



Brigham and Women's Hospital

Founding Member, Mass General Brigham

Soft Tissue Syndromes

Susan Y. Ritter, MD, PhD

Associate Physician and Director of Clinical Rheumatology

Division of Rheumatology, Immunology & Allergy

Department of Medicine

Brigham and Women's Hospital

Instructor in Medicine

Harvard Medical School



Susan Ritter, MD, PhD



University of Texas Health Science Center at Houston
Medicine Residency @ BWH
Rheumatology Fellowship @BWH/BIDMC
Instructor in Medicine@ HMS
Director of Clinical Rheumatology

DISCLOSURES

Pfizer stock



OBJECTIVES

Review musculoskeletal anatomy and clinical history of regional pain syndromes of various musculoskeletal sites

Discuss fibromyalgia and other causes of diffuse soft tissue pain

Introduce basic therapeutics used for musculoskeletal pain conditions



Regional pain syndromes to be covered today

- Shoulder
- Elbow
- Wrist
- Hip
- Knee
- Ankle



Generalized Soft Tissue Pain

- Hypermobility
- Fibromyalgia



Some definitions

Tendon: The collagenous portion of a muscle at the origin and insertion

Enthesis: The attachment of a tendon to bone

Bursa: Two membranes and the lubricated space between, that allows near-frictionless motion of soft tissue over bone

Ligament: Collagenous tissue connecting two bony structures

Fascia: A layer or sheet of fibrous tissue that separates or covers various soft tissues or organs



More definitions

Sprain: acute traumatic injury to a ligament

Strain: acute traumatic injury to a muscle-tendon junction

- May also be called a “pull”

Overuse injury: nonacute injury to soft tissue structures due to chronic, repetitive microtrauma



Tendinitis

History

- Pain with active motion
- Weakness
- May elicit an overuse history

Exam

- Little discomfort with passive ROM
- Isometric contraction is always tender
- Palpable tendons usually tender

Bursitis

History

- Pain with active motion
- Weakness not prominent
- May elicit an overuse history

Exam

- Passive ROM more uncomfortable than tendinitis
- Isometric contraction is tender
- Palpable bursae tender

Arthritis

History

- Pain with active motion
- Weakness only related to pain
- AM stiffness

Exam

- Passive ROM as uncomfortable as active ROM
- Isometrics not tender (the joint isn't moving)
- Crepitus in OA
- Joint effusion may be present



