

Podiatric Surgical Procedures - Considerations, Application & Management

Goals and Objectives

Course Description

"Podiatric Surgical Procedures - Considerations, Application & Management" is an online recorded video of a previously presented live CE webinar for occupational therapists and occupational therapy assistants that examines surgical procedures to manage common orthopedic pathologies of the distal lower extremity. This course includes a review of current literature relating to surgical procedures for tendons, ligaments, and bones of the foot and ankle.

Course Rationale

The purpose of this course is to provide an understanding of the current trends in surgical procedures to manage degenerative, traumatic and non-traumatic pathologies of foot and ankle. The emphasis is comparative analysis of contemporary surgical techniques to restore distal lower extremity function through repair tendons, ligaments, and bones.

Course Goals and Objectives

Upon completion of this course, participants will be able to:

1. List and identify common anatomical structures of the foot and ankle.
2. Distinguish degenerative, traumatic, and non-traumatic foot and ankle pathologies.
3. Identify emerging surgical techniques for foot and ankle orthopedic pathologies.
4. Identify contemporary theories regarding weight bearing after ankle fracture stabilization surgery.
5. Compare procedures to address chronic ankle instability.
6. Distinguish peroneal tendon stabilization from repair.
7. List surgical mechanisms to restore pes planus foot alignment.
8. Describe techniques to manage cartilage damage in the ankle.
9. List the indications for ankle arthrodesis.
10. Identify post-surgical considerations for procedures of the foot and ankle.

Course Provider – Innovative Educational Services

Provider Contact Information – information@cheapceus.com

Course Instructor - Jodi Gootkin, PT, MEd, CEAS

Conflict of Interest – No financial or non-financial conflict of interest exists for the presenter or provider of this course.

Target Audience – Occupational Therapists, Occupational Therapy Assistants

Course Educational Level – This course is applicable for introductory learners.

Course Prerequisites – None

Method of Instruction – Distance Learning – Independent; Asynchronous online video-based home study

Location - Cheapceus.com

Date – Continuously available on-demand

Course Completion Requirements / Criteria for Issuance of CE Credits – Completion of viewing of 3 hour recorded video, and a score of 70% correct or greater on the course post-test

Continuing Education Credits – Three (3) contact hours / .3 AOTA CEUs

Course Fee - \$34.95

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Podiatric Surgical Procedures: Considerations, Application & Management

Presented By
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1

1

Course Overview

- “Podiatric Surgical Procedures: Considerations, Application & Management” examines surgical procedures to manage common orthopedic pathologies of the distal lower extremity. This course includes a review of current literature relating to surgical procedures for tendons, ligaments, and bones of the foot and ankle.

2

2

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3

3

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4

4

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- Application of concepts presented in this webinar is at the discretion of the individual participant in accordance with federal, state, and professional regulations.
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5

5

Topic	Time
Anatomy and Arthrokinematics	0:00-0:10
Anesthesia and Pain Management	0:11-0:20
Hardware and Grafting	0:21-0:25
Hallux Valgus Osteotomy	0:26-0:35
Plantar Fasciotomy and Gastrocnemius Recession	0:36-0:50
Interactive Discussion of Clinical Applications	0:51-1:00
Ankle Fracture Fixation Considerations	1:01-1:05
Syndesmosis Stabilization	1:06-1:15
Chronic Ankle Instability Procedures	1:16-1:30
Peroneal Tendon Stabilization and Repair	1:31-1:40
Pes Planus Procedures	1:41-1:50
Interactive Discussion of Clinical Applications	1:51-2:00
Achilles Tendon Repair and Reconstruction	2:01-2:20
Anterior Ankle Impingement Arthroscopy	2:21-2:25
Osteochondral Lesions of Talus Cartilage Techniques	2:26-2:35
Ankle Arthrodesis	2:36-2:40
Total Ankle Arthroplasty	2:41-2:45
Post-Surgical Considerations	2:46-2:50
Interactive Discussion of Clinical Applications	2:51-3:00

6

6

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 - 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.

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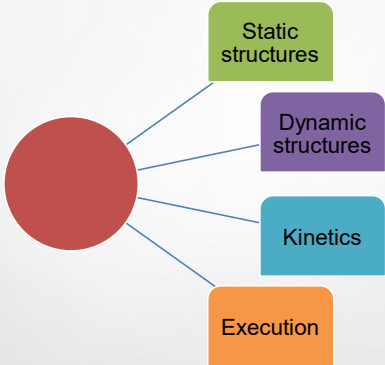
Regions of the Foot

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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Arthrokinematics

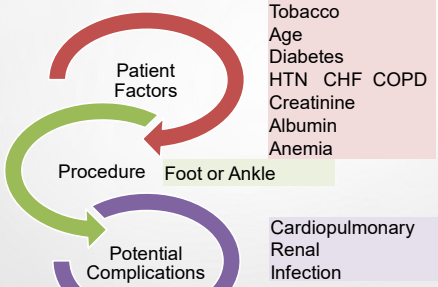


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Pre-Operative Considerations

- ACS-NSQIP surgical risk calculator informs surgical decision making and patient informed consent.



