Common and Commonly Missed Orthopedic Problems

UCSF Primary Care Medicine: Principles and Practice 2013

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Objectives

- Discuss the initial assessment and management of orthopedic problems that commonly present to primary care physicians
- We will focus on acute, orthopedic problems
- Review physical exam techniques commonly used in orthopedic assessment, as well as specialized orthopedic examination techniques necessary to make the diagnosis
- Review significant conditions that are easily missed on standard x-rays

Wrist Pain
**Wrist Pain**

Wrist is most injured joint in the upper extremity

**History**
- PPQRST- (precipitating, palliating, quality, radiation, severity, timing)
- Previous injuries and treatment
- Workplace or leisure activities

**Wrist Anatomy**

**Trauma History**
- Force of impact
- Injury involving radial side or extended wrist (Fall on Outstretched Hand “FOOSH”)
  - Scaphoid injury
- Injury loading ulnar side (Fall Backwards)
  - Lunate or triquetrum injury


**Wrist Pain**

"Pain Pattern"

1) Pain over the Dorsum of the Wrist with flexion and extension
   - Ligament injury
   - Fracture if post-traumatic

2) "Stiffness"
   - Rheumatoid arthritis
   - Carpal Tunnel

**Wrist Swelling**

- If localized
  - Ganglion Cyst

- If generalized
  - Complex Regional Pain Syndrome (RSD)

**Wrist Pain**

Parasthesias

- Thumb and thenar eminence
  - median nerve compression (CTS)

- Small and ring finger
  - ulnar nerve compression (uncommon)

**Wrist Pain**

"Pain Pattern"

- Decreased Grip Strength
  - Tendonitis- often felt in forearm
  - Strength reduced secondary to pain

- Radial Side Pain (no recent fall)
  - De Quervain’s tenosynovitis

- Ulnar Side Pain
  - Hook of hamate fracture

- Triangular Fibrocartilage Complex injury
**Wrist Pain**

Physical Exam
- Inspection, palpation, grip strength
- Compare to uninjured side
- Range of Motion (flexion 90 degrees, extension 80 degrees)
- Confirm normal radial pulse, capillary refill
- Confirm normal neurologic function

**Wrist Pain**

Physical Exam - Do “Specialized Physical Exam”
1. Finkelstein Test for De Quervains Tenosynovitis
2. Palpation of the scaphoid bone “snuff box tenderness”
3. “Watson Test” or scaphoid shift test
4. Ulnar Loading to assess for Triangular Fibrocartilage Complex Injury

**Wrist Pain – Case 1**

A first year orthopedic resident was rollerblading and fell onto her outstretched left hand
- Initially, the pain was quite intense, but subsided over 24 hours
- While smoothing a plaster splint on Monday, she notes that the wrist pain has worsened substantially
**Wrist Pain – Case 1**

- There is mild swelling over the wrist with point tenderness distal to the radius and proximal to the first MCP joint
- There is full range of motion of the wrist
- X-ray is negative for fracture

Based on this history and physical presented, what do you suspect?

1) Wrist sprain
2) Occult Radial Head Fracture
3) Scaphoid Fracture
4) Scapholunate Dissociation

**Scaphoid Fracture**

- Most common fracture of the carpal bones
- The scaphoid bridges the proximal and distal rows of carpal bones
- One dorsoradial artery
- 100% incidence of avascular necrosis in proximal fractures
- 30% in distal fractures


**Scaphoid Fractures**

- Seventy percent are through the waist
- Twenty percent are proximal
- Ten percent are distal
  - delay in diagnosis of one to two weeks increases risk of non-union and subsequent arthrosis


**Scaphoid Fracture**

- Non-union of scaphoid fracture (occurs in 5% of fractures)
- Wrist arthrosis and pain
- Long term occupational disability


**Scaphoid Fracture Palpation**

Tenderness in anatomic snuff-box
- bordered medially by the tendon of the extensor pollicis longus
- laterally (radially) by the tendons of the extensor pollicis brevis and the abductor pollicis longus

**Scaphoid Palpation**

The wrist is placed in neutral position, palm side up. The examiner places a finger on the radial aspect of the wrist, just above the base of the thumb. The thumb is flexed and then released, providing a measure of the force-bearing capacity of the scaphoid bone.
Scaphoid Fracture

