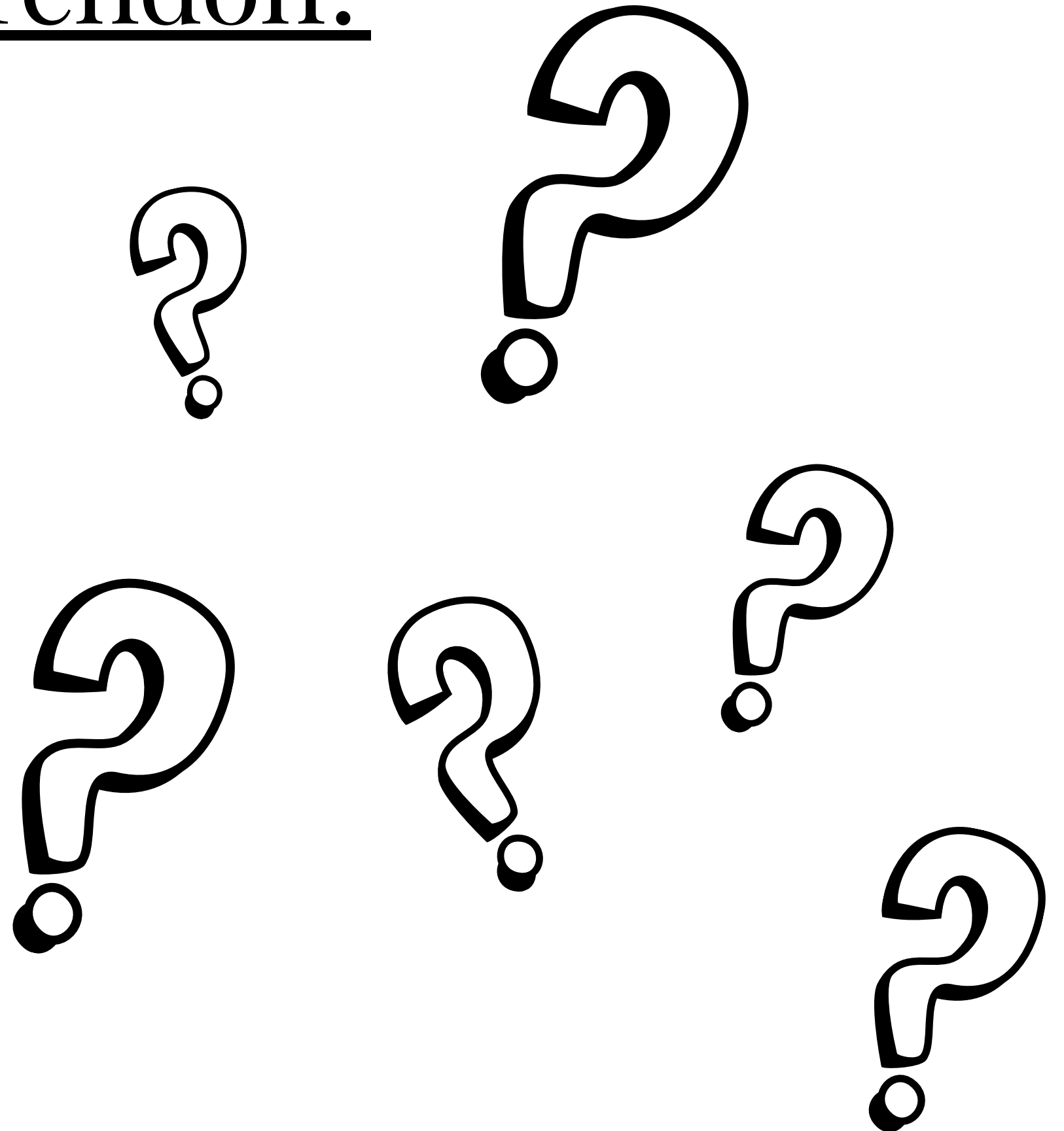


Achilles Tendon Rupture



What is an Achilles Tendon?

- Largest and Strongest tendon in the human body
- Formed by the joining of the gastrocnemius and the soleus
- Attaches to the calcaneus bone (heel bone)
- Main Function Produce plantarflexion at the ankle
- Subjected to high forces - up to 10x body weight during running



What is an Achilles Tendon Rupture?

- Occurs when the tendon is torn - partially or completely
- Happens when the tendon is exposed to a sudden, high level of force or stress
- 2 kinds of Achilles Tendon Ruptures

(Cleveland Clinic, 2023)

Chronic

- Not been identified or treated >4-6 weeks
- Retraction of the tendon
- Development of scar tissue
- Causing more complex surgical treatment

(Flint, Wade, Giuliani & Rue, 2014)

Acute

- Diagnosed and managed within a week of occurrence.

