**Lateral Ankle Sprain Conservative Treatment Guidelines for the Jumping Athlete**

* **Diagnosis**
  + Level of function, ligamentous laxity, hemorrhaging, point tenderness, total ankle motion, swelling, and pain1
    - If a hematoma is present, accompanied by pain on palpation of the lateral ankle around the fibula and/or a positive Anterior Drawer Test, ADT, a partial rupture of a lateral ligament is likely.2,3
    - Reverse anterolateral drawer test, RALDT, along with the traditional Anterior Drawer test, and side-to-side comparison.
      * The ADT should be utilized between 4 to 5 days post-injury to optimize Sensitivity (84%) and specificity (96%).2,3
    - Add anterolateral talar palpation to the traditional ADT to assess talar translation and improve diagnostic accuracy. The anterolateral talar palpation test had an overall accuracy of 87.5% compared to the traditional ADT at 69.6%.1
  + Imaging
    - The Ottawa Ankle Rules, OAR, are the gold standard for excluding fractures after an acute ankle injury, with evidence supporting use across the lifespan and for athletic events.1,4 Highly recommended for use among several high-quality Clinical Practice Guidelines, CPGs.5
    - According to the American College of Radiology, ACR, Appropriateness criteria, if symptoms are persistent for >6 weeks, radiographs are usually appropriate, followed by an MRI without contrast if negative but instability is suspected.1
* **Examination**
  + Patient-reported Outcome Measures
    - Patient-Reported outcome measures should be used before, and 1 or more times after the initiation of treatment.
    - The use of the PROMIS - Physical Function scale, PROMIS - Pain Interference scale, Lower Extremity Function Scale LEFS, and the Foot and Ankle Ability Measure FAAM is strongly recommended during clinical examination.1
    - The Tampa Scale of Kinesiophobia, TSK-11, and the Fear Avoidance Beliefs Questionnaire, FABQ, may be utilized to assess fear of movement and fear-avoidance. Scores on these measures have been shown to differentiate between individuals with chronic ankle instability, CAI, “copers,” and healthy controls.1
    - The Cumberland Ankle Instability Tool, CAIT, and the Identification of Functional Ankle Instability, IdFAI, are reliable and validated tools effective for assisting in the diagnosis and severity of CAI.1,6
  + Objective Measures
    - Assessed at baseline, at least 2 more times during the episode of care.1
    - Ankle ROM
      * Dorsiflexion ROM: The weight-bearing lunge test should be used to assess dorsiflexion. Asymmetries of greater than 2.5 cm between sides was predictive of lateral ankle sprains, LAS.1
      * Total Ankle ROM: Testing of passive, active and resistive ROM in both the sagittal and frontal planes with side-to-side comparison.6
      * Talar Motion: Assess talar translation and inversion via the ADT+palpation and the talar tilt test with side-to-side comparison.1,6
    - Strength
      * Ankle
        + Concentric and eccentric muscle strength deficits for ankle eversion, inversion and plantarflexion in individuals following acute LAS and in those with CAI.6
        + Reduced eversion strength has been associated with recurrent injury and chronic instability.7
        + Ankle strength asymmetries and imbalances have been associated with increased risk of LAS, specifically eccentric isokinetic dorsiflexion and plantarflexion strength asymmetries of >15% led to an 8.8 times increase in odds of sustaining a noncontact ankle sprain injury in professional soccer athletes.8
        + Decreased slow eccentric ankle inversion strength and increased fast concentric plantar flexion strength were found to be significantly correlated with LAS.9
      * Hip and Knee
        + Decreased hip strength is associated with an increased risk for LAS.7 Hip and knee sagittal and frontal muscle isometric strength decreased in individuals with CAI when compared with both “copers” and healthy controls.10 Furthermore, hip adductor, extensor and flexor torque is strongly correlated with posterolateral balance, emphasizing a strong relationship between hip strength, balance and LAS.10
        + In male soccer players, when hip abductor strength was less than 33.8% of body weight, LAS risk increased from 11.9% to 26.7%. Along with this, decreased hip extensor strength was associated with a significant increase in LAS among youth players.1
    - Swelling
      * A quantifiable Figure 8 measurement of ankle girth may be used to track changes during recovery, however this has not been found to correlate with self-reported function.6
    - Balance and Motor Control
      * Single-leg balance: Static SL balance on a firm surface with eyes closed is strongly recommended.1
      * Star Excursion Balance Test, SEBT: Anterior, anteromedial, posteromedial and posterolateral directions. Significant balance deficits were found in patients with unilateral LAS when compared with the uninjured, contralateral limbs.1,6 Posteromedial reach of greater than 77.5% of leg length decreased LAS risk by more than 4 times.1,12
      * Demi-pointe Test: Ability to maintain static balance unilaterally for 5 seconds while positioned high as possible on the ball of the foot. A significantly lower failure rate among a control group compared with both unilateral and bilateral ankle instability groups.11,12
  + Functional Performance Tests
    - Performed under safe conditions, after the patient has appropriately progressed
      * Single-leg hop test
      * Side-Hop Test
      * Multiple-Hop test
      * Figure-8 Hop
      * Foot-lift test
      * Single-leg drop landing
      * Drop-Vertical jump
* **Interventions**
  + Phases of Ligament Healing13,14
    - Phase I: Acute Inflammatory Phase (First 48-72 hours following LAS injury)
      * Acute inflammation with pain and swelling
    - Phase II: Proliferation Phase (48-72 hours to several months following LAS)
