



ANCILLARY ADJUSTMENTS WITH MUSCLE TESTING

Instructor: Dr James Glenn Drewry

Extensor Hallucis Longus and Brevis

Extensor Hallucis Longus

Origin: middle half of anterior tibial surface and adjacent interosseous membrane.

Insertion: base of distal phalanx of great toe.

Action: extends the great toe; continued action assists in dorsiflexion and inversion of the foot and ankle.

Nerve supply: deep peroneal, L4, 5, S1.

Extensor Hallucis Brevis

The extensor hallucis brevis is the medial slip of the extensor digitorum brevis (see 8—85).

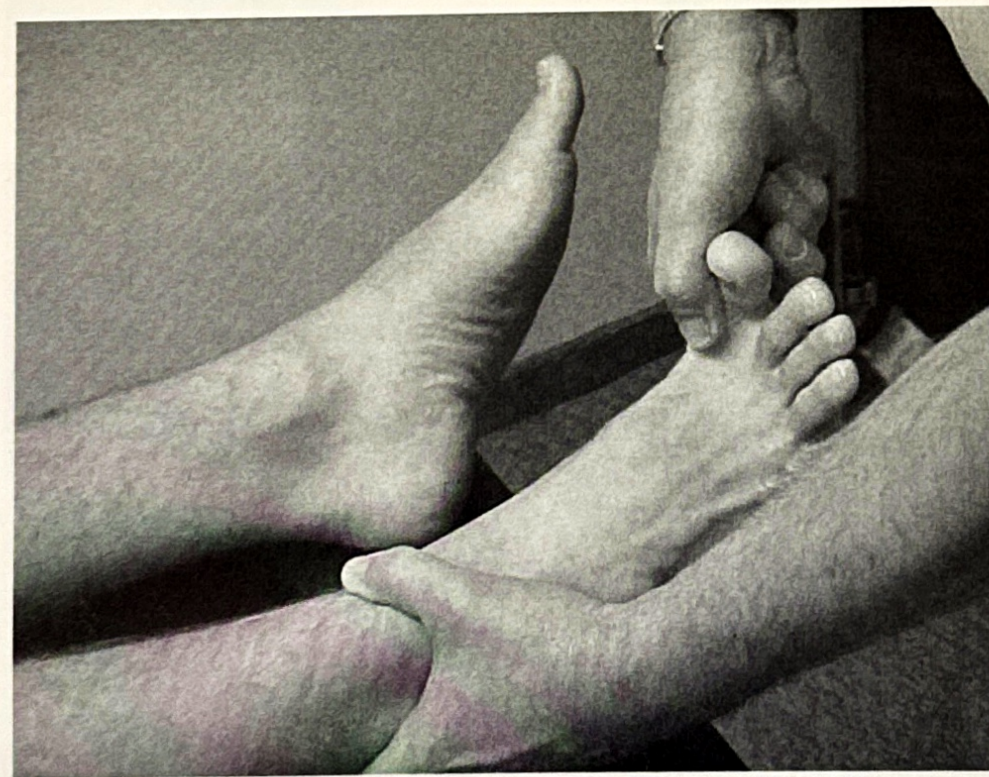
Origin: anterior portion of the superolateral surface of the calcaneus, lateral talocalcaneal ligament, cruciate crural ligament.

Insertion: dorsal surface of the great toe proximal phalanx base.

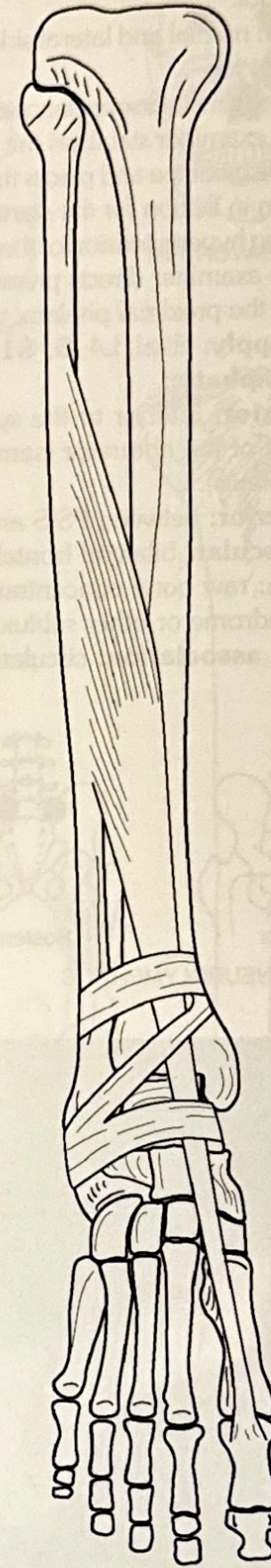
Action: extends great toe proximal phalanx.

Nerve supply: deep peroneal, L4, 5, S1.

Test for longus and brevis: With the patient sitting or standing, his great toe is placed in extension and the examiner stabilizes the foot and grasps the great toe to flex it while the patient resists.



8—83.



8—84. Extensor digitorum longus.

Extensor Digitorum Longus and Brevis

Extensor Digitorum Longus

Origin: lateral tibial condyle, proximal three-fourths of anterior fibula body, interosseous membrane, deep fascia, intermuscular septa.

Insertion: lateral four toes, middle and distal phalanges dorsal surface.

Action: extends toes and with continued action assists in foot and ankle dorsiflexion and eversion.

Nerve supply: peroneal, L4, 5, S1.

Extensor Digitorum Brevis

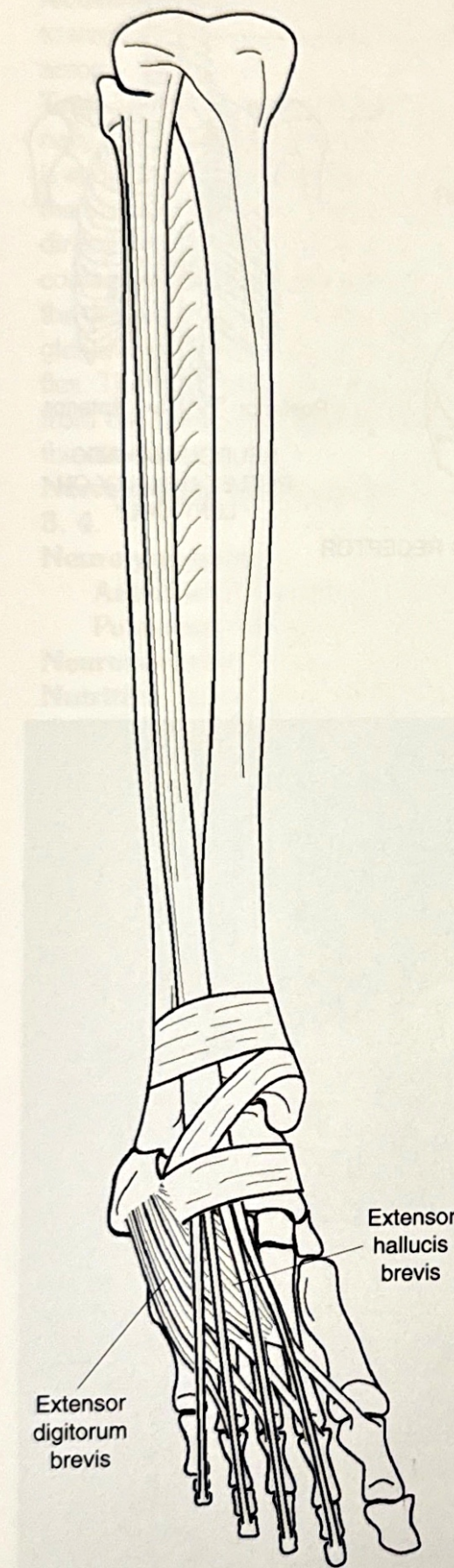
Origin: anterior portion of the superolateral surface of the calcaneus, lateral talocalcaneal ligament, cruciate crural ligament.

Insertion: first tendon to the dorsal surface of the great toe proximal phalanx base. This muscular slip and tendon are often called the extensor hallucis brevis. The other three tendons insert to the lateral sides of the extensor digitorum longus tendons.

Action: extends phalanges of the medial four toes.

Nerve supply: deep peroneal, L4, 5, S1.

Test of longus and brevis: The examiner stabilizes the foot in slight plantar flexion, and the patient's toes are extended. The test force is to bring the toes into flexion. Usually the middle three toes are tested; the hallux is tested separately.



8-85. Extensor digitorum longus and brevis. Extensor hallucis brevis.



8-86.



Proprioceptive Taping:

Effective for 5-7 days.

Allows for normal motion and proprioceptive input.

Blocks nociception.

Start with foot in neutral position.

Anchor to lower lateral leg, take all the stretch out of the tape and wrap over top of foot to medial then lateral arch.



Proprioceptive Taping of the Foot

In the protocol that I use, I will muscle test the gluteus medius/ minimus muscles (the hip abductors) bilaterally. Whichever side or sides I find not to be a grade 5 (isometrically contract), I will proprioceptively tape that foot or feet in order to enhance the proprioceptive response of the foot or feet.

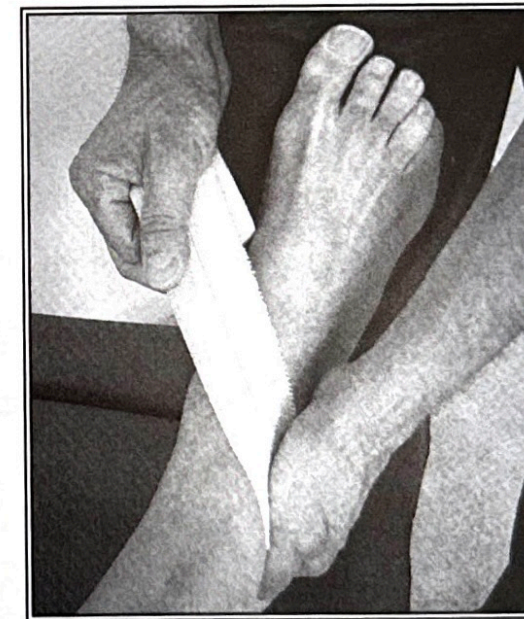
It's important to make sure that all three arches of the patient's foot (at the lowest end of normal for their length and width) are properly supported. Flexible, custom-made orthotics provide this special support and allow for flexible locomotion, which is necessary for a healthy posture and heel-strike shock reduction throughout the body. Proprioceptive taping of the foot is a useful but temporary measure that will stabilize the foot/feet until the patient's flexible, custom-made orthotics have arrived.

PROCEDURE FOR THE EXCESSIVELY PRONATED FOOT:

With patient in the supine position, the plantar surface of the patient's foot is resting on the anterior thigh of the doctor. There is no forced plantar flexion or dorsiflexion of the foot. The idea here is to tape the foot in a position that blocks excess pronation from heel strike to toe-off and allows for the normal wave-like motion of the foot.

This taping procedure requires two pieces of tape.

1st Piece — Using 2" elastic tape, doctor anchors the end of the first piece on the lower lateral leg. (If the doctor anchors the tape on the lower medial leg, the doctor risks over-correcting and may tape the foot into a slightly excessively supinated position.)



The doctor then stretches the tape taking out as much elasticity as possible. The tape is then laid on the skin towards the medial longitudinal arch, across the plantar surface toward the lateral longitudinal arch and then crisscrossed on the dorsum of the ankle as shown.

Make two revolutions and slightly off-center the tape to cover a slightly wider area.

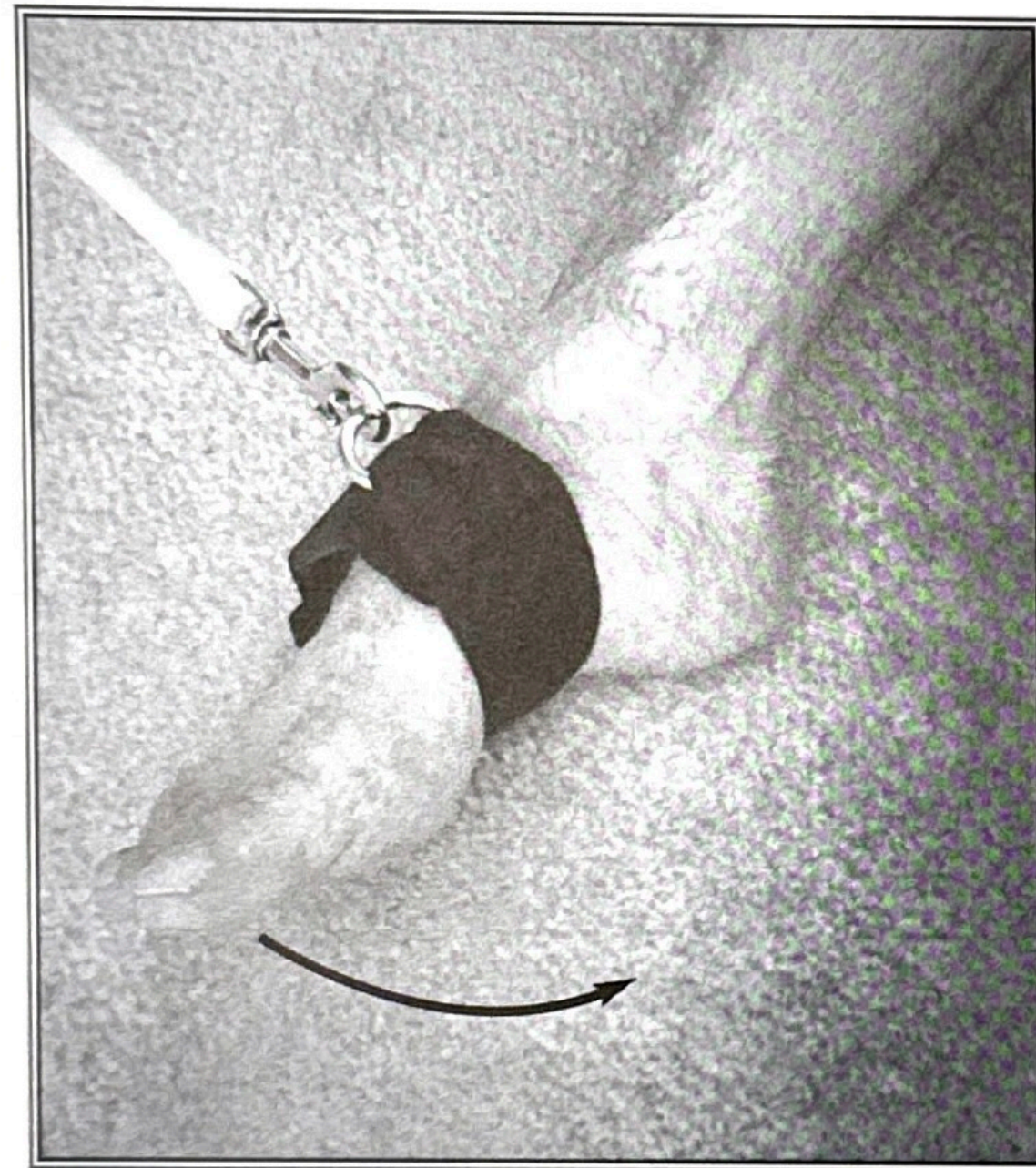


2nd Piece—This second piece of tape is used to stabilize the anterior transverse arch. Great care should be exercised to use only slight tension of the tape. The foot becomes slightly wider when weightbearing so taping the foot somewhat tightly when non-weightbearing can "jam" the metatarsal heads and greatly over-correct the anterior transverse arch. Doctor anchors the tape at the metatarsal-interphalangeal joint. With only mild tension the doctor pulls the tape in a lateral direction and makes 1-1/2 — 2 revolutions.

The patient is now asked to walk 10-12 steps and the gluteus medius/minimus muscles are retested. If grade 5 muscle response manifests, then the doctor knows that the patient will require flexible, custom-made orthotics, which allow for flexible locomotion while all three arches are supported at the lowest end of normal for that length and width. Use a weight-bearing electronic analysis or weight-bearing foam casting method to make impressions of the patient's feet for the flexible, custom-made orthotics.

Targeted Rehabilitation - The Foot

Since excessive pronation is the most common subluxation pattern of the foot, one will find that foot flare or toe-out is the most common postural condition of the foot that requires rehabilitation. Correction of this is achieved by inverting the foot against resistance. The inverters of the foot are the anterior tibialis and the posterior tibialis. The strongest inverter of the foot is the posterior tibialis which means that the best results of foot inversion against resistance are achieved by keeping the toes and forefoot close to the floor during the rehab exercise.



