Myth #1

If I can move it, it must not be fractured or broken. The reality is that athletes can move fractures and that continuing to move it, use it, or ignore it, can lead to significant deformities or arthritis.

Myth #2

Little joints = little problems. The reality is that injuries to these little joints can lead to big deformities or disabilities. For many people this can lead to the inability to play sports or, more importantly, work certain jobs down the road.

#1 “Jammed Finger” Ligament Tear/Finger Sprain
Ligamentous Anatomy

Volar Plate Injury
VS Collateral Ligament Injury

Finger Sprain Treatment

FIGURE 15.17 PIP sprain of the collateral ligament: This may be treated with a dorsal splint. The finger is flexed 20°–30° at the PIP joint, and may be taped to the adjacent finger.

Case History

- 14 y/o basketball player mishandles a pass, feels a “pop”, unable to straighten finger
#2 Mallet Finger

- Baseball Finger
  - Rupture of extensor tendon of distal phalanx

Mallet “Drop” Finger

FIGURE 15.26 Mallet finger. The extensor tendon itself or the tendon plus a piece of bone may be avulsed.

Mallet Finger Treatment

FIGURE 15.27 Mallet finger. The distal interphalangeal joint is splinted in extension (0°).
Case History

- 16 YO male, basketball player was going in for a breakaway dunk when fouled from behind
- His right long finger got tangled in the net, jammed his finger and felt a pop
- 2 days later continued swelling and pain and had finger examined at ER
- X-ray was normal, diagnosed with a "finger sprain"

#3 Jersey Finger

- Rupture flexor digitorum profundus (DIP joint)

Jersey Finger Treatment
Myth #3

All finger injuries are created equal. The reality is, unfortunately, that certain injuries are not a big deal to splint or play with but others may need compete immobilization or even surgery. Often a medical professional, including sometimes a hand specialist, is needed to help make those determinations.

Myth #4

Dislocations once reduced, are no longer a significant problem. The reality is that for fingers to dislocate there usually is some injury to the ligament or the bone around or in the joint. This may need further evaluation or treatment depending on how it responds after reduction.

#4 Finger Dislocation

DIP Joint
PIP Dislocation

- Most common in ball handling
  - Basketball
  - Football
  - Baseball

Dislocation/Fracture

Post Dislocation Evaluation

- Tap Test (+)
- Slight Rotation on "alignment test"
**Differential Diagnosis**

**“Coaches Finger”**

- Non-displace (<1mm) or (<20% of joint surface)
- Treat as ligament injury with splinting
- Re-x-ray three weeks
- >1mm, >20% of joint
  - Ortho referral (possible fixation)

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**Differential Diagnosis**

**Buckle Fracture**

- Bend
- Buckle
- Greenstick
- Complete
Case History

- 16 y/o wrestler punches the wall in disgust after getting pinned, pain and swelling, no improvement x 3 days

Boxer’s Fracture

- Fracture of metacarpal neck (little finger)

Exam
Diagnosis

Boxer's Fracture

Treatment – Boxer’s Fracture

- If < 40° gutter splint/cast/molded splint
- If > 40°, any rotation, or more proximal, needs an ortho evaluation.
Acceptable Deformity
Metacarpal Neck Fractures

- Upper limits
  - 20° (2nd, 3rd)
  - 30° (4th)
  - 45° (5th)
- Do not accept any rotation
- There should be only minimal varus or valgus angulation
- The more proximal the fracture, the less angulation is acceptable

Case History

- 17 y/o volleyball player attempting a dig landing on her thumb, feels a “pop”, x-ray in ER normal

Skier’s Thumb
Gamekeeper’s Thumb

- Ulnar collateral ligament injury
  - MP joint of thumb
Case History

- 18 y/o snowboarder fall on outstretched hand, snuff box tenderness, normal x-ray in ER

Skier’s Thumb

Skier’s Thumb Treatment
**Navicular Fracture**

Scaphoid Fracture

70% of carpal injuries

**Scaphoid Fracture**

- Pain over snuffbox (navicular fracture until proven otherwise)
- High medical-legal issues (high rate non-union)

**Scaphoid Fracture**
Scaphoid Fracture

Case History

- 16 y/o tennis player recurrent pain on backhand x7 days/week, “crunching” feeling on thumb side of wrist, x-ray normal

De Quervain’s Tenosynovitis

- Most common tendinitis around wrist
- Inflammation of first dorsal compartment
de Quervain’s Treatment

