**Body Region/Theme: Foot and Ankle (Jayne Rossiter)**

**Specific condition: Ankle Sprain and Instability**

**Lateral Ankle Mechanism/History**

1. Caused by landing on the outside of your foot and forcing your ankle to roll outwards whilst the foot turns inward. This causes the lateral ligaments to stretch and possibly tear. This commonly happens when landing on someone’s foot in a sporting match, or on uneven surfaces.

2. You may hear a “popping” noise or feel a “tearing” sensation on the outside of your ankle.

3. You may have a previous history of ankle sprains.

**5 Symptoms**

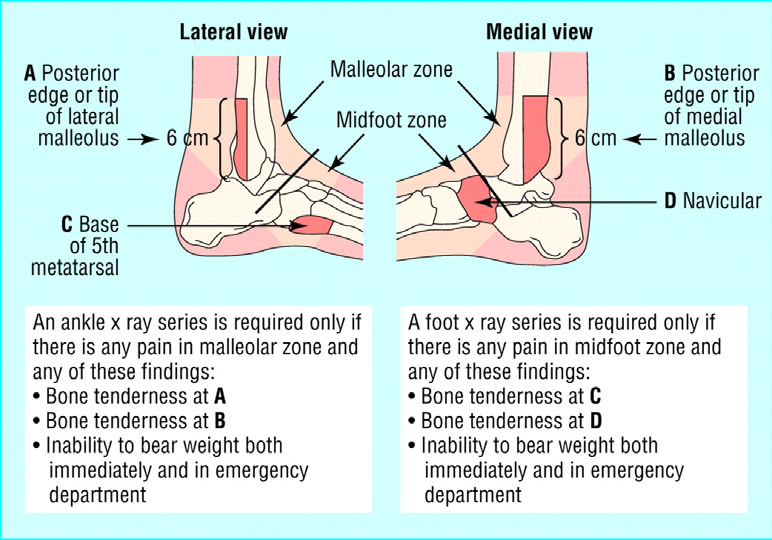
1. Pain may be experienced on weightbearing and rolling your foot inwards (plantarflexion and inversion).
2. Swelling of the lateral ankle (around lateral malleolus) usually appears rapidly but can be delayed some hours.
3. Bruising may be present on the outside of the ankle/foot and even sometimes on the inside of the ankle/foot).
4. If significant pain and disability persist, despite appropriate treatment, for more than 4-6 weeks than further investigations such as x-ray, bone scan, CT or MRI may be necessary to rule out more serious injury. Usually after about 2 weeks, even if you can’t put your full weight on the foot, it should not hurt much anymore and swelling/bruising should be settling.

**5 Objective signs/tests**

**Acute Phase Assessment (Connect)**

1. Palpation:

Palpate for swelling and tenderness. Determine whether or not tenderness is greatest on bone (lateral or medial malleolus, base of 5th metatarsal, navicular) or on ligament tissue ATFL, CFL, PTFL, deltoid lig). The Ottawa Ankle rules provide useful guidance to palpation. (See fig 1 below).



**Fig 1.**

The Ottawa rules help to differentiate between soft tissue and bone injury in order to rule out fracture. If at least 1 of the 3 Ottawa rules are positive (as seen in Fig 1) than radiographs are indicated. For more information this short video can be viewed.

<https://www.bing.com/videos/search?q=ottawa+ankle+rules&view=detail&mid=FAD8D7EDA5579088CEF8FAD8D7EDA5579088CEF8&FORM=VIRE>)

1. X-rays: XR of the ankle joint should include
   * The base of the 5th metatarsal to rule out fracture
   * If damage to the lower tibiofibular syndesmosis is suspected, special ankle mortise or syndesmosis views are required

Notes on Investigations:

* + Osteochondral lesions of the talus may not be obvious on x-ray. If significant pain and disability persist at 4-6 weeks post injury, despite appropriate treatment, a radioisotopic bone scan, CT or MRI is indicated to exclude this. If the bone scan gives a positive result and MRI is not available, CT can be used to determine bone damage.