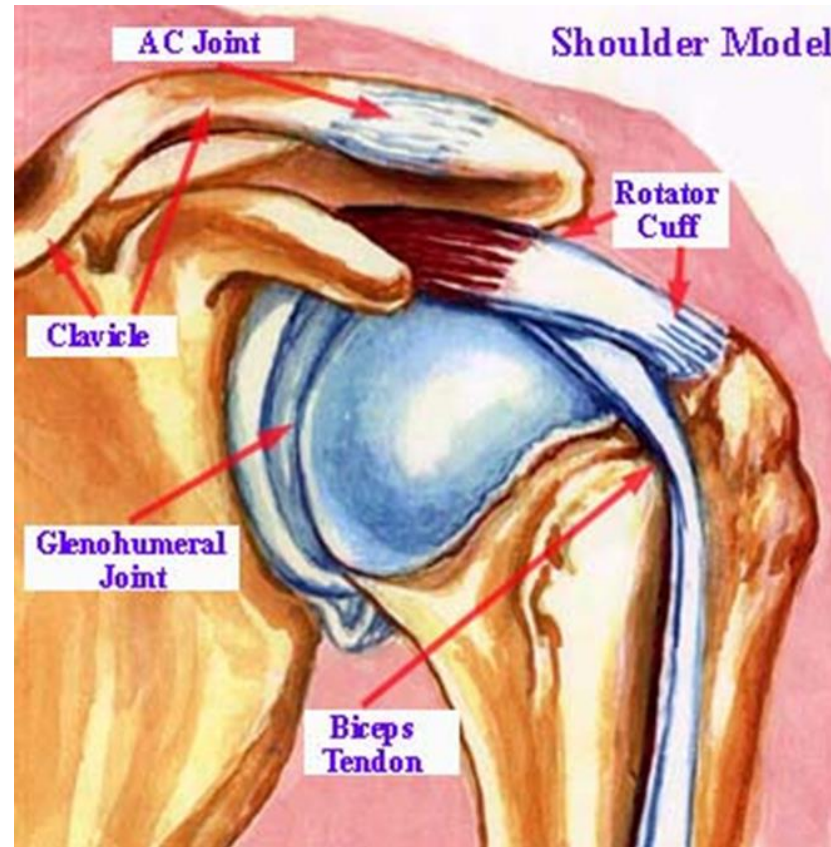
Regional Pain Syndromes

Head to Toe

- Shoulder
- Elbow
- Wrist
- Hip
- Knee
- Ankle



Shoulder: Normal anatomy

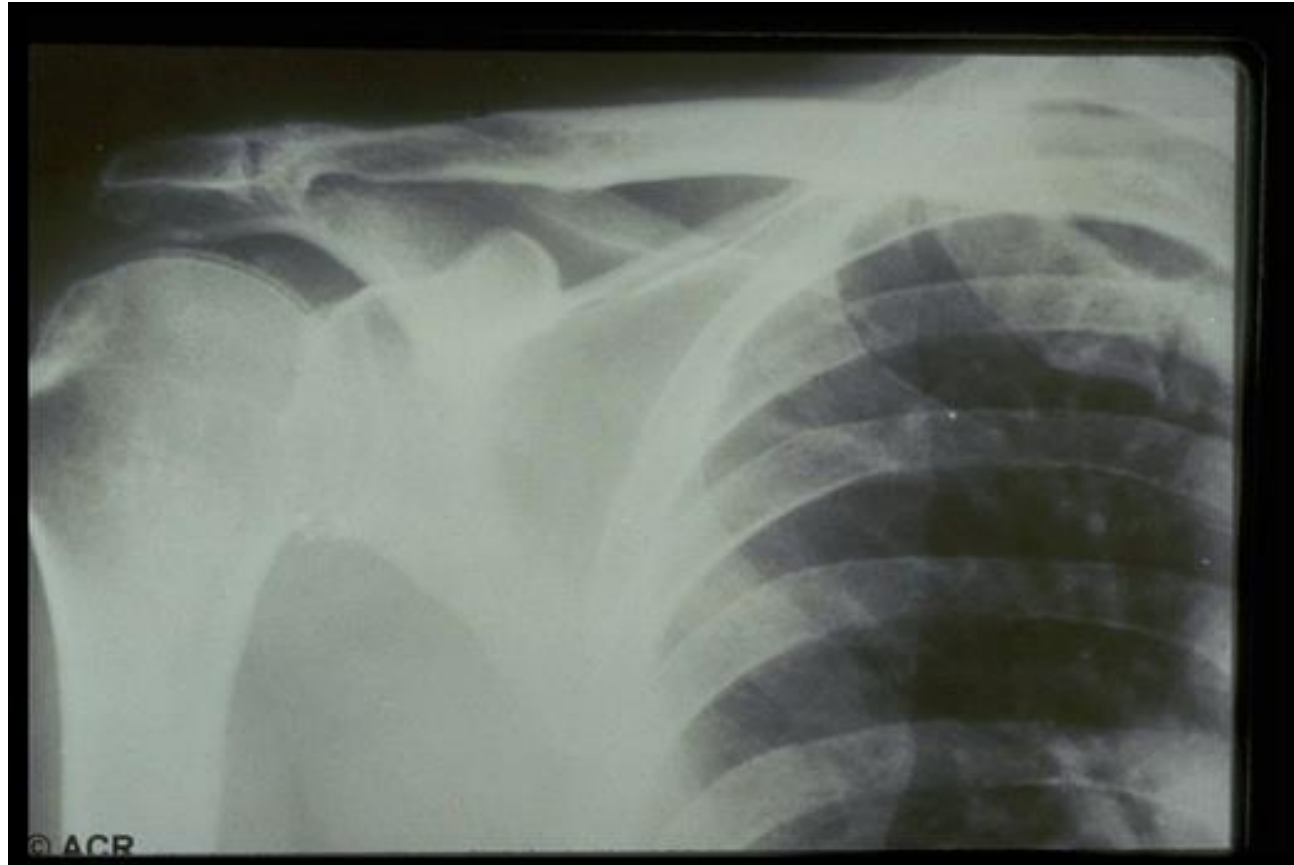


Shoulder: Common causes of shoulder pain

- Tendinitis: Rotator cuff (+/- Ca^{2+}), biceps
- Bursitis: Subacromial and subdeltoid bursae
- Adhesive capsulitis
- Arthritis: Glenohumeral, AC
- Neuropathy: Cervical, notalgia
- Dislocation/trauma: GH, AC separation, fracture
- Other: Cellulitis, pneumonia, cardiac



