

Musculoskeletal Pain in Sports-Related Injuries

The Pharmacist's Role

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Disclosures

- This webinar is supported by an unrestricted educational grant from Haleon, but the funder was not involved in the development of the materials; did not review the materials at any time; and did not communicate with the presenter.
- I have been paid an honorarium by CPhA for creating and delivering this presentation.
- Otherwise, I have no conflicts of interest to declare.
- I am a pharmacist who runs an interdisciplinary chronic pain clinic and a medication assessment clinic...who has personally experienced sports-related musculoskeletal injuries...so this is the lens through which I see this topic.

Learning Objectives

By the end of this webinar learners will be able to:

1. Identify common types of sports-related musculoskeletal injuries and their clinical presentations.
2. Understand the role of pharmacists in advising patients on self-care practices, including the appropriate use of medications.
3. Describe pharmacologic and non-pharmacologic options for managing pain and inflammation associated with sports-related musculoskeletal injuries.
4. Recognize when to refer patients to other health providers for evaluation and treatment of sports-related musculoskeletal injuries.

Patient case

- Derek is a middle aged, white male who asks you for medication to take for his sore shoulder.
- He tells you that he attends a gym 6 days/week where he does intense resistance interval training.
- His left shoulder has been hurting for the last ~3 days. He thinks he hurt it in the gym but does not remember an incident when it was injured.
- He wants something for the pain.
- When you probe for a detailed history, he tells you...



Poll #1

Would you immediately refer Derek to go to a walk-in clinic / physiotherapist / family doctor / nurse practitioner?

1. Yes
2. No
3. I am not sure

Types of Sports Injuries

Acute injuries

- Usually sudden trauma, often contact sports
- e.g., fractured bone during football, sprained ankle during basketball, torn muscle during heavy weightlifting

Chronic injuries

- Usually overuse or repetitive movements
- e.g., stress fractures, tennis elbow

Common Sports Injuries



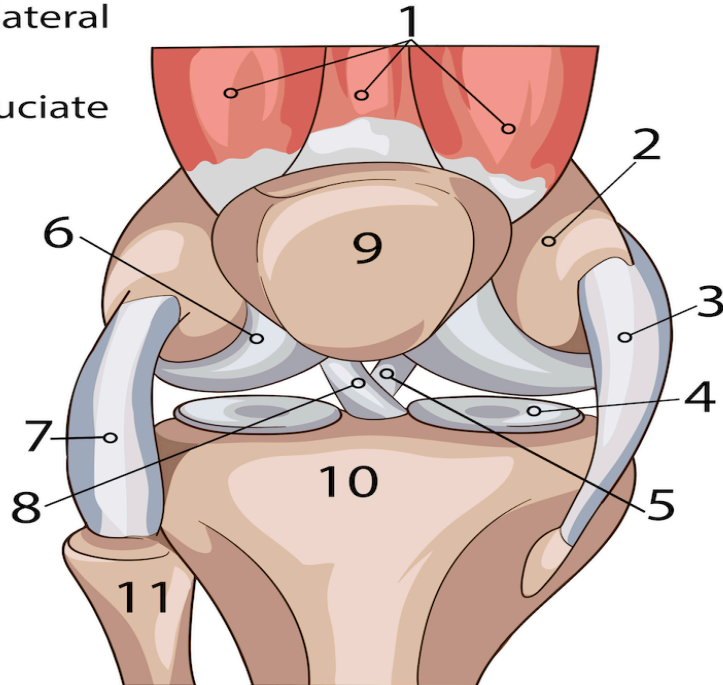
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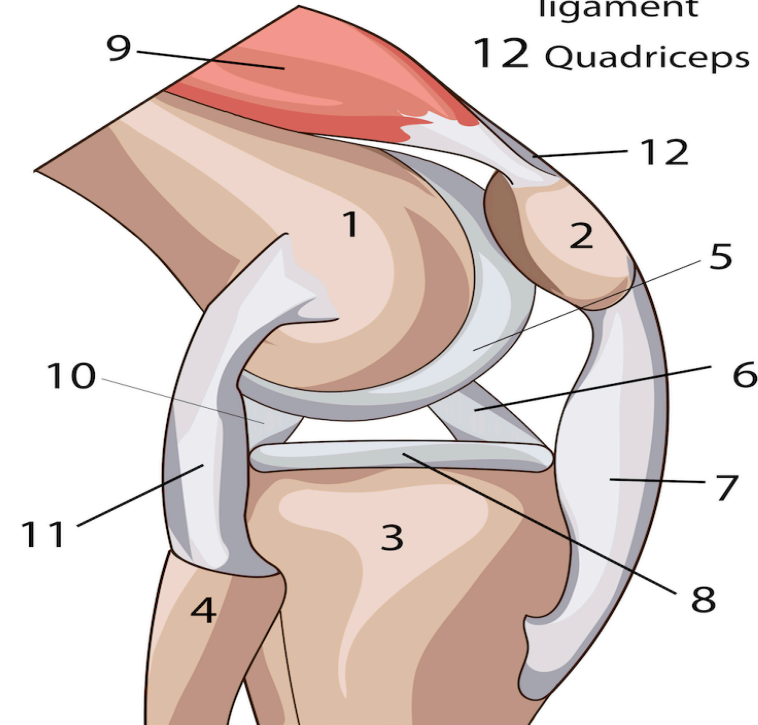


