aware of pitfalls and complications
-

Anatomy

# Anatomy medial



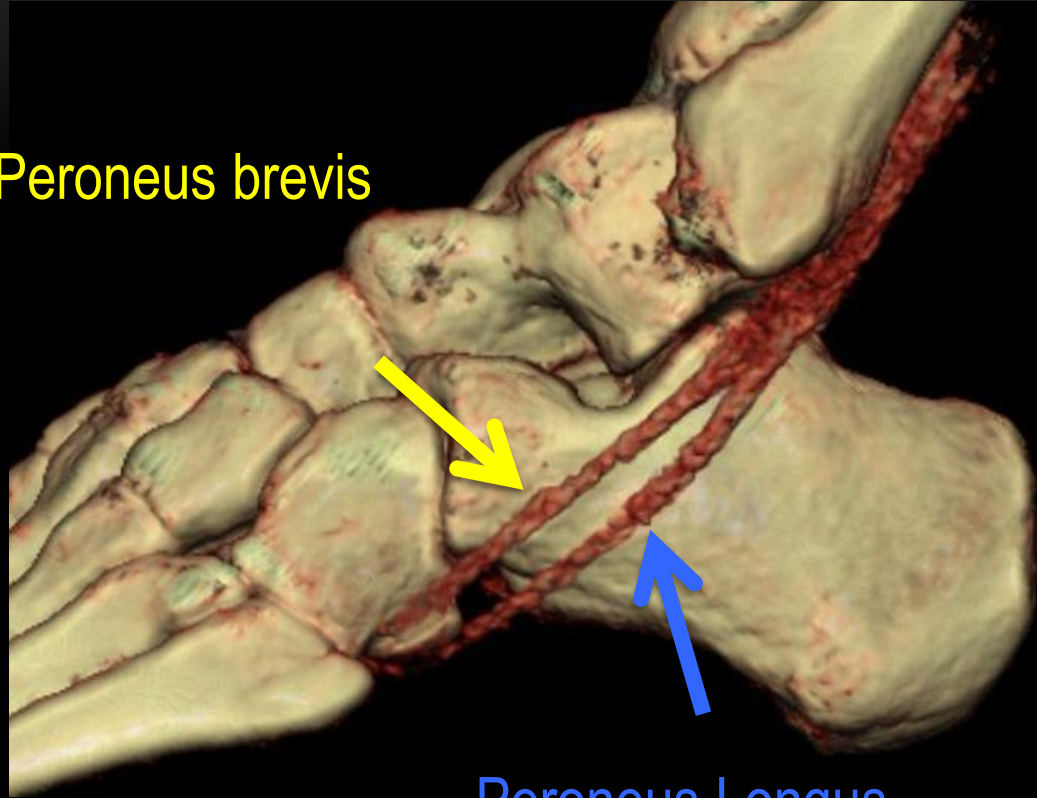
# Anatomy medial



Flexor  
Retinaculum

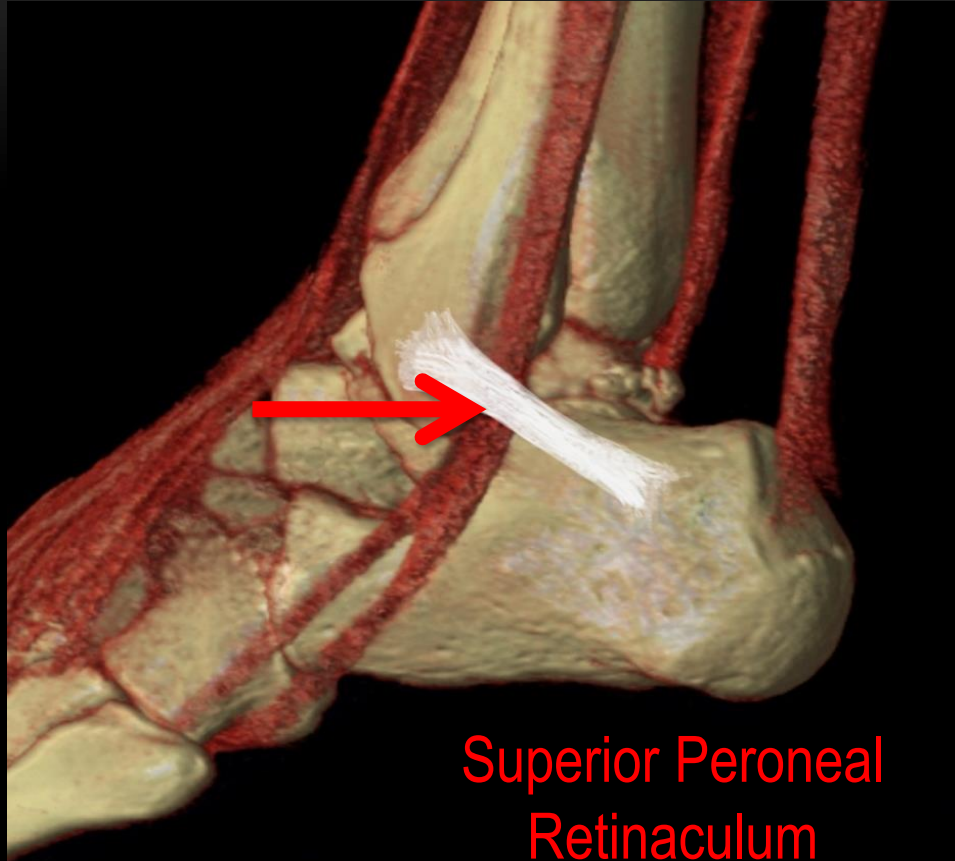
# Anatomy lateral

Peroneus brevis



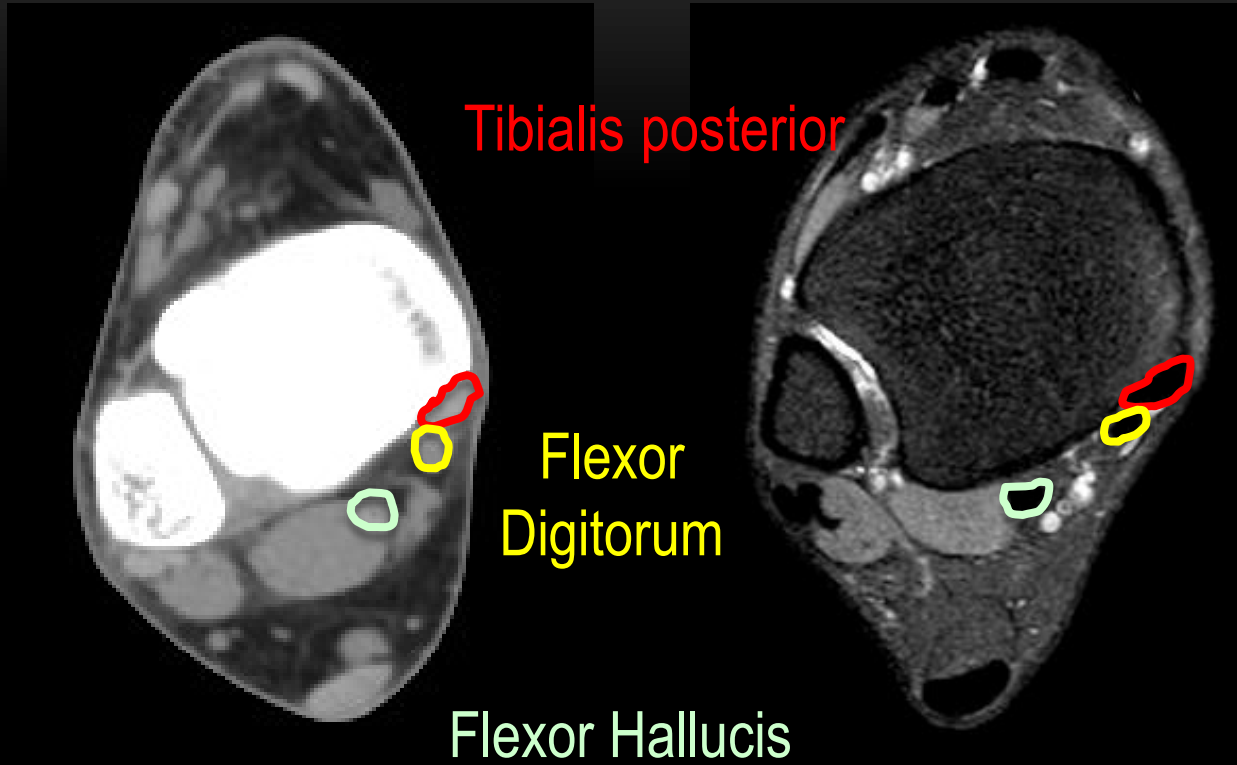
Peroneus Longus

# Anatomy lateral

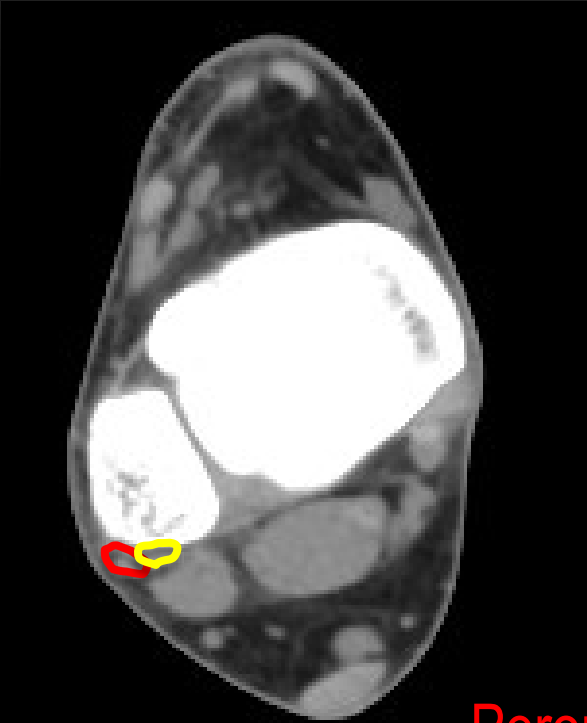




# Anatomy medial tendons



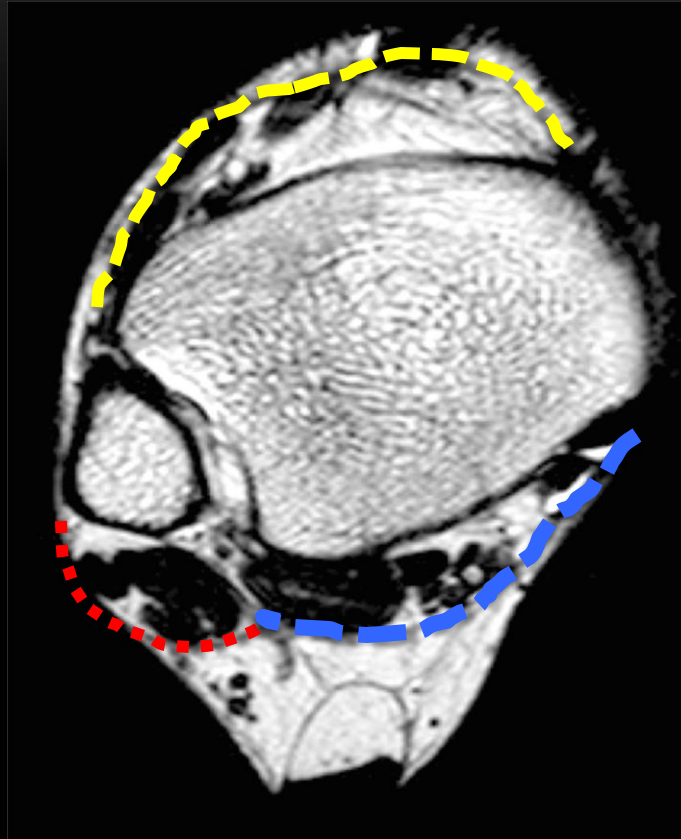