Shoulder: Chondrocalcinosis and AC osteophytes

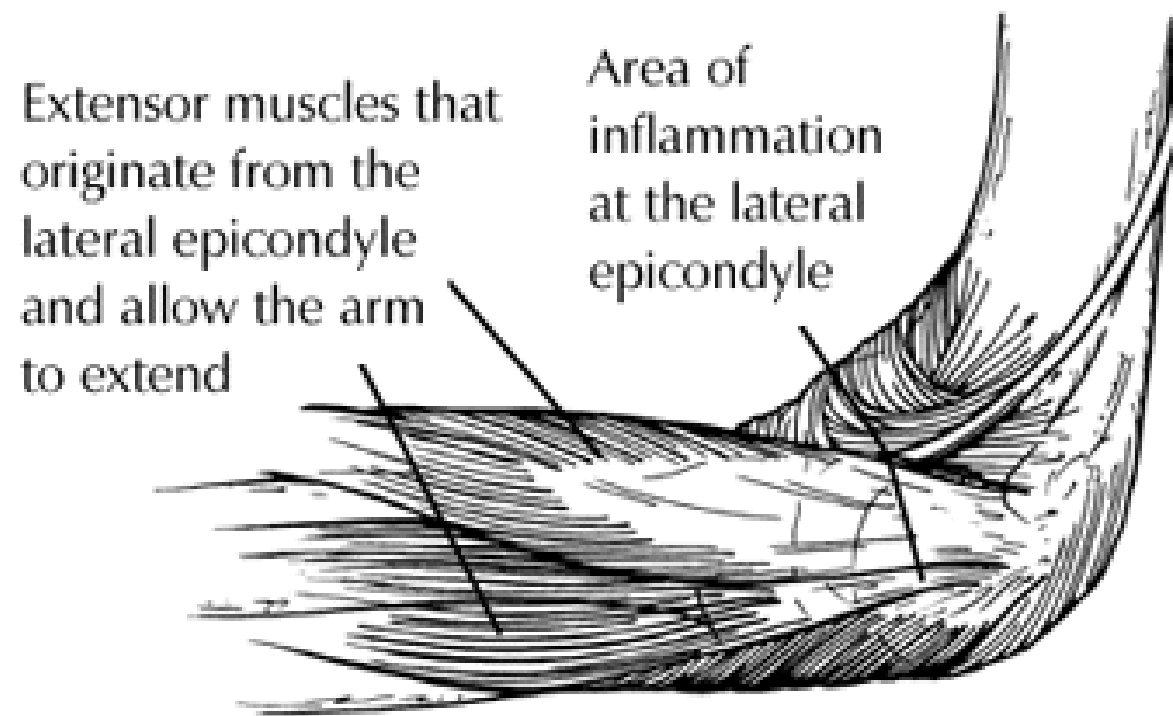


Elbow

- Lateral epicondylitis (actually an enthesitis)
- Olecranon bursitis
- Arthritis is uncommon



Elbow: Lateral epicondylitis



Lateral (outside) view of the left elbow

Treatment of Epicondylitis

- Consider bracing/strap
- Physical therapy
- Injection if severe



- However, a randomized study of 165 subjects with chronic lateral epicondyle pain showed corticosteroid injection improved pain at 1 month but had a higher recurrence rate and worse clinical outcomes at 1 year. Physiotherapy did not result in any significant differences. Coombes BK et al. JAMA 2013

Elbow: Olecranon bursitis



Wrist

- Fracture: Colle's
- Arthritis: Crystal, RA
- Median neuropathy: carpal tunnel syndrome
- deQuervain's tenosynovitis



Carpal tunnel syndrome

- Often overweight, middle-aged patient
- May have history of overuse/misuse
- Night pain, numbness in median distribution
- Tinel's & Phalen's signs
- EMG/NCS only necessary prior to surgery
- Therapeutic options include splint, rest, steroid injection, surgery. Address ergonomics.

Marshall S, et al. Local Corticosteroid injection for carpal tunnel syndrome. Cochrane Database Syst Rev 2007 April 18;(2):CD001554.



deQuervain's tenosynovitis

- Pain at the radial side of the wrist
- Inflammation extensor pollicis brevis and/or longus tendons
- Finkelstein test—passive ulnar deviation with a clasped thumb
- Associated with repetitive motions of the hand and wrist—e.g. baby care
- Therapeutic options include NSAIDs, thumb spica splint, and steroid injections

