Foot and Ankle Orthopedic Disorders

Live Interactive Webinar

Presented By

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Course Overview

- "Foot and Ankle Orthopedic Disorders" is a live (real-time) interactive webinar for rehabilitation professionals that examines common orthopedic ankle and foot disorders. This course includes a review of current literature relating to pathogenesis, clinical presentation, and rehabilitation considerations for pathologies of the foot and ankle.

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Course Rationale

- The purpose of this course is to provide participants with contemporary information on orthopedic foot and ankle disorders with comparative analysis of pathogenesis and clinical presentation to understand rehabilitation considerations and maximize outcomes based on current research.

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Goals and Objectives

1. List and identify common anatomical structures of the foot and ankle.
2. Identify normal and abnormal foot and ankle arthrokinematics.
3. Recognize and define common pathologies involving the joints, bones, ligaments, tendons, and fascia of the foot and ankle.
4. Distinguish the mechanism of injury and pathogenesis of common foot and ankle disorders.
5. Describe foot and ankle fracture classifications.
6. Describe the clinical presentation of common foot and ankle disorders.
7. Detail provocative tests utilized to assess disorders of the foot and ankle.
8. List management strategies for disorders of the foot and ankle.
9. Compare and contrast foot and ankle patient reported outcome measures.
10. Identify balance tools for assessment of foot and ankle disorders.

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Disclaimer

- Application of concepts presented in this webinar is at the discretion of the individual participant in accordance with federal, state, and professional regulations.
- No conflict of interest exists for the presenter or provider of this course.

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Course Outline and Schedule

3-hour live interactive webinar

Topic	Time
Anatomy and Arthrokinematics	0:00-0:20
Lateral Ankle Sprain	0:21-0:30
Medial Ankle Sprain	0:31-0:35
Syndesmosis Sprain	0:36-0:40
Chronic Ankle Instability	0:41-0:50
Interactive Discussion of Clinical Applications	**0:51-1:00**
Traumatic Foot and Ankle Fractures	1:01-1:10
Stress Fractures	1:11-1:20
Osteochondral Lesion of Talus	1:21-1:25
Ankle Impingement Syndrome	1:26-1:35
Achille's Tendinopathy	1:36:1:45
Sever's Disease	1:46-1:50
Interactive Discussion of Clinical Applications	**1:51-2:00**
Achille's Rupture	2:00-2:05
Peroneal Tendinopathy	2:06-2:15
Plantar Fasciitis	2:16-2:25
Turf Toe	2:26-2:30
Peroneal Tendinopathy	2:06-2:15
Assessment Tools	2:30-2:50
Interactive Discussion of Clinical Applications	**2:51-3:00**

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How To Obtain CEUs For This Course

- Course review and summary for post test at the end of the webinar.
- After the live interactive webinar and prior to 11:59 pm TONIGHT go to www.cheapceus.com
- Complete the post test with score of at least 70%
  - May be retaken multiple times
- Submit online payment for course
- Print certificate

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Course Post Test

- Slides with “Consider This” icon in bottom right corner will be helpful in completing the post-test.

Consider This

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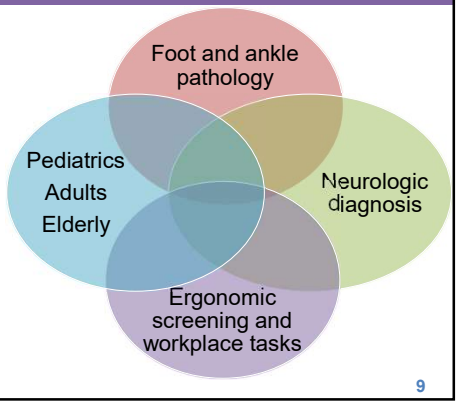
Foot and Ankle Function

- The foot and ankle is critical for locomotion, balance, and weight bearing when performing functional and recreational activities



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Regions of the Foot

Hindfoot	Talocrural and Subtalar	Tibia, Fibula. Talus, Calcaneus
Midfoot	Transverse tarsal, talonavicular, calcaneocuboid, TMT	Navicular, Cuboid, 3 Cuneiforms, Metatarsals
Forefoot	Tarsometatarsal, MTP, PIP, DIP	Metatarsals, Phalanges, Sesamoids

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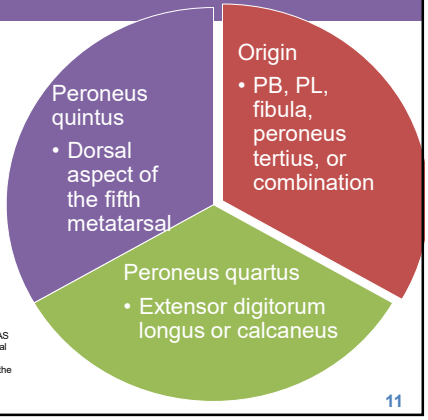
Accessory Peroneal Muscles

- Located in lateral retromalleolar groove



van Dijk, P. A., et.al. (2018). The ESSKA-AFAS international consensus statement on peroneal tendon pathologies. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA, 26(10), 3096–3107.

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Arthrokinematics

- Dorsiflexion
  - The superior surface of the body of the talus is wider anteriorly
- Inversion and eversion motion
  - The medial malleolus is shorter than the lateral
- Acquired flat foot with aging
  - “Pull-off” vs. “push-off” gait pattern

Menz, H. B. (2015). Biomechanics of the ageing foot and ankle: a mini-review. *Gerontology*, *61*(4), 381-388.

