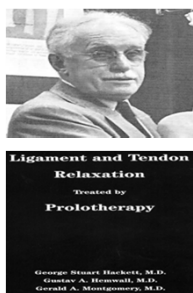


Regenerative injection therapy (Prolotherapy)

Ayman A. Halim, MD
Director of UNT Pain clinic
Fort Worth, Texas

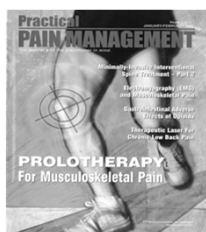
Evolution

"A joint is only as strong as its weakest ligament" George Hackett, MD



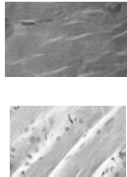
Objectives

- Scientific Evidence
- Proliferants
- Applications
- Complications
- Outcome



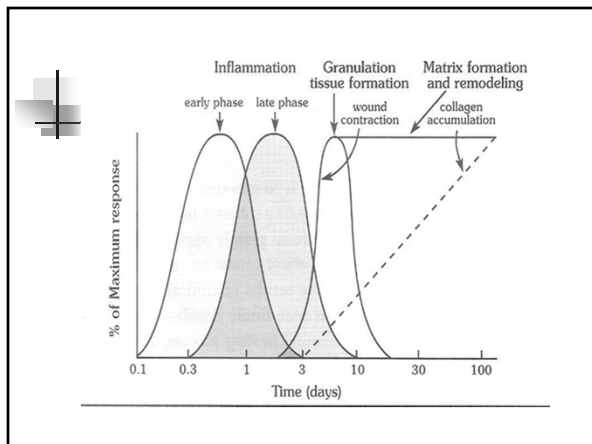
Prolotherapy

"The rehabilitation of an incompetent structure, such as a ligament or tendon, by the induced proliferation of new cells." Webster Dictionary



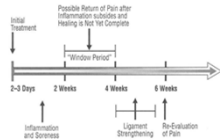
THREE STAGES OF HEALING

	INFLAMMATORY	PROLIFERATIVE	REMODELING
Effect on blood	Increased blood flow	Formation of new blood vessels	New blood vessels mature
Symptoms	Swelling and pain increase	Swelling and pain subside	If tissue is strong, pain subsides
Physiology	Immune cells, called macrophages, remove damaged tissue	Immune cells, called fibroblasts, form new collagen	Increased density and diameter of collagen fibers occur if healing is not hindered
Length of time	Immediate response occurs for a week	Begins at day 2 or 3 after injury and continues for 6 weeks	Continues from day 42 until 18 months after injury



Proliferants

- Growth factors:
Platelet Rich plasma
- Engulfed Particulates:
Pumice
- Irritants:
Ongley's solution
2.5%Phenol,25%Dextrose and 25% Glycerol
- Chemotactics:
Sodium Morrhuate 5%
- Osmotics:
Dextrose 15% to 25% mixed with Lidocaine .



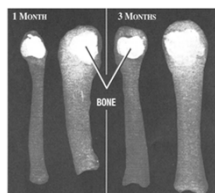
Platelet Rich plasma

"PRP is defined as a tissue graft incorporating autologous growth factors and/or autologous undifferentiated cells in a cellular matrix whose design depends on the receptor site and tissue regeneration" David Crane



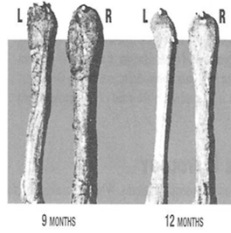
Tibial tarsal bone

- Marked increase in bone
- Marked increase in soft tissue
- Strong fibroosseous union



Rabbit tendons

- Increase of tendon diameter by 40%.
- Attachment of the ligament to the bone, which has increased 30%.



Applications

- Ligamentous laxity
- Tendinosis
- Osteoarthritis
- Hypermobility



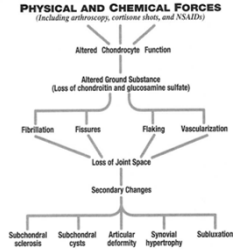
Hypermobility(Beighton Score)

- Extend little finger > 90 degrees. (1 point each side)
- Bring thumb back parallel to/touching forearm. (1 point each side)
- Extend Elbow > 10 degrees (1 point each side)
- Extend Knee > 10 degrees (1 point each side)
- Touch floor with Flat of hands, leg straight (1 point)
- Hypermobility = 6 or more

