



Best Practices in Ankle Injuries

Chairperson: Mark Yakavonis,
MD

Monday, March 27th, 2023
2:05-2:45pm



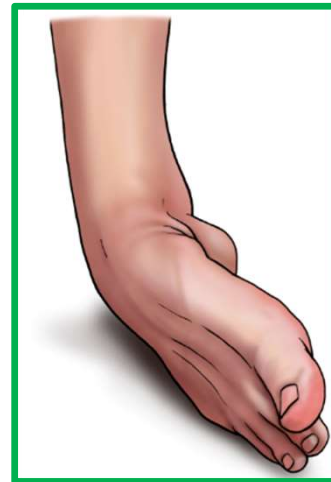
Ankle Sprains: Operative Indications

Mark Yakavonis, MD

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Boston University Medical Center

ANKLE SPRAINS

- Most common reason for missed athletic participation
 - High Ankle Sprain
 - 1-10%
 - Low Ankle Sprain
 - >90%





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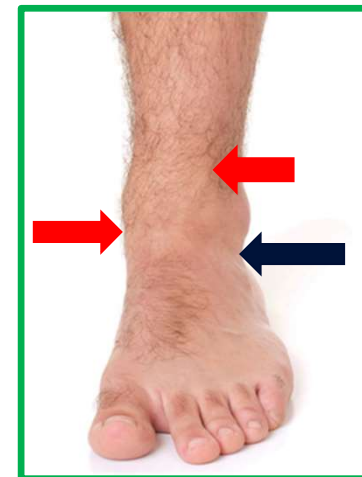
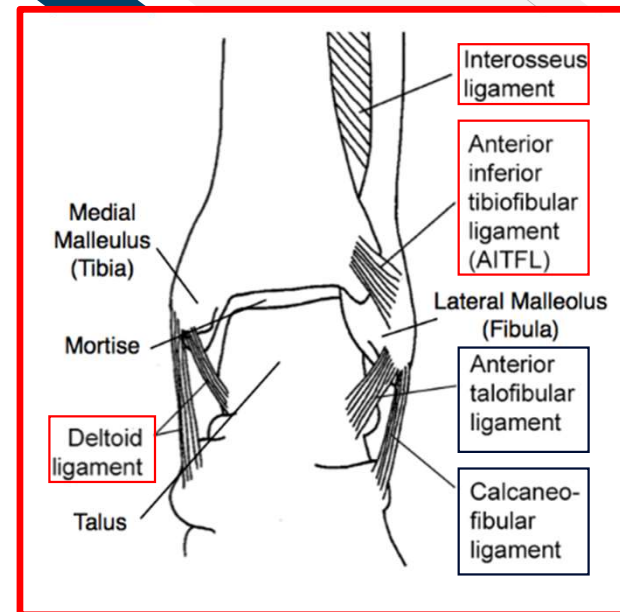
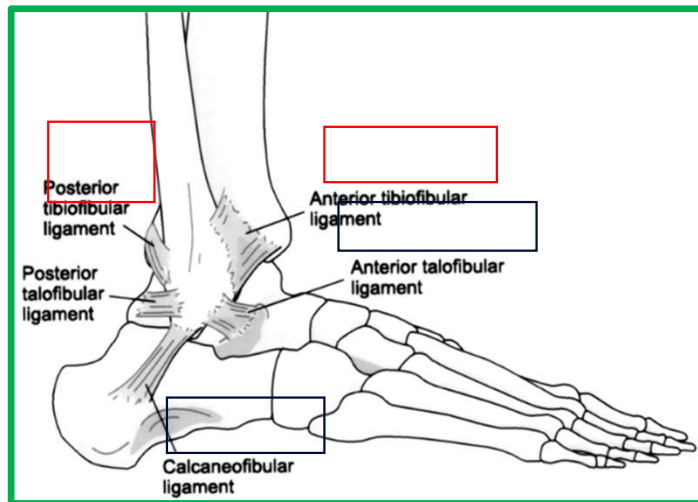
Types of Ankle Sprains

Lateral (Most Common)

Medial

High (Syndesmosis)