1. Anterior Drawer (ATFL): Tests passive integrity of the ATFL and is positive if there is more anterior drawer laxity compared to the unaffected side.
2. Talar tilt test (CFL): This tests the integrity of the ATFL, PTFL and CFL laterally and the deltoid ligament medially. This test is considered positive if there is excessive gapping and/or pain compared to the unaffected side.
3. Squeeze test- This can help determine if there is a syndesmotic sprain
4. External rotation squeeze test (Kleiger’s Test- This also helps determine if there is a syndesmotic sprain
5. Diagnostic US can be used on the lateral ankle tendons (PB and PL to look for signs of trauma, degenerative change or inflammation) and ligaments (ATFL, AITFL and CFL to look for tears).

**Classification (American Medical Association):**

* Grade 1 – anatomy stretched 🡪 pain but no/mild laxity on passive integrity tests.
* Grade 2- anatomy partially torn 🡪 pain and mild/moderate laxity on passive integrity tests
* Grade 3- anatomy completely torn 🡪 Laxity on passive integrity tests. Pain may be present but sometimes less due to less mechanical irritation of ligament fibres when ligaments are completely torn.

**Acute Management of Ankle Sprains**

**Inflammatory Phase (0-3 days)**

* The goal is to reduce pain and swelling, improve circulation and improve partial foot support.
* Protection: Protect the ankle from further injury by resting and avoiding activities that may cause further injuries and/or pain.
  + Taping
  + Bracing
* Rest: Rest for the first 24hrs is advised, possibly with crutches if necessary. Work, sport and exercise requirements will need to be altered.
* Ice\*: Apply ice for 15-20 mins, 1-3 x per day.
* Compression: Apply a compression bandage to control swelling.
* Elevation: As much as possible, elevate the foot above the level of the heart.

\*Despite its widespread use, the precise effects of ice on acute ankle sprains is not fully understood. There is insufficient evidence available from RCT’s to determine its effectiveness but there is also no evidence to reject the RICE protocol.

**Exercises for this phase:**

There should be a focus on increasing dorsiflexion.

Exercises:

* + During this phase the patient should perform active movements of the toes and ankle within a pain free range. Duration/Reps/Sessions per day
  + Example 2
  + Example 3

**Proliferative Phase (4-10 days)**

Aiming to improve foot and ankle function and improve load carrying capacity. This includes:

* Education: Gradual increase in activity level. Be guided by symptoms. Pain should not increase with paced loading. i.e. WB as tolerated. No increase in resting pain, night pain or morning pain.
* Practise foot and ankle functions including range of motion, active stability and motor coordination.
* Apply tape as soon as the swelling has decreased. Tape or brace use depends on patient preference, but a possible progression may include -Tape>Lace up>Semi-rigid>Elastic. Not providing proper support to the ankle may result in re-currant ankle sprains.

**Milestones to achieve in the acute phase & target exercises to prescribe to achieve**

|  |  |  |
| --- | --- | --- |
| **Exercise** | **4-10 days** | **Goal** |
| Range of Motion |  |  |
| Active Stability |  |  |
| Motor Co-Ordination |  |  |
| Balance & proprioception | - | - |
| Strength | - | - |
| Function: Walk/run/jump etc | * Provide assistive devices * Tape/brace advice | Walking: WBAT. Avoid further injury to ankle or other body regions by enabling as ‘normal’ gait as possible. |

**Milestones to achieve in the acute phase & target exercises to prescribe to achieve**

|  |  |  |
| --- | --- | --- |
| **Exercise** | **Progression 11- 21 days** | **Goal** |
| Range of Motion |  |  |
| Active Stability |  |  |
| Motor Co-Ordination |  |  |
| Balance & proprioception |  |  |
| Strength |  |  |
| Function: Walk/run/jump etc |  |  |