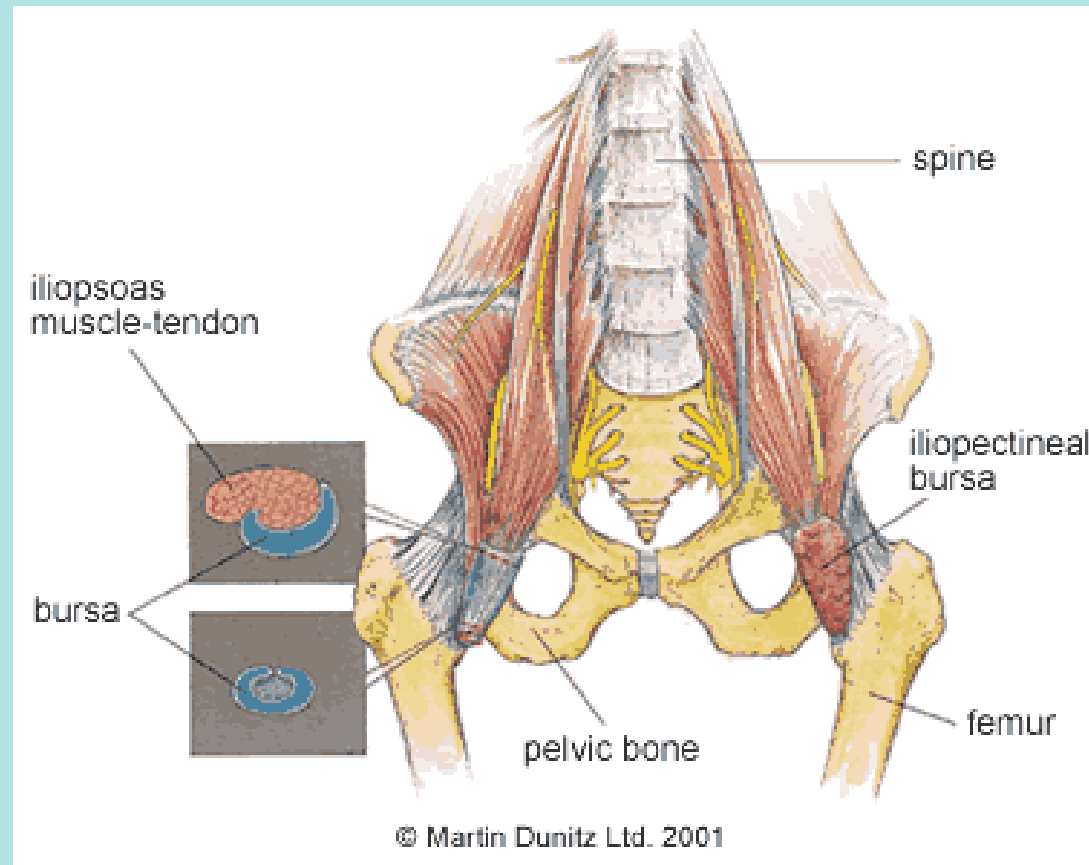


Hip

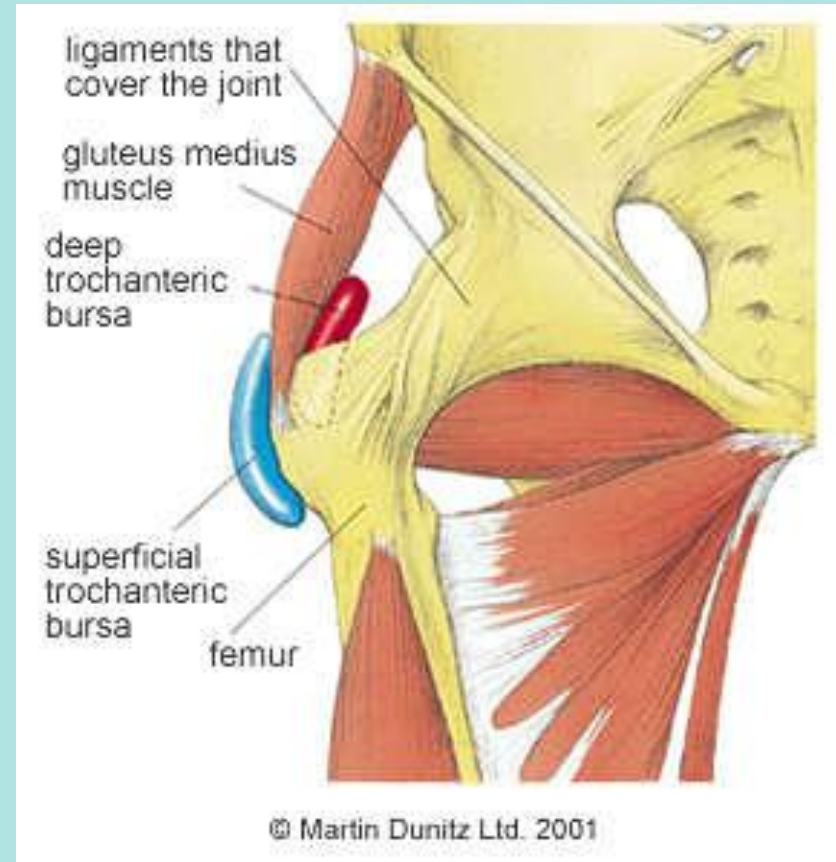
- Bursitis
- Tendinitis (gluteus medius/minimus)
- “Greater trochanteric pain syndrome”
- Groin “pull”
- Arthritis
- Referred from spine



