

$$V = \frac{\text{Results}}{\text{Price} \times \text{Time}}$$

**Clinical
Effectiveness**

“Patients with acute and chronic back pain reported statistically significant improvements in patient-reported outcomes four weeks after initiating chiropractic care.”



Gedin F et al. Patient-reported improvements of pain, disability, and health-related quality of life following chiropractic care for back pain - A national observational study in Sweden. J Bodyw Mov Ther. 2019 Apr;23(2):241-246.

“The mechanical stimuli provided through a cervical spinal manipulation may modify neuropeptide expression by immediately increasing the serum concentration of nociception-related (inhibiting) biomarkers.”



Lohman EB et al. The immediate effects of cervical spine manipulation on pain and biochemical markers in females with acute non-specific mechanical neck pain: a randomized clinical trial. J Man Manip Ther. 2018 Dec 11:1-11.

“In patients with cervical radiculopathy, one session of thoracic manipulation may result in improvements in pain disability, cervical ROM, and deep neck flexor endurance.”



Young IA et al. Immediate and Short-term Effects of Thoracic Spine Manipulation in Patients With Cervical Radiculopathy: A Randomized Controlled Trial. J Orthop Sports Phys Ther. 2019 May;49(5):299-309.



“The use of chiropractors increased from 9.1% in 2012 to 10.3% in 2017. Women were more likely than men to see a chiropractor (11.1% versus 9.4%).”

Clarke TC et al. Use of Yoga, Meditation, and Chiropractors Among U.S. Adults Aged 18 and Over. NCHS Data Brief. 2018 Nov;(325):1-8.

Safety

“...no evidence of excess risk for acute lumbar disc herniation associated with chiropractic compared with primary medical care.”



Hincapié, C.A., Tomlinson, G.A., Côté, P. et al. Chiropractic care and risk for acute lumbar disc herniation: a population-based self-controlled case series study. Eur Spine J (2018) 27: 1526.

“Clinicians' beliefs about the risk for acute LDH associated with chiropractic SMT varied systematically across professions, in spite of a lack of scientific evidence to inform these beliefs.”

Hincapié, C.A., Tomlinson, G.A., Côté, P. et al. Chiropractic care and risk for acute lumbar disc herniation: a population-based self-controlled case series study. Eur Spine J (2018) 27: 1526.

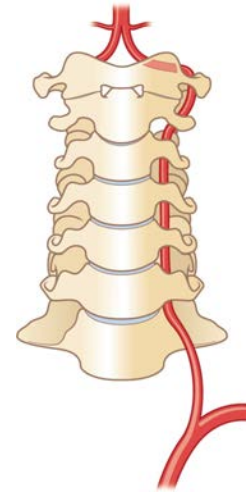
Perceived Risk of Disk Herniation via Manipulation

- **Chiropractor:** 66% reduced incidence
- **Family Physician:** Neutral
- **Orthopedic Surgeon:** 30% increased risk

Of the 25 studies (that evaluated adverse events), either no or minor events occurred.

According to the published trials reviewed, manipulation and mobilization appear safe.

Coulter ID et al. Manipulation and Mobilization for Treating Chronic Nonspecific Neck Pain: A Systematic Review and Meta-Analysis for an Appropriateness Panel. Pain Physician. 2019 Mar;22(2):E55-E70.



“Manual therapy does not result in an increased risk of cervical artery dissection”

Chaibi A et al. A risk-benefit assessment strategy to exclude cervical artery dissection in spinal manual-therapy: A comprehensive review. Ann Med. 2019 Mar 19:1-27.

Does Neck Manipulation Cause Stroke?

Media outlets have highlighted a published estimate that 1 in 5.7 million chiropractic patients suffers a stroke in the days following treatment; and some individuals question if neck manipulation could be the cause.

Research Answers the Question

Four major studies have answered this question after examining the relationship of stroke and neck manipulation.

DATA	1	100 MILLION PERSON YEARS	2	39 MILLION PATIENTS
CONCLUSION		“No evidence of excess risk of stroke associated chiropractic care compared to primary care.” (1)	CONCLUSION	“No significant association between stroke and chiropractic visits. Manipulation is an unlikely cause of stroke.” (2)
DATA	3	ALL PUBLISHED DATA	4	15, 523 CASES
CONCLUSION		“No causal link between chiropractic manipulation and Cervical Artery Dissection (stroke).” (3)	CONCLUSION	“No excess risk of stroke after chiropractic care.” (4)

1

100 MILLION PERSON YEARS

DATA

CONCLUSION

“No evidence of excess risk of stroke associated chiropractic care compared to primary care.” (1)

2

DATA

39 MILLION PATIENTS

CONCLUSION

"No significant association between stroke and chiropractic visits. Manipulation is an unlikely cause of stroke." (2)

3

DATA

ALL PUBLISHED DATA

CONCLUSION

"No causal link between chiropractic manipulation and Cervical Artery Dissection (stroke)." (3)

4

DATA

15, 523 CASES

CONCLUSION

"No excess risk of stroke after chiropractic care." (4)

Problems Trigger Doctor Visits, Not Vice Versa

Each study has concluded that chiropractic spinal manipulation does not cause stroke, however, patients with symptoms of an impending stroke have a higher likelihood to seek care from a variety of providers, including chiropractors. Chiropractic or medical treatment is not the cause of the stroke, but rather a non-contributory mid-point of a developing crisis.



If a doctor initially prescribes an antacid for indigestion and the patient is later diagnosed with stomach cancer, we should not implicate the treatment as the cause of cancer; it was a non-contributory treatment employed for the management of a yet-to-be recognized disease. The same logic should be applied to manipulation and stroke.

“Treatment with fluoroquinolones was associated with 2.5 times increased risk of Achilles tendon rupture, 3.95 times increased risk of Achilles tendinopathy. Older age and concomitant use of corticosteroids seem to be additional risk factors for tendinopathy.”

Alves C et al. Fluoroquinolones and the risk of tendon injury: a systematic review and meta-analysis. Eur J Clin Pharmacol. 2019 Jul 4. doi: 10.1007/s00228-019-02713-1. [Epub ahead of print]

“(Fluoroquinolone) antibiotics was associated with a more than twofold increased risk of CAD. ...and may represent a novel contributing factor involved in the pathogenesis of CAD.”



Del Zotto, E., and Alessandro Pezzini. “Use of fluoroquinolones and the risk of spontaneous cervical artery dissection.” European journal of neurology (Jan 29, 2019).

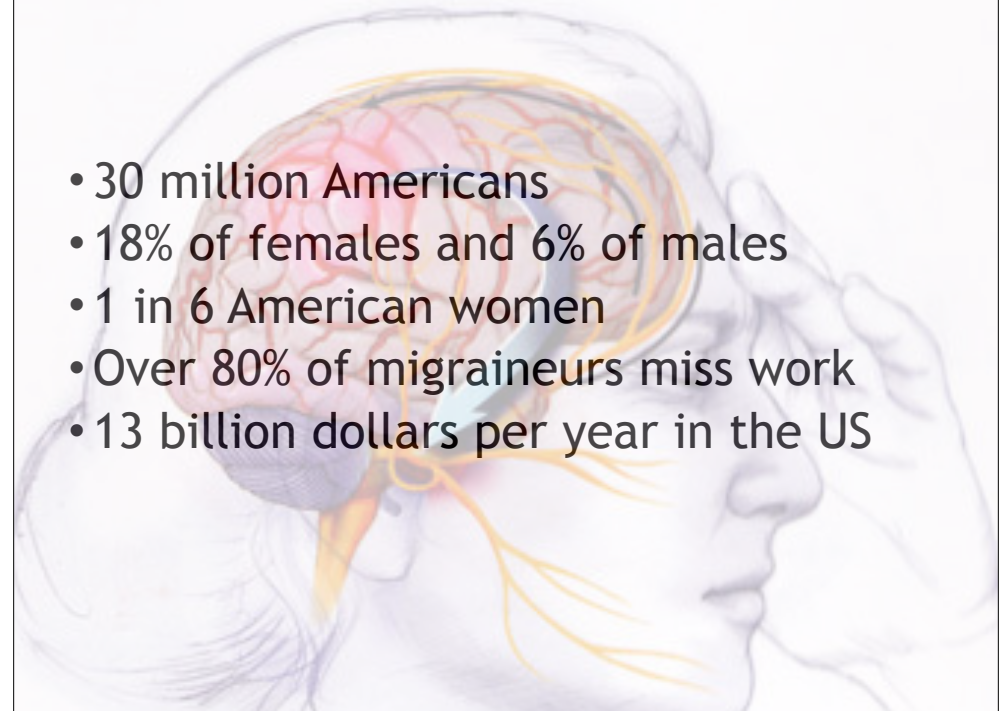
CERVICAL ARTERY DISSECTION ASSESSMENT

CONCERNING PRESENTATIONS	
1. Neck pain- sudden, sharp, severe, steady, throbbing unchanged by mechanical maneuvers or analgesics 2. Headache- new, different, sudden onset, unilateral, resembling migraine or cluster 3. Vertigo- “spinning” or continuous	
RISK FACTORS	ENVIRONMENTAL
	INHERITED
SYMPTOMS	INTERNAL CAROTID
	VERTEBRAL
SIGNS	INTERNAL CAROTID
	VERTEBRAL
ISCHEMIC SIGNS AND SYMPTOMS	
MEDICAL REFERRAL:	
MANUAL THERAPY:	

