

A group of runners participating in a marathon on a wet street. The runners are in various stages of their stride, and the wet pavement reflects the scene. The background shows spectators and trees.

Clinical Evidenced Based Rehabilitation: A Literature Analysis

Jessica Dorrington, PT, MPT, OCS, CMPT, CSCS
Aubree J. Swart, PT, DPT

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Outline

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 - Orthotics
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Introduction of Manual Therapy

▶ Examination

◦ Tissue Involvement

• Joint mobility

- Picciano AM, Rowlands MS, Worrell T. Reliability of Open and Closed Kinetic Chain Subtalar Joint Neutral Positions and Navicular Drop Test. *J Orthop Sports Phys Ther.* 1993;18:553–558.
- Somers DL, Hanson JA, Kedzierski CM, Nestor KL, Quinlivan KY. The Influence of Experience on the Reliability of Goniometric and Visual Measurement of Forefoot Position. *J Orthop Sports Phys Ther.* 1997;25:192–202.

• Ligamentous Stability

- Hertel J, Denegar CR, Monroe MM, Stokes WL. Talocrural and subatlar joint instability after lateral ankle sprain. *Med Sci Sports Exerc.* 1999;31(11):1501–1508.

• Muscular and Tendon Integrity

- Howard PD. Differential Diagnosis of Calf Pain and Weakness: Flexor Hallucis Longus Strain. *J Orthop Sports Phys Ther.* 2000;30:78–84.



Introduction of Manual Therapy

▶ Examination

◦ Tissue Involvement

• Joint Structural Alignment

- Tomaro J. Measurement of Tibiofibular Varum in Subject With Unilateral Overuse Symptoms. *J Orthop Sports Phys Ther*. 1995;21:86–89.
- Garbalosa JC, McClare MH, Catlin PA, Wooden M. The Frontal Plane Relationship of the Forefoot to the Rearfoot in an Asymptomatic Population. *J Orthop Sports Phys Ther*. 1994;20:200–206.
- Bennett JE, Reinking MF, Pluemer B, Pentel A, Seaton M, Killian C. *J Orthop Sports Phys Ther*. 2001;31:504–510.



Introduction of Manual Therapy

▶ Examination

◦ Extrinsic Factors

• Postural Influence

- Plisky MS, Rauh MJ, Heiderscheit B, Underwood FB, Tank RT. Medial Tibial Stress Syndrome in High School Cross-Country Runners: Incidence and Risk Factors. *J Orthop Sports Phys Ther.* 2007;37: 40–47.
- DeNoronha M, Refshauge KM, Crosbie J, Kilbreath SL. Relationship Between Functional Ankle Instability and Postural Control. *J Orthop Sports Phys Ther.* 2008;38:782–789.

• Proprioception

• Dynamic Functional Movement Patterns

- Caffrey E, Docherty CL, Schrader J, Klossner J. The Ability of 4 Single-Limb Hopping Tests to Detect Functional Performance Deficits in Individuals With Functional Ankle Instability. *J Orthop Sports Phys Ther.* 2009;39: 799–806.



Introduction of Manual Therapy

▶ Examination

◦ Extrinsic Factors

• Gait

- Dierks TA, Manal KT, Hamill J, Davis IS. Proximal and Distal Influences on Hip and Knee Kinematics in Runners With Patellofemoral Pain During a Prolonged Run. *J Orthop Sports Phys Ther.* 2008;38:448–456.
- Kellis E, Liassou C. The Effect of Selective Muscle Fatigue on Sagittal Lower Limb Kinematics and Muscle Activity During Level Running. *J Orthop Sports Phys Ther.* 2009;39:210–220.
- Fransen M, Crosbie J, Edmonds J. Reliability of Gait Measurements in People With Osteoarthritis of the Knee. *Phys Ther.* 1997;77:944–953.
- Kuo AD, Donelan JM. Dynamic principles of gait and their clinical implications. *Phys Ther.* 2010;90:157–174.

• Daily Regimen

- Body mechanics, ergonomics, footwear, training



Introduction of Manual Therapy

▶ Examination

◦ Differential Diagnosis

• Visceral

- Ryder M, Deyle G. Differential Diagnosis of Fibular Pain in a Patient With a History of Breast Cancer. *J Orthop Sports Phys Ther.* 2009;39:230.