- X-rays should include a scaphoid view
  - antero-posterior with 30 degree supination and ulnar deviation

Treatment

I) Snuff box pain and x-ray is POSITIVE for fracture
   - Urgent Ortho Consultation

II) Snuff box pain and x-ray is NEGATIVE for fracture
   - Urgent Ortho Consultation

Discharge patient with Thumb Spica Splint


Thumb Spica Splint

Wrist Pain – Case 2

Fortunately for this ortho resident, careful follow-up showed no scaphoid fracture

- But the wrist pain persists
- The pain is worse with dorsiflexion
- There is point tenderness over the dorsal mid-wrist, on the ulnar side of the scaphoid snuff box
Wrist Pain – Case 2

Based on the history and physical presented, what do you suspect?

1) Injury to the distal radial ulnar joint (DRUJ)
2) Occult Scaphoid Fracture
3) Scapholunate dissociation
4) Injury to the Triangular Fibrocartilage Complex

Scapholunate Dissociation

Disruption of the scapholunate interosseous ligament

Scapholunate Dissociation

Physical Exam Maneuver-

- “Watson” or Scaphoid Shift Test
Scapholunate Dissociation

Specialized X-ray Views
- Bilateral "clenched fist views"
- Abnormal scapholunate gapping can be shown with an AP clenched-fist view ("Terry Thomas Sign")
  - A scapholunate gap of 3 mm, or greater than the opposite wrist suggests disruption

Terry Thomas (1911-1990)

Another way to remember?

Wrist Pain – Case 3
- A 40 year old man joins his friend for a game of tennis at the club
- He hasn’t played for over a year
- He is rusty at first, but soon he is serving and returning the ball with a little “uummph”
- After the game, the wrist of his dominant hand is quite sore
Wrist Pain – Case 3

- At first, a little RICE (rest, ice, compression, elevation) seems to help
- But later, at work, he has trouble writing because of wrist pain
- He consults you for evaluation

- X-ray is negative for fracture
- Wrist pain is primarily on the lateral wrist (ulnar side)
- There is some localized swelling and loss of grip strength
- With active ulnar deviation, he (and you) feels a “click”
- There is point tenderness distal to the ulnar styloid
- There is significant pain with ulnar deviation of the wrist and axial loading

Based on this history and physical exam, what do you suspect?

1. Ulnar Styloid Fracture
2. Hook of Hamate Fracture
3. Acute Ulnar Nerve Neuropathy
4. Triangular Fibrocartilage Complex Injury (TFCC)
Triangular Fibrocartilage Complex Injury (TFCC)

- The TFCC functions as a cushion for the carpus, and a sling for the lunate and triquetrum
- Injury occurs with “fall on outstretched hand” and rotational force

Physical Exam findings suggestive of TFCC injury

- Ulnar-side wrist pain, swelling, loss of grip strength
- There also may be a "click" with active ulnar deviation
- Point tenderness distal to the ulnar styloid in the area of the TFCC
- Pain with passive pronation and supination (as well as ulnar deviation)

TFCC Injury

- Physical Exam
  - Axial loading of the wrist while in ulnar-deviation
- MRI
- Arthrogram
TFCC Injury

- Injection of the ulnar carpal space with a corticosteroid and lidocaine (mild cases)
- Arthroscopy
- Prompt surgery if Distal Radial Ulnar Joint (DRUJ) is also disrupted


Hand and Finger Pain

- Five metacarpals
- Two phalanges in thumb/three phalanges in the other fingers
- Joints
  - Metacarpophalangeal (MCP)
  - Proximal interphalangeal (PIP)
  - Distal Interphalangeal (DIP)
  - Interphalangeal Joint (IP) in thumb

Finger Flexor Tendons

- Travel in a fibro-osseous tunnel between the metacarpal and the DIP joint
- Superficialis Tendon attaches to the middle phalanges
- Profundus Tendon attaches to the distal phalanges

Hand and Finger Pain
Hand and Finger Pain

Finger Extensor Tendons
- Pass over the dorsum of the wrist

Ulnar Nerve
- Motor supply to most of the intrinsic hand muscles
- Sensation to the fifth finger and one half of the 4th finger

