Welcome to the Spring KAOM Conference

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President, AOAPRM
Arden Andersen DO

- Agriculturalist first and have consulted around the world, 5 continents, 13 countries, 4 languages
- Western University of Health Sciences COMP
- FP Internship Muskegon, Michigan
- Residency in Occupational Medicine, USF, Tampa along with MSPH
  - Boarded in Public Health and Prolotherapy
- US Air Force Aerospace Medicine and Combat Casualty Courses
  - AF Reserve Flight Surgeon, Chief of Aerospace Medicine with rank of Colonel; deployed 3 times - used prolotherapy all 3
- Current practice in Lansing, Kansas - Medicaid, Medicare, homeless, low socio-economic community
Why Prolotherapy?

• Chronic musculoskeletal pain is a common and costly occurrence in society.

• Low back pain is the most common reason for missed work and worker’s compensation claim.

• Neck, back and joint pain are, also the primary reason for opioid prescriptions and disability claims.
What happens when standard therapy doesn’t work?

• Many people with chronic pain fail NSAIDS, physical therapy, steroid injections, even surgery.

• The most common next step is chronic opioids, antidepressants, anxiolytics, neuroleptics, continued suffering.
The Optional Pain Management

• Outside of neoplasms and gross rupture of ligaments and tendons, chronic pain is most often linked to micro-injury of entheses, ligamentous laxity being the most frequent.

• Common symptoms are unresolved pain, complaints that pain improves with OMT or chiropractic, but only last briefly and another treatment is needed.
What is Prolotherapy?

Prolotherapy, formerly lumped into the broad term “sclerotherapy” is the introduction of a known chemical or mechanical irritant for the treatment of relaxed or incompetent joint ligaments, tendonous attachments, varicose veins, hemorrhoids, abdominal hernias and hydroceles by induced formation of new fibro-elastic connective tissue.
In Search of Solutions

- To find the perfect solution, one must research the history and physiology of prolotherapy.
- I researched article upon article, looked at biochemistry, searched for THE key components.
- What the elders revealed is that simplicity works, anatomy and physiology prevails and hitting the target is still what really matters.
Sclerotherapy was first referred to by Hippocrates during the fifth century B.C.¹ in the treatment of shoulder dislocations. During the dark ages sclerotherapy was mislaid.

Until a little over a hundred years ago when a French physician named Valpeau described his technique of injecting abdominal hernias or abdominal ruptures by the injection of an iodine and carbolic acid solution to produce scar tissue and thereby strengthen the abdominal muscles.

With advent of the hypodermic needle in 1853, Dr. Chassoignac, of Paris, France, treated varicose veins by the injection of saline and other solutions with marked success.

Before the advent of the non-absorbable suture, sclerosing agents were the most successful method of treatment of inguinal hernias both here and abroad.
During the 1930’s, Dr. Earl Gedney, Dr. David Shuman of Philadelphia, PA. and Dr. George Hackett of Canton, Ohio, working independently, began injecting agents with marked success. At the present time sclerosing solutions are far more widely used in the treatment of joint instability, relaxed or incompetent ligaments and tendons than in all other areas combined.

The first apparent histo-physiological reports on response in tissues to the sclerosing solutions were published by Hall and Frazier in 1927. Experimental work was performed on monkeys, guinea pigs and dogs to determine the histological response following injections of tanic acid. Rice obtained human biopsies following the injections of various sclerosing solutions.

In 1955 Drs. Hackett and Anderson reported the results of a two year animal experimentation of injections of ligaments and tendons. Dr. Schultz in 1937 conducted several experiments by injecting the tempromadibular joints of dogs. Dr’s. Bumpus and Henderson conducted a comparative study of ligaments and tendons by the use of sclerosing agents. Dr. Y.K. Liu and Dr. Charles M Tipton in 1981-1982 conducted a study of the strengthening effect of sodium morrhuate on the medial collateral ligaments of rabbits.
The initial professional association was the American Society of Herniologists Association, circa 1926. Journal of Prolotherapy, Vol. 1, Issue 4, November 2009 gives an extended history of the profession.