Adapted from: Chiba J et al. A risk-benefit assessment strategy to exclude cervical artery dissection in spinal manual therapy: A comprehensive review. Am J Med. 2019 Mar

Migraine Headache

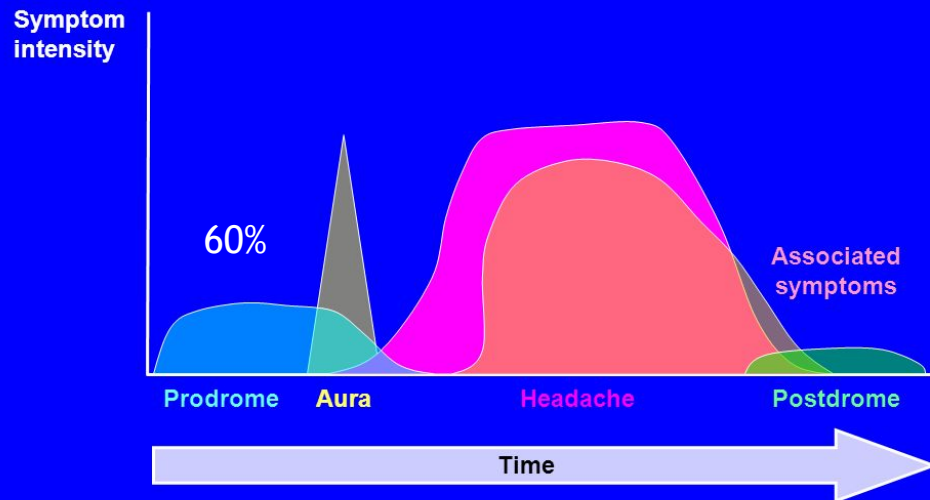
- 30 million Americans
- 18% of females and 6% of males
- 1 in 6 American women
- Over 80% of migraineurs miss work
- 13 billion dollars per year in the US



“In this study, we demonstrated a significant association between hypocalcemia and vitamin D deficiency with migraine attacks.”

Patel U, Kodumuri N, Malik P, Kapoor A, Malhi P, Patel K, Saiyed S, Lavado L, Kapoor V. Hypocalcemia and Vitamin D Deficiency amongst Migraine Patients: A Nationwide Retrospective Study. Medicina. 2019 Aug;55(8):407.

The migraine attack



Differentiating Migraine from Stroke

- Motor and sensory complaints, including paresthesia and numbness **rarely occur in isolation.**
- Aura symptoms develop **slowly**, over 5-20 minutes and can last up to an hour.

“The present findings show that supplementation with vitamin D in a dose of 1000-4000 IU/d could reduce the frequency of attacks in migraineurs.”



Ghorbani Z et al. Vitamin D in migraine headache: a comprehensive review on literature. Neurol Sci. 2019 Aug 3. Link

“We found that 2000 IU/ day vitamin D3 supplementation for 12 weeks could improve headache characteristics and might reduce neuro-inflammation in episodic migraine.”

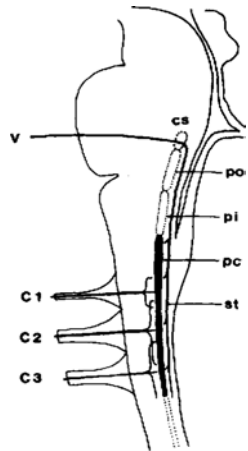
Ghorbani Z, Togha M, Rafiee P, Ahmadi ZS, Magham RR, Djalali M, Shahemi S, Martami F, Zareei M, Jahromi SR, Ariyanfar S. Vitamin D3 might improve headache characteristics and protect against inflammation in migraine: a randomized clinical trial. Neurological Sciences. 2020 Jan 2:1-0.

“We observed that spinal manipulation reduced migraine days as well as migraine pain intensity.”



Rist PM et al. The Impact of Spinal Manipulation on Migraine Pain and Disability: A Systematic Review and Meta-Analysis. Headache. 2019 Apr;59(4):532-542.

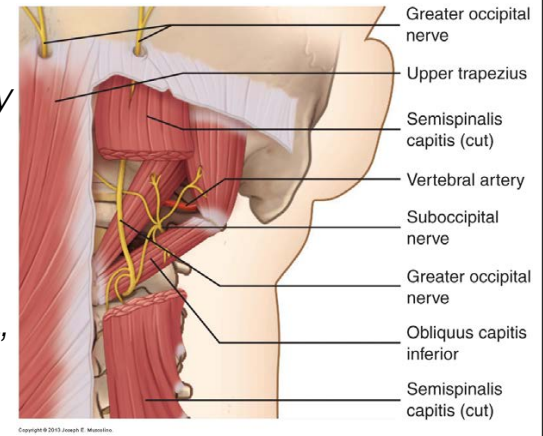
Cervicogenic Headache



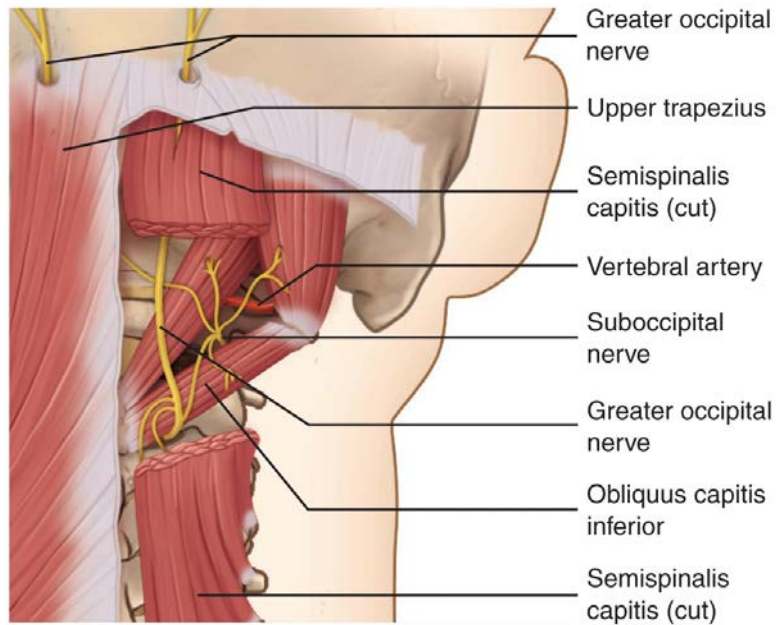
“Maladaptive postures can activate C1-C3 nociceptors. Convergence with trigeminal afferents at the trigeminocervical nucleus could explain spinal headache.”

Mingels S, Dankaerts W, Granitzer M. Is There Support for the Paradigm ‘Spinal Posture as a Trigger for Episodic Headache’? A Comprehensive Review. Curr Pain Headache Rep. 2019.

“The obliquus capitis inferior remains relatively immobile during traumatic events, like whiplash injuries, placing strain as a tethering point on the greater occipital nerve.”



Scherer SS, Schiraldi L, Sapino G, Cambiaso-Daniel J, Gualdi A, Peled ZM, Hagan R, Pietramaggiore G. The Greater Occipital Nerve and Obliquus Capitis Inferior Muscle: Anatomical Interactions and Implications for Occipital Pain Syndromes. Plastic and reconstructive surgery. 2019 Sep 1;144(3):730-6.



Suboccipital Nerve Flossing

Begin with the patient lying supine, headpiece slightly extended. Have the patient bring their fingertips to their clavicles. Firmly grasp the patient's head and move their neck into full flexion, while maintaining a chin tuck. Ask the patient to fully extend their arms, wrists, and fingers while you simultaneously move their head and neck into full extension. Return to the start position and slowly repeat 10 flossing cycles. Stop if there is reproduction of pain or neurologic symptoms. To improve available ROM, this maneuver may be preceded contract-relax stretching of the suboccipitals.



“A linear dose-response was observed for all follow-ups, a reduction of approximately 1 CGH day/month for each additional 6 SMT visits. Cervicogenic headache days/month were reduced from about 16 to 8 for the highest and most effective dose of 18 SMT visits.”

Haas M. et al. Dose-response and efficacy of spinal manipulation for care of cervicogenic headache: a dual-center randomized controlled trial. Spine J. 2018 Oct;18(10):1741-1754

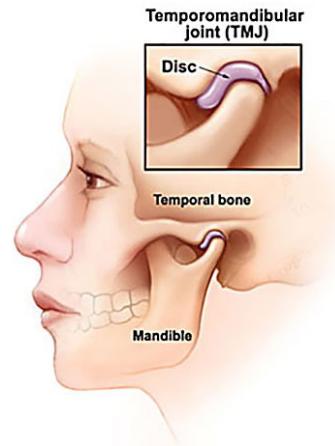


“Dry needling should be considered for the treatment of headache [cervicogenic, tension-type, and migraine], and may be applied either alone or in combination with pharmacological treatments.”

Vázquez-Justes D, Yarzabal-Rodríguez R, Doménech-García V, Herrero P, Bellosta-López P. Analysis of the effectiveness of the dry puncture technique in headaches: systematic review. Neurology. 2020 Jan 13.

TMD

“Women with TMD, regardless of self-reported headaches, showed limited flexion/extension ROM, limited upper cervical spine (C1-C2) mobility, and poor deep cervical flexor performance.”



Ferreira MP et al. Mobility of the upper cervical spine and muscle performance of the deep flexors in women with temporomandibular disorders. J Oral Rehabil. 2019 Jul 10.