      * Decreased inflammation and the initiation of ligament healing
    - Phase III: Remodeling Phase (lasts several months to years following LAS)
      * Collagen maturation begins and the healing ligament grows in strength
  + Protection and Support
    - External Support: Prophylactic bracing and taping is strongly recommended for use alongside exercise to reduce the risk of recurrent injury for individuals engaging in high-risk activity, such as indoor court or field-based athletics.1 Bracing has also been shown to reduce the risk of initial LAS in individuals with risk factors.
    - Immobilization: Progressive weight-bearing with external supports is preferred with loading beginning in the acute phase of injury.1-3,6 Functional treatment compared to immobilization led to improved RTS rate and time.1 Grade III sprains or more severe injuries may require immobilization with semi-rigid bracing to below-knee casting in the acute phase for a maximum of 10 days.1-3,6
  + Pain and Inflammation Management
    - RICE & POLICE (Rest, Ice, Compression and Elevation) and (Protection, Optimal Loading, Ice, Compression and Elevation): Ice, compression and elevation may be utilized intermittently in the inflammatory phase of healing, although there is limited evidence to support a positive effect on pain, swelling or function.1-3,6 Several studies show that when combined with exercise, RICE may improve ankle function and weight-bearing tolerance, and decrease pain.1-3 RICE should not be used as a stand-alone intervention but may be beneficial when combined with other therapy.
    - NSAIDs: NSAIDs may be used by patients to reduce pain and swelling, and improve short-term function following an acute LAS.1,3,6 In the acute phase, NSAID medication use benefits may outweigh the risks; however, NSAID use can affect the natural healing process resulting in reduced strength of healing ligaments, therefore caution should be taken.1,3,6 In addition to the detrimental effects on healing, the analgesic effect could result in increased patient activity, increasing the risk of further damage.14
    - Other Therapies and Modalities: Clinicians may use low-level laser therapy, pulsating shortwave diathermy, and electrical stimulation, although there is limited high-quality evidence supporting each.1-3,6 It is strongly recommended NOT to use ultrasound due to the lack of benefit and evidence.
  + Therapeutic Exercise
    - Balance and Neuromuscular Training: Balance and sensorimotor exercises have become an essential component of ankle sprain rehabilitation and have been shown to effectively reduce incidence and re-injury rates, along with improving function and dynamic neuromuscular control in athletes.6,15,16
      * Example exercises: Single-leg balance w/ varying surfaces, wobble board, BOSU, or eyes closed, weight shifting, balance with dual-task - ball toss, visual stimulus, or cognitive component
    - Strengthening: Ankle sprain injuries result in concentric and eccentric deficits for ankle eversion, inversion and plantarflexion, and should be strengthened following injury.6 Both balance and strength training has been shown to result in improved strength, balance, functional performance, and patient-reported outcome measures.17,18
      * Example exercises: Calf raises, 4-way ankle with resistance, 3-way hip, squats, lunges, RDLs, monster walk, concentric and eccentric ankle strengthening
    - Range of Motion and Mobility: Dorsiflexion is often impaired following acute ankle sprains. ROM exercises are typically initiated in the acute phase of injury to reduce mobility deficits while pain and inflammation are increased.6
      * Example exercises: AROM, PROM, slant board stretch, stationary bike, dorsiflexion lunge stretch, ankle mobilization with movement, stretching
  + Manual therapy
    - Joint Mobilization: Should be used alongside therapeutic exercise to reduce swelling and improve mobility.1,3,6 Ankle mobilization has been shown to have short-term improvements in dorsiflexion range of motion, pain, and also dynamic balance.1,19
      * Examples: Anterior-to-posterior talar mobilization, AP mobilization with movement for dorsiflexion
  + Dry Needling
    - Trigger point dry needling of the peroneal muscles may lead to better outcomes and improved function following ankle sprains.1,20 In basketball players, dry needling of the peroneus longus and tibialis anterior led to improved muscle pre-activation during a landing task, and improved static postural control.20
  + Sport-specific training
    - Will vary depending on the sport
    - Jumping athlete considerations:
      * Single-leg and double-leg Jump propulsion and landing mechanics
        + Individuals with CAI have increased inversion just prior to initial contact and move into less eversion after contact compared with healthy controls.21 These individuals also exhibit significantly greater preparatory hip joint flexion, a reduced flexor moment following initial contact and an associated increase in hip joint stiffness during landing tasks.22

**Abbreviations:**

* ACR – American College of Radiology
* ADT – Anterior Drawer Test
* AP – Anterior-Posterior
* AROM – Active Range of Motion
* CAI – Chronic Ankle Instability
* CAIT – Cumberland Ankle Instability Tool
* FABQ – Fear Avoidance Beliefs Questionnaire
* IdFAI – Identification of Functional Ankle Instability
* LAS – Lateral Ankle Sprain
* NSAID – Nonsteroidal Anti-Inflammatory Drug
* OAR – Ottawa Ankle Rules
* POLICE – Protection Optimal-Loading Ice Compression Elevation
* PROM – Passive Range of Motion
* PROMIS – Patient-Reported Outcomes Measurement Information System
* RALDT – Reverse Anterolateral Drawer Test
* RICE – Rest Ice Compression Elevation
* ROM – Range of Motion
* RTS – Return-to-Sport
* SEBT – Star Excursion Balance Test
* TSK-11 – 11-item Tampa Scale of Kinesiophobia

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