

Injectons in the Primary Care Office

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Objectives

Be familiar with various palpation guided injections that can be performed in the office

Understand pertinent anatomy to perform palpation guided injections

Known the supplies needed and dosing of medications needed for the different injections

Injections to be Reviewed

- Subacromial
- AC
- Lateral epicondyle
- Carpal tunnel
- Knee (anteromedial, anterolateral)
- Great trochanter

Why do we do injections



Therapeutic

After trialed conservative management

- Physical therapy, home exercises
- Ice
- Meds: OTC orals, prescription oral meds, topical treatment

Facilitate Physical Therapy



Diagnostic

Helps determine the location of pain generator

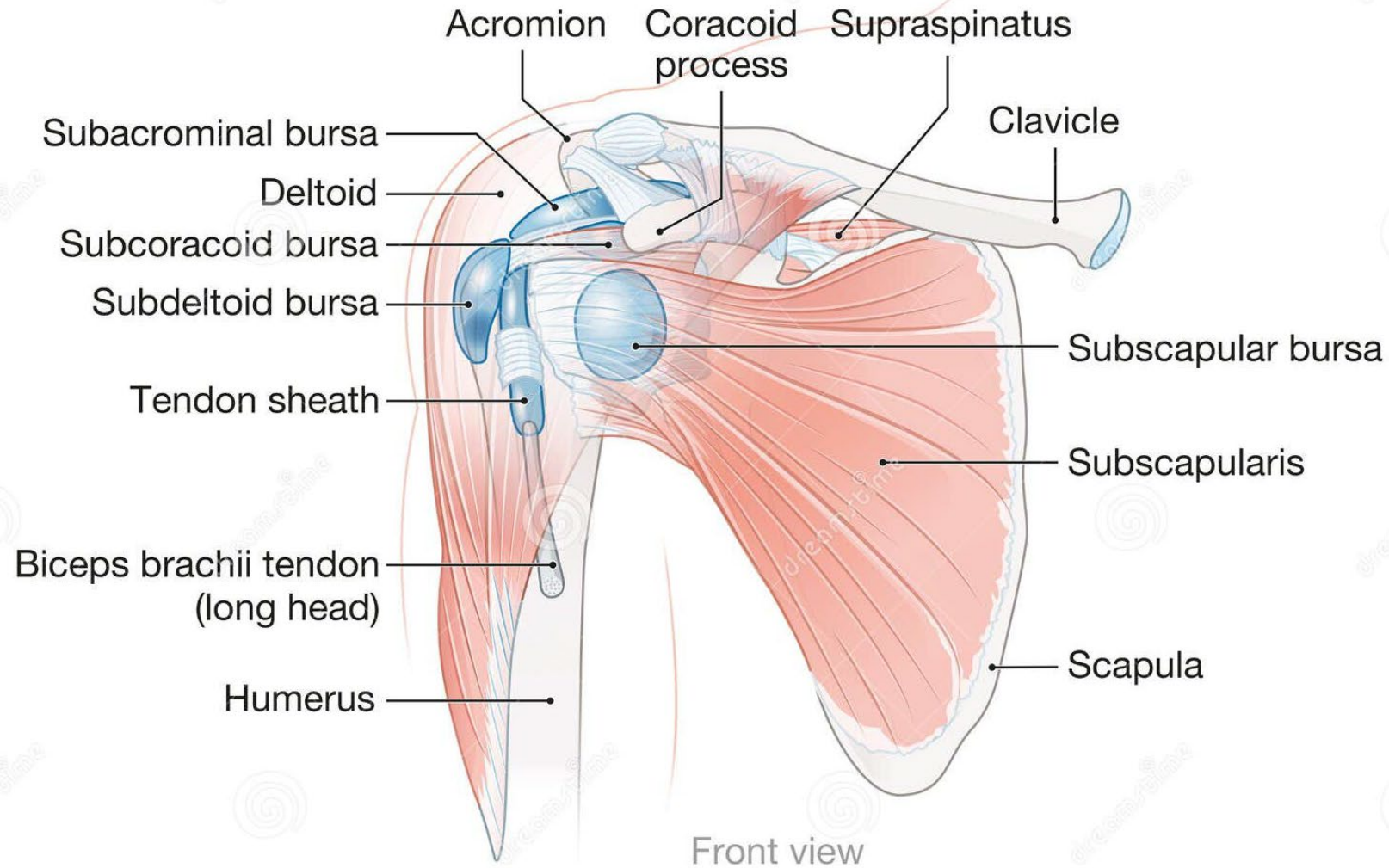
Shoulder Injections

Subacromial
space

Subacromial
bursa
(ultrasound)

AC joint

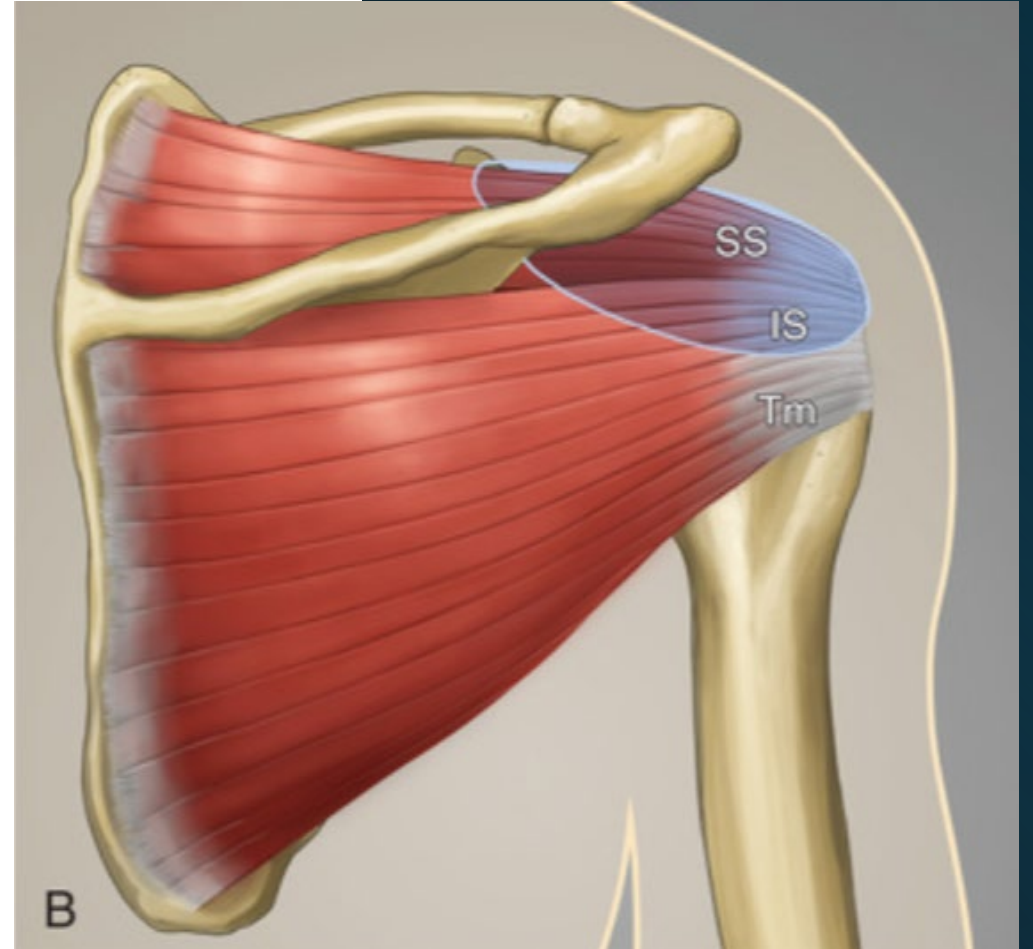
Shoulder Anatomy



- 3 joints (SC, AC, GH joints)
- Rotator Cuff(S.I.T.S.)
- Joint Capsule
- Biceps tendon
- Bursa (subacromial, subdeltoid, etc.)
- Ligaments (Coracoclavicular, coracohumeral, etc.)

Subacromial Impingement

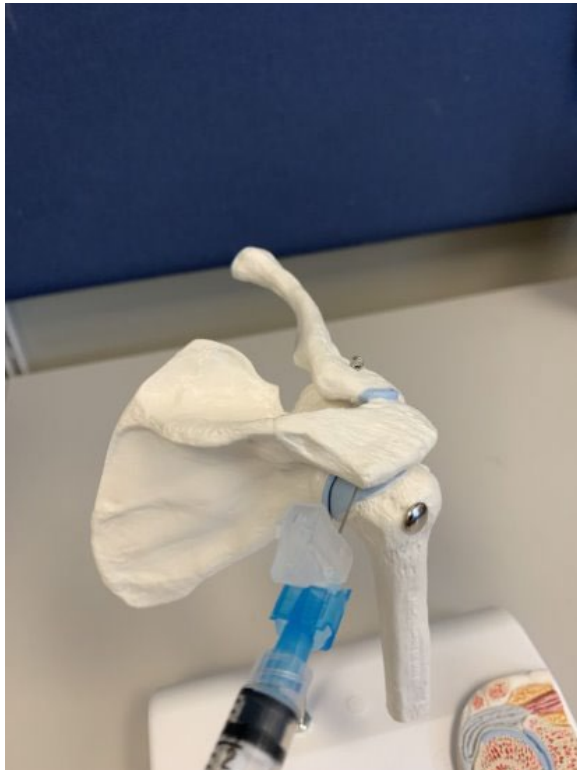
- Patient presentation
- Painful arc 60-120
- Subacromial space tenderness
- +Hawkins and Neers
- +lifthoff test



Subacromial Space Injection



What is needed for an injection



80mg of
Triamcinolone

3 cc of 1% lidocaine
NO EPI

21-23G Needle

5-6cc Syringe

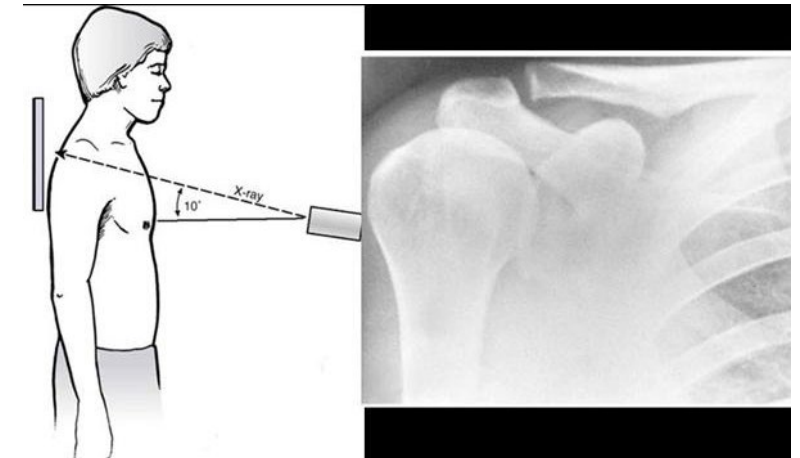
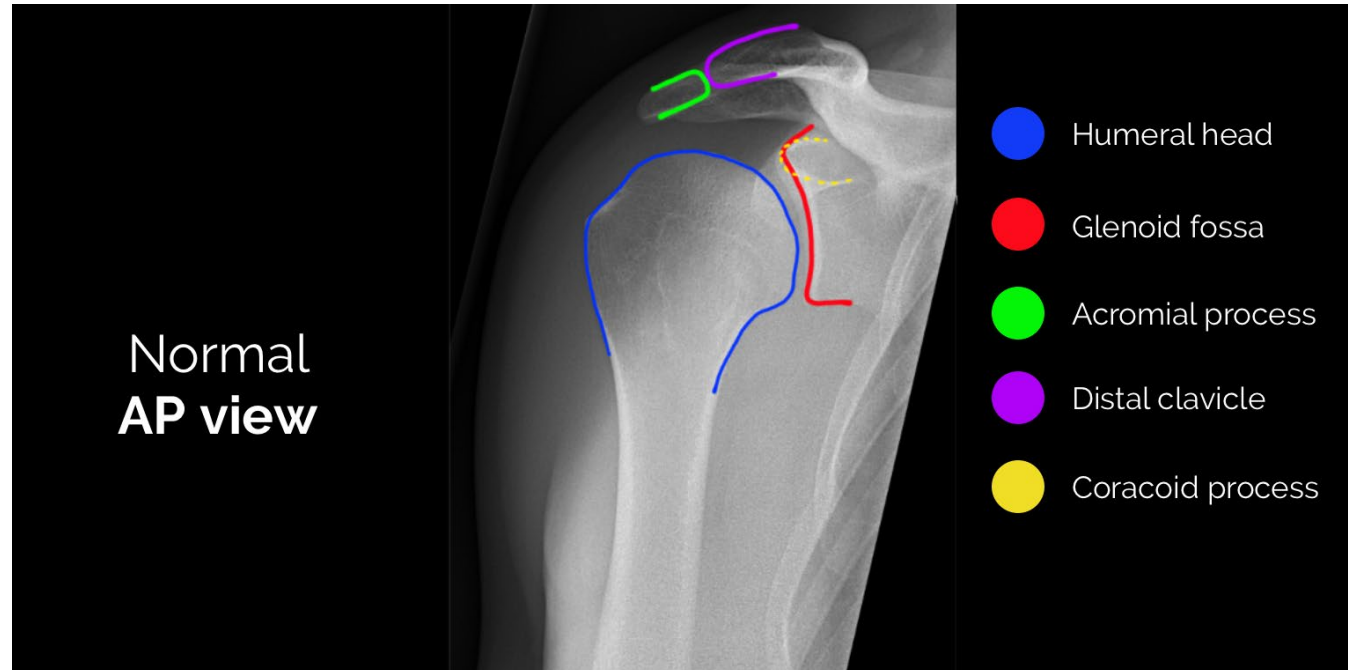
Subacromial injection with ultrasound