ANKLE SPRAINS



Lateral Ankle Sprains

- Most Common
- Treated very successfully conservatively
- Ligaments may take 3-6 months to become “stable”
- 40% have pain for up to 6 months after injury
 - Gerber, FAI (1998)

LOW ANKLE SPRAINS

Classification of Low Ankle Sprains			
	<i>Ligament disruption</i>	<i>Ecchymosis and swelling</i>	<i>Pain with weight bearing</i>
Grade I	none	minimal	normal
Grade II	stretch without tear	moderate	mild
Grade III	complete tear	severe	severe

LOW ANKLE SPRAIN PROGNOSIS

- Pain decreases rapidly in first 2 weeks
- 5-33% still have pain at 1 year



ANKLE SPRAIN TREATMENT

- Immobilization
 - CAM Boot
- Bracing
- Therapy
 - Peroneal Strengthening
 - Proprioceptive Training
 - ROM



ANKLE SPRAIN RETURN TO PLAY

- I → 1 week
- II → 2 weeks
- III → 3 weeks
- High Ankle → Several Weeks



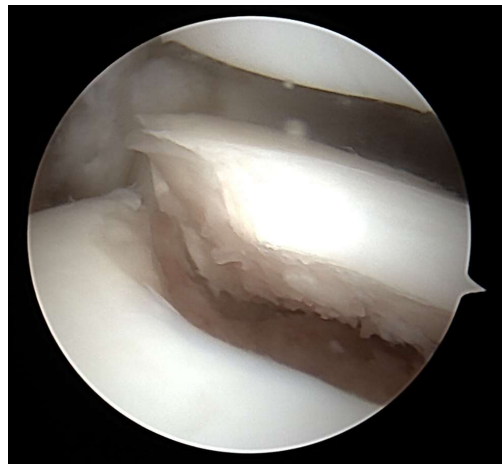
Formal PT may accelerate RTP

Role of Acute Lateral Ankle Ligament Repair?

- Limited
- Associated Injuries
- 32% Have persistent pain, discomfort, instability
 - Konradsen, SJMSS (2002)

Associated Injuries for Acute Repair

Osteochondral Lesions



Patients Not Improving?

Associated Injuries

- Chronic Instability
- Impingement
- Peroneal tendon injuries
- Osteochondral Lesions

Chronic Ankle Instability



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Chronic Ankle Instability

Presentation

- Feels unstable
- Radiographs
- MRI



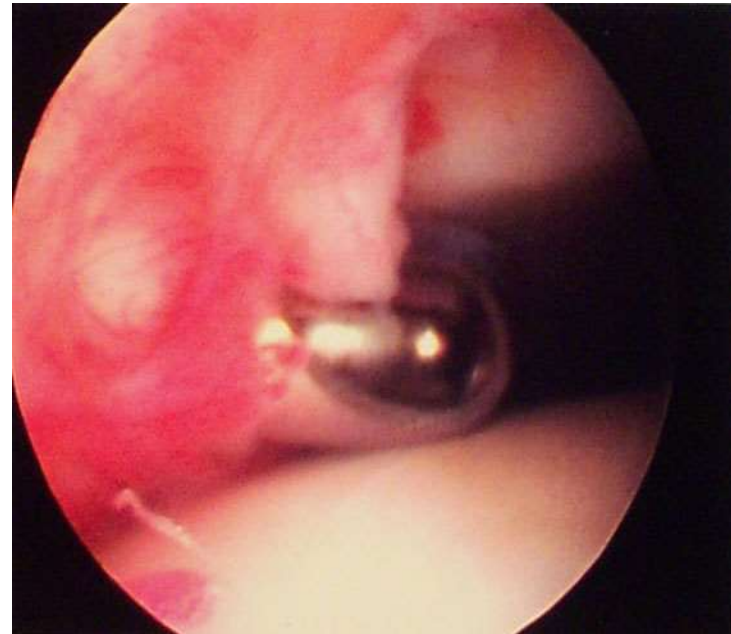
Chronic Ankle Instability

Treatment

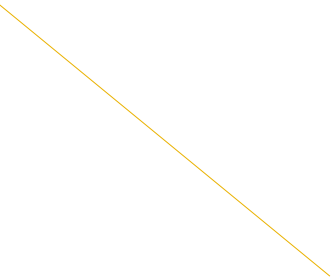
- Repair
 - Open vs. Arthroscopic
 - Over 90% Excellent Results
 - Baumhauer, JAT (2002)
- Reconstruction
 - 90% Success
 - Clanton, ARFA (2004)