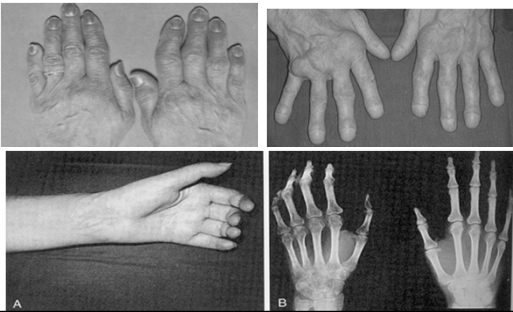


Pathogenesis of Osteoarthritis

- Local inflammation of the injured ligament or tendon is necessary to heal sports injuries.
- NSAIDs and Steroids inhibit the enzymes that block the production of prostaglandin and Leukotriens, which mediate inflammatory process.

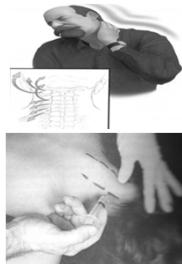


Degeneration, inflammation or.. Neuropathy!!!

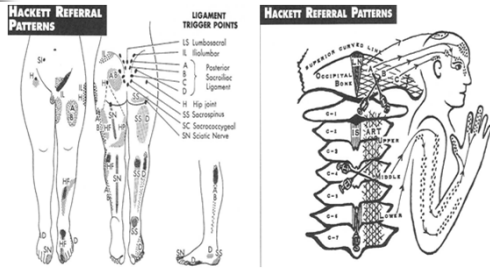


The Z joints

- Case series on chronic whiplash related Neck pain treated with intrarticular Zygapophyseal joint regeneration injection therapy (Hooper, 2007)
- Therapeutic cervical medical branch locks (Local anesthetics) in managing chronic neck pain (Manchikanti 2006)
- Cervical facet joint injections (steroids) in the neck and shoulder pain (Kim 2005)

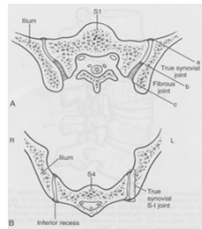


Hackett referral pattern



Sacroiliac Joint (3 D's)

- Diagnosis
- DonTigny
- Dextrose(Prolotherapy)



Sacroiliac joint



DonTigny

Intradiscal Restorative injection

In Vivo Safety Study of Intradiscal Restorative Injection

Abstract
Background Context
 There is growing interest in the development of treatment options that provide faster relief rather than slow relief of discogenic back pain. Restorative injection into the intervertebral disc has been shown to be more effective than placebo in the treatment of chronic low back pain. However, the safety of this injection has not been evaluated.

Purpose
 To assess the feasibility of intradiscal injection, and to determine the safety range of dosage, timing, and injection site for the treatment of chronic low back pain.

Study Design/Setting
 Prospective, randomized, controlled, animal study.

Sample Characteristics
 Twenty male Sprague-Dawley rats, body weight range of 300-350g, were divided into two groups: control group (Group A) and intradiscal injection group (Group B). Group B was further subdivided into three subgroups: 10 rats received 0.5ml of saline, 10 rats received 1.0ml of saline, and 10 rats received 1.5ml of saline.

Conclusion
 Intradiscal injection is a safe and effective treatment for chronic low back pain in rats. The safety range of dosage, timing, and injection site for the treatment of chronic low back pain was determined.

Spinal Stenosis

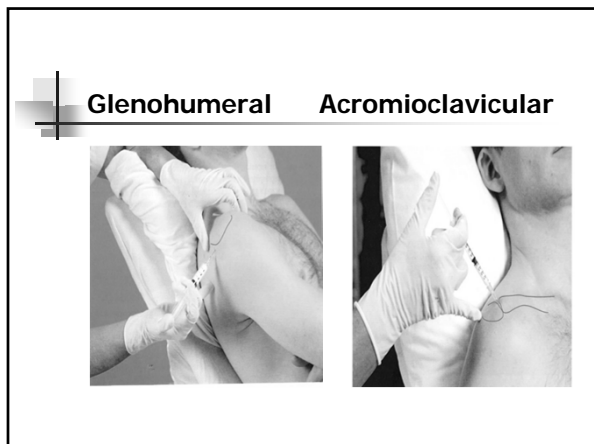
"A little less science, gentlemen, and a little more art!" Trousseau