• Vascular

- Riddle DL, Wells PS. **Diagnosis of lower-extremity deep vein thrombosis in outpatients.** *Phys Ther.*2004;84:729 -735.

• Neurologic

- Damiano DL, Arnold AS, Steele KM, Delp SL. Can strength training predictably improve gait kinematics? A pilot study on the effects of hip and knee extensor strengthening on lower-extremity alignment in cerebral palsy. *Phys Ther.* 2010;90:269-279.

• Psychogenic



Introduction of Manual Therapy

▶ Examination

◦ Differential Diagnosis

• Osseous

- Goss DL, Moore JH, Thomas DB, DeBerardino TM. Identification of a Fibular Fracture in a Intercollegiate Football Player in a Physical Therapy Setting. *J Orthop Sports Phys Ther.* 2004;34:182–186.
- Leerar PJ. Differential Diagnosis of Tarsal Coalition Versus Cuboid Syndrome in an Adolescent Athlete. *J Orthop Sports Phys Ther.* 2001;31:702–707
- Stiell IG, McKnight D, Greenberg GH, McDowell I, Nair RC, Johns C, Worthington JR. Implementation of the Ottawa Ankle Rules. *JAMA.* 1994;271:827–832.
- Axe MJ, Snyder-Mackler L. Proximal Tibiofibular Dislocation/Subluxation. *J Orthop Sports Phys Ther.* 2008;38:87.
- Hsieh C, Chen J. Acute Dislocation of the Proximal Tibiofibular Joint. *J Orthop Sports Phys Ther.* 2009;39:826.



Treatment Models

▶ Evidence Based Practice

- Childs JD, Fritz JM, Piva SR, Erhard RE. **Clinical Decision Making in the Identification of Patients Likely to Benefit From Spinal Manipulation: A Traditional Versus an Evidence-Based Approach.** *J Orthop Sports Phys Ther.* 2003;33:593–603.
- Fritz JM, Whitman JM, Flynn TW, Wainner RS, Childs JD. Factors related to the inability of individuals with low back pain to improve with a spinal manipulation. *Phys Ther.* 2004;84:173–190.
- Refshauge K, Hiller C. Fourth International Ankle Symposium — Introduction. *J Orthop Sports Phys Ther.* 2009;39:A1–A24.
- Whitman JM, Cleland JA, Mintken P, Keirns M, Bieniek M, Albin SR, Magel J, McPoil TG. **Predicting Short-Term Response to Thrust and Nonthrust Manipulation and Exercise in Patients Post Inversion Ankle Sprain.** *J Orthop Sports Phys Ther.* 2009;39:188–200.



Treatment Models

▶ Clinical Based Practice

- Wang Y, Hart DL, Stratford PW, Mioduski JE. Clinical Interpretation of Computerized Adaptive Test Outcome Measures in Patients With Foot/Ankle Impairments. *J Orthop Sports Phys Ther.* 2009;39:753–764.

▶ Patient Influenced Practice

- Own beliefs, understanding/misunderstanding, fears, previous experiences

▶ Clinical Prediction Rules

- Limitations



General Rehabilitation Concepts

- ▶ Mobilization/Manipulation of Joints
 - Whitman JM, Cleland JA, Mintken P, Keirns M, Bieniek M, Albin SR, Magel J, McPoil TG. **Predicting Short-Term Response to Thrust and Nonthrust Manipulation and Exercise in Patients Post Inversion Ankle Sprain.** *J Orthop Sports Phys Ther.* 2009;39:188–200.
 - Hoskins W, McHardy A, Pollard H, Windsham R, Onley R. **Chiropractic Treatment of Lower Extremity Conditions: A Literature Review.** *J Manipulative Physiol Ther.* 2006;29:658–671.
- Precautions/Contraindications
 - Flynn TW. **Move It and Move On.** *J Orthop Sports Phys Ther.* 2002;32:192–193.
- Pathophysiology of OA and where PT can help
 - Hettinga DL. **Normal Joint Structures and their Reactions to Injury.** *J Orthop Sports Phys Ther.* 1980;1:178–185.