Case History
- 18 YO baseball player finishing senior season
- Going to Ohio State to play D1 baseball in fall
- Took an awkward swing at an inside pitch and felt pop in his wrist
- Continued with pain and intermittent swelling in R wrist
- Had improvement of about 40%-50%, but then plateaued without continued improvement
- 1 month after original injury, had x-ray including good view of scaphoid that was normal

Differential Diagnosis?
- Circumduction
Triangular Fibrocartilage Complex Injury (TFCC)

Cartilage injury ulnar wrist joint

TFCC Injury

Ganglion Cyst
Summary: Hand, finger, wrist injuries

- Little joints but big problems
  - Keep a high index of suspicion
- Return to sport variable depending on specific injury
- Fall on out-stretch hand injury
  - Beware of scaphoid fracture

Ankle Sprains and Mimics

Joseph A. Congeni, MD
Medical Director Sports Medicine
Akron Children’s Hospital
And
Asst. Professor of Pediatrics
NEOUCOM
Ankle Sprains #1 Sports Injury

- One ankle sprain per 10,000 persons each day
- Approx. 2,000,000 sprains every year in US
- Average of 3 sprains per person in lifetime
- 25% of running and jumping injuries
- 30-50% of team sport injuries (basketball, volleyball, etc.)

Case #1

- 16 year old female basketball athlete
- Landed on opponents foot, inverted ankle
- Heard a pop
- Immediate swelling/bruising
- Unable to bear weight after injury
Physical Exam
- Swelling/bruising laterally
- Limited ROM
- Tender at ATFL and CFL
- Anterior drawer test positive
  - More translation that opposite ankle
- Able to bear weight with slight limp

Timeframe to Recovery
- Grade 1: 7-14 days
- Grade 2: 2-6 weeks
- Grade 3: 4-26 weeks

Acute Ankle Injuries
- Treatment
  - Protection
  - Reduce Swelling/pain
Reduce Swelling/Pain

- Meds
- Ice
- Compression
- Elevation
- Modalities

Compression

Acute Ankle Injuries

- Treatment
  - Protection
  - Reduce Swelling/Pain
  - Physical Therapy/Rehab
Physical Therapy/Rehab

- ROM
- Stretching
- Strengthening
- Neuromuscular balance

Acute Ankle Injuries

- Treatment
  - Protection
  - Reduce Swelling/Pain
  - Physical Therapy/Rehab
  - Functional Progression

Functional Progression

- Test for return to activity
- Sport specific
- Timeline
Radiographic Evaluation

- Rapid swelling/hemarthrosis
- Obvious dislocation
- Eversion injury
- Point tenderness along talus, medial/lateral malleoli, fifth metatarsal, proximal fibula
- Inability to bear weight

Radiographic Evaluation

- Anteroposterior view
- Lateral view
- Mortise view
- Stress views +/-

Instability = Lateral Tilt vs Ant. Drawer
Case #2

- 11 y/o soccer player who "rolled their ankle" and had immediate lateral pain
- Finished game but had lateral pain and swelling and a limp
- Exam showed: TTP lateral malleolus > ATFL > CFL
- Ant drawer/tilt neg/ext rot test +

Salter-Harris Classification

Acute Ankle Injuries
Differential Diagnosis

- Epiphyseal Injuries (Salter-Harris)
Salter I Fracture

- **Mechanism**
  - Inversion/eversion

- **Clinical**
  - Localized pain

- **Dx**
  - X-rays vs stress views

Case #3

- 16 year old football player, tackled from behind, ankle flexed and rolled underneath him
- Did not feel pop but unable to bear weight
- Significant swelling – entire ankle, limited ROM, can’t bear weight
- TTP at anterior joint line and along fib-fib junction
- Squeeze test positive, dorsiflexion-external rotation test positive

Special Tests
Syndesmosis Sprains

- Mechanism
  - Pronation, external rotation injury

Syndesmosis Sprains (High Sprain)

- Clinical Exam
  - External rotation test
  - Squeeze test
Syndesmosis Sprains

- **Treatment**
  - Key is deltoid ligament stability (if unstable consider surgery)
  - Spectrum of extent of injury
  - From aircast to walking boot/cast to surgery

Tarsal Coalition

- **History**
  - Multiple, recurrent “ankle sprain” early teens

- **Clinical**
  - “Stiff foot”, rigid, poor ROM, minimal lateral swelling

- **DX**
  - X-ray, bone scan, CT scan, tomograms

Acute Ankle Injuries

Differential Diagnosis

- Osteochondral Fractures (Osteochondritis Dissecans)
Osteochondral Fracture
Dome of the Talus