PROCEDURE:

With flexible tubing attached to the midfoot as shown, the foot is inverted (internally rotated) while the heel contacts the floor and the toes are kept close to the floor. I recommend 20 repetitions morning and evening for 8 weeks. The chiropractor should keep in mind the principles of crossover, overflow, and facilitation.

Hour 3

Knee and Hip Adjusting and Rehab



Knee and Hip Adjusting and Rehab

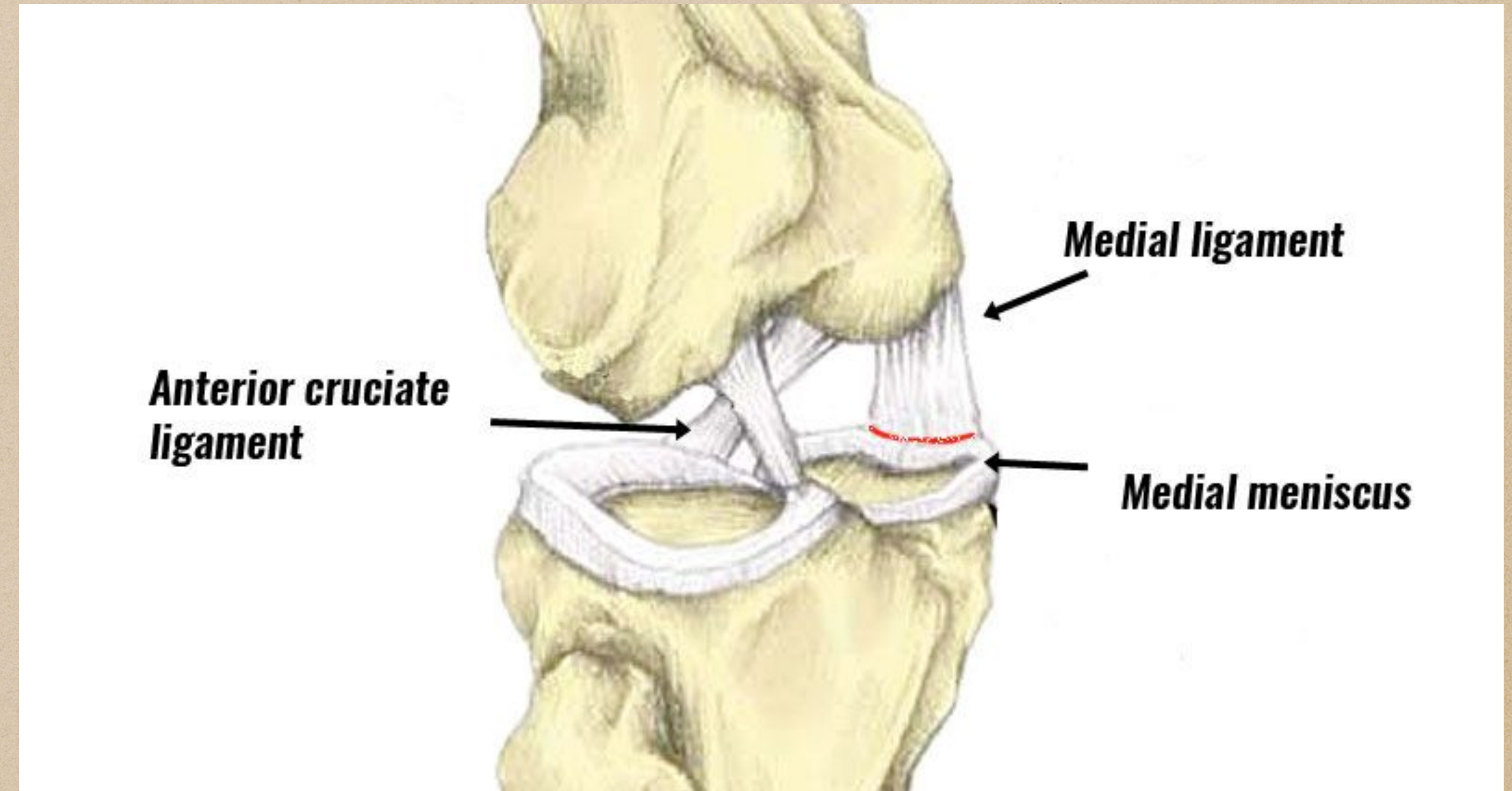
The Knee:

“Athletes with pronated and supinated feet had significantly more knee pain than the normal group.” - Dahle, LK et al

The Unhappy Triad:

- ◆ Anterior Cruciate Ligament
- ◆ Medial Collateral Ligament
- ◆ Medial Meniscus

Prolonged pronation of the foot and ankle complex produces excessive internal tibial rotation, and thus may produce a preloading effect on the Anterior Cruciate Ligament.



Chondromalacia Patella:

The excessively pronated foot is accompanied by a compensatory internal rotation of the tibia. This increased amount of rotation triggers stress throughout the peripatellar tissues of the knee.

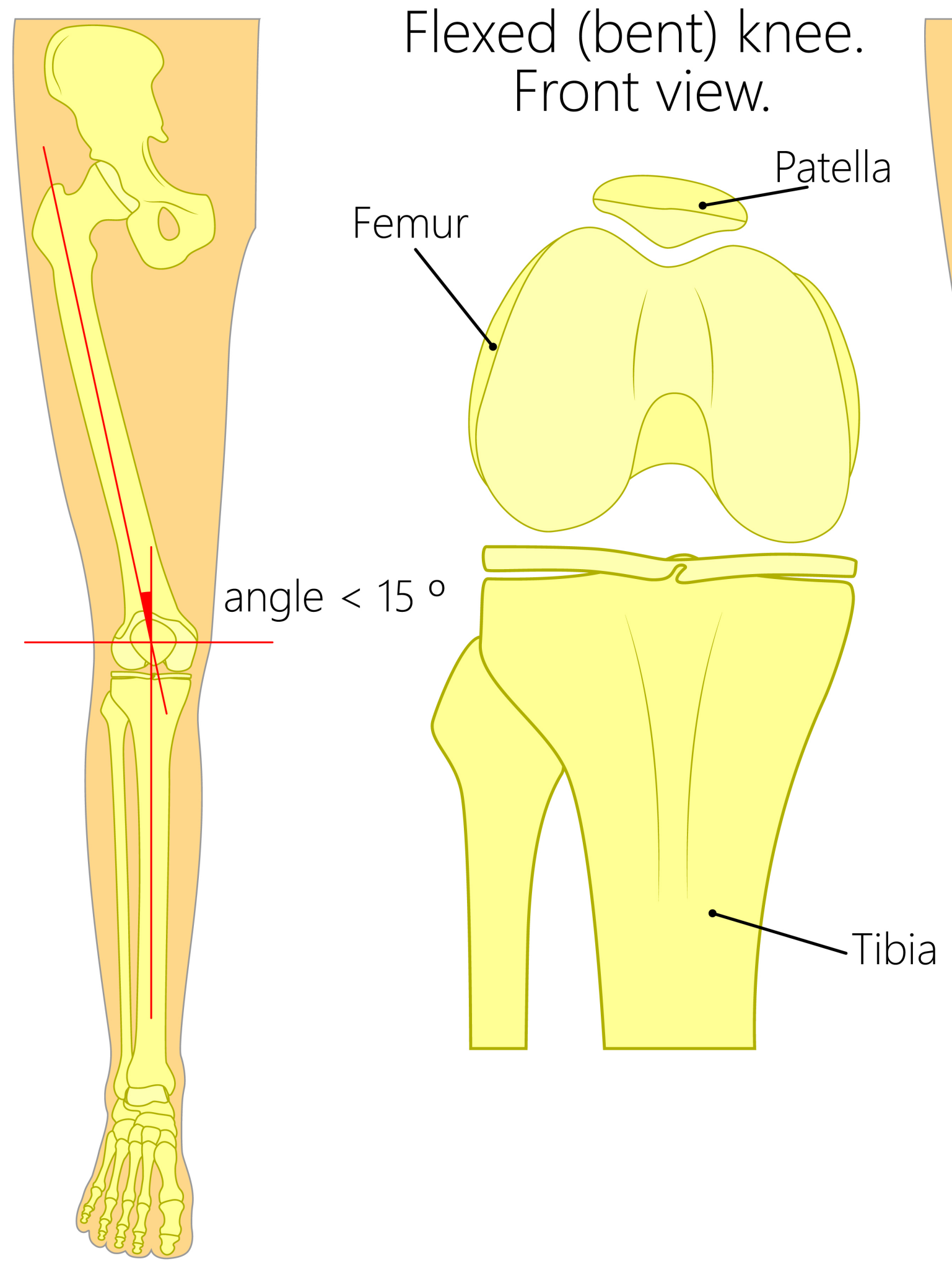
Research @ Logan CC by Robert Kuhn D.C., DACBR demonstrates Foot Levelers' orthotics improve q-angle and patellar tracking.

Some reasons for increased Q-angle:

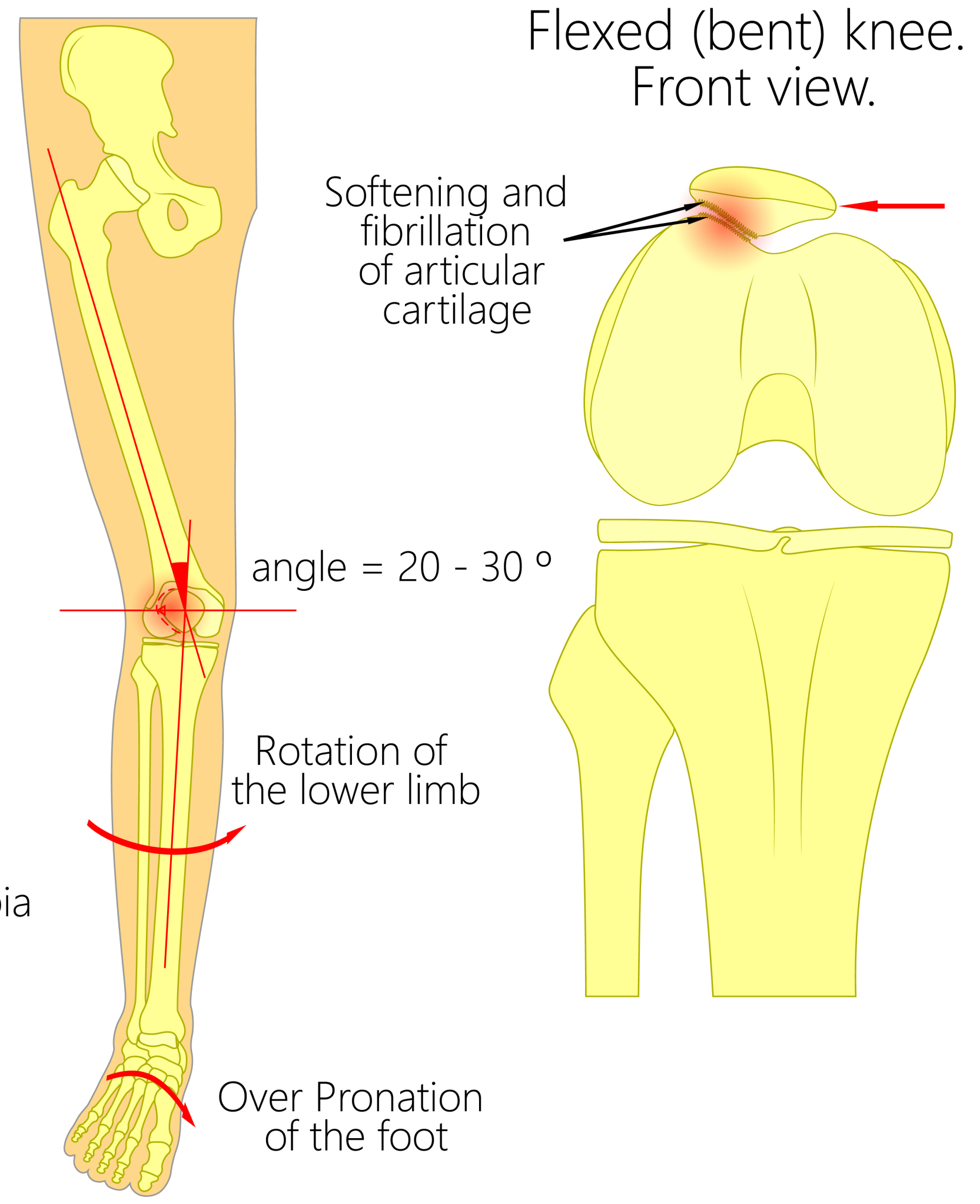
- ◆ Gender
- ◆ Foot Pronation
- ◆ Activity



NORMAL KNEE



CHONDROMALACIA PATELLA



05/15/2023

Weak Knee Extensors Increase Patellar Tendinopathy

Journal of Athletic Training:

"Isometric and concentric knee extensor strength is reduced in people with patellar tendinopathy compared to asymptomatic controls."

[Editor's note: no specific muscle contraction type appears to be superior for the treatment of patellar tendinopathy]

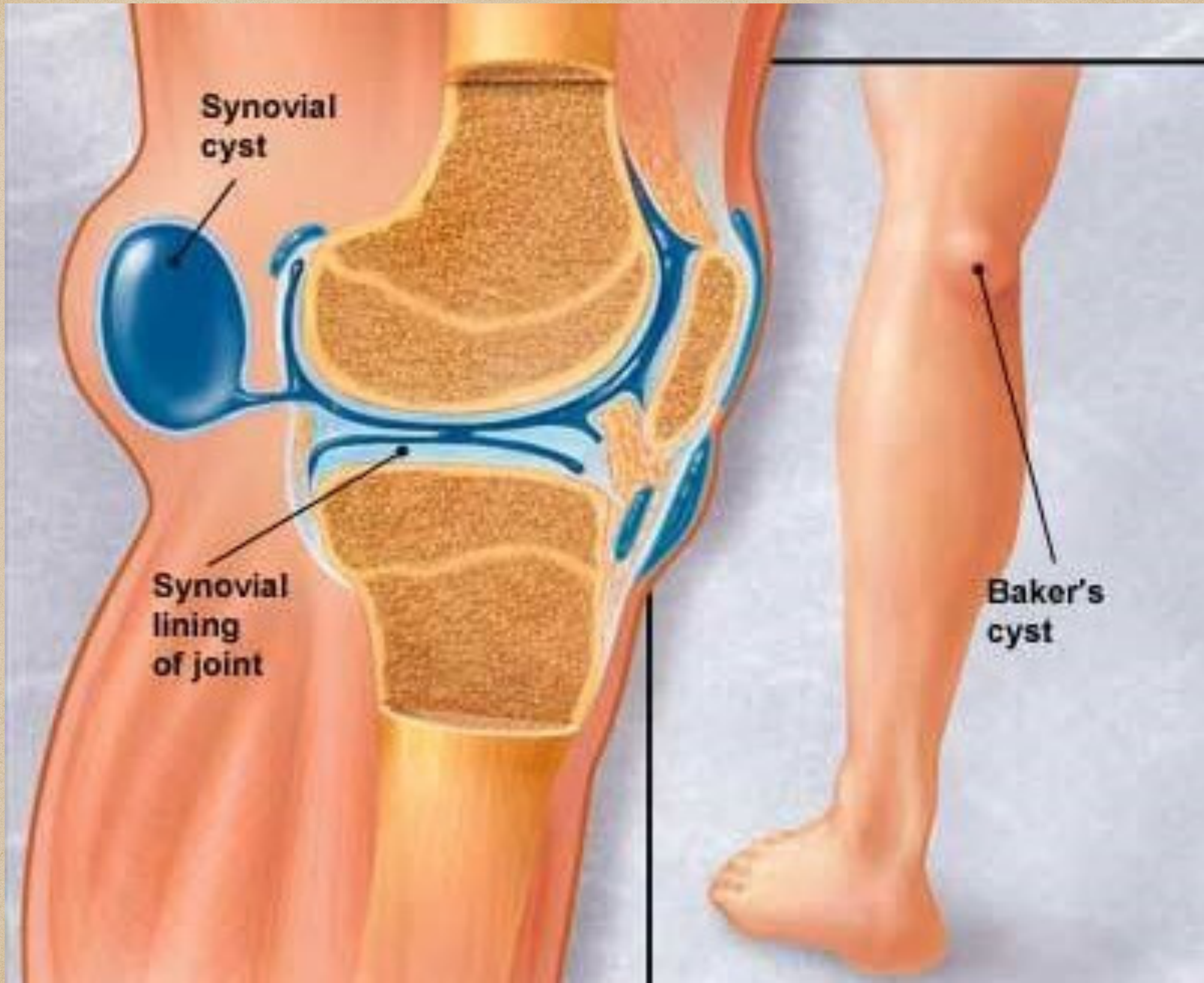
ChiroUp recommends Kettle Bell Goblet Squat exercises for knee strength and you can be locate them [here](#).

