



## ANKLE REHABILITATION PROTOCOL



PHASE OF REHABILITATION		LATERAL ANKLE SPRAIN: CONSERVATIVE TREATMENT	SYNDESMOSIS ANKLE SPRAIN
<b>PHASE 1 CONSERVATIVE Rx (0-4 DAYS)</b>  <b>NOTE: Rehab Phases may be 2x the length for Syndesmosis Injuries</b>	<b>GOALS</b>	1. Protection of injured joint 2. Pain management 3. Control inflammation 4. Progress WB as tolerated	1. Protection of injured joint 2. Pain management 3. Control inflammation 4. Progress WB as tolerated
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- Protection with ankle brace (if ++ pain, severe injury, or poor muscle activation)</li> <li>- May be NWB with crutches for 24 hours, but should progress WB as tolerated immediately</li> <li>- NSAIDS, RICE, electrical stimulation short-term for pain, cryotherapy</li> <li>- Start gentle ROM exercises as tolerated immediately</li> <li>- AROM of the toes</li> <li>- Strengthening and ROM for the knee and hip (quads, hamstrings, gluteus medius and maximus, hip adductors)</li> <li>- Manual mobilizations</li> <li>- Biking</li> </ul>	<ul style="list-style-type: none"> <li>- Protection with ankle brace or air cast boot</li> <li>- Often require crutches for ambulation until normal gait pattern achieved; progress WB as tolerated immediately</li> <li>- NSAIDS, RICE, electrical stimulation short-term for pain, cryotherapy</li> <li>- Start ROM exercises as tolerated immediately (may take 1-2 weeks for more severe injuries)</li> <li>- AROM of the toes</li> <li>- Strengthening and ROM for the knee and hip (quads, hamstrings, gluteus medius and maximus, hip adductors)</li> <li>- Biking</li> </ul>
	<b>PRECAUTIONS</b>	No active or passive inversion (INV) past neutral No active or passive plantar flexion (PF) past resting position No forceful eversion (EV)	No active or passive end-range dorsiflexion (DF) No active or passive external rotation (ER) / eversion (EV)
	<b>CRITERIA FOR PROGRESSION TO PHASE 2</b>	1. Pain and inflammation controlled 2. Near normal gait pattern	1. Pain and inflammation controlled 2. Near normal gait pattern with crutches
<b>PHASE 2 (2-4 DAYS up to 6 WEEKS)</b>	<b>GOALS</b>	1. Full ROM 2. Normal mobility 3. Increase strength 4. Improve neuromuscular control and proprioception 5. Promote function	1. Full ROM 2. Normal mobility 3. Increase strength 4. Improve neuromuscular control and proprioception 5. Promote function
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- AROM exercises</li> <li>- PROM with towel or stretching of gastroc / soleus in WB position</li> <li>- Gait training, encouraging normal gait pattern</li> <li>- Manual mobilizations</li> <li>- Begin strengthening:               <ul style="list-style-type: none"> <li>▪ Isometric → CON/ECC with theraband, towel slides, and seated heel-toe raises → CKC exercises (ie. standing calf raises, squats, lunges)</li> <li>▪ ** CON Peroneals <u>and</u> ECC Tibialis Posterior</li> <li>▪ NMES may be used initially over peroneals or tibialis posterior for muscle re-education</li> </ul> </li> <li>- Begin proprioception:               <ul style="list-style-type: none"> <li>▪ BAPS board</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- AROM exercises</li> <li>- PROM with towel or stretching of gastroc / soleus in WB position</li> <li>- Gait training, encouraging normal gait pattern</li> <li>- Manual mobilizations</li> <li>- Begin strengthening:               <ul style="list-style-type: none"> <li>▪ Isometric → CON/ECC with theraband, towel slides, and seated heel-toe raises → CKC exercises (ie. standing calf raises, squats, lunges)</li> <li>▪ ** CON Peroneals <u>and</u> ECC Tibialis Posterior</li> <li>▪ NMES may be used initially over peroneals or tibialis posterior for muscle re-education</li> </ul> </li> <li>- Begin proprioception:               <ul style="list-style-type: none"> <li>▪ BAPS board</li> </ul> </li> </ul>