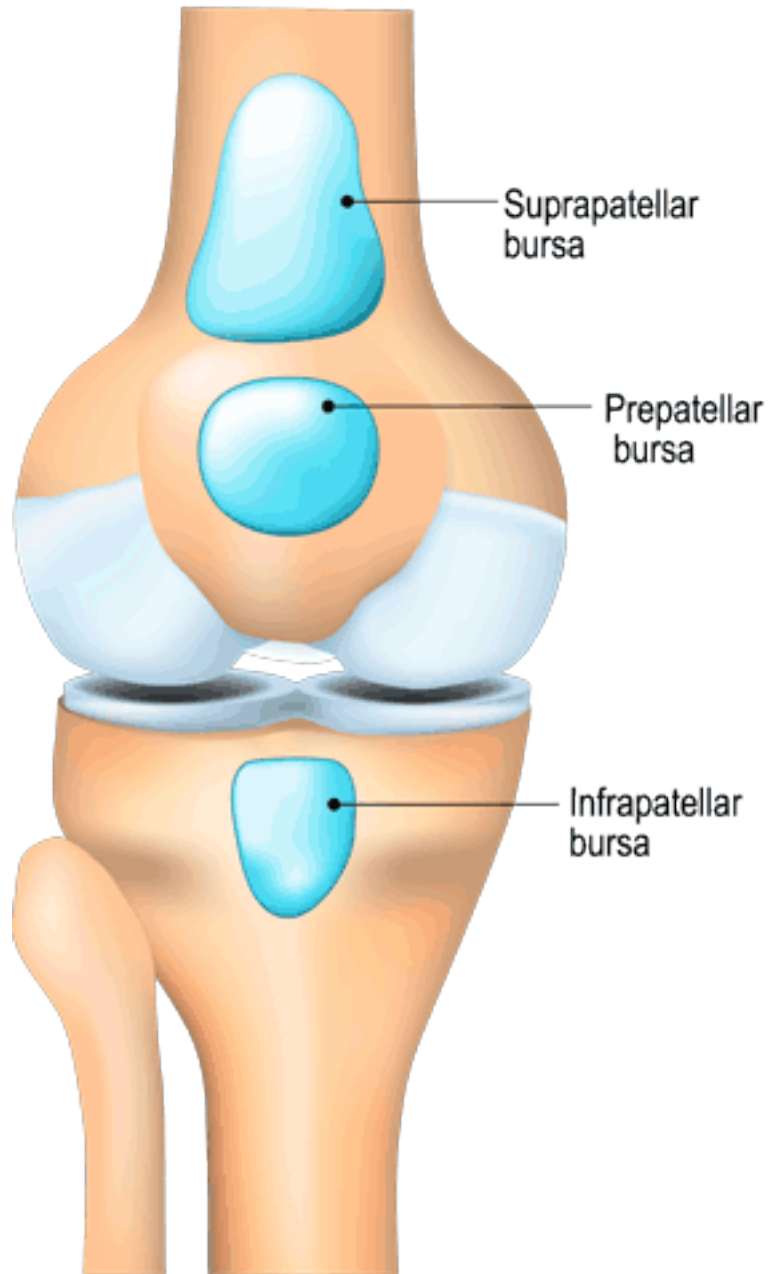
Anatomy Overview

- 1 Quadriceps
- 2 Femur
- 3 Medial collateral ligament
- 4 Meniscus
- 5 Posterior cruciate ligament
- 6 Articular cartilage
- 7 Lateral collateral ligament
- 8 Anterior cruciate ligament
- 9 Patella
- 10 Tibia
- 11 Fibula



- 1 Femur
- 2 Patella
- 3 Tibia
- 4 Fibula
- 5 Articular cartilage
- 6 Anterior cruciate ligament
- 7 Patellar tendon (Ligament)
- 8 Meniscus
- 9 Quadriceps muscles
- 10 Posterior cruciate ligament
- 11 Lateral collateral ligament
- 12 Quadriceps tendon





Anatomy Overview

Fractures, Sprains and Strains

Description:

- fracture – broken bone
- sprain - injury to a ligament when a joint is forced move in an unnatural position
- strain – injury to a muscle or tendon when it is stretched excessively and part of it tears

Clinical presentation:

- sudden onset of pain, swelling and tenderness
- severe sprains can be hard to tell from a fracture

Diagnosis:

- physical exam, some require imaging (X-ray)