Anterolateral Impingement

- Common cause of chronic pain after lateral ankle sprain
 - Gerber 1998



Anterolateral Impingement

- Pathogenesis
 - Incomplete healing, synovitis + fibrosis
 - Hypertrophy with soft tissue impingement
- 

Anterolateral Impingement

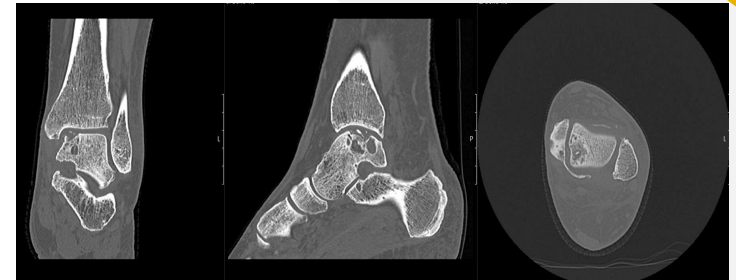
- Clinical presentation
 - history of lateral ankle sprain(s)
 - tenderness anterolateral corner ankle joint
 - localized swelling
 - with and without ankle joint instability
- Radiographs
 - x-rays unremarkable
- MRI
 - may show anterolateral capsule thickening
 - diagnosis made by history and exam most cases
 - most helpful to rule out talar OCD lesions

Anterolateral Impingement

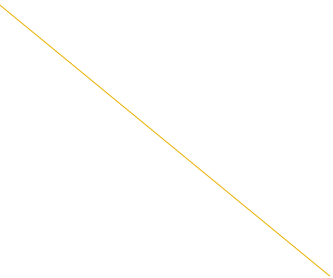
- Treatment:
 - nonoperative
 - ice, NSAIDs, rest, cross-train
 - phonophoresis, iontophoresis
 - intra-articular cortisone injection
 - arthroscopic debridement
 - debride hypertrophic synovitis and scar

Talar OCDs

- Terminology
 - osteochondritis dissecans
 - transchondral fracture
 - talar dome fracture
 - talus osteochondral defect (OCD)
- Etiology
 - trauma, most popular theory
 - idiopathic avascular necrosis, no history trauma



Talar OCDs

- Incidence
 - .09 % to 6.5 % of acute ankle sprains
 - higher percentage in patients with chronic lateral ankle instability
 - 17-79% of acute ankle fractures
- 

Talar OCDs

- Medial versus Lateral lesions
 - Medial
 - Frequency?
 - Location?
 - Cause?



OLT Characteristics

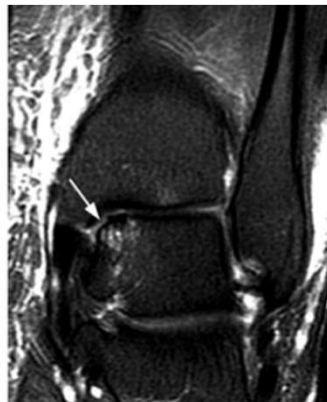
- Type
 - Chondral, osteochondral, subchondral, cystic
- Stability
- Displacement
- Location
 - Medial, lateral, central
 - Anterior, posterior, central
- Containment
- Size (< or > 1.5cm²)

OLT Presentation

- Local pain, swelling, clicking
- Ankle effusion
- Sensation of instability
- History of ankle sprain(s) common
- Less frequently diagnosed after acute injury
 - if diagnosed acutely, history prior injury common
 - dilemma: often impossible to determine lesion age
 - err on treatment of lesion as acute