Obst SJ, Peterson B, Heales LJ. Lower limb strength in patellar tendinopathy-A systematic review with meta-analysis. Journal of Athletic Training. 2023 Apr 19. [Link](#)

A Baker's cyst is a fluid-filled sac that forms in the popliteal fossa, which is located on the posterior aspect of the knee.

In adults, Baker's cysts are commonly associated with degenerative conditions of the knee

Patients may present with tightness, discomfort, or pain behind the knee.





Knee arthritis is by far the most common cause of Bakers cysts.



The most common injury to cause a Bakers cyst is a *cartilage tear*.



There are a few types of inflammatory arthritis that increase the risk of developing a Bakers cyst, the most common being *gout*.

Indicators for lateral/medial condyle

- ◆ Unnamed Orthopaedic test - leg in full extension, check for play. Any motion medial or lateral is a listing
- ◆ Leg check/swipe the condyle
- ◆ Muscle test/therapy localise or static challenge

Adjusting the Knee: Wrist Extension Thrust Technique

5 Important Points/Rules:

◆ Apply the proper pressures.

a. Pressure Hand – 50-70 lbs (non-dominant hand)

b. Speed Hand – 10 lbs (dominant hand)

Total – 60-80 lbs minimum

◆ Do not torque.

◆ Do not rebound.

◆ Apply pressure evenly from thumb to the little finger on pressure hand.

◆ The elbows ARE NOT involved



Adjusting the Knee: Wrist Extension Thrust Technique

◆ Pressure Hand:

◆ Fingertip on thumb of non-dominant hand.

◆ Proximal phalanges and thumb pad make single flat surface. Thumb pad on contact point.

◆ Even pressure over entire area.

◆ Speed Hand:

◆ On Dominant hand, cross thumb pad over DIP of index finger. Thumb points toward doctor.

◆ Speed thumb pad on pressure thumbnail.

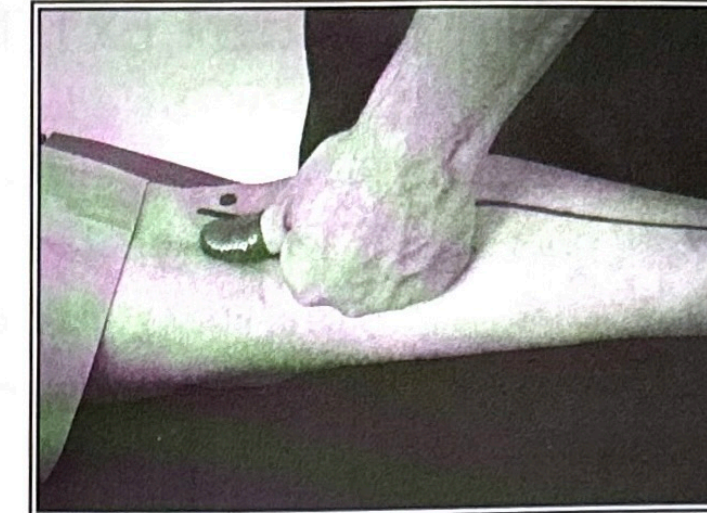
◆ Pressure:

◆ Roll speed thumbnail toward pressure hand. Pressure hand applies 50-70 lbs. of pressure. Speed hand applies 8-10 lbs.

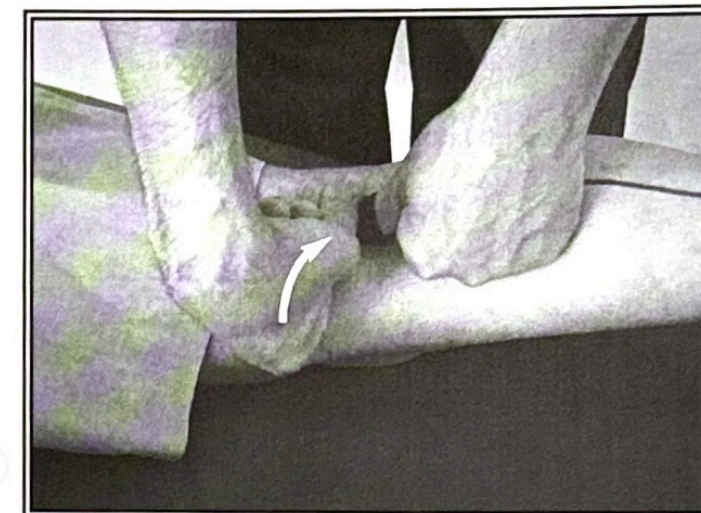


4. Set-up :

The thumb pad of the pressure hand contacts the appropriate contact point. The flat surface of the proximal phalanges contact an area superior or inferior to the tibial condyles.



The thumb pad of the speedhand contacts the thumbnail of the pressure hand. The entire speedhand then "rolls" toward the pressure hand putting the speedhand into flexion. The doctor will note that the medial border of the speedhand thumb is contacting the thumbnail of the pressure hand. Doctor's knee is then flexed and placed next to patient's knee.



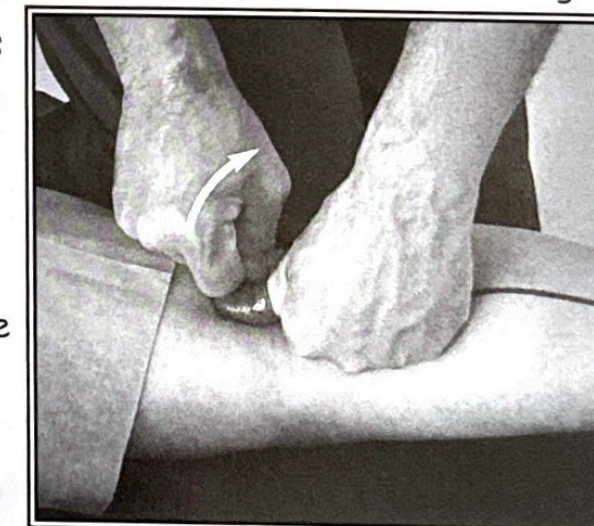
5. Proper Pressures:

Pressure Hand: Doctor applies 50-70 pounds of pressure into the popliteal fossa area. Pressure is even from thumbtip to little finger.

Speed Hand: Doctor applies an additional 10 pounds of pressure onto thumbnail of pressure hand.

6. The Thrust:

The thrust is achieved by simultaneously applying appropriate pressures with hands and extending the wrist of the speed hand as quickly as possible. The doctor's anterior "inside" surface of the forearm and the lateral/"outside" surface of the upper leg should be parallel prior to wrist extension thrust. The flat surfaces of the forearm and thigh should meet from the wrist to the elbow upon extension of the wrist. It is important to stop the thrust abruptly by striking the forearm against the thigh.



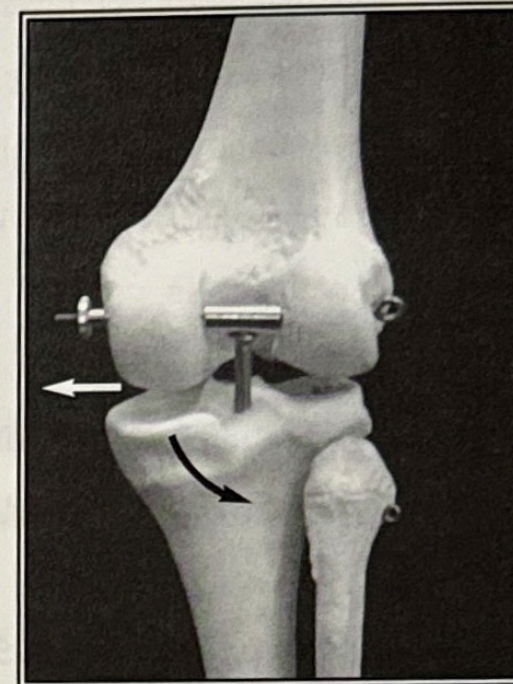
KNEE LISTINGS

These listings are based on Dr. Ray Zindler's interpretation of the knee and its function.

LISTING SYSTEM:

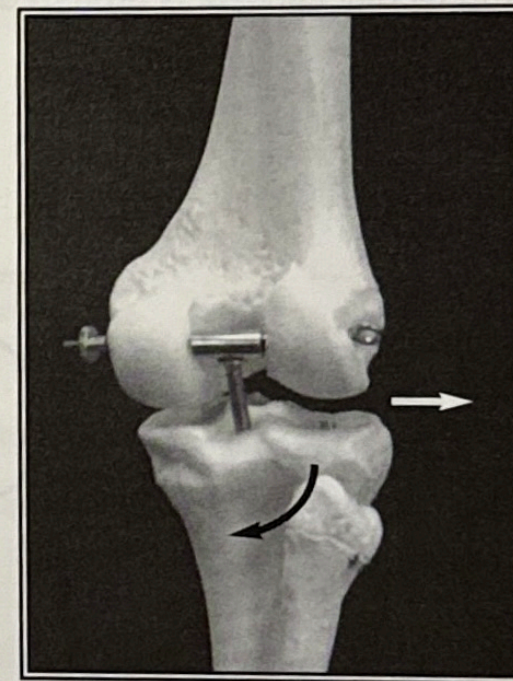
1.) Medial Condyle:

With patient's knee in "locked" extension position, there is motion (to some degree) in the medial/valgus direction (shown by white arrow). This indicates the medial condyle of the tibia has rotated posterior to some degree. The medial condyle of the tibia should be adjusted.



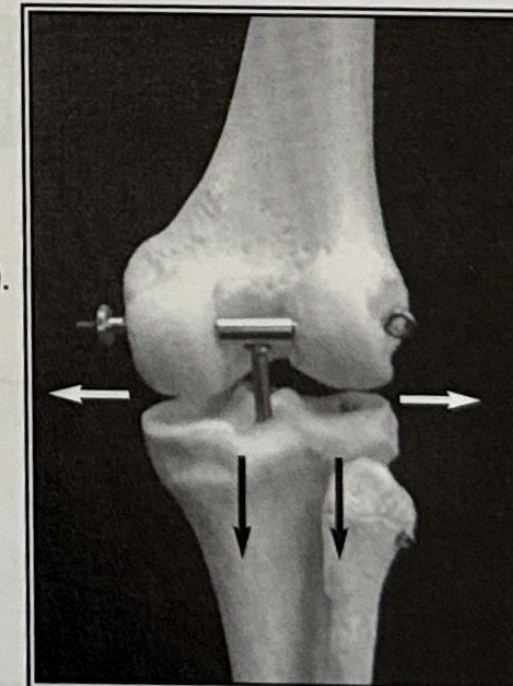
2.) Lateral Condyle:

With patient's knee in "locked" extension position, there is motion (to some degree) in the lateral/varus direction (shown by white arrow). This indicates the lateral condyle of the tibia has rotated posterior to some degree. The lateral condyle of the tibia should be adjusted.



3.) Posterior Tibia:

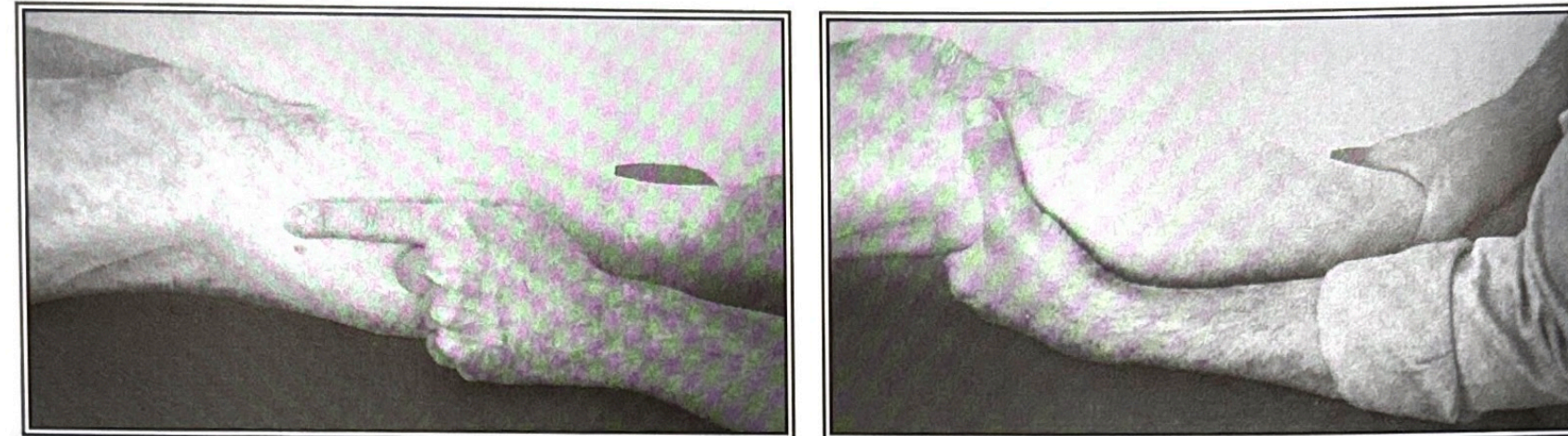
With patient's knee in "locked" extension position, there is motion in both medial/valgus and lateral/varus directions (shown by white arrows). This motion is usually not symmetrical and indicates the tibia has misaligned/subluxated in a posterior direction.



Fibular Head - Posterior and Lateral Subluxation/Fixation

Though the fibular head is part of the knee complex, I adjust it as part of the pronation protocol. It is typical for the doctor to find point tenderness on the posterior and/or lateral aspect(s) of the fibular head with this subluxation/fixation.

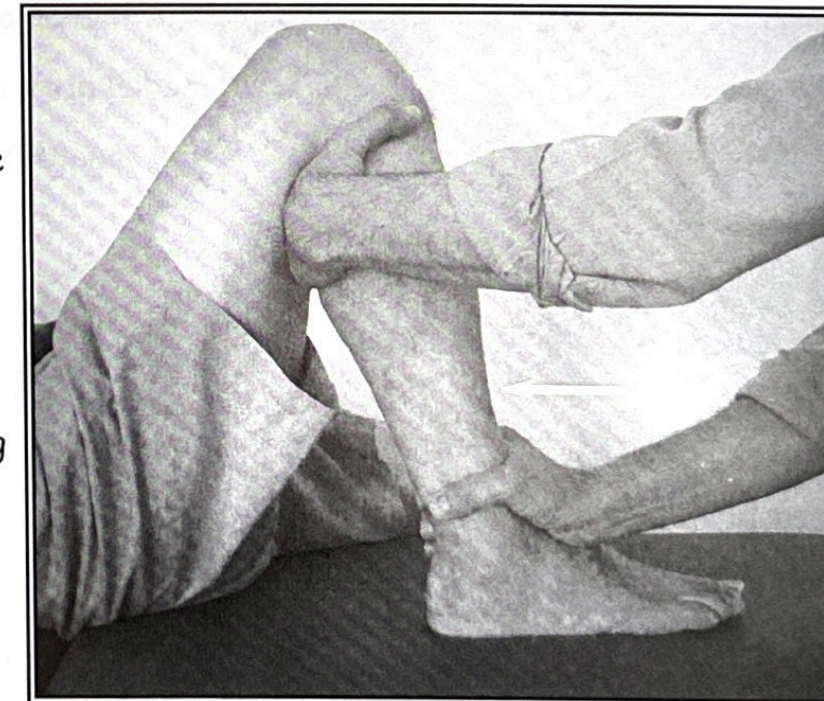
ADJUSTMENT:



With the doctor standing on the lateral aspect of the patient's leg, doctor's "inside" hand grasps patient's lower leg slightly above the ankle while the index finger of the "outside" hand locates the fibular head. This same index finger will take a tissue pull on the fibular head in an anterior to posterior direction followed by a tissue pull in a lateral to medial direction. The 1st metacarpal-interphalangeal joint should be contacting the posterior aspect of the fibular head and the doctor should not be able to see his/her 1st metacarpal-interphalangeal joint. This knuckle is acting as a fulcrum and does not move after this placement.