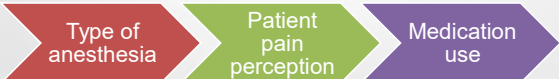
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Kisana, H., et al. (2022). Development of a Risk Stratification Scoring System to Predict General Surgical Complications for Patients Undergoing Foot and Ankle Surgery. *Orthopedics*, 45(2), 139-144.

Anesthesia

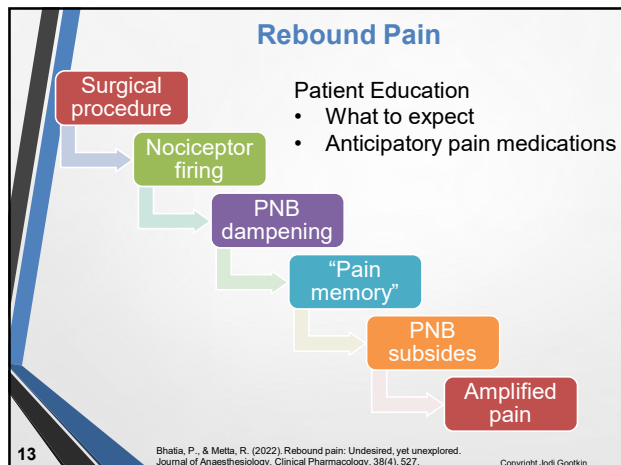
- No consensus on whether general or neuraxial anesthesia is superior for patients undergoing foot and ankle procedures.
- Peripheral nerve blocks may contribute to reduced pain levels and opioid use.
 - May mask compartment syndrome and VTE symptoms
 - Monitor for rebound pain



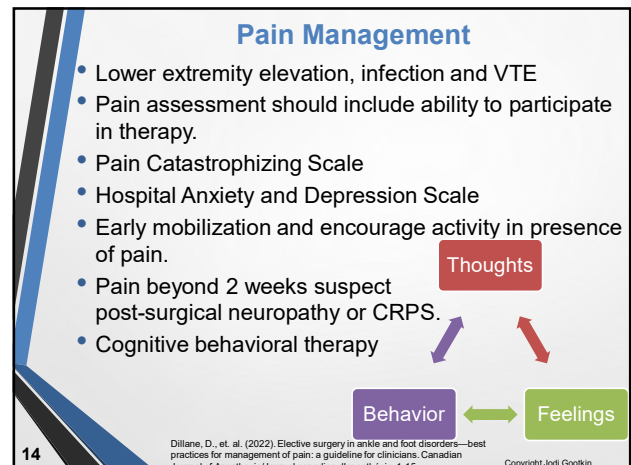
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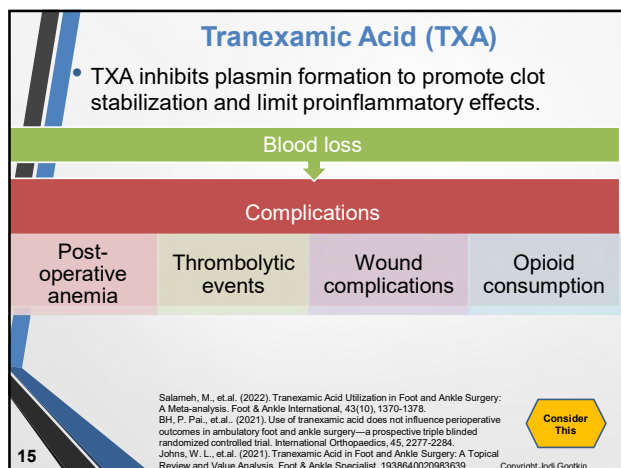
Quan, T., et al. (2022). Evaluating the Association of Anesthesia Type With Postoperative Complications in Patients Undergoing Ankle Fracture Repair. *The Journal of Foot and Ankle Surgery*.
 Mateen, S., et al. (2021). Retrospective chart review of perioperative pain management of patients having surgery for closed ankle fractures using peripheral nerve blocks at a level one trauma center. *Pain Reports*, 6(1).