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Weight Bearing Lunge Test

- While keeping heel on floor, flex hip and knee to dorsiflexing ankle and lunge forward toward the wall

Tape measure	• Great toe to wall
Inclinometer	• Anterior tibia
Goniometer	• Lateral ankle
Smartphone	• Anterior tibia

Rathi, A., & Sahasrabuddhe, P. (2021). Inter and Intra Rater Reliability of Different Measurement Techniques of Weight Bearing Ankle Dorsiflexion Range of Motion. Int J Physiother Res, 9(6), 4045-50.

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Soft Tissue Injury Management

- ICE RICE PRICE POLICE
- PEACE & LOVE
  - Encompasses continuum of care and addresses psychosocial contributors to healing

PEACE
- **P**rotection
- **E**levation
- **A**void Anti-Inflammatories
- **C**ompression
- **E**ducation

LOVE
- **L**oad
- **O**ptimism
- **V**ascularization
- **E**xercise

Consider This

Dubois, B., Esculier, J. F. (2020). Soft-tissue injuries simply need PEACE and LOVE. *British journal of sports medicine*, *54*(2), 72-73.

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Ankle Sprain

- Lateral sprains are the most common followed by high then medial sprains
- May present with concurrent injuries of the foot and ankle

Grade 1
- Stretching or microscopic tearing

Grade 2
- Partial tearing with laxity

Grade 3
- Complete tear

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Ankle Ligaments

- Lateral complex
  - Anterior talofibular
  - Calcaneofibular
  - Posterior talofibular
- Deltoid ligament
  - Posterior tibiotalar
  - Tibiocalcaneal
  - Tibionavicular
  - Anterior tibiotalar
- Distal tibiofibular syndesmosis
  - Anterior-inferior, posterior-inferior, transverse tibiofibular ligaments
  - Interosseous membrane and ligament
  - Inferior transverse ligament

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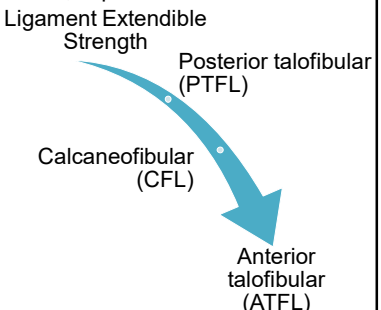
Lateral Ankle Sprain (LAS)

- Mechanism of injury to the lateral ligamentous complex is combined foot plantarflexion, supination and adduction



Altink, J. N., et.al. (2022). Ankle Sprains and Instability. In Management of Track and Field Injures (pp. 263-272). Springer, Cham.

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LAS Clinical Presentation

- Lateral perimalleolar swelling, ecchymosis, increased symptoms with passive plantarflexion with inversion
- Pain or tenderness with palpation of ligaments
- Tenderness of peroneus longus and/or brevis
- Assess Weight Bearing Lunge Test, single-limb balance and hopping, and dynamic balance mindful of safety

Gribble, P. A. (2019). Evaluating and differentiating ankle instability. *Journal of athletic training*, *54*(6), 617-627.

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ATFL and CF Provocative Tests

Medial Talar Tilt Test
Ankle neutral with inversion force at talus and calcaneus

Anterior Drawer Test
Neutral ankle; anterior force to posterior aspect calcaneus

Anterolateral Drawer Test
10*-15* PF; anterior force to posterior aspect calcaneus and lateral talus palpation

Reverse Anterolateral Drawer Test
Hook lying with 10*-15* PF; posterior force to anterior aspect tibia and lateral talus palpation

Consider This

Li, Q., et.al. (2020). Reverse anterolateral drawer test is more sensitive and accurate for diagnosing chronic anterior talofibular ligament injury. Knee Surgery, Sports Traumatology, Arthroscopy, 28(1), 55-62.
Larkins, L, et.al. (2020). Physical examination of the ankle: a review of the original orthopedic special test description and scientific validity of common tests for ankle examination. Archives of Rehabilitation Research and Clinical Translation, 2(3), 100072.

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Medial Ankle Sprain

- Mechanism of injury to the deltoid complex is combined pronation, abduction, and dorsiflexion of the foot
- Differential diagnosis includes Maisonneuve fracture
  - Medial ankle sprain and proximal fibula fracture

Wade, F., et.al. (2018). Kinematic analysis of a televised medial ankle sprain. Asia-Pacific journal of sports medicine, arthroscopy, rehabilitation and technology, 12, 12-16.
20

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Syndesmosis Sprain

- Mechanism of injury is forced dorsiflexion and external rotation of the planted foot
- Classified as stable or unstable based on extent of ligament damage
  - Anterior inferior tibiofibular
  - Interosseous ligament
  - Posterior inferior tibiofibular
  - Transverse ligament
  - Interosseous membrane

Corte-Real, N., & Caetano, J. (2021). Ankle and syndesmosis instability: consensus and controversies. EFORT open reviews, 6(6), 420–431.
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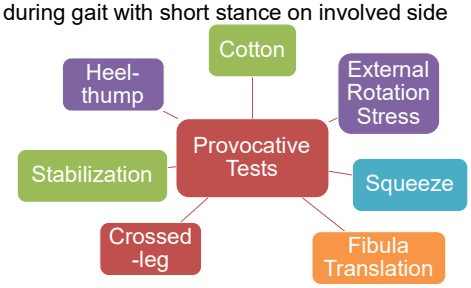
Syndesmosis Sprain Clinical Presentation

- Anterolateral ankle and distal leg pain exacerbated with weight bearing and ambulation on uneven surfaces
- Heel raised during gait with short stance on involved side



Larkins, L., et.al. (2020). Physical examination of the ankle: a review of the original orthopedic special test description and scientific validity of common tests for ankle examination. Archives of Rehabilitation Research and Clinical Translation, 2(3), 100072.
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Ankle Sprain Neuropathy

- Monitor for initial or delayed neurologic symptoms and CRPS Type 1

Deep peroneal
Distal first intermetatarsal space Percuss extensor hallucis brevis