General Rehabilitation Concepts

▶ Therapeutic Exercise/Activities

- Kerns–Steiner R, Washecheck HS, Kelsey DD. Strategy of Exercise Prescription Using an Unloading Technique for Functional Rehabilitation of an Athlete with an Inversion Ankle Sprain. *J Orthop Sports Phys Ther.* 1999;29:282–287.

○ Biomechanical and Anatomical Considerations

- Kaumeyer G, Malone T. Ankle Injuries: Anatomical and Biomechanical Considerations Necessary for the Development of an Injury Prevention Program. *J Orthop Sports Phys Ther.* 1980;1:171–177.
- Brosky T, Nyland J, Nitz A, Caborn D. The Ankle Ligaments: Consideration of Syndesmotic Injury and Implications for Rehabilitation. *J Orthop Sports Phys Ther.* 1995;21:197–205.

○ Functional Movement Pattern Influence



General Rehabilitation Concepts

▶ Taping/Bracing

- Zhang S, Wortley M, Chen Q, Freedman J. Efficacy of an Ankle Brace With a Subtalar Locking System in Inversion Control in Dynamic Movements. *J Orthop Sports Phys Ther.* 2009;39:875–883.

▶ Education

- Jung D, Koh E, Kwon O, Yi C, Oh J, Weon J. Effect of Medial Arch Support on Displacement of the Myotendinous Junction of the Gastrocnemius During Standing Wall Stretching. *J Orthop Sports Phys Ther.* 2009;39:867–874.
- Distefano LJ, Blackburn JT, Marshall SW, Padua DA. Gluteal Muscle Activation During Common Therapeutic Exercises. *J Orthop Sports Phys Ther.* 2009;39:532–540.
- Heiderscheit BC. Lower Extremity Injuries: Is It Just About Hip Strength? *J Orthop Sports Phys Ther.* 2010;40:39–41.



General Rehabilitation Concepts

▶ Individualized Rehab

- Shrader JA. Nonsurgical Management of the Foot and Ankle Affected by Rheumatoid Arthritis. *J Orthop Sports Phys Ther.* 1999;29:703–717.
- Sinacore DR, Withrington NC. Recognition and Management of Acute Neuropathic (Charcot) Arthropathies of the Foot. *J Orthop Sports Phys Ther.* 1999;29:736–746.
- Quillen WS. An Alternative Management Protocol for Lateral Ankle Sprains. *J Orthop Sports Phys Ther.* 1981;2:187–190.

▶ Proprioception/Neuromuscular Re-education

- van Deursen RWM, Simoneau GG. Foot and Ankle Sensory Neuropathy Proprioception and Postural Stability. *J Orthop Sports Phys Ther.* 1999;29:718–726.

▶ Modalities

◦ ASTYM

- Loghmani MT, Warden SJ. Instrument-Assisted Cross-Fiber Massage Accelerates Knee Ligament Healing. *J Orthop Sports Phys Ther.* 2009;39:506–514.



Detailed Pathoanatomical Treatments

▶ Talocrural Joint

◦ Restoring ROM

- Denegar CR, Hertel J, Fonseca J. The Effect of Lateral Ankle Sprain on Dorsiflexion Range of Motion, Posterior Talar Glide and Joint Laxity. *J Orthop Sports Phys Ther.* 2002;32:166–173.

• Manipulation

- Lopez-Rodriguez S, de-las-Penas CF, Albuquerque-Sendin F, Rodriguez-Blanco C, Palomeque-del-Cerro L. Immediate Effects of Manipulation of the Talocrural Joint on Stabilometry and Baropodometry in Patients with Ankle Sprain. *J Manipulative Physiol Ther.* 2007;30:186–192.
- Fryer GA, Mudge JM, and McLaughlin PA. The Effect of Talocrural Joint Manipulation on Range of Motion at the Ankle. *J Manipulative Physiol Ther.* 2002;25:384–390.
- Pellow JE, Brantingham JW. The Efficacy of Adjusting the Ankle in the Treatment of Subacute and Chronic Grade I and Grade II Ankle Inversion Sprains. *J Manipulative Physiol Ther.* 2001;24:17–24.



