



Prolotherapy: The Next Step in Treating Your Patient



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- Musculoskeletal Ultrasound
- Hackett Hemwall Course in Honduras 2008, 2009, 2010
- AAOM Mexico 2014, 2015



Disclosures:

- I have no relevant financial or nonfinancial relationships to disclose.

Objectives:

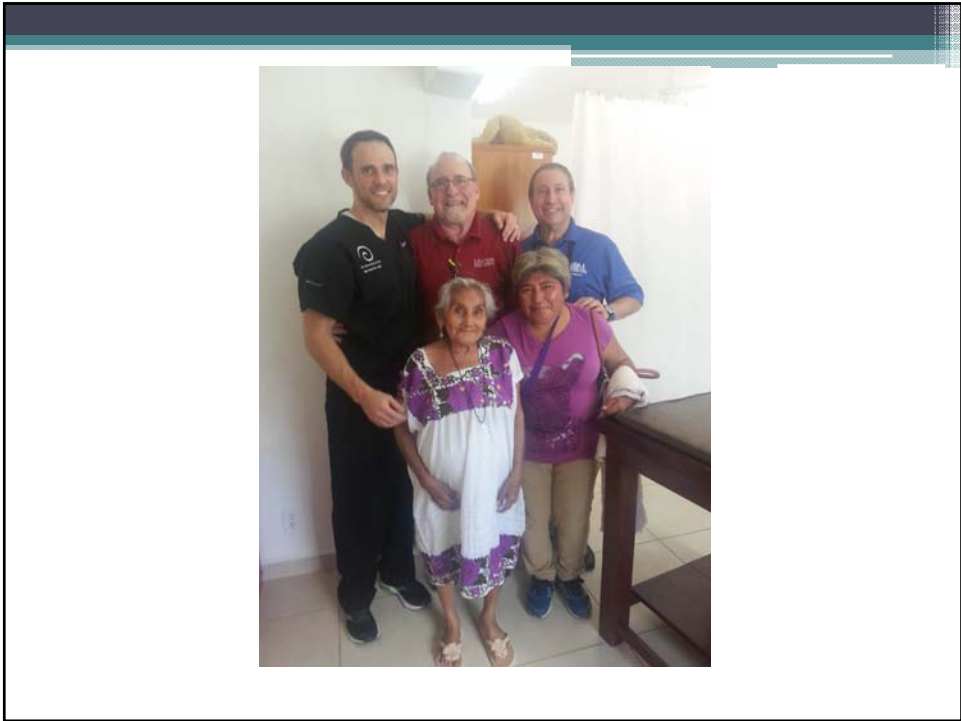
- Define Prolotherapy
- Discuss different types of Prolotherapy
- Review Prolotherapy literature
- Demonstrate Indications in Office
- Review Prolotherapy cases

Hacket Hemwall- Honduras



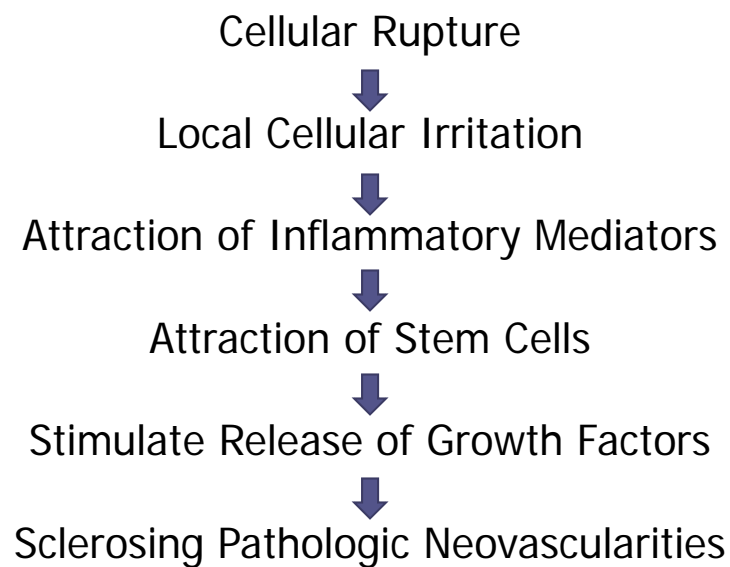
AAOM- Mexico





What is Prolotherapy?