**Milestones to achieve in the acute phase & target exercises to prescribe to achieve**

|  |  |  |
| --- | --- | --- |
| **Exercise** | **Progression 21 days+** | **Goal** |
| Range of Motion |  | Full, pain-free |
| Active Stability |  |  |
| Motor Co-Ordination |  |  |
| Balance & proprioception |  |  |
| Strength |  |  |
| Function: Walk/run/jump etc |  | Jump x 10 (within 5cm of target) |

**Early Remodelling (11-21 days)**

Goals are to improve muscle strength, active and functional stability, foot/ankle ROM and mobility.

* -Provide education about possible preventative measures such as taping/bracing and advice regarding appropriate footwear for their sport/activity.
* -Practise balance, muscle strength, ankle/foot motion and progressive mobility (walking, running, stairs).
* -Look for symmetrical walking pattern.
* -Work on stability exercises and gradually progress the loading.
* -Encourage home exercises and give clear instructions on how to perform them correctly.
* -Advise wearing tape/brace during physical activity until static and dynamic balance and motor coordination exercises can be performed confidently.

\*Check for ankle exercises template in PhysiTrack\*

**Late Remodelling and Maturation**

This phase will be directed by client goals to improve the skills needed for activities of daily living and sport.

PhysiYoga LL knee/ankle assessment: Discuss with Catherine where this is at? Would be a great RTS screening program we could use to identify specific functional deficits to determine if physio is “finished”

* Practise motor coordination skills while performing mobility exercises.

(can you provide examples or review the PhysiTrack Ankle Sprain rehab templates or create Physiyoga ones?)

* + Example 1
  + Example 2
  + Example 3
* Continue to progress load bearing capacity until pre-injury capacity is reached.
  + Example 1
  + Example 2
  + Example 3
* Increase the complexity of motor coordination exercises in varied situations until pre-injury level is reached.
* Encourage continued practise at home
* Advice regarding the ongoing need for strapping and bracing:
  + Stable (Grade 1/2)- Strap/brace 6 weeks for sport
  + Unstable (Grade 3) – Strap/brace for sport (?forever?). This may be the case if pre-injury performance is not achieved or if re-currant ankle sprains occur.
  + (what about the functional/mechanical instability category if there is no passive integrity issue, but the client feels unstable or weak? How do we assess for this – either outcome measure score? Or perhaps a functional test like the one Catherine has worked on for the ACL?)

Part 2: **Chronic Ankle Assessment: Reach/Extend**

*Clients may come to you seeking advice regarding an old ankle sprain or injury. This section is designed to assess and manage clients who are in the chronic category for ankle injury.*

**Chronic Ankle Instability**

To understand the degree of dysfunction, the following outcome measures are helpful:

**Useful Outcome Measures**

Lower Extremity Functional Scale (LEFS) (available on PhysiTrack)

Foot and Ankle Ability Measure (FAAM)

Foot and Ankle Disability Index (FADI) (available on PhysiTrack)

*(any interpretation points regarding the outcome measures? Do you have a recommended one or a way to decide between the different measures?)*

**Objective Tests**

When chronic ankle instability is present, classification can be divided into functional and mechanical instability.

*Functional instability* involves pathologic joint laxity.

* Talar tilt discrepancy greater than 10 degrees or an anterior drawer difference of 10mm compared to the contralateral ankle.

*Functional instability* is attributed to sensorimotor and neuromuscular deficits that accompany ligamentous injury, but mechanical instability is not necessarily present.