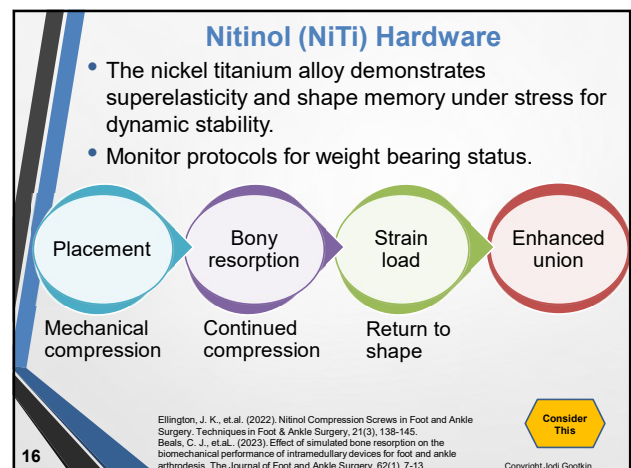
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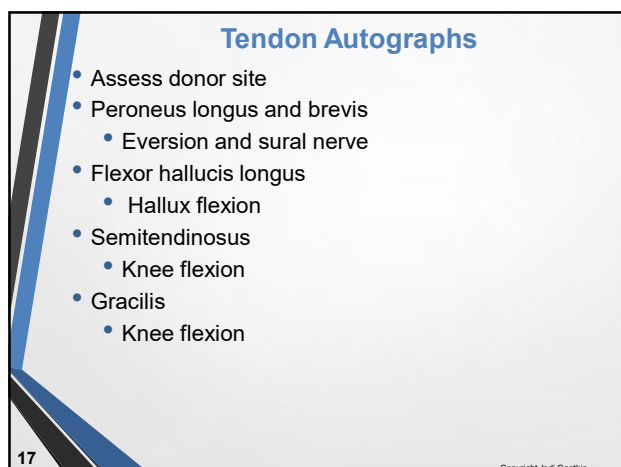
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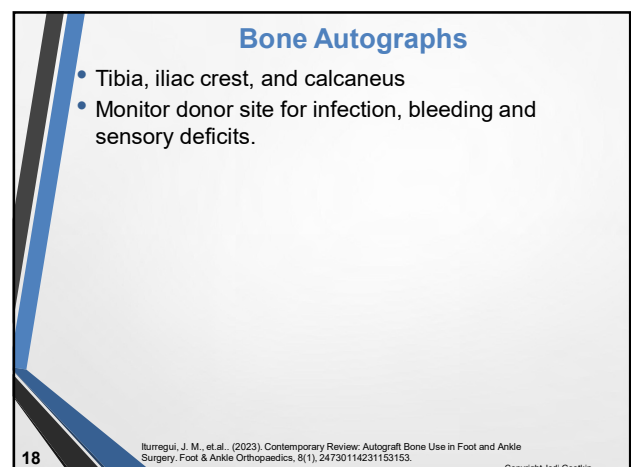
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16



17



18

Hallux Valgus

- Lateral deviation of great toe proximal phalanx and medial deviation of first metatarsal head.
- Footwear etiology or exacerbator?

Severity Classification	Mild	Moderate	Severe
Hallux Valgus Angle	<20°	20-40°	>40°
Intermetatarsal Angle	9-11°	11-16°	>16°

Resect
↓
Realign
↓
Stabilize

19 Ray, J. J., et al. (2019). Hallux valgus. *Foot & Ankle Orthopaedics*, 4(2), 2473011419838500. Copyright Jodi Gootkin

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Osteotomy

Open	Minimally Invasive
Chevron	Minimally Invasive Chevron Akin (MICA)
Akin	Percutaneous Chevron Akin (PECA)
Scarf	
1st metatarsal distal head	
1st proximal phalanx base	
1st metatarsal Z-cut	

20 Copyright Jodi Gootkin Ray, J. J., et al. (2019). Hallux valgus. *Foot & Ankle Orthopaedics*, 4(2), 2473011419838500. Copyright Jodi Gootkin

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Hallux Valgus Osteotomy Considerations

- Post-operative pain
- Ambulation with surgical shoe progressing to roomy supportive footwear.
- Driving restrictions
- PROM NWB → Seated AROM → Seated WB
- Balance and gait
 - Recurrence
 - Transfer metatarsalgia

21 Image: CC BY 4.0 Demmner, D., et al. (2016). Effect of surgical shoes on brake response time after first metatarsal osteotomy—a prospective cohort study. *Journal of Orthopaedic Surgery and Research*, 11, 1-6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4719548/>
CC BY 2.0 Babat, A. N., et al. (2009). Metatarsal osteotomy in the management of hallux valgus: An Indian perspective. *Indian journal of orthopaedics*, 43(1), 76-81. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2739490/> Copyright Jodi Gootkin

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Plantar Fasciitis

- Degenerative fasciitis without inflammation.

Conservative	Minimally Invasive	Surgery
Pain 3-6 months	Pain > 6 months	Recalcitrant pain
Therapy, splints/orthotic, activity modification	- Corticosteroid injection - Extracorporeal shock wave therapy - Platelet Rich Plasma	- Plantar fasciotomy - Gastrocnemius recession

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Plantar Fasciotomy

- There is no consensus on percentage of medial fascia to release.

