

ORTHOPAEDICS



FOR PRIMARY
HEALTH CARE



LION

LEARNING INNOVATION VIA
ORTHOPAEDIC NETWORKS

EDITOR: **MICHAEL HELD**

UNIVERSITY OF CAPE TOWN'S **ORTHOPAEDIC DEPARTMENT**

Lower limb soft tissue injuries

by Kirsty Berry, Shaun De Villiers & Marc Nortje

Learning objectives

1. Have an approach to lower limb soft tissue injuries.
2. Diagnose common soft tissue injuries in lower limbs.
3. Understand the basic management principles of these injuries.

Introduction

Ligament, tendon and muscle injuries of the hip, knee and ankle are common conditions seen in emergency departments and general practice. The majority of these injuries can be treated with conservative management. It is essential to identify injuries that should be referred to an orthopaedic surgeon for possible surgical intervention or further work-up.

Groin injuries

Also known as an adductor strain.

Clinical findings

History

Most often young athletes complain of groin pain following an injury while playing sport (most often running). It is more common in males than in females.

Examination

- Tenderness in the groin.
- Antalgic gait.
- Pain on resisted adduction of the hip, passive end of range abduction of the hip (adductors stretched), or both.

Additional injuries to note

It is essential to rule out non-orthopaedic causes such as inguinal hernias.

Special investigations

Imaging

- X-rays are normal.
- MRI – show changes in the adductor (oedema or tear); most often not indicated.

Management

Non-surgical

- RIC(E):
 - Rest
 - Ice
 - Compression
- Physiotherapy for rehabilitation and return to activity.

Surgical

- Rarely indicated.

Ligament and meniscal injuries of the knee

Applied anatomy

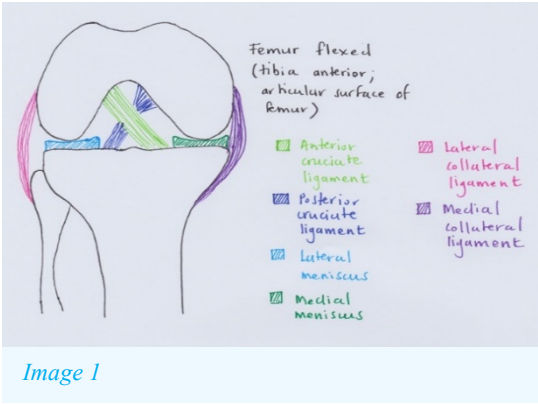


Image 1

The stability of the knee is dependent on bony anatomy, joint capsule, ligaments, menisci and surrounding muscle. The most commonly injured structures in the knee are the ligaments and menisci that can lead to ongoing pain, difficulty with daily and sporting activities and instability. The ligaments of the knee are the anterior and posterior cruciate ligaments and medial and lateral collateral ligaments. Both medial and lateral menisci contribute to stability function and articulation of the knee joint. Image 1 shows the anatomy of the ligaments and menisci.

Clinical findings

History

- **Anterior cruciate ligament** – the typical history is twisting the knee with the ankle fixed and immediate swelling.
- **Posterior cruciate ligament** – an anterior force to the tibia in a flexed

knee. Dash-board injury is the most common mechanism.

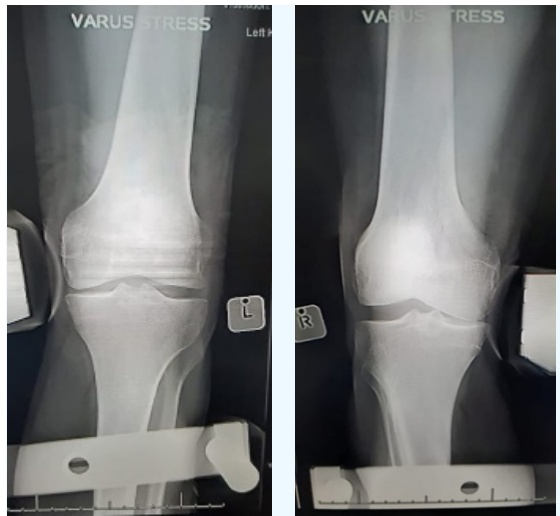
- **Medial (MCL) and lateral (LCL) ligament injuries** – valgus (MCL) or varus (LCL) force applied to the knee.
- **Multi-ligament injuries** – most often seen in high-velocity motor vehicle accidents or patients with a high BMI and low-velocity injuries.
- **Meniscal injuries** – the typical history is twisting motion on the fixed ankle with delayed swelling.