Rotator Cuff Injuries

Supraspinatus

Supraspinatus

Subscapularis

Teres major

Teres major

Teres major

Teres major

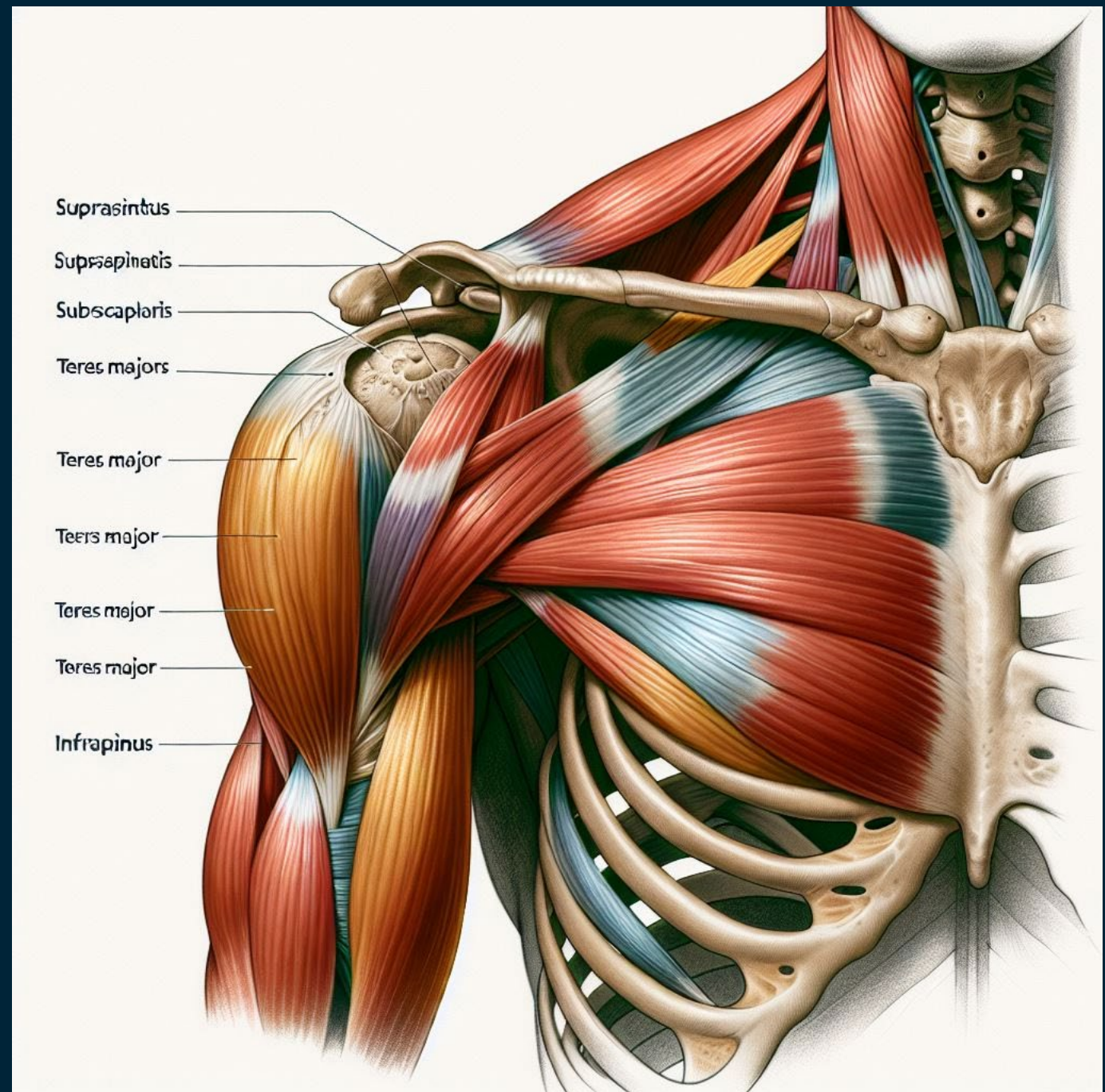
Teres major

Infraspinatus



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Rotator Cuff Injuries

Description:

- sprain, strain, or tear of one of the muscles, or tendons or ligaments in shoulder

Clinical presentation:

- sudden or gradual onset of pain, especially with movement reaching away from body or above head
- often reduced range of motion
- weakness may be present

Diagnosis:

- physical exam
- often requires imaging (ultrasound, maybe MRI)

Plantar Fasciitis

Description:

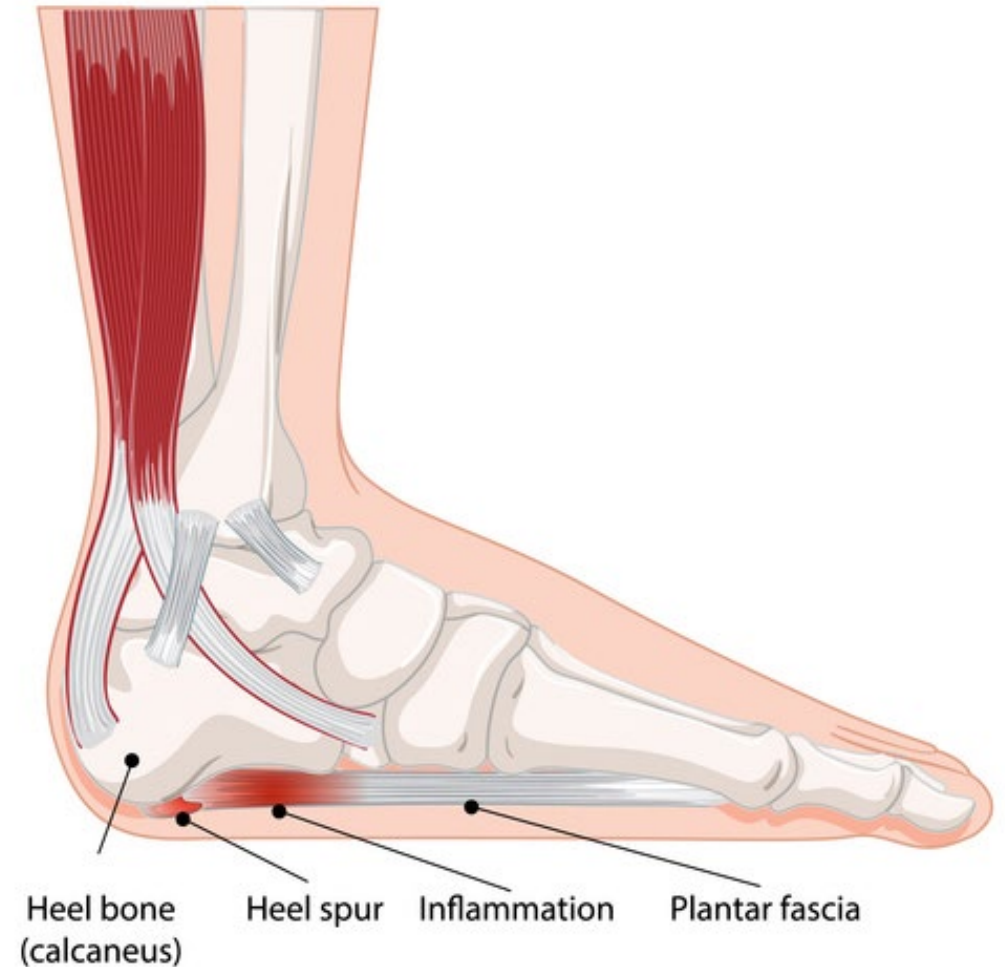
- injury and inflammation of the plantar fascia, which is the tissue along the sole of the foot
- from repetitive activities like walking/running