With the "inside" hand of the doctor grasping the patient's ankle, the doctor flexes the patient's knee and approximates the heel to the buttocks. When TENSION is achieved, doctor thrusts with the "inside" hand approximating the heel to the buttocks in a quick short arc. This will provide a posterior to anterior force on the fibular head. A "crisp" audible release is common.

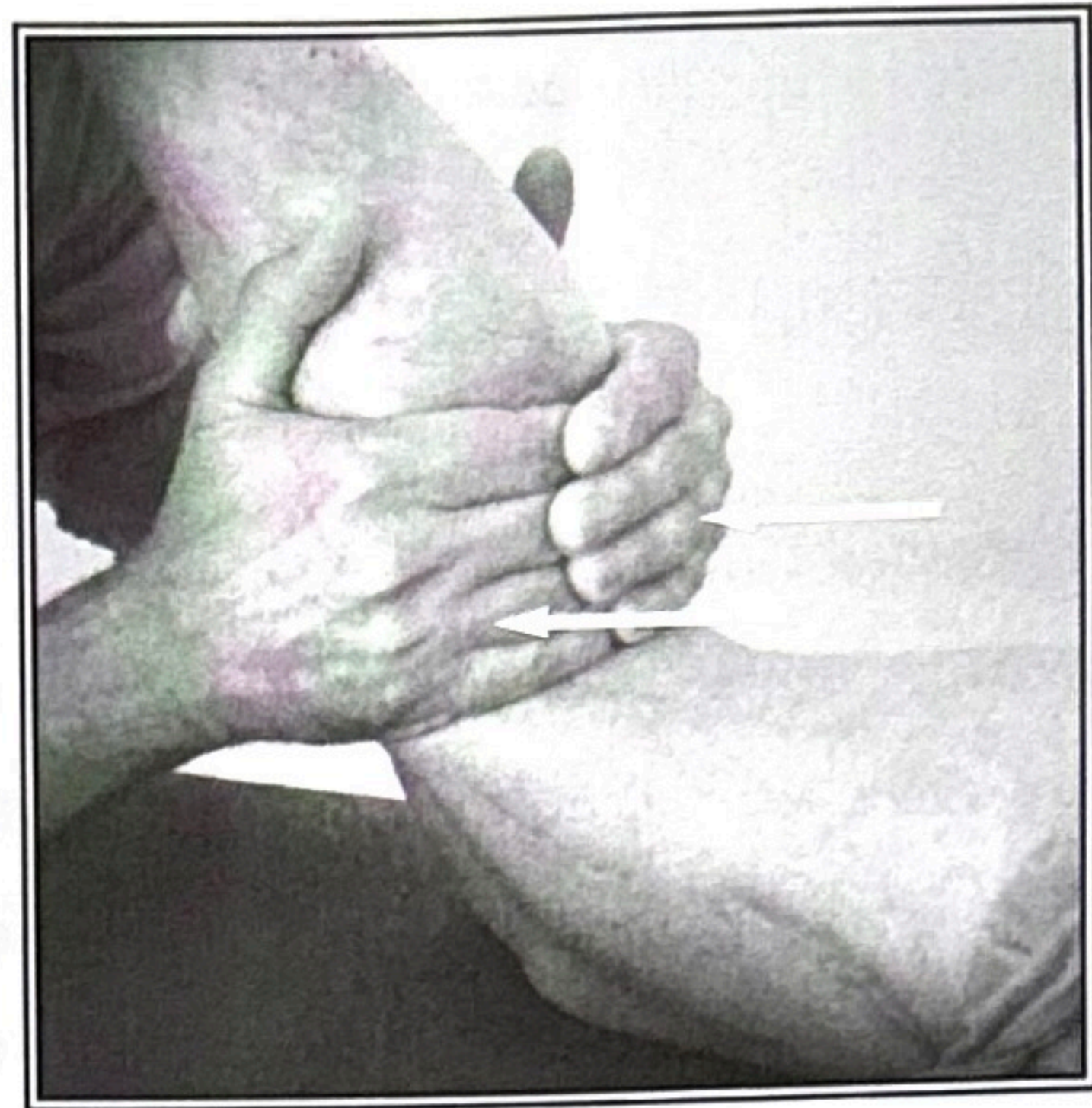
Great care should be exercised in order to keep the foot, knee and hip in alignment to avoid inducing tibial rotation.



KNEE ADJUSTMENT

PRONE KNEE FLEXION ADJUSTMENT:

With patient prone and knee flexed at 90 degrees, doctor contacts either medial or lateral condyle of the tibia with overlapped little fingers. Patient's ankle rests on doctor's clavicle area. Condyle is brought to TENSION with posterior to anterior pressure. A quick THRUST is delivered in a posterior to anterior direction.



With a listing of MEDIAL CONDYLE, only the medial condyle is adjusted. With a listing of LATERAL CONDYLE, only the lateral condyle is adjusted.

In the case of a listing of POSTERIOR TIBIA, both condyles are adjusted. It is recommended that the medial condyle is adjusted first followed by the lateral condyle.

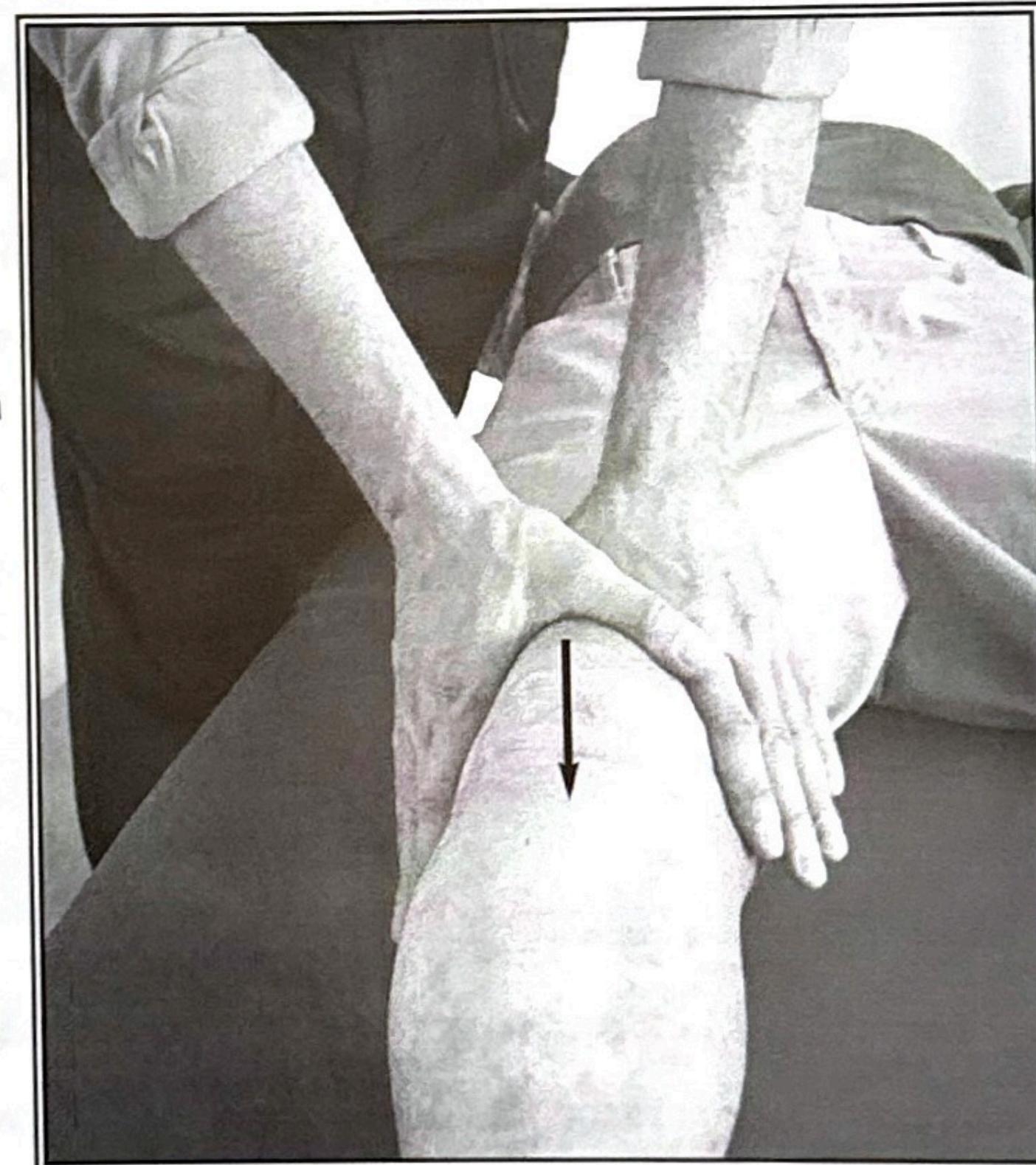
PATELLA - Superior or Superior/Lateral Subluxation

The most common direction of subluxation/fixation of the patella is in a SUPERIOR or SUPERIOR/LATERAL direction.

PROCEDURE:

The doctor contacts the superior border of the patella with both thumbwebs as shown. Pressure is applied in an inferior or inferior/medial direction. If patellar motion is not felt, a fixation/subluxation has occurred and an adjustment is indicated.

Thrust is via bilateral triceps contraction in an inferior or inferior/medial direction.



Set-up:

- ◆ Place knee on table so lateral thigh is parallel to forearm of speed hand.

Thrust:

- ◆ Apply appropriate pressures with hands and extend wrist as quickly as possible. Stop the thrust abruptly by sticking forearm against lateral thigh.

Contact Points: Bent over the pt. with elbows out, pushing posterior (15-20lb of pressure).

- ◆ Upper middle portion of condyle, and
- ◆ Medial condyle= medial listing
- ◆ Lateral condyle= Lateral listing
- ◆ Both condyle= En mass listing

Posterior Tibia alternate technique: Pt. prone with knee bent. Same Listings as wrist extension tech.



Lateral Condyle Correction:

- ◆ Knee extension resistive exercises with leg externally rotated.

Post Tibia Correction:

- ◆ Knee extension resistive exercises with leg internally rotated and then with leg externally rotated.
- ◆ For all exercises, maintain upright posture with neck in true flexion (double chin)

The Hip:

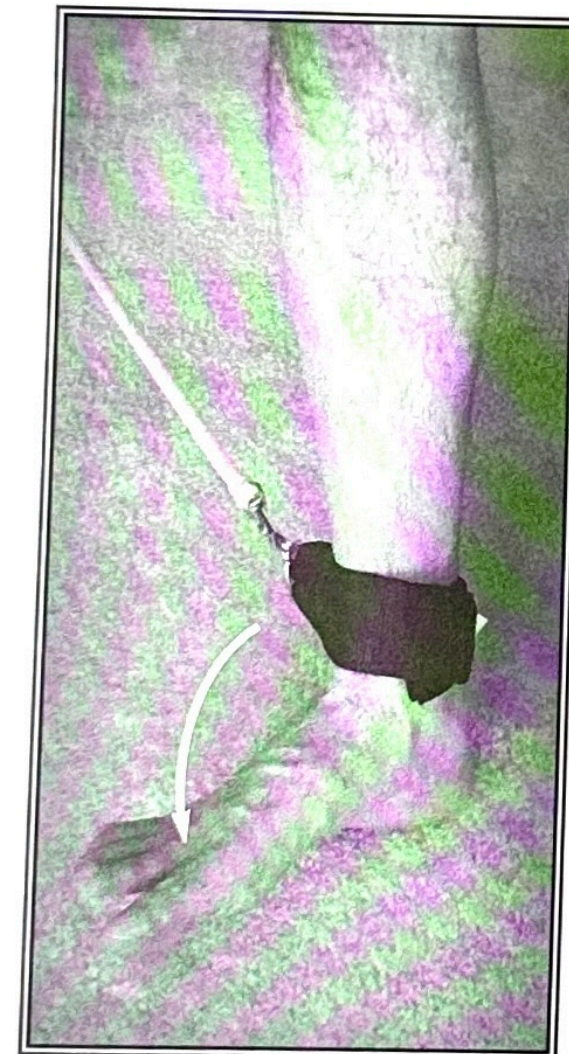
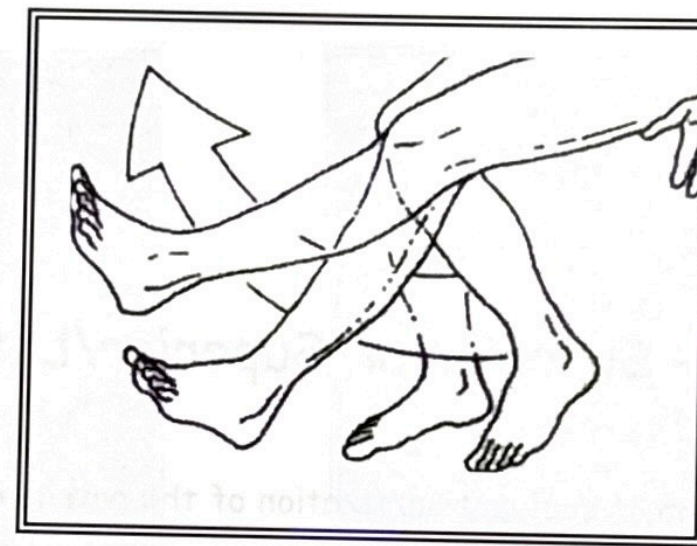
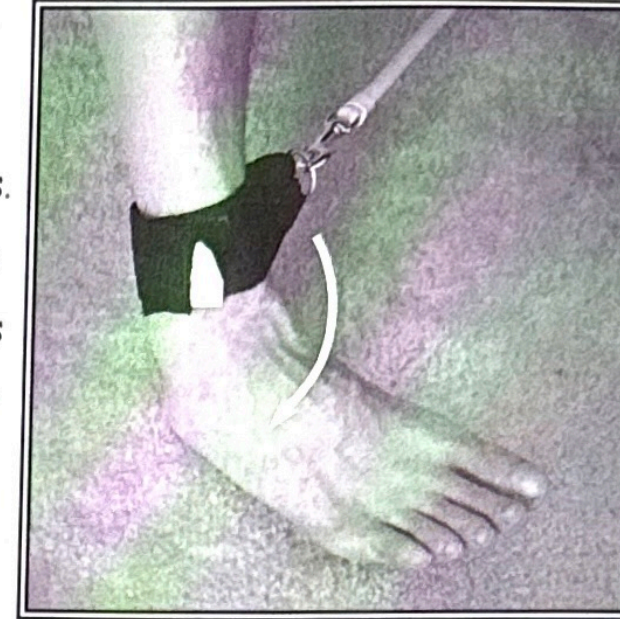
- ◆ Abduction against resistance



Knee-Targeted Exercises

TARGETED REHABILITATION:

1. Medial Condyle Listing: Using flexible tubing or a leg extension machine, the patient performs a series of leg extension repetitions. Patient's leg is rotated internally ("toe-in") then extended. This exercise will help balance the knee by stressing the vastus lateralis of the quadriceps group. I recommend 20 repetitions twice daily for 2 months.



2. Lateral Condyle Listing: Using flexible tubing or a leg extension machine, the patient performs a series of leg extension repetitions. Patient's leg is externally rotated ("toe-out") then extended. This exercise will help balance the knee by stressing the vastus medialis of the quadriceps group. I recommend 20 repetitions twice daily for 2 months.

3. Posterior Tibia Listing: Doctor has the patient do a set of leg extension repetitions in both the internally and externally rotated positions.