(Malik et al., 2025)

Aetiology

The causes/ orgin of a physical injury

Intrinsic Factors

- Tibia Vara
- Overly pronated foot
- Tight/ or undeveloped hamstrings
- High arched foot

(Nandra, Matharu & Porter, 2012)

Genetic Expression

COL5A1 Gene

- Codes for a type V collagen and combines with Type I Collagen
- Controls the diameter and strength of those fibres.

(van der Merwe et al., 2015).

TNC Gene

- Produces tenascin C
- Extracellular matrix protein
- Helps tissue repsond to mechanical loading

Extrinsic Factors

- Improper/ unsuitable footwear
- Improper training surfaces
- Poor conditioning
- Drug - Quinolones

(Saglimbeni & Hommer, 2025)

Collagen Composition

- Healthy tendon contains 95% Type I Collagen
- Degenerated Tendon -
 - Less Type I Collagen
 - Higher amount of Type III Collagen

- Tendons become stiffer and more suceptible to rupture.

(Saglimbeni & Hommer, 2025)

- Ageing reduces blood supply .

(Kjaer et al., 2011; SAGE Journals).

Epidemiology

Study of how diseases and health conditions occur in different groups of people.

- UK Study – 8 cases per 100,000 people each year
- Most common in men
- Predominantly during sporting activity (Briggs-Price et al., 2024).

• ATR injuries among the most common tendon injuries in adults in the US.

- 7 to 40 cases per 100,000 each year

(Lemme et al., 2018).

Are men at a higher risk of ATR?

- Gianakos, A.L., Hartman, H., Kerkhoffs, G.M.M.J., Calder, J. and Kennedy, J.G. (2024) ‘Sex differences in biomechanical properties of the Achilles tendon may predispose men to higher risk of injury: A systematic review’, Journal of ISAKOS, 9(2), pp. 184–191. doi:10.1016/j.jisako.2023.11.001.

• **Key Findings -**

- Men have a greater Achilles tendon length, thickness, and cross-sectional area than women.

- Men showed higher stiffness, peak force, and loading rates.

- Subjected to higher biomechanical stress and less adaptive deformation

- Contributes to injury risk when forces exceed tendon capacity.

- Women - Greater CSA deformation, strain, and compliance.

- Reflects higher adaptability of the tendon under load

- Leading to less rates of ATR in women compared to men.

Weekend Warriors

- People who take part in intense, high-impact recreational sport sporadically.

- Exposed to sudden, mechanical loads

- Limited conditioning and abrupt participation increase risk of acute rupture. (Nielsen et al., 2017).

Deng, L., Zhang, X., Xiao, S., Wang, B. and Fu, W. (2021) ‘Gender difference in architectural and mechanical properties of medial gastrocnemius–Achilles tendon unit in vivo’, Life, 11(6), article 569. doi:10.3390/life11060569.

- Men - Thicker gastrocnemeuis + larger pennation angle.

- Enhances the calf’s force-generating capacity.

- Increases the mechanical load transmitted to the Achilles tendon.

- Elevated forces may exceed the tendon’s tolerance.

- Increasing risk of rupture.

Mechanism of Injury

How an injury happened.

Eccentric Loading

- Rapid dorsiflexion whilst calf muscle are contracted.

(Moore et al., 2020)

Movements

- Explosive movements e.g. jumping, sprinting
- Produces rapid, high-force demands on the tendon.

(MDPI Sports, 2019)

Collagen Failure

- Cross-links begin to fail - can result in tendon rupture.

(Wang, 2006).

Injury Situations

- Commonly occur without contact.
- Take-off or acceleration.
- Rapid changes of direction.
- Stop-and-turn actions.