# Anatomy lateral tendons



Peroneus Longus

Peroneus brevis

# Anatomy retinaculum



Extensor  
retinaculum

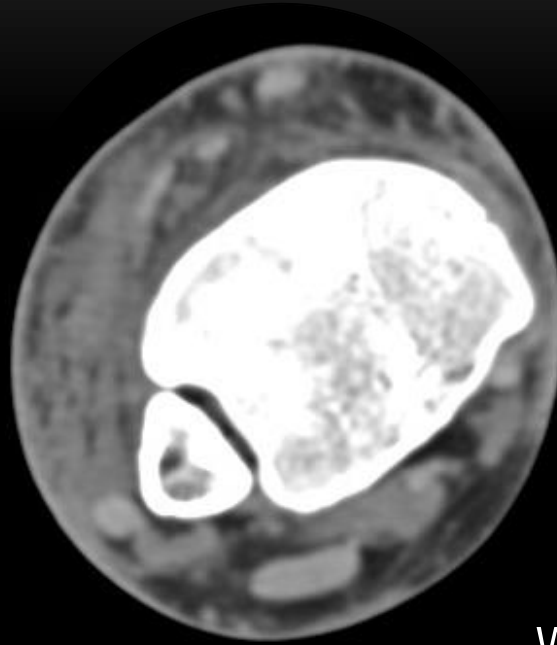
Flexor  
retinaculum

Superior peroneal  
retinaculum

Cases !

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38 yr. old pain and unstable – following trauma

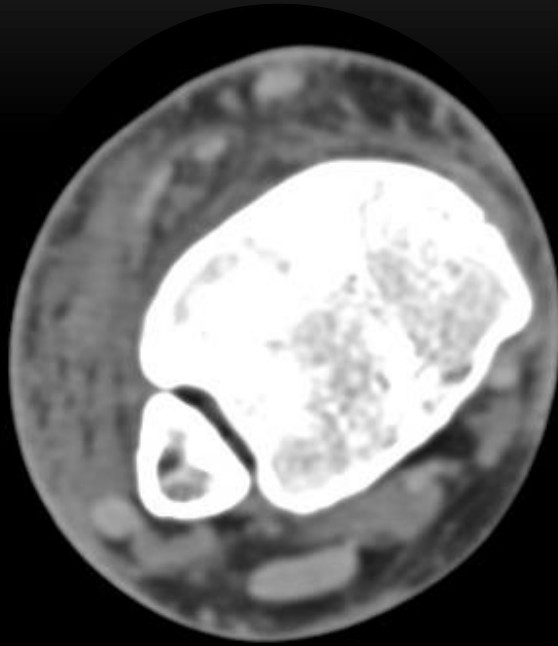


Where is the abnormality ?

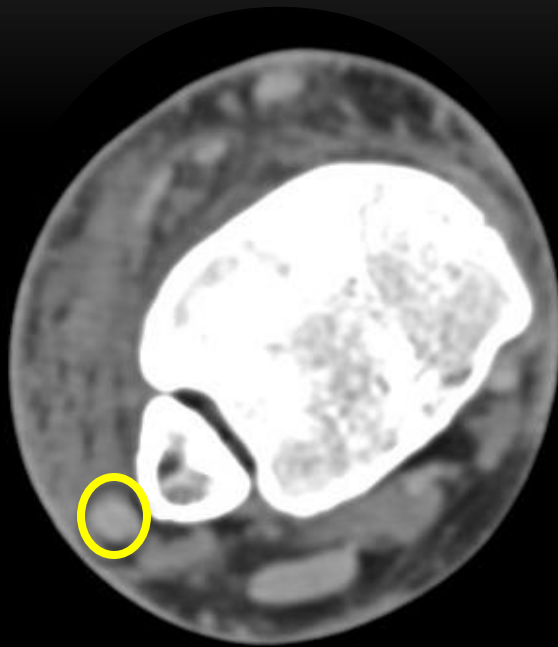
What is causing the abnormality ?