Clinical presentation:

- pain and inflammation of the bottom of foot, usually the heel

Diagnosis:

- physical exam



Shin Splints (medial tibial stress syndrome)

Description:

- inflammation of muscles and tendons around the tibia, usually from repetitive activity

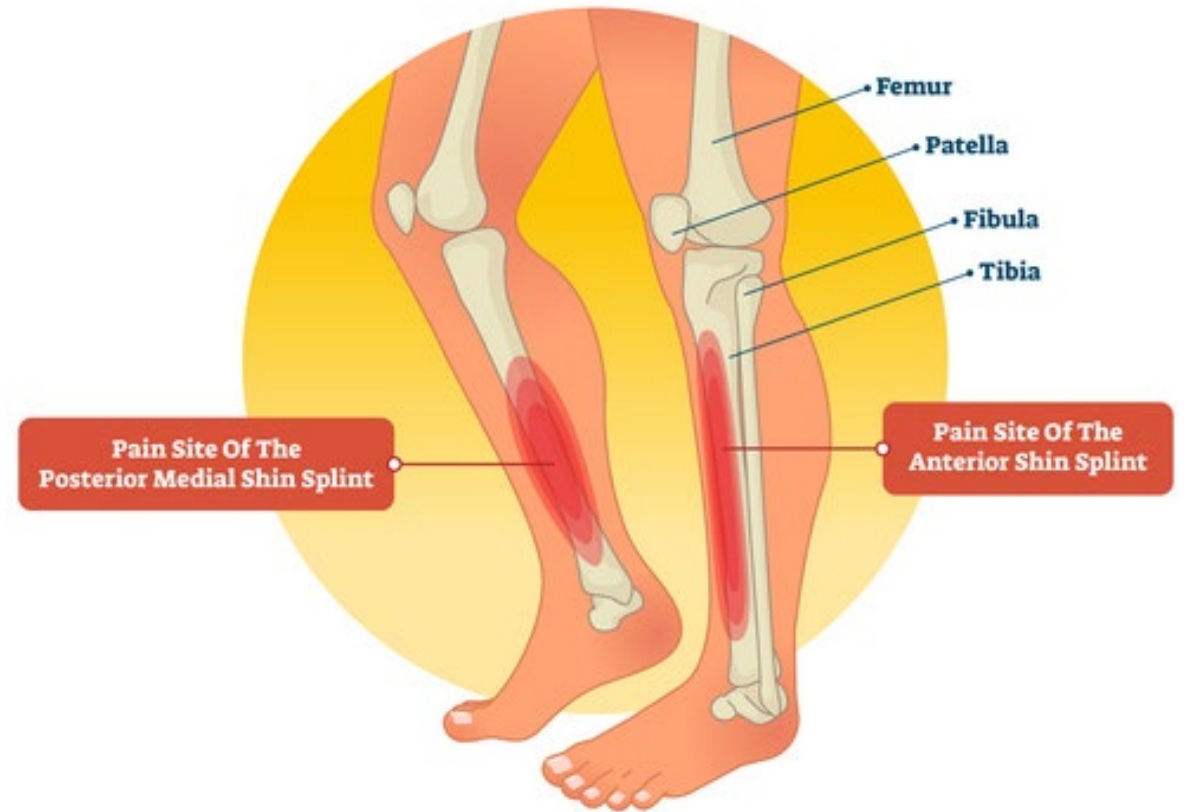
Clinical presentation:

- gradual or sudden onset of pain and inflammation of the shins

Diagnosis:

- physical exam, imaging (X-ray)

L. Lum, Sports Injuries Chapter, CPS



Tendinitis

Description:

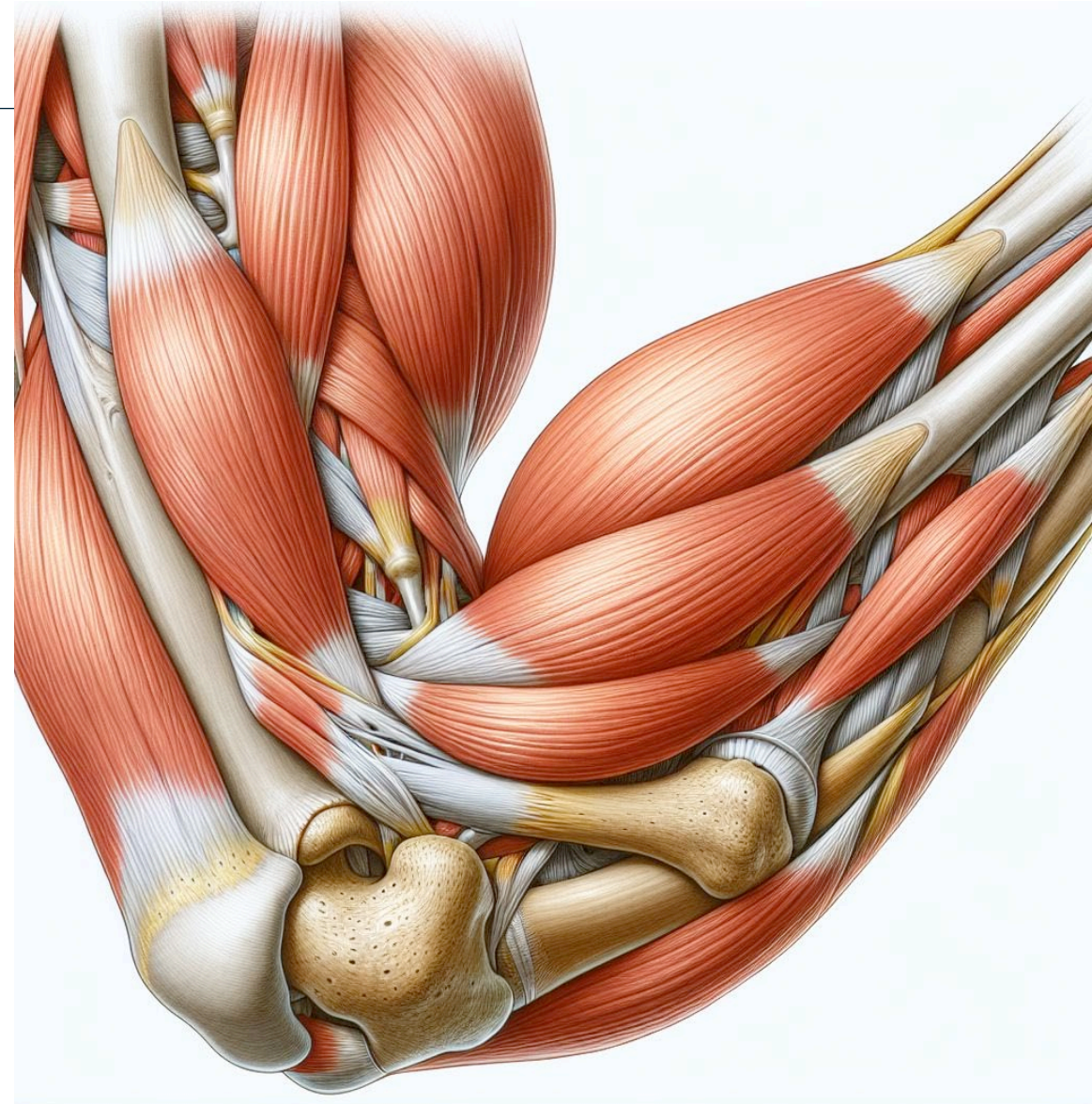
- inflammation of a tendon
- from repetitive movement
- e.g., Achilles tendinitis, lateral epicondylitis (tennis elbow), medial epicondylitis (golf elbow)

Clinical presentation:

- Gradual or sudden onset of pain and inflammation in affected joint

Diagnosis:

- physical exam



Stress Fractures

Description:

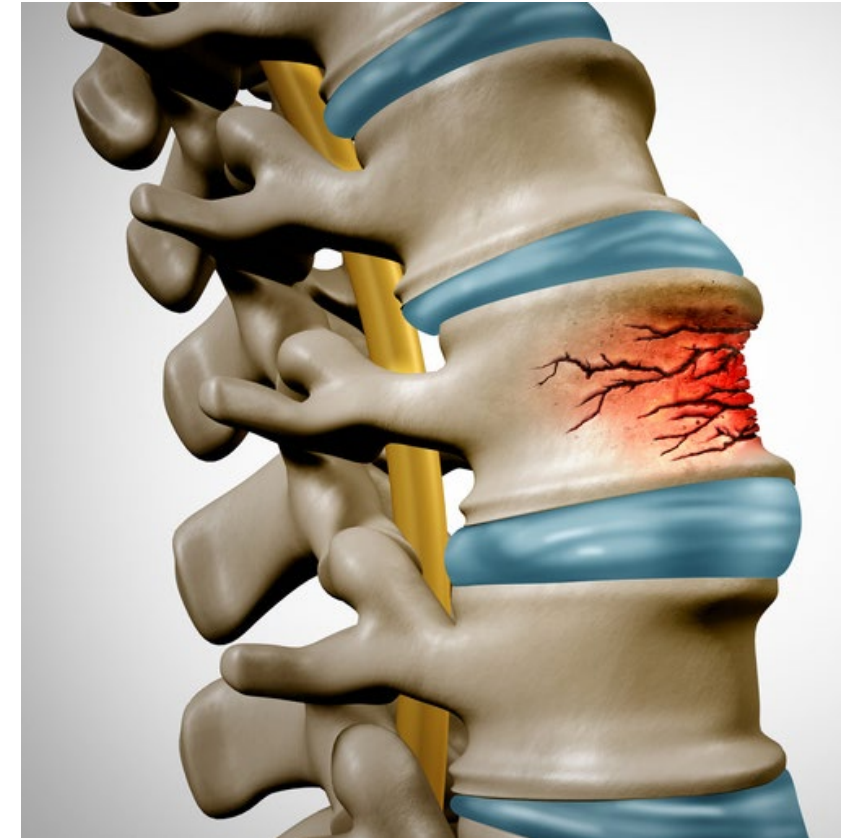
- tiny cracks in bones from repeated semi-traumatic impact, especially jumping (e.g., gymnasts, basketball) and usually in feet or legs

Clinical presentation:

- symptom onset insidious
- pain improves with rest and worsens slowly with activity as workout/activity progresses
- often feel fine at start of exercise, but pain gets so bad cannot finish the workout or event
- can be mistaken for shin splints

Diagnosis:

- physical exam, imaging (X-ray)



When is imaging (ultrasound, X-ray, MRI) needed?