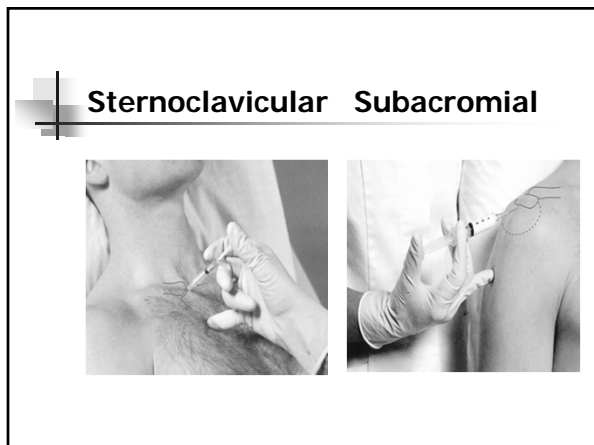
Spondylolisthesis Barre-Lieou

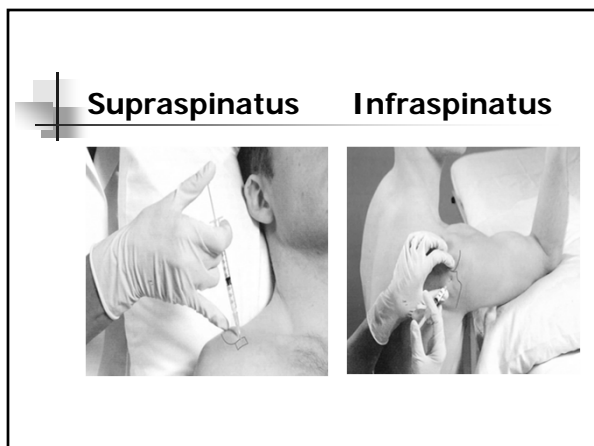
Prolotherapy versus Fusion

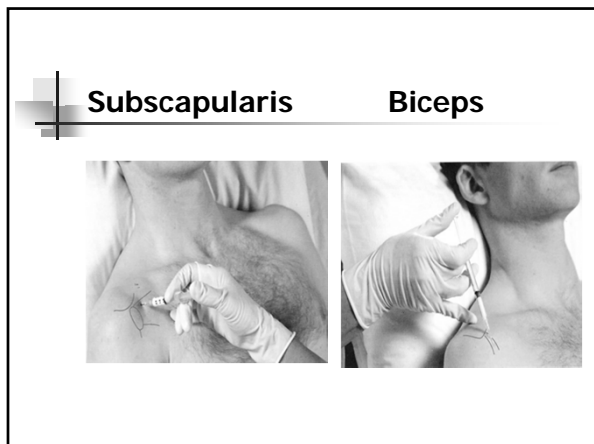
Joint motion	Preserved	Abolished
Pain	Eliminated	May continue
Collagen growth	Enhanced	Inhibited
Tendon strength	Enhanced	Inhibited
Ligament strength	Enhanced	Inhibited
Results	80% cure	Variable