- Founded in 1940s by George Hackett, MD
- “Prolo” is a non-surgical Tx used mostly for **chronic ligament and tendon injuries**
- Irritating solution injected into injured ligaments or tendons (entheses) to re-stimulate healing of injured area
- Inflammation → Decay → Repair



Prolo physiology - How does it work?

- Exact mechanism unclear - Prolo injections likely trigger local *inflammation*
- Inflammation → GF → Fibroblasts → Collagen
- Collagen – builds *new, healthy* ligaments & tendons
....NOT scar tissue (as once thought)

Jensen K, et al. Response of Knee Ligaments to Prolotherapy in a Rat Injury Model. AJSM 2008; 36 (7):1347-1357.

Reason for Referral for Prolotherapy

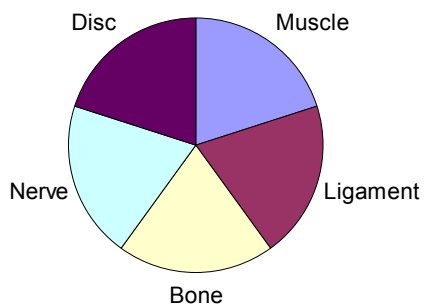
- Chronic ligament injury is a common pain generator
 - When a patient's injury doesn't respond to treatment as anticipated or correlate with imaging, think chronic ligament injury
- Chronic ligament injury is a *clinical* diagnosis
 - U/S & MRI are poorly sensitive at identifying chronic ligament injuries

- The Ligament is a frequent cause of musculoskeletal pain and is our treatment target.



PAIN

UNDERSTANDING PAIN PATTERNS



Degenerative Postural Cascade

- Gravity
- Abnormal Muscle Tone
- Distorted Joint Balance
- Fascial Distortion
- Compression/Tension Alteration
- Ligamentous Laxity
- Tendinous Enthesopathy
- Neural Input Changes

Additional Factors

- Trauma
 - Acute or Repetitive
 - Deconditioning
 - Proprioceptive Dysfunction
- Surgery
- Altered Autonomic tone
- Hormonal Deficiencies
- Nutritional Deficiencies
- Narcotics
- Scoliosis
- Short Leg

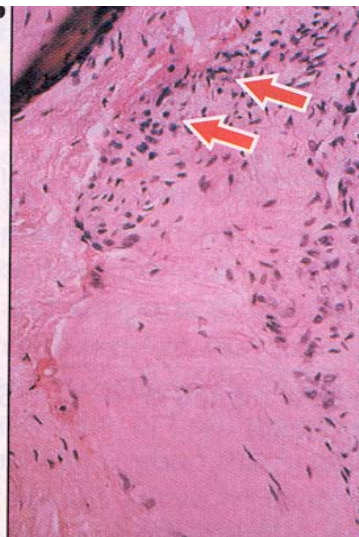
Connective tissue

- Tendons
- Ligaments
- Capsules
- Fascia
- Enthesis: Zone of insertion of connective tissue to bone

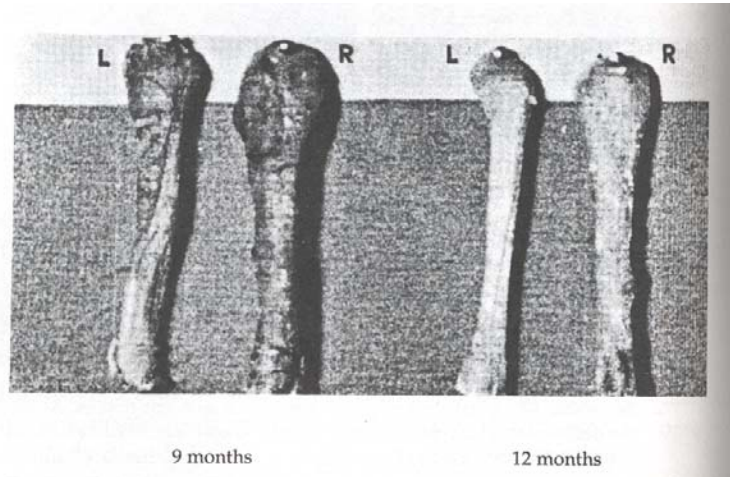
Normal Tendon



Tendinosis



Rabbit tendons pre and post prolo



What solutions are injected?

