IT'S A WIDE WIDE WORLD

Literature Reviews

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Chronic elbow pain is of interest to many patients and prolotherapists—basically because it seems so often to resist classic forms of treatment. Chronic elbow pain often comes on slowly as an insidious but, eventually, disabling musculoskeletal malady that plagues the elbows of many individuals from all walks of life.

As is so often the case with similar sprain injuries, chronic elbow pain is usually associated with repetitious occupational or sports-related activities, movements, and postures. Thus, it is a common complaint amongst Rolfers, massage therapists and other body work therapists; weight lifters; people constantly involved in computer and word processing work—and, yes, tennis players and golfers. Why, even waiters who constantly bus heavily-laden trays of dishes with food complain of chronic elbow pain! But, just to be on the safe side, keep in mind that dysfunctional elbow pain may also be associated with a more proximal shoulder injury and dysfunction that is affecting the more distal elbow function.

Chronic elbow pain usually presents as that dull to sharp, nagging pain on either the lateral or medial aspect of the elbow that just doesn't want to go away. It can be exceedingly tender to the touch—even keeping one awake at night due to inadvertent pressure on the sore spot.

Quite often elbow pain becomes refractory—nonresponsive—to many of the standard therapies, including cortisone injections, nonsteroidal anti-inflammatory medication, physical therapy, orthotic devices, massage, electrical stimulation therapy, and acupuncture. At best, these therapies provide only temporary, short-term pain relief. Some may be actually deleterious to tendon health. Seldom do any promote definitive repair and long-term return to pain-free, normal function.

Hopefully, the following articles will shed some light on the current thinking about the cause of chronic elbow pain and the treatments that are available. These reviews offer the readership an expanded view of what's happening out there in that "wide, wide world"—out there where the science and art of proven Prolotherapy meet the more staid, often unproven wisdom of outmoded convention.

We encourage each reader to use the National Library of Medicine's "PubMed" website on the Internet to personally review any of the following articles first hand. You can go directly to the source—it doesn't take a medical diploma to "surf the net!" In this wonderful age of worldwide communication, we are pleased to summarize and interpret for you while you have the grand opportunity to learn more and become better informed about Prolotherapy and your personal aches and pains.

Structure-function relationships in tendons: a review.

Benjamin M, et. al. *Journal of Anatomy.* 2008 Mar;212(3):211-28.

Where tendons and ligaments meet bone: attachment sites ('entheses') in relation to exercise and/or mechanical load.

Benjamin M et. al. *Journal of Anatomy.* 2006 Apr;208(4):471-90.

ABSTRACT SUMMARY

The authors of these two articles explain some of the more modern, proven conventions regarding tendon attachment to a joint site. They refer to the site of tendon attachment to joint bone as the "enthesis." The excessive overuse injury to that site of tendon-to-bone attachment is called an "enthesopathy." It is at the enthesis that most muscle tendon sprain injuries occur if that site has become the epicenter of concentration of chronic stress forces during repetitive, excessive overuse.

The authors describe the key cell of a tendon as the "tenocyte", which is morphologically and functionally distinctly unique compared to other fibroblastic cells—including those of ligaments. It is the tenocyte that generates and lays down new collagen tissue during normal wear-and-tear tendon regeneration—and is a component of the traumatic, sprain injury caused by chronic, excessive stress injury.

JOP COMMENTARY

One of the "banes" of our existence as Prolotherapy patients and Prolotherapists are tendon sprain injuries. Why? Because tendons seem to behave so differently from the usual ligament sprain injury and, often, seem so much harder to treat.

These two articles present up-to-date concepts of the biochemical and cellular makeup of tendon tissues, explaining the basis for chronic tendon injury. They emphasize that most repetitive occupational and sports injuries are more degenerative in nature (i.e., they are a "tendonosis")—rather than inflammatory (i.e., not a "tendonitis"). They, also, describe why tendons behave differently under stress—as compared to ligaments. It is more than there being a relative scarcity of blood vessels inciting to injury and hindering healing. It has to do more with the unique biochemical properties of the enthesis, the comparatively increased cellularity of the tendon, and the function of the tenocytes, themselves. The difference of tendon tissue behavior speaks not only to the tendon's somewhat different response to injury—but also to the tendon's responding differently to various treatments, including Prolotherapy. The 2008 offering, particularly, is an elegant review that offers a "unified theory" of myofascial biology for musculoskeletal medicine.