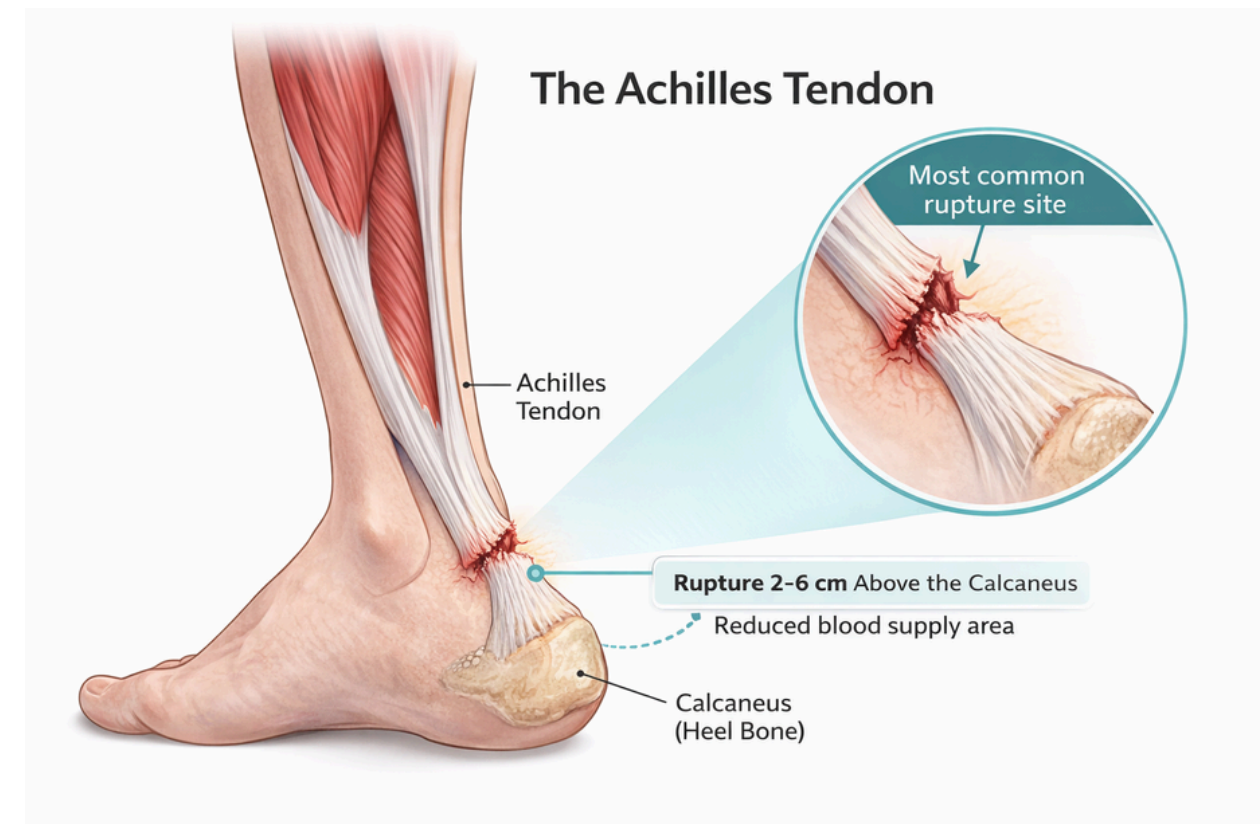
(Smith et al., 2024).

Watershed Zone + Location of rupture

- Mid-portion has the poorest blood supply.
- Relies on tiny capillaries from surrounding connective tissue.

- Commonly occur 2-6cm above the calcaneus insertion.

(Jones et al., 2024; StatPearls, 2020).



Immediate Signs and Symptoms

How the injury is recognised

- Hearing or feeling a sudden “pop”
(StatPearls, 2020).
- Sensation of being kicked in lower leg.
(StatPearls, 2020).
- Immediate sharp pain at posterior calf or heel.
(Maffulli et al., 2017).
- Inability to push off the ground/ loss of plantar flexion.
(Gatz et al., 2020).
- Inability to rise onto toes.
(Harvard Health, 2023).
- Palpable gap or defect along the tendon.
(Simmonds et al., 2014).



Management and Recovery

Early mobilisation vs Immobilisation

Early mobilisation benefits -

- Faster recovery of ROM, strength, and function.
- Quicker return to daily activities.
- Limits calf muscle atrophy.

(Suchak et al., 2006; McCormack & Bovard, 2015; Zellers et al., 2021).

Immobilisation benefits -

- Protects the tendon.
- Minimises mechanical stress during inflammatory phase.
- Reduces risks linked to premature mobilisation.

(StatPearls, 2023).

McCormack, R. and Bovard, J. (2015) 'Early functional rehabilitation or cast immobilisation for the postoperative management of acute Achilles tendon rupture? A systematic review and meta-analysis of randomised controlled trials', British Journal of Sports Medicine, 49, pp. 1329–1335.

- Patients of early rehabilitation reported higher satisfaction and returned to sport sooner than those immobilised.
- No difference in return to work.
- No difference in overall complications rate.