OLT Imaging

- Plain x-rays
 - may be negative
 - may underestimate lesion extent
- CT Scan
 - will reveal most lesions
 - good for further info with known diagnosis of OCD
 - Better defines dimensions of cyst
- MRI Scan
 - better information on cartilage condition
 - may reveal other soft tissue pathology
 - useful if x-rays + physical exam nondiagnostic
 - Can exaggerate size of lesion

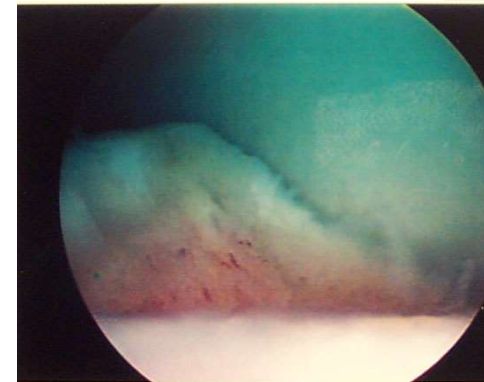


OLT Treatment

- General considerations
 - Trial of non-operative mgmt for non-displaced OLT
 - Trial of protected WB
 - Non WB, bracing, PT, NSAIDS
 - 45% success rate
 - Contraindication: displaced lesion
 - Resect or reduce and internally fix fragment

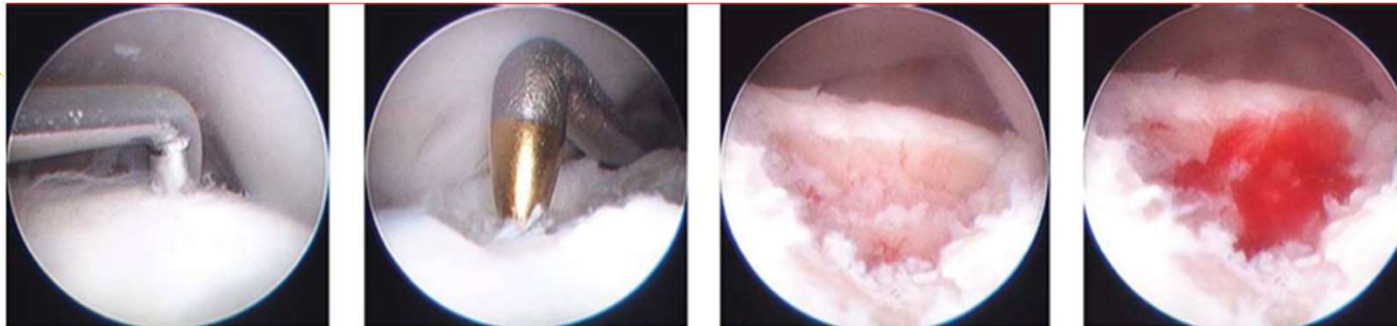
OLT Treatment

- Arthroscopic Treatment
 - OLT with unstable cartilage +/- bone
 - Acute large lesions with subchondral bone: reduction and internal fixation
 - If chronic:
 - debride unstable cartilage and bone to stable rim
 - Marrow stimulation technique



OLT Treatment

- Marrow stimulation
 - 2 most common methods
 - Drilling
 - Microfracture
 - Penetrate subchondral bone → bleeding → healing response → fibrocartilage
 - Fibrocartilage
 - Type I and Type II cartilage
 - wear, stiffness and resilience < hyaline

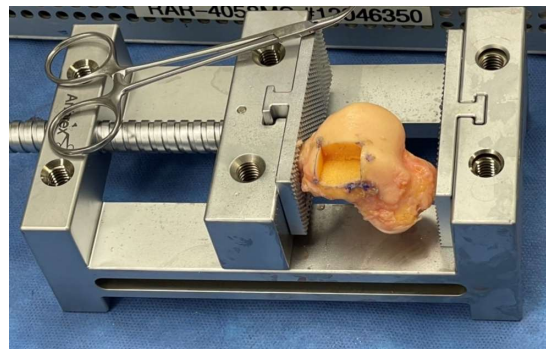


OLT Treatment

- Marrow stimulation
 - Outcomes
 - 40-90% good-excellent results
 - 80% good to excellent result at 2nd attempt
 - Pooled data shows no difference in outcomes based on any characteristic of the lesion
 - Size, grade, location