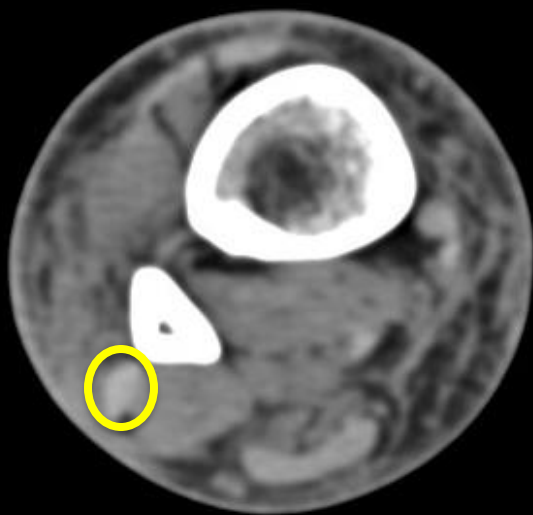


pain

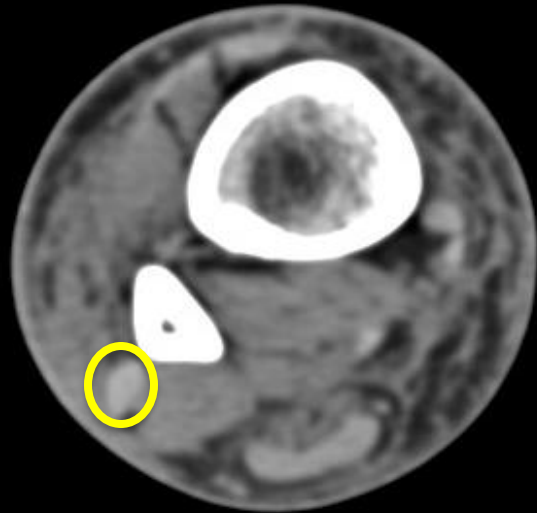


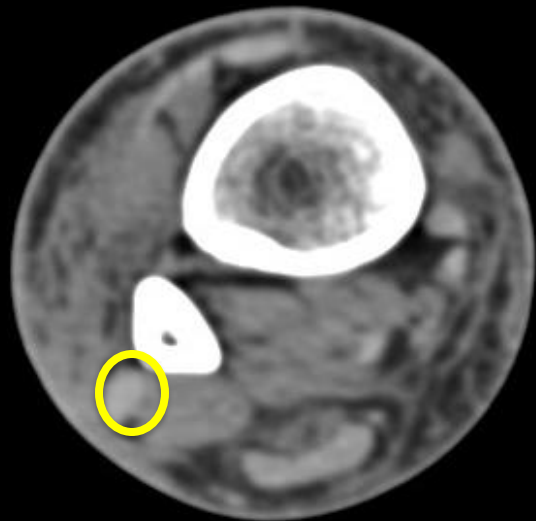
More images

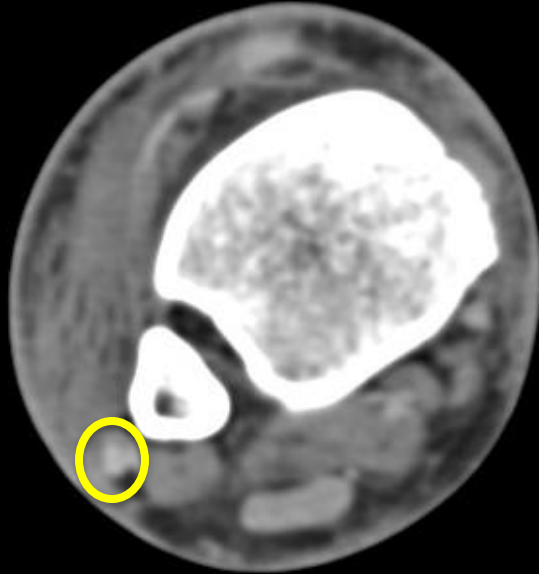


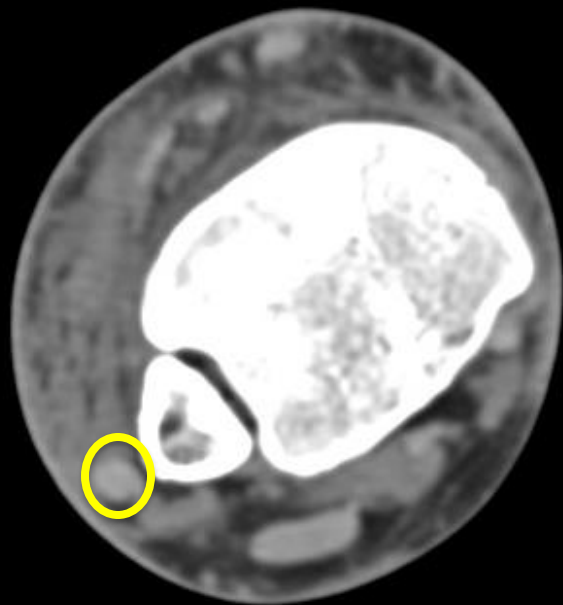


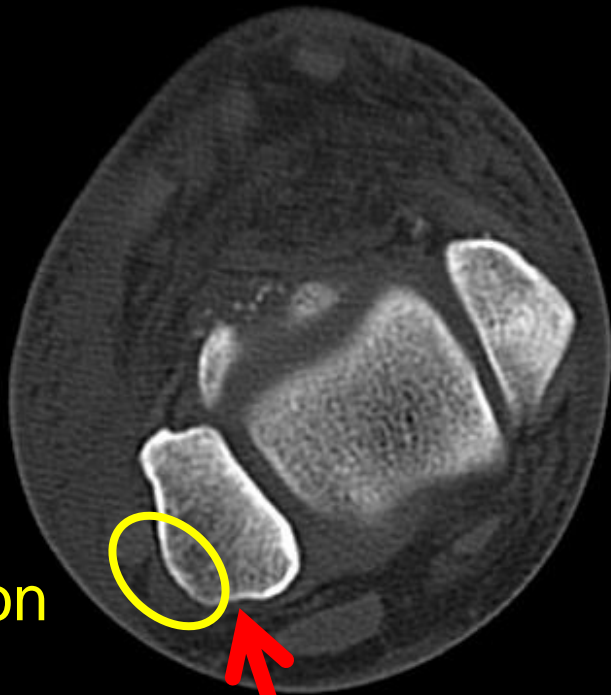










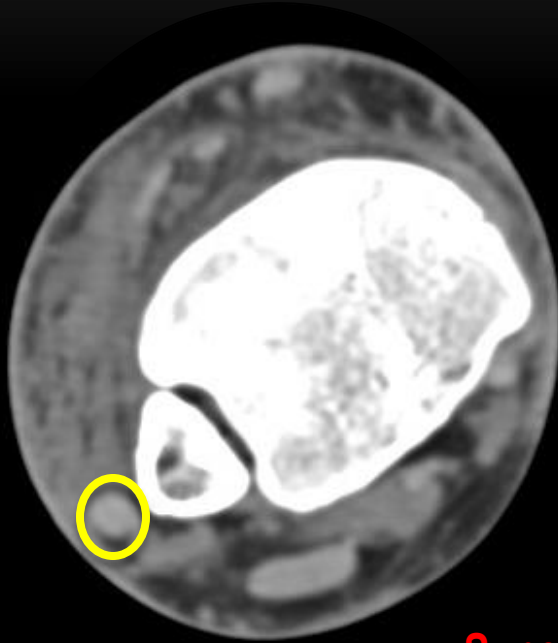


NO avulsion

Retro-fibular groove



# Subluxation of peroneal



Superior Peroneal  
Retinaculum

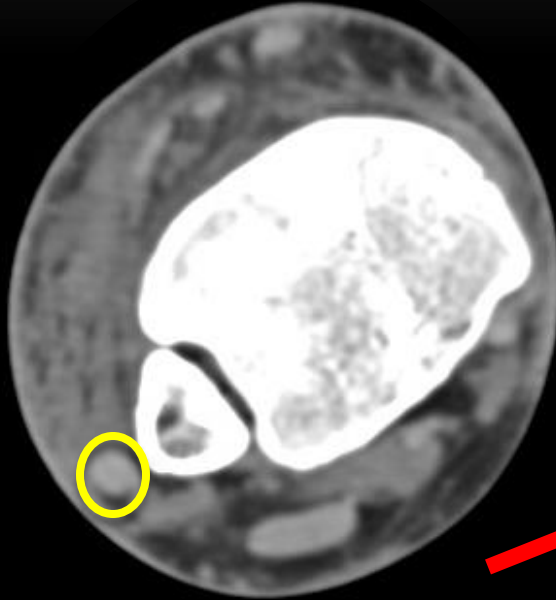


Normal

# Subluxation of peroneal

Peroneal tendons stay b'cos

- Superior peroneal retinaculum
- Retro-fibular groove
- Fibrocartilage



Normal Fibrocartilage



# 57-year-old with - Lateral symptoms

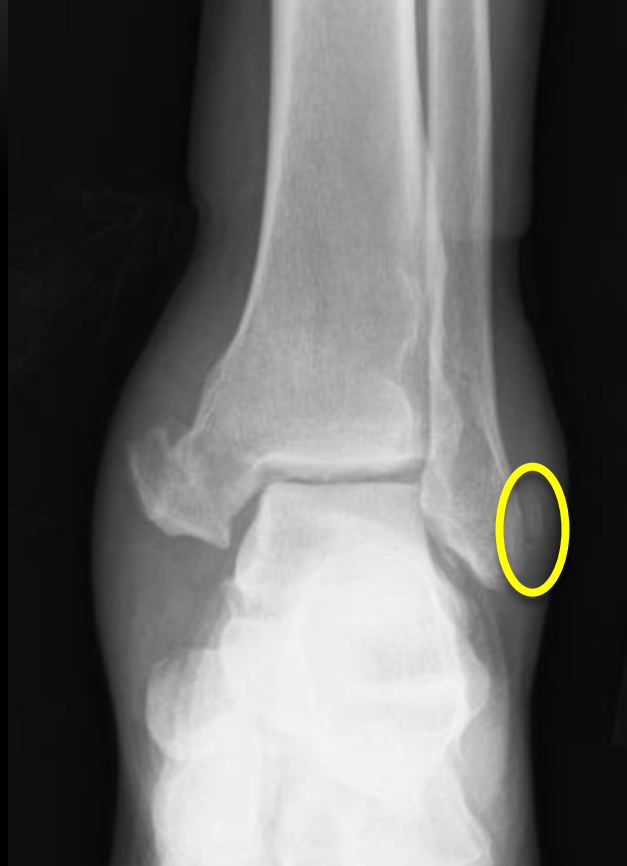


Where is the abnormality ?