Other functional tests that will reveal functional instability with –ve passive integrity tests include:

* X
* Y
* z

**2-3 Treatment options - what we do at PY**

1. **Diagnosis** – we look at the clinical signs and the story behind the injury to give a clear diagnosis. This allows a better understanding of what is going on and how to best manage. We can direct you for further scans or interventions if needed. Get early intervention for best chance of recovery.
2. **Prevention of recurrence and worsening**

* Support: Advice and management on taping & bracing
* Footwear advice, such as high-top shoes
* Appropriate muscle strengthening and stretching depending on your precise diagnosis

Can you create an “Ankle Instability” template in PhysiTrack? There is currently templates for ankle rehab – include 4-5 exercises from the categories listed below and the right prescription and save there.

* Muscle strengthening
* Achilles tendon stretching
* Proprioceptive training
* High level, individualized return to sport programs

1. **Management of Acute Ankle Sprains**

Research shows that even moderate to severe sprains can be improved with the right exercise and strength program.

You can expect a great recovery from ankle sprains if you get a clear diagnosis and a targeted and specific approach to rehabilitation.

If you suffer from weak ankles or if you’ve experienced one or more ankle sprains, there could be some instability there. To fully rehab an ankle sprain takes a significant period of time (potentially 6- 9 months) – if you’ve not completed a full return to sport program before, you might be leaving yourself open to future problems.

We can clinically assess the degree of instability with special tests and determine if a non-surgical (conservative) approach with Physiotherapy is suitable for you. If the injury is mild (i.e. grade 1), then an operation is highly unlikely to be necessary.

However, should you require surgery due to the demands of your lifestyle (occupation, sporting goals etc) our physiotherapists can assist your orthopaedic specialist through pre and post surgical advice and exercise.

* Mild – grade 1 (non-operative- functional)
* Moderate- grade 2 (non-operative – functional)
* Severe – grade 3 (controversial. Usually non-operative)

\*Review of current evidence, 85-90% of patients have good to excellent results whether they have operative or non-operative management.

**Chronic Ankle Instability**

Around 20% of people develop chronic ankle stability. This has been attributed to a delayed muscle reflex of stabilising lower leg muscles, deficits in lower leg muscle strength and deficits in postural control. The star excursion test can be used to determine evidence of deficits and self-reported function can also be quantified using the Foot and Ankle Ability Measure. It is recommended that all patients undergo conservative treatment to improve ankle stability and this is effective for most people. Surgery is only occasionally required.

**2-3 Home exercise ideas - something to try now**

Exercises on PhysiTrak include:

-Inverted and everted calf raisers

-Eccentric calf exercises on floor

-Counter movement drop jump (height of box can be progressed)

\*Number of repetitions should be guided by pain and assessed performance of patient\*

**2 Ergononomic & lifestyle contributions to consider (footwear, workstation, ergonomics, lifting technique, nutrition etc)**

1. Footwear- that is supportive and appropriate to their activity. Higher ankle support may be required.
2. Playing surface- this can influence risk of injury. Eg) fake turf vs Real turf for soccer players. Ankle support may need to be re-enforced++ on fake turf due to higher risk of injury. Hard surfaces such as cement or asphalt (netball) may require shoes with increased shock absorption.
3. Load management- such as how many training sessions to do and for how long. What activities to participate in and what activities to rest from.
4. Landing biomechanics- avoiding knees and feet rolling inwards when landing. Box jumps can be a good way to assess and train safer landings.
5. Previous history- a previous history of ankle sprains pre-disposes someone to future sprains. Extra precautions and proper rehabilitation should be emphasised.
6. Check for predispositions such as varus hindfoot or hypermobility (compare with other ankle +/- other joints)

**How does this relate to your own personal experience and areas of interest?**

I have an interest in sports and sports injuries. This injury is common to many local sports such as netball, football, basketball, soccer etc. Two of the most important pieces of advice I have found useful for people when returning to sport after ankle sprain is:

-Give the ankle the rest it needs in the acute phase. Don’t push it through pain or rush back to sport.

-Be consistent and persistent with strengthening and balance exercises. It takes time to strengthen an ankle but diligent and complete rehabilitation after your first ankle sprain can save you from many more!!