Superficial peroneal
Distal lateral leg/ankle/dorsum of foot
Pressure proximal to distal tip of fibula with active dorsiflexion/eversion
Percuss with passive plantarflexion and inversion

Sural
Lateral foot/ankle
Pressure posterior to lateral malleolus Passive plantarflexion/inversion

Tibial
Medial ankle or plantar surface
Palpate tarsal tunnel Passive ankle/toe dorsiflexion with foot eversion

Pina, M., et.al. (2021). Persistent Nerve Injury and CRPS After Ankle Sprains. Techniques in Foot & Ankle Surgery, 20(1), 2-5.
Hood, Jr. R. and Morrison, S. (2018). Recognizing nerve injuries in patients with acute ankle sprain. Podiatry Today.
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Ankle Sprain Management

- Surgery may be indicated based on severity of sprain
- Mulligan mobilization with movement
  - Lateral sprain - inferior tibiofibular, talocrural, cubometatarsal joints

Can/may use	• Cryotherapy and diathermy
Should use	• Manual therapy pain free range
Should NOT use	• Ultrasound
Conflicting evidence	• Acupuncture and electrotherapy

Nguyen, A., et.al. (2021). Effects of Mulligan mobilization with movement in subacute lateral ankle sprains: a pragmatic randomized trial. Journal of Manual & Manipulative Therapy, 29(6), 341-352.
Martin, R., et.al. (2021). Ankle Stability and Movement Coordination Impairments: Lateral Ankle Ligament Sprains Revision 2021: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Academy of Orthopaedic Physical Therapy of the American Physical Therapy Association. Journal of Orthopaedic & Sports Physical Therapy, 51(4), CPG1-CPG80.
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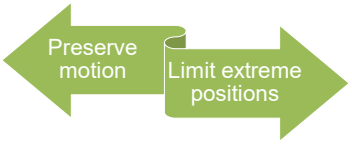
Ankle Sprain Functional Support

- External stabilizing support combined with exercise facilitates return to work and sport



Vuurberg, G., et.al. (2018). Diagnosis, treatment and prevention of ankle sprains: update of an evidence-based clinical guideline. British journal of sports medicine, 52(15), 956-956.
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Ankle Sprain Functional Support Outcomes

LAS Intervention	Outcome
Dynamic tape	Improved asymmetrical loading
Kinesiotape	Single-leg dynamic balance improved Dynamic postural control similar to sham
Bracing	No consensus on flexible vs. rigid

Pawik, Ł., et.al(2022). In Patients with Grade I and II Ankle Sprains, Dynamic Taping Seems to Be Helpful during Certain Tasks, Exercises and Tests in Selected Phases of the Rehabilitation Process: A Preliminary Report. International Journal of Environmental Research and Public Health, 19(9), 5291.
Tomruk, M., et.al. (2022). Is Ankle Kinesio Taping Effective to Immediately Change Balance, Range of Motion, and Muscle Strength in Healthy Individuals? A Randomized, Sham-Controlled Trial. Korean Journal of Family Medicine, 43(2), 109.
Altomare, D., et.al. (2022). Evidence-based treatment choices for acute lateral ankle sprain: a comprehensive systematic review. Eur Rev Med Pharmacol Sci, 26(6), 1876-1884.
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Ankle Sprain Functional Therapy

- Core and bilateral lower extremity strengthening
- Proprioception training, reaction time
- Dynamic balance
  - Consider sensorimotor connectivity deficits in the elderly
- Hop stabilization program

Bain, K., et.al. (2021). Sensorimotor Connectivity is related to Static Postural Control in Older Adults with History of Lateral Ankle Sprain.
Ardakani, M., et.al.(2019). Hop-Stabilization Training and Landing Biomechanics in Athletes With Chronic Ankle Instability: A Randomized Controlled Trial. Journal of athletic training, 54(12), 1296–1303.
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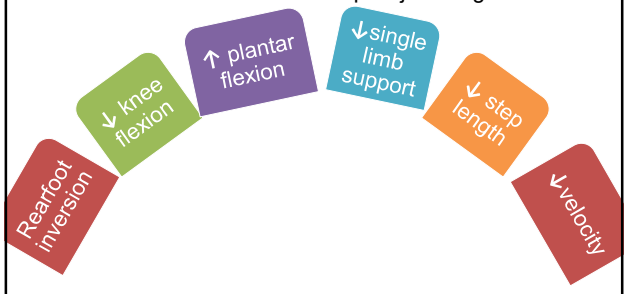
Ankle Sprain Gait Analysis

- Talar inversion secondary to altered soft tissue mechanical stiffness can increase ankle complex joint degeneration



Fraser, J., et.al.(2019). Multisegmented ankle-foot kinematics during gait initiation in ankle sprains and chronic ankle instability. Clinical biomechanics, 68, 80-88.
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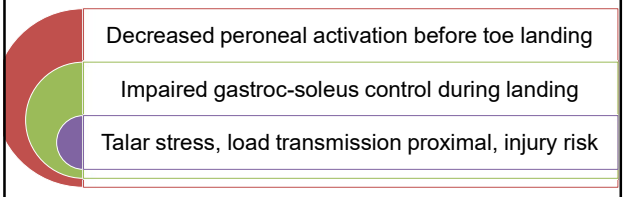
Ankle Sprain Altered Gait Kinematics

- Altered mechanics when landing may contribute to recurrent ankle sprain, anterior cruciate injury, and ankle/knee osteoarthritis