The Hip

Red flags - hip and/or groin pain

History of cancer

History of trauma

fever

unexplained weight loss

burning with urination

night pain

prolonged corticosteroid use

CoCommon Intra- and Extra-articular Causes of Hip Pain

Intra-articular Causes of Hip Pain

- Labral tear
- Extra-articular bony impingement
 - Loose bodies
 - Iliopsoas tendonitis
- Femoroacetabular impingement
- Internal or external snapping hip
 - Synovitis
 - Abductor tears
- Tears of the ligamentum teres
- Greater trochanteric bursitis
- Chondral injury

Extra-articular Causes of Hip Pain

- Femoral neck stress fracture
- Proximal adductor, hamstring, or rectus injuries
 - Piriformis syndrome
 - Deep gluteal syndrome
 - Sacroiliac joint pain
 - Athletic pubalgia
 - Osteitis pubis

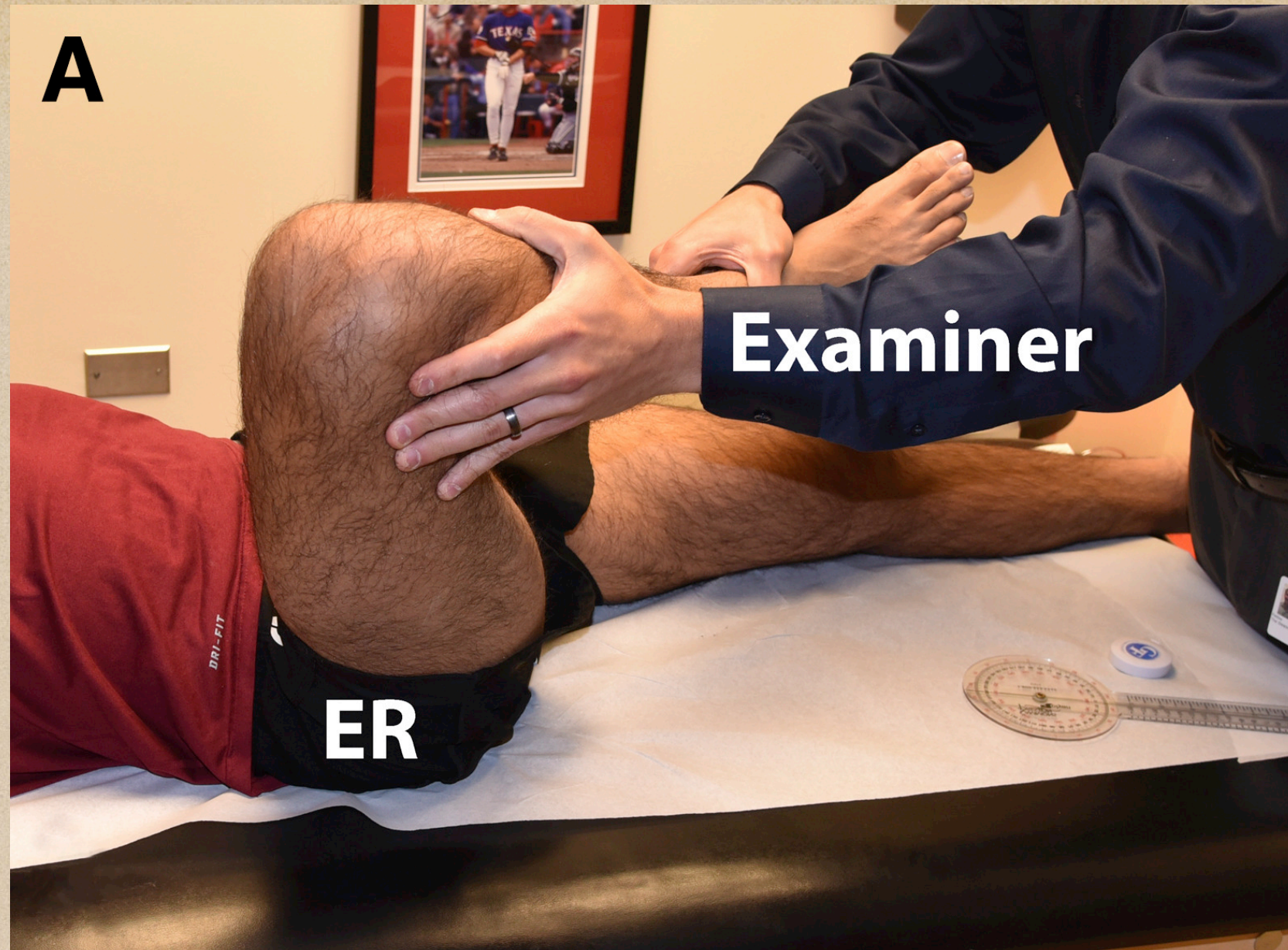
Hip Analysis

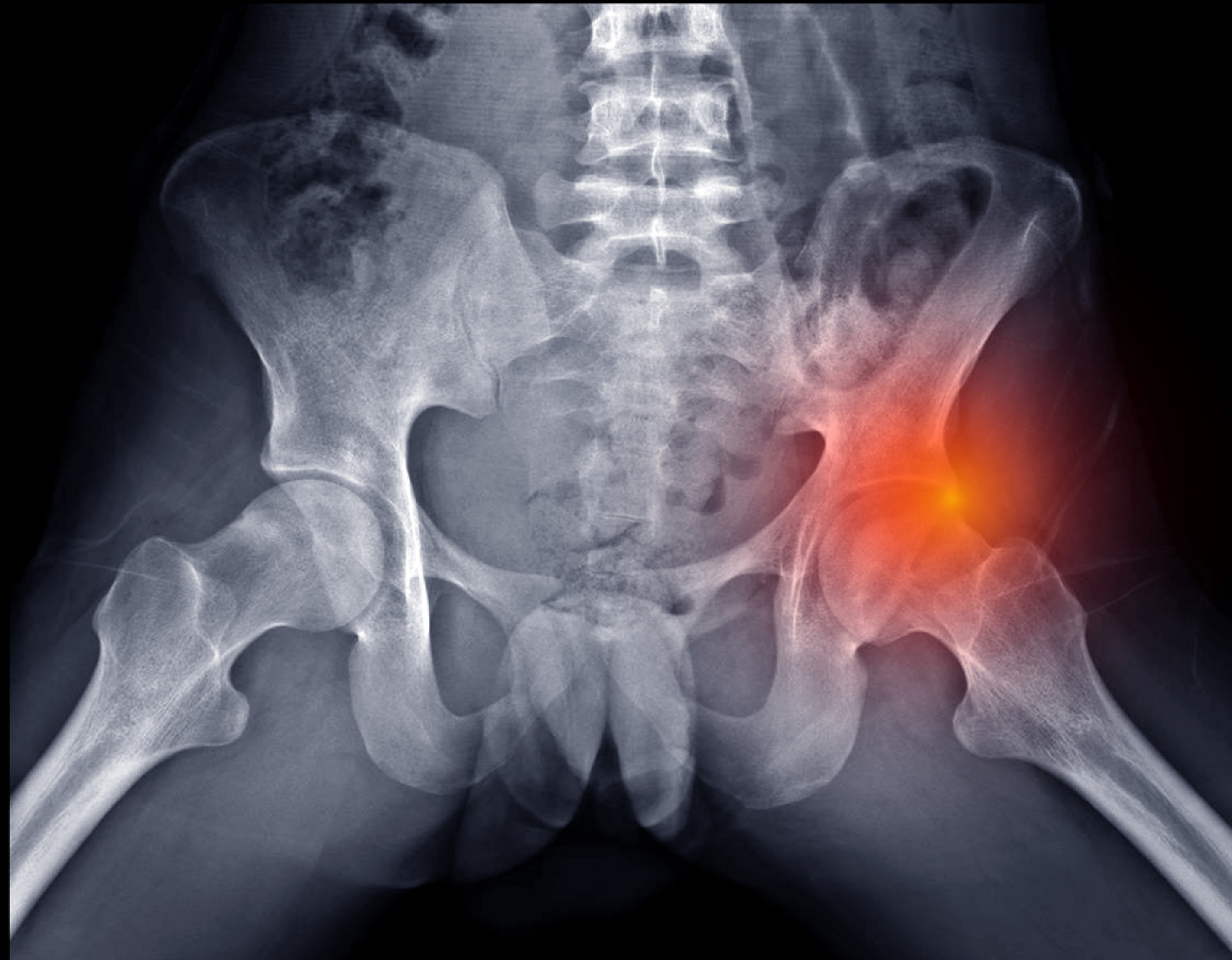
- ◆ Check for motion bilaterally
- ◆ Do hip impingement test -
- ◆ Test psoas bilaterally
- ◆ Muscle test for anterior hip/drop straight A to P
- ◆ Muscle test for external rotation - drop medial to lateral

Impingement-Specific Testing

The flexion, internal rotation, and adduction (FADIR) test evaluates anterior rim FAI by passively flexing the hip to 90° , with adduction and internal rotation (Fig 4). A study by Wyss et al.²³ showed an inverse relationship between the amount of passive hip internal rotation at 90° of flexion and the severity of a cam lesion. Posterior rim impingement is evaluated by extending the hip in an abducted and externally rotated position (hanging the affected leg off the edge of the examination table). The hip is then brought through a progression of passive flexion to extension while maintaining hip abduction with pain or resistance indicating a positive test (Fig 4).²⁴

Fig 4. Testing for anterior impingement (FADIR) on a right hip on a patient in the supine position. The examiner takes the relaxed extremity into a flexed slight abducted position (A) into a flexed, adducted, and internally rotated position (B). Pain or clicking indicates a positive test for anterior impingement. (ER, external rotation; FADIR, flexion, internal rotation, and adduction; IR, internal rotation.)





The clinician grasps the supine patient's calf and ankle and moves their lower limb into a FABER position (Flexion, Abduction, and External Rotation). The clinician then moves the patient's limb into a FADIR position (Flexion, Adduction, and Internal Rotation) while "bouncing" the hip via subtle alternating internal and external rotation. Reproduction of anterolateral hip or groin pain suggests hip labral lesion with reported 0.94 sensitivity and 0.33 specificity.

Arlington Test

The clinician grasps the supine patient's calf and ankle and moves their lower limb into a FABER position (Flexion, Abduction, and External Rotation). The clinician then moves the patient's limb into a FADIR position (Flexion, Adduction, and Internal Rotation) while "bouncing" the hip via subtle alternating internal and external rotation. Reproduction of anterolateral hip or groin pain suggests hip labral lesion with reported 0.94 sensitivity and 0.33 specificity.



05/16/2023

Hip Osteoarthritis Decreases Lower Limb Strength

Disability and Rehabilitation:

"Moderate-to-severe hip osteoarthritis may be characterised by bilateral deficits in lower-limb maximal strength, markedly lower knee extensor endurance and impaired functional performance."

Find gentle hip sparing Quadriceps exercises here at [ChiroUp](#).

Burgess LC, Taylor P, Wainwright TW, Swain ID. Strength and endurance deficits in adults with moderate-to-severe hip osteoarthritis, compared to healthy, older adults. *Disability and Rehabilitation*. 2022 Sep 11;44(19):5563-70. [Link](#)

Origin-Insertion Technique

- The first technique used in applied kinesiology to change muscle function was stimulation of the muscles origin and insertion
- In 1964 Goodheart was using manual muscle testing to identify muscle dysfunction involved with poor structural integrity
- On one patient he observed a weak serratus anticus muscle
- The weakness was paradoxical because there was no observable atrophy of the muscle in comparison to the opposite side
- On closer examination, palpation revealed discrete painful nodules at the origin of the muscle and the ribs
- This finding was not present on the opposite serratus Anticus which had normal strength.



- ◆ Origin/Insterion problems - typical areas
- ◆ Medial knee
- ◆ Pubic bone
- ◆ Iliac crest/QL origin
- ◆ Can be any area after trauma



ANCILLARY ADJUSTMENTS WITH MUSCLE TESTING

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Hour 4

Wrist and Elbow Adjusting, Taping and Rehab



- ◆ One third of all acute injuries seen in emergency rooms involve the upper extremities.
- ◆ Two thirds of upper extremity injuries occur to individuals in their working years.
- ◆ The most common disabling work injuries in the united states involve the upper extremities, accounting for over one fourth of all disabling work injuries. One out of six disabling work injuries involve the fingers, most often due to the finger striking or being struck against a hard surface.
- ◆ One fourth of athletic injuries involve the hand and wrist.
- ◆ Children under the age of six are at the greatest risk for crushing or burning injuries of the hand.



- One out of six of congenital anomalies recorded on birth statistics involve the upper extremities.
- White children are four times more likely than black children to be born with webbed fingers.
- Black children are ten times more likely than white children to be born with extra fingers.
- The thumb is controlled by 9 individual muscles, which are controlled by:
- All 3 major hand nerves: **The radial, ulnar and median nerves.**



Anatomical facts

- ◆ Each hand contains (plus or minus... Everyone is different, and everyone counts these things differently...)
- ◆ 29 major and minor bones (many people have a few more).
- ◆ 29 Major Joints.
- ◆ AT least 123 named Ligaments.
- ◆ 34 muscles which move the fingers and thumb:
 - 17 in the palm of the hand, and
 - 18 in the forearm.
- ◆ 48 named nerves:
 - 3 major nerves.
 - 24 named sensory branches.
 - 21 named muscular branches.
- ◆ 30 named arteries and nearly as many smaller named branches.

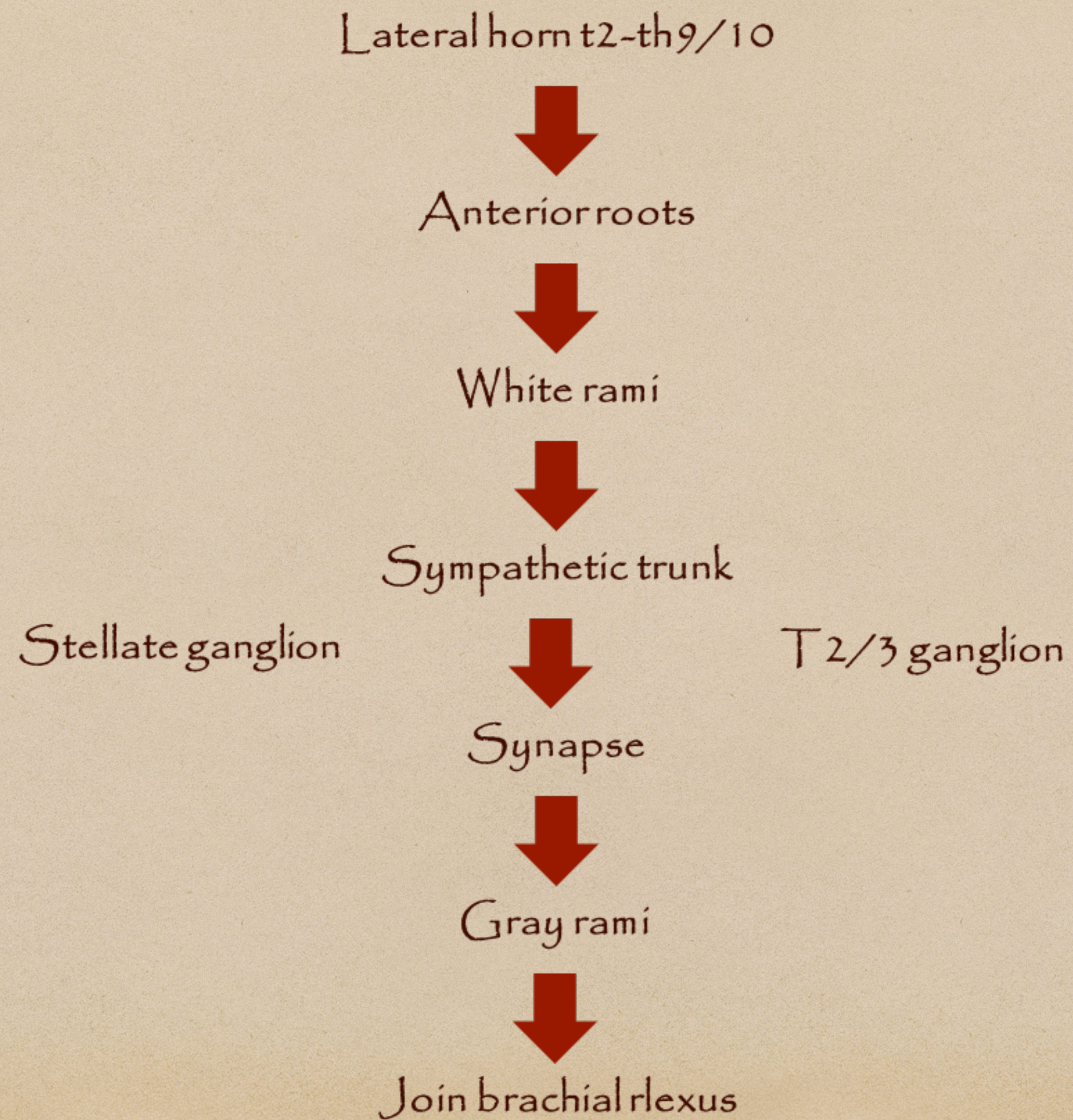


Wrist-Hand

- ◆ Very complicated mechanics.
- ◆ Great deal of flexibility.
- ◆ 20-25% of acute injuries.
- ◆ Large potential for acute and overuse injuries.
- ◆ Many interactive joints, its total function depending upon the integrity of the different joints and the nerves and muscles governing them.