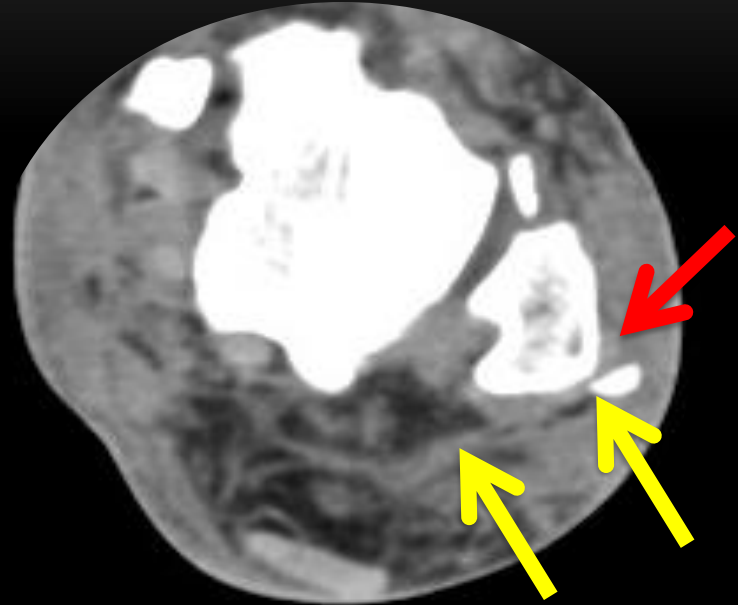
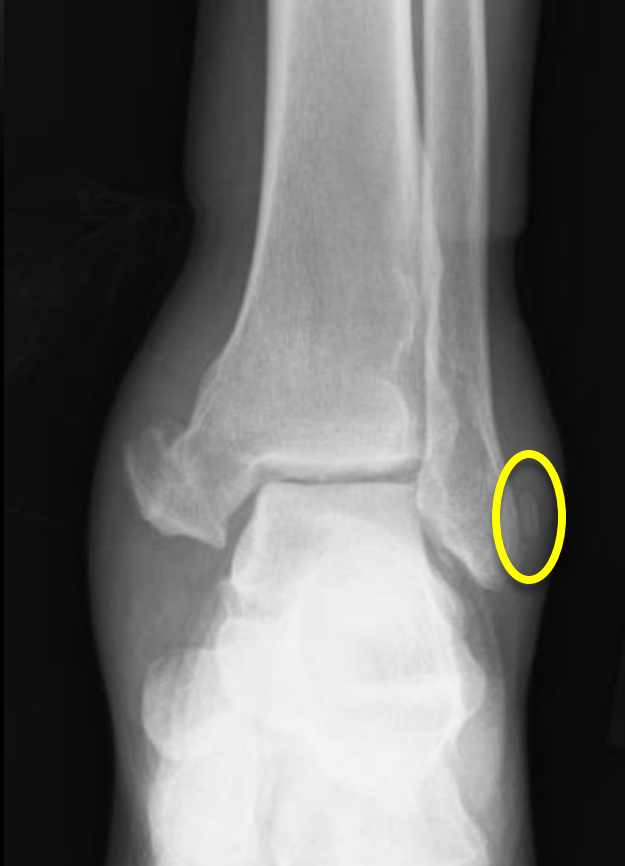
What attaches to the site?



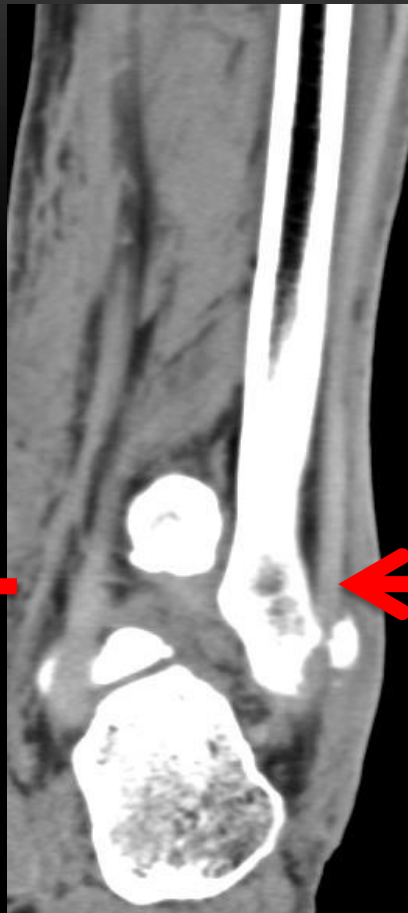
# Lateral symptoms



# Lateral symptoms



Superior Peroneal retinacular  
avulsion fx + split **Peroneus**



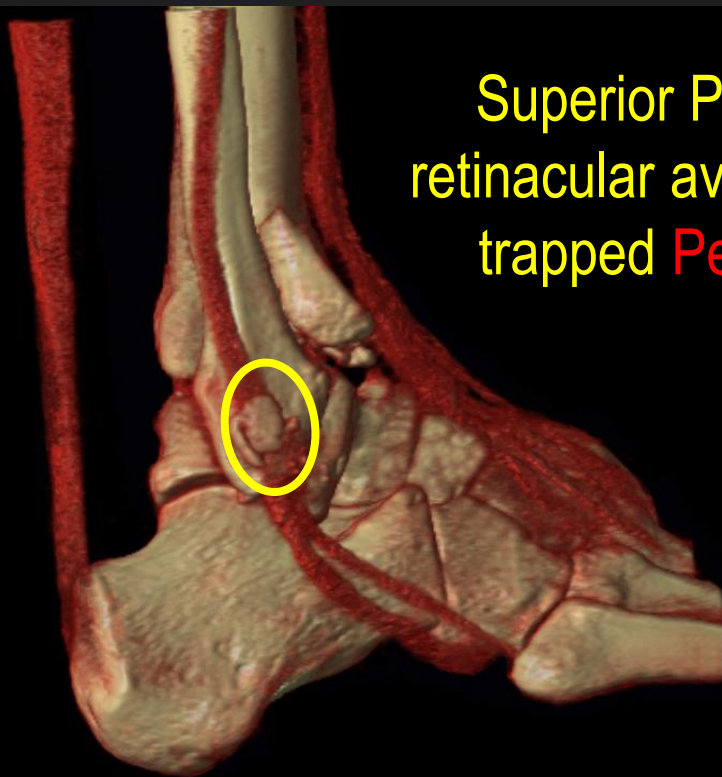


Superior Peroneal  
retinacular avulsion fx  
+ split Peroneus



# Lateral symptoms

2<sup>nd</sup> case



Superior Peroneal  
retinacular avulsion fx +  
trapped **Peroneus**

23yr old - Medial sided pain in ER



Where is the abnormality ?