Several name changes have transpired, in a back and forth with the AOA, and the latest and current organizational name is the American Osteopathic Association of Prolotherapy Regenerative Medicine. It is a 501C3 organization sanctioned by the AOA as one of its specialty colleges granting a certificate of added specialty and one of few that are financially stable.
The fundamental principle of prolotherapy is to induce a proliferative response at the primary site of injury. This is the enthesis for ligamentous/tendinous issues.

The enthesis is where the ligament or tendon attach to the bone. This is the most common location of the underlying cause of joint/spinal pain, DJD, DDD and disability. Here rest many pain fibers and a fibro-cartilagenous matrix that prolotherapists target for therapy.
Injury at the enthesis is likened to pulling out a few hairs from one’s scalp (individual fiber injury) vs. the entire head of hair (full ligament evulsion). The injury (microscopic tears) to the ligament/tendon elicit pain and trigger proprioceptive feedback that leads to instability, muscle spasm, and pain. Instability leads to excessive micro- or macroscopic joint movement leading to degenerative processes.
Acute to Chronic Injury

Upon injury, the inflammatory cascade ensues leading eventually to fibroblastic infiltration and new tissue placement. Unfortunately, this process is most often derailed before the actual injury is fully mended. The healing inflammatory process completes or resolves, but does not fully mend the damage. This occurs due to NSAIDS, steroids, ischemia, and fundamentally a deficiency of nutrients: vitamins and minerals.
Repair: Prolotherapy

Because the injury does not fully mend, the healing inflammatory process must be restarted/reinitiated however many times it takes for the body to fully mend the injury, thus, resolving the instability, the pain and, potentially, the degeneration.
(d) Lateral view, humerus removed
“Food” for Thought

- The following slides on herbals and nutrients are meant to be food for thought for those innovative practitioners that come up with ideas about new, more regenerative injectables.

- Additionally, to get the best results, especially with many patients today, we must improve their nutritional status so they can heal.
“The Machinist”
Collagen Builders

- Proanthocyanidins
  - Bilberry
  - Grape seed

- Glycosaminoglycans

- Chicken collagen

- Hyaluronic acid

- Hormones: only bio-identical, buccally delivered
  - Estradiol, estrone, estriol, DHEA, testosterone, androstenedione, pregnenolone, progesterone, T3, T4, melatonin, human growth hormone
Proanthocyanidin
Influences on Collagen

- Stimulates all four types of collagen blasts
- Inc. cross-linkage of peptides
- Protects all collagen from free radical damage
- Interferes with overproduction of hyaluronidase
- Prevents premature breakdown of collagen
- Augments vitamin C activity
collagen builders (cont’d)

- Bioflavonoids
  - Hesperidin, rutin, quercetin
- Hawthorn
- Gotu kola
- Vitamin A
- Vitamin B6
- Vitamin C
- Vitamin E
- Pantothenic acid
- Boron
- Zinc
- Copper
“the a team”
Bone Trophic Nutrients

- Hormone
  - Testosterone, DHEA, pregnenolone, androstenedione, progesterone, melatonin, human growth hormone, T3 & T4
- Molybdenum
- Vanadium
- Mg++
- Vitamin K
- Vitamin D
- Vitamin C
- Selenium
- Silicon
- Boron
- Strontium
- Vitamin B6
- Vitamin B12
- Folate
- Copper
Neurotrophic (Nootropic) Nutrients

- Phosphatidylcholine
- Phosphatidylserine
- Mg++
- Essential fatty acids
- Vitamin E
- Every B vitamin
- L-glutamine
- L-glutathione
- Co Q10
- Alpha lipoic acid
- Pregnenolone
- E1, E2, E3
- Testosterone
- Progesterone
- DHEA
- Human growth hormone
- Thyroid
- Melatonin
Antioxidants

- Include vitamins A, C, E, selenium, grape seed extract, lipoic acid, Co Q10 & more
- Believed to inhibit aging process
- Free radicals implicated in heart disease, cancer & chronic degenerative diseases
- Protects cell membranes, DNA, RNA
- Protects from oxidative damage caused by environmental toxins & radiation
“the natural”

glucosamine sulfate

- Extremely well studied
- Better results than NSAIDs
- NSAIDs potentially inhibit natural glucosamine synthesis and suppress chondrocytes.
- Is required for cartilage proteins
- Addresses a cause of osteoarthritis - sulfur deficiency as well as glucosamine deficiency
- Takes at least 3 - 8 weeks to see results
Glucosamine Sulfate (cont’d)