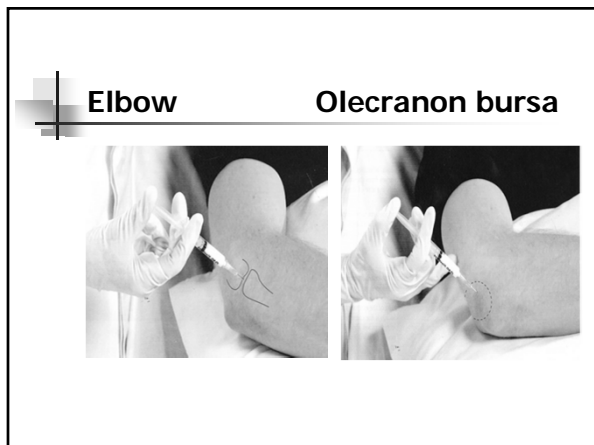
Temporomandibular joint

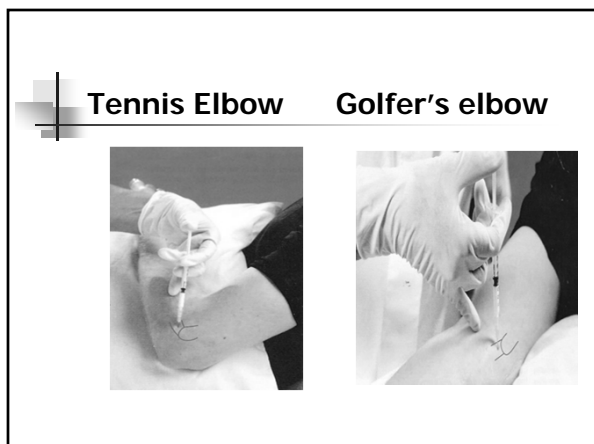


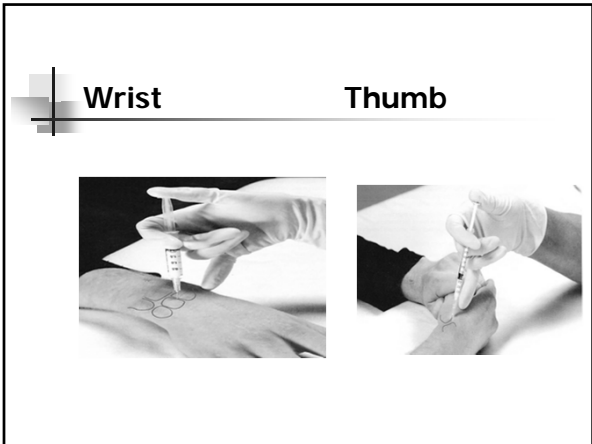


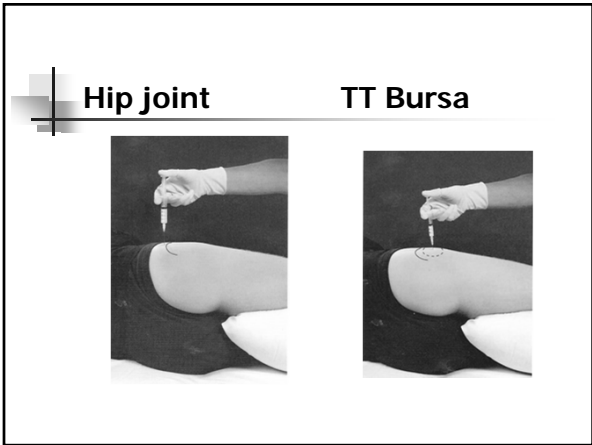


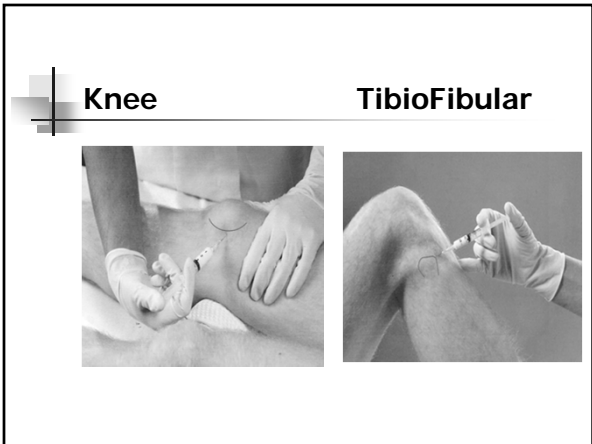


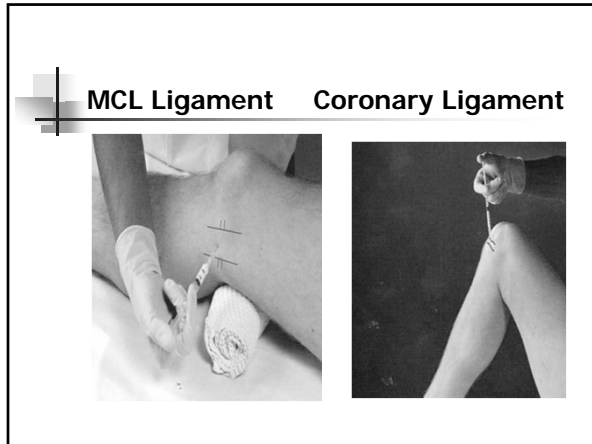


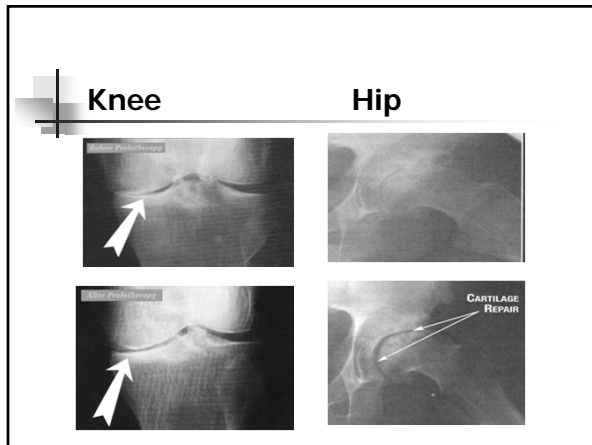


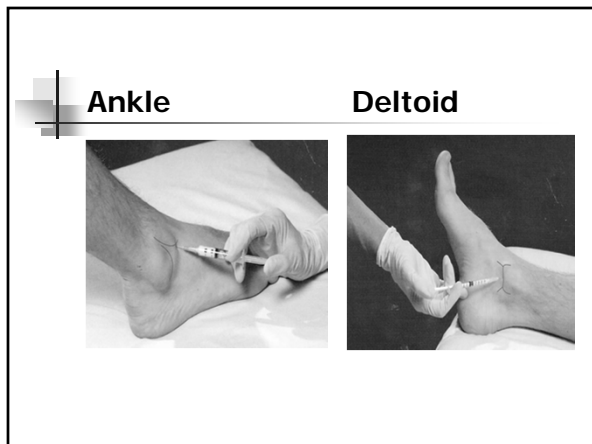




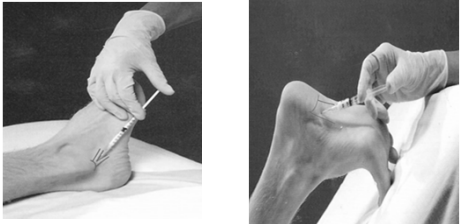









Peroneal **Plantar**

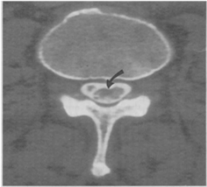


Lateral ligament **Achilles**



Complications

- Pain
- Needle trauma
- Arachnoiditis



Complications

Sterile meningitis after lumbosacral ligament sclerosing injections
Journal of Orthopaedic Medicine, 1994, Grayson

Complications following injections of sclerosing agent to precipitate fibro-osseous proliferation
J Neurosurgery, 1961, Hunt, Baird

Paraplegia from treatment with sclerosing agents
JAMA, 1960, Keplinger, Bucy

Fatality after injection of sclerosing agent to precipitate fibro-osseous proliferation
JAMA, 1959, Schneider, Williams, Liss

Evidence based medicine

"In this age of accountability it is imperative that therapies with questionable benefits be critically evaluated" Kepes, 1985

"Do not put your faith in what statistics say until you have carefully considered what they do not say" William W. Watt

Quality of Studies
↓
Strength of Evidence
↓
Clinical Practice Guidelines
↓
Pain Physician

Reference Type: randomized clinical trial

A randomized, double-blind, placebo-controlled trial of sclerosing injections in patients with chronic low back pain
Rheumatology (Oxford), 1999, Dechow, Davies, Carr, Thompson

A randomized double blind trial of dextrose-glycerin-phenol injections for chronic low back pain (abstract only)