- Dextrose (5-25%) – most common (\$5)
- Others: Phenol, Glycerin, Na+ Morrhuate



Prolotherapy Solutions

- Dextrose
- Sodium Morrhuate
- P2G (Ongley's Solution)
- Pumice
- Testosterone
- HGH
- Autologous Blood
- PRP
- Adipose Derived Stem Cells
- Mesenchymal Derived Stem Cells
- Incubated Stem Cells
- Purified Human Amniotic Membrane and Porcine Bladder Membrane

Treatment protocol:

- Typical patient requires 3-5 Treatments
- Frequency – injection every 3-6 weeks
- Patient knows after 3 Tx if Prolo is helping

Indications for Prolotherapy:

- Headaches
- Neck pain
- Whiplash injuries
- TMJ
- SLAP lesions
- Rotator Cuff tears
- Tennis elbow
- Golfer's elbow
- Carpal Tunnel Syndrome
- DeQuervain's
- TFCC injuries
- DJD
- Arthritis
- Herniated discs
- SI dysfunction
- Hip sprains
- Athletic pubalgia
- Groin strain
- Hamstring tears
- ITB
- Trochanteric bursitis
- Knee pain
- Ankle pain/instability
- Plantar fasciitis
- PTT
- Turf toe
- MTSS
- Pes Anserine Bursitis

Contraindications to prolotherapy

- Allergy to anesthetic or proliferant solutions or their ingredients
- Acute non-reduced subluxations or dislocations
- Acute arthritis
- Acute bursitis or tendinitis
- Recent onset of a progressive neurological deficit
- Paraspinal neoplastic lesions involving the musculature and osseous structures
- Severe exacerbation of pain or lack of improvement after local anesthetic blocks

Prolotherapy Complications

- Increased Pain
- Dizziness
- Vaso-vagal Episodes
- Bleeding/ hematoma
- Nerve Damage
- Pneumothorax
- Infection
- Paralysis
- Spinal or Cerebral Infarction
- Death



Will Prolotherapy alone cure me?

- Prolotherapy should not be used in a vacuum!
- Prolotherapy should be used as part of a larger Tx plan (multidisciplinary approach)
- Most patients need good PT in addition to prolotherapy:
 - core strengthening
 - correct muscle imbalance and postural defect
 - manual therapy
 - retrain proper muscle firing sequence

Where's the evidence for Prolo?

- Multiple studies in major journals in last 5 yrs
 - CJSM, Lancet, AJSM, BJSM, Pediatrics, J Am Acad Orthop Surg, etc.
- Studies show mixed results
- Many studies are weak evidence:
 - retrospective, cohort, small sample size, few RCTs, etc.

Prolotherapy Evidence Based

- Studies difficult to compare due to:
 - significant methodological differences
 - different injuries, different sites
 - different solutions
 - different outcome measures
 - usage of other interventions (ie: PT, manip.)

- Multiple studies pending (RCTs):
 - Knee OA
 - Rotator cuff tendinopathy
 - Lateral epicondylosis

An UpToDate review on “Subacute and chronic low back pain: Nonsurgical interventional treatment” (CHOU, 2014

In a prospective RCT, KIM and colleagues (2010) evaluated the efficacy and long-term effectiveness of intra-articular prolotherapy in relieving sacroiliac joint pain

In a COCHRANE review on prolotherapy injections for chronic LBP, DAGENAIS et al (2007)

.An UpToDate review on “Overview of the management of overuse (chronic) tendinopathy” (KHAN AND SCOTT 2014)

In a pilot study, SCARPONE et al (2008) examined the effectiveness of prolotherapy in the treatment of lateral epicondylosis.

ONGLEY et al, 1987) was able to demonstrate conclusively that prolotherapy was significantly superior to placebo for treatment of chronic low back pain.

KHAN and colleagues (2008) presented the results of dextrose prolotherapy undertaken for chronic non-responding coccygodynia

In a prospective, uncontrolled study with 1-year follow-up, **RABAGO** et al (2012) examined if prolotherapy would improve pain, stiffness, and function in adults with symptomatic knee osteoarthritis

DAGENAIS et al (2005) stated that results from clinical studies published to date indicate that prolotherapy may be effective at reducing spinal pain

Prolo vs PRP & other proliferants:

- No head-head trials between Proliferants
- Some “experts” believe that PRP is stronger than Prolotherapy
- No evidence that PRP is more effective than Prolotherapy 3-4x >Expensive

Hall M, et al. Platelet-rich Plasma: Current Concepts and Application in Sports Medicine. J Am Acad Orthopd Surg 2009; Oct; 17 (10): 602-608.