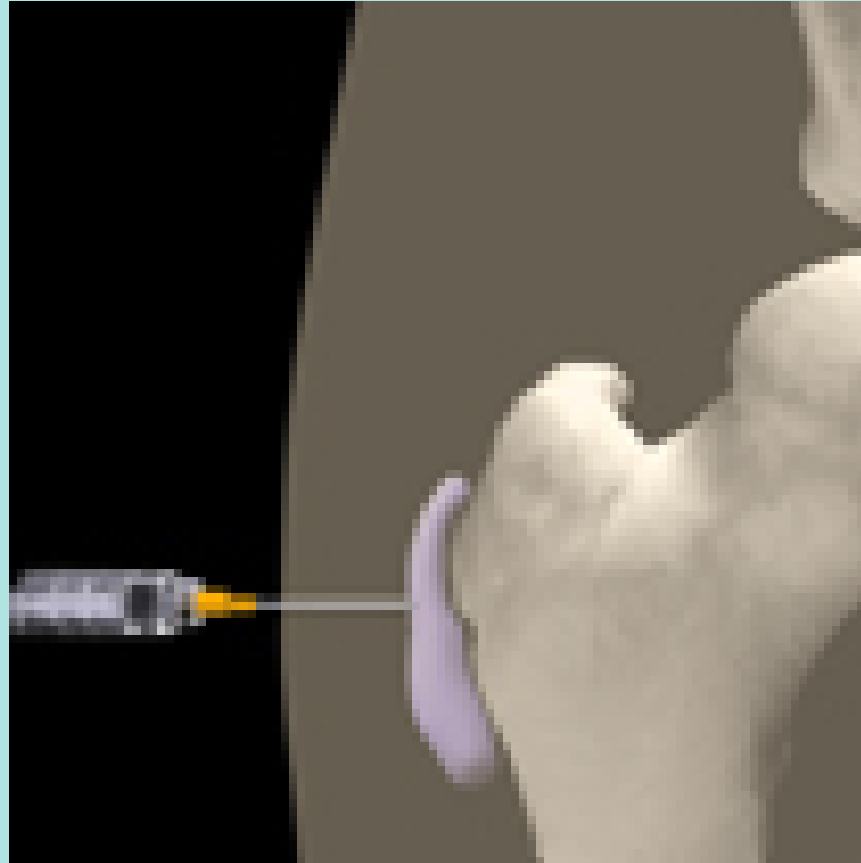
Hip: bursitis



Hip: trochanteric bursitis



Hip: trochanteric bursa injection



Brinks A et al. Corticosteroid injections for greater trochanteric pain syndrome: a randomized controlled trial in primary care. Ann Fam Med 2011.

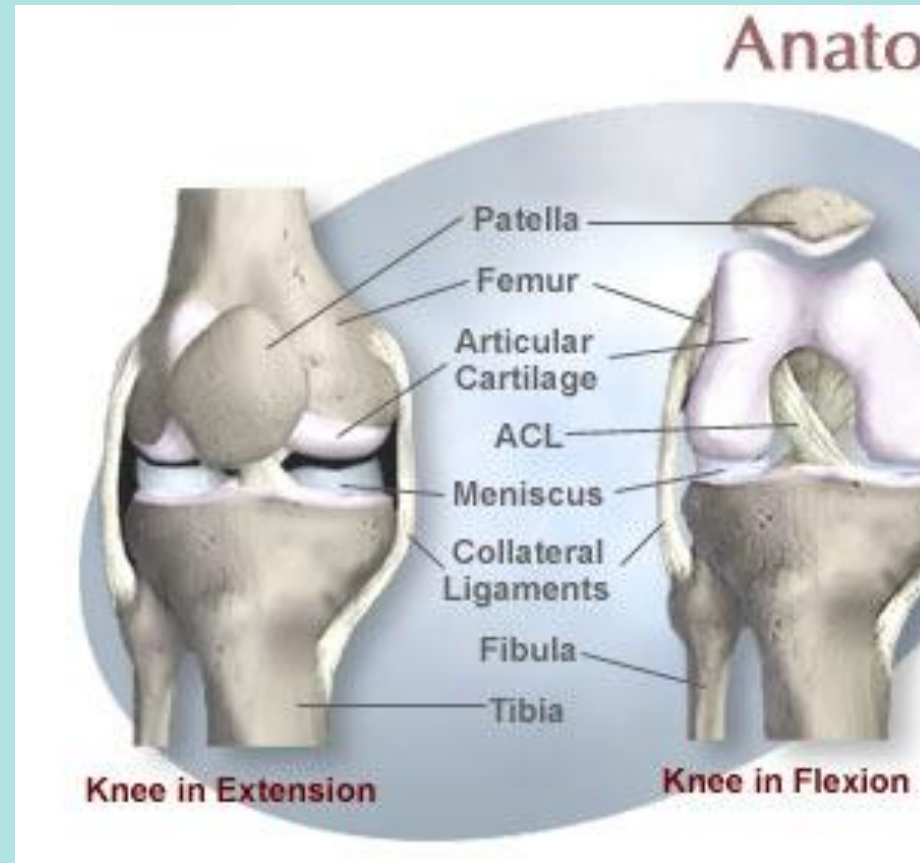
Knee

- Trauma: meniscal or ligament tear, fracture
- Arthritis: Inflammatory and OA
- Bursitis: Pre-patellar, pes anserine, etc.

The knee is the first joint we've discussed today where routine plain films are often helpful!