Detailed Pathoanatomical Treatments

▶ Talocrural Joint

◦ Restoring ROM

• Mobilization

- Kramer PG. Restoration of Dorsiflexion after Injuries to the Distal Leg and Ankle. *J Orthop Sports Phys Ther.* 1980;1:159–164.
- De Souza M, Venturini C, Teixeira LM, Chagas MH, de Resende MA. Force–Displacement Relationship During Anteroposterior Mobilization of the Ankle Joint. *J Manipulative Physiol Ther.* 2008;31:285–292.
- Vicenzino B, Branjerdporn M, Teys P, Jordan K. Initial Changes in Posterior Talar Glide and Dorsiflexion of the Ankle After Mobilization With Movement in Individuals With Recurrent Ankle Sprain. *J Orthop Sports Phys Ther.* 2006;36:464–471.
- Venturini C, Penedo M, Peixoto G, Chagas M, Ferreira M, de Resende MA. Study of the Force Applied During Anteroposterior Articular Mobilization of the Talus and its Effect on the Dorsiflexion Range of Motion. *J Manipulative Physiol Ther.* 2007;30:593–597.



Detailed Pathoanatomical Treatments

▶ Talocrural Joint

◦ Stabilize

- Taping

- Proprioception

- Rotem-Lehrer N, Laufer Y. Effect of Focus Attention on Transfer of a Postural Control Task Following an Ankle Sprain. *J Orthop Sports Phys Ther.* 2007;37:564–569.
- Wester JU, Jespersen SM, Nielsen KD, Neumann L. Wobble Board Training After Partial Sprains of the Lateral Ligaments of the Ankle: A Prospective Randomized Study. *J Orthop Sports Phys Ther.* 1996;23:332–336.
- Lentell G, Baas B, Lopez D, McGuire L, Sarrels M, Snyder P. The Contributions of Proprioceptive Deficits, Muscle Function and Anatomic Laxity to Functional Instability of the Ankle. *J Orthop Sports Phys Ther.* 1995;21:206–215.
- Hoffman M, Payne VG. The Effects of Proprioceptive Ankle Disk Training on Healthy Subjects. *J Orthop Sports Phys Ther.* 1995;21:90–93.



Detailed Pathoanatomical Treatments

▶ Talocrural Joint

◦ Stabilize

• Proprioception (con't)

- Han K, Ricard MD, Fellingham GW. Effects of a 4-Week Exercise Program on Balance Using Elastic Tubing as a Perturbation Force for Individuals With a History of Ankle Sprains. *J Orthop Sports Phys Ther.* 2009;39:246-255.
- Fitzgerald D, Trakarnratanakul N, Smyth B, Caulfield B. Effects of a Wobble Board-Based Therapeutic Exergaming System for Balance Training on Dynamic Postural Stability and Intrinsic Motivation Level. *J Orthop Sports Phys Ther.* 2010;40:11-19.
- Rahnema L, Salavati M, Akhbari B, Mazaheri M. Attentional Demands and Postural Control in Athletes With and Without Functional Ankle Instability. *J Orthop Sports Phys Ther.* 2010;40:180-187.

• Strengthening



Detailed Pathoanatomical Treatments

▶ Tibiofibular Complex

◦ Assessment

- Lin C-F, Gross MT, Weinhold P. Ankle Syndesmosis Injuries: Anatomy, Biomechanics, Mechanism of Injury and Clinical Guidelines for Diagnosis and Intervention. *J Orthop Sports Phys Ther.* 2006;36:372–384.
- Hubbard TJ, Hertel J, Sherbondy P. Fibular Position in Individuals With Self-Reported Chronic Ankle Instability. *J Orthop Sports Phys Ther.* 2006;36:3–9.
- Brosky T, Nyland J, Nitz A, Caborn D. The Ankle Ligaments: Consideration of Syndesmotic Injury and Implications for Rehabilitation. *J Orthop Sports Phys Ther.* 1995;21:197–205.



Detailed Pathoanatomical Treatments

▶ Tibiofibular Complex

◦ Restoring ROM

- Mobilization
- Manipulation
- Flexibility

◦ Stabilize

- Taping
- Proprioception
- Strengthening

- Milner CE, Hamill J, Davis IS. Distinct Hip and Rearfoot Kinematics in Female Runners With a History of Tibial Stress Fracture. *J Orthop Sports Phys Ther.* 2010;40:59–66.