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		<ul style="list-style-type: none"> <li>▪ Tandem stance</li> <li>▪ Single leg balance</li> <li>▪ Rocker board</li> <li>▪ Foam or Waffles single leg balance</li> <li>▪ Wobble board</li> <li>▪ Mini-trampoline</li> <li>▪ Bosu ball</li> <li>▪ Balance beam</li> </ul> <p>- Cardiovascular exercise (ie. biking) - Core strengthening</p>	<ul style="list-style-type: none"> <li>▪ Tandem stance</li> <li>▪ Single leg balance</li> <li>▪ Rocker board</li> <li>▪ Foam or Waffles single leg balance</li> <li>▪ Wobble board</li> <li>▪ Mini-trampoline</li> <li>▪ Bosu ball</li> <li>▪ Balance beam</li> </ul> <p>- Cardiovascular exercise (ie. biking) - Core strengthening</p>
	<b>PRECAUTIONS</b>	No passive end-range INV or PF	No passive end-range DF No passive end-range ER / EV
	<b>CRITERIA FOR PROGRESSION TO PHASE 3</b>	<ol style="list-style-type: none"> <li>1. Full ROM</li> <li>2. Minimal pain</li> <li>3. 70-80% strength compared to unaffected</li> <li>4. Able to do single-leg balance test for 30 sec, eyes closed</li> </ol>	<ol style="list-style-type: none"> <li>1. Full ROM</li> <li>2. Minimal pain</li> <li>3. 70-80% strength compared to unaffected</li> <li>4. Able to do single-leg balance test for 30 sec, eyes closed</li> </ol>
<b>PHASE 3 (&gt; 3 WEEKS up to &gt; 12 MONTHS)</b>	<b>GOALS</b>	<ol style="list-style-type: none"> <li>1. More aggressive strengthening</li> <li>2. More aggressive proprioceptive training</li> <li>3. Sport-specific / Work-specific functional and agility training</li> </ol>	<ol style="list-style-type: none"> <li>1. More aggressive strengthening</li> <li>2. More aggressive proprioceptive training</li> <li>3. Sport-specific / Work-specific functional and agility training</li> </ol>
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- Continue to progress strengthening in all planes                             <ul style="list-style-type: none"> <li>▪ Standing calf raises double leg → single leg</li> </ul> </li> <li>- Cardiovascular exercise (ie. biking)</li> <li>- Progress proprioceptive training with perturbations</li> <li>- Begin running as tolerated</li> <li>- Functional activities                             <ul style="list-style-type: none"> <li>▪ Skipping, jumping, hopping, twisting, figure-8 running, stair climbing, lifting, carrying, pushing, pulling, squat, crouching</li> </ul> </li> <li>- Begin sport- and work-specific activities                             <ul style="list-style-type: none"> <li>▪ Sport-specific skills and drills</li> <li>▪ Work circuits (include material and non-material handling abilities)</li> </ul> </li> <li>- Begin plyometrics and agility training late in program as tolerated</li> <li>- Incorporate core strengthening and stability into functional activities</li> <li>- Progress to independent Home Exercise Program</li> </ul>	<ul style="list-style-type: none"> <li>- Continue to progress strengthening in all planes                             <ul style="list-style-type: none"> <li>▪ Standing calf raises double leg → single leg</li> </ul> </li> <li>- Cardiovascular exercise (ie. biking)</li> <li>- Progress proprioceptive training with perturbations</li> <li>- Begin running as tolerated</li> <li>- Functional activities                             <ul style="list-style-type: none"> <li>▪ Skipping, jumping, hopping, twisting, figure-8 running, stair climbing, lifting, carrying, pushing, pulling, squat, crouching</li> </ul> </li> <li>- Begin sport- and work-specific activities                             <ul style="list-style-type: none"> <li>▪ Sport-specific skills and drills</li> <li>▪ Work circuits (include material and non-material handling abilities)</li> </ul> </li> <li>- Begin plyometrics and agility training late in program as tolerated</li> <li>- Incorporate core strengthening and stability into functional activities</li> <li>- Progress to independent Home Exercise Program</li> </ul>
	<b>PRECAUTIONS</b>	Careful with dynamic activities in lateral planes	Careful with dynamic activities involving end-range DF (ie. plyometrics) or pivoting
	<b>CRITERIA FOR RETURN TO SPORT/ RETURN TO WORK</b>	<ol style="list-style-type: none"> <li>1. Pain free</li> <li>2. 85-90% strength compared to unaffected</li> <li>3. Able to complete sport-specific / work-specific testing</li> <li>4. Bracing and/or taping during athletics for at least 1 year post-injury</li> </ol>	<ol style="list-style-type: none"> <li>1. Pain free</li> <li>2. 85-90% strength compared to unaffected</li> <li>3. Able to complete sport-specific / work-specific testing</li> </ol>