Knee: Normal anatomy



Knee: Chondrocalcinosis



Knee: Osteoarthritis

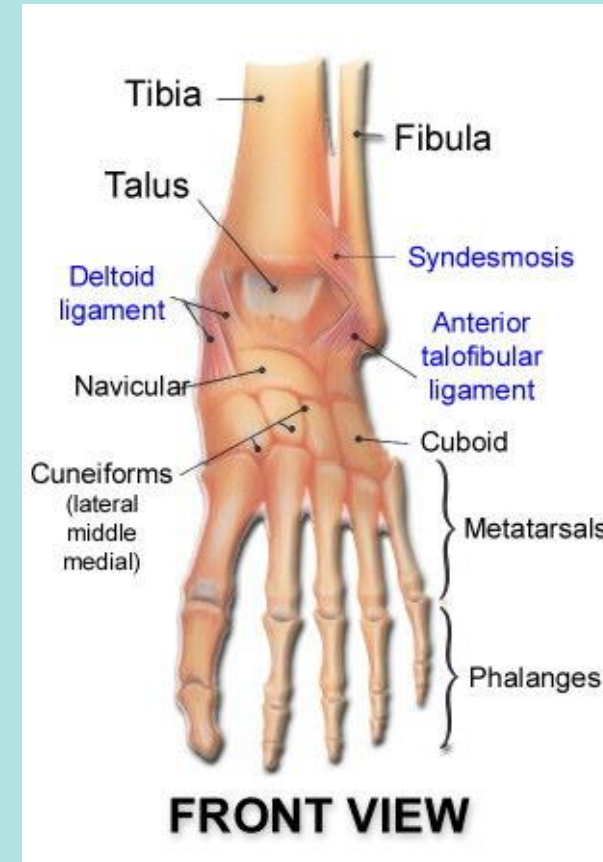
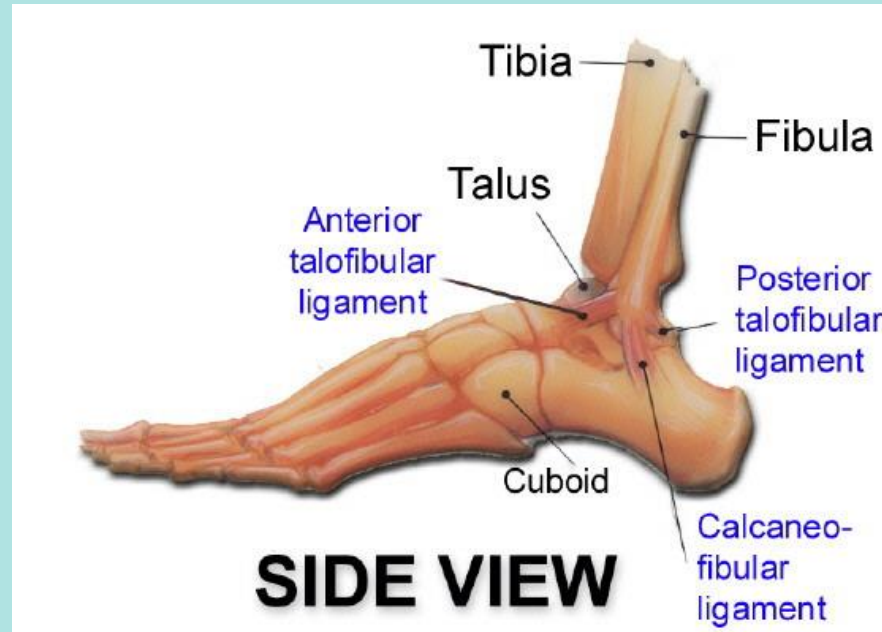


Ankle

- “Sprain” = traumatic ligamentous tear
- Fracture
- Arthritis
 - OA is uncommon in the ankle
 - Crystal arthritis is common
- Tendonitis
 - Peroneus longus and brevis—LATERAL
 - Tibialis posterior/FHL—MEDIAL
 - Tibialis anterior—ANTERIOR
- Neuropathy, e.g. Tarsal tunnel syndrome



Ankle and Foot Anatomy



Sprains

- Protect from further injury
- Rest, ice, compression, elevation
- Helps reduce swelling
- NSAIDs for pain
- Gradual return to activity

Consider physical therapy for most soft tissue injury—i.e. treat locally



Therapies for Regional Pain

- Physical therapy, splinting or bracing
- Systemic Steroids or NSAIDs
- Intra-articular or bursa injection
 - Caution with repeated injections
 - Steroid injection of olecranon bursa should be avoided, due to risk of infection (~10%)
- Disease-specific therapy, e.g. colchicine for crystal disease
- MR imaging indicated primarily to guide surgery



Generalized Soft Tissue Pain

Hypermobility Arthralgia
Fibromyalgia



Hypermobility

Hypermobility Spectrum Disorders: Connective tissue disorder associated with instability, injury, pain. Can see fatigue, headaches, GI problems and autonomic dysfunction along with joint hypermobility

The Ehlers-Danlos Society has helpful information—checklists, criteria for all disciplines to use
Physical therapists can be VERY helpful

[The 5-part questionnaire for hypermobility](#)

1. Can you now [or could you ever] place your hands flat on the floor without bending your knees?
2. Can you now [or could you ever] bend your thumb to touch your forearm?
3. As a child, did you amuse your friends by contorting your body into strange shapes or could you do the splits?
4. As a child or teenager, did your kneecap or shoulder dislocate on more than one occasion?
5. Do you consider yourself “double-jointed”?