“Our study suggests that HVLA manipulation of the upper cervical spine with neck exercise can be effective for treatment of pain and dysfunction in patients with chronic TMD.”

Corum M, Basoglu C, Topaloglu M, Diracoglu D, Aksoy C. Spinal high-velocity low-amplitude manipulation with exercise in women with chronic temporomandibular disorders. Manuelle Medizin. 2018 Jun 1;56(3):230-8. Link

“Fifty individuals with TMD were randomly assigned to receive cervical HVLAT or sham manipulation for four visits over 4-weeks. Significant interactions were noted in [pain & functional disability]... with significant differences in successful outcomes noted immediately after baseline treatment and at 4-weeks.”

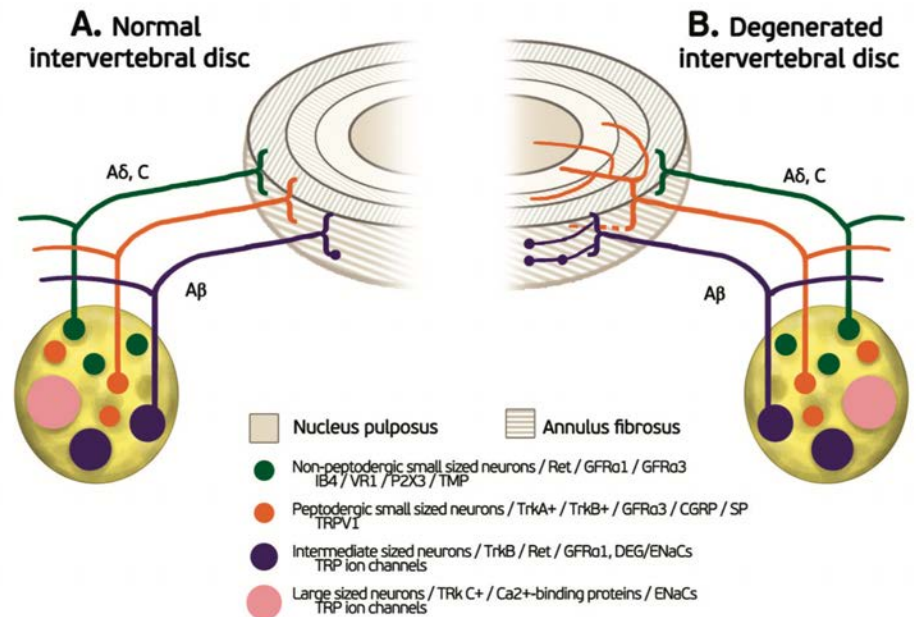
Reynolds B, Puentedura EJ, Kolber MJ, Cleland JA. Effectiveness of cervical spine high velocity low amplitude thrust added to behavioral education, soft tissue mobilization, and exercise in individuals with temporomandibular disorder (TMD) with myalgia: A randomized clinical trial. *Journal of Orthopaedic & Sports Physical Therapy*. 2020 Jan 6(0):1-40.

Cervical Spine Degeneration

“Substance P-positive nerve fibers were obviously increased in number and deeply ingrown into the inner annulus fibrosus and even into the nucleus pulposus in the degenerative cervical discs of patients with severe neck pain”



Wu B et al. Ingrowth of Nociceptive Receptors into Diseased Cervical Intervertebral Disc Is Associated with Discogenic Neck Pain. *Pain Med*. 2019 Mar 8. pii: pnz013. doi: 10.1093/pm/pnz013. [Epub ahead of print]



"In the group with moderate facet joint degeneration, 69.6% reported non-recovery compared with 23.6% among patients without any signs of degeneration. We hypothesize that whiplash trauma can be a trigger for painful manifestation of previously asymptomatic facet joint degeneration."

Rydman E et al. Association between cervical degeneration and self-perceived non-recovery after whiplash injury. Spine J. 2019 Aug 5. pii: S1529-9430(19)30899-X.

Rotator Cuff Tendinopathy

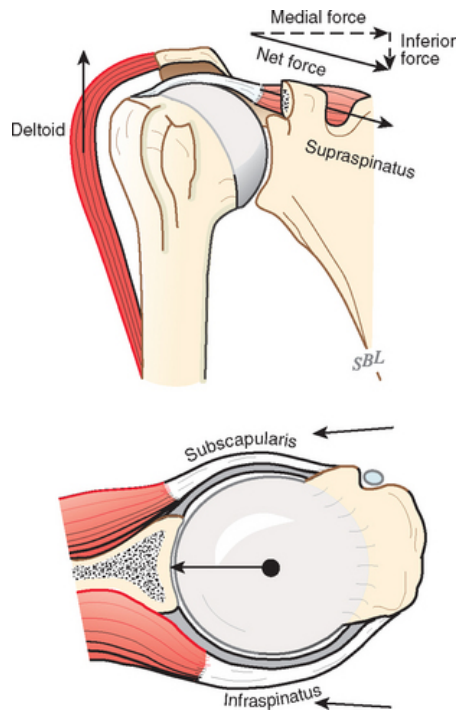
The Shoulder Dysfunction Continuum

- Scapular Dyskinesis
- Anterior Impingement Syndrome
- Rotator Cuff Tear
- Rotator Cuff Rupture