Examination

- **Look**
 - Swelling is typical of all injuries around the knee.
- **Feel**
 - Joint effusion may be seen with all injuries and can be assessed with the patella tap test. Tenderness over the MCL or LCL collateral may indicate an injury in this area. Anterior lateral or medial pain on palpation may point to lateral or medial meniscal injuries, respectively.
- **Move**
 - Range of motion of the knee may be limited (normal 0–130).
 - Anterior and posterior draw test – ACL and PCL
 - Lachmann and reverse Lachmann – ACL and PCL
 - Varus and valgus stress tests – lateral and medial collateral ligaments, respectively
 - McMurray's meniscal injuries

Additional injuries to note

- May be associated with vascular injuries (especially in multi-ligament injuries); vascular assessment is essential.
- High suspicion of reduced knee dislocation in patients with multi-ligament knee dislocations.
- Poly-trauma patients must be assessed closely in the case of a swollen knee and normal X-rays.



(A)

(B)

Images (A) and (B) are varus stress views of the left and right knees. The right knee shows an increased lateral joint space indicative of lateral collateral injury.

Special investigations

Imaging

- Plain film X-rays may be normal.
- Horizontal beam lateral (HBL) view may show an effusion (lipohaemarthrosis).
- Stress views are useful in diagnosing ligament injuries (compare to the contralateral side).
- Soft tissue swelling can be seen on plain film X-rays.
- An MRI is the gold standard for assessing soft tissue injuries.

Management

Non-surgical

- Rest
- Ice
- Compression
- Elevation
- Crutches with partial weight-bearing for pain management
- Analgesia (including NSAIDs where indicated)

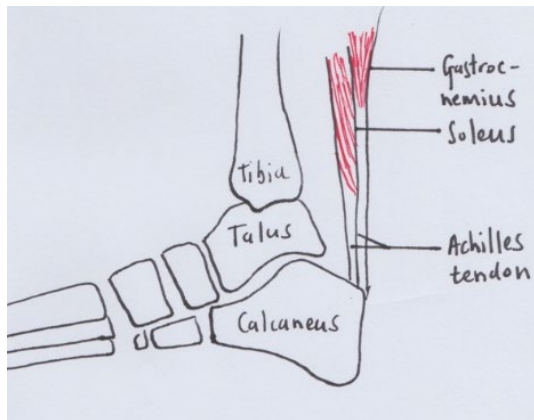
Surgical

- Failure of conservative management in the non-athlete, with ongoing pain and instability after six weeks.
- Multi-ligament knee injuries.
- ACL and meniscal injuries.
- Surgery includes arthroscopic or open repair or reconstruction of ligaments;

debridement, repair or replacement of menisci.

Achilles' tendon rupture

Applied anatomy



The Achilles tendon is the confluence of the soleus and gastrocnemius muscles of the posterior compartment of the leg. It inserts onto the posterior aspect of the calcaneus tuberosity. Its primary function is plantar flexion of the ankle joint.

Clinical findings

History

Most often, a low-velocity injury. The foot is either forced into extreme plantarflexion or dorsiflexion from a maximal plantarflexed position. A popping sound may be heard at the time of injury. The patient may have pain in the heel or calf and difficulty walking. The so-called 'weekend warrior' is vulnerable to this type of injury. The use of fluoroquinolones and steroid injections around the ankle has been associated with Achilles' tendon rupture.