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PHASE OF REHABILITATION		LATERAL LIGAMENT RECONSTRUCTION (Brostrom and similar repairs)
<b>PHASE 1 POST OP (0-3 WEEKS)</b>	<b>GOALS</b>	<ol style="list-style-type: none"> <li>1. Protection of healing tissues</li> <li>2. Pain management</li> <li>3. Control inflammation</li> <li>4. Full WB in Air cast boot</li> </ol>
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- Air cast boot, WBAT with crutches               <ul style="list-style-type: none"> <li>▪ Encourage immediate WB in the boot, with minimal use of crutches</li> <li>▪ Remove boot for hygiene</li> </ul> </li> <li>- NSAIDS, ice, elevation for control of pain and inflammation</li> <li>- Strengthening and ROM for the knee and hip (quads, hamstrings, gluteus medius and maximus, hip adductors)</li> </ul>
	<b>PRECAUTIONS</b>	WBAT in boot No active/passive INV, forceful EV, and limited PF and DF
	<b>CRITERIA FOR PROGRESSION TO PHASE 2</b>	<ol style="list-style-type: none"> <li>1. No complications from surgery</li> <li>2. Good wound / scar healing</li> <li>3. Pain and inflammation controlled</li> <li>4. Full (or near full) WB in Air cast boot</li> </ol>
<b>PHASE 2 (3-6 WEEKS)</b>	<b>GOALS</b>	<ol style="list-style-type: none"> <li>1. Protection of healing tissues</li> <li>2. Begin range of motion</li> <li>3. Avoid muscle atrophy</li> <li>4. Progress weightbearing tolerance and Gait training</li> <li>5. Improve mobility</li> <li>6. Improve function</li> </ol>
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- Progress WB and gait training in Air cast boot; wean off crutch use if not already</li> <li>- Begin gentle AROM of the ankle, with precautions below</li> <li>- Begin gentle isometric strengthening of the ankle</li> <li>- Continue with pain management and swelling control as needed</li> <li>- Mobilization of intermetatarsal and midtarsal joints</li> </ul>
	<b>PRECAUTIONS</b>	No passive ROM No active INV past neutral No extremes of ankle ROM Be cautious with talocrural and subtalar joint manual mobilizations
	<b>CRITERIA FOR PROGRESSION TO PHASE 3</b>	<ol style="list-style-type: none"> <li>1. Pain and Inflammation controlled</li> <li>2. Full WB in Air cast boot</li> <li>3. Able to tolerate gentle ROM exercises</li> </ol>
<b>PHASE 3 (6-12 WEEKS)</b>	<b>GOALS</b>	<ol style="list-style-type: none"> <li>1. Protection of healing tissues</li> <li>2. Discontinue use of Air cast boot after 6 weeks</li> <li>3. Increase range of motion</li> <li>4. Avoid muscle atrophy</li> <li>5. Progress weightbearing tolerance and gait training without boot</li> <li>6. Initiate proprioceptive training and neuromuscular control</li> <li>7. Improve mobility</li> <li>8. Improve function</li> </ol>