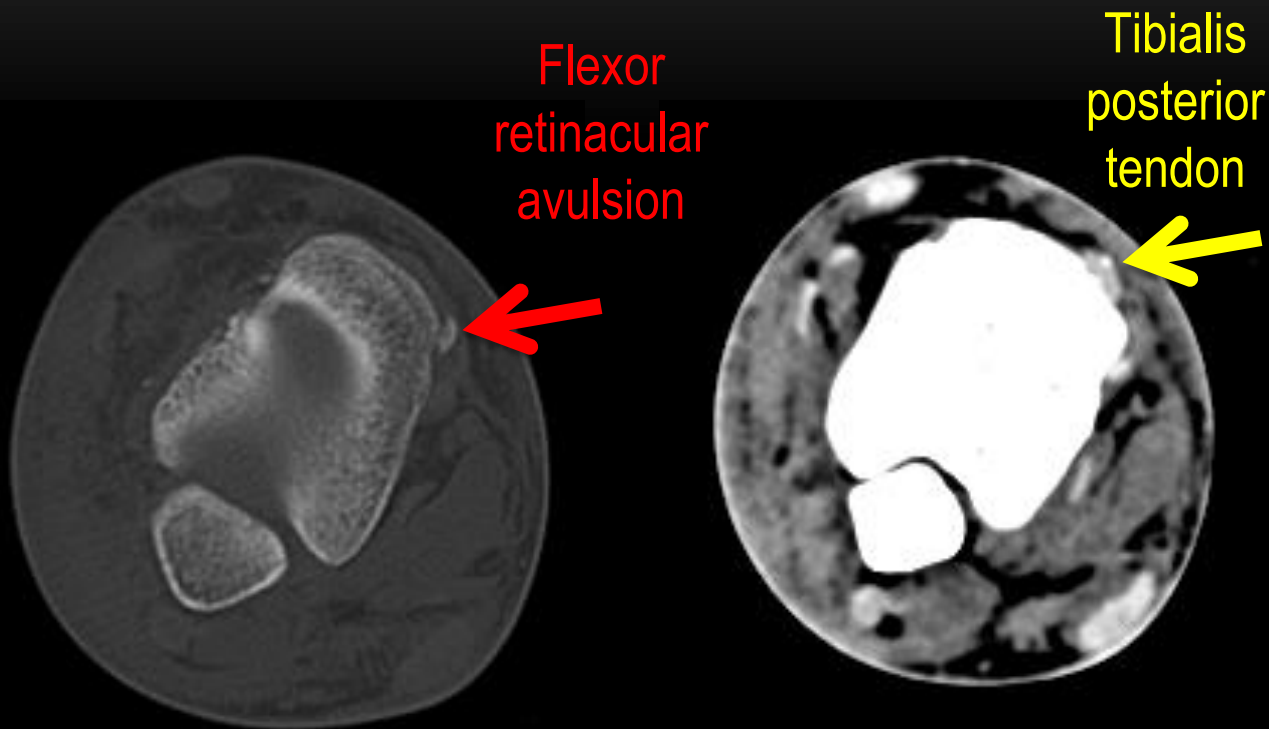




# Medial sided pain in ER

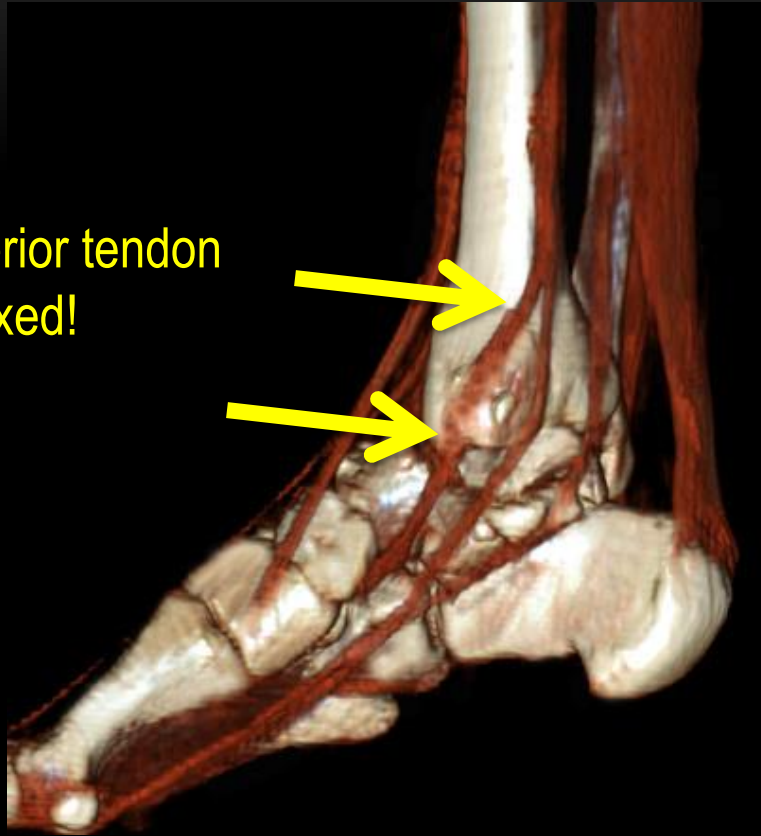


# Flexor retinacular avulsion



# FLEXOR RETINACULAR AVULSION

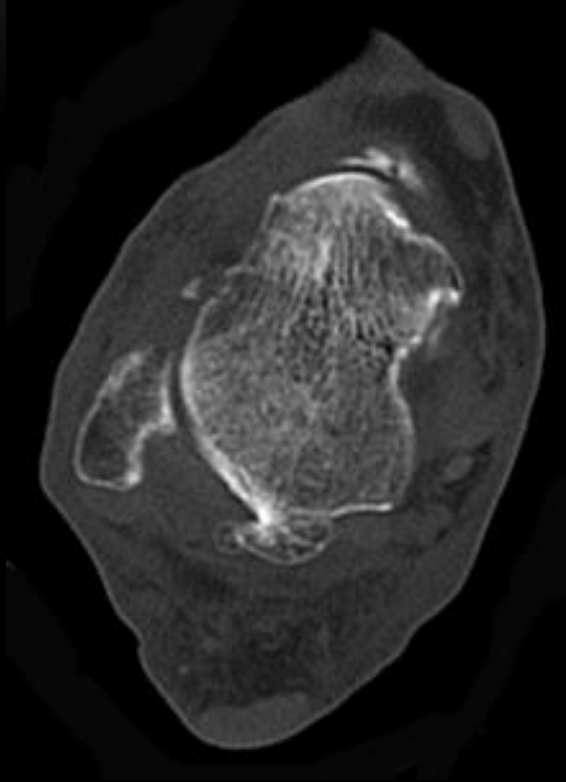
Tibialis Posterior tendon  
Subluxed!



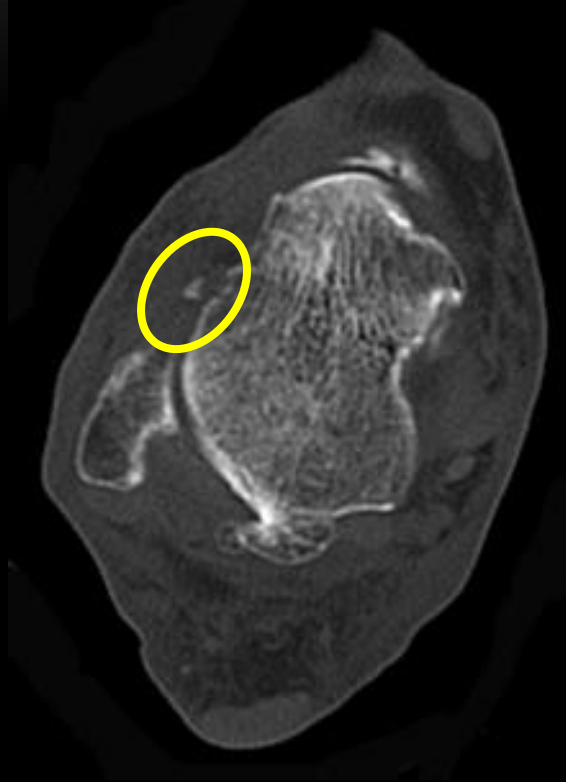
Let's look at some more injuries

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What are you worried about that could lead to instability?

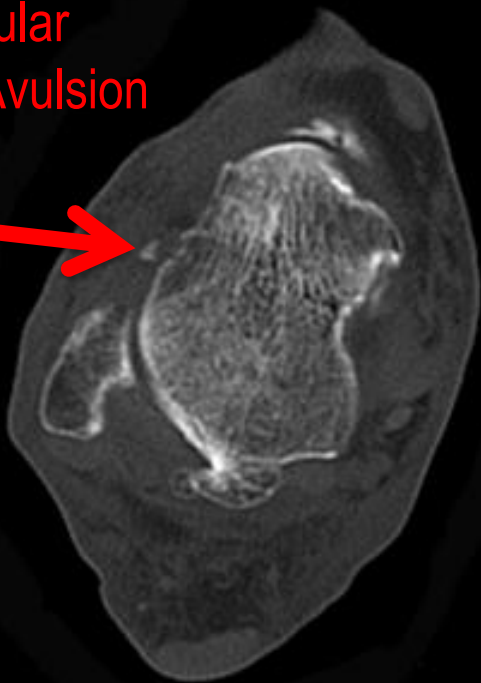


What are you worried about that could lead to instability?

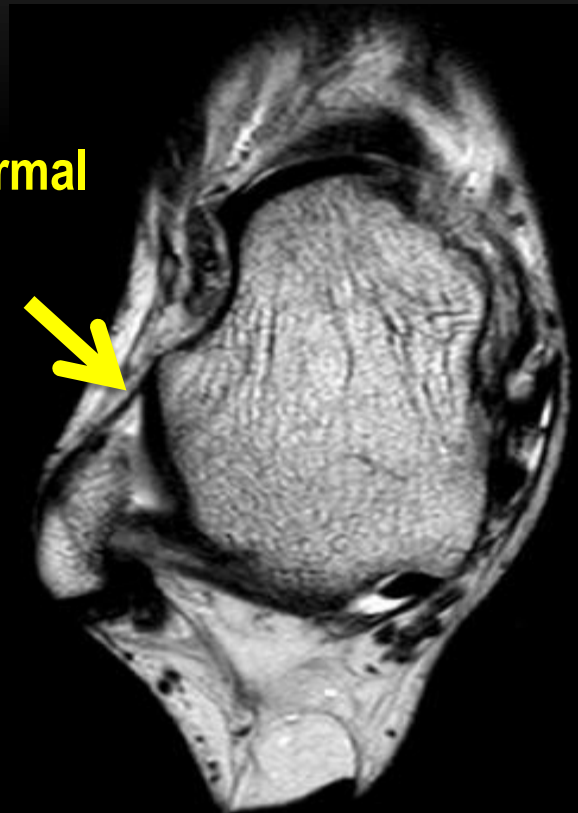


# ATFL avulsion

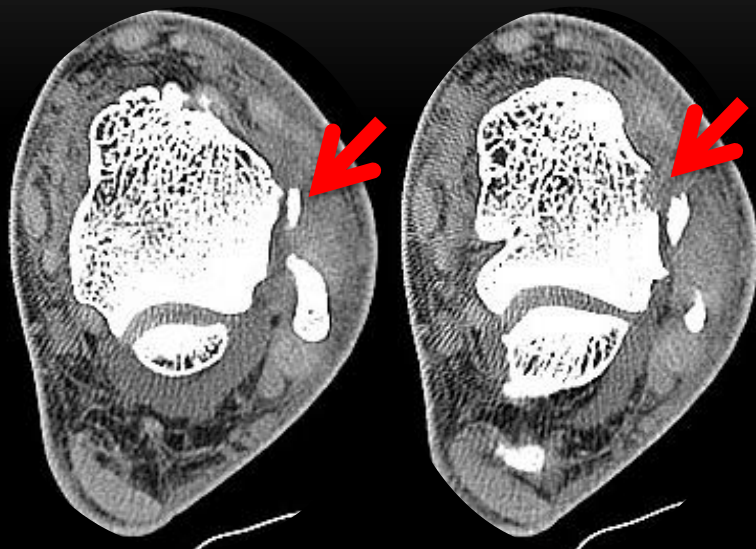
Anterior  
Talofibular  
Ligament Avulsion