Rabago D, et al. A systematic review of four injection therapies for lateral epicondylitis: prolotherapy, polidocanol, whole blood and platelet-rich plasma. BJSM 2009; 43:471-481.

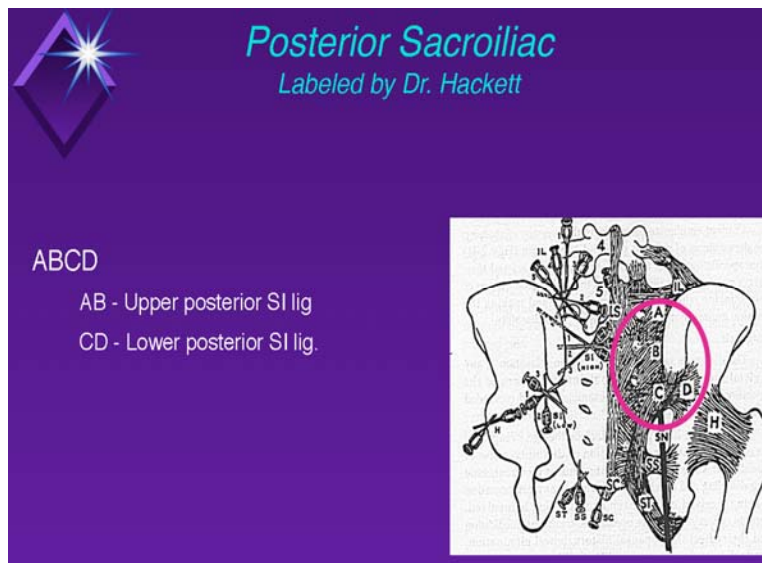
Prolotherapy Case Examples

Case #1:

- 32 y/o female c/o chronic LBP x 5 yrs
- Large herniated disc L5-S1 -> microdiscectomy completely resolved radicular Sx
- But localized LBP persisted
- Unresponsive to PT, DC, acupuncture
- Neg. repeat MRI
- Persistent SI instability found @ PT

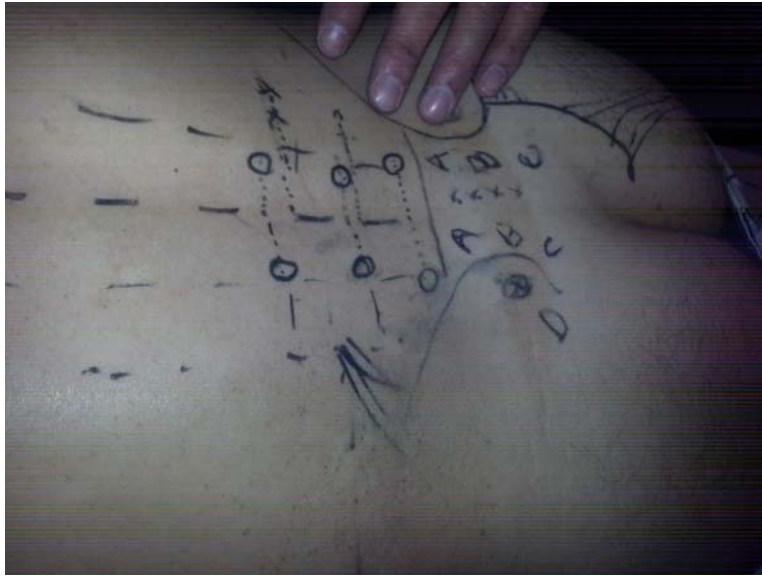
Case #1:

- 100% improvement (pain & SI stability) after 4 Prolo treatments of sacroiliac joint.