Median Nerve
- Motor supply to thenar muscles and two radial lumbricals
- Sensory supply of palmar aspect of digits 1-3 and radial half of the 4th finger

Radial Nerve
- Provides sensation to the dorsum of the hand
Hand and Finger Pain

Examination
- Pain, stiffness, enlargement of DIP joints
  - Osteoarthritis
- Pain, swelling and fusiform enlargement of multiple hand joints
  - Rheumatoid arthritis
- Tenderness over a single MP joint with loss of smooth digit function
  - Flexor tenosynovitis (trigger finger)
- Assessment of ulnar ligament laxity if a patient experiences forceful abduction of thumb

Hand and Finger Pain Case 1

A 35 year old man consults you for thumb pain
- He just returned from a ski trip to Tahoe
- He reports pushing hard on his pole on a sharp turn and losing his grip
- He states that the pole “pushed out” this thumb
- He says that he was initially evaluated at a local urgent care, and x-rays were taken (and were negative for fracture)
- He would like you to treat him for his “sprained thumb”

Based on this history, what do you suspect?
1) Occult 1st MCP Joint Fracture
2) Ulnar Collateral Ligament Tear
3) Acute Median Nerve Palsy
4) Occult fracture of the 1st metacarpal
Ulnar Collateral Ligament Tear

- “Gamekeeper’s Thumb” or “Skier’s” thumb
- Rupture of the 1st MCP joint of the hand

Ulnar Collateral Ligament Tear represents 60% of upper limb problems in skiers

- Frequently overlooked and under-diagnosed
- Untreated tears can cause disabling instability of the hand, as the ulnar collateral ligament stabilizes the first metacarpalphalangeal (MCP) joint
- Early surgical repair (within two or three weeks of the injury) are superior to results of late repair


Ulnar Collateral Ligament Tear

- Stress testing is performed by stabilizing the metacarpophalangeal joint in flexion and radially deviating the thumb
- More than 30 degrees deviation (or 20 degrees more than opposite side) suggests significant damage to ulnar collateral ligament

X-rays should be taken BEFORE stress testing as it might further displace the tear and lead to soft-tissue trapping

- Consider stress testing under fluoroscopy
**Ulnar Collateral Ligament Tear**

Orthopedic Follow-up for
- No end point on stress testing
- Deviation of 30 degrees on stress testing
- Deviation of more than 20 degrees compared with the other side
- Displaced avulsion fracture
- “Stener Lesion”
  - soft tissue trapping (collateral ligament trapped in the adductor aponeurosis)

**Treatment:**
- Thumb spica splint/cast
- Physical therapy at three or four weeks

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**Hand and Finger Pain – Case 2**

- An 18 year old woman checks in to your practice
- She was playing football in gym class earlier that day and caught a hard pass
- She “jammed” her right third finger against the ball
- On physical exam, there is pain and slight swelling at the 3rd distal interphalangeal (DIP) joint
- The DIP joint appears to be in approximately 20 degrees of flexion at rest
- Finger x-ray, obtained before your evaluation, is negative for fracture

**Based on the history and physical presented, what is wrong?**

1. Occult DIP joint fracture
2. Blunt trauma causing acute dysfunction of the motor nerve
3. Cartilage injury affecting the synovial surface of the DIP joint
4. Rupture of the finger extensor tendon
Hand and Finger Pain – Case 2

Based on the history and physical presented, what is wrong?

1) Occult DIP joint fracture
2) Blunt trauma causing acute dysfunction of the motor nerve
3) Cartilage injury affecting the synovial surface of the DIP joint
4) Rupture of the finger extensor tendon

Mallet Finger

Mallet Finger Injury

Rupture of Extensor Tendon

Mallet Finger

Mallet Finger Injury

Figure 5: A mallet finger occurs with the loss of bony (arrow) ligamentous attachment of the extensor mechanism into the distal phalanx.
**Mallet Finger Injury**

- The distal interphalangeal (DIP) joint is extended by the
  - medial and lateral bands of the extensor tendon, which inserts into the dorsal base of the distal phalanx
  - injury results from loss of bony (avulsion fracture) or ligamentous attachment of the extensor mechanism into the distal phalanx