Normal



# Cycling injury



ATFL avulsion

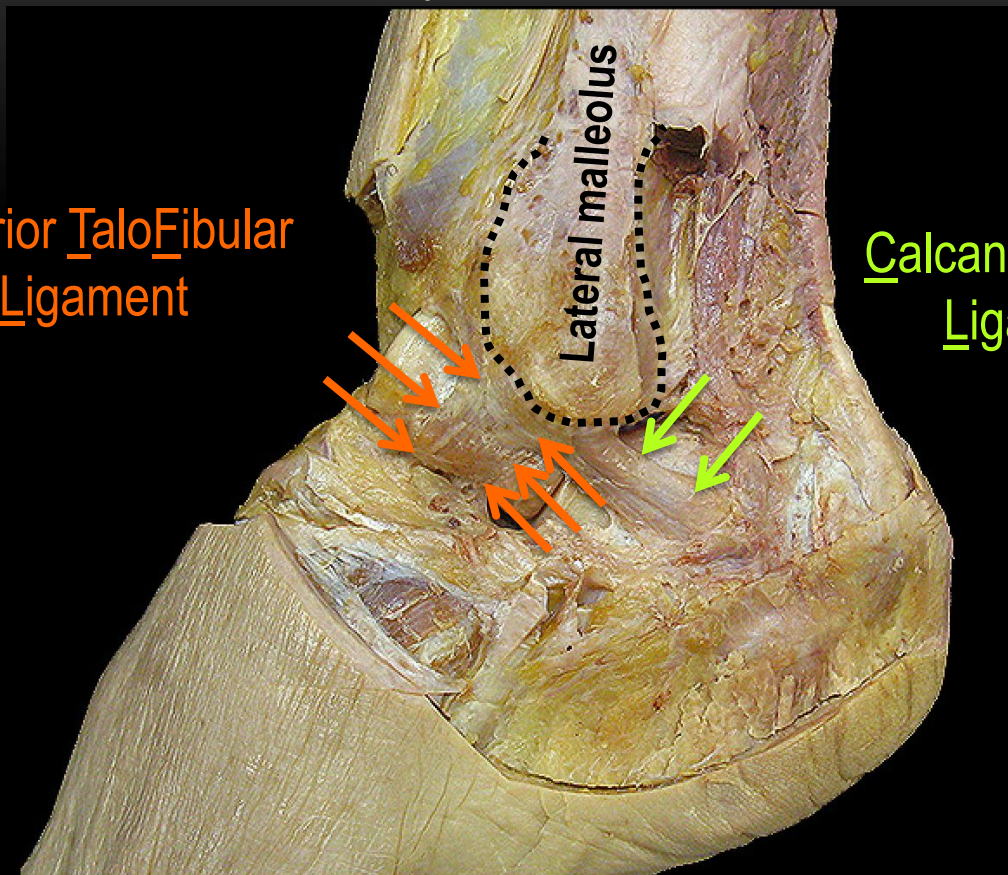




# Anatomy – ATFL & CFL

Anterior TaloFibular  
Ligament

Calcaneo Fibular  
Ligament



# CalcaneoFibular Ligament Avulsion

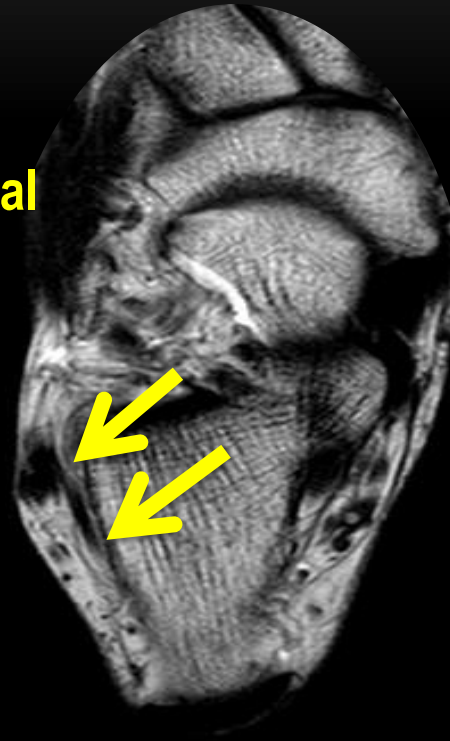
Posterior  
lateral pain



# CalcaneoFibular Ligament Avulsion



**Normal**



# Some more avulsions

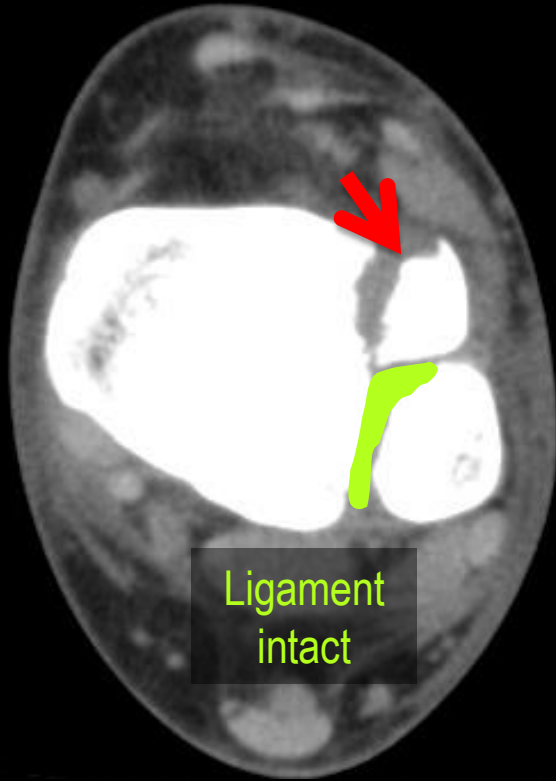


Distal Tib Fib avulsion



Normal  
Distal Tib Fib  
Ligament

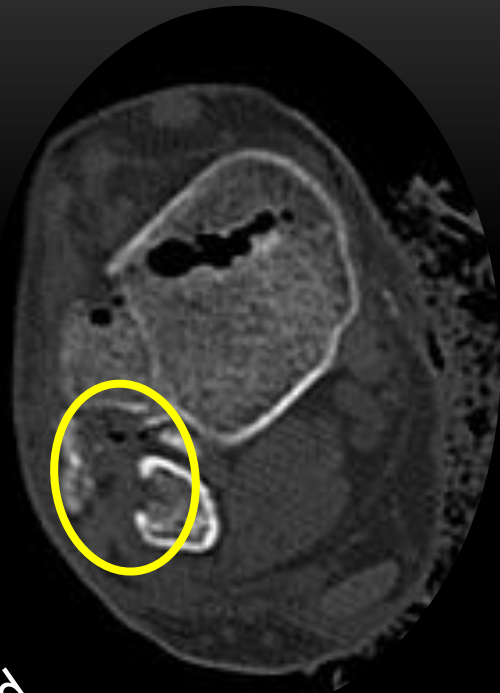
# 14 yr old Gymnastics injury



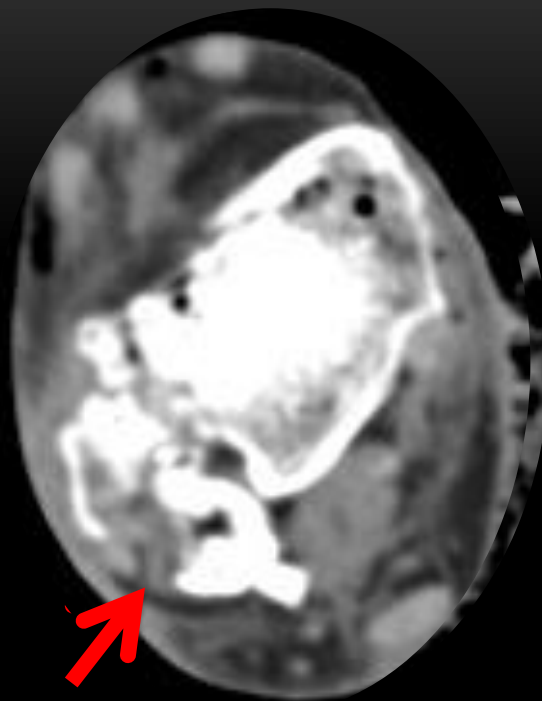
Juvenile Tillaux fracture

What about tendons?!