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	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- Protection with ankle brace</li> <li>- Gait training without boot, encouraging normal gait pattern</li> <li>- Begin DF, PF, and EV PROM</li> <li>- Continue to progress DF, PF, and EV AROM</li> <li>- Strengthening for intrinsic muscles of the foot (ie. Towel scrunching)</li> <li>- Begin isotonic strengthening of DF, PF, and EV (continue with isometric INV)</li> <li>- Seated proprioceptive exercises for Week 6-9</li> <li>- Standing proprioceptive exercises beginning Week 10 (see examples above)</li> <li>- Begin CKC lower extremity strengthening Week 8               <ul style="list-style-type: none"> <li>▪ Squats, Lunges (start forward/back, progress to lateral then multidirectional), step-ups</li> </ul> </li> <li>- Biking as tolerated</li> <li>- Swimming</li> <li>- Fast-paced walking after Week 8</li> <li>- Core strengthening</li> </ul>
	<b>PRECAUTIONS</b>	<p>No active INV ROM past neutral          No passive INV ROM          No concentric INV strengthening</p>
	<b>CRITERIA FOR PROGRESSION TO PHASE 3</b>	<ol style="list-style-type: none"> <li>1. Near normal ROM (except INV)</li> <li>2. Normal gait pattern</li> <li>3. Minimal pain</li> <li>4. 70-80 % strength compared to unaffected</li> </ol>
<b>PHASE 4 (WEEK 12 – 5 MONTHS)</b>	<b>GOALS</b>	<ol style="list-style-type: none"> <li>1. Full ROM</li> <li>2. Increase muscle strength, endurance, and power</li> <li>3. Improve proprioception neuromuscular control</li> <li>4. Begin sport- and work-specific training</li> </ol>
	<b>REHABILITATION GUIDE</b>	<ul style="list-style-type: none"> <li>- ROM exercises as needed to obtain full motion</li> <li>- Begin isotonic strengthening for INV</li> <li>- Continue to progress strengthening in all planes               <ul style="list-style-type: none"> <li>▪ Standing calf raises double leg → single leg</li> </ul> </li> <li>- Biking</li> <li>- Progress proprioceptive training with perturbations</li> <li>- Begin running as tolerated</li> <li>- Functional activities (as above)</li> <li>- Begin sport- and work-specific activities (as above)</li> <li>- Begin plyometrics and agility training late in program as tolerated</li> <li>- Incorporate core strengthening into functional activities</li> <li>- Progress to independent Home Exercise Program</li> </ul>
	<b>PRECAUTIONS</b>	Careful with dynamic activities in lateral planes
	<b>CRITERIA FOR RETURN TO SPORT/ RETURN TO WORK</b>	<ol style="list-style-type: none"> <li>1. Pain free</li> <li>2. Full ROM</li> <li>3. 85-90% strength compared to unaffected</li> <li>4. Able to complete sport-specific / work-specific testing</li> <li>5. Physician clearance to resume full activity</li> <li>6. Bracing and/or taping during athletics</li> </ol>