Examination

- Tenderness and ecchymosis around or proximal to the insertion of the tendon.
- A gap in the tendon on palpation.
- Inability to actively plantarflex.
- Thompson test – pathognomonic.



Ecchymosis and gap in the Achilles tendon

Differential diagnosis

- Ankle sprain
- Ankle fractures
- Calcaneus fractures

Special investigations

Imaging

- X-rays are normal.
- Ultra-sound – confirm the clinical diagnosis; determine the size of the gap

and differentiate between partial and complete tears.

- MRI – helpful if the clinical diagnosis is unclear or for surgical planning in chronic tears.



Normal lateral ankle X-ray

Management

All patients with Achilles' tendon rupture should be referred to an orthopaedic surgeon.

Non-surgical

Serial casting progressing from plantar flexion to neutral every two weeks for 6–12 weeks has shown good outcomes in the low demand patient with acute tendon rupture.

Surgical

- An open or percutaneous repair can be considered for closed injuries.

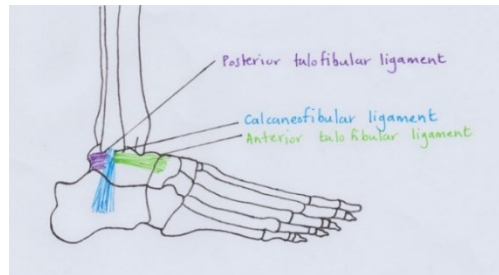
- Open injuries with direct laceration rather than tear should be repaired primarily.
- Tendon reconstruction and transfers are surgical options in chronic tears.



Intraoperative view of the Achilles' tendon gap following closed rupture

Ankle sprain

Applied anatomy



Ankle sprains involve injury to the lateral ligament structures of the ankle, specifically the anterior talofibular (ATFL) and the calcaneofibular ligaments (CFL).

Clinical findings

History

Inversion on a plantarflexed foot. The patient often reports ‘twist of the ankle’.

Examination

- Oedema and ecchymosis around the lateral aspect of the ankle.
- Tenderness over the lateral ankle (both lateral malleolus and talus).
- Inability to weight-bear.
- Anterior draw test for the ankle may be positive.
- Talar tilt test – inversion (especially end of range) causes pain.



Ecchymosis and swelling associated with a lateral ligament injury

Additional injuries to note

- Fractures of the ankle (lateral malleolus) and tarsal bones (especially talus and calcaneus) must be ruled out.

- Syndesmosis injuries can present as high ankle sprains (positive squeeze test).

Special investigations

Imaging

- X-rays – normal bony anatomy; soft tissue swelling may be evident.
- MRI – only indicated in chronic injuries or where the diagnosis is unclear.

Management

Non-surgical

- The majority of injuries improve with non-surgical intervention. The mainstay of treatment is ‘RICE’:
 - Rest
 - Ice
 - Compression
 - Elevation
- Non-weight or partial weight-bearing for pain relief.
- Physiotherapy

Surgical

- Indicated where conservative measures have failed.
- Arthroscopy of the ankle for diagnosis and debridement of the joint.
- Repair or reconstruction of the ATFL or tendon rerouting.

Essential takeaways

1. Ankle strains are the most common of all lower limb soft tissue injuries.
2. History and clinical examination are essential for diagnosis.
3. Non-surgical management of these injuries is the mainstay.
4. Achilles' tendon ruptures and ligament and meniscal injuries to the knee should be referred to an orthopaedic surgeon for further assessment and possible surgical intervention.