**History**

- Hyperflexion
- Hyperextension
- Axial Loading

**Physical Exam**

- Extensor “lag” in the DIP joint

**X-Rays:**

- Lateral and PA radiographs should be obtained initially to assess injury (and also after splinting) to determine joint congruity
- However, in many cases the x-rays do not show a fracture as the tendon has ruptured without bony avulsion
  - The distal phalanx may appear to have subluxed in a volar direction from the unopposed pull of the flexor tendon

**Treatment:**

- Dorsal splinting or the use of a “stack” splint
- The joint must be splinted in full extension (or 10 degrees of hyperextension)
- Failure to properly splint can lead to long-term flexion deformity and weakness

*J Orthop Trauma 1991;1(2):105-111*
**Mallet Finger Injury**

Time in Splint-
- 6 weeks for a fracture
- 8 weeks for tendon failure
- **24 HOURS A DAY**
- If the finger droops, the clock starts over

Follow-up:
- Regular follow-up with patients help ensure good outcome (every 2 weeks)
- Evaluate for skin maceration


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**Ankle and Foot Pain**

- Approximately 20 percent of all musculoskeletal complaints are related to the foot and ankle
- One to 10 million ankle injuries in the US per year
- 85% are sprains
- Functions
  - Stable base for body weight support
  - Rigid lever to propel body forward during walking
  - Shock absorption for walking and running (two to six times an individual’s body weight)

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**Surgical Pinning** is required if:
- Full extension not achieved by second visit
- Subluxation of the distal phalanx volarly
- Avulsed bony fragment involves more than one-third of the joint
Ankle and Foot Pain

- Plantarflexion and dorsiflexion are the primary actions of the ankle
- Inversion (supination) and eversion (pronation) are secondary

Ankle Anatomy

Bones
- Distal tibia and fibula (superior)
- Dome of the talus (inferior)

Ligaments

- Lateral Ligaments
- Medial Ligaments
Ankle and Foot Pain

The tibia and the fibula are bound together by
- the anterior inferior tibio-fibular ligament
- the posterior inferior tibio-fibular ligament
- the interosseous membrane, which runs between the two long bones

Ankle Anatomy
Tendons
- Posterior Tendon
  - Achilles Tendon

Ankle Anatomy
Tendons
- Medial Tendons
  - Posterior Tibialis Tendon

History
- Position of the ankle
  - during plantar flexion the anterior talofibular ligament is at greatest tension making it prone to injury
- Can the patient bear weight after the injury?
- Pop or snap may mean partial or full tendon injury
- Previous strains? (More susceptible to injury, slower recovery)
Ankle and Foot Pain

Observation
- Can the patient bear weight?
- Swelling? (lateral or medial or posterior)
- Ecchymosis?
  - More likely in Grade 2 and Grade 3 ankle sprains

Physical Exam:
- Careful palpation over the lateral and medial malleolus and Achilles tendon

At this point, I STOP and ask-
Does this patient need an x-ray?

Ottawa Criteria

Ankle X-rays for Malleolar Pain
1. Bone tenderness- Posterior Edge or Tip of Lateral Malleolus
2. Bone tenderness- Posterior Edge or Tip of Medial Malleolus
3. Inability to bear weight both immediately and in the emergency department

Ankle Fracture
Ankle Fracture

Ankle and Foot Pain

If there is no fracture, then do a “specialized” ankle physical exam:

- Assess for anterior talofibular rupture
- Assess the calcaneofibular ligaments
- Assess the interossus membrane and syndesmotic ligaments for “high ankle sprain”
- Assess the Achilles tendon
- Assess the integrity of the posterior tibialis tendon

Physical Exam:

Anterior Talofibular ligament
- Anterior Drawer Test

The Calcaneofibular ligaments
- Talar Tilt Test
Ankle and Foot Pain

Physical Exam:
Assess the interosseus membrane - “Squeeze Test”

Ankle and Foot Pain

Physical Exam
Test syndesmotic ligaments (Distal Tibiofibular Syndesmosis Complex DTFSC)

“External Rotation Stress Test”