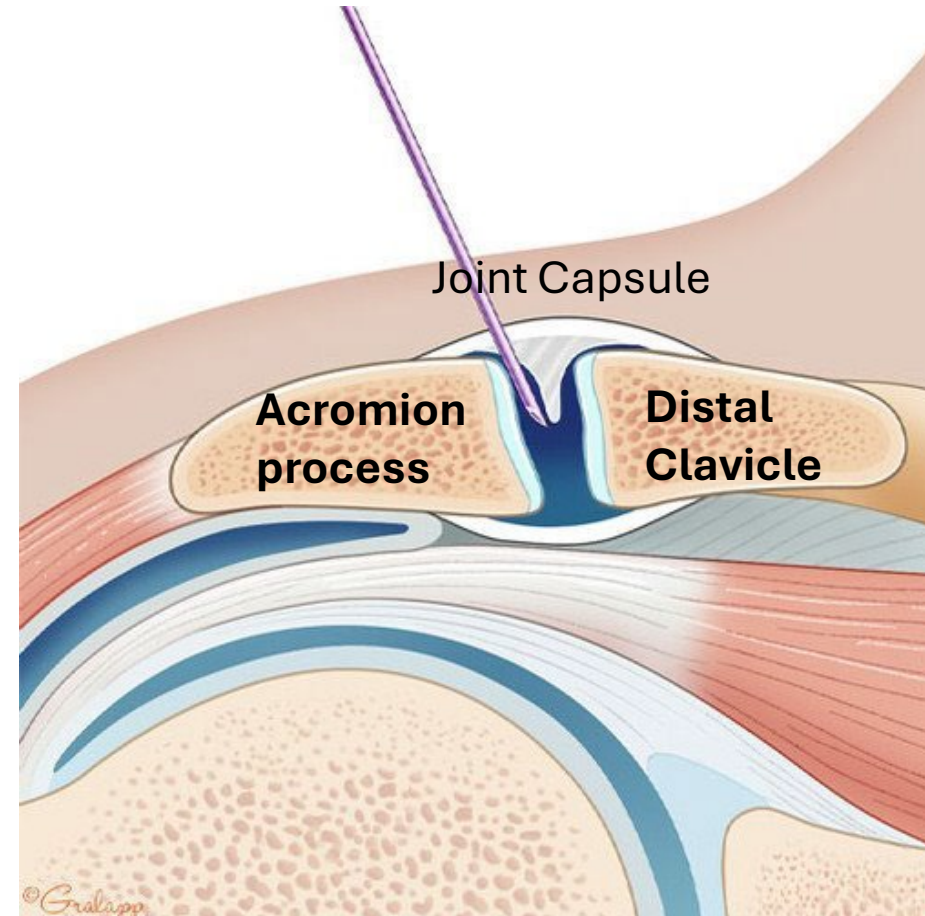
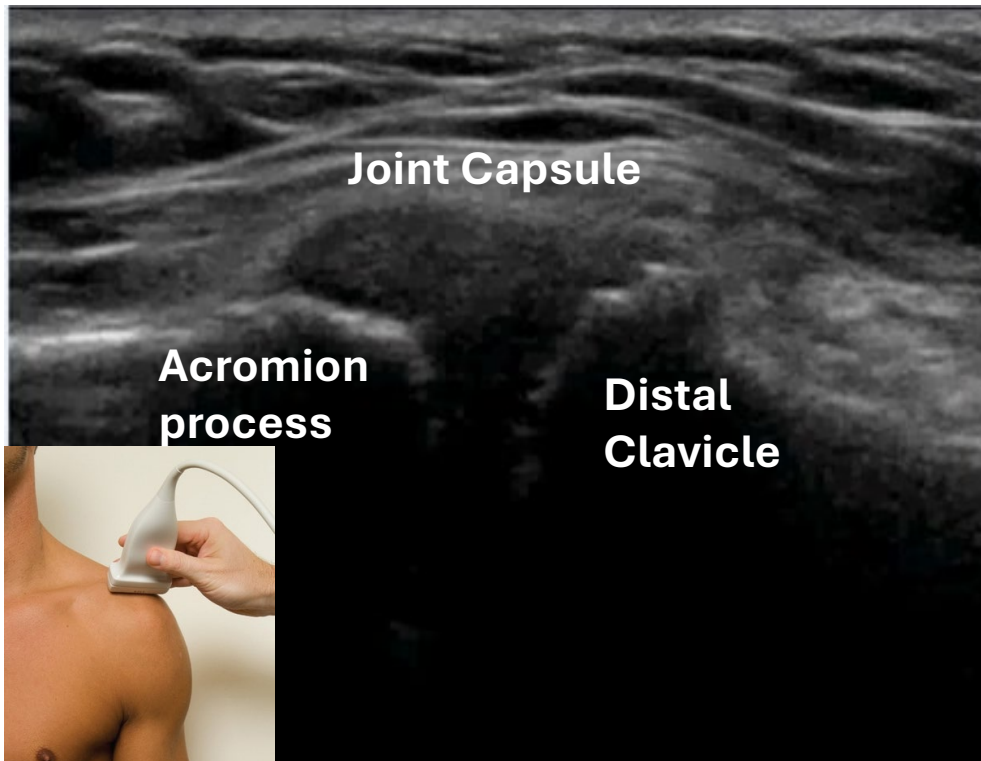
Acromioclavicular joint pain

- Tenderness
- Pain with cross body and overhead
- Pain worse sleeping on the side, push-ups or dips, carrying a purse
- May have some clicking or grinding
- Zanca xray view with comparison

AP vs Zanca View

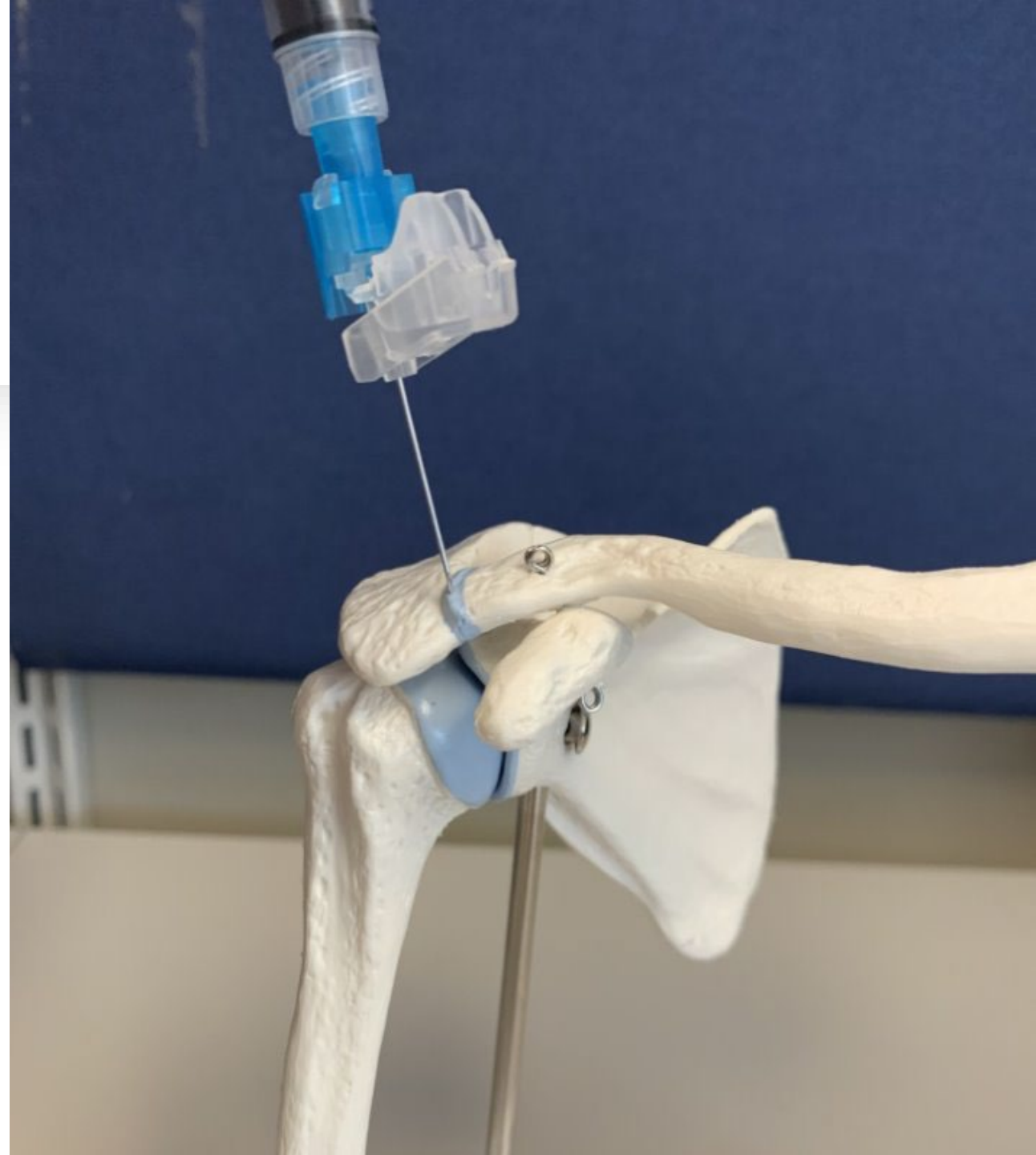


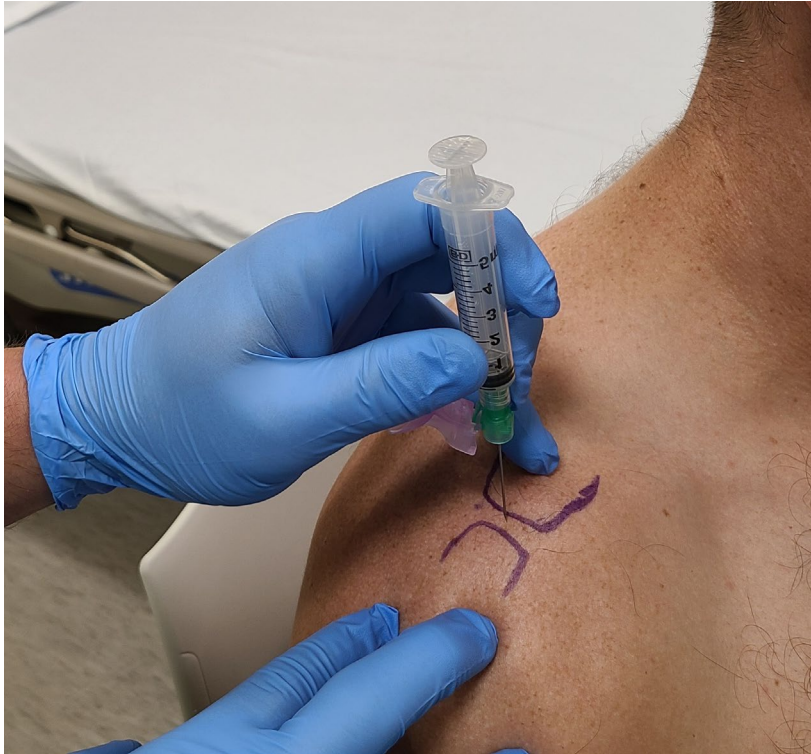
Anatomy of AC Joint



How to perform an AC joint injection

- Pt seated facing you
- Shoulder relaxed in a neutral position
- Palpate and mark site
- Inject straight down
- Resistance will be at 0.5cc