Surgery vs No Surgery

Myhrvold, S.B. et al. (2022) 'Nonoperative or surgical treatment of acute Achilles' tendon rupture', New England Journal of Medicine, 386(15), pp. 1409–1420. doi:10.1056/NEJMoa2108447.

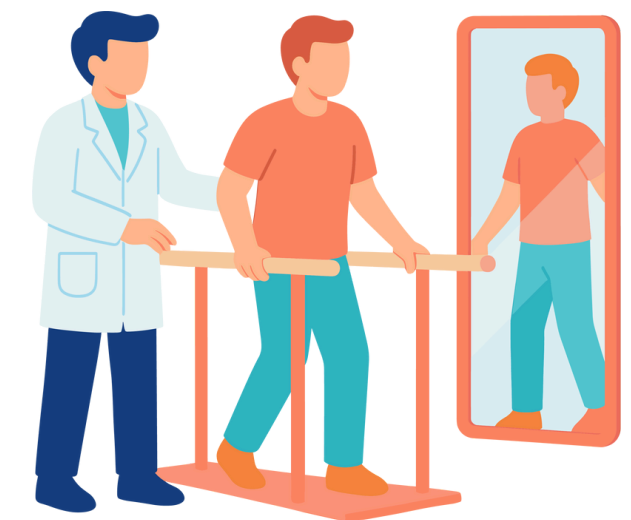
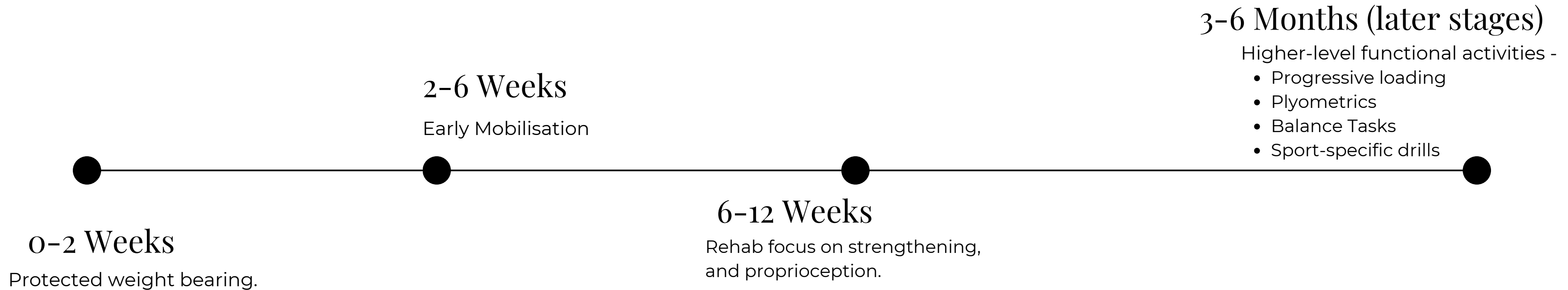
- Higher re-rupture rates with non-operative care.
- Non-surgical management avoids risks -
 - Wound infection
 - Nerve Injury
 - Scarring

Enwemeka, C.S. (1992) 'Functional loading augments the initial tensile strength and energy absorption capacity of regenerating rabbit Achilles tendons', American Journal of Physical Medicine & Rehabilitation, 71, pp. 31–38.

- Early controlled loading improves -
 - Tendon strength
 - Reduces adhesion formation
 - Enhances tendon gliding.