Ankle and Foot Pain

Physical Exam:
Another test for the Distal Tibiofibular Syndesmosis Complex (DTFSC)

Ankle and Foot Pain – Case 1

• A 42 year old man is competing in a tennis tournament at his health club
• While starting forward to meet his opponent’s serve, he feels as if someone came up behind him and kicked him in the heel
Ankle and Foot Pain – Case 1

• With NSAIDs and rest, the pain rapidly improves
• But he continues to feel his ankle is “not stable”
• He consults you asking for a physical therapy referral

On physical exam:
• There is mild swelling at his heel and a few centimeters proximally
• While lying supine on the exam table, he can flex and extend his foot normally

Based on this history and physical exam, what do you suspect?
1. Distal fibula “chip” fracture
2. Complete rupture of the calcaneofibular ligaments
3. Gastrocnemius tear
4. Achilles tendon rupture
Achilles Tendon Rupture

• Second most frequently ruptured tendon.
• Diagnosis is missed 25% of the time on initial exam.


Achilles Tendon Rupture

History

• Patients often report a “pop” at the back of the heel.
• Other terms used by patients include “kick” and “being shot in the heel.”
• Symptoms of pain may rapidly improve.
• Reasonably good plantar flexion of the foot may be preserved (especially in partial tears).

“Achilles Tendon Rupture

“Thompson’s Test”

– Performed with patient laying prone.
– An abnormal test is identified by the absence of plantar-flexion of the foot with a hard squeeze of the calf.

Thompson’s Test

Having the patient plantar-flex their foot while lying supine is not adequate.

• Long toe flexors can be quite strong.
• However, most patients cannot stand on their toes.

Figure 4. Thompson's test indicates Achilles tendon continuity. With the patient's knee flexed 90°, the ankle plantarflexed in an attempt to palpate the tendon. Loss of plantar-flexion indicates complete tendon rupture. Comparison to the uninjured leg is helpful in partial tears.
Partial Achilles Tendon Tear

- Often has normal Thompson’s test
- May have a palpable defect

Achilles Tendon Rupture

Plain X-rays-
- Rarely helpful
- Occasionally reveals bony avulsion of the posterior calcaneus or disruption of the soft tissue planes

Initial Treatment (in consultation with Ortho)

“Equinus Splint”

Definitive Treatment

- Surgery
  - Delayed primary repair will improve a missed rupture, but outcome better with surgery done at an early stage
  - Cast treatment has a higher re-rupture rate, and the patient has decreased strength in the long run

Ankle and Foot Pain – Case 2

- A 68 year old woman steps into a shallow, uncovered open hole in the sidewalk on the way to your office for routine medical follow-up
- She reports twisting her ankle and falling to the ground

Ankle and Foot Pain – Case 2

- She is unhurt except for her left ankle
- She is having some pain with weight bearing
- On exam, she has pain and some ecchymosis over the medial malleolus
- She is neurovascularly intact
- Her left foot seems to have a flattened arch, but she denies having “flat feet”
- X-ray of the foot and ankle is negative for fracture

What do you suspect is the problem?
1) Occult calcaneal compression fracture
2) Charcot joint from chronic denervation
3) Acute S1 motor neuropathy in the foot secondary to traumatic compression from fall
4) Posterior tibialis tendon rupture
Posterior Tibialis Tendon Rupture

- Not a common problem, but associated with ankle sprains that are commonly evaluated by primary care physicians
- Delayed diagnosis can cause fixed bony planus and need for hindfoot fusion


Posterior Tibialis Tendon Rupture

Posterior Tibialis Tendon
- Helps maintain the arch of the foot
  - Rupture leads to asymmetric pes planus
- Pain and swelling over (or just distal to) the medial malleolus
- The posterior tibial tendon also contributes to internal rotation and walking on toes

Rupture More Frequent
- Older (geriatric) populations
- Twisting injuries and high impact load

Ankle and Foot Pain

Posterior Tibialis Tendon
- Rupture lead to acute asymmetric eversion
- “Too Many Toes Sign”

Imaging-
- Plain film x-rays may show a “flatfoot” with a sag in the midfoot at the talonavicular joint (or naviculocuneiform joint)
- MRI is sensitive and specific, and needed pre-operatively