Osteochondral Allograft

- Benefit: no donor site morbidity, uses hyaline cartilage restore defect, can restore large defects
- Disadvantages: requires open arthrotomy, malleolar osteotomy, technically demanding, high failure rate, prolonged recovery, cost
- Recommended for lesions >1cm wide and >5mm deep
- Fresh or fresh-frozen
- 60% success rate in 2 retrospective studies
- Salvage is ankle arthrodesis



Medial Ankle Sprains (Deltoid)

- Treated very successfully conservatively
- Rare
 - 5% of ankle sprains
 - Waterman, AJSM (2011)
- Chronic instability can be repaired/reconstructed

High Ankle Sprains

- 20% of all ankle sprains
- Longer recovery
- Stable vs. Unstable

High Ankle Sprains

Presentation

- 20% of all ankle sprains
- Longer recovery
- Stable vs. Unstable

Determining “Stability”

Imaging

- Radiographs
 - Stress vs Weight bearing
- CT Scan
 - Weight Bearing
- MRI
- Arthroscopy

"Stable" High Ankle Sprains

- Treated nonoperatively
- Pain can last longer
- Can develop impingement

“Unstable” High Ankle Sprains

- Managed Surgically



THANK YOU





Ankle Fractures: Long Term Expectations

Anthony Schena, MA



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Disclosures

- Nothing to disclose for this talk
- 

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WATCH THURSDAYS

Quicken Loans Arena

CLEVELAND CAVALIERS

Quicken Loans Arena

PTS	REB	AST	FLS
23	0	2	2
99	4	1	0
9	2	0	1
1	2	1	0
13	0	0	0

FG%	3PT%	TOL
37	0	6

FOULS COMMITTED
2

1Q THE DIFF -1 23

6:58

PTS	REB	AST	FLS
20	2	1	0
0	0	0	1
42	2	2	2
7	2	1	0
11	4	1	0

FG%	3PT%	TOL
45	0	7

FOULS COMMITTED
2

Cleveland Clinic

Ankle fractures

- Bimodal distribution: high energy-young male; low energy older female ⁽¹⁾
- Economic burden to society and healthcare ⁽²⁾
- Increasing in prevalence with aging population ⁽²⁾

- 1 Court-Brown CM, McBirnie J, Wilson G. Adult ankle fractures - an increasing problem? Acta Orthop Scand. 1998;69(1):43-7.
- 2 McKeown, R., Rabi, AR., Ellard, D.R. et al. Primary outcome measures used in interventional trials for ankle fractures: a systematic review. BMC Musculoskelet Disord 20, 388 (2019). <https://doi.org/10.1186/s12891-019-2770-2>

Risk Factors

- Smoking, diabetes, obesity, previous falls and/or fractures, very high or low levels of physical activity, and low bone mineral density (BMD). For older individuals over an age of 50, additional risk factors include female gender, comorbidities and multiple medications.

Classification

Danis-Weber Lauge-Hansen

Type A SAD I, II
(Infrasyndesmotic)

Type B SER I, II, III, IV
(transsyndesmotic)

Type C PER I, II, III, IV
(suprasyndesmotic)

PA I, II, III

AO/OTA

44-A1 (isolated lateral)

44-A2 (lateral and medial)

44-A3 (lateral, medial, and posterior)

44-B1 (isolated lateral)

44-B2 (lateral and medial)

44-B3 (lateral, medial, and Volkmann's fracture)

44-C1 (simple diaphyseal)

44-C2 (multifragmentary)

44-C3 (proximal)

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Fixation



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Other Injuries

- Soft tissue trauma-peroneals, skin
- Other fractures: mid foot bones/other extremities
 - Multitrauma
 - osteoporosis
- Cartilage damage/other joint involvement:
 - Talus OCD
 - Tibial plafond OCD
 - Subtalar damage