Acromioclavicular Injection

20mg of Kenalog

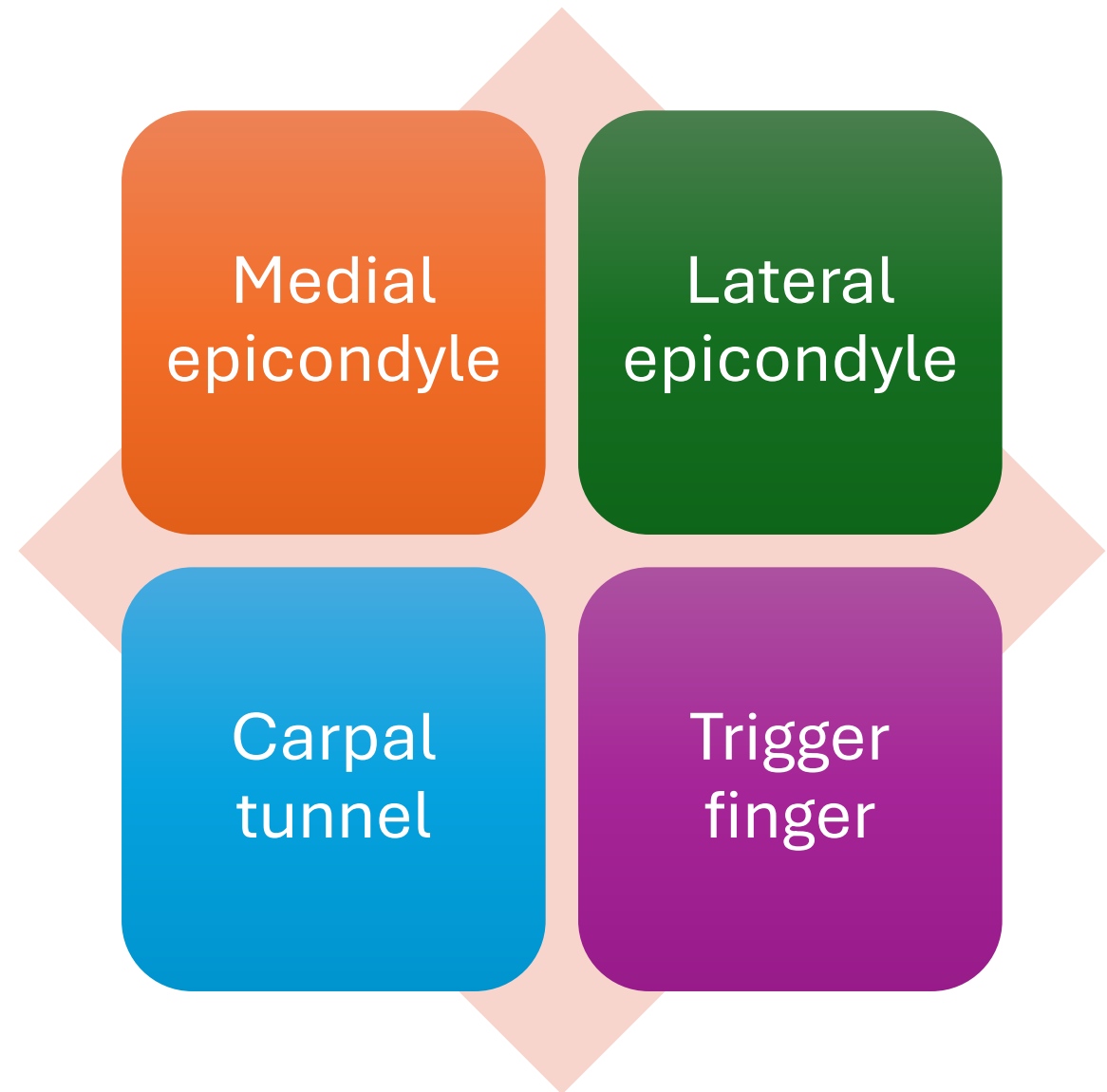
1cc of 1% lidocaine NO EPI

21-23 gauge needle

3 cc syringe

Iodine or chlorhexidine

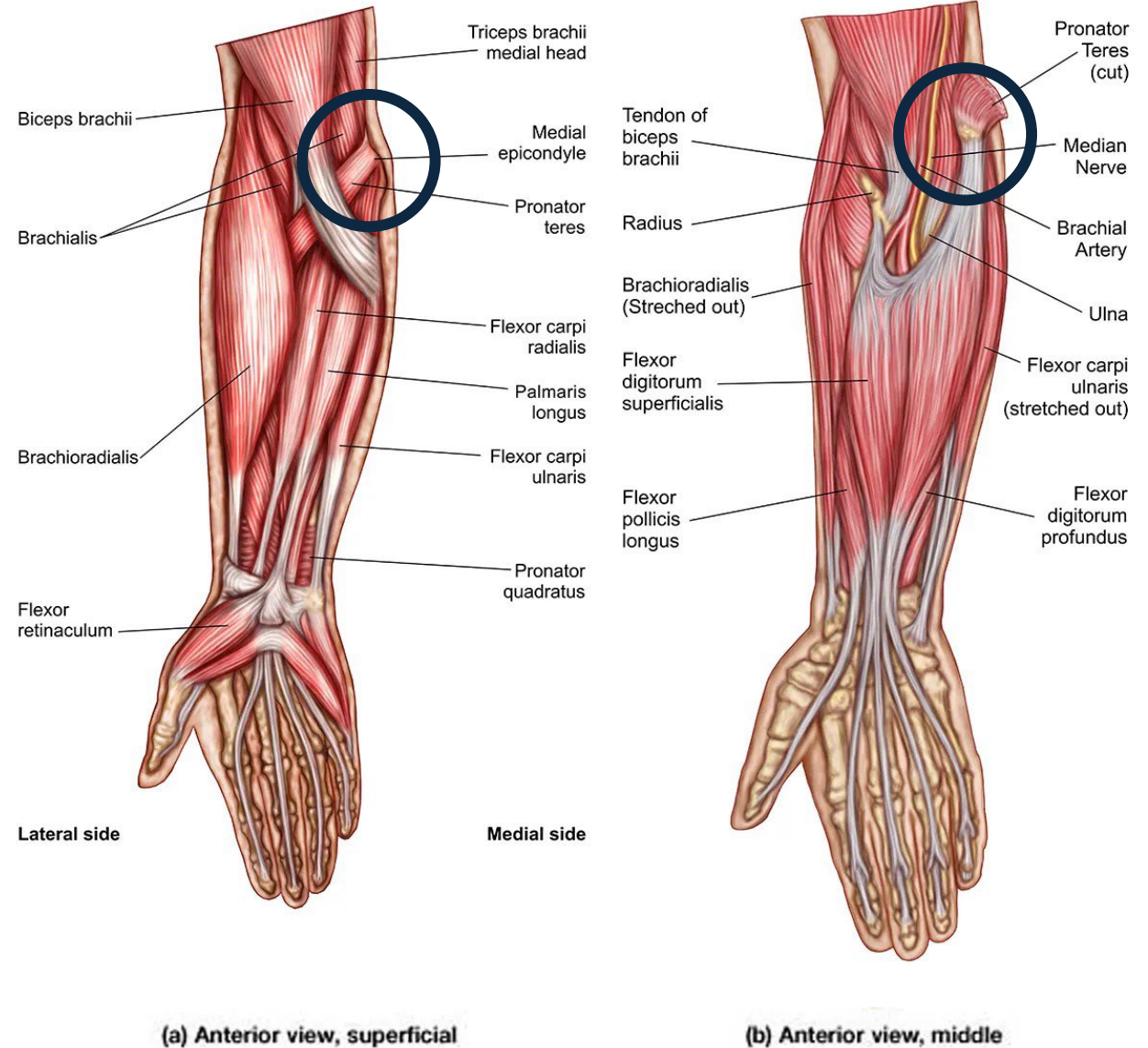
Lower upper extremity injections



Medial Epicondyle

Anatomy

- Medial Epicondyle
- Common Flexor tendon
- Ulnar Nerve
- Median nerve



Medial Epicondylitis (Golfers Elbow)

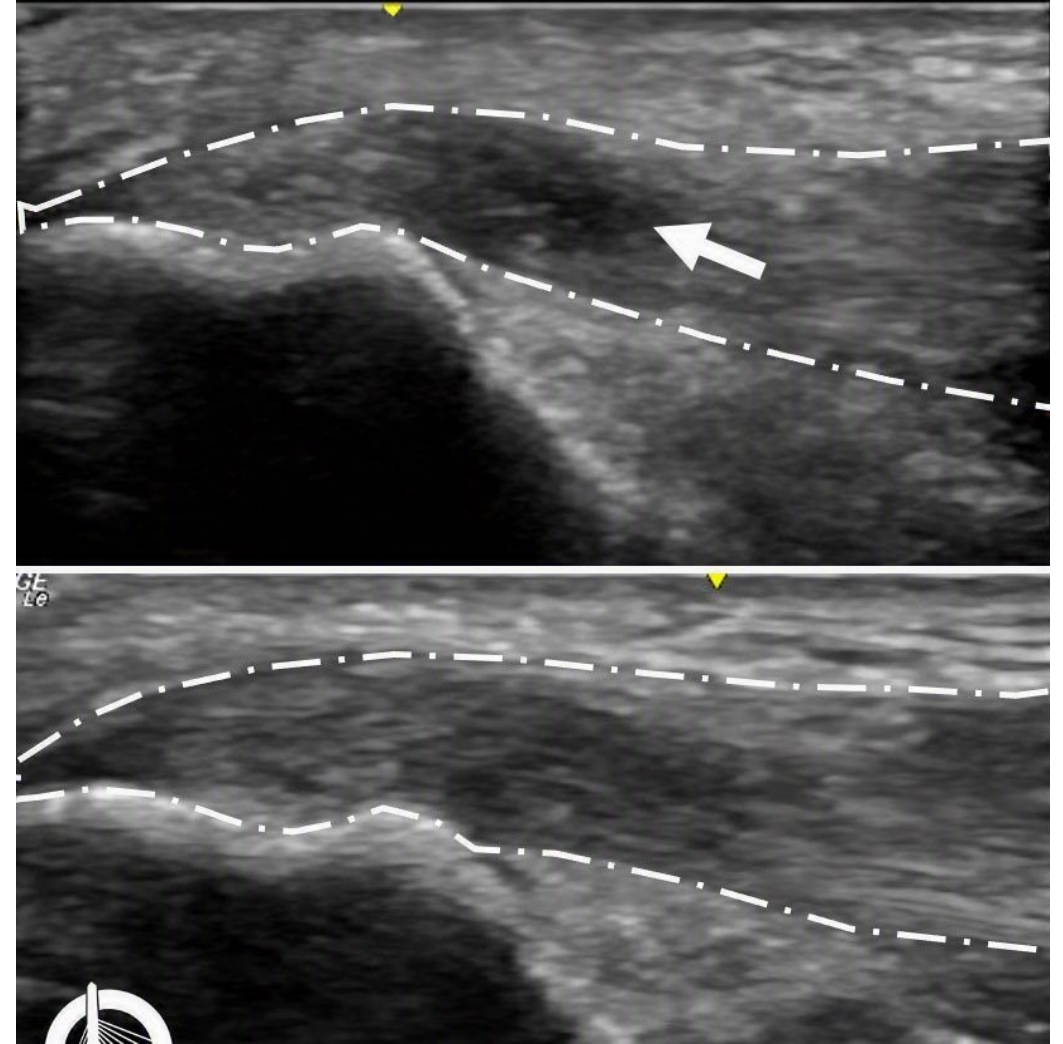
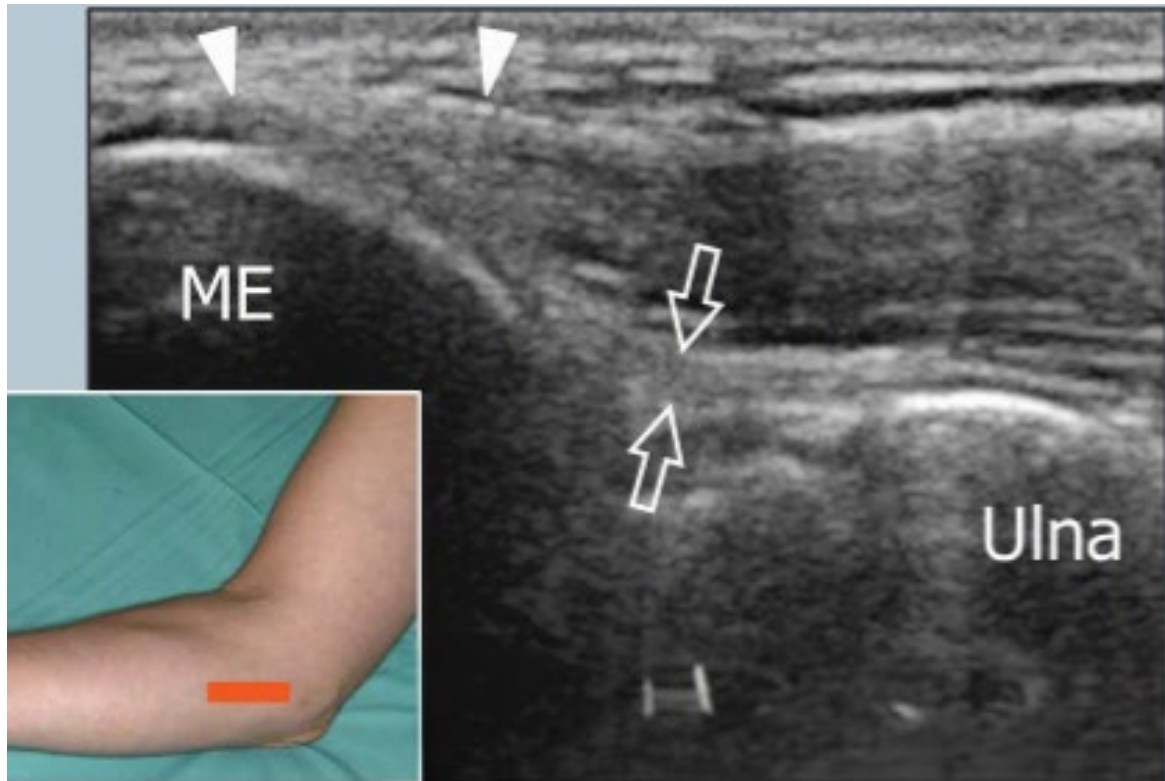
Symptoms

- Pain at the medial epicondyle that radiates up or down
- Pain to open jars and wrist flexion
- After repeated activity