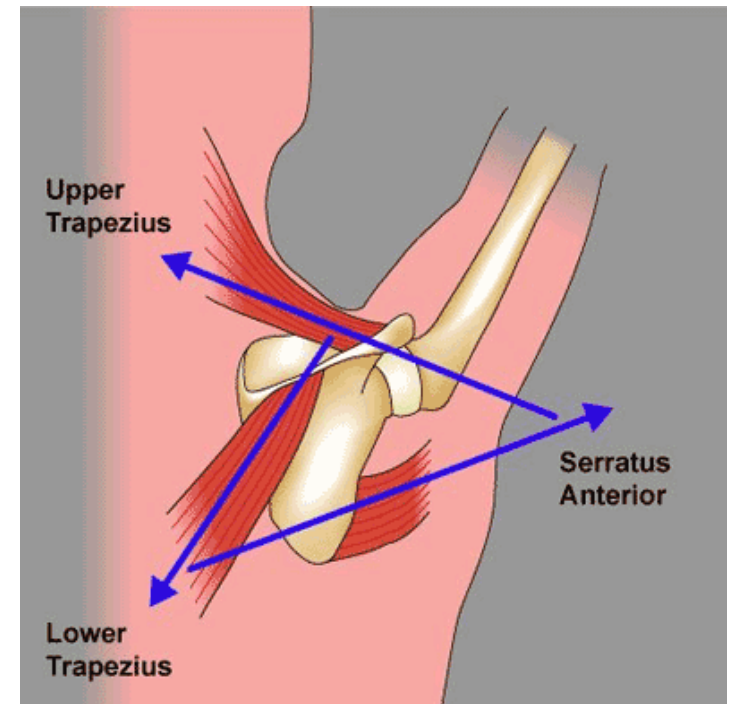
Large Movers



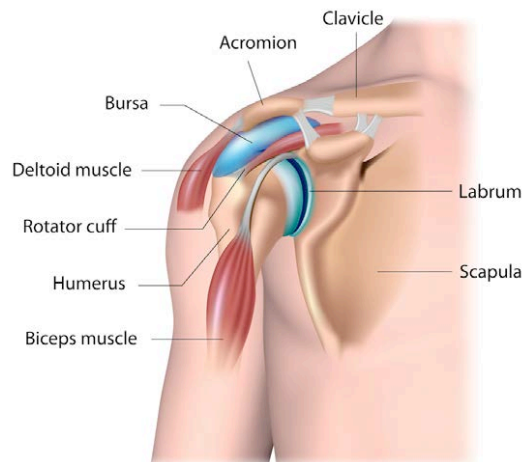
Rotator Cuff



Scapular Stabilizers



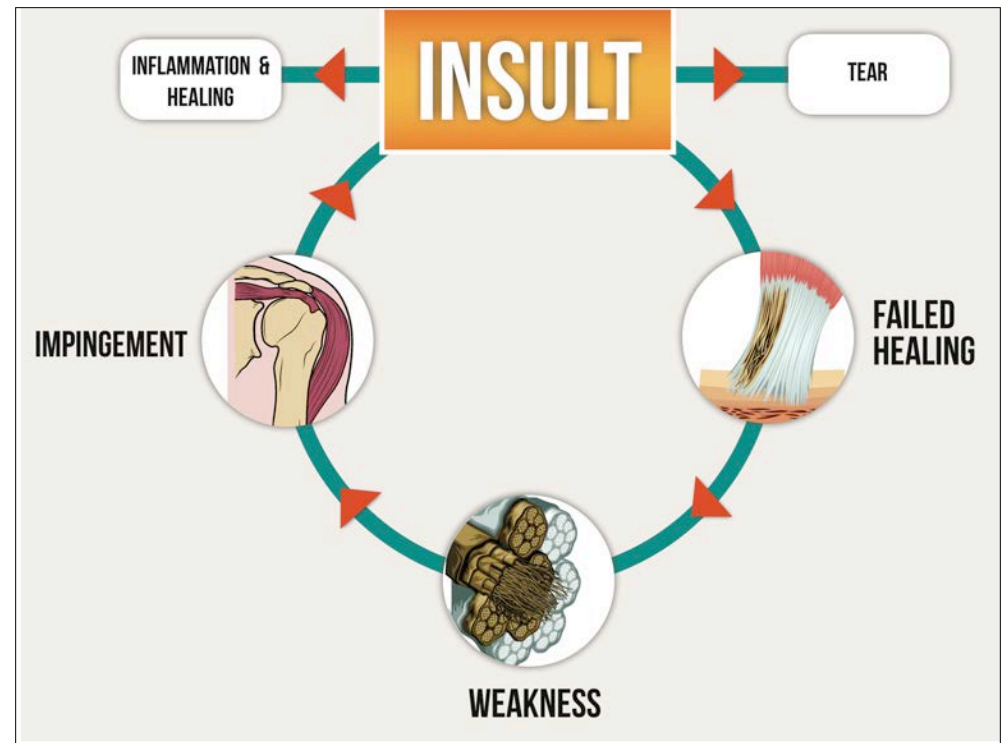
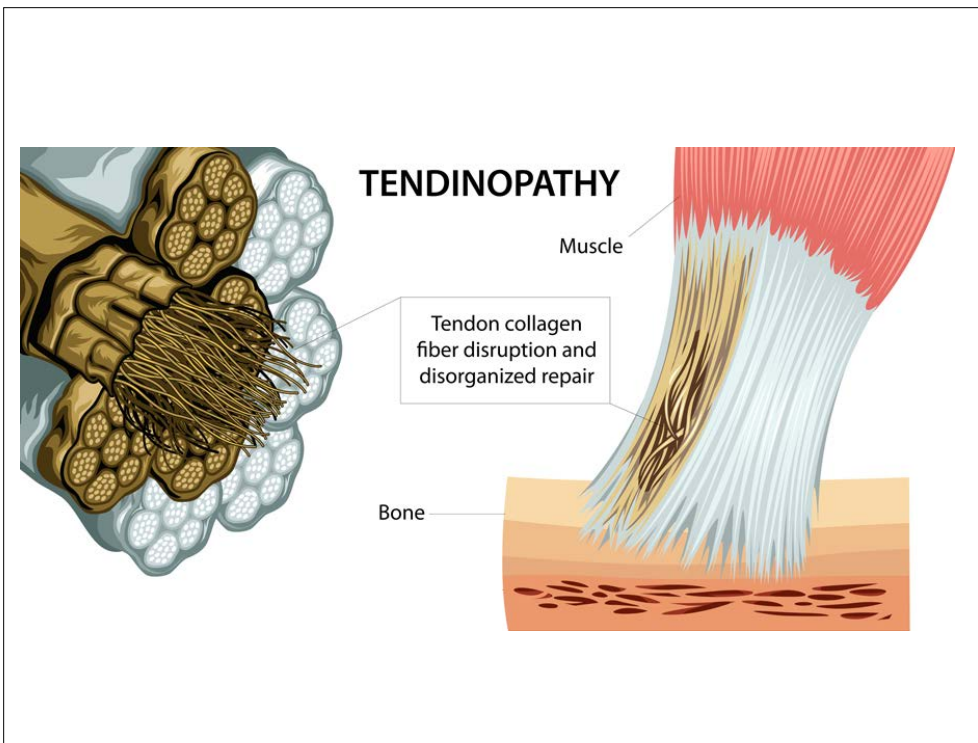
Shoulder Anterior Impingement Syndrome



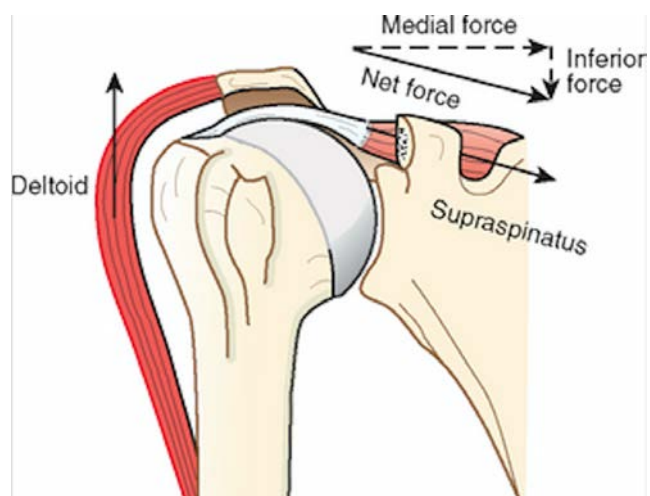
INFLAMMATION & HEALING

INSULT

TEAR



Tension vs. Compression



Tendon...

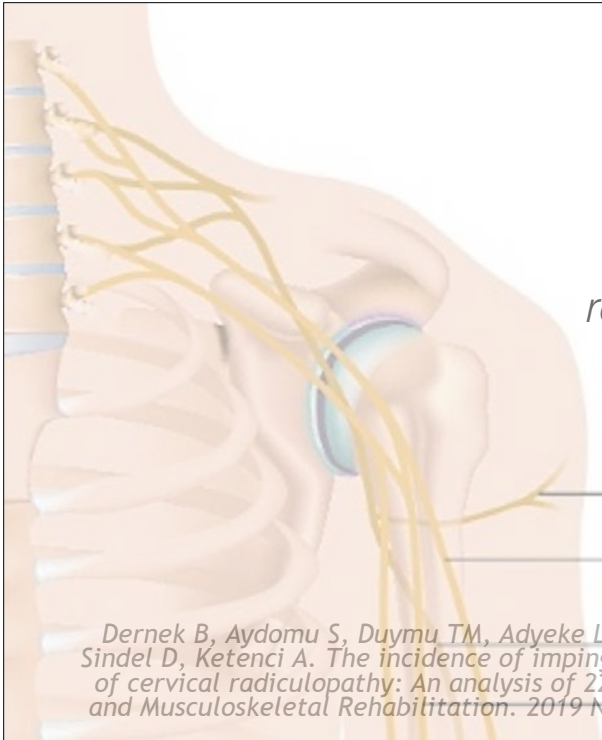
-itis

- Acute
- Stretch/ strain overload
- Inflammation
- Anti-inflammatory Tx

-opathy, -osis

- Chronic
- Compressive overload
- Ischemic
- Failed Inflammation
- Pro-inflammatory Tx

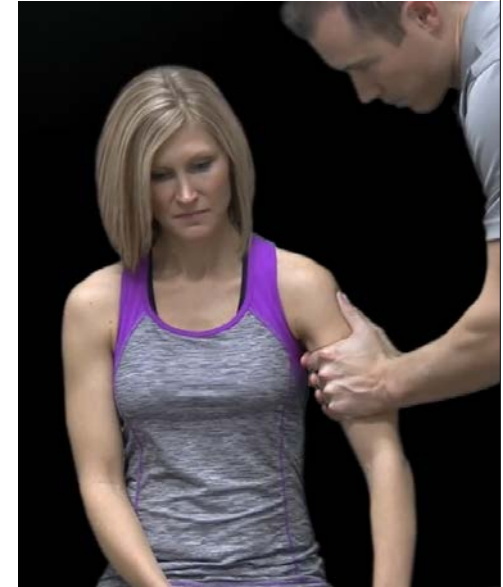
“35% of the patient with shoulder anterior impingement syndrome (SAIS) had cervical nerve root compression on the same side.”



Dernek B, Aydomu S, Duymu TM, Adyeke L, Yardm MY, Kesikta FN, Sindel D, Ketenci A. The incidence of impingement syndrome in cases of cervical radiculopathy: An analysis of 220 cases. Journal of Back and Musculoskeletal Rehabilitation. 2019 Nov 29(Preprint):1-4. Link

Arm Squeeze Test

The clinician stands behind the patient and uses both hands to clasp and squeeze the middle third of the upper arm with enough force to create moderate compression of the underlying muscle. Reproduction of arm pain (rated at least VAS 3 on a 0-10 scale) during compression suggests a cervical origin. The rationale is that compression provokes a response from the relatively superficial peripheral nerves (musculocutaneous, radial, ulnar and median) that arise from hypersensitized lower cervical nerve roots (C5-T1). The Arm Squeeze test shows high sensitivity (97%), specificity (>91%) and inter/ intraobserver reliability for differentiation of shoulder vs. radicular pain.



43.5% of extremity pain originates from the (asymptomatic) spine.

Shoulder pain – 47%
Elbow pain – 44%
Wrist/Hand pain – 38%
Hip pain – 71%
Knee – 25%
Ankle/Foot – 29%

Rosedale R, Rastogi R, Kidd J, Lynch G, Supp G, Robbins SM. A study exploring the prevalence of Extremity Pain of Spinal Source (EXPOSS). Journal of Manual & Manipulative Therapy. 2019 Sep 4:1-9.

“Over 90.2% of [rotator cuff] patients had premature MRI. The use of MRI before a trial of conservative management in patients with: atraumatic shoulder pain minimal to no strength deficits on physical examination, and suspected cuff tendinopathy other than full-thickness tears provides negative value in the management of these patients, at both the individual and population level.”

Cortes A, Quinlan NJ, Nazal MR, Upadhyaya S, Alpaugh K, Martin SD. A value-based care analysis of magnetic resonance imaging in patients with suspected rotator cuff tendinopathy and the implicated role of conservative management. Journal of shoulder and elbow surgery. 2019 Nov 1;28(11):2153-60.