Answering yes to 2 or more suggests hypermobility (sensitivity 85%, specificity 90%)



Hypermobility—Clinical Evaluation



THE BEIGHTON SCORING SYSTEM

Measuring joint hypermobility

A positive Beighton score is any score **greater than or equal to**:

- **6/9** points in **children before puberty**
- **5/9** points from **puberty up to the age of 50**
- **4/9** points for those **50 years of age and over**

A. 5th FINGER / PINKIES

Test **both sides**: Rest palm of the hand and forearm on a **flat surface** with the palm side down and fingers out straight.

Can the **fifth finger** be bent/lifted upwards at the knuckle to go back **beyond 90 degrees**?

If yes, add **one point** for each hand.



B. THUMBS

Test **both sides**: With the arm out straight, the palm facing down, and the wrist then fully bent downward, can the thumb be pushed back to touch the forearm?

If yes, add **one point** for each thumb.



+1

D. KNEES

Test **both sides**: While standing, with knees locked (bent backwards as far as possible), does the lower part of either leg to extend more than 10 degrees forward?

If yes, add **one point** for each side



C. ELBOWS

Test **both sides**: With arms outstretched and palms facing upwards, does the elbow extend (bend too far) upwards **more than an extra 10 degrees** beyond a normal outstretched position?

If yes, add **one point** for each side.



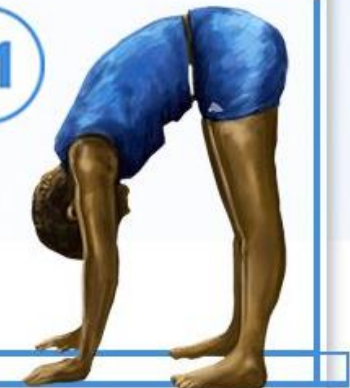
E. SPINE

Bend forward, can you place the palms of your hands **flat on the floor in front of your feet** without bending your knees?

If yes, add **one point**.

+1

+1



Fibromyalgia



Mechanistic Characterization of Pain

Peripheral—due to inflammation or mechanical damage in periphery

Neuropathic—damage/entrapment of nerves

Central (non-nociceptive)—disturbance in pain processing

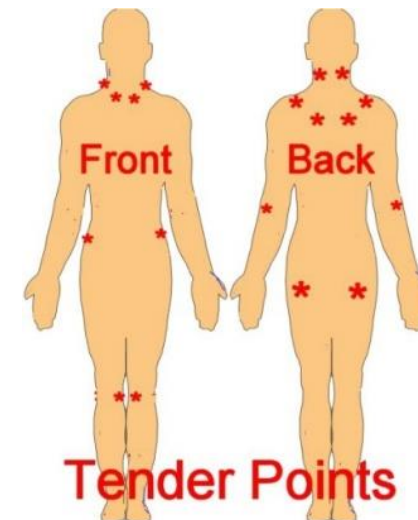
Fibromyalgia is the final common pathway of central pain

- Various degrees of “fibromyalgia-ness”



Fibromyalgia

- Pain syndrome
- Diagnosed when pain present > 3 months, of sufficient severity and impact on daily life (brain fog, etc.)
- No medical cause



The American College of Rheumatology Preliminary Diagnostic Criteria for Fibromyalgia and Measurement of Symptom Severity

FREDERICK WOLFE,¹ DANIEL J. CLAUW,² MARY-ANN FITZCHARLES,³ DON L. GOLDENBERG,⁴
ROBERT S. KATZ,⁵ PHILIP MEASE,⁶ ANTHONY S. RUSSELL,⁷ I. JON RUSSELL,⁸ JOHN B. WINFIELD,⁹
AND MUHAMMAD B. YUNUS¹⁰

Arthritis Care & Research
Vol. 62, No. 5, May 2010, pp 600–610

Consider over the past week how you felt
Exclude your pain from other known illnesses

Widespread Pain Index(WPI)—Part 1
Symptom Severity Score(SS score)—Part 2a+2b

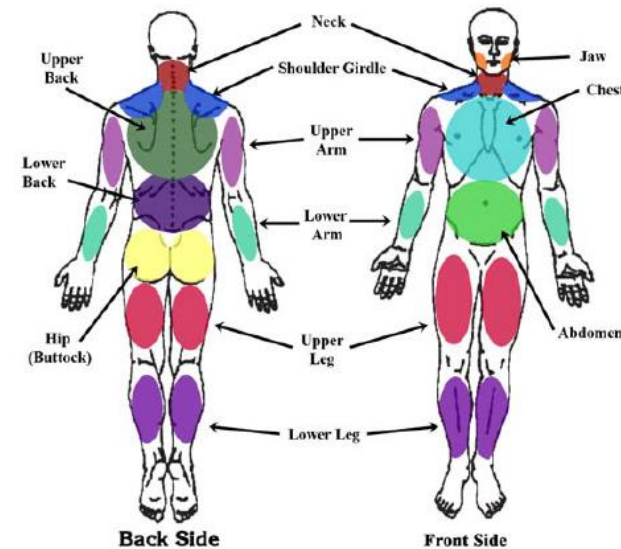


Widespread Pain Index

Where have you felt pain the past week?