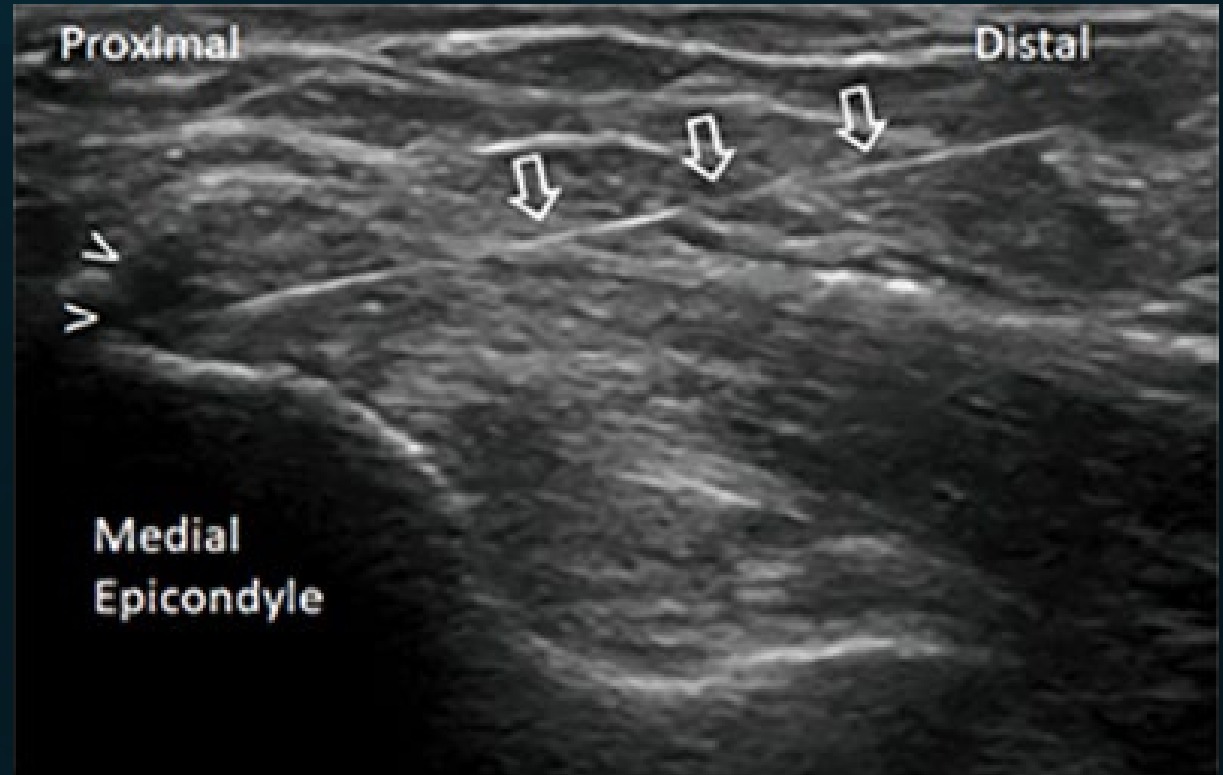
Exam

- Tenderness along common flexor tendon and epicondyle
- Resisted wrist flexion and grip strength testing painful

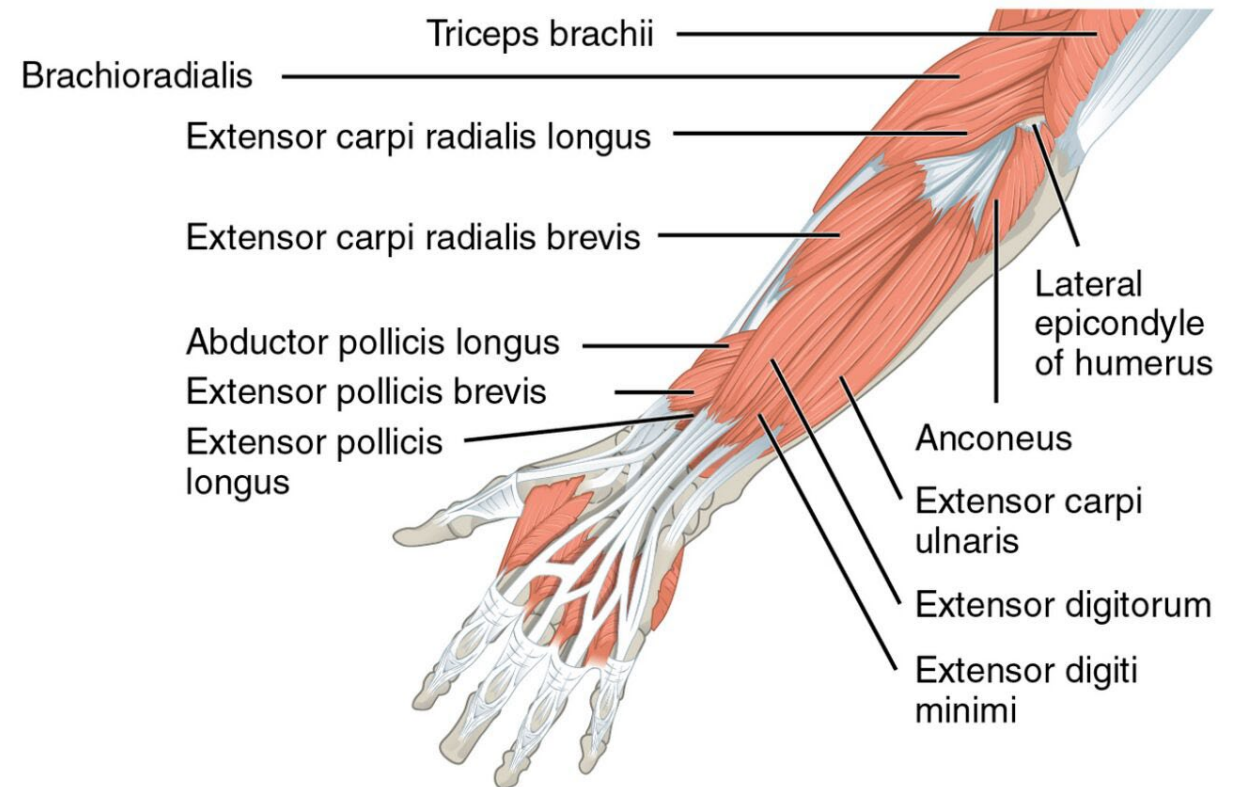
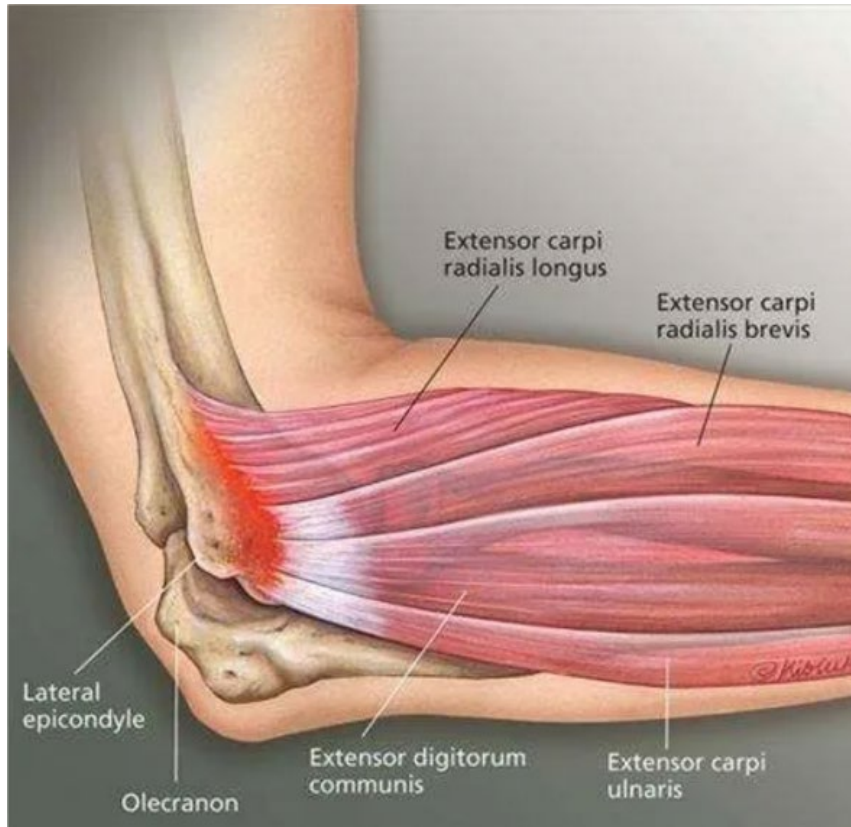
Medial epicondylitis – Ultrasound Anatomy



Medial Epicondyle Injection



Lateral Epicondyle Anatomy



Lateral Epicondyle

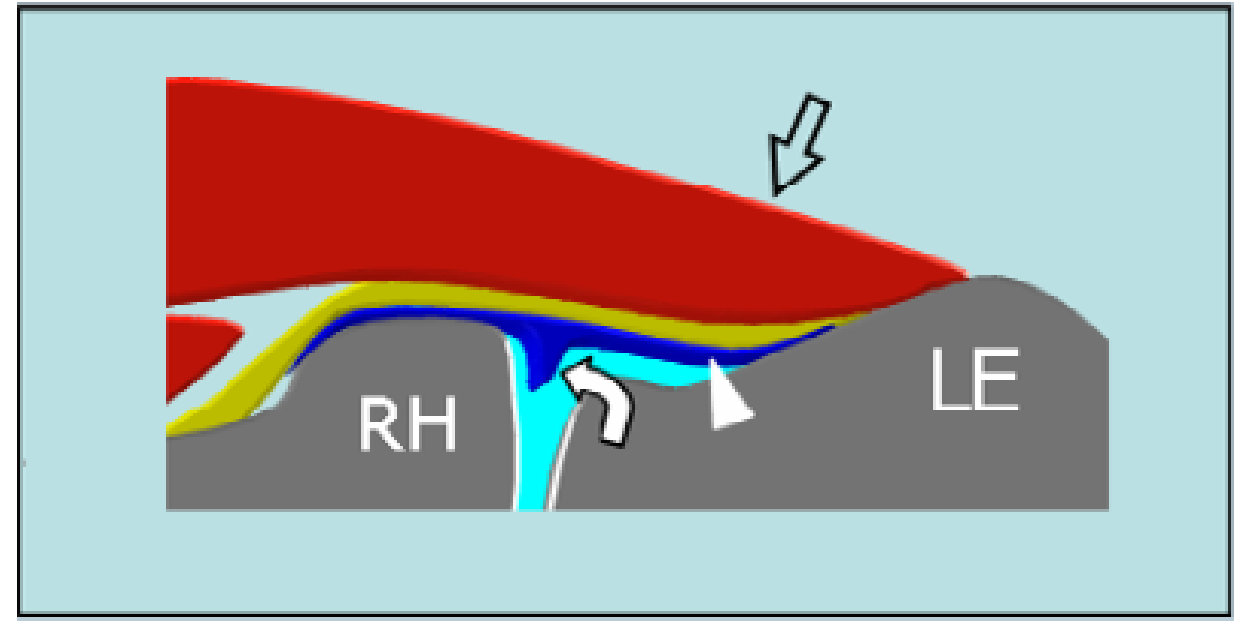
HPI

- Pain along the posterior forearm
- Typically insidious and progressive
- Pain with strong grip or opening jars
- Any raquet sport

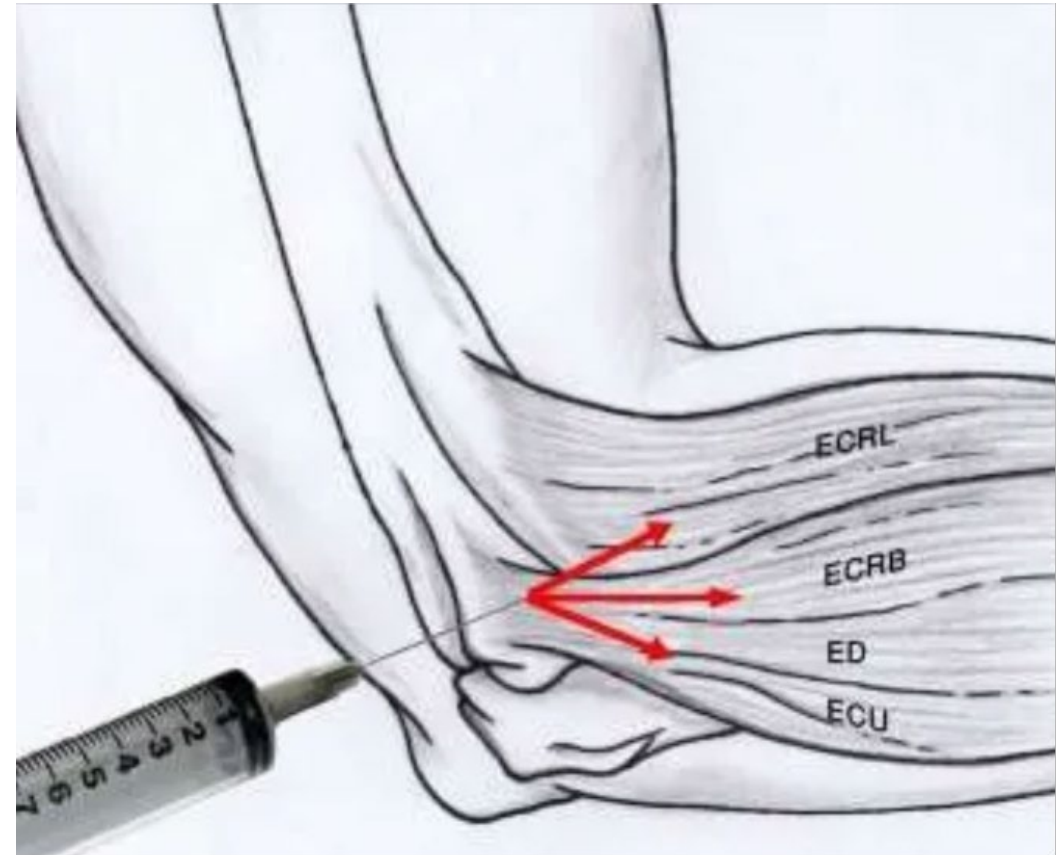
Exam

- Full ROM but pain with wrist extension and grip
- TTP on common extensor tendon and lateral epicondyle