- Glucosamine is the carrier for much needed sulfur, therefore do not use the HCl form
- Inhibits cartilage breakdown
- Promotes cartilage repair
- With chondroitin, regenerates damaged cartilage, tendons, ligaments, muscles
- Dose - 1500mg per day, minimum
  - need synergistic minerals e.g. Mn
“big fish”
Hyaluronic Acid

- A major constituent of extracellular spaces, responsible for “plumpness” of skin, cartilage, vitreous humour, arterial walls & other collagen

- Holds over 1,000X its weight in water

- Levels decline with free radical damage over time - sun, diet, drugs, toxins, etc. - broken down by hyaluronidase

- Responsible for cellular repair & maintenance
Chondroitin

- Beneficial when injected into synovial fluids
- Orally not absorbed unless angstrom size controlled - molecule larger than & related to heparin
- Enzymatically cleaved vs. chemically cleaved
- Only a couple of companies worth using due to absorption; same with any supplement
- Inc. blood flow via inc.’d angiogenesis & strength of vascular walls
inflammatory modulating, pro collagen, regenerative
Substances useful in Prolotherapy & Pain

- Curcumin
- Ginger
- Devil's claw
- Quercetin
- Boswellia
- Yucca
- Capsaicin
- Homeopathy
  - Vitamin C, buffered, fully reduced with bioflavonoids
- SAMe
- Zinc-manganese drops
- Chicken collagen drops
- Niacinamide
References


“silver linings playbook”
optimal daily supplementation

High potency multi-vitamin/mineral

- Vit C: 4,000-8,000mg
- Omega-3: 1650mg
- L-taurine: 700mg
- Grape seed ext: 100mg
- Schisandra: 175mg
- Bilberry extract: 175mg
- Glutamic acid: 75mg
- Glycine: 75mg
- N-acetyl-cysteine: 300mg
- Lutein: 20mg
- Lycopene: 4mg
- Zeaxanthin: 2000mcg
- Tocotrienols: 25mg
- Superoxide dismutase: 200mg
- Quercetin: 300mg
- Ginkgo biloba: 100mg
- Co Q10: 120mg
ODA - Optimal Daily Allowance

» Vit A (71% beta-carotene) 35,000 IU
» Vit C ascorbic acid 2000 mg
» Vit D3 2000 IU
» Vit E (as mixed tocopherols) 800 IU
» Vit K1 150 mg
» Thiamine (B1) 200 mg
» Riboflavin (B2 as R-5-P and Riboflavin) 100mg
» Niacin/niacinamide 250 mg
» Vit B6 (Pyrodoxine/P-5-P) 300 mg
» Folate (Calcium folate/5-MTHF) 800 mcg
» Vit B12 (methyl- and hydroxycobalamin) 1,000 mcg
» Biotin 500 mcg
» Pantothenic Acid from Calcium pantothenate 500 mg
» Iodine (sea kelp and potassium iodide) 1,000 mcg
» Magnesium (from magnesium glycinate) 500 mg
» Zinc (from zinc picolinate) 50 mg
» Selenium (from amino acid chelate) 400 mcg
» Copper (citrate) 3 mg
» Manganese (ascorbate) 20 mg
» Molybdenum (fumerate) 300 mcg
» Potassium (citrate) 99 mg
» chromium (from chromium GTF) 400 mcg
ODA cont.

» Choline (citrate) 300 mg
» Inositol 300 mg
» N-Acetyl L-Cysteine 200 mg
» Betaine HCl 150 mg
» Bioflavonoids (citrus) 100 mg
» PABA 100 mg
» Glutamic Acid HCl 20 mg
» L-Methionine 12.5 mg
» Co-Q10 10 mg
» Boron (citrate) 50 mg
» Vanadium (Asparate) 300 mcg
» Trace Elements 100 mcg
Dry needling has been shown to initiate a degree of regenerative processes, but is not sufficient for most situations. The addition of prolotherapy solutions is needed to fully engage the healing inflammatory processes to achieve full injury resolution.
Categories of Solutions: Irritants in some form or another