References

Martin et al, 2014. AAOS Comprehensive Orthopaedic Review, Volumes 1 and 2. USA. American Academy of Orthopaedic Surgeons

Assessment

1. A 24-year-old male rugby player is injured during a game when his foot is locked on the ground, and his knee is twisted. The knee swells up immediately, and he is unable to bear weight. The most likely structure injured is:
 - A. Posterior cruciate ligament
 - B. Medial meniscus
 - C. Anterior cruciate ligament
 - D. Lateral collateral ligament
 - E. Patella tendon

(C) is correct, as this is the typical history described by the patient with an acute ACL injury

2. A 54-year-old male is running at his daughter's school in the father-daughter race. Halfway down the track, he hears a pop and is unable to continue running. Which of these is not a risk factor for Achilles' tendon rupture:
 - A. Systemic steroid use
 - B. Course of ciprofloxacin for UTI a week ago
 - C. Cortisone injection into the tendon two weeks before the injury
 - D. Age
 - E. Alcohol consumption

(E) is correct – alcohol has not been linked to Achilles' tendon rupture. All the others are known risk factors. A Cortisone injection should never be given due to the risk of rupture.

3. A 20-year-old gymnast twisted her ankle following landing off the bar apparatus. She has swelling, ecchymosis and pain on the maximal passive inversion of the foot. What is the next most appropriate management for her injury:
 - A. Immediate referral to an orthopaedic surgeon.
 - B. Weight-bearing – continue to exercise through the pain and reassess in a week.
 - C. Early anterior talofibular ligament repair.
 - D. Ice pack over the area, compression bandage with Robert Jones-type bandage, crutches for non-weight bearing and no gymnastics.
 - E. Tendon rerouting surgery to prevent recurrence and early return to sport.

(D) is correct, as the majority of all ankle sprains can be treated conservatively

Editor: Michael Held

Conceptualisation: Maritz Laubscher & Robert Dunn

Cover design: Carlene Venter
(Creative Waves Brand Design)

Developmental editing and design:
Vela Njisané and Phinda Njisané

ABOUT THE BOOK

Informed by experts: Most patients with orthopaedic pathology in low to middle-income countries are treated by non-specialists. This book was based on a modified Delphi consensus study* with experts from Africa, Europe, and North America to provide guidance to these health care workers. Knowledge topics, skills, and cases concerning orthopaedic trauma and infection were prioritised. Acute primary care for fractures and dislocations ranked high.

Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritised.

* Held et al. Topics, Skills, and Cases for an Undergraduate Musculoskeletal Curriculum in Southern Africa: A Consensus from Local and International Experts. JBJS. 2020 Feb 5;102(3):e10.

THE LION

The Learning Innovation via Orthopaedic Network (LION) aims to improve learning and teaching in orthopaedics in Southern Africa and around the world. These authors have contributed the individual chapters and are mostly orthopaedic surgeons and trainees in Southern Africa who have experience with local orthopaedic pathology and treatment modalities but also in medical education of undergraduate students and primary care physicians. To centre this book around our students, iterative rounds of revising and updating the individual chapters are ongoing, to eliminate expert blind spots and create transformation of knowledge.

DISCLAIMERS

Although the authors, editor and publisher of this book have made every effort to ensure that the information provided was correct at press time, they do not assume and hereby disclaim any liability to any party for any loss, damage, or disruption caused by errors or omissions, whether such errors or omissions result from negligence, accident, or any other cause.

This textbook is not intended as a substitute for the medical advice of physicians. The reader should regularly consult a physician in matters relating to his/her health and particularly with respect to any symptoms that may require diagnosis or medical attention.

The information in this book is meant to supplement, not replace, Orthopaedic primary care training. The authors, editor and publisher advise readers to take full responsibility for their safety and know their limits. Before practicing the skills described in this book, be sure that your equipment is well maintained, and do not take risks beyond your level of experience, aptitude, training, and comfort level.

The individual authors of each chapter are responsible for consent and rights to use and publish images in this book.

© The Authors 2021



Licensed under a Creative Commons Attribution (CC BY) 4.0 International Licence.

ACKNOWLEDGEMENTS

This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada. Thanks to Johan Fagan, Michelle Willmers and Glenda Cox for their mentorship and support.