Endoscopic or Percutaneous	Open
- Hook blade - Early boot WB and AROM	Plantar or medial incision

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Concurrent Procedures

- Baxter's nerve decompression
 - Sensory - calcaneal periosteum and long plantar ligament
 - Motor - abductor digiti minimi
- Calcaneal spur resection

Plantar fasciitis
Heel spur
Baxter's neuritis
Heel pain

24 Ozyurt, M. et al. (2023). Do the presence, size, and shape of plantar calcaneal spurs have any significance in terms of pain and treatment outcomes in patients with plantar fasciitis? *Turkish Journal of Medical Sciences*, 53(1), 413-419. Copyright Jodi Gootkin

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Plantar Fasciotomy Considerations

- Lateral column pain
- Altered medial longitudinal arch height
- Fifth toe abduction strength
- Rehab progression per protocol
 - NWB → FWB in boot, AROM/isometrics ankle and toes
 - Supportive shoes, manual therapy, plantar fascia/gastrocnemius stretching, foot intrinsic strengthening, heel raise progression
 - FWB eccentric/resistance ankle exercise, balance, proprioception, joint mobilization
 - Return to impact activities

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Liew, S. K., et al. (2022). Foot Arch Changes after Endoscopic Plantar Fascia Release for Recalcitrant Plantar Fasciitis. *Malaysian Orthopaedic Journal*, 16(2), 78. Copyright Jodi Gootkin

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Gastrocnemius Recession

- Surgical lengthening to restore plantarflexion ROM and normalize forces placed on plantar fascia with weight bearing.
- Strayer Method
 - Musculotendinous junction
- Baumann Procedure
 - Gastrocnemius muscle

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Sanchez, T., et al. (2023). Factors Associated With Poor Patient-Reported Outcomes in Isolated Gastrocnemius Recession for Heel Pain. *Foot & Ankle Orthopaedics*, 8(2). Copyright Jodi Gootkin

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Gastrocnemius Recession Considerations

- CAM boot, night splint, stretching, strengthening, manual therapy, gait and balance.
- Manual work to surgical scar.
- Gait training
 - Heel first initial contact position
 - Neutral foot alignment during stance phase
 - Sufficient DF during swing phase of gait
- Also indicated to manage Achilles tendinopathy, equinovarus, metatarsalgia, adult acquired flatfoot.

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Ankle Fracture Fixation Considerations

- No consensus on weight bearing restrictions and protection mechanisms postoperatively.

NWB 4-6 weeks	• Late
Within 3 weeks	• Early
Within 24 hours	• Immediate

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Weight Bearing (WB) Restriction Outcomes

Cohort	Early Protected WB Outcome
Elderly	Quality of life under reported No increased complications
Adults	Same complication rate Improved short term function Comparable function medium term
Adults	Improved short term function and overall health Comparable medium term

29

van Halsema, M. S., et al. (2022). An overview on the treatment and outcome factors of ankle fractures in elderly men and women aged 80 and over: a systematic review. *Archives of Orthopaedic and Trauma Surgery*, 142(11), 3311-3325. Khojaly, R., et al. (2022). Weight-bearing allowed following internal fixation of ankle fractures, a systematic literature review and meta-analysis. *Foot & Ankle International*, 43(8), 1143-1156. Schubert, J., et al. (2020). Effect on overall health status with weightbearing at 2 weeks vs 6 weeks after open reduction and internal fixation of ankle fractures. *Foot & Ankle International*, 41(6), 658-665. Copyright Jodi Gootkin

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Syndesmosis Stabilization

- Ligamentous injury of the distal tibiofibular joint can occur concurrent with ankle fracture or in isolation.
- No consensus on optimal stabilization technique.

Screws

Mal reduction

Breakage

Loosening

Removal

Suture Button

Anatomical movement

Early rehab

Permanent

30

Rogero, R. G., et al. (2021). Management of Ankle Fractures With Syndesmotic Disruption: A Survey of Orthopaedic Surgeons. *Cureus*, 13(7). Copyright Jodi Gootkin

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Suture Button

- Designed to provide stability while maintaining physiologic motion.
- Allows earlier weight bearing and eliminates need for removal surgery.

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Syndesmosis Stabilization Considerations

- Rigid fixation procedures - NWB postoperatively
- Dynamic stabilization procedures - early weight bearing.
- No consensus on screw removal.
 - Concern for adjacent joint arthritis.
- Caution with activities applying vigorous translation and compressive forces to suture button fixation.

32

Klepckli, K., et al. (2022). Radiographic Assessment of Tibiotalar Syndesmosis Injury with Different Durations and Types of Fixation. *Journal of Clinical Medicine*, 11(21), 6331.
 Meekaw, P., et al. (2022). Biomechanics comparison between endobutton fixation and syndesmotic screw fixation for syndesmotic injury ankle fracture: a finite element analysis and cadaveric validation study. *Journal of Orthopaedics*, 34, 207-214.
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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.
- Mechanical insufficiency cases require surgery.