Sacroiliac ligaments:

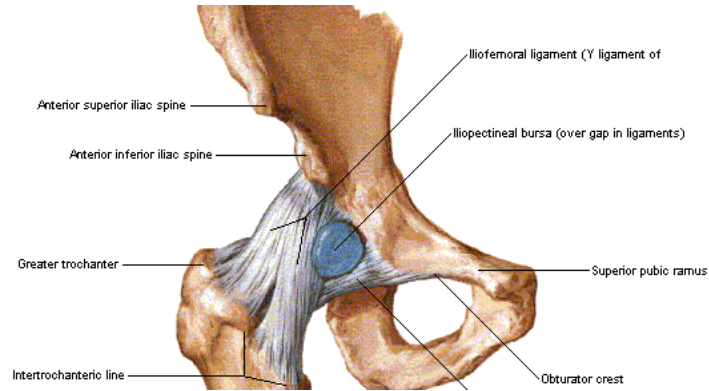




Case #2:

- 49 y/o F c/o > 20 yr Hx of Lt posterolateral hip pain
- No injury or trauma
- No radicular Sx
- No improvement w/ PT, chiro, cortisone
- Negative Xrays & MRI

Case #2:



Case #2:

- **Exam:**
 - Unstable SI
 - Tenderness of lat & post hip capsules
 - + Gaenslen & FABER tests
 - O/W norml exam
- > 95% improvement w/ 6 Prolo Tx (of SI, Lt hip capsule)

Hip capsule:



Case #3:

- 18 y/o M lacrosse player c/o sudden onset Rt buttock pain while jogging off field x 1 year
- No relief w/ PT, chiro, acupuncture
- Negative Xray & bone scan
- Rt SI dysfx noted on exam

- 100% improvement (pain & SI stability) w/ 4 Prolo Tx of SI

Case #4:

- 16 y/o HS football player c/o recurrent ankle instability & pain
- Multiple inversion sprains over last 2 years
- Unresponsive to numerous PT, taping, bracing, proprioception
- Normal Xrays & MRI

Case #4:

- **Exam:**
 - mild chronic swelling of lateral ankle
 - + subtalar laxity
 - + tenderness of distal syndesmosis, ant. Tib/fib ligament, sinus
- > 95% improved stability and pain after 6 Prolo Tx (of above injured areas)

Chronic ankle instability/sprain:



Ankle:



Ankle: Sinus Tarsi



Case #5:

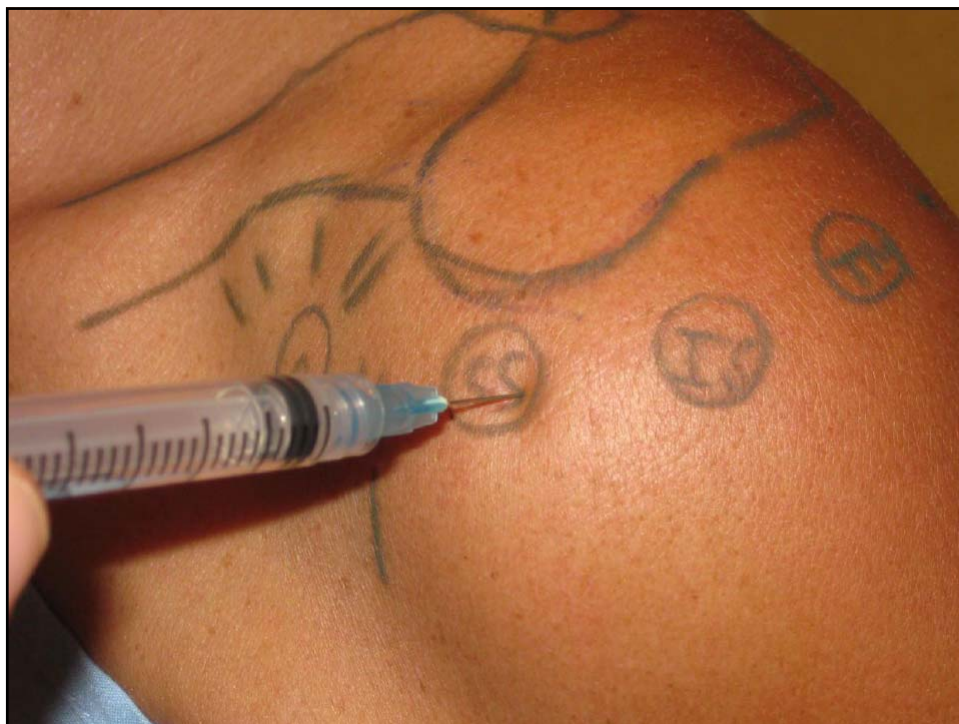
- 38 y/o construction worker c/o Rt dominant shoulder pain x 2 year
- Due to overuse @ work
- Unresponsive to cortisone, PT, NSAIDs
- Neg. Xray & U/S