- Chemical
  - Hypertonic solutions: glucose and saline
  - Irritants: sodium morrhuate, PQU, phenol/glucose/glycerine
  - Biological solutions: Plate-Rich-Plasma, adipose with stem cells, blood
  - Other: ozone
    - Sello LebohangManotoMakwese JohanessMaepaShirley KeolebogileMotaung
      Medical ozone therapy as a potential treatment modality for regeneration of
      damaged articular cartilage in osteoarthritis. Saudi Journal of Medical Sciences.
      https://doi.org/10.1016/j.sjbs.2016.02.002

- Physical
  - Pumice
Solutions’ Politics

- There is great debate about what is best, worst
  - often the decisions are financially driven, politically driven, latest fad driven, FDA driven, supply driven

Our search uncovered almost 200 reference materials in various media related to prolotherapy, including 31 clinical studies related to spinal pain. There were 26 observational cohorts and 5 randomized clinical trials (RCTs). Indications in these studies were low back pain (22), neck pain (3), cervical headaches (3) and dorsal or thoracic pain (3). **A total of 20 sclerosing solutions were used in these studies; the most common was a mixture of dextrose 12.5%, glycerin 12.5%, phenol 1.25% and lidocaine 0.25%.** Wide variations were found in treatment protocols, such as dose, number of treatments and use of adjunct therapies. Most cohort studies were only of moderate quality and varied greatly in the substances injected and the use of co-interventions. Most clinical studies reported positive results such as decreased pain or disability, although differences between treatment and control groups did not always reach statistical significance. **Commonly reported adverse reactions to this treatment include temporary postinjection pain and stiffness. A handful of more serious adverse events were reported in the 1950s and 1960s with stronger or unknown solutions.**
What solution to choose?

Key to looking at solutions is understanding the goal of prolotherapy and the desired outcome.

- Stimulate healing inflammatory process in the context of an injured environment (enthesis, …) with sufficient nutrient milieu present to resolve pain and instability.
Beginner & Soft Tissue Ingredients

- lidocaine or procaine
  - with or w/o epi
- D50
  - basic solution 2cc lido, 1cc D50 (16.667%)
- homeopathic solutions for tissue healing, collagen formation, etc.
Solutions Options

- Starter solution: 4 cc glucose and 6 - 7 cc lidocaine
  - think about adding 1/4 - 1/2 cc compounded B complex, 1/4 to 1/2 cc ascorbic acid
  - perhaps use 6 - 7 cc pumice in lidocaine
    - Pumice is most commonly compounded
Biological Solutions

- Some will use PRP alone; others will add some adipose or bone marrow stem cells at 1/2 - 1 cc per injection site - quite painful

- Consider 2 - 3 cc D50, 1/4 - 1/2 cc B complex, 1/4 cc ascorbic acid w/or w/o 1 cc lidocaine/procaine and 5 - 6 cc PRP
Prolotherapy

- Fundamentally, placing a needle and solution at/into points of micro/macro injury to the connective tissue structures to stimulate healing/regeneration.

- The solutions are secondary, results are dependent upon placement and patient biochemistry. Prolotherapy is between 80-90% effective regardless of the solution used.

- Has been and can be done without the aid of ultrasound or fluoroscopy, or supplemental equipment.
The effectiveness of prolotherapy in treating knee osteoarthritis in adults: a systematic review

Fadi Hassan, Suad Trebinjac, William D. Murrell, Nicola Maffulli

Br Med Bull 1-18. DOI: https://doi.org/10.1093/bmb/ldx006

Published: 04 March 2017

Abstract

Introduction

Osteoarthritis (OA) often leads to symptoms such as pain, stiffness and decreased function. OA is treated with a wide range of modalities, both conservatively and surgically. Prolotherapy has been used to treat various musculoskeletal problems and has shown some promise.

Sources of data

Searches of the electronic databases, PubMed, ISI web of science, PEDro and SPORTDiscus, were conducted for all Level 1–4 studies published from inception through to December 2016.

Areas of agreement

Ten studies were evaluated and results show significant improvement in scores for pain, function and range of motion, both in the short term and long term. Patient satisfaction was also high in these patients (82%).

Areas of controversy

Meta-analysis was not possible due to heterogeneity of outcome measures and populations.