Anatomic Repair

Anatomic Reconstruction

Non-Anatomic Reconstruction

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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 - Broström Anatomic Repair

- Brostrom – “gold standard”
 - Anterior talofibular ligament repair with or without calcaneofibular ligament repair
- Gould modification
 - Extensor retinaculum to reinforce repair
- Suture Tape Augmentation

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CAI - Anatomic Lateral Ligament Reconstruction

- Indicated when ligaments are inadequate for repair, general laxity, high demand activities, obesity.
- Allograft - semitendinosus
- Autograft - semitendinosus, gracilis, peroneus longus, patellar tendon

35

Spennacchio, P., et al. (2022). Anatomic reconstruction of lateral ankle ligaments: is there an optimal graft option? *Knee Surgery, Sports Traumatology, Arthroscopy*, 1-11.
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CAI - Non-Anatomic Reconstruction

- Indicated when anatomic repair has failed.
- Tenodesis using peroneus brevis tendon.
 - Watson-Jones, Evans, Chrisman-Snook procedures
- Risk of hindfoot malalignment, limited range of motion and early arthritis.

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Lateral Stabilization Considerations

- Protocols vary.
- Prolonged immobilization with modified Brostrom-Gould contributes to stiffness.

The flowchart illustrates the timeline of lateral stabilization considerations. It starts with 'Immobilization Restricted WB' at 'POD' (Post-Operative Day). This leads to 'Weeks' with 'Removable orthosis AROM'. This is followed by 'Weeks' with 'Splint Subtalar ROM Proprioception Strengthening'. Finally, it leads to 'Months' with 'Functional bracing Return to activities'.

Al-Janabi, M. M., et al. (2023). Early mobilization following elective ankle lateral collateral ligament reconstruction in adults. The Foot, 101988.
Hermanns, C., et al. (2020). Review of variability in rehabilitation protocols after lateral ankle ligament surgery. Kansas journal of medicine, 13, 152.

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Lateral Stabilization Outcomes

Procedure	Outcome
Reconstruction with gracilis vs. modified Brostrom-Gould	Equivalent long-term function Reconstruction – less sprain recurrence
Brostrom suture tape augmentation with and without early rehab	Early rehab - without repair compromise High patient satisfaction
Brostrom with and without early accelerated rehab	With early rehab - greater short-term strength and proprioception gains

Su, T., et al. (2022). Anatomic reconstruction using the autologous gracilis tendon achieved less sprain recurrence than the Brostrom-Gould procedure but delayed recovery in chronic lateral ankle instability. Knee Surgery, Sports Traumatology, Arthroscopy, 1-8.
Martin, K. D., et al. (2021). Suture tape augmented Brostrom procedure and early accelerated rehabilitation. Foot & Ankle International, 42(2), 145-150.
Rhyu, H. S., et al. (2023). Effects of accelerated rehabilitation exercise after mbo on ankle function and strength in ankle instability. Revista Brasileira de Medicina do Esporte, 29.

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Peroneal In-Office Needle Tendoscopy

- Can be utilized for diagnosis and treatment of tendinopathy.
 - Debride, groove deepening, scar resection, soft tissue release or repair
- Wide-awake local anesthesia no tourniquet (WALNT) allows patient participation.
- Immediate therapy participation.

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Peroneal Tendon Stabilization

- Tendon subluxation occurs with retinaculum rupture, lateral sprain, peroneus quarto/quintus and calcaneus malunion.
- Stabilization is achieved through retromalleolar deepening and repair of the superior peroneal retinaculum.

The diagram shows two techniques for peroneal tendon stabilization. An upward arrow is labeled 'Indirect deepening' with the note 'Preserves fibrocartilage'. A downward arrow is labeled 'Direct deepening'. A yellow hexagon with the text 'Consider This' is located at the bottom right.

Hwang, I. M., et al. (2022). Open peroneal tendon stabilization with fibular groove deepening. Arthroscopy Techniques, 11(31), e347-e352.

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Peroneal Tendon Repair and Reconstruction

- Tear - longitudinal or incomplete rupture
- Rupture - complete discontinuity

The diagram shows three categories of peroneal tendon repair and reconstruction. The 'Repairable' category (red) includes 'debridement and tubularization of one or both tendons'. The 'Irreparable' category (green) includes 'Autograft with hamstrings or side-to-side tenodesis'. The 'Last Option' category (purple) includes 'Flexor hallucis longus or flexor digitorum longus tendon transfer'.

van Dijk, P. A., et al. (2019). The ESSKA-AFAS international consensus statement on peroneal tendon pathologies. Knee Surgery, Sports Traumatology, Arthroscopy, 26, 3006-3107.

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Peroneal Tendon Procedures

- Repair
 - Debridement and/or tenodesis
- Reconstruction
 - Semitendinosus or gracilis autograft
 - Beneficial biological and mechanical properties
- Tendon transfer
 - Flexor digitorum longus or flexor hallucis longus
 - Potential push-off strength deficits
- Superior peroneal retinaculum (SPR) repair

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Peroneal Procedures Considerations

- Monitor for DVT, paresthesia, and donor site.