Detailed Pathoanatomical Treatments

▶ Subtalar

- Restoring ROM

- Mobilization
- Manipulation
- Flexibility

- Stabilize

- Taping

- Holmes CF, Wilcox D, Fletcher JP. Effect of a Modified, Low-Dye Medial Longitudinal Arch Taping Procedure on the Subtalar Joint Neutral Position Before and After Light Exercise. *J Orthop Sports Phys Ther.* 2002;32:194–201.

- Proprioception
- Strengthening



Detailed Pathoanatomical Treatments

▶ Talocalcaneonavicular

◦ Assessment

- Picciano AM, Rowlands MS, Worrell T. Reliability of Open and Closed Kinetic Chain Subtalar Joint Neutral Positions and Navicular Drop Test. *J Orthop Sports Phys Ther.* 1993;18:553–558.
- Plisky MS, Rauh MJ, Heiderscheit B, Underwood FB, Tank RT. Medial Tibial Stress Syndrome in High School Cross-Country Runners: Incidence and Risk Ractors. *J Orthop Sports Phys Ther.* 2007;37: 40–47.
- Dicharry JM, Franz JR, Croce UD, Wilder RP, Riley PO, Kerrigan DC. Differences in Static and Dynamic Measures in Evaluation of Talonavicular Mobility in Gait. *J Orthop Sports Phys Ther.* 2009;39:628–634.



Detailed Pathoanatomical Treatments

▶ Talocalcaneonavicular

◦ Restoring ROM

- Mobilization
- Manipulation
- Flexibility

◦ Stabilize

- Taping
 - Lange B, Chipchase L, Evans A. The Effects of Low-Dye Taping on Plantar Pressures During Gait, in Subjects with Navicular Drop Exceeding 10 mm. *J Orthop Sports Phys Ther.* 2004;34:201–209.
- Proprioception
- Strengthening



Detailed Pathoanatomical Treatments

▶ Calcaneocuboid

○ Assessment

- Jennings J, Davies GJ. Treatment of Cuboid Syndrome Secondary to Lateral Ankle Sprains: A Case Series. *J Orthop Sports Phys Ther.* 2005;35:409–415.
- Mooney M, Maffey-Ward L. Cuboid Plantar and Dorsal Subluxations: Assessment and Treatment. *J Orthop Sports Phys Ther.* 1994;20:220–226.

○ Restoring ROM

- Mobilization
- Manipulation
 - Refer to assessment articles
- Flexibility

○ Stabilize

- Taping
- Proprioception
- Strengthening



Detailed Pathoanatomical Treatments

▶ First Ray

◦ Assessment

- Zammit GV, Menz HB, Munteanu SE. Structural Factors Associated With Hallux Limitus/Rigidus: A Systematic Review of Case Control Studies. *J Orthop Sports Phys Ther.* 2009;39:733–742.
- Glasoe WM, Allen MK, Kepros T, Stonewall L, Ludewig PM. Dorsal First Ray Mobility in Women Athletes With a History of Stress Fracture of the Second or Third Metatarsal. *J Orthop Sports Phys Ther.* 2002;32:560–567.

◦ Restoring ROM

- Mobilization
- Manipulation
- Flexibility

◦ Stabilize

- Taping
- Proprioception
- Strengthening



Detailed Pathoanatomical Treatments

▶ Plantar/Heel Pain

◦ Assessment

- McPoil TG, Martin RL, Cornwall MW, Wukich DK, Irrgang JJ, Godges JJ. Heel Pain–Plantar Fasciitis: Clinical Practice Guidelines Linked to the International Classification of Function, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *J Orthop Sports Phys Ther.* 2008;38:A1–A18.
- Treatment approaches
 - Cornwall MW, McPoil TG. Plantar Fasciitis: Etiology and Treatment. *J Orthop Sports Phys Ther.* 1999;29:756–760.
 - Cleland JA, Abbott JH, Kidd MO, Stockwell S, Cheney S, Gerrard DF, Flynn TW. Manual Physical Therapy and Exercise Versus Electrophysical Agents and Exercise in the Management of Plantar Heel Pain: A Multicenter Randomized Clinical Trial. *J Orthop Sports Phys Ther.* 2009;39:573–585.