Open wound  
MCC



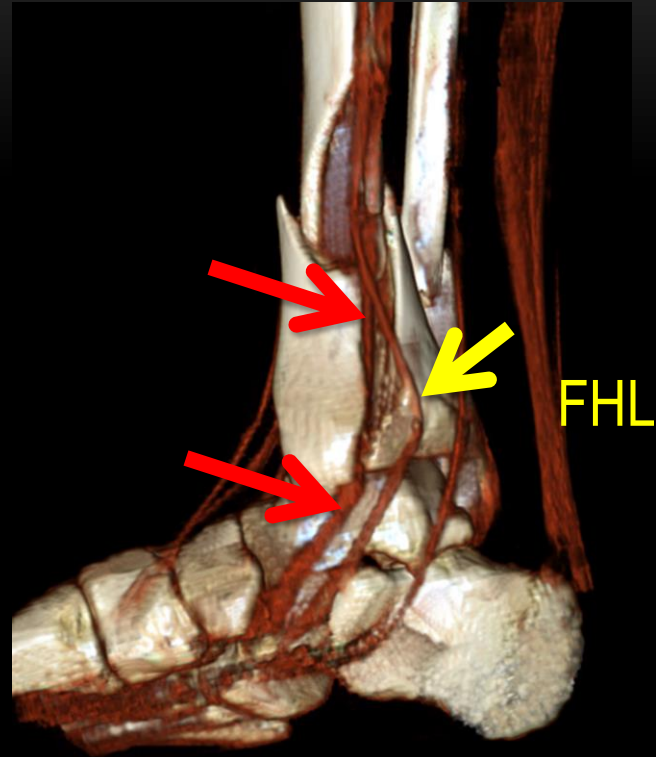
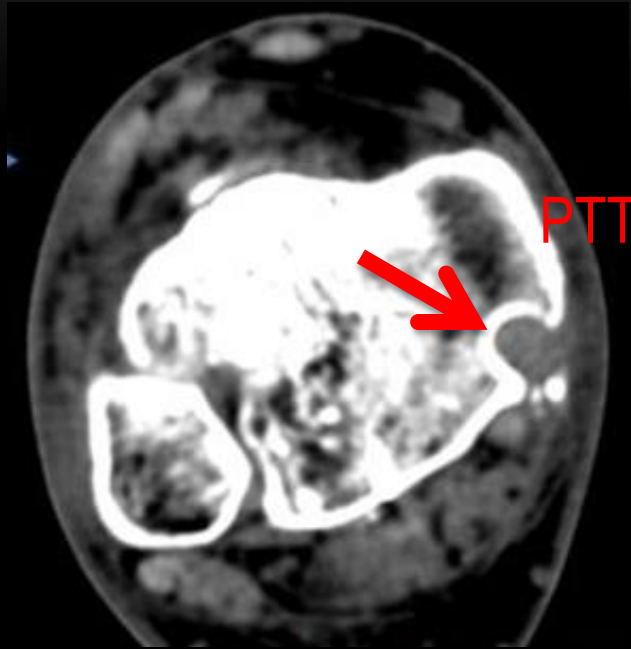
Trapped PL & PB  
tendons



# Trapped Peroneus Longus & Brevis



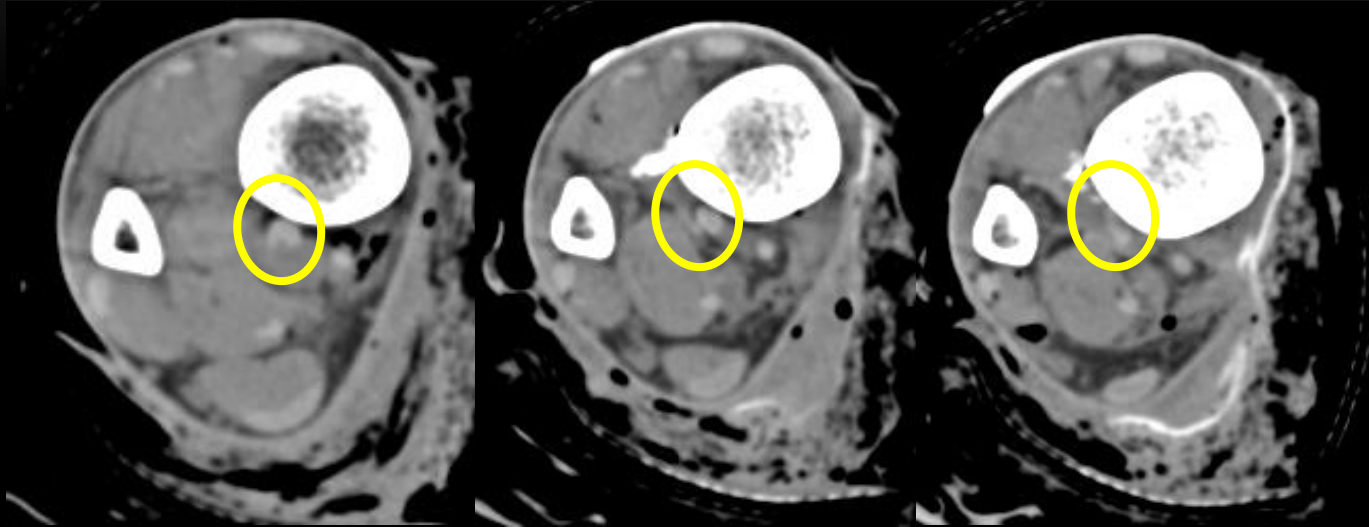
# Medial tendons in trouble!



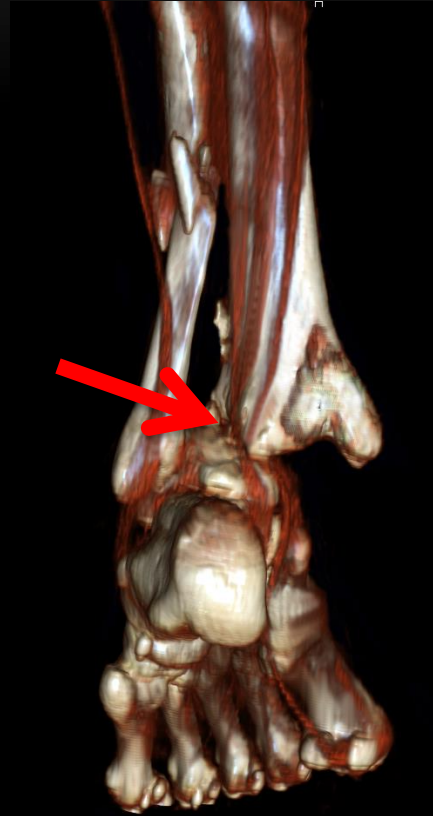
# NON REDUCING ANKLE !