Shoulder—left/right
Upper arm—left/right
Lower arm—left/right
Hip(buttock) —left/right
Upper leg—left/right
Lower leg—left/right
Jaw—left/right
Chest
Abdomen
Neck
Upper back
Lower back

Determining Your Widespread Pain Index (WPI)
The WPI Index score from Part 1 is between 0 and 19.



Symptom Severity Score-a

Indicate your level of symptom severity over the past week:

Fatigue	Waking Unrefreshed	Cognitive symptoms
0=No problem	0=No problem	0=No problem
1=Slight or mild, intermittent	1=Slight or mild, intermittent	1=Slight or mild, intermittent
2=Moderate; considerable and often present	2=Moderate; considerable and often present	2=Moderate; considerable and often present
3=Severe; pervasive, life disturbing	3=Severe; pervasive, life disturbing	3=Severe; pervasive, life disturbing



Symptom Severity Score-b

Review of systems:

How many other somatic symptoms have you had over the past week

No symptoms: score 0

Few symptoms (<10): score 1

Moderate symptoms: score 2

Great deal of symptoms: score 3



2016 Revision

Wolfe et al, Seminars in Arthritis and Rheumatism

1. Generalized pain, defined as pain in at least 4 of 5 regions
2. Symptoms have been present at a similar level for at least 3 months
- 3. $WPI \geq 7$ and $SSS \geq 5$ OR $WPI \geq 4-6$ and $SSS \geq 9$**
4. A diagnosis of fibromyalgia is valid irrespective of other diagnoses.



What to do?

Examination

Typically tender to touch around joints

- Bursas, paraspinal muscles, sometimes just the skin is painful

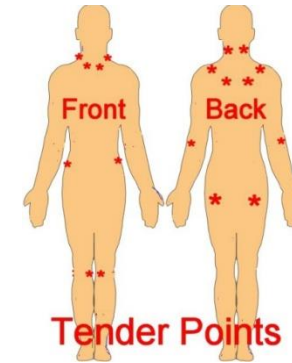
Make sure no joint swelling

Check labs:

- CBC, TSH, ESR, CRP, chemistries, CPK, vitamins (B12 or D)

Avoid checking RF or ANA unless indicated

Be very careful about considering this diagnosis in the elderly!



Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein

- Can help distinguish inflammatory vs non-inflammatory conditions
- However—nonspecific
- CRP can be elevated in obesity
- ESR increases with age
- ESR/CRP can be normal early in systemic rheumatic illness
- It will never be diagnostic, but can help support your differential diagnosis



Fibromyalgia Treatment

Multidisciplinary treatment of symptoms

—pain, brain fog, fatigue, insomnia

Education

Sleep interventions

Exercise

Cognitive behavioral therapy

Medications, if not improving with non-pharmacologic treatment

- Published studies of medications FDA approved for fibromyalgia show 30% improvement in pain
- Benefits may not outweigh risks/side effects in some patients



MOC REFLECTIVE STATEMENT

- Soft tissue pain syndromes are among the most common reasons patients seek medical attention.
- A diagnosis is frequently evident after a proper history and exam.
- Embrace the principle of local therapy for a local problem.
- For generalized soft tissue pain, a multimodality approach may be required.



Question 1

55-year-old man with significant alcohol use, hypertension and diabetes, with a decreased GFR presents with a swollen olecranon bursa. Aspiration is performed, and crystal exam of the fluid reveals monosodium urate crystals.



Question 1

Which of the following is appropriate at this point?

- a) Cortisone injection
- b) NSAID therapy
- c) Oral steroids



Answer is C

Avoid injections into the olecranon bursa
Patient is at high risk for NSAID toxicity
Oral steroids is the least risky option



Question 2

32-year-old woman with rheumatoid arthritis on methotrexate complains of diffuse muscle and joint pain. She feels tired and is not sleeping well. Feels like she is in a fog and is forgetting things at work. This weekend, she was out in the sun and felt even more tired.

EXAM: diffuse soft-tissue tenderness, no swollen joints, no rash



Question 2

Which of the following is the most appropriate next step in this patient's management?

- a) Trial of prednisone
- b) Check ANA
- c) Add a biologic
- d) Amitriptyline and aerobic exercise



Answer is D

There is no joint swelling

History is classic for fibromyalgia



REFERENCES

Clauw DJ. Fibromyalgia: a clinical review. JAMA 2014; 311 (15): 1547-1555.

www.ehlers-danlos.com

Coombes BK et al. Effect of corticosteroid injection, physiotherapy, or both on clinical outcomes in patients with unilateral lateral epicondylalgia. A Randomized Controlled Trial. JAMA 2013; 209(5) 461-469.

Mellor R et al. Education plus exercise versus corticosteroid injection use versus a wait and see approach on global outcome and pain from gluteal tendinopathy: prospective, single blinded, randomised clinical trial. BMJ 2018; 361:K1667