**References**

1. Bruckner, P., Khan, K. Clinical Sports Medicine 3E. McGraw-Hill Professional. Toronto. 2007.
2. Amendola A, Williams G, Foster D. Evidence-based approach to treatment of acute traumatic syndesmosis (high ankle) sprains. *Sports Medicine and Arthroscopy Review* 206;14:232-236.
3. Bleakley CM, McDonough SM, MacAuley DC. Some conservative strategies are effective when added to controlled mobilization with external support after acute ankle sprain: a systematic review. *Australian Journal of Physiotherapy* 2008;54:7-20.
4. Collins N, Teys P, Vincenzino. The initial effects of a mulligan's mobilization with movement technique on dorsiflexion and pain in subacute ankle sprains. *Manual Therapy* 2004;9:77-82.
5. Coughlan G, Caulfield B. A 4-week neuromuscular training program and gait patterns at the ankle joint. *Journal of Athletic Training* 2007;42(1):51-59.
6. de Vries JS et al. Interventions for treating chronic ankle instability (review). *Cochrane Database of Systematic Reviews* 2008;2:CD004124.
7. Delahunt E. Neuromuscular Contributions to Functional Instability of the Ankle Joint. *Journal of Bodywork and Movement Therapies*. Volume 11, 2007. Pages 203 – 213.
8. Glasgow P. Sports Rehabilitation Principles and Practice. *sportEX medicine*. Volume 32, April 2007. Pages 10 – 16.
9. Glasgow P. Part 2: Applying the Principles of Rehabilitation in the Clinical Environment. *sportEX medicine*. Volume 32, April 2007. Pages 17 – 22.
10. Gribble PA, Hertel J, Denegar CR. Chronic ankle instability and fatigue create proximal joint alterations during performance of the star excursion balance test. *International Journal of Sports Medicine* 2007;28:236-242.
11. Hale SA, Hertel J. Reliability and sensitivity of the foot and ankle disability index in subjects with chronic ankle instability. *Journal of Athletic Training* 2005;40(1):35-40.
12. Hertel J. Sensorimotor Deficits with Ankle Sprains and Chronic Ankle Instability. *Clinics in Sports Medicine*. Volume 27, 2008. Pages 353 – 370.
13. Jones MH, Amendola AS. Syndesmosis sprains of the ankle. *Clinical Orthopaedics and Related Research* 2006;455:173-175.
14. Jones MH, Amendola AS. Acute treatment of inversion ankle sprains. *Clinical Orthopaedics and Related Research* 2007;455:169-172.
15. Kerkhoffs GMMJ et al. Different functional treatment strategies for acute lateral ankle ligament injuries in adults (review). *Cochrane Database of Systematic Reviews* 2002;3:CD002938.
16. Kerkhoffs GMMJ et al. Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults (review). *Cochrane Database of Systematic Reviews* 2008;3:CD003762. Kerkhoffs GMMJ et al. Surgical versus conservative treatment for acute injuries of the lateral ligament complex of the ankle in adults (review). *Cochrane Database of Systematic Reviews* 2008;2:CD000380.
17. Lin C-F, Gross MT, Weinholt P. Ankle syndesmosis injuries: anatomy, biomechanics, mechanism of injury, and clinical guidelines for diagnosis and intervention. *Journal of Orthopaedic & Sports Physical Therapy* 2006;36(6):372-384.
18. Martin RL, Irrgang JJ. A survey of self-reported outcome instruments for the foot and ankle. *Journal of Orthopaedic & Sports Physical Therapy* 2007;37(2):72-84.
19. McKeon P, Mattacola C. Interventions for the Prevention of First Time and Recurrent Ankle Sprains. *Clinics in Sports Medicine*. Volume 27, 2008. Pages 371 – 382.
20. van der Wees PJ et al. Effectiveness of exercise therapy and manual mobilization in acute ankle sprain and functional instability: a systematic review. *Australian Journal of Physiotherapy* 2006;52:27-37.
21. Van Deun S et al. Relationship of chronic ankle instability to muscle activation patterns during the transition from double-leg to single-leg stance. *The American Journal of Sports Medicine* 2007;35(2):274-281.
22. van Os AG et al. Comparison of conventional treatment and supervised rehabilitation for treatment of acute lateral ankle sprains: a systematic review of the literature. *Journal of Orthopaedic & Sports Physical Therapy* 2005;35(2):95-105.
23. van Rijn RM et al. What is the clinical course of acute ankle sprains? A systematic literature review. *The American Journal of Medicine* 2008;121(4):324-331.
24. Vincenzino B et al. Initial changes in posterior talar glide and dorsiflexion of the ankle after mobilization with movement in individuals with recurrent ankle sprain. *Journal of Orthopaedic & Sports Physical Therapy* 2006;36(7):464-471.
25. Williams GN, Jones MH, Amendola A. Syndesmotic ankle sprains in athletes. *The American Journal of Sports Medicine* 2007;35(7):1197-1207.
26. The Stone Clinic. Brostrom repair for chronic ankle instability: rehabilitation protocol. <http://www.stoneclinic.com/anklerehab>.



## ANKLE REHABILITATION PROTOCOL



27. Dr. Laith Jazrawi. Postoperative rehabilitation following brostrom-gould procedure. [http://newyorkortho.com/pt\\_ankle/p\\_BrostrumGould.pdf](http://newyorkortho.com/pt_ankle/p_BrostrumGould.pdf).