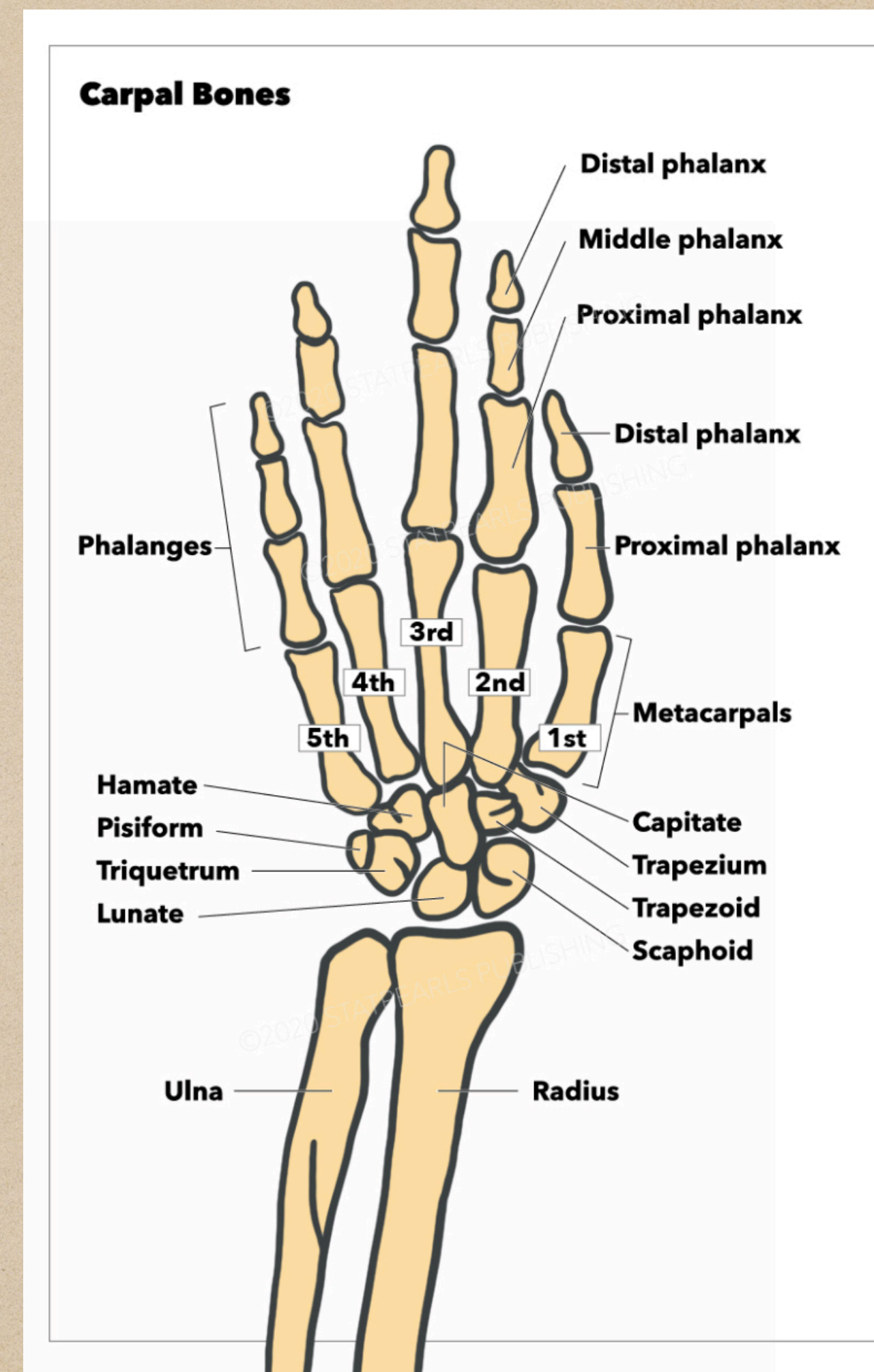
Sympathetic nerve supply to upper extremities

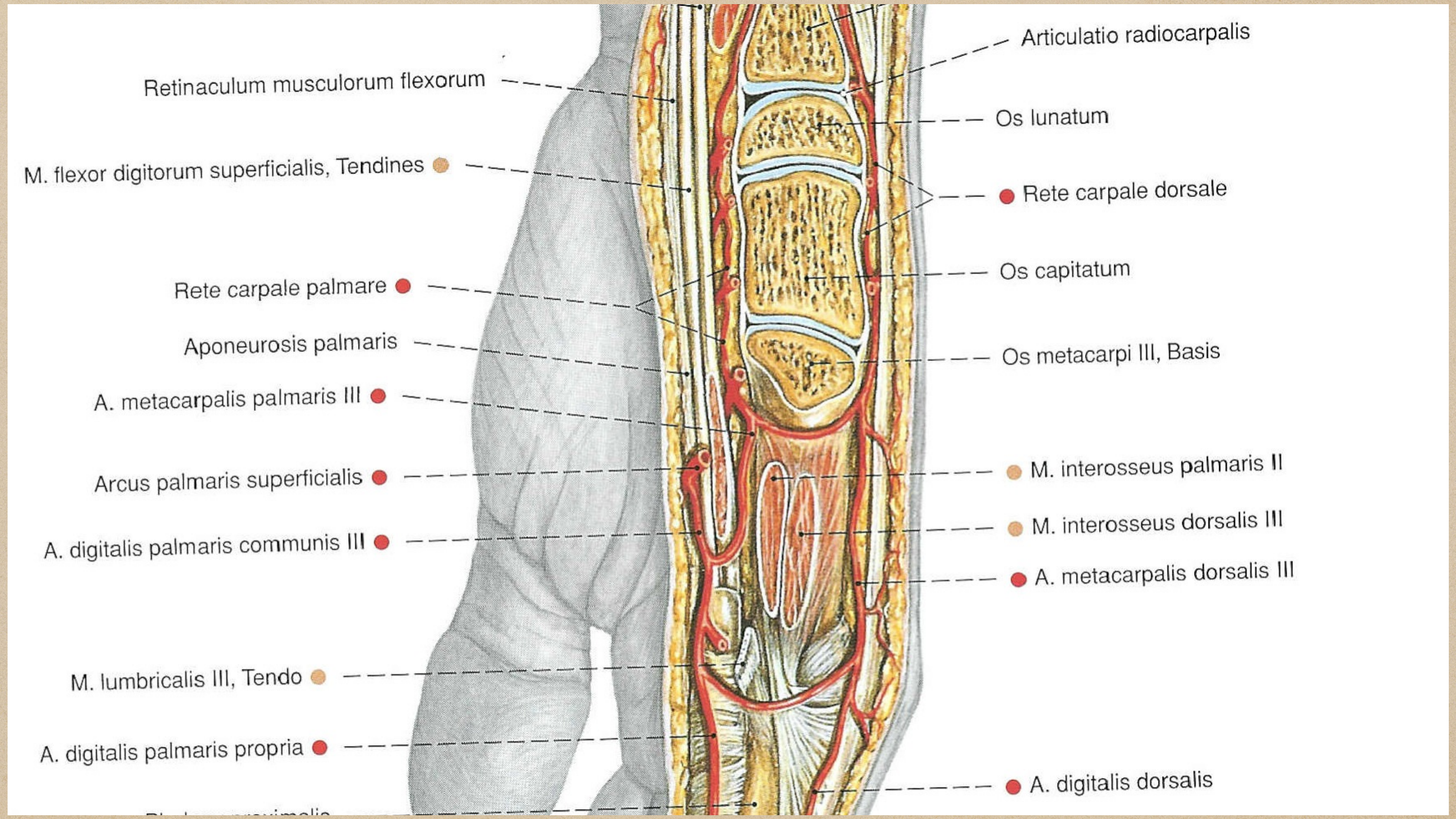


- ◆ Ascending sympathetic fibers through the sympathetic trunk join peripheral nerves from C2-8 spinal nerves.
- ◆ These project onto effectors in the head, neck, upper limbs and thoracic cavity.
- ◆ For example, a cephalic arterial nervous branch leaves the superior cervical ganglion and projects onto the peri-arterial plexus on the carotid arteries.
- ◆ From here they project onto the dilator muscle of iris.

Wrist and Elbow

- ◆ Scaphoid- Posterior & Medial
- ◆ Triquetrum -Posterior & Lateral
- ◆ Lunate- Anterior
- ◆ Thumb (Carpal-Metacarpal)- Lateral
- ◆ Radius-Lateral
- ◆ Ulnar-Medial
- ◆ Proximal Row of Carpals- Superior





Retinaculum musculorum flexorum

M. flexor digitorum superficialis, Tendines

Rete carpal palmare

Aponeurosis palmaris

A. metacarpalis palmaris III

Arcus palmaris superficialis

A. digitalis palmaris communis III

M. lumbricalis III, Tendo

A. digitalis palmaris propria

Articulatio radiocarpalis

Os lunatum

Rete carpal dorsale

Os capitatum

Os metacarpi III, Basis

M. interosseus palmaris II

M. interosseus dorsalis III

A. metacarpalis dorsalis III

A. digitalis dorsalis



Chronic

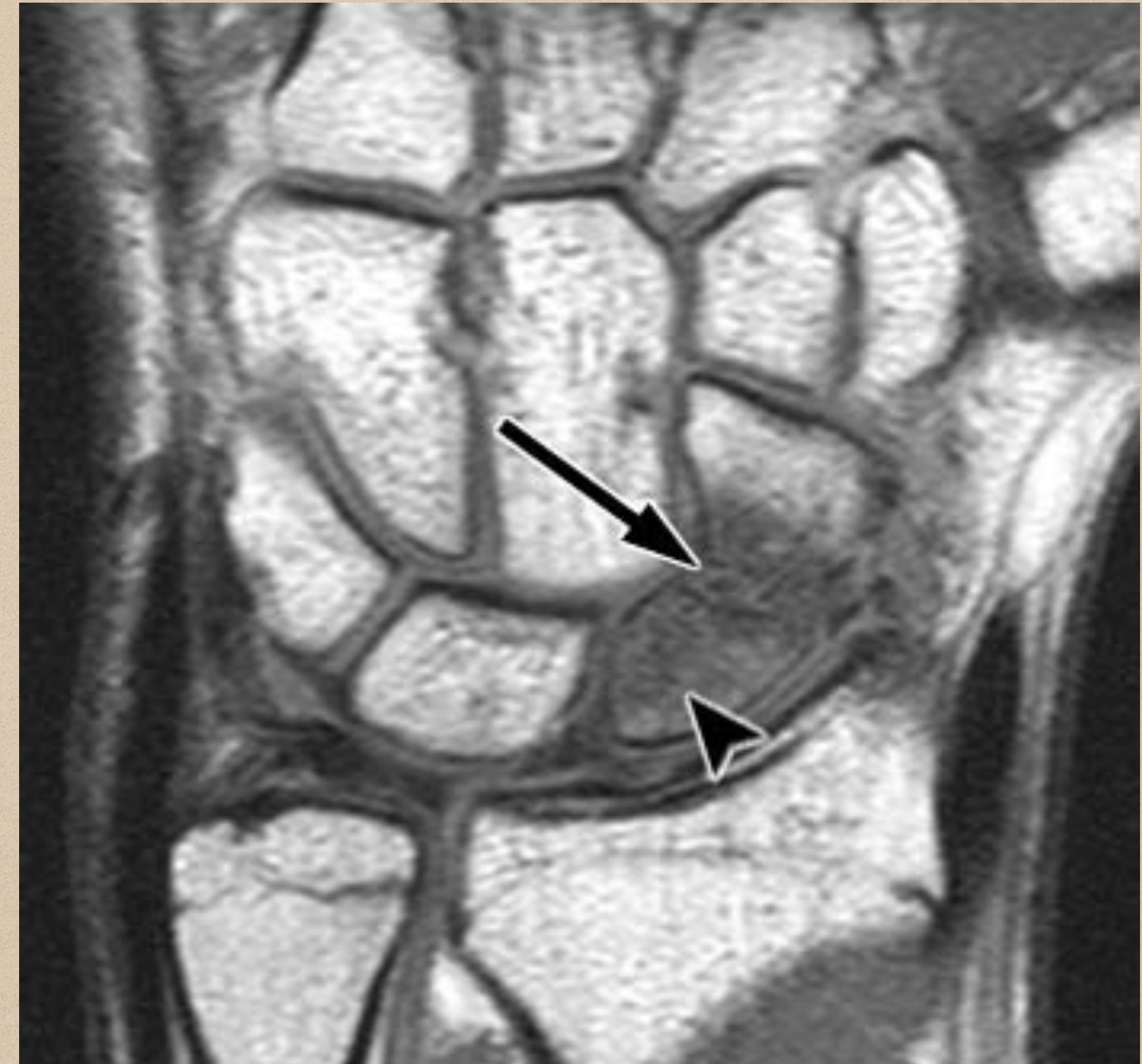
- ◆ Tendinitis.
- ◆ Carpal tunnel syndrome (canalis carpi syndrome).
- ◆ Tunnel of guyon's syndrome.
- ◆ Mouse overuse.
- ◆ De quervains, tennis elbow, golfers elbow often stem from problems of the wrist.
- ◆ Various other entrapment syndromes.



Nerve	Location	Name of entrapment
Median	Carpal Tunnel	Carpal tunnel syndrome
Median (ant interosseous)	Proximal forearm	Ant. interosseous syndrome
Median	Pronator Teres	Pronator Teres Syndrome
Median	Ligament of Struthers	Lig. Of Struthers Syndrome
Ulnar	Cubital Tunnel	Cubital tunnel syndrome
Ulnar	Guyons Canal	Guyons canal syndrome
Radial	Axilla	Rad. Nerve Compression
Radial	Spiral Groove	Rad. Nerve Compression
Radial (post interosseous)	Proximal forearm	Post. Interosseous nerve entr.
Radial (Superficial radial)	Distal forearm	Wartenbergs Syndrome
Suprascapular	Suprascapular notch	Suprascapular nerve entr.



◆ Fractures of the proximal part of the scaphoid, may result in avascular necrosis of part of the bone, because of lack of blood supply from the radial artery.