First Interdisciplinary World Congress on Low Back Pain and its Relation to the Sacroiliac Joint, 1992, Klein, Eek, DeLong, Mooney

A randomized double-blind trial of dextrose-glycerine-phenol injections for chronic, low back pain
J Spinal Disord, 1993, Klein, Eek, DeLong, Mooney

Back pain and sciatica: controlled trials of manipulation, traction, sclerosant and epidural injections
Br J Rheumatol, 1987, Mathews, Mills, Jenkins, Grimes, Morkel, Mathews, Scott, Sittampalam

A new approach to the treatment of chronic low back pain
Lancet, 1987, Ongley, Klein, Dorman, Eek, Hubert

Randomized, prospective, placebo-controlled double-blind study of dextrose prolotherapy for osteoarthritic thumb and finger (DIP, PIP, and trapeziometacarpal) joints: evidence of clinical efficacy
J Altern Complement Med, 2000, Reeves, Hassanein

Randomized prospective double-blind placebo-controlled study of dextrose prolotherapy for knee osteoarthritis with or without ACL laxity
Altern Ther Health Med, 2000, Reeves, Hassanein

Prolotherapy Injections, Saline Injections, and Exercises for Chronic Low-Back Pain: A Randomized Trial
Spine, 2004, Yelland, Glasziou, Bogduk, Schluter, McKernon

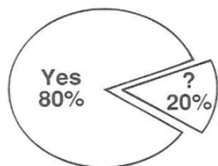
Are you totally lost?

- www.prolonews.com
- www.camresearch.com
- www.aaomed.org
- www.benuts.com



Outcome ?

"To find health should be the object of the doctor. Anyone can find disease" A.T. Still



Integrative medicine

"Complementary and alternative Medicine (CAM) is defined as therapies that are neither taught widely in Medical schools nor generally available at United States hospitals, CAM + Conventional Medicine = Integrative or Holistic Medicine" Eisenberg 1986