“The use of MRI before a trial of conservative management in patients with atraumatic shoulder pain, minimal to no strength deficits on physical examination, and suspected cuff tendinopathy other than full-thickness tears provides negative value”

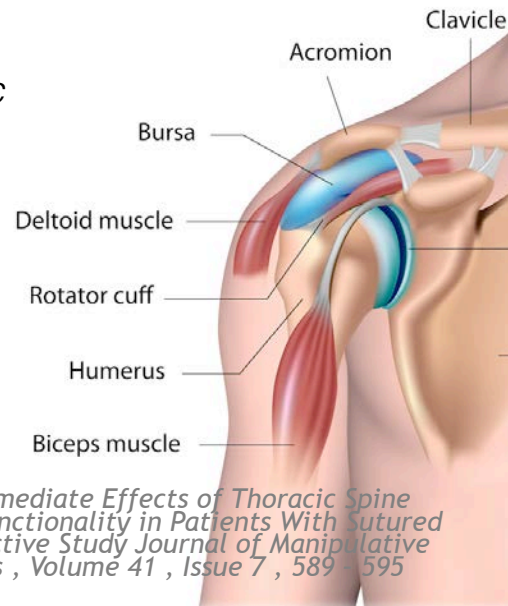
Cortes A et al. A value-based care analysis of magnetic resonance imaging in patients with suspected rotator cuff tendinopathy and the implicated role of conservative management. J Shoulder Elbow Surg. 2019 Jul 4. pii: S1058-2746(19)30247-2.

“Individuals with shoulder impingement had a greater thoracic kyphosis and less extension ROM than healthy controls. These results suggest that clinicians could consider addressing the thoracic spine in patients with shoulder impingement.”



Hunter DJ, Rivett DA, McKiernan S, Smith L, Snodgrass SJ. Relationship Between Shoulder Impingement Syndrome and Thoracic Posture. Phys Ther. 2019 Dec 11. pii: pzz182. doi: 10.1093/ptj/pzz182.

“Active shoulder flexion and abduction mobility increase after manipulation of thoracic spine in (rotator cuff) patients. Subacromial space increases significantly after manipulation.”

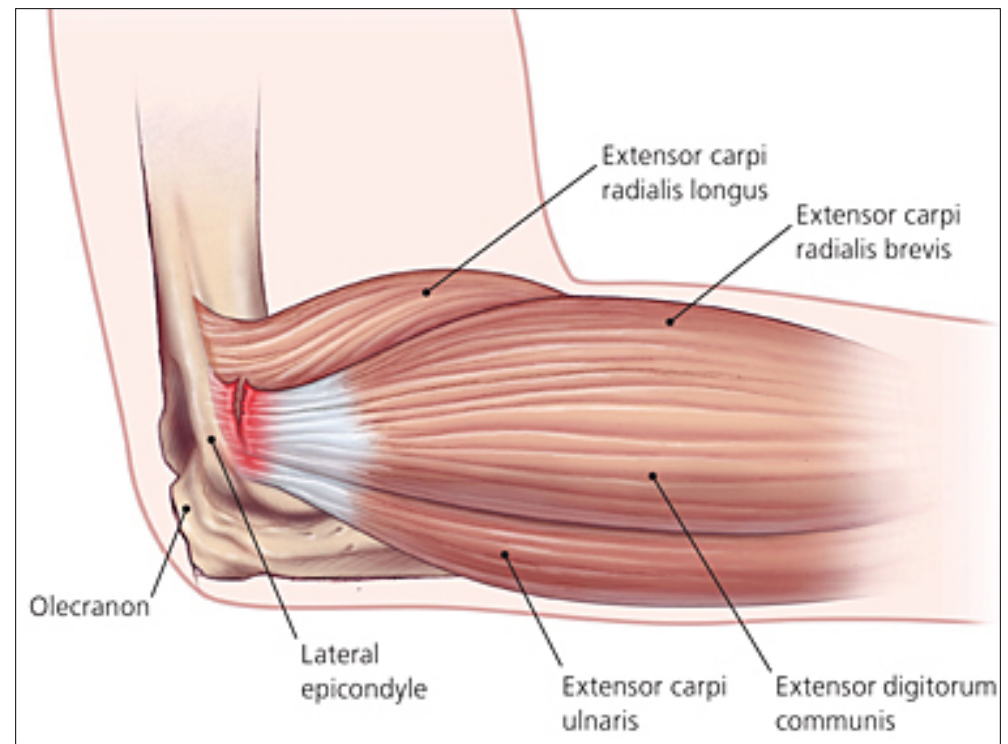


Belón-Perez, Pedro et al. Immediate Effects of Thoracic Spine Manipulation Upon Shoulder Functionality in Patients With Sutured Rotator Cuff Repair: A Prospective Study Journal of Manipulative & Physiological Therapeutics , Volume 41 , Issue 7 , 589 - 595

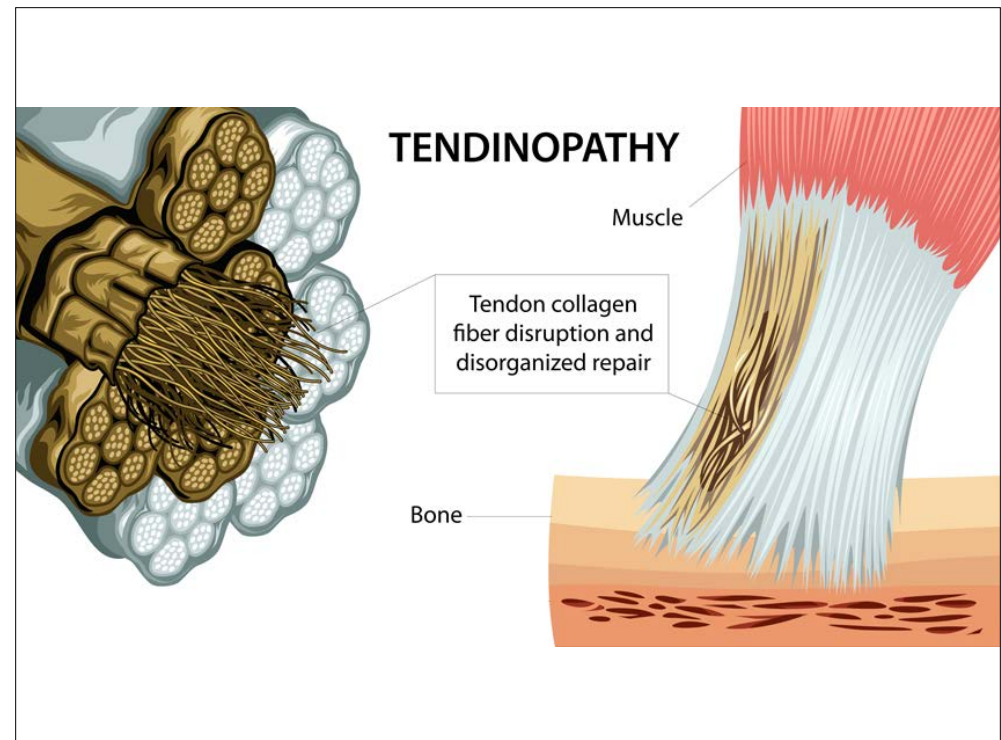
*“A single rotator cuff corticosteroid injection (in the year before surgery) is associated with **1.3- 2.8** times increased risk of needing revision rotator cuff repair.”*

Puzzitiello RN, Patel BH, Nwachukwu BU, Allen AA, Forsythe B, Salzler MJ. Adverse impact of corticosteroid injection on rotator cuff tendon health and repair: A systematic review. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2019 Dec 17.

Lateral Epicondylopathy



- Affects between **1 and 3%** of the population each year.
- Occurs predominantly in the **fourth or fifth decade**
- Affects men and women equally.
- Strikes the **dominant arm** in 75% of cases.
- Average of 12 weeks disability in up to 30% of those workers affected



“The counterforce brace provides significant reduction in the frequency and severity of pain in the short term (2-12 weeks), as well as overall elbow function at 26 weeks.”



Kroslak M et al. Counterforce bracing of lateral epicondylitis: a prospective, randomized, double-blinded, placebo-controlled clinical trial. J Shoulder Elbow Surg. 2019 Feb;28(2):288-295. doi: 10.1016/j.jse.2018.10.002.

“Using wrist joint splinting for a short duration is effective for improving pain intensity... [and] may also be effective for improving wrist ROM and grip strength in the treatment of patients with lateral epicondylitis.”



Kachanathu SJ, Alenazi AM, Hafez AR, Algarni AD, Alsubiheen AM. Comparison of the effects of short-duration wrist joint splinting combined with physical therapy and physical therapy alone on the management of patients with lateral epicondylitis. European journal of physical and rehabilitation medicine. 2019 Aug;55(4):488-93.

“Soft tissue calcification is likely iatrogenic complication of steroid injection for lateral epicondylitis patients.”



Park HB et al. Association of steroid injection with soft-tissue calcification in lateral epicondylitis. J Shoulder Elbow Surg. 2019 Feb;28(2):304-309. doi: 10.1016/j.jse.2018.10.009.



“The surgical excision of the degenerative portion of the extensor carpi radialis brevis (ECRB) offers no additional benefit over and above placebo surgery for the management of chronic tennis elbow.”