Detailed Pathoanatomical Treatments

▶ Plantar/Heel Pain

◦ Restoring ROM

- Mobilization
- Manipulation
- Flexibility
- ASTYM

- Loghmani MT, Warden SJ. **Instrument-Assisted Cross-Fiber Massage Accelerates Knee Ligament Healing.** *J Orthop Sports Phys Ther.* 2009;39:506–514.
- <http://www.astym.com/>



Detailed Pathoanatomical Treatments

▶ Plantar/Heel Pain

◦ Stabilize

• Taping

- Hyland MR, Webber-Gaffney A, Cohen L, Lichtman SW. Randomized Controlled Trial of Calcaneal Taping, Sham Taping, and Plantar Fascia Stretching for the Short-Term Management of Plantar Heel Pain. *J Orthop Sports Phys Ther.* 2006;36:364–371.

• Proprioception

• Strengthening

• Orthotics

- Gross MT, Byers JM, Krafft JL, Lackey EJ, Melton KM. The Impact of Custom Semirigid Foot Orthotics on Pain and Disability for Individuals With Plantar Fasciitis. *J Orthop Sports Phys Ther.* 2002;32:149–157.
- Wooten B, Uhl TL, Chandler J. Use of Orthotic Device in the Treatment of Posterior Heel Pain. *J Orthop Sports Phys Ther.* 1990;11:410–413.



Detailed Pathoanatomical Treatments

▶ “Itis” and “Osis”

◦ Assessment

- Gross MT. Chronic Tendinitis: Pathomechanics of Injury, Factors Affecting the Healing Response, and Treatment. *J Orthop Sports Phys Ther.* 1992;16:248–261.
- Geideman WM, Johnson JE. Posterior Tibial Tendon Dysfunction. *J Orthop Sports Phys Ther.* 2000;30:68–77.
- Houck J, Neville CG, Tome J, Flemister A. Foot Kinematics During a Bilateral Heel Rise Test in Participants With Stage II Posterior Tibial Tendon Dysfunction. *J Orthop Sports Phys Ther.* 2009;39:593–603.



Detailed Pathoanatomical Treatments

- ▶ “Itis” and “Osis”
 - Restoring ROM
 - Mobilization
 - Voorn R. Case Report: Can Sacroiliac Joint Dysfunction Cause Chronic Achilles Tendinitis? *J Orthop Sports Phys Ther.* 1998;27:436–443.
 - Manipulation
 - Flexibility
 - Kawakami Y, Kanehisa H, Fukunaga T. The Relationship Between Passive Ankle Flexion Joint Torque and Gastrocnemius Muscle and Achilles Tendon Stiffness: Implications for Flexibility. *J Orthop Sports Phys Ther.* 2008;38:269–276.



Detailed Pathoanatomical Treatments

▶ “Itis” and “Osis”

◦ Stabilize

• Taping/Bracing

- Neville C, Flemister AS, Houck J. Effects of the AirLift PTTD Brace on Foot Kinematics in Subjects With Stage II Posterior Tibial Tendon Dysfunction. *J Orthop Sports Phys Ther.* 2009;39:201–209.

• Proprioception

- Williams III DSB, Zambardino JA, Banning VA. Transverse-Plane Mechanics at the Knee and Tibia in Runners With and Without a History of Achilles Tendonopathy. *J Orthop Sports Phys Ther.* 2008;38:761–767.

• Strengthening

• Orthotics

- Wooten B, Uhl TL, Chandler J. Use of Orthotic Device in the Treatment of Posterior Heel Pain. *J Orthop Sports Phys Ther.* 1990;11:410–413.



Multidisciplinary Approach

► Orthotics

- Vicenzino B, Giffiths SR, Griffiths LA, Hadley A. Effect of Antipronation Tape and Temporary Orthotics on Vertical Navicular Height Before and After Exercise. *J Orthop Sports Phys Ther.* 2000;30:333–339.
- Wooten B, Uhl TL, Chandler J. Use of Orthotic Device in the Treatment of Posterior Heel Pain. *J Orthop Sports Phys Ther.* 1990;11:410–413.
- Mueller MJ. Application of Plantar Pressure Assessment in Footwear and Insert Design. *J Orthop Sports Phys Ther.* 1999;29:747–755.
- Gross MT, Byers JM, Krafft JL, Lackey EJ, Melton KM. The Impact of Custom Semirigid Foot Orthotics on Pain and Disability for Individuals With Plantar Fasciitis. *J Orthop Sports Phys Ther.* 2002;32:149–157.
- Guskiewicz KM, Perrin DH. Effect of Orthotics on Postural Sway Following Inversion Ankle Sprain. *J Orthop Sports Phys Ther.* 1996;23:326–331.
- Neville C, Houck J. Choosing Among 3 Ankle–Foot Orthoses for a Patient with Stage II Posterior Tibial Tendon Dysfunction. *J Orthop Sports Phys Ther.* 2009;39:816–824.
- Rao S, Baumhauser JF, Becica L, Nawoczinski DA. Shoe Inserts Alter Plantar Loading and Function in Patients With Midfoot Arthritis. *J Orthop Sports Phys Ther.* 2009;39:522–531.



