Prolotherapy: The Next Step in Treating Your Patient

Patrick F. Leary DO  FAOASM FACSM FACOFP  LECOM Sports Medicine

• 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 (enthesis) to re-stimulate healing of injured area

- Inflame $\rightarrow$ Decay $\rightarrow$ Repair

Cellular Rupture

$\downarrow$

Local Cellular Irritation

$\downarrow$

Attraction of Inflammatory Mediators

$\downarrow$

Attraction of Stem Cells

$\downarrow$

Stimulate Release of Growth Factors

$\downarrow$

Sclerosing Pathologic Neovascularities
Prolo physiology - How does it work?

- Exact mechanism unclear - Prolo injections likely trigger local *inflammation*

- Inflam → GF → Fibroblasts → Collagen

- Collagen – builds *new, healthy* ligaments & tendons
  ....NOT scar tissue (as once thought)


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.
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.
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.

**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.

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

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**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

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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:

- 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 Epicondylosis:

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

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.
References:

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References:

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