Growing points

Moderate evidence suggests that prolotherapy is safe and can help achieve significant symptomatic control in individuals with OA.

Listed in AOA Morning Brief 3/24/17: Reported in Reuters

HEALTH NEWS | Wed Mar 22, 2017 | 4:44pm EDT

Can sugar injections help ease knee joint pain?
“Intra-articular injection of either TAH or TA is associated with significantly increased blood glucose levels in patients with controlled diabetes with OAK. This increase is quite solely due to the injected steroids.” (triamcinolone hexacetonide or acetonide)

In adults with moderate to severe KOA, dextroser prolotherapy may result in safe, significant, sustained improvement of knee pain, function, and stiffness scores.

Dextrose, amino acids and ascorbic acid mixture (nutritive mixture solution - NMS) injected 5 times into the transected ACL

- “0.5 ml of NMS or NS was intra-articularly administered into the knee joint cavity of mature rabbits for 13 consecutive weeks starting on week 6 after ACLT at 2-week or 3-week intervals, when arthritic changes had begun. It was found that only NMS injection significantly restored the extracellular matrix and inhibited the progression of OA-like changes in articular cartilage that had undergone ACLT. We suggest further comparative studies with other existing OA treatments, because in this study we only examined the effects of NMS on OA progression in comparison with a control (NS) treatment.”

- “…electron microscopy findings also indicated that nms injection, in contrast to normal saline injection, restored the cartilage matrix, which is known to be composed of a collagen and proteoglycan network. thus, nms injection is a potent treatment that significantly retards oa progression, which in turn prevents progressive destruction of joints…”

Dr. Andersen L–S Prolo Solution

- 12 cc syringe
- 50% Dextrose 4-5cc
- Pumice-Lidocaine Solution 6 cc
- Vit. C 1/4 - 1/2 cc (cofactor in collagen production)
- B-complex 1 cc (address the stress of the procedure on the person)
- Q.S. Sterile Water to total volume of 12 cc syringe
“Simple” also works

- My first exposure to prolotherapy was via a physician who used 4cc D50 and 6cc lidocaine using a 27ga - 1/2 inch needle.

- Injected the supraspinous and interspinous ligaments of the spine; the AC, corocoid process, angle of the scapula of the shoulder.

- His results were excellent, had many satisfied patients, never felt he needed to expand his techniques
Solutions vs. Market/FDA Policy

- It is getting more and more difficult to get old solution materials such as sodium morrhuate, pumice, PQU, etc. as these require compounding.

- PRP is simple and straightforward for office practice, no concerns about shelf life expiration, but expensive for many patients.
Wealthy Patient:
Stem cells and other sophisticated biologicals

Middle Class Patient:
Basic plus pumice, vitamins, PRP and pharmaceuticals
if available to the practitioner

Lower Socio-economic Patient and Mission Service:
Glucose, Hypertonic Saline, Lidocaine
Solution placement is the most important factor in the success or failure of prolotherapy.

In today’s world, we must match the solution to the patient both biologically and logistically/financially.

Lidocaine/procaine, D50, B-complex and ascorbic acid are all off the shelf and readily compoundable solutions. Pumice is a bit more precarious, but available.

PRP and stem cell solutions are great additive options but rapidly becoming gimmick or elitist options in many venues.
The Hippocratic Oath

We are physicians to first do no harm and second to help people in need. To help the masses, we must offer approaches that are viable for the average/majority physician, not just the elitist. If your prolotherapy treatments stabilize joints, regenerate connective tissue and relieve pain, no one really cares if it is via lidocaine and dextrose, with PRP and stem cells, or ozone and homeopathics. The patient received what they came for the doctor to deliver.
KISS Principle

- Keep in mind that prolotherapy has been around for a long time.

- 20th Century prolotherapy laid the foundation for present day prolotherapy with a strong record of successful outcomes using simple and fairly unsophisticated solutions.

- The solution does not make the result; proper diagnosis, needle and solution placement in a responsive patient make the result.
Please pass the word

- Running for Governor of Kansas
  - I have actual Answers
- Only prolotherapist to ever run
  - Goal to get prolotherapy into Medicaid, WC…
- Only scientist running
- Andersen2018.com