Multidisciplinary Approach

▶ Posting Modifications

- Picciano AM, Rowlands MS, Worrell T. Reliability of Open and Closed Kinetic Chain Subtalar Joint Neutral Positions and Navicular Drop Test. *J Orthop Sports Phys Ther.* 1993;18:553–558.

▶ Surgical Intervention

- Saltzman CL, McIlff TE, Buckwalter JA, Brown TD. Total Ankle Replacement Revisited. *J Orthop Sports Phys Ther.* 2000;30:56–67.
- Hastings MK, Mueller MJ, Sinacore DR, Salsich GB, Engsberg JR, Johnson JE. Effects of a Tendo–Achilles Lengthening Procedure on Muscle Function and Gait Characteristics in a Patient with Diabetes Mellitus. *J Orthop Sports Phys Ther.* 2000;30:85–90.
- Brown HE, Mueller MJ. A "Step-to" Gait Decreases Pressures on the Forefoot. *J Orthop Sports Phys Ther.* 1998;28:139–145.
- Nawoczinski DA. Nonoperative and Operative Intervention for Hallux Rigidus. *J Orthop Sports Phys Ther.* 1999;29:727–735.

▶ Physical Therapy

- Aiken AB, Pelland L, Brison R, Pickett W, Brouwer B. Short–Term Natural Recovery of Ankle Sprains Following Discharge From Emergency Departments. *J Orthop Sports Phys Ther.* 2008;38:566–571.



Multidisciplinary Approach

▶ Differential Diagnosis

◦ Miscellaneous Studies

- Bronner S, Novella T, Becica L. Management of a Delayed–Union Sesamoid Fracture in a Dancer. *J Orthop Sports Phys Ther.* 2007;37:529–540.
- Tamari K, Tinley P. A New Concept of Estimating Tibiofibular Torsion: An In Vivo Reliability Study. *J Orthop Sports Phys Ther.* 2003;33:85–90.
- Requejo SM, Kulig K, Thordarson DB. Management of Foot Pain Associated With Accessory Bones of the Foot: Two Clinical Case Reports. *J Orthop Sports Phys Ther.* 2000;30:580–594.
- Brown GP, Feehery RV, Grant, SM. Case Study: The Painful Os Trigonum Syndrome. *J Orthop Sports Phys Ther.* 1995;22:22–25.
- Johansen BE, Flintholn J. A Case Study: The Accessory Soleus. *J Orthop Sports Phys Ther.* 1983;84–85.



Multidisciplinary Approach

▶ Why Some Patients Don't Heal

- Wikstrom EA, Tillman MD, Chmielewski TL, Cauraugh JH, Naugle KE, Borsa PA. Self-Assessed Disability and Functional Performance in Individuals With and Without Ankle Instability: A Case Control Study. *J Orthop Sports Phys Ther.* 2009;39:458–467.
- *Please note: Ankle Joint Functional Assessment Tool*



Random article for your reading enjoyment...



- Bronner S, Ojofeitimi S, Rose D. Repair and Rehabilitation of Extensor Hallucis Longus and Brevis Tendon Lacerations in a Professional Dancer. *J Orthop Sports Phys Ther.* 2008;38:362–370.



References





Thank You!

Authors

Jessica Dorrington, PT, MPT, OCS, CMPT, CSCS

Bethany Physical Therapy

503-466-2254

Aubree J. Swart, PT, DPT

Northeast Portland Physical Therapy

503-493-4463

<http://www.therapeuticassociates.com/OPMA>