So, the good news is that, thanks to Prolotherapy, tendon sprain injuries of the elbow are no longer such a "bane" of our existence. Chronic elbow tendon sprain is much more. ■

Understanding tendinopathies.

Murrell GA. *British Journal of Sports Medicine.* 2002;36;392-393.

Loss of homeostatic tension induces apoptosis in tendon cells.

Egerbacher M, et. al. *Laboratory of Comparative Orthopaedic Veterinary Medicine*. G-387, Michigan State University, East Lansing, MI 48824, USA.

ABSTRACT SUMMARY

The authors of these two articles employ another, "new-fangled" term called "apoptosis". Apoptosis is simply a fancy medical label for normal cell death—the normal cell death that is expected to happen during the normal life span of any given tissue, including a tendon or ligament. Of course, we want the rate of normal cell regeneration to keep up the pace with normal cell death. In disease and injury, apoptosis starts to win that race.

The authors go on to explain that, in the case of tendon degenerative injury, the normal rate of cell death apoptosis is increased over the rate of new cell regeneration. In fact, they demonstrate very good experimental evidence that tendon degeneration is associated with increased tendon cellular apoptosis along with a concomitant loss of collagen fiber integrity, even potentially leading to tendon rupture.

JOP COMMENTARY

These two articles provide more insight into the reason for there being a difference between ligaments and tendons in their functional, as well as dysfunctional, behavior—especially in response to injury.

The "Big Question" is what is causing the increased rate of cellular apoptosis or tenocyte death? Are the cellular and collagen matrix changes of tendon degenerative "sprain" injury:

Directly due to excessive, repetitive mechanical load forces—which is the conventional conceit?

Or, at least in some cases, directly due to a loss of "homeostatic tension"—in other words loss of normal postural muscle tone?

Currently, there are cogent arguments that both of these processes may be occurring. In any case, understanding these basic cellular concepts of tendon degeneration goes on to explain why treatment of tendon injuries definitely requires a regenerative approach, such as Prolotherapy. This is because Prolotherapy promotes regeneration of new tendon tissue at the enthesis—the site of degenerative damage. ■

The efficacy of Prolotherapy for lateral epicondylosis: a pilot study.

Scarpone, M, et. al. *Clinical Journal of Sports Medicine.* 2008 May;18(3):248-54.

The systematic review of four injection therapies for lateral epicondylosis: Prolotherapy, polidocanol, whole blood and platelet rich plasma.

Rabago D, et al. *British Journal of Sports Medicine*. 2009 Jan 21. [Epub ahead of print]

ABSTRACT SUMMARY

The authors of these two reports have accomplished three steps that are necessary to produce an acceptable, evidence-based rationale for performing Prolotherapy. Those three steps are achieving:

1. Based upon a well-designed study
2. Presented as a well-written report—and
3. All the above presented in a reputable medical journal.

The first article is a well-designed, randomly controlled pilot study. The second article is a well-designed meta-analysis of five prospective case series and four controlled trials. The information gleaned from these two studies reports provides definite pilot-level, evidence-based support for the use of Prolotherapy, Polidocanol, autologous whole blood, and platelet-rich blood for treating lateral elbow epicondylosis (tennis elbow).

JOP COMMENTARY

The authors of these two reports demonstrate some of the best examples of carefully thought out and executed scientific studies of the efficacy of Prolotherapy. Everybody asks for "scientific proof" of the efficacy of Prolotherapy? This has been borne out by insurance company response.

As is often the case when such a study is in its early conceptual and developmental stages—funding, resources, and scope of design were limited. Therefore, the numbers of patients studied were relatively few. As they say in the statistics game, the "n" was small. Nevertheless, these two reports pave the way for larger studies in the foreseeable future. More study needs to be accomplished to solidify the original findings and determine the comparative efficacies between the four individual injection therapies—three of which are, basically, variations of the regenerative Prolotherapy theme.

Regardless of their size or differential accuracy, these reports have provided ample evidence to convince some insurance companies to accept Prolotherapy of lateral epicondylosis for reimbursement with preauthorization.

Also, these articles presage the future advent of injecting more specific growth factors via Prolotherapy techniques. Also waiting in the wings is the possible, future adjunctive use of nitric oxide stimulants either topically or by injection to reduce the rate of apoptosis and enhance the rate of collagen regeneration. ■

Using nitric oxide to treat tendinopathy. Murrell GA. *British Journal of Sports Medicine* 2007 Apr;41(4):227-31.