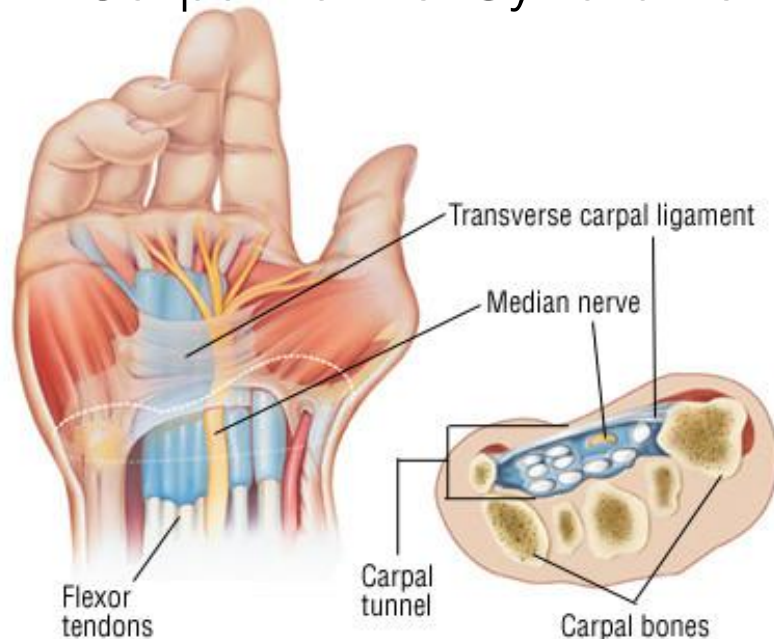
Kroslak M, Murrell GA. Surgical treatment of lateral epicondylitis: a prospective, randomized, double-blinded, placebo-controlled clinical trial. The American journal of sports medicine. 2018 Apr;46(5):1106-13.

"Pitching to the age-restricted pitch count limit did not result in altered pitching mechanics or muscle activations, and no differences occurred between the 3 pitches (fastball, curveball, and change-up). These results support previous research that indicate the curveball pitch is no more dangerous for youth than the other pitches commonly thrown."

Oliver GD et al. Effects of a Simulated Game on Upper Extremity Pitching Mechanics and Muscle Activations Among Various Pitch Types in Youth Baseball Pitchers. J Pediatr Orthop. 2019 Sep;39(8):387-393.

Carpal Tunnel Syndrome

Carpal Tunnel Syndrome



- Affects **3-5%** of the general population
- More common in **dominant** hand
- **Female** to male ratio of at least 2 or 3:1
- Adults age **45-60**
- **White** adults are affected 2-3 times more commonly than black adults

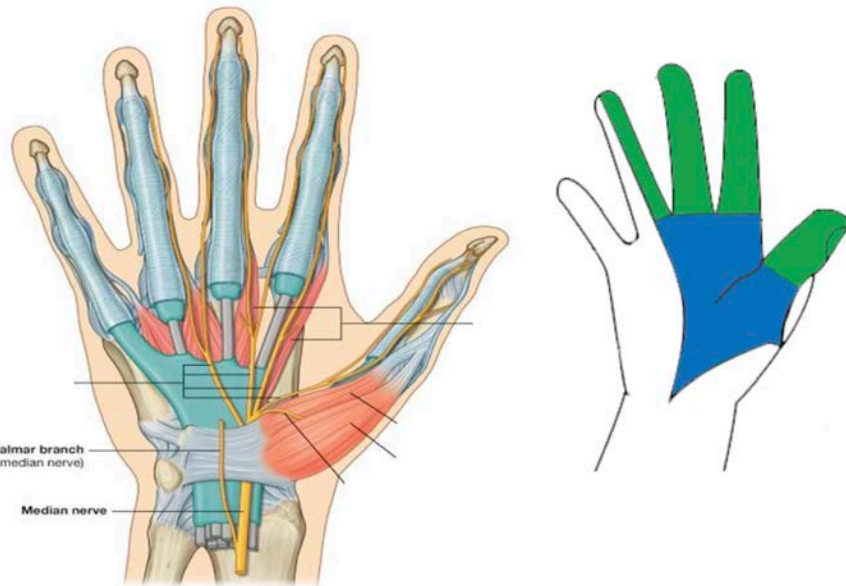


"I hear there's a new ICD-10 code for carpal tunnel syndrome caused by clicking too many times in an EMR system."

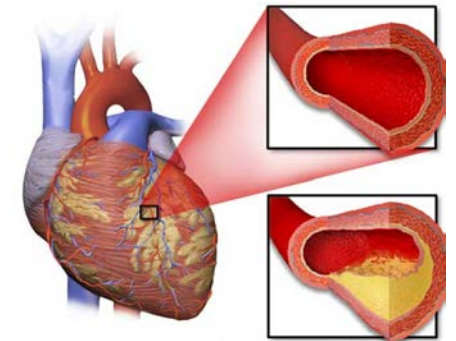
Sensitivity

- Paresthesia in a median nerve distribution with nocturnal awakening - **77.4%**
- Phalen sign - **52.8%**
- Hoffman-Tinel sign - **37.7%**

Hegmann KT et al. Median Nerve Symptoms, Signs, and Electrodiagnostic Abnormalities Among Working Adults. J Am Acad Orthop Surgery. 2018 Jul 19.



"A significant positive correlation was observed between CAD and a previous diagnosis of carpal tunnel syndrome."



Chang YC, Chiang JH, Lay IS, Lee YC. Increased Risk of Coronary Artery Disease in People with a Previous Diagnosis of Carpal Tunnel Syndrome: A Nationwide Retrospective Population-Based Case-Control Study. Biomed Res Int. 2019;2019:3171925. Published 2019 Mar 3.

“Intraneural blood flow velocity is dependent on median nerve function and wrist posture such that patients with mild CTS are more susceptible to the effects of non-neutral wrist postures. This study stresses the importance of limiting exposure to non-neutral wrist postures in patients with early signs of the condition.”

Zuniga AF, Ghavanini AA, Israelian G, Keir PJ. Blood flow velocity but not tendon mechanics relates to nerve function in carpal tunnel syndrome patients. Journal of the Neurological Sciences. 2020 Jan 21:116694.



Sprouse RA et al. Braces and Splints for Common Musculoskeletal Conditions. Am Fam Physician. 2018 Nov 15;98(10):570-576.



“Manual therapy, including desensitization maneuvers of the central nervous system, has been found to be equally effective but less costly (i.e., more cost-effective) than surgery for women with CTS.”

Fernandez-De-Las-Penas C, Ortega-Santiago R, Díaz HF, Salom-Moreno J, Cleland JA, Pareja JA, Arias-Buñia JL. Cost-Effectiveness Evaluation of Manual Physical Therapy Versus Surgery for Carpal Tunnel Syndrome: Evidence From a Randomized Clinical Trial. Journal of orthopaedic & sports physical therapy. 2019 Feb;49(2):55-63.

“The use of manual therapy based on neurodynamic techniques maintains the beneficial effects 6 months after therapy in CTS patients.” (With regards to pain reduction, symptom severity, and strength improvement)

Wolny T, Linek P. Long-term patient observation after conservative treatment of carpal tunnel syndrome: a summary of two randomised controlled trials. Peer J. 2019 Nov 8;7:e8012.

Median Nerve Floss

Begin with your elbow, wrist, and fingers bent with your hand at chest level, palm up. Your head should be leaning toward the side of the arm that you are flossing. As you simultaneously move your head toward the opposite shoulder, also move your arm down across the front of your chest out to the side of your hip. As your wrist and fingers move into extension, follow your hands motion with your eyes. Return to the start position and repeat three sets of 10 repetitions twice per day or as directed.



Median Nerve Glide

Begin by making a fist. First, flex your fist downward, then bring your wrist back to a neutral position. Straighten your fingers and thumb so that all five tips are pointing forward. Bend your wrist back/up as to make a “stop” motion and move your thumb away from your palm. Turn your wrist palm up. Use your opposite hand to pull your thumb further away from your palm. Perform 20 repetitions twice per day or as directed.



“For both symptom relief and function improvement, manual acupuncture is superior to ibuprofen.”



Wu IX, Lam VC, Ho RS, Cheung WK, Sit RW, Chou LW, Zhang Y, Leung TH, Chung VC. Acupuncture and related interventions for carpal tunnel syndrome: systematic review. *Clinical rehabilitation*. 2019 Sep 26;0269215519877511.

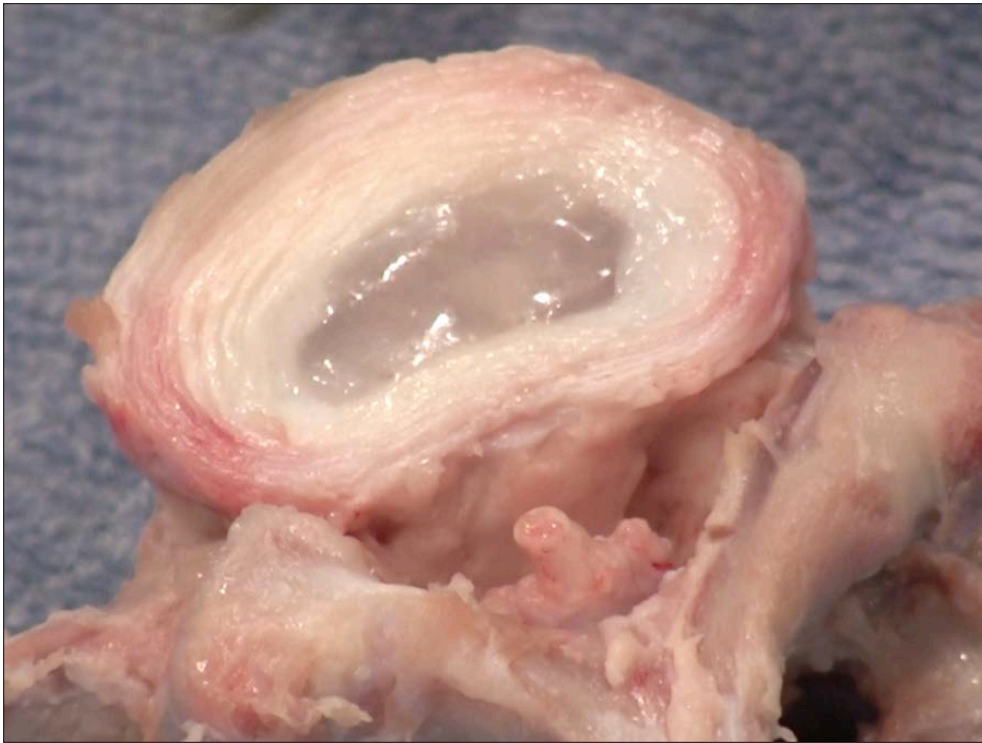


“We found no clinically significant benefit from ultrasound treatment for CTS”