SPR Not Repaired	Immobilization no more than 4 weeks AROM 2 weeks then goal-based rehab
SPR Repaired	NWB immobilization 2 weeks then WB immobilization 4 weeks AROM 2 weeks Tendon loading 6 weeks Cautious inversion/eversion, scar mobilization

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van Dijk, P. A., et al. (2018). The ESSKA-AFAS international consensus statement on peroneal tendon pathologies. *Knee Surgery, Sports Traumatology, Arthroscopy*, 28, 3096-3107. Copyright Jodi Gootkin

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Pes Planus Procedures

- Decreased medial longitudinal arch and hindfoot valgus with many different etiologies.
- Progressive Collapsing Foot Deformity is secondary to posterior tibialis tendon insufficiency.

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Osbeck, I., et al. (2023). Surgically treated adult acquired flatfoot deformity: Register-based study of patient characteristics, health-related quality of life and type of surgery according to severity. *Foot and Ankle Surgery*, 29(4), 367-372. Copyright Jodi Gootkin

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Medial Displacement Calcaneal Osteotomy

- Hindfoot valgus correction to achieve a neutral heel.
- Shift achilles tendon moment arm medially alleviating hindfoot eversion force.
- Redistribute plantar pressures decreasing strain on spring and deltoid ligaments, and posterior tibialis tendon.

45

Schon, L. C., et al. (2020). Consensus for the indication of a medializing displacement calcaneal osteotomy in the treatment of progressive collapsing foot deformity. *Foot & Ankle International*, 41(10), 1287-1288. Copyright Jodi Gootkin

Consider This

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Pes Planus Procedures Considerations

- Immobilization and NWB post-op
- Progressive weight bearing in boot with ROM exercises
- Progressive weight bearing without boot
- Strengthening and proprioceptive exercise
- If flexor digitorum longus to posterior tibial tendon transfer is done, delayed PROM and strengthening.
- Weight loss

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Achilles Tendon Rupture Procedures

- Repair
- Reconstruction
- Combined procedures

I	partial ≤50%
II	complete < 3.0 cm gap
III	complete 3.0- 6.0 cm gap
IV	complete > 6.0 cm gap

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Achilles Tendon Repair

- Specific end-to-end suture technique utilized considers pull-out and gap resistance to facilitate healing.
- Calcaneal anchoring
- Augmentation techniques

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Achilles Tendon Reconstruction Tendon Transfer

- Flexor hallucis longus (FHL)
 - Potential push-off strength deficits
- Peroneus brevis
 - Subjective foot strength reduction
- Plantaris

Dianna, N. R., & Brodsky, J. W. (2020). Diagnosis and operative treatment of peroneal tendon tears. *Foot & Ankle Orthopaedics*, 5(2).

Willemsse, L., et al. (2023). Plantar intrinsic foot muscle activation during functional exercises compared to isolated foot exercises in younger adults. *Physiotherapy Theory and Practice*, 1-13.

Marfili, N., et al. (2023). Local tendon transfers for chronic ruptures of the Achilles tendon: a systematic review. *Journal of Clinical Medicine*, 12(2), 707.

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Achilles Tendon Reconstruction Autograft

- Open or minimally invasive procedures utilizing semitendinosus and/or gracilis.

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Achilles Tendinopathy Procedures

- Mid-portion
 - Debridement and tendon repair
 - > 50% tendon thickness removal requires reconstruction with flexor hallucis longus tendon
- Insertional
 - Debridement and osseous/soft tissue excision
 - > 50% insertion detachment requires calcaneal reinforcement
 - Gastrocnemius release

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Achilles Tendon Procedures Considerations

- Monitor incision/donor site and Thompson Test
- No consensus on protocols
- Initial immobilization NWB in plantarflexion
 - Progressive weight bearing with bracing
 - Heel gel cushion
- Avoid ROM beyond neutral in early rehab
- Begin heel raises bilaterally and concentric
- Delay stretching and eccentric exercise

Christensen, M., et al. (2020). Resistance exercises in early functional rehabilitation for achilles tendon ruptures are poorly described: A scoping review. *Journal of Orthopaedic & Sports Physical Therapy*, 50(12), 681-690.

Saxena, A., et al. (2022). Current consensus for rehabilitation protocols of the surgically repaired acute mid-substance achilles rupture: A systematic review and recommendations from the "GAIT" study group. *The Journal of Foot and Ankle Surgery*, 61(4), 855-861.

Gould, H. P., et al. (2021). Postoperative rehabilitation following Achilles tendon repair: a systematic review. *Sports Medicine and Arthroscopy Review*, 29(2), 130-145.

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Achilles Tendon Procedures Outcomes

Diagnosis/Procedure	Outcome
Insertional achilles tendinopathy	Calcific vs. non-calcific similar outcomes Low overall complications
Debridement and calcaneal anchors	High return to activity rate
Acute achilles tendon tear	Low complication rate
Open end-to-end repair	Significant Achilles Tendon Rupture Score increase
Accelerated functional rehab	

Saxena, A., et al. (2021). Insertional Achilles tendinopathy: analysis of 166 procedures and return to activity. *The Journal of Foot and Ankle Surgery*, 60(6), 1117-1123.