Post traumatic oa



Outcome Measures

- SF-36 includes 8 categories: Physical functioning, Physical role, Bodily pain, General health, Vitality, Social functioning, Emotional role and Mental health)[12]
- Kerr-Atkins score for pain and function after calcaneal fracture leading to a best score of 100points.[6]
- EuroQol (EQ-5D) to measure the Quality of life and general health status[6]
- American Orthopaedic Foot and Ankle Society score based on 9 items: pain, activity and functional limitations, walking distance, difficulties with different terrains, gait abnormality, sagittal range of motion at the ankle and range of motion at the subtalar joint, stability, and alignment[13]
- Olerud-Molander Ankle Score (OMAS), is an ordinal rating scale from 0 points (totally impaired function) to 100 points (completely unimpaired function) related to 9 different items given different points: pain, stiffness, swelling, stair climbing, running, jumping, squatting, supports and work/activity level.[14]
- FAOS is also a self-administered patient questionnaire and consists of 42 items divided into five subscales: pain, other symptoms, function in daily living (ADL), function in sport + recreation + foot and ankle-related quality of life.[14]
- Global self-rated ankle (GSRF) to evaluate their present ankle function[14]
- The American Orthopaedic Foot and Ankle Society Hindfoot score (AOFAS) score contains 3 components: pain (40 points), function and alignment on a scale of 0- 100 points, 100 best possible score[7]
- Foot Function Index (FFI) consists of 23 questions to measure the impact of foot pathology on function in terms of pain, disability and restriction of activity. The lower the score, the better outcome[7]

Long Term Outcomes

- Studies have identified that 52% to 87% of patients have good to excellent clinical outcomes after an ankle fracture ¹
- Studies looking at patient outcomes between 14 months and 6 years following fracture have found that few patients reported a full recovery in most areas ¹
- Systematic review of long term outcomes from 1822 ankle fractures across 18 studies (4 to 14 years follow up) reported that approximately one in five did not result in a good or excellent outcome ¹
- Adults typically experience a rapid initial recovery of physical function after ankle fracture (approximately 80% function at 6 months), but, on average, recovery remains incomplete 24 months after injury ²

¹ McPhail, S.M., Dunstan, J., Canning, J. *et al.* Life impact of ankle fractures: Qualitative analysis of patient and clinician experiences. *BMC Musculoskelet Disord* **13**, 224 (2012). <https://doi.org/10.1186/1471-2474-13-224>

² Beckencamp, P. *Journal of Orthopaedic & Sports Physical Therapy*; Published Online: October 31, 2014 Volume 44 Issue 11 Pages 841-851

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Outcomes after unstable ankle fracture

Monestier L, Riva G, Coda Zabetta L, Surace MF. OUTCOMES AFTER UNSTABLE FRACTURES OF THE ANKLE: WHAT'S NEW? A SYSTEMATIC REVIEW. *Orthopedic Reviews*. 2022;14(3). doi:10.52965/001c.35688

- Meta-analysis of 33 studies (out of 1211 initially selected)
- F/U ranged from 1-13 years
- OA: 7-44%
- OCD: 40% of unstable ankle fractures
- Worse outcomes with higher grade (Trimalleolar fractures)

Risk Factors for Poor Outcomes

- AGE: >61
- BMI: >40
- ASA: >1
- Type C Fracture/dislocation
- ? Women better than men
- Soft tissue damage at time of fracture
- Conservative care for significant fractures
- Longer immobilization/delayed physical therapy
- DM, HTN, ETOH did not affect outcome; smoking +/-

Monestier L, Riva G, Coda Zabetta L, Surace MF. OUTCOMES AFTER UNSTABLE FRACTURES OF THE ANKLE: WHAT'S NEW? A SYSTEMATIC REVIEW. *Orthopedic Reviews*. 2022;14(3). doi:10.52965/001c.35688