# THE VANISHING Tibialis post tendon!



# THE VANISHING Tibialis post tendon!



## Fall from ladder – landed on toes



- Forceful contraction of abductor hallucis against Plantar fascia and Achilles

Fall from height



Bifurcate ligament  
avulsion fracture

# Medial foot

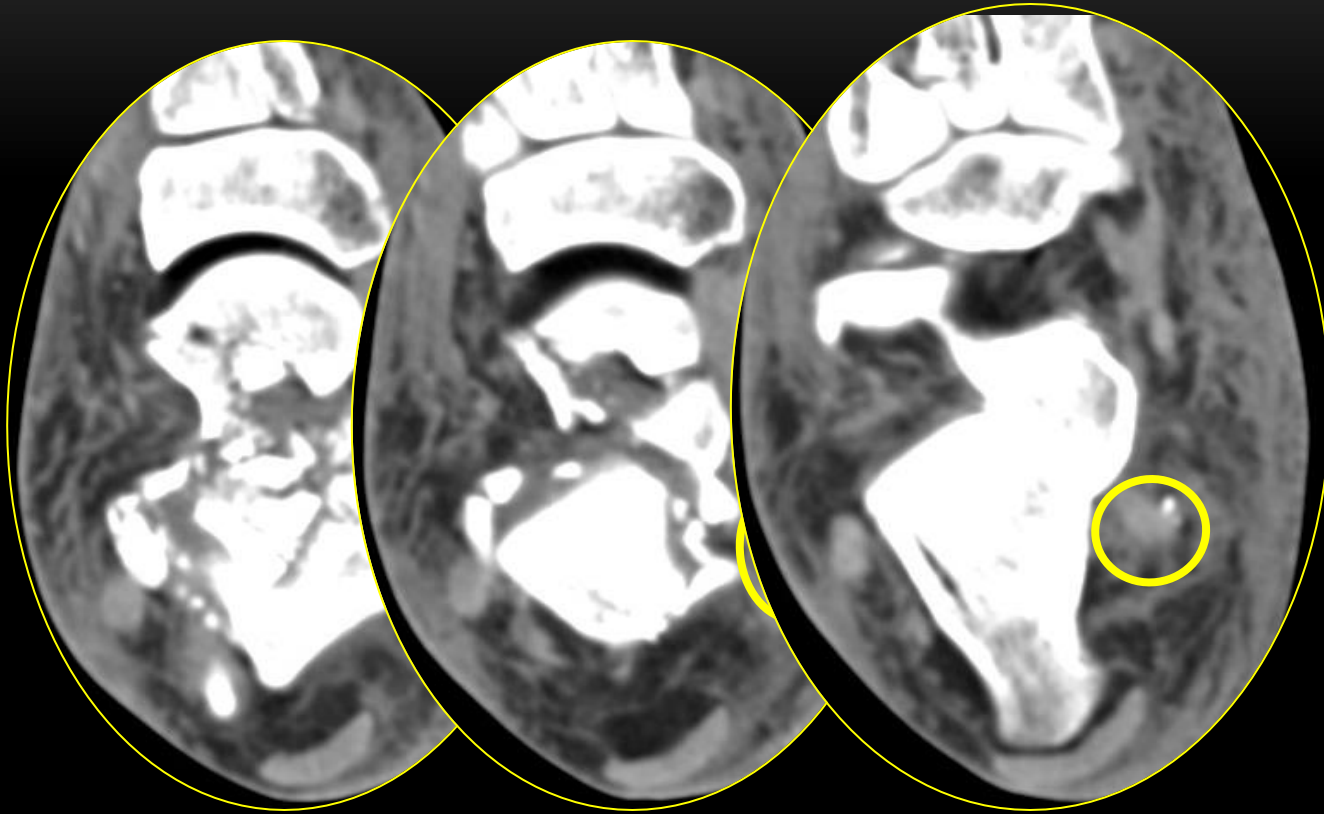


Malunion



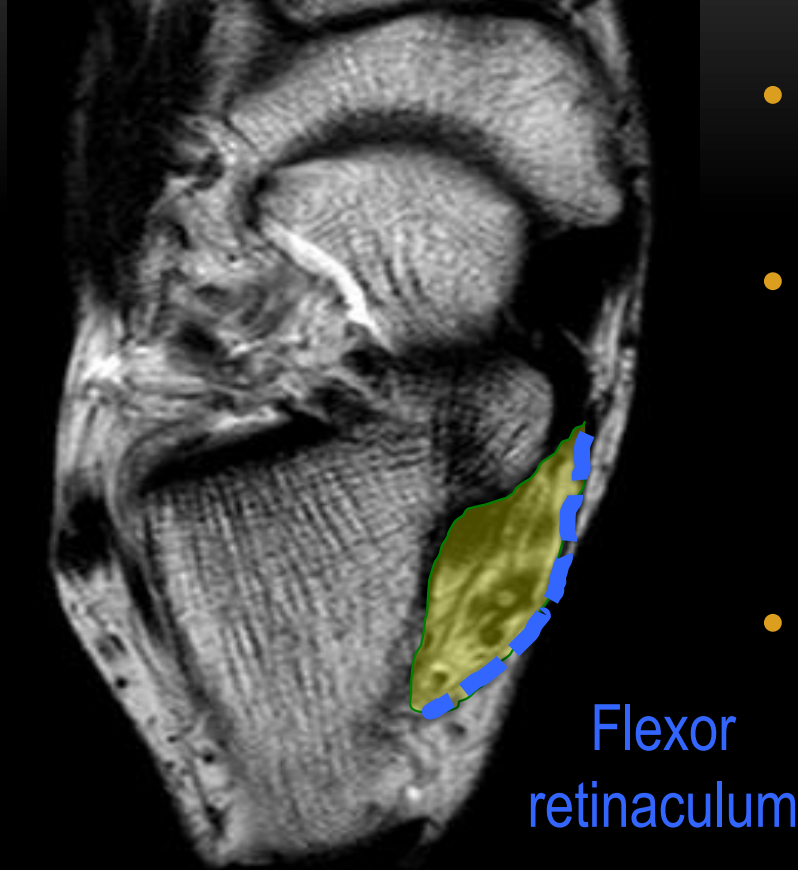


# Tarsal tunnel syndrome



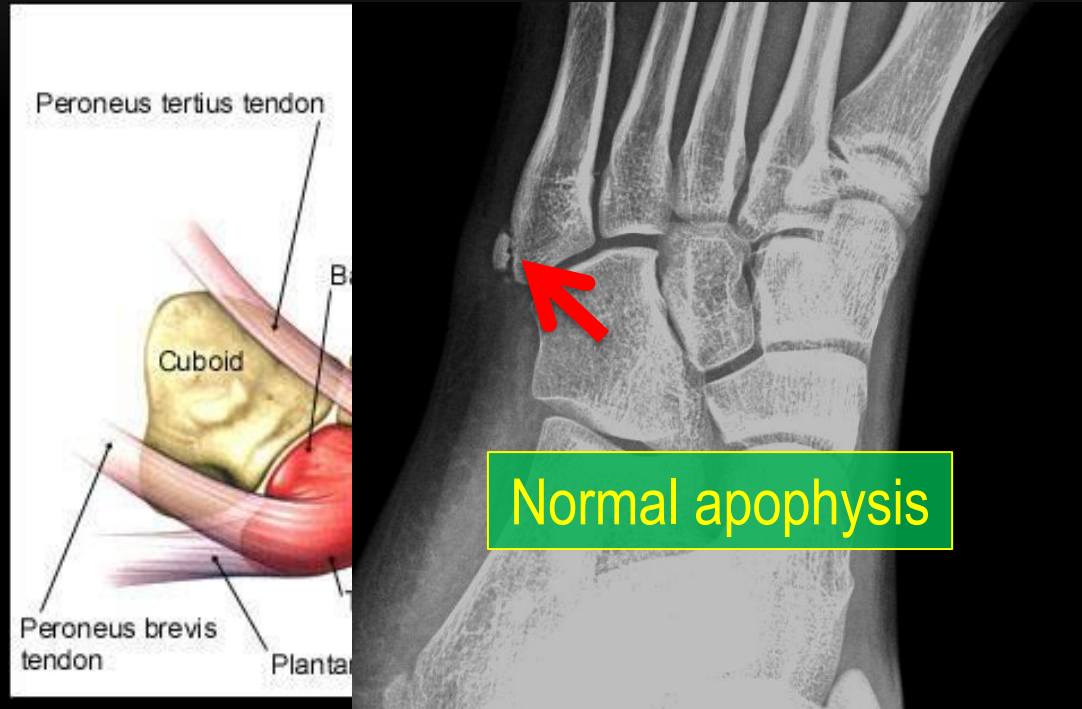
Neurovascular bundle

# Tarsal tunnel syndrome



- Neuropathy of tibial nerve – compression
- Tib post , Flx digitorum, post tib art , post tib veins, **tib nerve**, flex hallucis
- Radiating pain , muscle atrophy

# The 5<sup>th</sup> Metatarsal - myth



# The 5<sup>th</sup> Metatarsal .....



Avulsion  
fracture

# The 5<sup>th</sup> Metatarsal .....

90% of all 5<sup>th</sup>  
Metatarsal fractures



Avulsion  
fracture

# The 5<sup>th</sup> Metatarsal .....



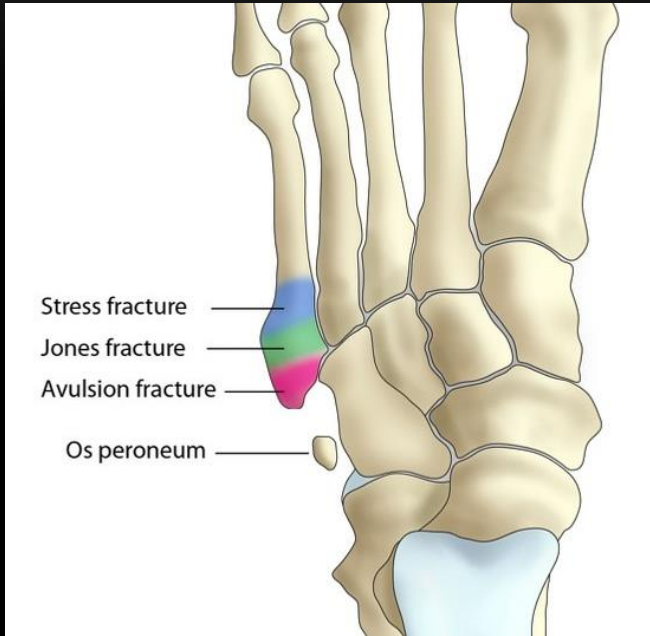
**Jones  
fracture**

# The 5<sup>th</sup> Metatarsal .....



Stress fracture









# Summary

- Subtle injuries are associated with significant soft tissue injuries
  - Review closely the soft tissue windows in CT imaging of the ankle
  - 3D and MRI aid in problem solving
-

# Acknowledgments

Susanna Spence MD

UT Houston, Texas

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# References

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Thank you for your attention!  
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McGovern  
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