- When the diagnosis is unclear with history and physical exam
- When severity of injury unclear
- If result may change treatment
- If complications are suspected
- When injury not healing as expected



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Pharmacist's Role: Summary

1. Assess the need for immediate referral

2. Assist with self-management:

- Education on non-drug injury management
- Recommend medication for pain / inflammation

3. Follow up, when possible, to:

- Ensure the injury has healed
- Monitor for complications
- Ensure adherence to treatment plan

Assess the Need for Immediate Referral



RED FLAGS:

1. **Severe pain** that doesn't improve with rest / OTC analgesics
2. **Significant swelling or bruising** around the injured area
3. **Inability to bear weight**
4. **Limited range of motion** or inability to move joint normally
5. **Significant weakness**
6. **Deformity** or abnormal appearance to the joint / limb
7. **Numbness or tingling**
8. **Persistent symptoms** beyond normal expected time to heal
9. **Frail elderly**
10. **People taking anticoagulants**
11. **Systemic symptoms** - dizziness, confusion, memory loss

1. L. Lum, *Sports Injuries Chapter, CPS*; 2. G. Donmez et al. *Initial Management of soft tissue MSK injuries, UpToDate*



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Assist with self-management

Goals of therapy:

1. Reduce pain and inflammation (by 10-20% initially)
2. Promote healing and recovery
3. Prevent complications

Non-Drug Injury Management

- Protection
- Rest
- Ice
- Compression
- Elevation
- Progressive re-loading / gradual return to activity

1. L. Lum, *Sports Injuries Chapter, CPS*
2. G. Donmez et al. *Initial Management of soft tissue MSK injuries, UpToDate*
3. A. Qaseem et al. *ACP/AAFP Guideline. Ann Intern Med 2020; 173: 739*
4. D. Scialoia, A. Swartzendruber, *The RICE Protocol is a Myth. The Sport Journal, Oct 2020.*

Medications for Pain and Inflammation

1. Acetaminophen
2. NSAIDs (systemic)
3. NSAIDs (topical)
4. Opioids
5. Combinations of above



Poll #2

Which drug would you recommend to Derek?

1. Acetaminophen
2. NSAIDs (systemic)
3. NSAIDs (topical)
4. Acetaminophen with codeine (Tylenol #1)
5. Combinations of above

Caution with high performance athletes and doping rules

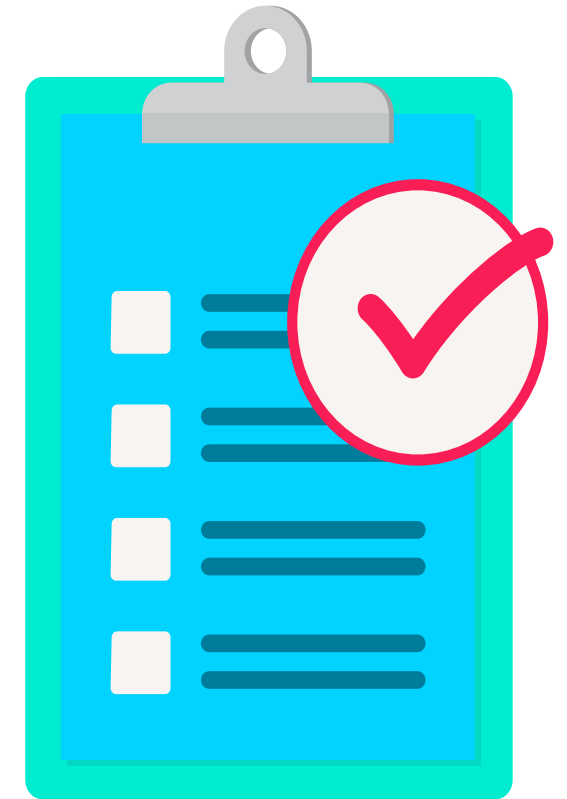


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American College of Physicians (ACP) and American Academy of Family Physicians (AAFP) Guideline

Management of Acute Pain from Non–Low Back, Musculoskeletal Injuries in Adults



A. Qaseem et al. ACP/AAFP Guideline. Ann Intern Med 2020; 173: 739

ACP and AAFP Guideline

- Performed a network meta-analysis
- Created guideline based on results
- Team from McMaster University
- Included adults with acute (<4 weeks) musculoskeletal pain (excluding low back pain)
- 28 RCTs including 4464 patients (for the medication recommendations)
- Patients included: 48% mixed MSK injuries, 29% sprains, 6% whiplash, 5% strains, 12% other (fractures, contusions, etc.)

Medication Benefits Summary

	Pain relief <2 hours	Pain relief 1- 7 days	Physical function	Patient satisfaction
Acetaminophen	✓	✓	X	X
Oral NSAID	✓	✓	✓	X
Topical NSAID	✓	✓	✓	✓
Acetaminophen + opioid	✓	✓	?	?
Acetaminophen + oral NSAID	✓	X	?	X

— ✓ = statistically significant benefit, X = no benefit, ? = lack of data

Guideline Recommendations

Recommendation 1

ACP and AAFP recommend that clinicians treat patients with acute pain from non–low back, musculoskeletal injuries with topical NSAIDs as first-line therapy to reduce or relieve symptoms, including pain; improve physical function; and improve the patient's treatment satisfaction

Grade

Strong recommendation, moderate-certainty evidence

Guideline Recommendations

Recommendation 2

ACP and AAFP suggest that clinicians treat patients with acute pain from non–low back, musculoskeletal injuries with oral NSAIDs to reduce or relieve symptoms, including pain, and to improve physical function, or with oral acetaminophen to reduce pain

Grade

Conditional recommendation, moderate-certainty evidence

Guideline Recommendations

Recommendation 3

ACP and AAFP suggest against clinicians treating patients with acute pain from non–low back, musculoskeletal injuries with opioids, including tramadol

Grade

Conditional recommendation, low-certainty evidence

What Does the *CPS* Suggest?