Lin, J.,et.al. (2022). Influence of Landing in Neuromuscular Control and Ground Reaction Force with Ankle Instability: A Narrative Review. Bioengineering, 9(2), 68.
Jeon, H,et.al.(2021). Ankle Instability Patients Exhibit Altered Muscle Activation of Lower Extremity and Ground Reaction Force during Landing: A Systematic Review and Meta-Analysis. Journal of Sports Science & Medicine, 20(2), 373.
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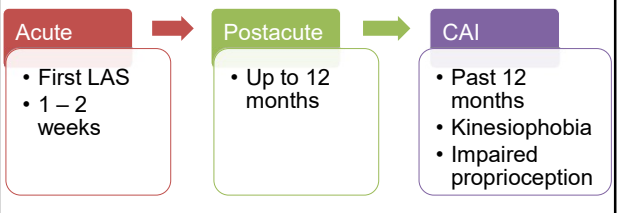
Chronic Ankle Instability (CAI)

- History of at least 1 significant ankle sprain, episodes of "giving way" and/or recurrent sprain and/or "feelings of instability", diminished function measured by validated tool



Gribble, P., et.al.(2013). Selection criteria for patients with chronic ankle instability in controlled research: a position statement of the International Ankle Consortium. journal of orthopaedic & sports physical therapy, 43(8), 585-591.
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CAI Evaluation

- Include comprehensive examination for multiple ankle pathologies with the addition of specific assessments for coping skills and comfort with movement

- Pain Self-Efficacy Questionnaire
- 11-item Tampa Scale of Kinesiophobia
- Fear-Avoidance Beliefs Questionnaire

Lin C., et al. (2021) The effect of chronic ankle instability on muscle activations in lower extremities. PLoS ONE 16(2): e0247581.

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CAI Classification

Functional Ankle Instability (FAI)	Mechanical Ankle instability (MAI)
Anatomic stability	Structural pathology
Sensorimotor and proprioceptive training	Stabilization and surgery

Consider This

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Contributors to CAI

Bilateral impaired proprioception/dynamic postural control
- Kinesthesia and joint position sense diminished

Inversion and eversion weakness
- Delayed peroneal reaction time

Decreased dorsiflexion range of motion
- Gastroc-soleus tightness and/or talus hypomobility

Altered postural control
- Decreased gluteus medius activation and increased trunk activation

Hertel, J., & Corbett, R. O. (2019). An updated model of chronic ankle instability. Journal of athletic training, 54(6), 572-588.
Ma, T., et.al (2021). Chronic ankle instability is associated with proprioception deficits: a systematic review and meta-analysis. Journal of sport and health science, 10(2), 182-191.
Hoch, M. C., & McKeon, P. O. (2014). Peroneal reaction time after ankle sprain: a systematic review and meta-analysis. Medicine and Science in Sports and Exercise, 46(3).
Powers. C.,et.al.(2017). Hip strength as a predictor of ankle sprains in male soccer players: a prospective study. Journal of athletic training, 52(11), 1048-1055.

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CAI Rehabilitation Outcomes

Cohort	Intervention	Outcome
Female athletes with FAI	Wobble board progression, kinesiotape, combined	Improved balance, stability, and instability scores
Male football players with FAI	Virtual reality, resistance band, combined	Improved balance and subjective sense of instability
Healthy vs. Individuals with CAI	Functional performance tests	Side-hop, multiple-hop, foot-lift better identified CAI

Khalili, S, et.al.. (2022). Effect of Combined Balance Exercises and Kinesio Taping on Balance, Postural Stability, and Severity of Ankle Instability in Female Athletes with Functional Ankle Instability. Life, 12(2), 178.
Mohammadi, N, et.al. (2022). Compare the Effect of Traditional and Virtual Reality Training on Subjective-sense of Instability and Balance in Basketball-players with Functional Ankle Instability: Matched Randomized Clinical Trial. Journal of Biomedical Physics and Engineering.
Rosen, A.,et.al. (2019). Ability of functional performance tests to identify individuals with chronic ankle instability: a systematic review with meta-analysis. Clinical Journal of Sport Medicine, 29(6), 509-522.

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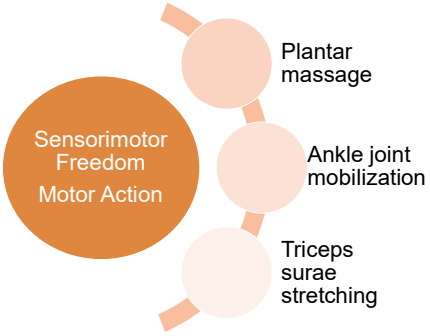
Sensory Targeted Ankle Rehabilitation Strategies (STARS)



McKeon, P. O., & Wikstrom, E. A. (2016). Sensory-targeted ankle rehabilitation strategies for chronic ankle instability. Medicine and science in sports and exercise, 48(5), 776.

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Traumatic Foot and Ankle Fractures

- Weber Classification

Type A	Distal to ankle joint Palpate fifth metatarsal and calcaneocuboid joint
Type B	At level of ankle joint Palpate distal fibula and tibia
Type C	Proximal to ankle joint Palpate proximal fibula

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Ottawa Ankle Rules (OAR)

- Determine potential presence of fracture and need for radiographic imaging

Ankle X-ray — Malleolar zone pain

Tender posterior edge tibia or tip medial malleolus
Tender posterior edge fibula or tip lateral malleolus
Unable to bear weight 4 steps

Foot X-ray — Midfoot pain

Tender navicular
Tender base of fifth metatarsal
Unable to bear weight 4 steps

Consider This

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Pilon Fracture

- High energy axial loading forces talus into tibial articular surface resulting in distal tibia fracture
- Nondisplaced fractures managed with immobilization and weight bearing limitation
- Complex fractures require surgical intervention

Hegmann, KT. (2018). American College of Occupational and Environmental Medicine: Ankle and Foot Disorders Guideline. Reed Group, Ltd.