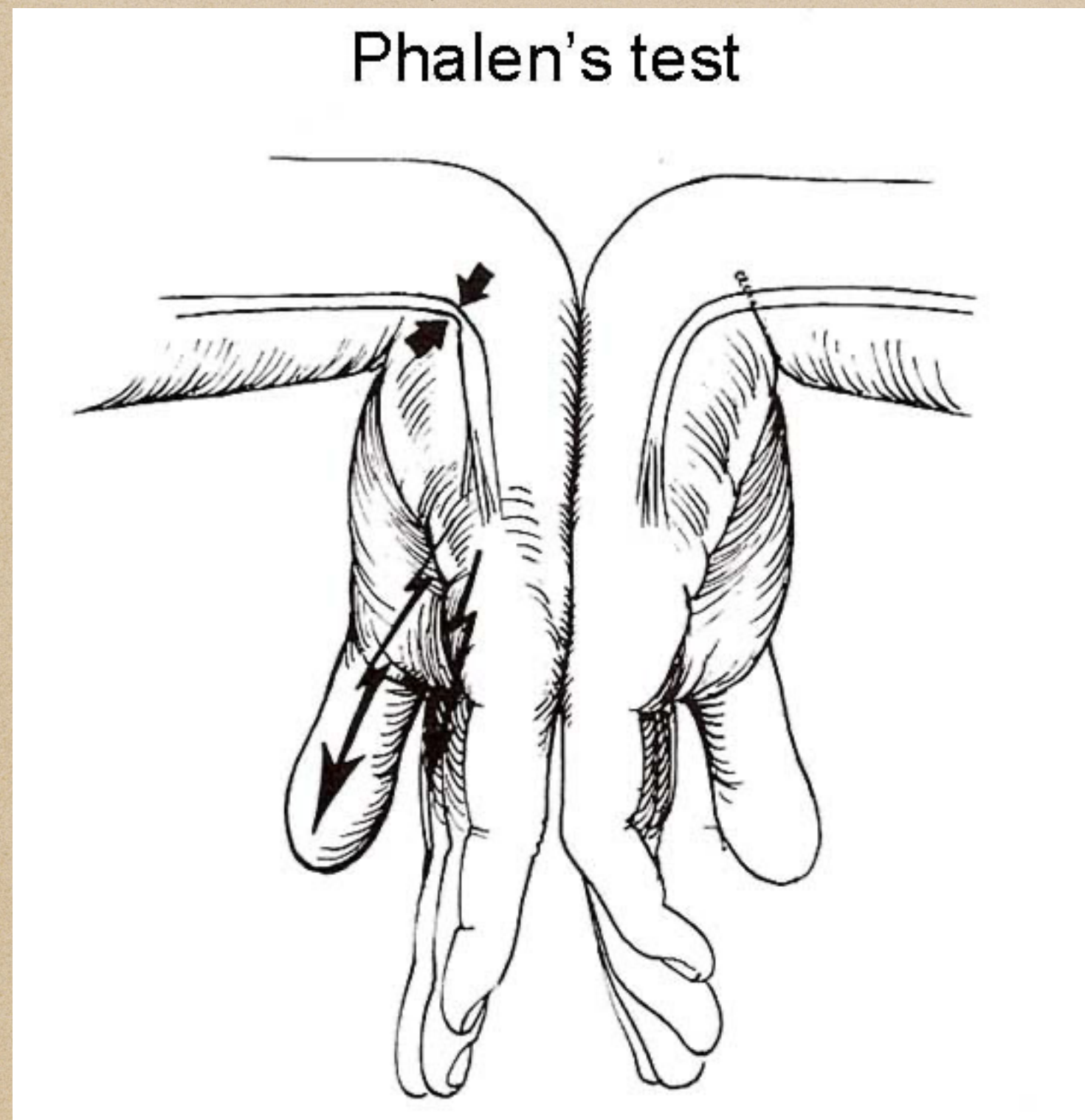
The carpal tunnel

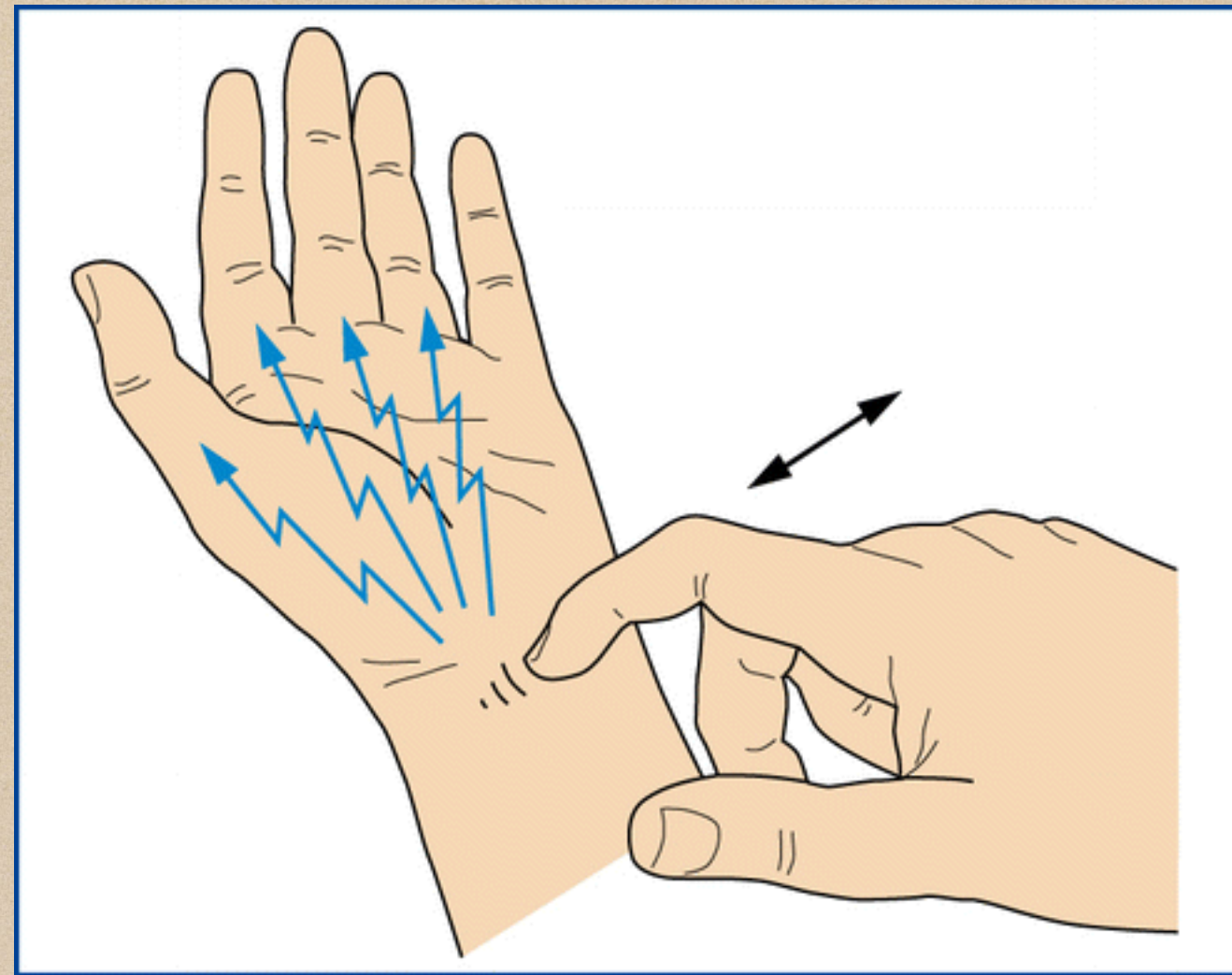
- ◆ The carpal tunnel is made up of the carpals on three sides and the flexor retinaculum ventrally.
- ◆ 8 carpals in an arch-like structure.
- ◆ Loss of integrity in, and thus flattening of the tunnel may result in entrapment of the median nerve and the blood vessels within the canal.
- ◆ Flattening of the tunnel is most often seen by the lunate bone (the key bone of the arch) subluxating ventrally into the canal.
- ◆ One may also see narrowing of the canal because of inflammation, swelling, tissue hypertrophy and increased water retention (e.G. As seen in pregnant women)



Testing for carpal tunnel problems by:

◆ Phalen's/reverse phalens test.



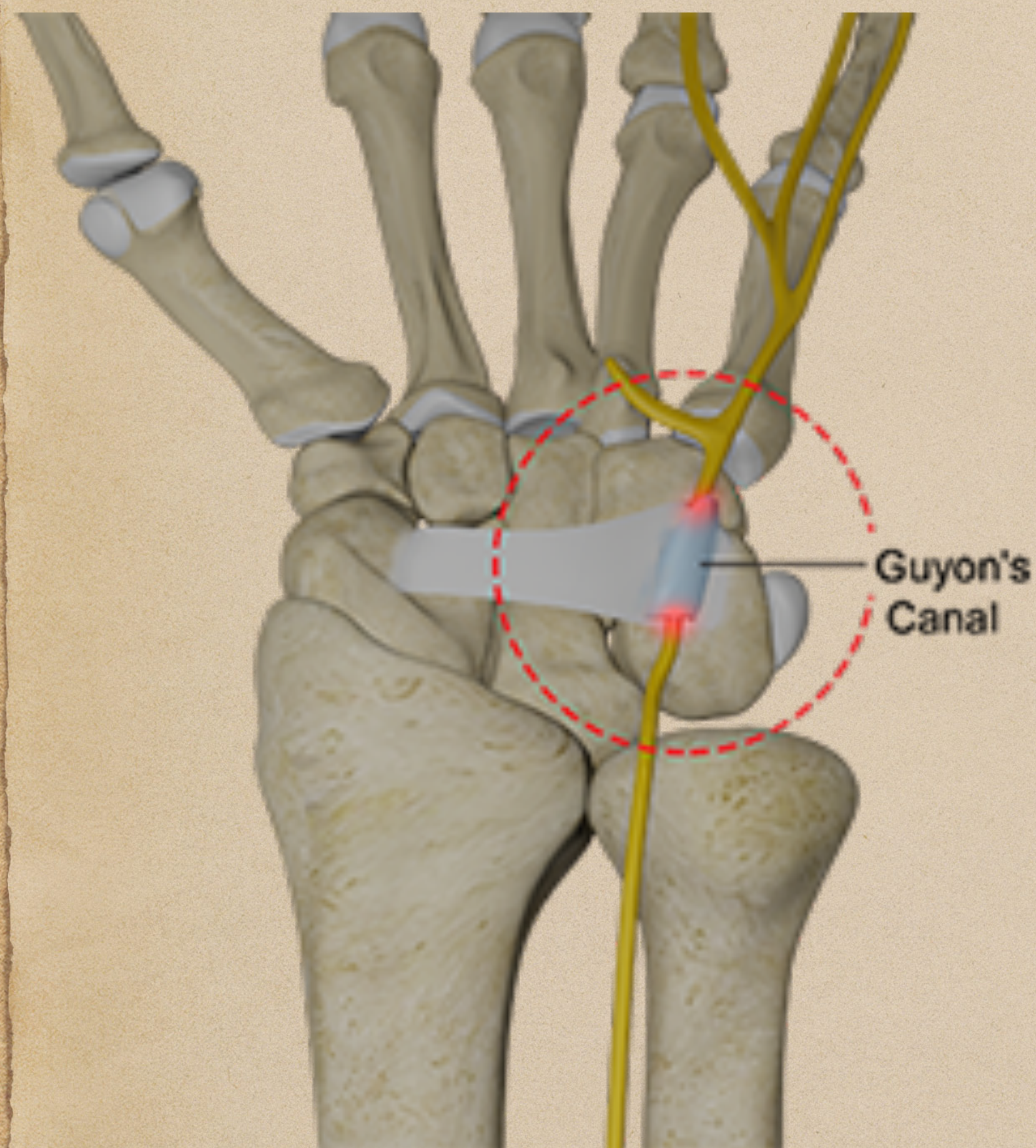


- ◆ Tinel tap test.
- ◆ Stress tests: provoking by repeated opening/closing of hand and/or repeated flexion / extension of the wrist. Testing sensitivity before and after. Symptoms will generally worsen following stress testing.
- ◆ Emg/neurography (nerve conduction velocity)



- ◆ Guyon's tunnel is placed medially on the ulnar side of the carpal tunnel.
- ◆ In a similar fashion, narrowing here may lead to entrapment of the ulnar nerve.
- ◆ Stress testing in a similar fashion.
- ◆ Emg / neurography.





Zones of Guyon's Canal Compression

Zone 1

Location

Proximal bifurcation of the nerve.

Symptoms

Mixed motor and sensory

Common causes

Ganglia and hook of hamate fractures



Dupuytren's Contracture

Dupuytren's contracture is a progressive hand condition involving abnormal collagen accumulation, resulting in the thickening and contracture of the palmar fascia. This leads to the formation of nodules and cords, causing the fingers to bend inward.

Pathogenesis is multifactorial, involving genetic predisposition, as well as environmental factors such as trauma, chronic inflammation, and microvascular changes.

Although painless in most cases, it can progressively impair hand function, affecting daily activities and dexterity.

Treatment options range from conservative measures like hand therapy and splinting to more invasive interventions such as needle aponeurotomy or surgical fasciectomy.



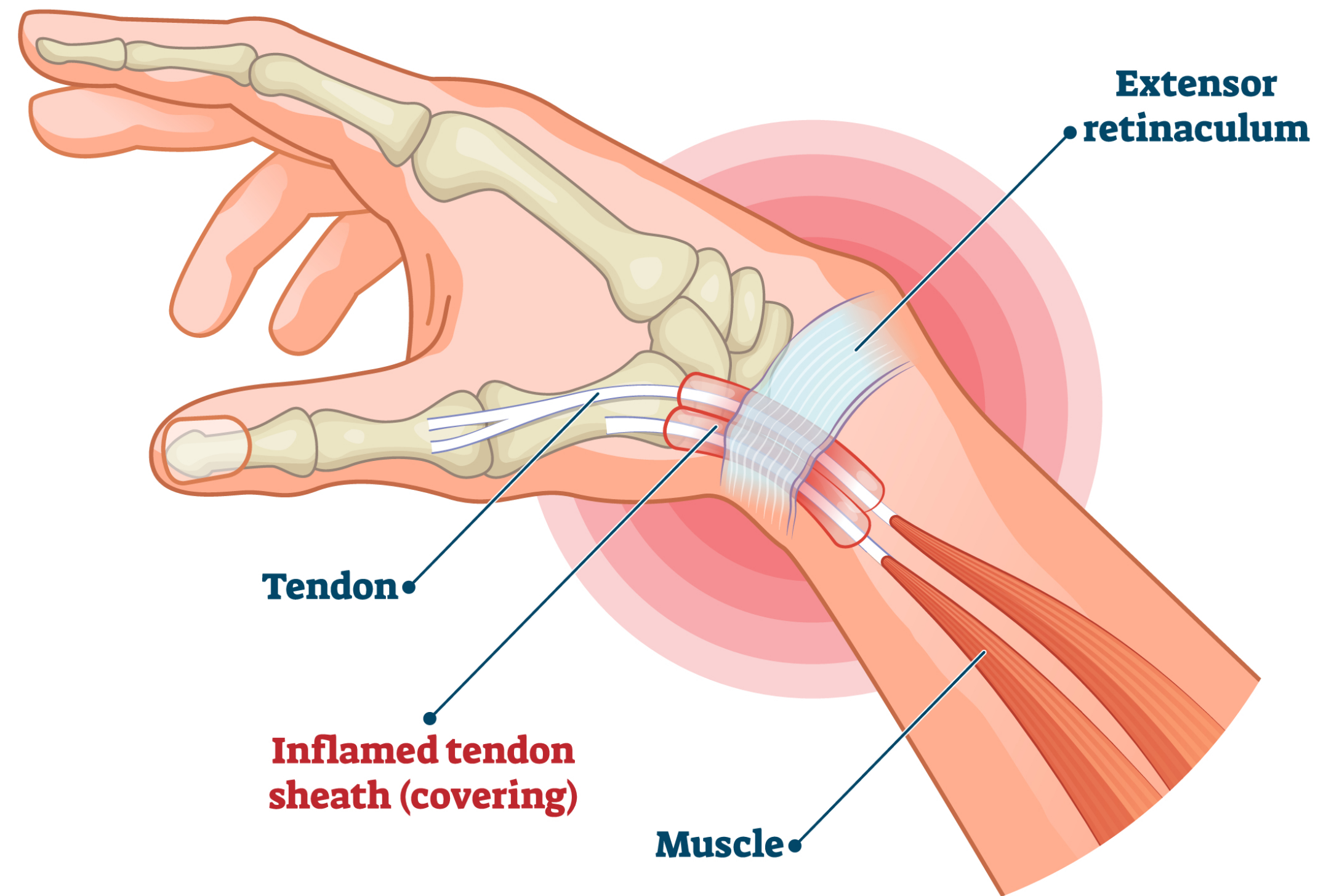
De quervain's syndrome

- ◆ De quervain syndrome aka texting thumb, gamer's thumb, washerwoman's sprain, radial styloid tenosynovitis, de quervain disease, de quervain's tenosynovitis, de quervain's stenosing tenosynovitis, mother's wrist
- ◆ Is a tenosynovitis of the tendon sheath/tunnel surrounding the two tendons controlling movement of the thumb.



De QUERVAIN SYNDROME

Inflammation of two tendons and their sheath that control movement of the thumb



Finkelstein Test

1. Place thumb in a closed fist



2. Tilt hand down



Pain felt during the Finkelstein Test is a positive indicator of de Quervain's syndrome.



11/24/2023

First-Line Treatment For de Quervain's Disease

JAMA Network Open:

"These findings suggest that administration of corticosteroid injection followed by 3 to 4 weeks immobilization should be considered as a first-line treatment for patients with de Quervain tenosynovitis."

Challoumas D, Ramasubbu R, Rooney E, Seymour-Jackson E, Putti A, Millar NL. Management of de Quervain Tenosynovitis: A Systematic Review and Network Meta-Analysis. JAMA Network Open. 2023 Oct 2;6(10):e2337001-. [Link](#)

Adjusting Scaphoid and Triquetrum:

- ◆ Traction – (inferior)
- ◆ Extend to Tension – (no more than 30 degrees)
- ◆ Thrust P to A – (without winding up or recoiling)

Adjusting the Lunate:

- ◆ Traction (inferior)
- ◆ Flex to Tension – (no more than 40 degrees)
- ◆ Pull – A to P (without flexing the wrist)
Alternate Method - Flick from I to S, from extension to flexion
- ◆ Radius and Ulna - “Traction and Squeeze” Carpal-Metacarpal - “Scoop” Lat. to Med.
- ◆ Rehab for the Wrist: Finger extension exercises with a rubber band.