- Mechanism
  - Dorsiflexion with inversion/eversion
- Clinical
  - Pain in joint line
  - Minimal lateral swelling
- DX
  - X-ray (mortise view)
  - CT scan
- Site
  - Medial > lateral

OCD - CT Scan
Anatomic Detail

Acute Ankle Injuries
Differential Diagnosis

- Peroneal Tendinitis
  (Peroneal Tendon Subluxation)
Peroneal Tendinitis/Subluxation

- History
  - Ankle sprain with marked pop
- Clinical
  - Minimal lateral swelling
  - Reproduce pain over tendons with dorsiflexion and eversion or resisted circumduction
- DX
  - Clinical

Acute Ankle Injuries
Differential Diagnosis

- Base of the Fifth Metatarsal Avulsion Fracture vs (Proximal Shaft-Jones Fracture)

Base of Fifth vs Jones

- Mechanism
  - Forceful inversion
- Clinical
  - Tender at base of 5th localized
- DX
  - X-ray
Posterior Tibialis Tendinitis

Post Tibialis - Rupture = Arch Collapse

Post Tibialis Tendonitis - Treatment
Flexor Hallucis Longus Tendinitis

FHL - Clinical Exam

Os Trigonom Fractures
Acute Ankle Injuries
Differential Diagnosis

- Posterior Talus Fractures (Os Trigonum Fracture)
- “En Pointe” view

Sever’s Disease
Calcaneal Apophysitis

Sever’s - Clinical Exam (Squeeze Test)
Sever's - Age Distribution

![Age Distribution Chart](image)

Sever's - Treatment – Cast vs Fracture Walker?

![Cast and Fracture Walker](image)

Proximal Fifth Metatarsal (Jones Fracture)

- Must differentiate from base of the 5th metatarsal
- Some best managed surgically
Clinical Presentation

Tarsal Navicular

- High non-union rate
- Controversy cast vs surgery
- ? Clinical significance
- Return to sport 4-6 months
**High Risk Sites**

- Poor Healing
  - Tarsal navicular
  - Proximal-anterior tibia
  - Fifth Metatarsal (Jones)
  - Femoral Neck

**Stress Fractures**

- Differential Diagnosis
  - Osteoid osteoma
  - Osteomyelitis
  - Other trauma (eg., occult fracture)
  - Malignancy (primary vs metastatic)

**Stress Fractures**

What Is The Clinical Presentation?
Symptoms

- Deep ache
- No response to treatment
- Rapid training change
- Pain after activity during sports ADL pain at rest

Physical

- Palpable periosteal thickening
- Tuning fork test
- “Hop Test”

Stress Fractures

- Plain Film Radiographs
  - Often negative early in course
  - May become positive 2-4 weeks after onset of symptoms
  - Positive in about 30% of cases
  - Findings include periosteal new bone formation with cortical thickening or radiolucent fracture line in cortex
Stress Fractures

- **Bone Scan**
  - Highly sensitive for stress fractures
  - Easily done in outpatient setting
  - Cost effective
  - Very helpful in distinguishing between stress fracture and soft tissue injury

Stress Fractures

- **SPECT Scan**
  - SPECT - Single Photon Emission Computed Tomography
  - Allows three-dimensional image reconstruction
  - Enhances lesion detectability and allows better spatial resolution over planar scans
  - Especially useful for vertebral lesions (spondylolysis)

Stress Fractures

- **MRI**
  - May demonstrate focal marrow edema and low signal intensity lines in area of stress fracture
  - Findings may be very subtle
  - Better for evaluation of soft tissues
  - Usefulness limited by cost and sublety of findings
Stress Fractures

How Do You Treat Them?

**REST**

**REHAB**

**RETURN TO SPORT**

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**Stress Fractures- Treatment**

- "Active" rest using pain as guide
- Alternate fitness activities
- Support as needed with crutches, braces, etc.
- Strict immobilization usually not necessary (unless visible crack on plain films)
- Nutritional & hormonal therapy (calcium supplements, estrogen therapy)
- Develop a “Game Plan”

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**Stress Fracture Rehab**

- Stretch/strengthen muscular support
- Correct malalignment problems
- Return to activity gradually-functional progression
Treatment
Gait Analysis / Orthotics

Stress Fractures

- Return to competition
  - Full, pain-free range of motion in injured part
  - Strength at least 80% that of the uninjured side
  - Absence of clinical signs such as point tenderness, percussion tenderness, etc.
  - Aerobic and anaerobic capacity consistent with demands of sport or activity
  - Full, pain-free functional ability