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Calcaneus Fractures

- Typically, displaced and intra-articular resulting from axial loading
- Plantar ecchymosis and Calcaneus Squeeze Test
- Conservative or surgical management based on severity
- Monitor for peroneal impingement, compartment syndrome and CRPS
- Incorporate toe exercises

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Lisfranc Complex Injury

- Fracture-dislocation or pure ligamentous injury of the first and second tarsometatarsal joints

Yan, A.,et.al. (2021). Updates on Lisfranc Complex Injuries. Foot & Ankle Orthopaedics.

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Lisfranc Complex Injury Rehabilitation

- Medial plantar ecchymosis
- Midfoot pain exacerbated with push-off
- Dorsal midfoot pain with Tarsometatarsal Squeeze Test
- Conservative or surgical management based on severity
- Monitor for compartment syndrome

Yan, A.,et.al. (2021). Updates on Lisfranc Complex Injuries. Foot & Ankle Orthopaedics.

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Stress Fractures

- Combination of excessive muscular force and repetitive loading resulting in fracture
  - Second and fifth metatarsal are most common

Microtrauma — Bone fatigue — Fracture

Caravelli, S.,et.al. (2022). Foot and Ankle Stress Fractures in Athletics. In Management of Track and Field Injures (pp. 301-309). Springer, Cham.

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Fifth Metatarsal Fracture Clinical Presentation

- Lateral forefoot pain exacerbated with weight bearing, tenderness and swelling
- Inspect for varus hindfoot and metatarsal callus
- Pain and weakness with eversion
- Interview regarding activity patterns and comorbidities

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Female Athlete Triad

- Very active females may present with a combination of conditions increasing risk of stress fractures

Menstrual dysfunction	• Excessive exercise or activity • Amenorrhea, oligomenorrhea • Low estrogen levels
Low energy availability	• Insufficient food intake or eating disorder • Decreased Calcium and Vitamin D
Low bone mineral density	•Osteoporosis

Nazem, T. G., & Ackerman, K. E. (2012). The female athlete triad. *Sports health*, *4*(4), 302–311.

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Fifth Metatarsal Fracture Rehabilitation

- DVT prophylaxis

Zone 1	• Avulsion – Tuberosity • WBAT in supportive device
Zone 2	• Jones - Metaphyseal-diaphyseal • Avascular zone nonunion risk • Conservative and surgical options
Zone 3	• Stress fracture – Proximal diaphyseal • Avascular zone is nonunion risk • Conservative and surgical options

Metzl, J., et.al. (2022). Fifth metatarsal jones fractures: diagnosis and treatment. JAAOS-Journal of the American Academy of Orthopaedic Surgeons, 30(4), e470-e479.

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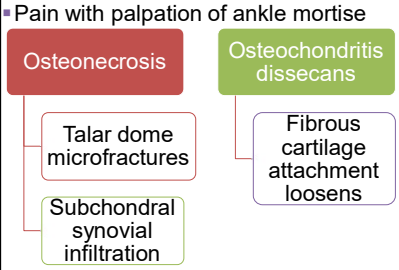
Osteochondral Lesion of Talus (OLT)

- Talus subchondral bone and cartilage damage following traumatic ankle injury
- Deep ankle pain with weight bearing and catching sensation
- Pain with palpation of ankle mortise



Rikken, Q.,et.al.(2022). Osteochondral Lesions of the Ankle: An Evidence-Based Approach for Track and Field Athletes. In Management of Track and Field Injures (pp. 273-281). Springer, Cham.

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OLT Rehabilitation

- Ankle joint off-loading
- Flexibility, strength, balance for biomechanical correction
- Platelet rich plasma or hyaluronic acid injections
- Surgery if conservative treatment unsuccessful

Mei-Dan O, et.al. (2012) Platelet-Rich Plasma or hyaluronate in the Management of Osteochondral Lesions of the Talus, The American Journal of Sports Medicine, Vol 40, Issue 3, pp. 534 – 541.

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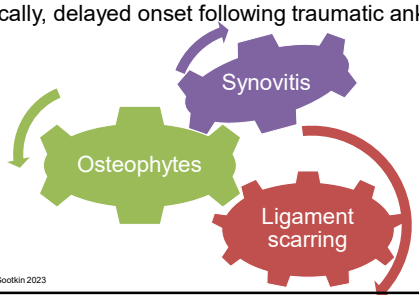
Ankle Impingement Syndrome

- Soft tissue or osseous abnormalities of the ankle creating pain and restriction of the talocrural joint
  - Anterior or posterior impingement
- Typically, delayed onset following traumatic ankle injury



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Anterior Ankle Impingement Clinical Presentation

- Anterior ankle pain with activities in terminal dorsiflexion
- Pain with passive dorsiflexion and eversion
- Lateral ankle instability with history of sprain

Consider This

Lavery, K.,et.al.. (2016). Ankle impingement. Journal of orthopaedic surgery and research, 11(1),

49

Posterior Ankle Impingement Clinical Presentation

- Soft tissue encroachment at tibiotalar and talocalcaneal articulations with end range of motion plantarflexion activities
- Posterior Ankle Impingement Test

Talus Stieda process or os trigonum	Hypertrophic capsule or osteophytes	Ligament scarring	Flexor hallucis longus tendinopathy

Kalbouneh, H., et.al. (2021). The Anatomical Variations of the Posterolateral Tubercle of Talus in Patients with Posterior Ankle Impingement Syndrome.