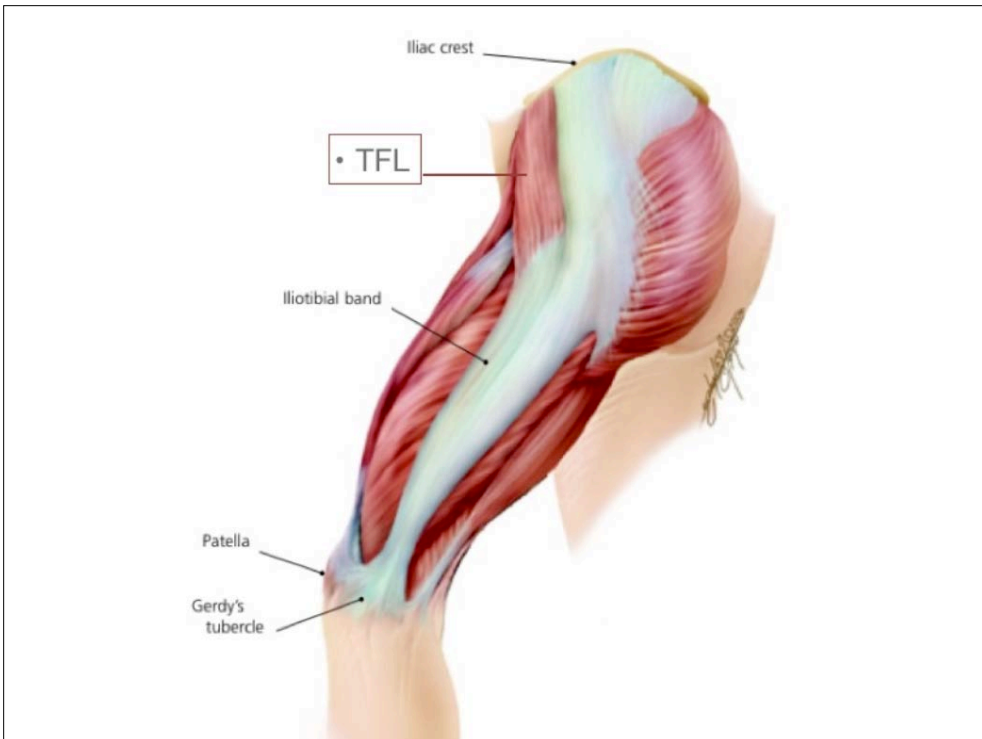
Jothi KP, Bland JD. Ultrasound Therapy Adds No Benefit to Splinting in Carpal Tunnel Syndrome. *Muscle & nerve*. 2019 Jul 30.

Lumbar Spine



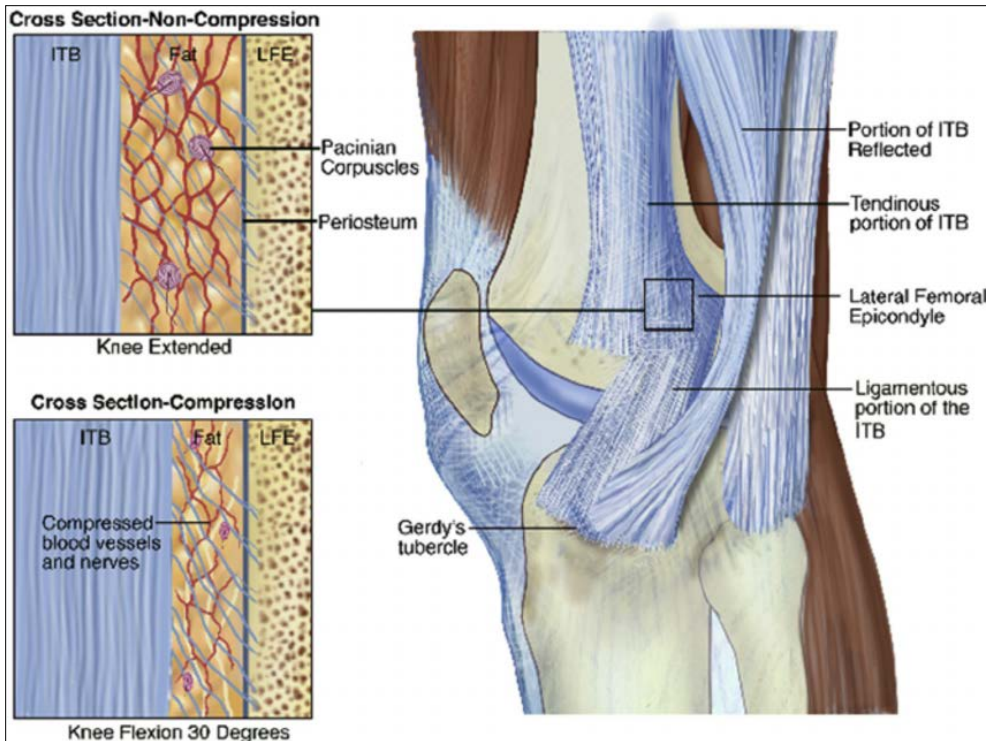


Iliotibial Band Syndrome



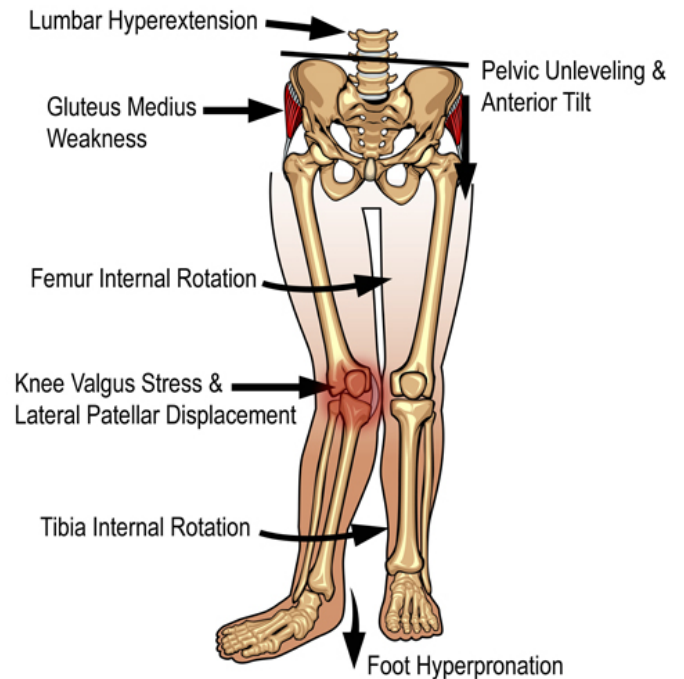
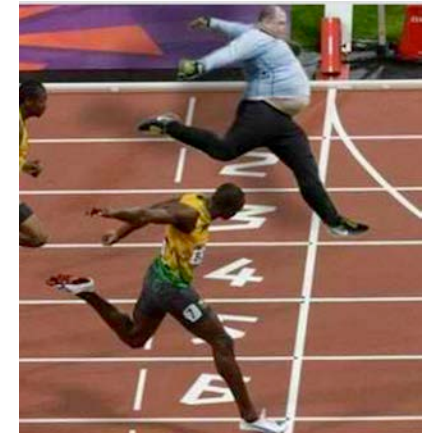
■ ITBS

- 2nd most common cause of knee pain after PFPS
- Up to 12% of runners
- 2-25% in active people
- 22% in military recruits
- 24% of cyclists
 - 50% of cyclists have knee pain issues



Risk Factors

- Weakness of the knee extensors, flexors, or hip abductors
- High arches
- TFL hypertonicity
- High mileage running
- Running on a circular track



“We conclude that relatively small decreases in step width can substantially increase ITB strain as well as strain rates. Increasing step width during running, especially in persons whose running style is characterized by a narrow step width, may be beneficial in the treatment and prevention of running-related ITB syndrome.”



Meardon SA, Campbell S, Derrick TR. Step width alters iliotibial band strain during running. Sports Biomech. 2012;11:464-472.

“A single session of gait retraining using a 10% increase in step rate resulted in significant improvements in running kinematics, pain, and function in runners with patellofemoral pain. These improvements were maintained at 3-month follow-up



Bramah C, Preece SJ, Gill N, Herrington L. A 10% Increase in Step Rate Improves Running Kinematics and Clinical Outcomes in Runners With Patellofemoral Pain at 4 Weeks and 3 Months. The American journal of sports medicine. 2019 Oct 28:0363546519879693.