Case:

- Exam:
 - + Speed' s, Job' s, Gerber' s liftoff
 - + tenderness of biceps tendon, inferior capsule, distal supraspinatus
- > 90% improvement after 6 Tx

Shoulder





Case #6:

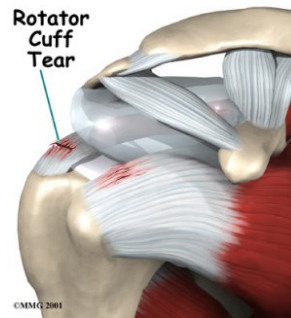
- 30 y/o male c/o right dominant shoulder pain & subluxation after landing on shoulder during flag football
- Had repeated shoulder instability & pain x 3 yrs
- No improvement despite NSAIDs, cortisone injection & PT

Case #6:

- Had 75% improvement of pain & function w/ 5 Prolo Tx
- ...but continued to have instability of shoulder (esp. w/ pushups & throwing)
- eventually had Arthroscopic repair:
 - Grade 2 SLAP tear w/ Supraspinatus tear

Case #6:

If Prolo didn't "fix" my SLAP or RC tear (prior to surgery), why did I have 75% improvement in pain & function w/ Prolo?



Case #7:

- 43 y/o Physical Therapist c/o anterior Lt shoulder pain after catching falling patient (traction mechanism)
- Dx' d w/ PT Supraspinatus tear & ? Myofascial pain syndrome (@ University Sports Med Center)
- Pain mostly in L SC region w/ clicking & popping during motion

Chronic SC or AC joint instability/sprain:



Sternoclavicular joint:



Case #8:

- 17 y/o pitcher c/o gradual onset medial elbow pain (dominant arm) x 1 yr
- Plays year-round baseball on 3 different teams
- No improvement w/ PT, NSAIDs, rest, ice, neoprene sleeve
- Exam:
 - + tenderness of medial epicondyle region, no laxity w/ valgus or milking tests
 - Good strength, but mild pain w/ wrist flexion

Case #8:

- Xray – normal, physes closed
- MRI – small signal at proximal flexor origin; no obvious large tears of tendon or UCL
- > 95% improvement after 5 Prolo Tx
 - No pain w/ pitching (even w/ breaking balls) & return to full velocity
 - Emphasize 3-4 months of rest per year

Medial & Lateral Epicondylitis:



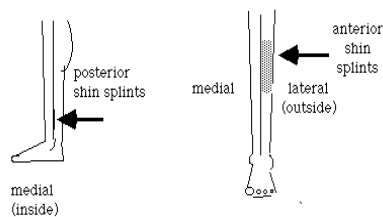
Case #9:

- 56 y/o RN c/o Lt medial knee pain x 5 yrs
- No injury, instability or mechanical Sx
- Mild medial compartment OA on Xray
- Exam: + tenderness along MCL/Pes Anserine, mild discomfort w/ valgus testing but no gapping
- > 80% improvement w/ 5 Prolo Tx

Chronic MCL/pes anserine:



Expanding Applications: Shin Splints (MTSS)



- An overuse injury, often in untrained athletes
- Causes pain along medial aspect of lower leg (tibia)
- Treated with “relative rest”, stretching, PT, Foam Roller
- Biomechanical exam
- Prolotherapy

Curtin M, Crisp T, Malliaras P, Padhiar N. The effectiveness of prolotherapy in the management of recalcitrant medial tibial stress syndrome: a pilot study. Br J Sports Med 2011;45:e1 doi:10.1136/bjism.2010.081554.8

Prolotherapy Application

- Prolotherapy is a great non-surgical tool for chronic ligament & tendon injuries
- Prolotherapy is not a cure-all
- Think of chronic ligament injuries in your DDx
- Prolotherapy evidence is evolving
- Good head-to-head studies needed b/w different Proliferants

Future of Prolotherapy:

- Standardization of training
- Certification of competency evolving
- Various solutions, methods
- “One size fits all” attitude
- Weak/mixed evidence
 - Not unlike: cortisone injections, Neuro Psych testing, U/S guided injections, PRP, many ortho surgeries, etc.



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- www.cma.ca (Canadian Medical Association: LBP position statement)