Lateral Epicondyle Ultrasound Anatomy



Lateral Epicondyle injection



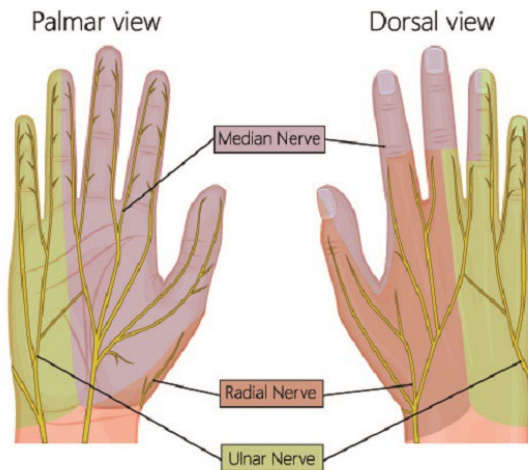
Carpal Tunnel Injection

HPI

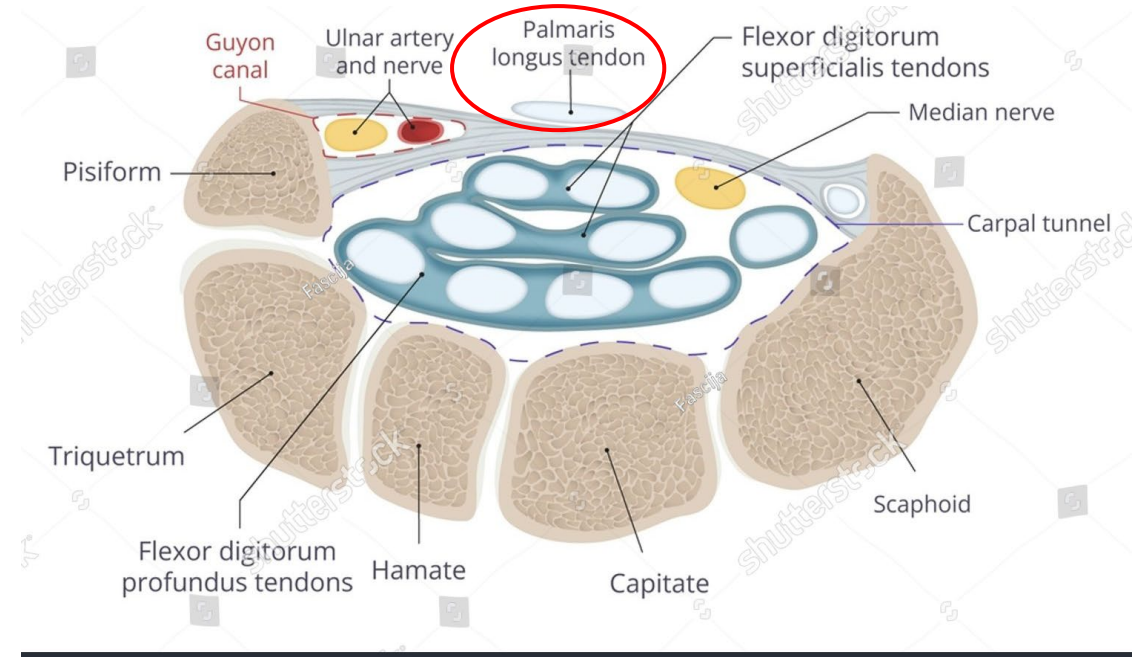
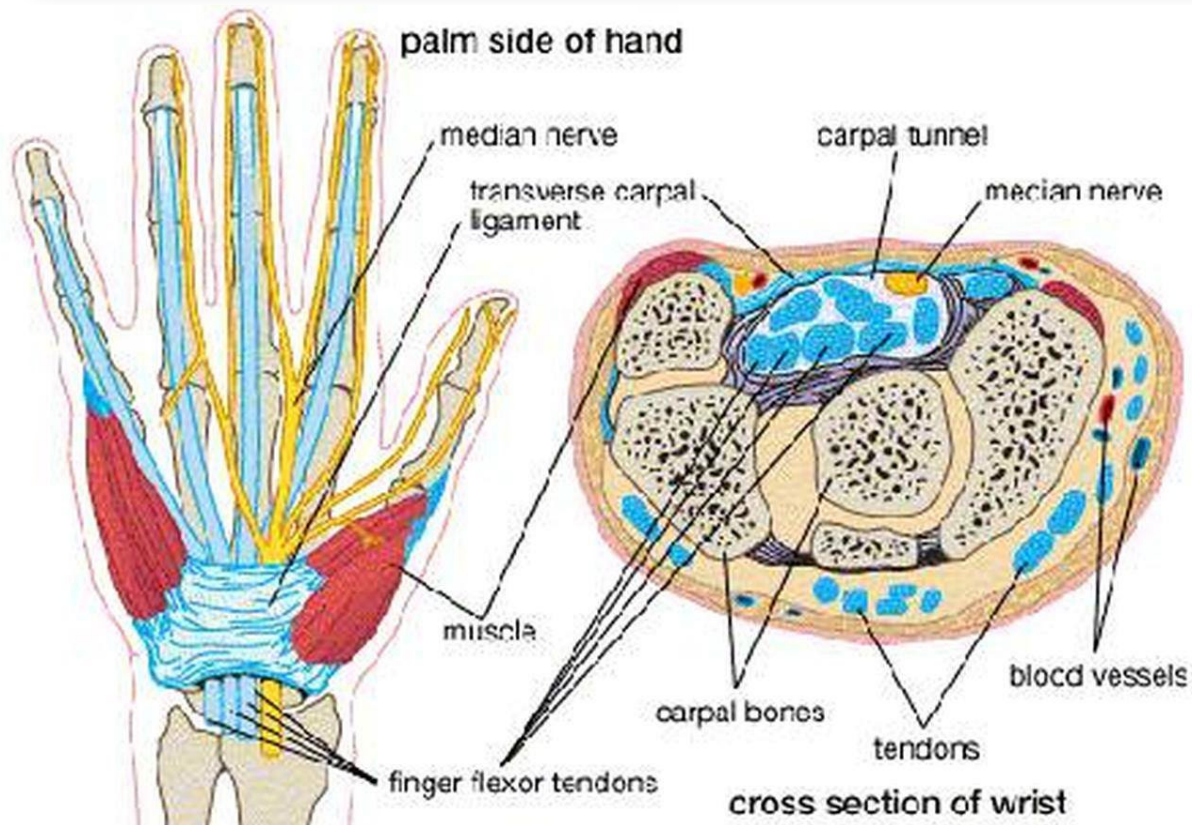
- Numbness, pain, tingling, decreased sensation

Exam

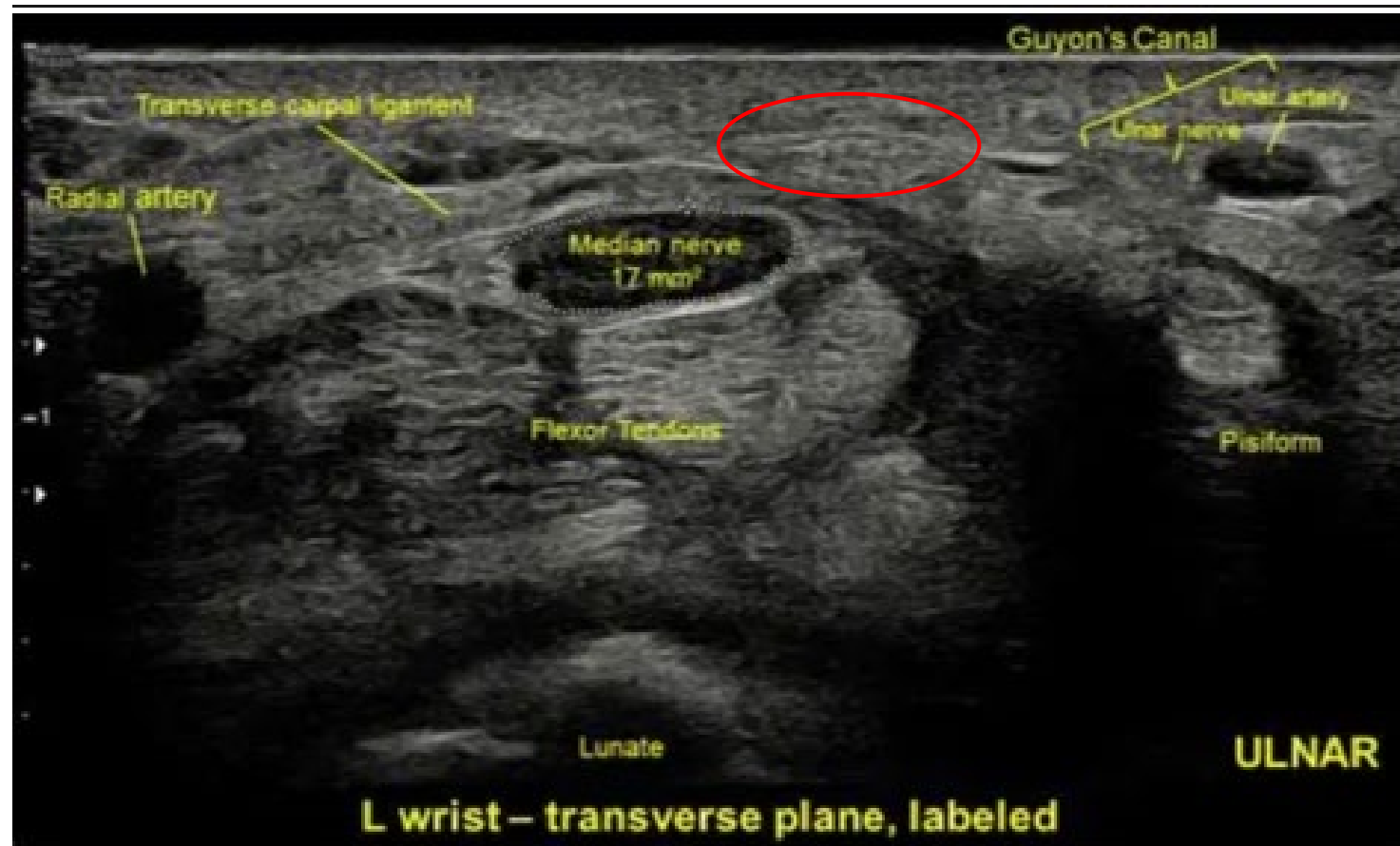
- Decreased sensation
- Weakness secondary to pain
- Tinel, Phalen's, reverse Phalen's, compression test



Presentation and risk factors of Carpal Tunnel



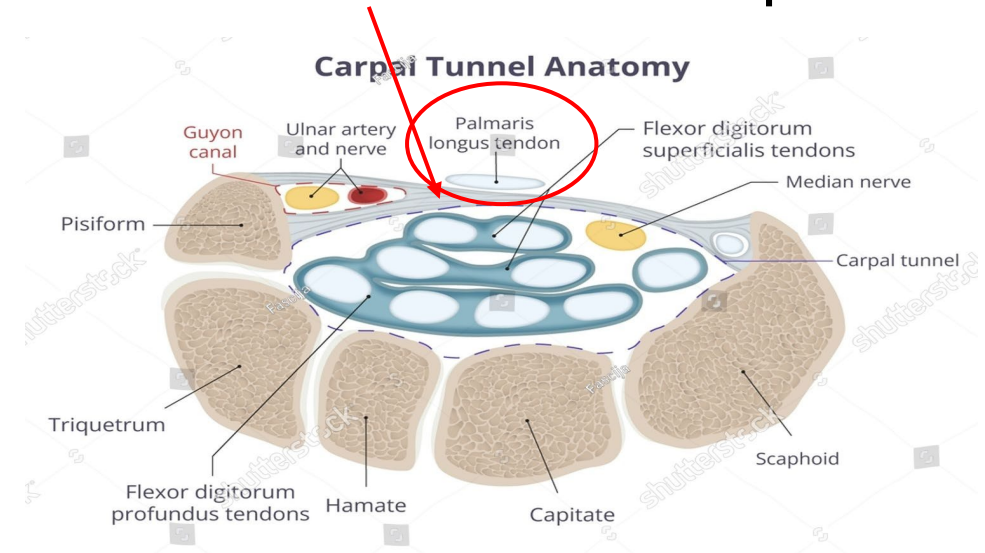
Carpal Tunnel Ultrasound Anatomy



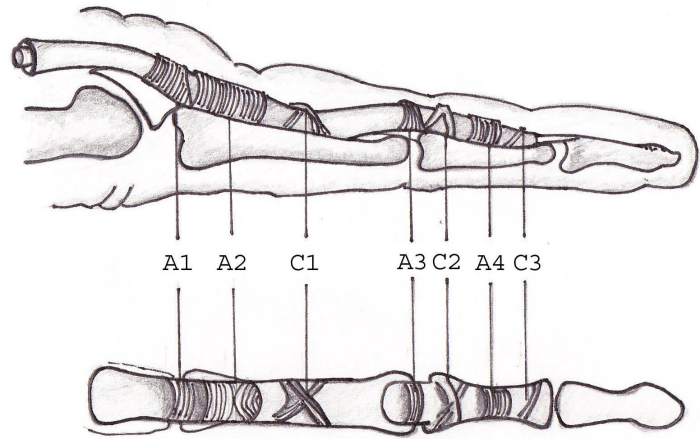
Carpal Tunnel Injection



- 23 G – 1 inch needle
- 3 cc Syringe
- 40mg Triamcinolone
- 1 mL 1% lidocaine NO epi