THE WRIST

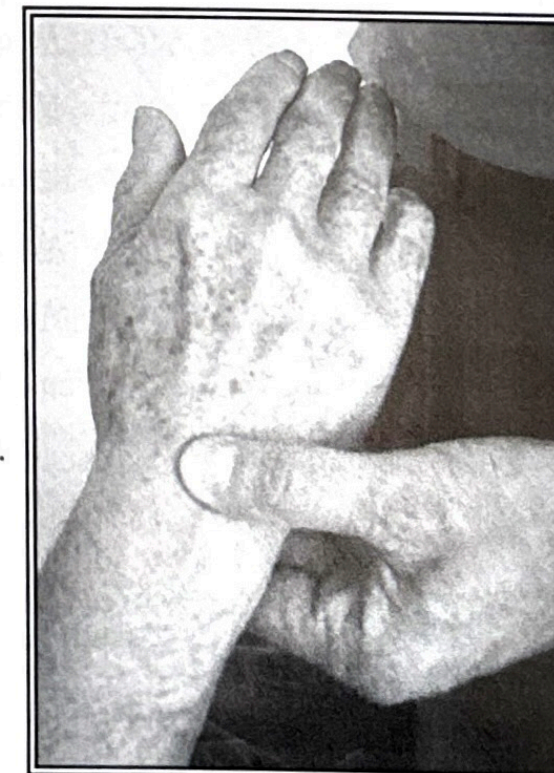
By far the most common position causing a subluxation complex of the wrist is that of EXTENSION.

TYPICAL WRIST SUBLUXATION PATTERN

Scaphoid	Posterior & Medial
Triquetrum	Posterior & Lateral
Lunate	Anterior
Thumb (Carpal-Metacarpal)	Lateral
Distal Radius—Ulna	Radius—Lateral Ulna—Medial
Proximal Row of Carpals	Superior



The chiropractor will palpate a marked ANTERIOR DEPRESSION of the lunate. If this indicator is present, the above pattern of subluxation/fixation has occurred to some degree.



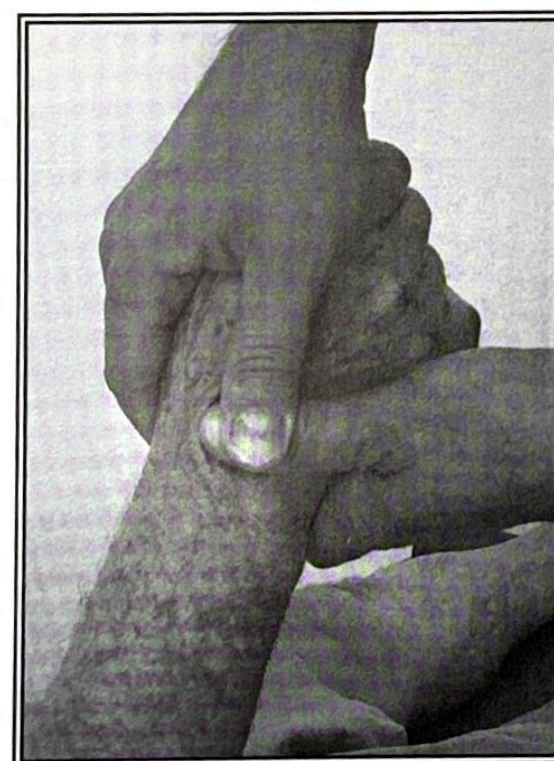
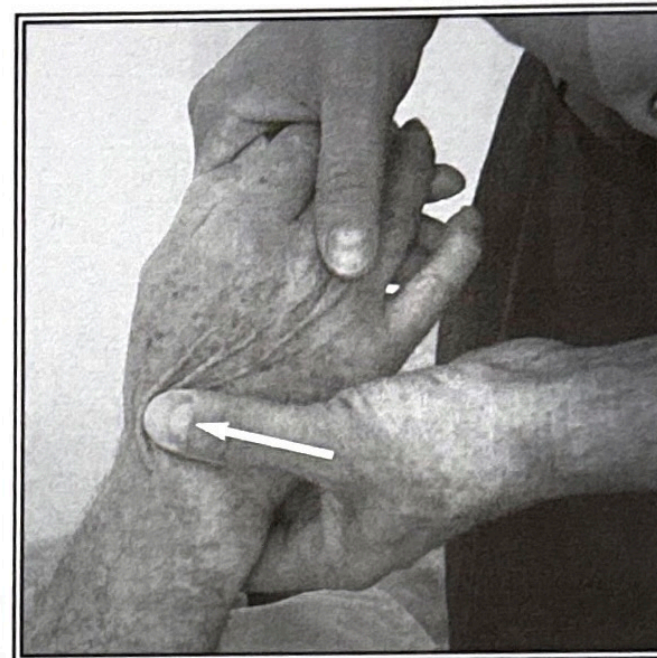
For stability purposes, it is extremely important that the chiropractor adjust the scaphoid and triquetrum prior to adjusting the lunate. One will find it quite difficult to achieve wrist/hand stability if one adjusts (or attempts to adjust) the lunate before the scaphoid and the triquetrum are addressed.

SCAPHOID

The scaphoid subluxates/fixates in a posterior and slightly medial direction.

ADJUSTMENT:

The doctor's "outside" thumbpad contacts the dorsal surface of the wrist over the lunate anterior depression. A tissue pull is taken from the lunate to the scaphoid (medial to lateral in anatomical position).



The doctor then crosses the "inside" thumbpad over the "outside" thumbpad.

The scaphoid is then brought to TENSION by applying inferior traction and extension (approximately 30 degrees). Then, without "winding up", the doctor thrusts in a posterior to anterior direction. This is a very short-arc thrust with audible release common.



TRIQUETRUM

The triquetrum subluxates/fixates in a posterior and slightly lateral direction.

ADJUSTMENT:



The thumbpad of the "inside" hand contacts the dorsal surface of the wrist over the anterior depression of the lunate. A tissue pull is taken from the lunate to the triquetrum (lateral to medial in anatomical position).

The thumbpad of the "outside" hand is crossed over the thumbnail of the "inside" hand.



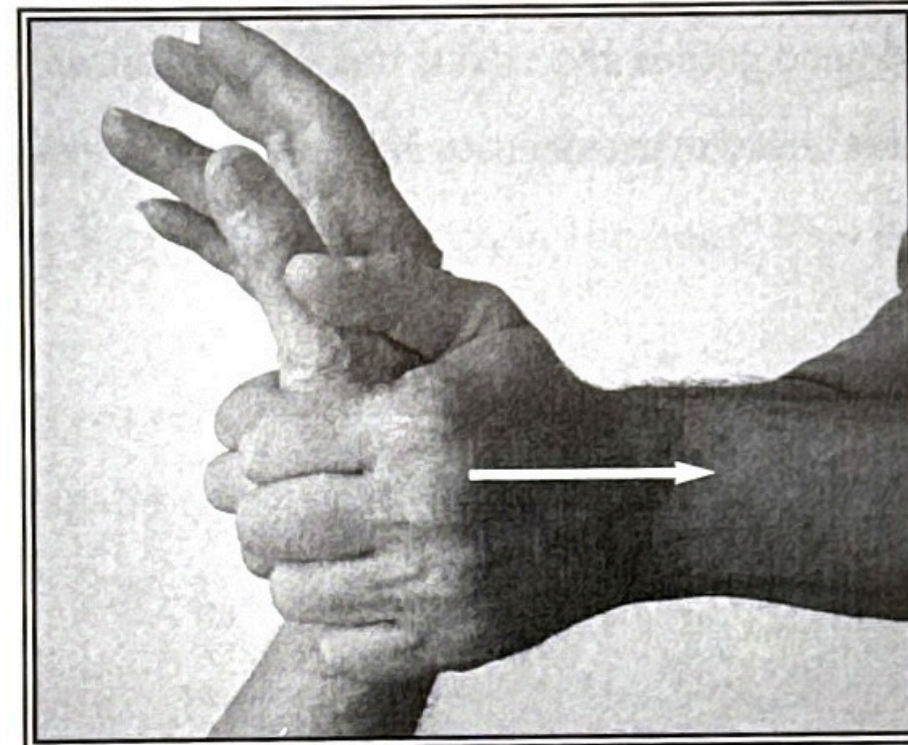
The triquetrum is then brought to TENSION by applying inferior traction and extension (approximately 30 degrees). Then, without "winding up", the doctor thrusts in a posterior to anterior direction. This, like the scaphoid adjustment, is a very short-arc thrust.

LUNATE

The lunate subluxates/fixates in an anterior direction.

ADJUSTMENT:

The doctor turns the palmar surface of the hand so it faces the patient and places his/her fingertips of the index and chiropractic index fingers over the lunate area to make a broad contact on the palmar surface. The thenars and hypothenars contact the dorsum of the hand.

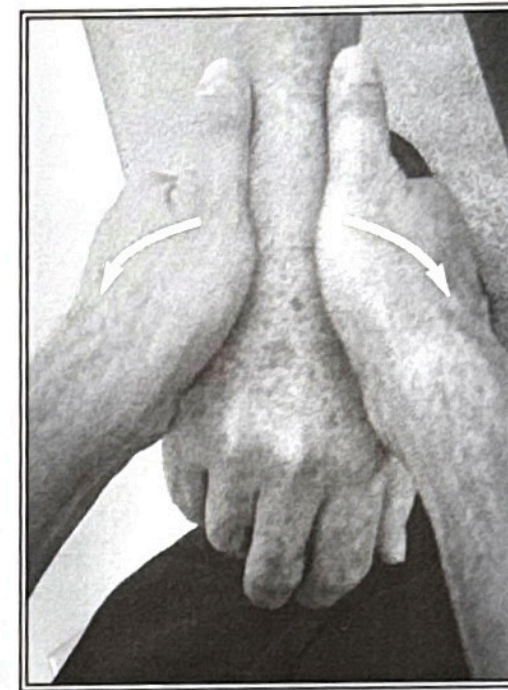
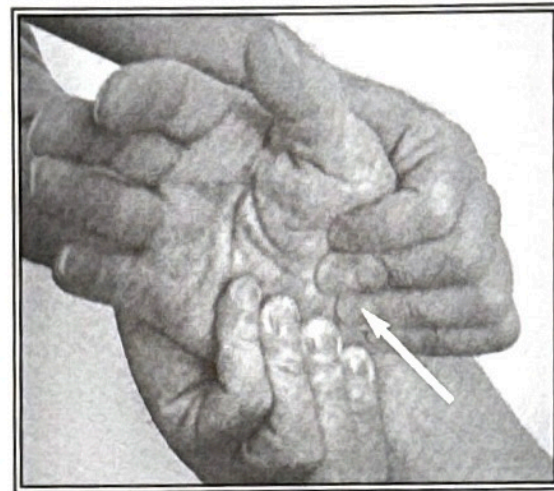


The lunate is brought to TENSION by applying inferior traction and flexion (approximately 40 degrees). Great care should be taken not to flex the wrist past the point of tension. The doctor then "pulls" in an anterior to posterior direction. There is absolutely no flexion of the wrist during the thrust/pull.

Audible release using this type of lunate adjustment is not common.

CARPAL SPREAD

This adjustment can be thought of as a "cleanup" adjustment. The idea here is to establish/re-establish the arch in the hand. This arch is made up of the proximal row of carpal bones.



ADJUSTMENT:

The doctor places his/her thenars and hypothenars on the dorsal surface of the patient's hand. Doctor's fingertips contact the palmar surface as shown. The doctor then pulls lateral and medial as shown in order to exaggerate the arch in the hand. This is a slow and smooth motion.

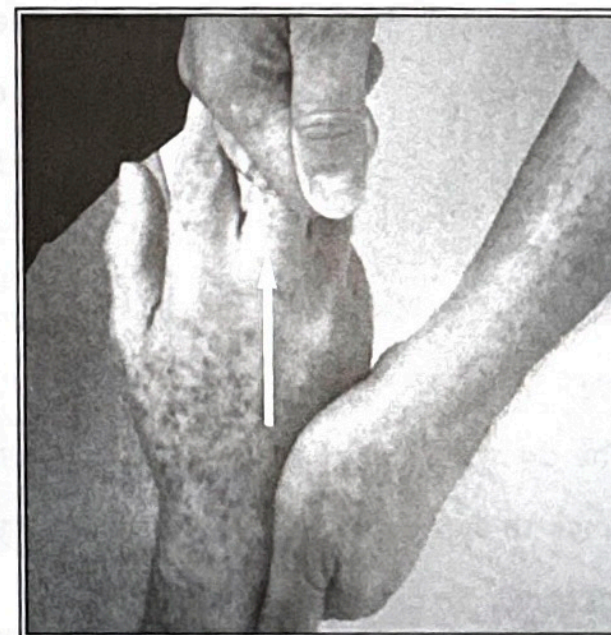
Great care should be exercised when utilizing this adjustment on the elderly since the skin of the hand may be quite thin and a tearing is possible.

DISTAL CARPAL DISTRACTION

The idea here is to mildly distract the distal row of carpals by applying a traction force on the fingers.

ADJUSTMENT:

The doctor's "outside" hand grasps the medial border of the patient's hand for stability. Then with the doctor's bent index and chiropractic index fingers grasping one of the patient's fingers, a small circular motion is performed followed by a quick (but not overly forceful) traction-type force. Audible release is multiple and quite common.

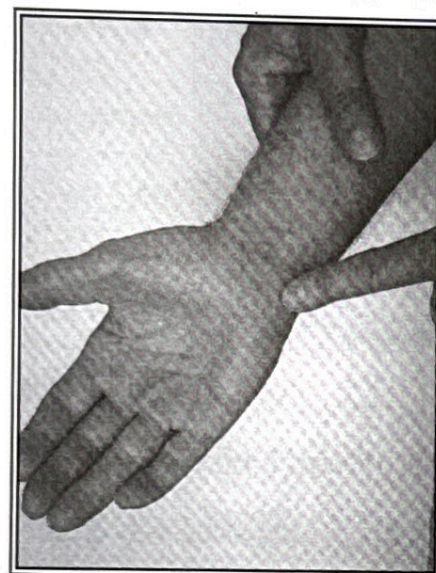


ASSOCIATED WRIST/FINGER ADJUSTMENTS

PISIFORM ADJUSTMENT - Superior and Medial Subluxation/Fixation

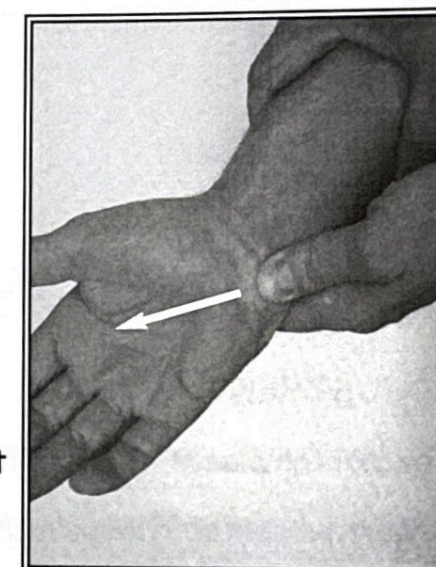
With the wrist extended and pressure applied to the palmar surface of the hand, the pisiform frequently subluxates.

The most common direction of subluxation is in a superior and medial direction.



ADJUSTMENT:

The CONTACT POINT is the superior/ medial aspect of the pisiform. The doctor contacts this point with a thumb tip. The thrust can be either a gradual push or a dynamic thrust. The direction of the thrust is inferior and lateral. An audible release is common with this adjustment when a crisp, dynamic thrust is used.



CAPITATE ADJUSTMENT - Posterior Subluxation/Fixation

With a hyperflexion injury of the wrist, a posterior subluxation of the capitate is common and can be quite painful.



ADJUSTMENT:

The CONTACT POINT is on the dorsum of the hand over the capitate. The doctor takes a broad contact over this area with the finger pads of the index and chiropractic index fingers.

The doctor then adds inferior traction along with extension of the wrist to approximately 40 degrees. The thrust is dynamic and in a posterior to anterior direction.