Treatment-
- Initially, some arch and heel support may be useful
- Surgery is usually needed to prevent chronic foot pain and rigidity
Foot Pain

Anatomy
- 28 Bones
  - 14 phalanges
  - 7 tarsal bones
  - 5 Metatarsals
  - 2 Sesamoids
- Hindfoot connects to the midfoot at the Chopart joint
- Midfoot connects to the forefoot at the Lisfranc joint

Physical Exam
- Perform a neurovascular exam (pulses, sensation, capillary refill)
- Inspect for wounds
- Careful palpation for point tenderness which may indicate a fracture

Following trauma, does this patient require a foot x-ray?
**Ottawa Foot Rules**

X-ray is required if there is any pain in the mid-foot zone and ANY of these findings:
- Bone tenderness at base of fifth metatarsal
- Bone tenderness over the navicular
- Inability to weight bear both immediately and in the casualty department

**Foot Pain**

Common soft-tissue causes
- Plantar fasciitis
- Morton’s neuroma

**Plantar Fasciitis**

- Painful inflammation of plantar fascia
- Often caused by overuse, high BMI or age
- Reproduced with palpation over the insertion of the plantar fascia into the calcaneus, and dorsiflexion of the foot and toes
- Treatment- NSAIDs, stretching and other PT, shockwave therapy

**Morton’s Neuroma**

- Benign “neuroma” (perineural fibroma) between 2-3rd or 3-4th metatarsal heads
- Variable pain on weight bearing- neuropathic or “pebble in my shoe”
- Sometimes relieved by removing footwear
- Diagnosis- exclude stress fracture, arthritis
- Treatment- steroid injection, orthotics, surgery
Foot Pain

Common Acute Fractures

- Fracture of the proximal 5th metatarsal
- Fractures of the metatarsal shaft
- Stress fractures

Foot Pain – Common Fractures

- Three distinct fractures occur in the proximal fifth metatarsal
- Each is treated differently
- The joint between the bases of the fourth and fifth metatarsals is a key landmark for classifying proximal fifth metatarsal fractures

Foot Pain – Common Fractures

- Minimally displaced avulsion fracture of the fifth metatarsal tubercle (styloid)
- Ankle inversion while the foot is in plantar flexion
- Can present like a lateral ankle sprain
- Heals well - post-op shoe
  - Weight bear as tolerated
  - Heals in three to six weeks
  - Radiographic union 8 wks

Foot Pain – Common Fractures

- Acute fifth metatarsal diaphysis (Jones) fracture
- Occurs from a medial or mediolateral force on the base of the fifth metatarsal while weight is over the lateral aspect of the plantar flexed foot (heel off the ground injury)
- Heal poorly - cast and surgery
**Foot Pain – Common Fractures**

- Torg type II stress fracture of the metatarsal diaphysis
- Fracture just distal to the intermetatarsal joint
- Heals poorly – cast and surgery

**Metatarsal Shaft Fractures**

- Usually not displaced
- Direct blow or twisting
- Swelling and point tenderness
- Hard shoe, crutches, weight bearing as tolerated
- Repeat x-rays in one week to check fracture position, 4-6 weeks to document healing

**Stress Fracture**

- Results from abrupt increase in activity or chronic overload
- Starts with pain during activity
- Point tenderness
- Axial loading of the foot (stand on tip-toe) will often create pain at the fracture site
- Not visible on x-rays for two to six weeks
- MRI or bone scan definitive
  - With typical history and physical, presumptive clinical diagnosis is fine
- Heal well with cessation of activity four to eight weeks
Foot Pain – Common Fractures
Stress Fracture
- If very painful, crutches and partial weight-bearing
- Short leg cast for 1-3 weeks if severe pain
- Consider custom orthotics, but no evidence for injury prevention

Foot Pain – Uncommon Fractures
Fractures of the proximal first through fourth metatarsal
- Endanger the Lisfranc ligament complex
Chopart's fracture–dislocation
- Dislocation of the mid-tarsal (talonavicular and calcaneocuboid joints of the foot
- Often with associated fractures of the calcaneus, cuboid and navicular

