

Prolotherapy

Warren Hammer, MS, DC, DABCO

I recently examined a patient who complained of 10 years of intermittent pain over her right sacroiliac joint during lifting, prolonged sitting, walking and rising from a chair. All of the usual functional and orthopedic tests were negative except for localized tenderness over the right posterior sacroiliac ligaments. Motion palpation of the right sacroiliac joint revealed hypermobility. This patient did not suffer from a total-body hypermobility syndrome, and testing for lumbar instability was negative. She had been to many doctors and therapists over the years, with no lasting results. I referred her to a doctor who specialized in prolotherapy technique; after several months of treatment, the patient's pain appeared to be eliminated.

In the 1950s, Dr. George S. Hackett, of Canton, Ohio, injected glucose solutions into ligaments and tendons to incite a fibroblastic hyperplasia and subsequent scar formation.¹ New collagen was created, causing the ligaments and tendons to thicken and become stronger and stiffer. Hackett referred to the process as "prolotherapy" (to proliferate): the generation of new cellular tissue.

Klein, et al.² studied 20 chronic low back pain (LBP) patients, injecting a dextrose-glycerine-phenol solution into lumbar and sacroiliac ligaments, fascia, and facet capsular sites. This was combined with mobilization and flexion/extension exercises. In three of the patients with LBP of at least two years' duration, the researchers took pre- (two weeks prior) and post-biopsies (three months after), after a series of six weekly injections. Light microscopic examination showed increased cellularity in the posttreatment biopsies, compared to the pretreatment biopsies. The hypercellularity was due to an increased number of active fibroblasts in the treated ligaments. Electron microscopic analysis showed increases in fiber diameter.

In this study, patients were required to perform repetitive flexion exercises 150 times daily during the injection series, and for at least six months afterward. The researchers felt such exercises ensured a frequent and repetitive mechanical stimulus in the major planes of movement of the lumbar apophyseal and sacroiliac joints, encouraging the deposition of collagen parallel to existing connective tissue. Mechanical tension caused the spindle-shaped fibroblasts and their mitotic figures to arrange themselves with their long axis parallel to the line of pull.³ One of the concepts of this treatment, as indicated by the research, is that the passive tissue of the lower spine, consisting of the ligaments, lumbodorsal fascia and apophyseal joint capsules - all of which are richly innervated by nociceptive nerve endings - are causative of backache when under abnormal mechanical stress. Passive supporting structures are emphasized in this type of treatment, rather than the traditional treatment of muscle strengthening.

Klein, et al., note that either chemical or mechanical irritation will result in inflammatory exudates, leading to varying degrees of collagen formation that mimic the early stages of an injury-repair sequence.⁴ It is also interesting to note that the theory of how prolotherapy works is in many ways similar to the theory behind assisted soft-tissue mobilization (i.e., the Graston technique).

References

1. Hackett GS, Hemwall GA, Montgomery GA. *Ligament and Tendon Relaxation Treated by Prolotherapy*. Springfield, Ill, Charles C. Thomas, 1958
2. Klein RG, Dorman TA, Johnson CE. Proliferant injections for low back pain: histologic changes of injected ligaments and objective measurements of lumbar spine mobility before and after treatment. *J of Neurological & Orthopaedic Medicine & Surgery* 1989;10(2): 141-144.
3. Bunting Ch, Eades CC. The effect of mechanical tension on the polarity of growing fibroblasts. *J Exp Med* 1926;44: 147-149. In: Klein RG (reference #2).
4. Maynard JA, Pedrini VA, et al. Morphological and biochemical effects of sodium morrhuate on tendons. *J Orthop Res* 1985;3:236-248. Referenced by Klein RG, et al. (see reference #2).

Warren Hammer, MS, DC, DABCO
Norwalk, Connecticut
softissu@optonline.net

AUGUST 2003