RUNNING WITH FORM

HEAD

Make your neck tall, so your ears are in line with your shoulders. Hold your gaze on the road at least 20 feet in front of you, but not over the horizon. (If NoTreadmillTV)

SHOULDERS

Avoid slouching. Pull your shoulders slightly back to open your chest. However, stay relaxed and avoid shrugging your shoulders upward – especially after you start to fatigue.

HANDS

Keep your hands closed but relaxed, as though you were holding a baby bird. Your thumbs should point upward. Do not let your hands cross the midline.

BREATHING

Think about initiating “breathing from your belly,” and not your upper chest. Also, inhalation and exhalation are usually triggered by ground strike. To maintain symmetry, strive for an odd-numbered breathing pattern with more strides of exhales than inhales, i.e., a 5-foot strike breathing cycle would be: in, in, Out, Out, Out.

STEP WIDTH

Avoid excessively narrow gaits. Imagine that you are trying to avoid stepping on the “centerline” directly beneath you.

SHOES

Running shoes should be replaced every 300-500 miles.

ARMS

Your arm swing determines your cadence. Hold your arms close to your sides. Make sure you keep your elbows bent at 90 degrees so that your hands stay between your waist and chest. Your elbows should move cyclically behind and in front of your torso, like a locomotive.

TORSO

Lean slightly forward without bending at the waist. Imagine that your body is your gas pedal; the more you lean forward, the faster you will move. (i.e., walking vs. jogging vs. sprinting)

PACE/STRIDE

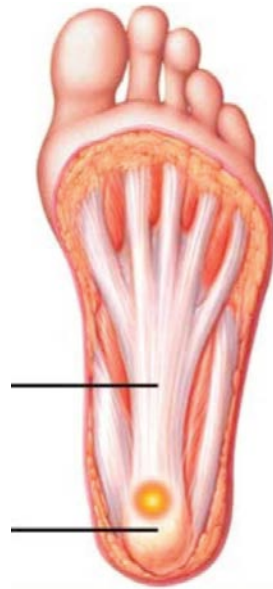
Avoid over-striding. Your feet should land directly beneath your torso, not significantly in front of you. Take short quick steps as though you were running on a hot surface. Try to maintain a cadence of 180 steps/minute.

FOOT STRIKE

For running, midfoot strikes are generally more efficient and safe as compared to landing on your heels. Think about landing on the ball of your foot with your shin perpendicular to the ground. Your feet should be alive and “springy”, moving backward at the instant of strike, not slapping the ground.

Plantar Fasciitis

- **Most common cause** of plantar heel pain
- Effects approximately **10%** of the population
- Majority of plantar fascia patients are **over the age of 40**
- **Bilateral in 20-30%** of those affected



“The results of this study indicate that cross friction massage of the plantar fascia and stretching of the gastroc/soleus complex showed the greatest overall improvement in terms of reducing the pain and disability and ankle dorsiflexion ROM.”

Yelverton C, Rama S, Zipfel B. Manual therapy interventions in the treatment of plantar fasciitis: A comparison of three approaches. Health SA Gesundheit (Online). 2019;24:1-9.

IASTM/TFM – Plantar Fascia



STM Plantarflexors



“Extracorporeal shockwave therapy (ESW) was found to be more effective than cortisone injections for plantar fasciitis.”



“Our study results suggest that both shock wave therapy (ESWT) and low-level laser therapy (LLLT) seem to be effective on pain, foot functions, and fascia thickness in the treatment of plantar fasciitis.”

Mishra BN et al. Effectiveness of extra-corporeal shock wave therapy (ESWT) vs methylprednisolone injections in plantar fasciitis. J Clin Orthop Trauma. 2019 Mar-Apr;10(2):401-405. doi: 10.1016/j.jcot.2018.02.011. Epub 2018 Feb 23.

Sanmak ÖD, Külçü DG, Mesci N, Altunok EÇ. Comparison of effects of low-level laser therapy and extracorporeal shock wave therapy in plantar fasciitis treatment: A randomized, prospective, single-blind clinical study. Turkish Journal of Physical Medicine and Rehabilitation. 2019 Jun;65(2):184.

“Dry needling seems to be a reliable procedure for treating plantar fasciitis, with better outcomes than corticosteroid injection.”



Uygun E et al. Preliminary Report on the Role of Dry Needling Versus Corticosteroid Injection, an Effective Treatment Method for Plantar Fasciitis: A Randomized Controlled Trial. J Foot Ankle Surg. 2019 Mar;58(2):301-305. doi: 10.1053/j.jfas.2018.08.058.

Disease	Typical age of onset	M:F Ratio (Prevalence / 100K US population)	Typical Sites of Involvement	Clinical Manifestations	Lab Diagnosis (in addition to CBC with differential, UA, CRP & ESR)
Rheumatoid Arthritis <i>Chronic destructive autoimmune synovitis</i>	40-50 years	1:3 (500/100K)	Bilateral & symmetrical: small joints of the hand (PIP, MCP), wrist, elbow, knee, & foot (MTP),	Morning stiffness, warm, tender, swollen joints, provoked by inactivity, subcutaneous nodules. Associated with Sjogrens syndrome (dry mucous membranes)	RA factor, anti-CCP antibody test
Ankylosing Spondylitis <i>Chronic joint inflammation leading to bony fusion</i>	20-40 years	3:1 (130/100K)	Symmetric sacroiliitis, lumbar and lower thoracic spine, ribs, asymmetric lower extremities	Intermittent LBP and stiffness provoked by inactivity, night time pain, aortic regurgitation	HLA B27 (90%)
Psoriatic Arthritis <i>Inflammatory arthritis preceded by psoriasis</i>	35-45 years	1:1 (100/100K)	Asymmetric hands, wrists, ankles, feet, sacroiliitis, cervical spine, DIP joint	Psoriasis, enthesitis, dactylitis (sausage appearance), nail dystrophy	HLA B27 (40%)
Reactive Arthritis/ Reiter's syndrome <i>Reaction secondary to enteric infection or UTI</i>	20-40 years	5:1 (35/100K)	Asymmetric sacroiliitis, lumbar spine and lower extremities	Nearly clinically identical to AS, provoked by inactivity, inflammation of the joints, urinary tract and eyes, ulcerations of the skin and mouth enthesitis, dactylitis, uveitis, aortic regurgitation, "flu-like" symptoms	HLA B27 (80%)
Enteropathic Arthritis <i>Chronic inflammatory arthropathy secondary to Crohns or UC</i>	Any age	1:1 (65/100K)	Symmetric sacroiliitis, lower extremities	Self-limiting but recurrent- correlating with bowel disease	HLA B27 (30%)
SLE <i>Chronic autoimmune disease of skin, joints and organs</i>	16-55	1:10 (45/100K)	Asymmetric fingers, hands, wrists and knees	Fatigue, headache, joint pain disproportionate to swelling, fever, "flu-like" symptoms, malar rash (50%), photosensitivity, hair loss, discoid lesions, migratory pattern, episodic. Associated with Sjogrens syndrome. 11 diagnostic criteria	Leukopenia, ANA, Sjogren's syndrome A, Sjogren's syndrome B antibodies
Scleroderma <i>Overproduction of collagen in skin and/or organs</i>	30-50	1:4 (25/ 100K)	"Localized" affects only skin, "Systemic" affects organs; esophagus, colon, lung, heart, kidneys	Raynauds, GERD, skin changes: tight, thickened or shiny skin (especially fingers and face)	
Lyme Disease <i>Bite from black-legged tick infected with Borrelia burgdorferi</i>	Bimodal age 5-19 and >30	1:1 (9/100K)	Polyarticular, knee	Initial "flu-like" symptoms beginning days or weeks post tick bite, expansile "bullseye" rash (75%), if untreated, episodic pain and swelling of joints. Late symptoms include: paresthesias, weakness, facial paralysis	ELISA for Lyme, Western blot
Septic Arthritis <i>Joint infection via puncture or spread from another body infection</i>	young & elderly (>65)	1:1 (8/100K)	Monoarticular, adults- knee, children- hip	Low-grade fever (40-60%), pain (75%), and impaired range of motion.	Joint aspiration & culture, blood culture
Gout <i>Uric acid crystals accumulate in and around joints</i>	>40	9:1 (500/100K)	Monoarticular, great toe, less commonly ankle or knee	Sudden, severe joint pain and swelling lasting days, tophaceous deposits at the helix of the ear or extensor surfaces of fingers	Uric acid in blood, joint aspiration
Pseudogout / CPPD <i>CPPD crystals accumulate in joints</i>	>60	1:1 (130/100K)	Monoarticular, knee, less commonly ankle, wrist or elbow	Sudden, severe joint pain and swelling lasting days	Joint aspiration
Polymyalgia Rheumatica <i>Acute inflammatory myopathy</i>	70	1:2 (52/ 100K)	Hip and shoulder girdle	Rapid development of "flu-like" symptoms, especially myalgia and inactivity stiffness, limited range of motion, weakness, fever, weight loss. Associated with Giant cell arteritis (15% of cases).	ESR, CRP
Polymyositis <i>Chronic progressive inflammatory myopathy</i>	45-60	1:2 (<.8/100K)	Symmetrical skeletal muscles near trunk; hips, thighs, shoulders, upper arms and neck	Mild joint and muscle tenderness, fatigue and shortness of breath. Slowly progressive muscle weakness leading to difficulty moving swallowing or speaking. Dermatomyositis affects skin also.	CPK, urine myoglobin, serum aldolase, EMG/NCV and muscle biopsy