- Oral analgesics such as acetaminophen and NSAIDs can provide effective relief of musculoskeletal pain in sports injuries.
- Opioids have limited use for most sports injuries, (but possibly) for fractures that are extremely painful.
- Although oral NSAIDs play a well-established role in reducing pain, swelling and inflammation from sports injuries, topical NSAIDs are less entrenched. But a meta-analysis of 47 RCTs involving 3455 patients concluded that topical NSAIDs were effective and safe in treating acute pain in musculoskeletal conditions.

L. Lum, Sports Injuries Chapter, CPS

What Does *UpToDate* Suggest?

- Analgesics may be prescribed to relieve pain following acute injury in conjunction with ice and compression
- While the analgesic effects of acetaminophen are comparable to NSAIDs, acetaminophen has a better side effect profile.
- We suggest using oral NSAIDs at standard therapeutic dose for 3-5 days.
- Topical NSAIDs are effective for providing pain relief at the site where they are applied and are suitable for the symptomatic treatment of acute, soft tissue musculoskeletal injury.

Which topical NSAIDs have evidence?

Cochrane Systematic Review, 2015

- 61 RCTs, 9001 patients comparing various topical NSAIDs vs. placebo for adults with acute pain from sport related injury
- Topical **diclofenac, ibuprofen, ketoprofen, piroxicam and indomethacin** all had higher rates of success ($\geq 50\%$ pain relief) than topical placebo
- Insufficient data to compare individual topical NSAIDs with each other or the same oral NSAID
- Insufficient data to comment on optional vehicle

Derry S, Moore RA, Gaskell H, McIntyre M, Wiffen PJ. Topical NSAIDs for acute musculoskeletal pain in adults. Cochrane Database of Systematic Reviews 2015, Issue 6. Art. No.: CD007402. DOI: 10.1002/14651858.CD007402.pub3. Accessed 28 January 2025.

Key messages - Medications

- Essentially all options will help for pain
- Avoid opioids and combination therapy
- Lean towards NSAIDs (oral or topical) for 1-7 days, but...
 - don't expect a huge effect size (warn patient pain will not go to 0/10)
 - dose around the clock during acute phase and use anti-inflammatory doses
 - use oral naproxen, topical NSAIDs, acetaminophen in high CV risk patients
 - consider need for gastrointestinal ulcer protection in those at high risk
- Patients in studies seemed to prefer topical NSAIDs but practically, the decision may be influenced by what people have around the house already
- GREAT opportunity for shared decision making
- After the initial week, role of medications limited, as they do not speed healing / recovery, nor do they prevent complications

Patient case



You suggest Derek do the following for 7 days:

- Take ibuprofen 600mg po q8h PRN
- Rest the shoulder, but do not immobilize it
- Apply ice packs as tolerated

**See family doc if not
significantly improved in 7 days**

Patient case



- Derek comes back to you about 6 weeks later and asks for “something stronger” for his shoulder
- He has been taking ibuprofen 600mg q8h PRN for the last few weeks, but his shoulder has not healed
- When ask for more history he tells you...

Poll #3

What is the most important advice you can now give to Derek?

1. Add on acetaminophen
2. Add on topical NSAID
3. Add acetaminophen with codeine
4. Switch to different pain medication
5. Go to emergency department today
6. See his family doctor / nurse practitioner soon (within days)

—

What else should you do for Derek?

- Encourage him to make an appointment (in the next few days) with family doctor/nurse practitioner (first) and physiotherapist (second)
- Can continue ibuprofen if he found it helpful, or switch to a topical NSAID, if he prefers
- Take a bit of a break from the gym until those appointments, but staying active a good idea

Why see a family doc?

- Derek needs a diagnosis
- At this point imaging likely needed
- Results of a formal diagnosis (and imaging results) will make physical therapist's role more effective

Why a physical therapist?

- Will confirm / adjust the family doc's diagnosis
- Provide education on the injury
- Provide manual therapy in office
- Provide exercises, stretches and advice for effective recovery
- Provide advice on safe activity levels and re-loading
- Will follow up on recovery progress and monitor for complications

Other possible referrals?

- Massage
- Acupuncture
- Chiropractic

Patient case



- Derek went to see his family doctor, who ordered an X-ray and ultrasound
- Then he saw a physiotherapist