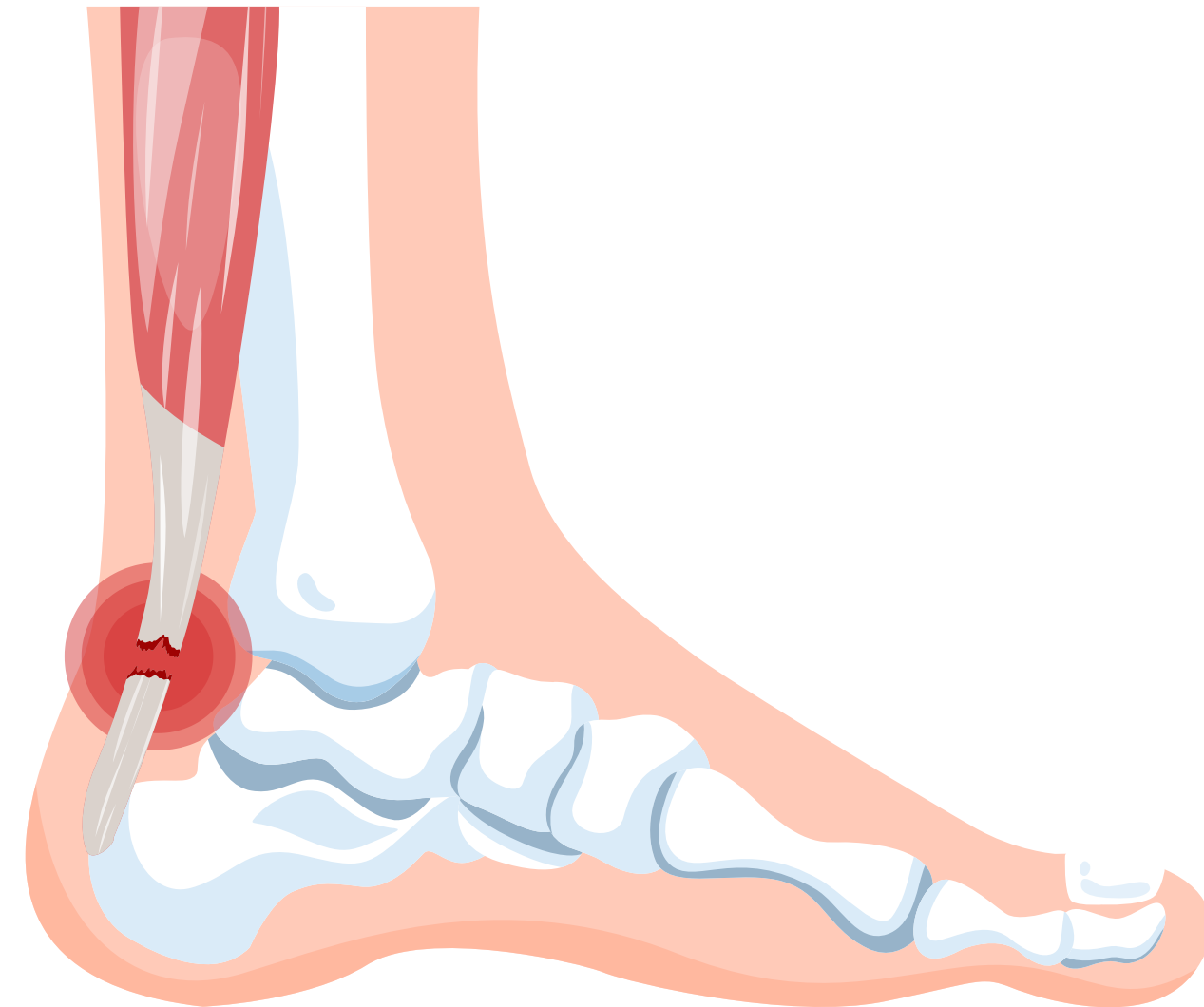
ATR Rehabilitation Timeline

Progressive, phased approach.



Summary

- Strongest tendon in the human body.
- Vital in everyday movements e.g. walking, running, and jumping.
- Vulnerable to rupture due to exposure to high-forces.
- ATR's can be chronic or acute.
- Influenced by a range of factors
- Occur most often in active adults, especially men.
- Commonly occur during sports involving sprinting or jumping.
- Symptoms include - sudden “pop”, sharp calf pain, weakness, and difficulty pushing off the foot.
- Increasing evidence supports an early mobilisation approach.
- Management is dependant on the individual.



SST Clinical Reflection



Pitch-side WRU Division 1 West Game

Experience -

- Player sustained a direct kick to the hand.
- Resulted in trauma to a fingernail.
- Nail was partially lifted from the nail bed with moderate bleeding.

What did I do and Why?

- Performed a quick assesment to rule out fracture or dislocation.
- Controlled the bleeding .
- Cleaned/ sanitised the area.
- Didn't initially tape the nail as it hadn't lifted yet.
- Once bleeding was controlled, the nail was taped to:
 - Prevent further lifting
 - Protect the nail bed
 - Reduce pain and risk of infection

What went well?

- Calm and effective bleeding control.
- Good initial assesment.
- Hoped to stabilise and protect the injury.
- Reassurance to the player.
- Maintained hygiene standards.

What would I do differently?

- Tape the nail sooner.
- Apply a sterile dressing under the tape.

What could have been better?

- Nail could have been taped and stabilised earlier.
- Could have used sterile dressing under the tape.

What did I Learn?

- Recognised the importance of early stabilisation.
- Improved confidence in dealing with bleeding management.
- Learned the value of clear aftercare advice.
- Identified the need for reflection on my performance/management after every game.

Thank you!

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