Lee, K. W., et al. (2022). Immediate Weightbearing and Ankle Motion Exercises After Acute Achilles Tendon Rupture Repair. *The Journal of Foot and Ankle Surgery*, 61(3), 604-608.

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53

Anterior Ankle Impingement Arthroscopy

- Following trauma, fibrotic tissue and osteophytes form then become entrapped with ankle movement.
- Debridement allows recovery of motion.
- Immediate protected weightbearing and ROM/stretching/strengthening/proprioception.
- Monitor peroneal nerve.

Gianakos, et al. (2021). Outcomes after arthroscopic surgery for anterior impingement in the ankle joint in the general and athletic populations: Does sex play a role? *The American Journal of Sports Medicine*, 49(10), 2834-2842.

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54

Podiatric Surgical Procedures: Considerations, Application & Management

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Osteochondral Lesion of Talus (OLT)

- Talus subchondral bone and cartilage damage following traumatic ankle injury or repetitive microtrauma.
- Surgical management includes cartilage repair, regeneration and replacement techniques.

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OLT - Cartilage Regeneration Procedures

- Bone Marrow Stimulation (BMS) encourages talus revascularization.
- Autologous chondrocyte transplantation
 - Donor site cells are grown in vitro and implanted into the talar dome defect.
 - Monitor donor site



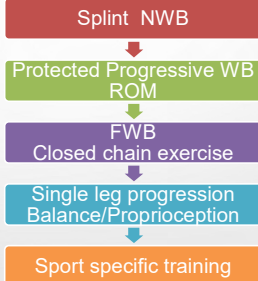
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Krause, F., & Anwander, H. (2022). Osteochondral lesion of the talus: still a problem?. EFORT open reviews, 7(6), 337-343. 11

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OLT - Cartilage Replacement Procedures

- Osteochondral Autograft Transfer (OATS Procedure)
 - Monitor donor site
- Osteochondral Allograft Transplant
- Weight bearing delayed until radiographic evidence of bone healing.



57

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OLT Procedure Considerations

- Best technique for immature bone?
- Immediate weight bearing and early ROM with BMS appears to decrease pain scores.
- Monitor for anterior ankle impingement syndrome.

Pallamar, M., et al., (2022). Surgical treatment of traumatic osteochondritis dissecans of the immature talus—Clinical results and prevalence of radiographic joint degeneration after a median follow-up of 72.5 months. Foot and Ankle Surgery, 28(5), 557-563.

Danilowicz, R. M., et al., (2021). Impact of early weightbearing after ankle arthroscopy and bone marrow stimulation for osteochondral lesions of the talus. Orthopaedic Journal of Sports Medicine, 9(9).

Viehöfer, A. F., et al., (2021). Smoking is associated with anterior ankle impingement after isolated autologous matrix-induced chondrogenesis for osteochondral lesions of the talus. Cartilage, 13(1_suppl), 1368S-1372S.

58

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Arthrodesis

- Indications
 - Pes planus with subtalar osteoarthritis
 - End-stage arthritis
 - Charcot arthropathy
 - Failed ORIF
 - Talus avascular necrosis
 - Congenital deformity
 - Bone tumors
 - Tarsal coalitions with pain/surrounding joint degeneration
 - Neurologic conditions with propulsive gait

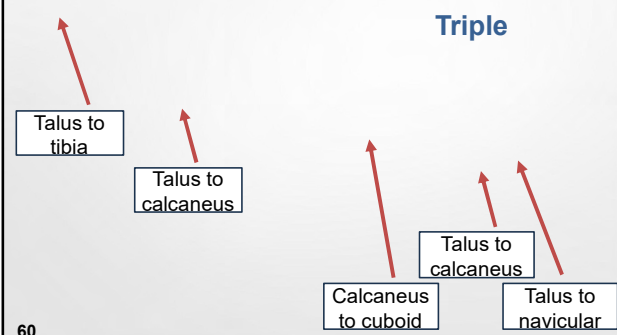
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Tibiotalar

Subtalar

Triple



60

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Arthrodesis Considerations

- Orthobiologics may promote bone formation.
- Monitor wound healing
- No consensus on early mobilization
 - Glissan's principles – radiographic confirmation for weight bearing progression
- Nonunion and hardware failure risk
- Adjacent joint arthritis risk

Protected NWB

Core/Proximal strengthening

Protected progressive WB

Non-fused joints ROM/isometrics, foot intrinsic strengthening

Shoe FWB

Strengthening, balance, proprioception, gait

Greer, N. L., et al. (2020). Orthobiologics in foot and ankle arthrodesis sites: a systematic review. Department of Veterans Affairs, Veterans Health Administration, Health Services Research & Development Service. Essop-Adam, A., et al. (2020). The need for a paradigm shift in the rehabilitation of elective foot and ankle reconstructive surgery patients? An annotation. Journal of Clinical Orthopaedics and Trauma, 11(3), 369-374. Copyright Jodi Gootkin

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Total Ankle Arthroplasty

- Indicated for management of advanced arthritis.
- Goal to relieve pain without limiting range of motion.
 - Decreased risk of adjacent joint arthritis.
- Manage gait symmetry, pain, and return to activity expectations.