Foot Pain – Case 1
- Your next patient is a 35 year old healthy woman
- Last evening, she was sitting in the front seat of a car driven by a friend
- The car in front of them suddenly slammed on their brakes to avoid hitting a deer in the road
- The car your patient was in tried to stop, but couldn’t avoid a rear-end collision
- Although your patient was wearing a seat belt, it was a very small car and she instinctively pushed both feet against the forward floorboard to brace for impact

Foot Pain – Case 1
- Fortunately, she didn’t suffer any head or thorax or upper extremity injury, or hip or knee or ankle trauma
- But she injured her right foot, and she couldn’t bear weight without a lot of pain
- EMS took her to the local ED, who X-rayed her foot
- The x-ray was read as negative, on exam she was neurovascularly intact, and she was discharged with high dose NSAIDs and placed in post-operative shoe
Foot Pain – Case 1

- She consults you three days later, reporting that she feels “no better”
- On exam:
  - She has edema from the mid-tarsal area distally into the toes
  - Normal DP pulse and capillary refill
  - Marked dorsal tenderness was noted over the second through fourth tarso-metatarsal joints
  - You obtain the x-ray report from the ED and confirm that no fracture was found

Based on this history and physical exam, and x-ray report, what are you concerned about?

1. Traumatic stress fracture not yet evident on x-ray
2. Dorsalis pedis artery rupture endangering the navicular bone
3. Comminuted navicular fracture not visible on x-ray
4. Lisfranc fracture

Lisfranc Injury of the Foot

- “Lisfranc joint” - medial articulation involving the first and second metatarsals with the first and second cuneiforms
- Named for Jacques Lisfranc (1790-1847) a field surgeon in Napoleon’s army – after an amputation he performed for gangrene
Lisfranc Injury of the Foot

- This entire tarsometatarsal complex is supported by the "keystone" wedging of the second metatarsal into the cuneiform
- There is a "weak link"—the first and second metatarsal bases lack a transverse ligament


Lisfranc Injury of the Foot

- The Lisfranc Ligament Complex
  - Hold metatarsal bases rigidly in place
  - Maintain arch of foot
  - Even subtle injuries can cause long-term disability

Lisfranc Injury of the Foot

Most common mechanism of injury is an axial load placed on a plantar-flexed foot

Lisfranc Injury of the Foot

One of the most commonly missed fractures by physicians (one of the top 5 missed diagnosis in the ER)
- Nearly 50 percent of Lisfranc joint injuries are missed on initial antero-posterior and oblique radiographs (even with significant injury)
- Most important initial diagnostic test is a clinician’s high index of suspicion
- Refer for unexplained tenderness near the tarsometatarsal joint
Lisfranc Injury of the Foot

A Few Exam Pearls

- Patient is unlikely to bear weight while standing on tip-toe
- It may seem like a Grade III ankle sprain,
  - But no ankle ligamentous laxity
  - If you stabilize the hindfoot (calcaneus) with one hand, and “twist” the forefoot, it will cause severe pain with a Lisfranc injury (and not with an ankle sprain)
- Check and document neurovascular status
  - Dorsalis pedis artery passes over the proximal head of the second metatarsal

Plain X-rays

- Weight-bearing antero-posterior and lateral views, as well as a 30-degree oblique view

Classic Findings

1) Widened spaces between bases of the first and second metatarsals
2) “Fleck Fracture” adjacent to base of the first metatarsal
3) Loss of alignment of the medial edge of the proximal second metatarsal with the medial edge of the second cuneiform

The lateral radiographic view of the foot may show a diagnostic “step off” - the dorsal surface of the proximal second metatarsal is higher than the dorsal surface of the middle cuneiform
- Arch height is lost on the lateral view in severe injuries
Lisfranc Injury of the Foot

Treatment
- Stage 1 injury – non-weight bearing cast
- Displacement of more than 2mm may need open reduction and internal fixation (perhaps within 12 to 24 hours)
- There is some evidence for closed reduction

References:

Failure to diagnose promptly
- Compartment syndrome
- Ischemic contractures of the muscles (“claw toes”)
- Arthritis
- Permanent anergic gait
- Chronic foot pain

Thank you!