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Ankle Impingement Syndrome Rehabilitation

- Avoid provocative activity
- Joint mobilization
- Footwear and training patient education
- Proprioceptive training and strengthening
- Cortisone injection
- Surgery may be necessary

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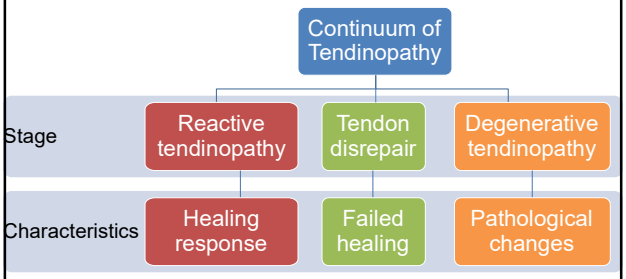
Tendon Pathology

- Tendonitis vs. tendinosis vs. tendinopathy



Scott, A., et.al. (2020). Icon 2019: international scientific tendinopathy symposium consensus: clinical terminology. British journal of sports medicine, 54(5), 260-262.
Matthews, W., Ellis, R., Furness, J. W., Rathbone, E., & Hing, W. (2020). Staging achilles tendinopathy using ultrasound imaging: the development and investigation of a new ultrasound imaging criteria based on the continuum model of tendon pathology. BMJ Open Sport & Exercise Medicine, 6(1), e000699.

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Achilles Tendinopathy

- Posterior ankle pain
  - Insertional - Between tendon and calcaneus
  - Midportion - In tendon body

Intrinsic	Biomechanical abnormalities	Systemic conditions
Extrinsic	Mechanical overload	Training errors

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Achilles Tendinopathy Clinical Presentation

- Palpable localized tendon thickening or swelling and pain
  - Achilles Tendon Palpation Test
  - Arc Sign
- Ankle plantar flexion endurance
- Single-limb Hop Tests

Martin, R,et.al. (2018). Achilles pain, stiffness, and muscle power deficits: midportion Achilles tendinopathy revision 2018: clinical practice guidelines linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association. Journal of Orthopaedic & Sports Physical Therapy, 48(5), A1-A38.

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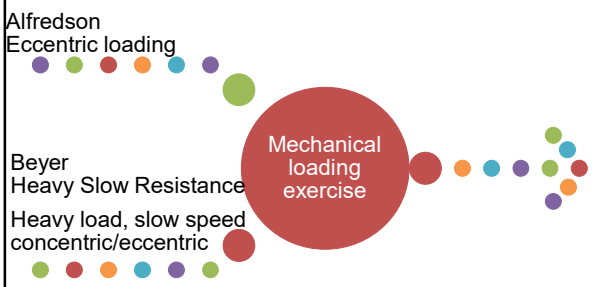
Midportion Achilles Tendinopathy Rehabilitation

- Iontophoresis
- Dry needling
- Joint mobilization
- Orthotic
- Rigid taping
- Isometric exercise
- Gastrocnemius and soleus stretching
- Body weight resistance exercise
- Modifiable risk factor education

Martin, R.,etlal. (2018). Achilles pain, stiffness, and muscle power deficits: midportion Achilles tendinopathy revision 2018: clinical practice guidelines linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association. Journal of Orthopaedic & Sports Physical Therapy, 48(5), A1-A38.
Lee, K.,et.al. (2019). Controlled trial to compare the Achilles tendon load during running in flatfeet participants using a

55

Midportion Achilles Tendinopathy Exercise



Habets, B., et.al.(2021). No difference in clinical effects when comparing alfredson eccentric and silbernagel combined concentric-eccentric loading in achilles tendinopathy: a randomized controlled trial. Orthopaedic journal of sports medicine, 9(10), 2325967121031254.
Consider This

56

Sever's Disease

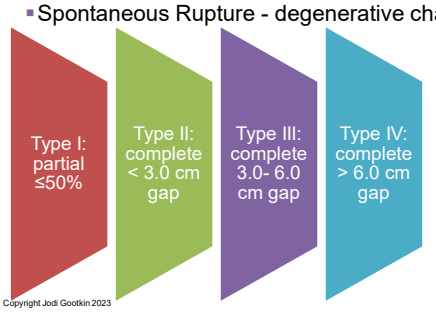
- Repetitive stress on calcaneal growth plate causing calcaneal apophysitis in children
- Insidious onset of posterior heel pain and tenderness exacerbated with activity
- Calcaneal Squeeze Test
- Management with activity restriction, orthosis, gastrocnemius stretching and open chain eccentric strengthening

Fares, M., et.al. (2021). Sever's Disease of the Pediatric Population: Clinical, Pathologic, and Therapeutic Considerations. Clinical Medicine & Research, 19(3), 132-137.
Consider This

57

Achilles Tendon Rupture

- Mechanism of injury
  - Acute Rupture - sudden high load dorsiflexion
  - Spontaneous Rupture - degenerative changes



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Achilles Tendon Rupture Clinical Presentation

- Palpable tendon gap
- Weak plantarflexion
- Achilles Tendon Total Rupture Score (ATRS)

Thompson Test

Matles Test

Kearney, R., et.al. (2012). The Achilles tendon total rupture score: a study of responsiveness, internal consistency and convergent validity on patients with acute Achilles tendon ruptures. Health and quality of life outcomes, 10(1), 1-7.

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Achilles Tendon Rupture Rehabilitation

- DVT prophylaxis
- Functional rehabilitation
  - Tendon gap may not be valid predictor of outcome

Protected early weight bearing

Early controlled movement

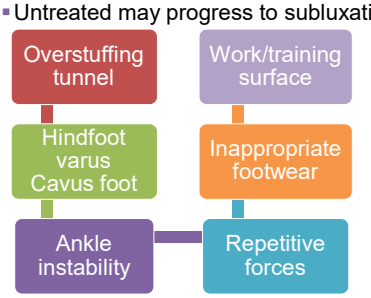
Immobilization

Tarantino, D,et.al. (2020). Achilles Tendon Rupture: Mechanisms of Injury, Principles of Rehabilitation and Return to Play. Journal of functional morphology and kinesiology, 5(4), 95.