Life Impact from Ankle Fractures

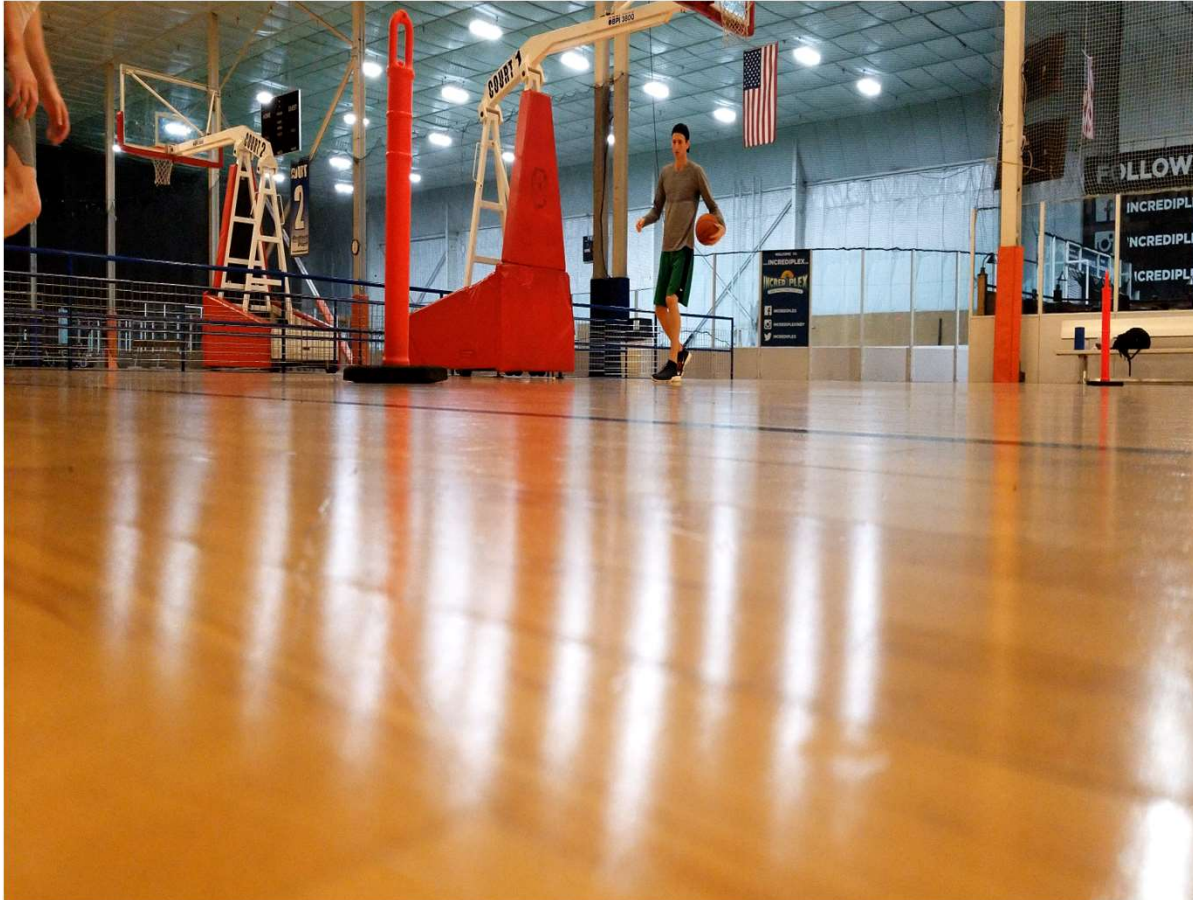
McPhail, S.M., Dunstan, J., Canning, J. *et al.* Life impact of ankle fractures: Qualitative analysis of patient and clinician experiences. *BMC Musculoskeletal Disord* 13, 224 (2012). <https://doi.org/10.1186/1471-2474-13-224>

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- Physical-primary focus on health care professionals
- Psychological-not often noted/addressed/worries about re-injury
- Daily living-similar between patients/providers/unrealistic expectations at times
- Social-under reported by providers/patients feel like they missed out on activities
- Occupational/Domestic-primary focus for providers/patients
- Monetary-providers noted job related but not personal money issues
- Aesthetic-(2) primary categories for patients: Wt gain and shoes
- Medication-mostly part of early care except sleeping meds
- GOAL-

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Thank you

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