62

Total Ankle Arthroplasty (TAA)

- Monitor wound healing
- If concurrent tendon transfers, strengthening and stretching restricted for approximately 3 months.
- No consensus on early mobilization

Protected NWB
Proximal strengthening

Protected WB
Ankle ROM/stretching

Shoe with brace
Joint/scar mobilizations
Resistance

Normalize gait
Balance/proprioception

Rameskandhan, J., et al. (2023). Randomized Controlled Trial Comparing Early Mobilization vs Six Weeks of Immobilization in a Walking Cast Following Total Ankle Replacement. The Journal of Foot and Ankle Surgery, 62(4). Copyright Jodi Gootkin

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Arthrodesis (AA) vs. Total Ankle Arthroplasty (TAA) Arthritis Outcomes

Study type	Outcome
Prospective RCT	• Both cohorts - significant improvement on Ankle Osteoarthritis Scale and no significant improvement on SF-36 • AA Higher complication rate
Systematic review and meta-analysis	• Both cohorts – similar outcomes for pain, gait, satisfaction, and Ankle Osteoarthritis Scale • TAA – greater range of motion and more significant improvement in American Orthopedic Foot & Ankle Society score • TAA – higher complication and reoperation rate

Glazebrook, M., et al. (2021). Clinical outcome results of total ankle replacement and ankle arthrodesis: a pilot randomised controlled trial. Foot and Ankle Surgery, 27(3), 326-331. Shin, C. L., et al. (2020). Clinical outcomes of total ankle arthroplasty versus ankle arthrodesis for the treatment of end-stage ankle arthritis in the last decade: a systematic review and meta-analysis. The Journal of Foot and Ankle Surgery, 59(5), 1032-1039. Copyright Jodi Gootkin

64

Ambulation Devices

- Knee scooter vs. hands free crutch

65

Sural Neuropathy

- Sensation to posterolateral aspect of the distal third of the leg, the lateral foot, and the fifth toe.
- Differential diagnosis includes S1 radiculopathy, Achilles tendinopathy, and compartment syndrome.

Peroneal tendon harvest, stabilization, repair

Achilles procedures

Calcaneus, cuboid, 5th metatarsal fracture

Tibia and calcaneus bone graft harvest

Arthrodesis

Lateral ankle stabilization procedures

Consider This

66

Conclusion

- Technology advances facilitate innovative surgical techniques to restore arthrokinematics and muscle function of the foot and ankle following injury.
- Continued research is needed to develop best practices for post-surgical rehabilitation to achieve functional outcomes and minimize complications.

67

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1. What substance may be administered perioperatively to limit blood loss?

- A. Hyaluronic acid
- B. Platelet rich plasma
- C. Tranexamic acid
- D. Autologous matrix

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2. What characteristic of nitinol technology allows it to provide dynamic stability?

- A. Low bending threshold
- B. Shape memory
- C. Rigid construct
- D. Narrow bridge design

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3. Gastrocnemius recession is indicated to manage recalcitrant pain from what condition?

- A. Plantar fasciitis
- B. Ankle osteoarthritis
- C. Intra-articular ankle fracture
- D. Hallux valgus

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4. Which of the following is a method of fixation to manage syndesmotic instability?

- A. Osteotomy
- B. Intramedullary nail
- C. Suture Button
- D. Needle tendoscopy

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5. Which technique is considered the gold standard for patients with chronic ankle instability not responding to conservative management?

- A. Evans
- B. Gould augmentation
- C. Brostrom
- D. Thermal capsular shrinkage

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6. Retromalleolar deepening with repair of the superior retinaculum could be performed to manage what condition?

- A. Hallux rigidus
- B. Pes planus
- C. Achilles tendon rupture
- D. Peroneal tendon subluxation

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7. How does the medial displacement calcaneal osteotomy alleviate hindfoot eversion force?

- A. Shifts anterior tibialis moment arm
- B. Increases spring ligament forces
- C. Shifts achilles tendon moment arm
- D. Decreases fibular forces

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8. What is the goal of arthroscopy to manage anterior ankle impingement?

- A. Tighten the anterior joint capsule
- B. Remove osteophytes and fibrotic tissue
- C. Repair ligamentous laxity
- D. Implant bone matrix

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9. Bone marrow stimulation is a surgical option to manage what condition?

- A. High ankle sprain
- B. Achilles tendon rupture
- C. First metatarsophalangeal arthritis
- D. Osteochondral lesion of talus

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10. Altered sensation of the posterolateral aspect of the distal leg and lateral foot along the fifth metatarsal might indicate injury to what nerve?

- A. Sural
- B. Tibial
- C. Deep peroneal
- D. Saphenous

77

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