60

Peroneal Tendinopathy

- Inflammation of one or both peroneal tendons
- Untreated may progress to subluxation, tear, or rupture



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Peroneal Tendinopathy Clinical Presentation

- Ottawa Ankle Rules
- Pain on lateral foot and ankle exacerbated with activity
- Tenderness to palpation with plantarflexion and inversion stretching
- Eversion and plantarflexion weakness with pain
- Posture assessment

62

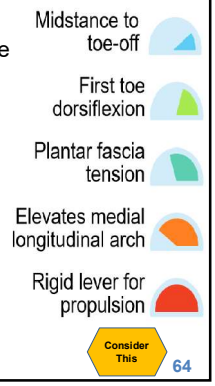
Peroneal Tendinopathy Rehabilitation

- Avoid immobilization
- Activity modification
- Strengthening and proprioceptive training
- Orthotic
- Training and footwear education

63

Plantar Fasciitis

- Faulty mechanics of windlass mechanism and excessive vertical compressive forces create microdamage
  - Excessive pronation and lack of dorsiflexion



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Plantar Fasciitis Clinical Presentation

- Medial plantar heel pain with initial steps after rest and/or prolonged weight bearing
- Windlass Test
- Restricted dorsiflexion
- Palpable pain at proximal plantar fascia insertion
- Negative findings for peripheral nerve entrapment or lumbopelvic radiating pain

Rhim, H. C., et.al.(2021). A Systematic Review of Systematic Reviews on the Epidemiology, Evaluation, and Treatment of Plantar Fasciitis. Life, 11(12), 1287.

65

Plantar Fasciitis Rehabilitation

- Iontophoresis, low-level laser, phonophoresis
- Joint and soft tissue mobilization
- Plantar fascia and triceps surae stretching
- Medial longitudinal arch support, heel cushion, night splint
- Anti-pronation or kinesiotaping gastrocnemius and plantar fascia
- Assess functional, recreation, work-related weight bearing activities and BMI

Martin, R.,et.al. (2014). Heel pain—plantar fasciitis: revision 2014. Journal of Orthopaedic & Sports Physical Therapy, 44(11), A1-A33.

66

Turf Toe

- Hyperextension injury resulting in injury of the first metatarsophalangeal joint complex
- First MTP pain, swelling, ecchymosis
- Pain with passive first MTP extension and active flexion
- Pain with weight bearing and antalgic gait
- Vertical Lachman Test

Foot planted in plantarflexion with MTP hyperextension → External force axial loading of heel → Plantar plate damage

67

Turf Toe Rehabilitation

- Education on appropriate footwear for surface
- Grade 1 and 2
  - Taping, orthotics, strengthening
- Grade 3
  - Surgery may be indicated

Passive plantarflexion → Low-impact exercise protecting from passive MTP extension → Progression of weight bearing activities to full push-off position

68

Assessment Tools

Pain and Disability	• Patient-Reported Outcomes Measurement Information System – Pain Interference (PROMIS-PI) • Lower Extremity Functional Scale (LEFS) • Foot and Ankle Ability Measure (FAAM) • Identification of Functional Ankle Instability (IdFAI) • Cumberland Ankle Instability Tool (CAIT) • Victorian Institute of Sport Assessment-Achilles (VISA-A)
Balance	• Clinical Test of Sensory Interaction on Balance (CTSIB) • Star Excursion Balance Test (SEBT) • Y-Balance Test • Single-Limb Hop Tests

69

Patient-Reported Outcomes Measurement Information System – Pain Interference (PROMIS-PI)

- Measures the self-reported consequences of pain on a person's life
- Considers the extent to which pain hinders engagement with social, cognitive, emotional, physical, and recreational activities including sleep and enjoyment of life
- Higher score reflects greater pain interference

Consider This

70

Lower Extremity Functional Scale (LEFS)

- Assesses functional limitation of everyday activities
- A lower score reflects a greater level of disability

71

Foot and Ankle Ability Measure (FAAM)

- Assess elements of routine activities with ADL and sports subscales
- Patient should record N/A if limitation is not attributed to the foot and ankle
- Lower percentage score reflects lower physical function

72

Identification of Functional Ankle Instability (IdFAI)

- Self-report questionnaire to assess if the individual meets the minimum criteria for chronic ankle instability
- Scores greater than 11 suggest chronic ankle instability

73

Cumberland Ankle Instability (CAIT)

- A brief self-report questionnaire that focuses on symptoms of instability during several physical tasks
- Differentiates functionally stable and unstable ankle
- Measures the severity of functional instability
- Lower scores indicate less stability

Consider This

74

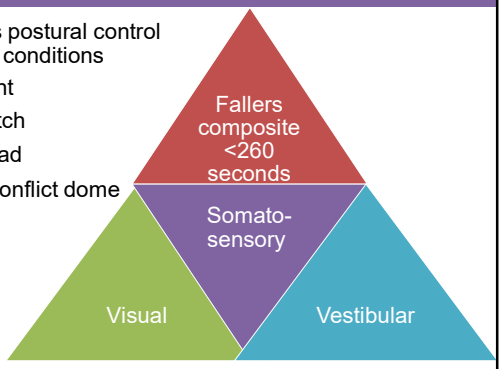
Victorian Institute of Sport Assessment-Achilles (VISA-A)

- Assesses physical symptom severity for individuals presenting with Achilles tendinopathy
  - Specifically, pain in the Achilles tendon region
- Maximum score of 100 with lower scores reflecting greater symptoms

75

Clinical Test of Sensory Interaction on Balance (CTSIB)