Trigger finger Anatomy and presentation



ANNULAR (A) AND CRUCIATE (C) PULLEYS
OVER FLEXOR TENDONS

HPI

- Triggering, popping, getting stuck

Exam

- Will not be able to trigger passively
- Ring > Middle > Index
- Painful nodule near



Tigger Finger Injection

Whats needed:

- 25 G 3/8" needle
- 1 cc syringe
- Alcohol
- 20mg Triamcinolone
- 0.5 mL of 1% lidocaine

Lower Extremity Injections

- Knee (anteromedial, anterolateral)
- Knee lateral sub patellar
- Superolateral (ultrasound)
- Greater Trochanter

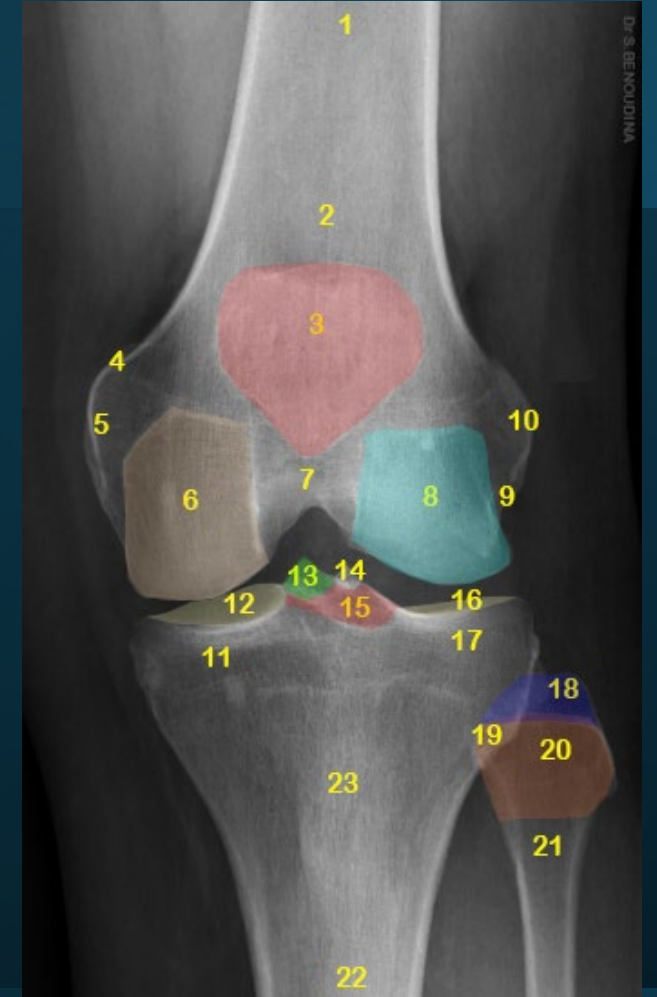
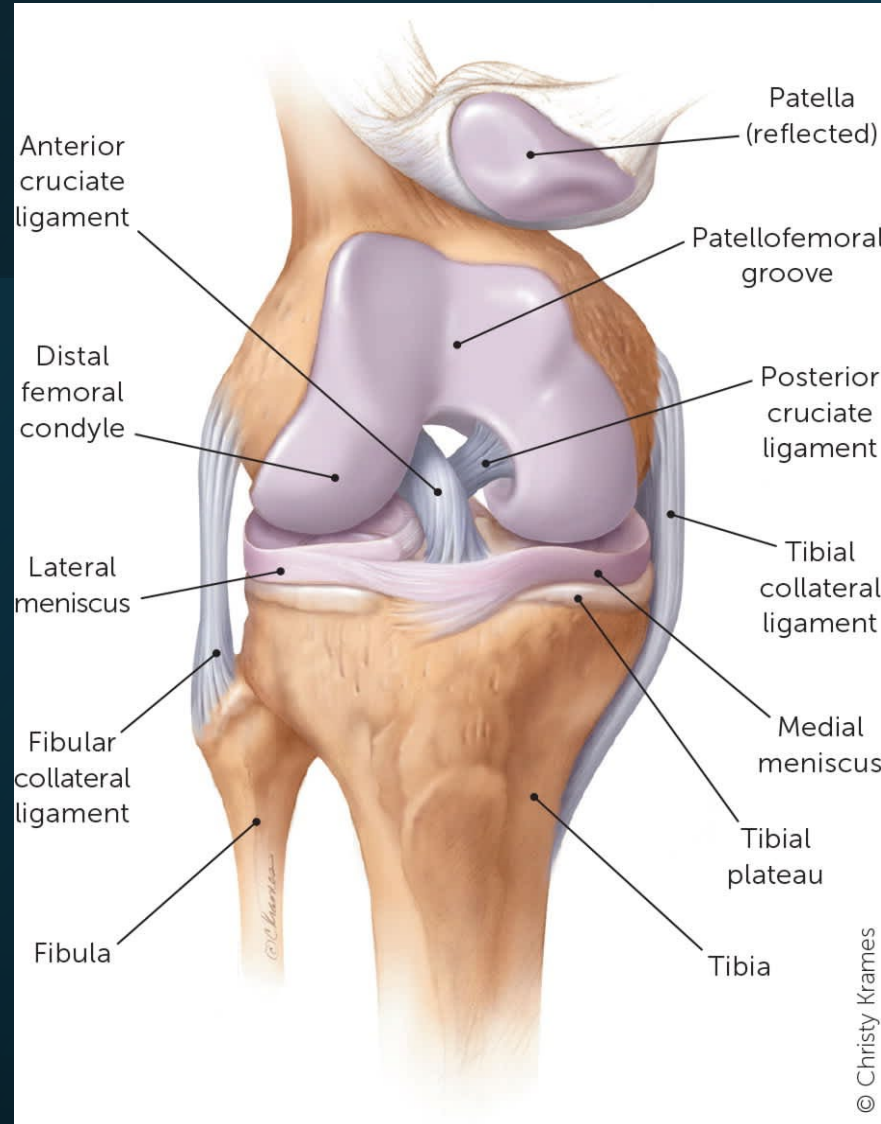
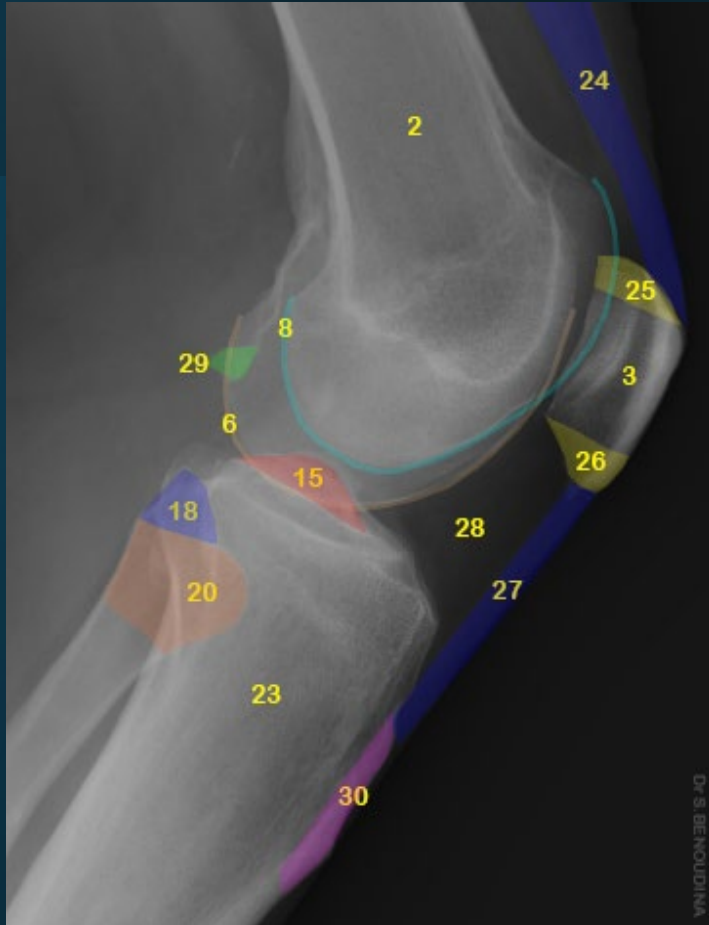


Knee Injections Indication

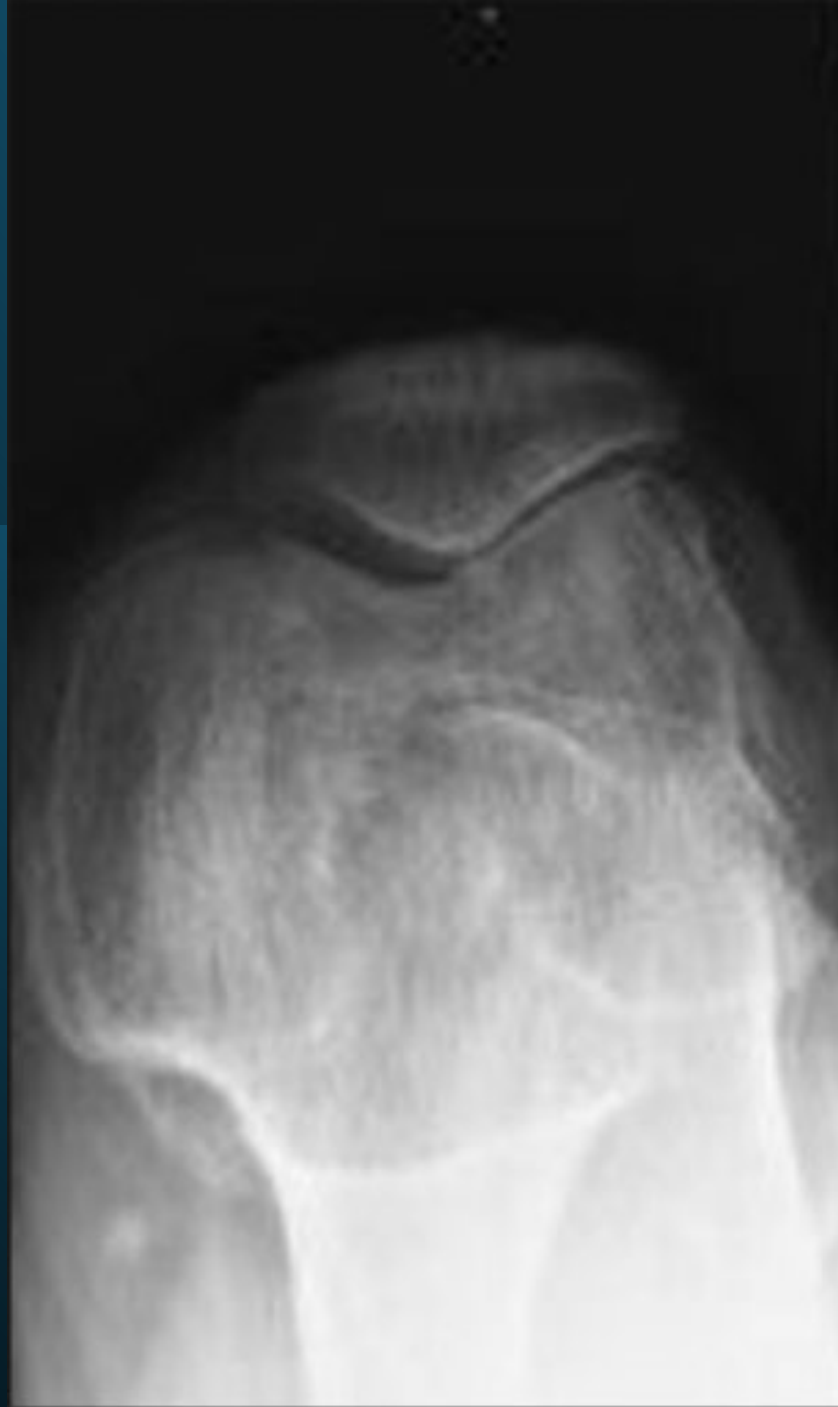
- Osteoarthritis
- Inflammatory arthritis
- Meniscus injuries
- Bakers cysts
- Chondrocalcinosis
- Acute or chronic gout