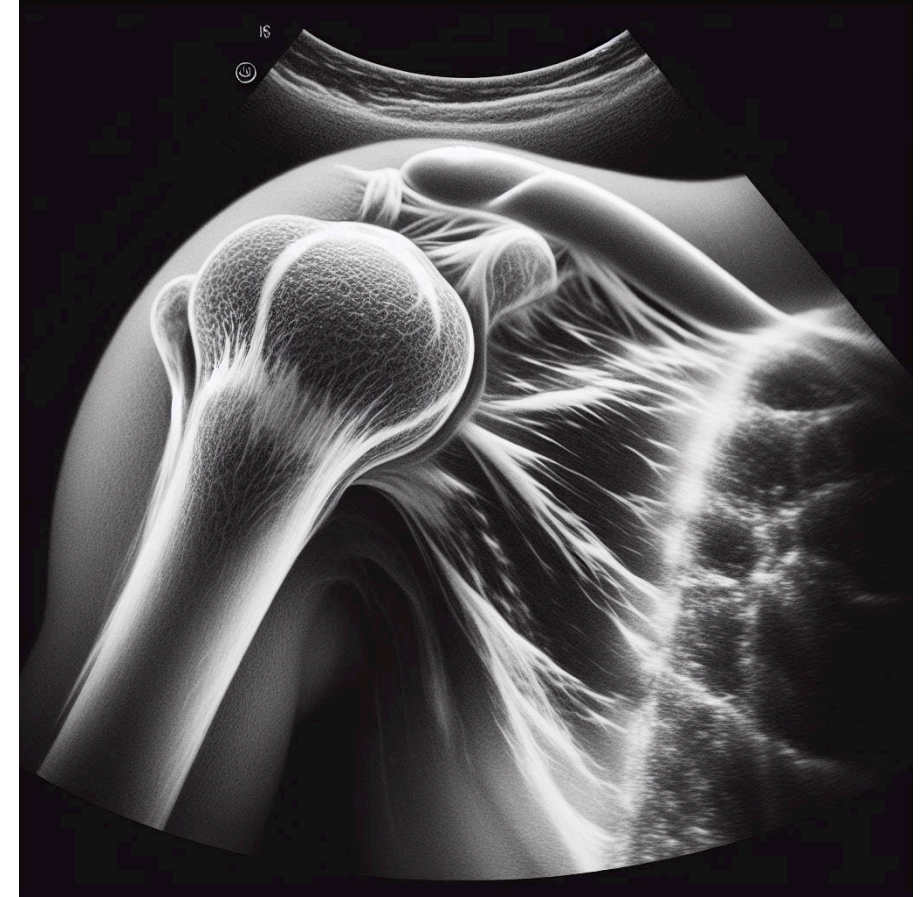
Imaging results - actual

LEFT SHOULDER ULTRASOUND

The long head of biceps tendon is visualized in the bicipital groove. The biceps labral anchor and glenoid labrum not visualized by the ultrasound. Small amount of fluid in the biceps tendon sheath. **There is a small intersubstance tear in the subscapularis tendon measuring 7 mm long. No other full thickness tear within the subscapularis, supraspinatus or infraspinatus tendons.** No fluid subacromial/subdeltoid bursa. There is degenerative change at the AC joint. No sonographic evidence of impingement.

SUMMARY

Findings suspect for a small intersubstance tear in the distal subscapularis tendon.



Advice provided by Physio and MD

- Surgery unnecessary, but complete healing may take weeks to months (normal recovery ++ variable for rotator cuff injury)
- Stay active, avoid movements that cause pain
- Provided with rehabilitation exercises for home by physio
- Weekly physio appointments x 1 month
- Continue NSAID (oral or topical) PRN, only if he wants

Patient case



- You see Derek 8 weeks later, looking frustrated, as he refills an unrelated prescription.
- You ask about his shoulder and he tells you it has **STILL** not improved, despite diligently following treatment plan.
- Saw physio this week who noted worsening range of motion and was concerned about a *Frozen Shoulder* and he may need an MRI and he's seeing his family doc tomorrow.

Monitoring for long-term complications

1. Significantly delayed recovery / worsening injury

- Maybe due to: incorrect initial diagnosis, patient not following treatment plan, re-injury, progression of injury (e.g., Frozen Shoulder)

2. Medication mis-use

- e.g., : opioid use, medication overuse headaches, multiple NSAID use, toxic doses of acetaminophen, corticosteroid use, recreational drugs / alcohol use

3. Conversion to a chronic pain syndrome

- e.g., Nociceptive pain, neuropathic pain

Nociplastic (Neuroplastic) Pain

Clinical Features:

1. Symptoms persist past expected time for healing of injury
2. Pain spreads beyond boundary of original injury
3. Increased sensitivity with movement
4. Allodynia (i.e., pain caused by a stimulus that does not normally cause pain)
5. Non-pain symptoms:
 - sleep problems, fatigue, brain fog, sensitivity to light/smell/noise, or urinary/bowel dysfunction

What is happening?

- This is a central sensitization syndrome (CSS)
 - Sensitization of the nervous system
 - Abnormal pain processing with no evidence of injury
 - Dysfunction in how pain signals are processed and perceived
- Estimated to affect >30 million people in North America
- Often leads to disability and goes undiagnosed, misunderstood (creating anxiety, stress, depression)
- Identifying (and addressing) the sensitization component is imperative
 - Responds to different non-drug and drug therapies than nociceptive pain
 - FINALLY provides patient with a diagnosis

Treatment approach – 3M

1. Mind

- Mindfulness, meditation, diaphragmatic breathing, cognitive behavioral therapy, acceptance and commitment therapy, trauma therapy
- Treat co-morbid mental health diagnoses

2. Movement

- Physiotherapist

3. Medications

- Similar to neuropathic pain, but less effective and less evidence (anticonvulsants, SNRIs, TCAs)

Clinical pearl...

- When features of central sensitization appear OR when things just don't make sense...nociceptive pain should be considered as a possibility
- Can use the Central Sensitization Inventory:
<https://www.pridedallas.com/questionnaires>

Key messages - Overall

- Medications play a role in initial management but minor role in recovery and healing.
- Recovery and healing (if the acute injury persists) is complex and requires interdisciplinary collaboration.
- Pharmacists play a vital role in:
 - (1) assessing the need for immediate referral
 - (2) assisting with initial self-management (drug and non-drug)
 - (3) following up to monitor for when things go wrong, or the injury persists, and interdisciplinary collaboration is needed.

References

1. Sports Injuries. In: Compendium of Therapeutics for Minor Ailments. Canadian Pharmacists Association. Updated August 8, 2019. Accessed January 2025. https://cps-pharmacists-ca.proxy.lib.uwaterloo.ca/print/new/documents/MA_CHAPTER/en/sports_injuries_minor
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QUESTIONS?



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