- Assesses postural control under six conditions
- Equipment
  - Stopwatch
  - Foam pad
  - Visual conflict dome



Clinical Test of Sensory Interaction on Balance
https://www.sralab.org/rehabilitation-measures/clinical-test-sensory-interaction-balance-vedge

76

Star Excursion Balance Test (SEBT)

- Single limb stance reaching as far as possible with contralateral limb in different directions
- Eight direction star tape pattern created on floor

77

Y-Balance Test

- While maintaining single leg stance, free limb reaches in the anterior, posteromedial, and posterolateral directions in relation to the stance foot
- Tape in Y shape on floor

78

Single-Limb Hop Tests

Distance measured

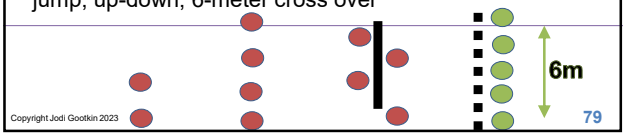
Single - Furthest distance forward with one hop
Triple - Total of 3 consecutive forward hops
Cross-over - Total of 3 consecutive forward hops alternating left-to-right with foot crossing over center line

Timed

6-meter - series of consecutive single forward hops

Other variations

Vertical, medial, lateral, figure-8, side, square, stair, triple jump, up-down, 6-meter cross over



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Conclusion

- Understanding the mechanism of injury for foot and ankle disorders allows the clinician to appropriately assess the clinical presentation.
- This will strengthen decision making when developing rehabilitation programs.

80

1. What acronym for management of soft tissue injuries encompasses the continuum of rehabilitation beyond the acute phase and addresses psychosocial contributors?

A. POLICE
B. PRICE & VALUE
C. PEACE & LOVE
D. RICE

81

2. Which provocative test places the foot in 10-15 degrees of plantarflexion and applies an anteriorly directed force to translate the talus while palpating the talus translation?

A. Medial talar tilt
B. Reverse anterolateral drawer
C. Anterior drawer
D. Anterolateral drawer

82

3. What characteristic is specific to the functional instability classification of chronic ankle instability following ankle sprain?

A. Pain greater than 12 months post injury
B. Lateral ankle ligament laxity
C. Anatomic ankle stability
D. Perception of ankle giving way

83

4. According to the Ottawa Ankle Rules, inability to bear weight immediately after injury and in department for _____ steps is a factor indicating the need for radiograph to rule out ankle fracture.

A. 2
B. 4
C. 6
D. 8

84

5. An individual presenting with ankle instability and anterior ankle pain with dorsiflexion activities 9 months following an ankle sprain should be assessed for what condition?

A. Anterior ankle impingement
B. Posterior ankle impingement
C. Achille's tendinopathy
D. Plantar fasciitis

85

6. Which type of exercise can be beneficial when rehabilitating an individual with mid-portion Achilles tendinopathy?

A. Closed chain, isometric exercises
B. Heavy load, slow speed exercises
C. Small range, open chain exercise
D. Rapid fatigue, endurance exercise

86

7. Which of the following is NOT a characteristic of Sever's disease?

A. Calcaneal apophysitis
B. Posterior heel pain
C. Associated with high activity in childhood
D. Common in sedentary older adults

87

8. What is the role of the windlass mechanism during the gait cycle?

A. Generate eversion stability during midstance
B. Compensate for functional leg length discrepancy
C. Transform foot structures into rigid lever for propulsion
D. Reciprocal inhibition to decelerate in preparation for initial contact

88

9. Which measure assesses self-reported consequences of pain on an individual's life including enjoyment in life and sleep?

A. PROMIS-PI
B. IdFAI
C. FAAM
D. CTSIB

89

10. Which measure differentiates between stable and unstable ankles and measures the severity of functional instability?

A. SEBT
B. VISA-A
C. LEFS
D. CAIT

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Foot and Ankle Orthopedic Disorders
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Foot and Ankle Orthopedic Disorders
Resources

APTA Lateral Ankle Sprain Clinical Practice Guideline
https://www.jospt.org/doi/pdf/10.2519/jospt.2021.0302

APTA Midportion Achilles Tendinopathy Clinical Practice Guideline
https://www.jospt.org/doi/epdf/10.2519/jospt.2018.0302

Continuum of Tendinopathy
https://bjsm.bmj.com/content/bjsports/50/19/1187.full.pdf

Achilles Tendon Total Rupture Score
http://www.londonorthopaedicsurgery.co.uk/media/1467/ATRS-questionnaire.pdf

APTA Plantar Fasciitis Clinical Practice Guideline
https://www.jospt.org/doi/pdf/10.2519/jospt.2014.0303

Patient-Reported Outcomes Measurement Information System – Pain Interference (PROMIS-PI)
https://www.healthmeasures.net/implement-healthmeasures/administration-platforms

Lower Extremity Functional Scale (LEFS)
https://www.apta.org/contentassets/d6463ac2e3fd454cb0c9f8b6ba7c495b/lefs-test.pdf

Foot and Ankle Ability Measure (FAAM)
https://www.sralab.org/rehabilitation-measures/foot-and-ankle-ability-measures

Identification of Functional Ankle Instability (IdFAI)
http://m4.wyanokecdn.com/ed75cc230849eb339ef5d18ad745cf3e.pdf

Cumberland Ankle Instability Tool (CAIT)
https://orthotoolkit.com/cait/

Victorian Institute of Sport Assessment-Achilles (VISA-A)
https://www.sralab.org/rehabilitation-measures/victorian-institute-sports-assessment-achilles

Clinical Test of Sensory Interaction in Balance

https://www.sralab.org/rehabilitation-measures/clinical-test-sensory-interaction-balance-vedge

Y-Balance Test
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