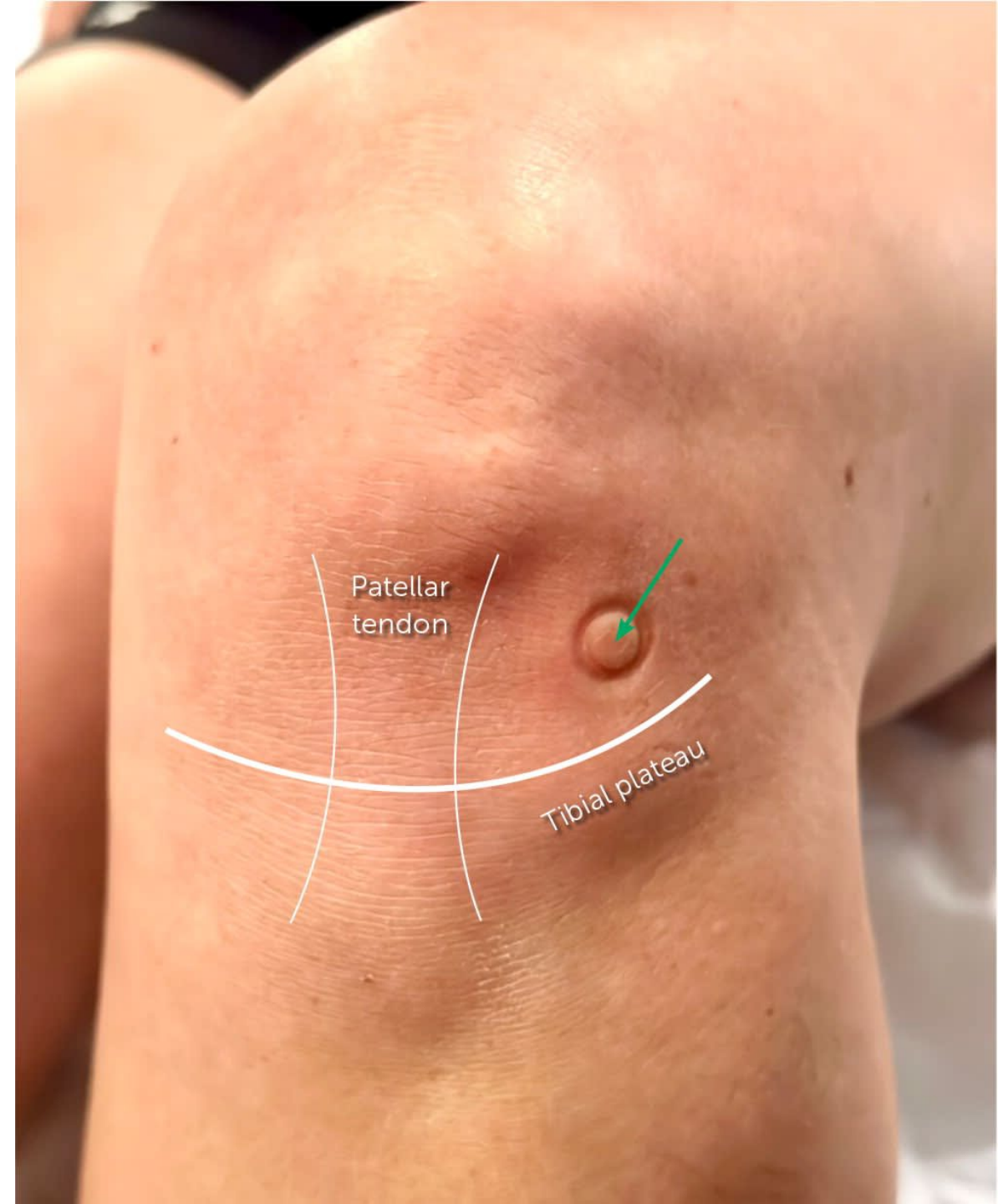
Knee Anatomy



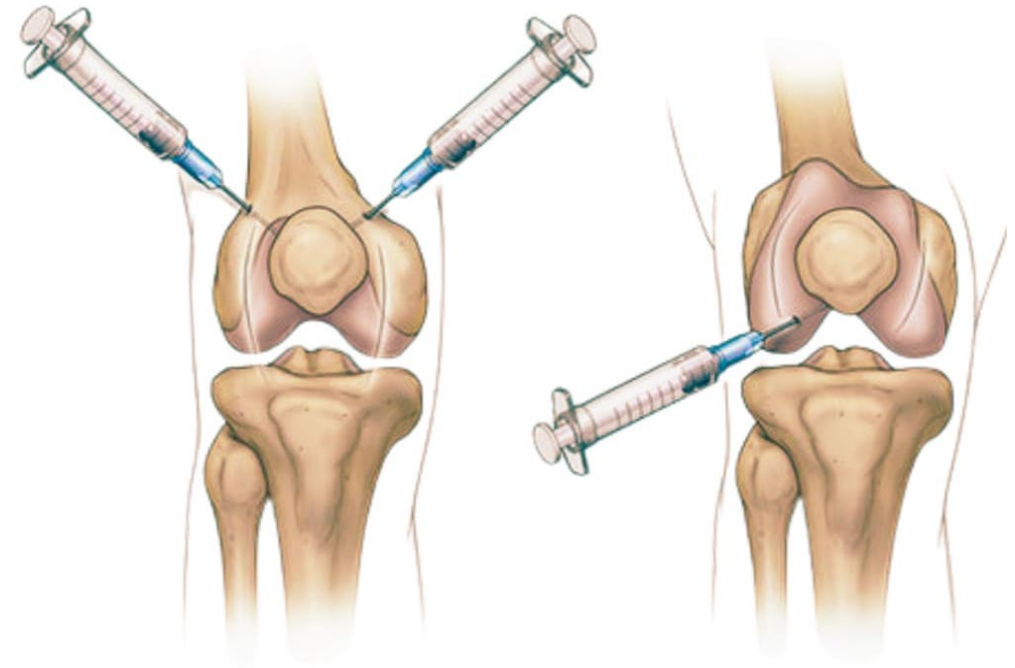
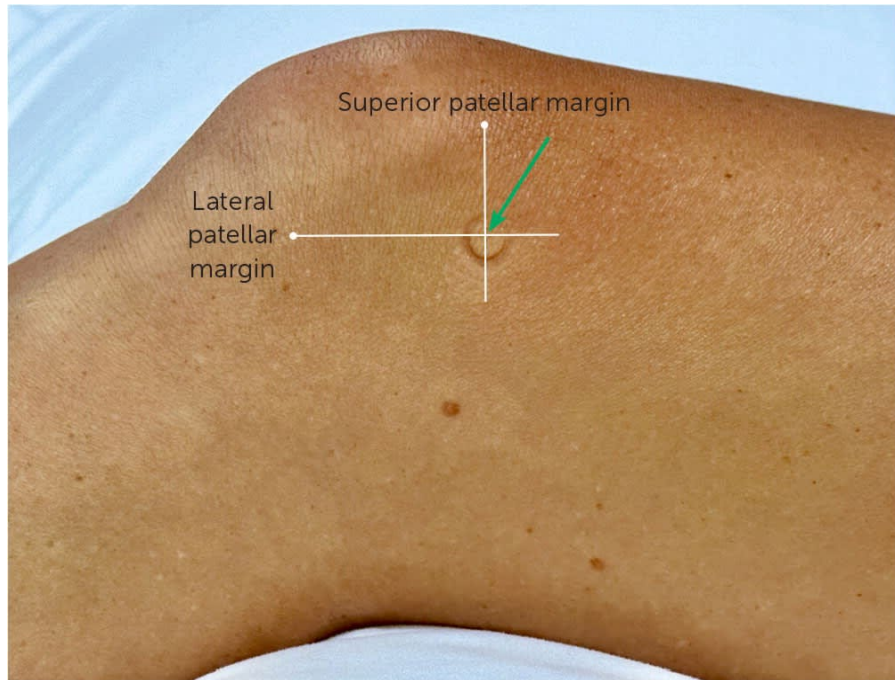
Knee Xrays and how to decide



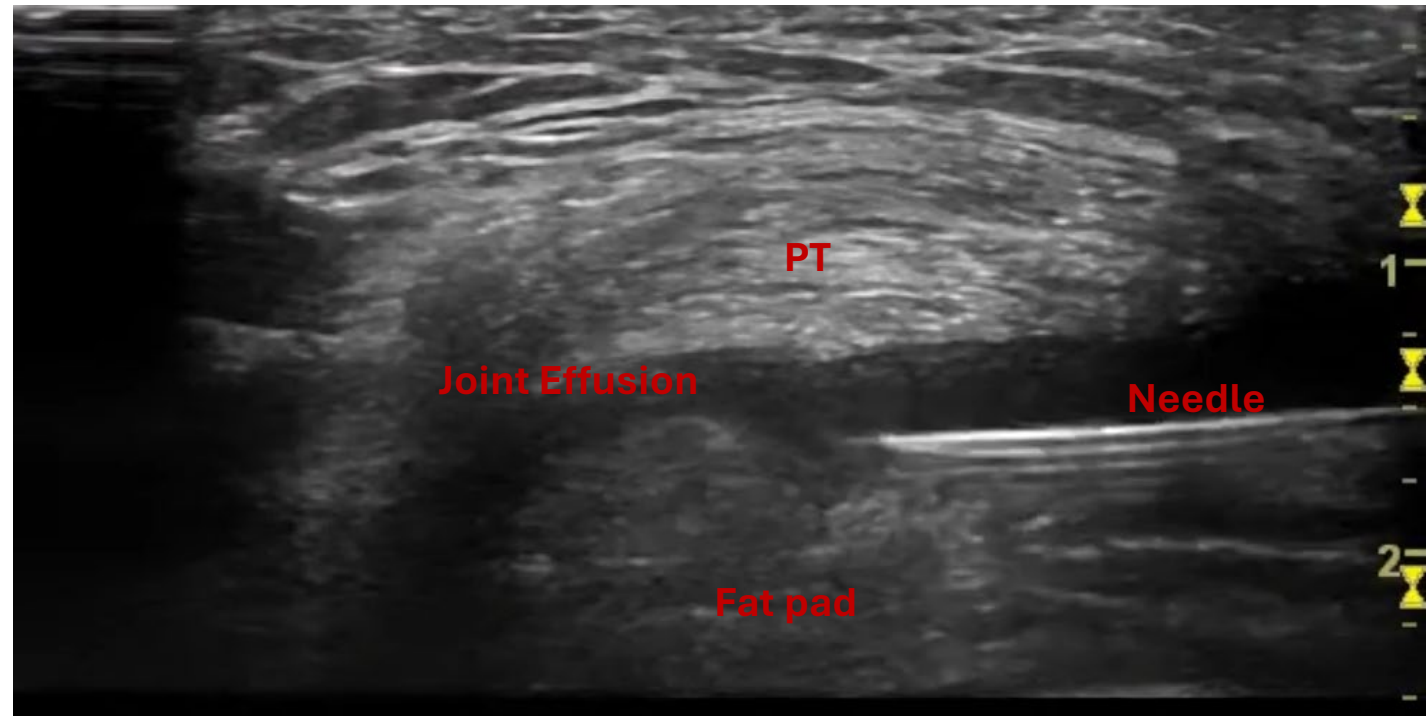
Knee Injections: Anteromedial and Anterolateral



Knee Injection (sub patellar)

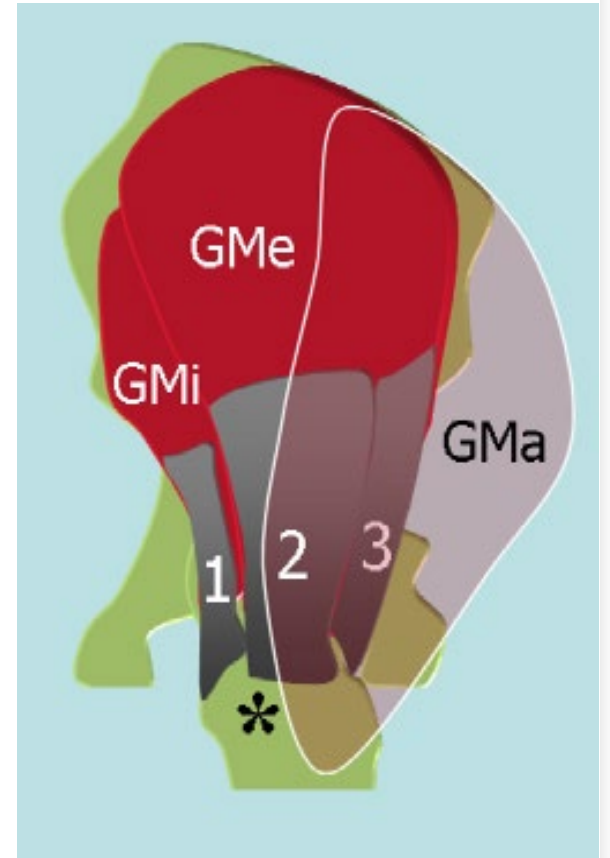
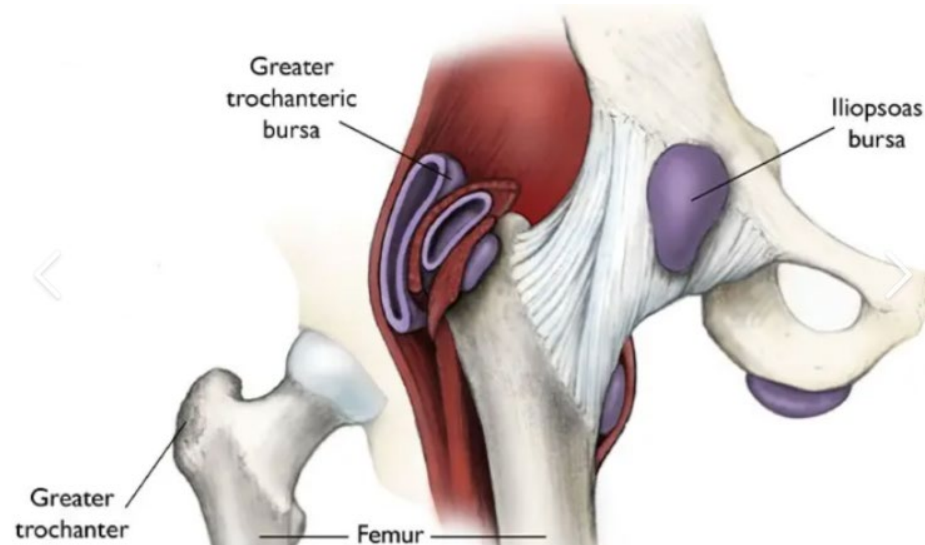


Knee Injections (Superior lateral)



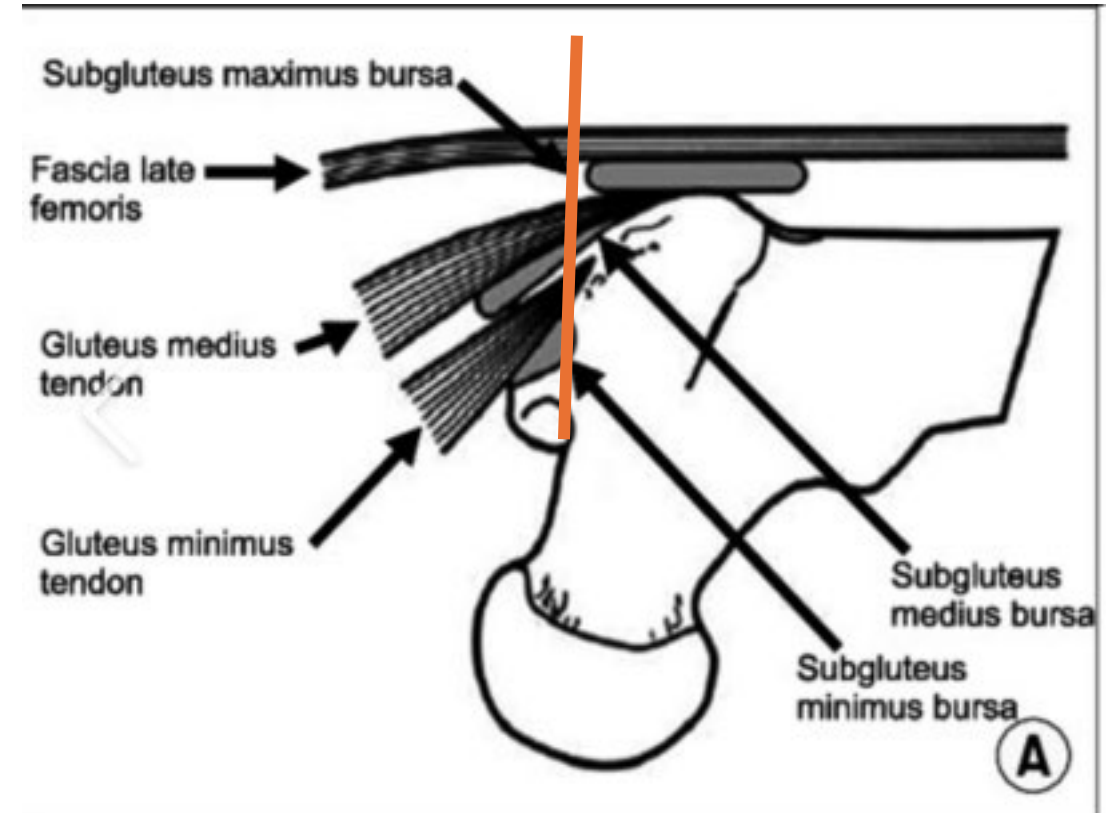
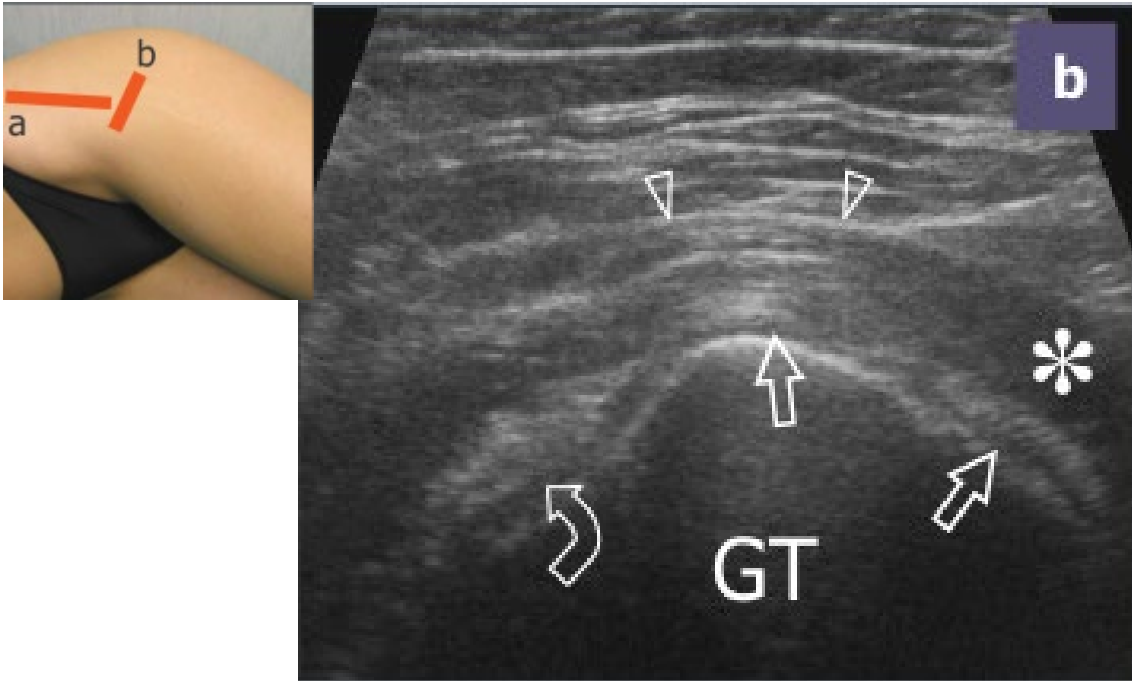
Greater Trochanter Injection

- Lateral tenderness
- Pain sleeping on side
- Pain with stairs
- Radiates down leg
- Pain with glute activation



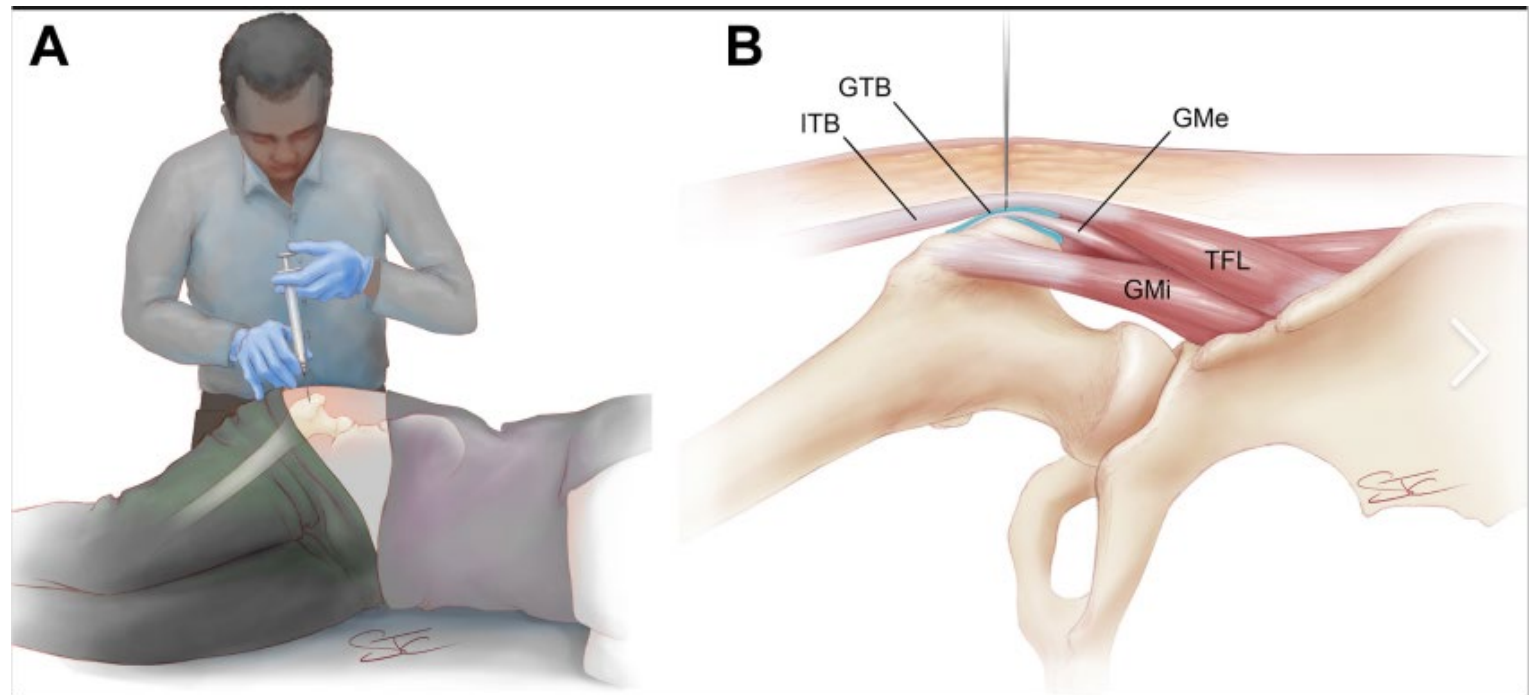
Greater Trochanter Ultrasound Anatomy

- Ultrasound Picture ESSR



Greater Trochanter Injection

- Lateral decubitus position
- Point of tenderness
- 90 degree angle
- 3.5" needle
- 80mg kenalog
- 3 cc 1% Lidocaine



Supplies needed

TABLE 4

Supplies for Joint or Soft Tissue Injection

Syringe
Needle
Alcohol, povidone-iodine, or chlorhexidine swabs
Gauze pads
Bandage
Ethyl chloride spray (optional)
Pillow, wedge, other devices for patient comfort and positioning

Information from reference 2.



TABLE 3

Suggested Composition and Needle Size for Common Landmark-Guided Corticosteroid Injections

Anatomic site	Injectate dose			Needle size	
	1% lidocaine (mL)	Triamcinolone acetonide (mg)*	Betamethasone (mg)	Gauge	Length (in)
Intra-articular knee	3 to 4	20	6	25	1.5 to 2
Acromioclavicular joint	0.5 to 1	10 to 20	3 to 6	25	1 to 1.5
Glenohumeral joint	4 to 6	20	6	22 or 25	1.5 to 2
Subacromial space	4 to 6	20	6	25	1.5 to 2
de Quervain tenosynovitis	1 to 2	20	6	25	1 to 1.5
Trigger finger	1	10 to 20	3	25 or 27	1 to 1.5
Trochanteric bursa	4 to 6	20	6	22	1.5 to 2
Carpal tunnel	0.5 to 1	20	3 to 6	25 or 27	1 to 1.5
Morton neuroma	1 to 2	20	3 to 6	25	1 to 1.5

Note: Triamcinolone acetonide dosing is equivalent to methylprednisolone dosing.

*—To ensure appropriate volume of injectate, this table assumes the use of triamcinolone acetonide, 40 mg per mL. Recent studies suggest lower doses of corticosteroid (20 mg of triamcinolone acetonide) are as effective as higher doses (40 mg of triamcinolone acetonide).²²⁻²⁴

Information from references 12 and 22-24.

Indications and Contraindications

- Overlying soft tissue infection
 - Broken skin at the injection site
 - Septic arthritis
 - Bacteremia
 - osteochondral/intra-articular fracture
 - Avascular necrosis
 - Charcot joint
 - Joint instability
 - Known hypersensitivity to intra-articular agent
 - Unstable coagulopathy
 - Uncontrolled diabetes (relative)
 - Prosthetic joint (relative)
- Inflammatory arthritis
 - Adult and juvenile RA
 - Crystal-induced arthritis
 - Spondyloarthropathies
 - Noninflammatory arthritis
 - Osteoarthritis
 - Nonarticular conditions
 - Bursitis
 - Carpal tunnel syndrome
 - Epicondylitis
 - Tenosynovitis

Counseling pt on possible complications

- Infection
- Allergies
- Steroid flare: Kenalog ~ 1:1,000
- Avascular necrosis ~ 1:300,000
- Infectiveness
- Diabetes
- Skin Changes/hypopigmentation
- Tissue and fat atrophy
- Tendon rupture (Achilles and plantar fascia)

Does ethyl chloride spray make a difference



RISK OF INFECTION – NO
INCREASED RISK



HAND INJECTIONS – NO
DIFFERENCE IN PAIN OR ANXIETY



ULTRASOUND GUIDED – SAFE
AND EFFECTIVE ALTERNATIVE TO
LOCAL

What about Diabetes and Steroids

Impact of Intra-Articular Corticosteroid Injection on Glycemic Control: A Population-Based Cohort Study

Terin T. Sytsma, Laura S. Greenlund, Karen M. Fischer, Rozalina G. McCoy

Primary Care Internal Medicine, Quantitative Health Sciences

A1C	Odds Ration increase	Steroid Dosing
7.0 and less	---	
7.0-8.0	1.8	Full dose with strict precautions
8.0+	4.8	Half dose with strict precautions
9.0+		No injection

Aspirations

Synovial Fluid Analysis

	NORMAL	Non-Inflammatory	Inflammatory	Septic	Hemorrhagic
Clarity	Transparent	Transparent	Translucent	Opaque	Bloody
Colour	Clear	Yellow	Yellow	Dirty/Yellow	Red
Viscosity	High	High	Low	Variable	Variable
WBC/mm ³	<200	200-2,000	2000-10,000 (up to 100,000)	>80,000	200-2,000
PMNs %	<25%	<25%	>50%	>75%	50-75%

Depending on the clinical scenario, synovial fluid is analysed for:

- Cell count and differential
- Crystals
- Culture and sensitivity (if septic arthritis suspected)
- Cytology (if malignancy suspected)

Ultrasound vs palpation success rates

Injection	Palpation guided	Ultrasound guided
SA bursa	65	90-100
AC joint	40-70	90-100
Epicondyles	~	~
Carpal tunnel	95	95
Trigger Finger	~	~
Knee	78	97
Greater Trochanter	67	92

Thank you

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