

PROLOTHERAPY TREATMENT OF LOW BACK PAIN AND SCIATICA\*

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PROLOTHERAPY is the treatment of relaxed ligaments by the injection of sclerosing agents into the ligaments and tendons. This sets up a proliferative reaction which follows the laws of inflammation the end result of which is the formation of fibrous connective tissue. The application of Prolotherapy to treatment of low back pain and sciatica is derived from the work of Leriche and Steindler. Leriche's (1) studies revealed the rich supply of sensory nerve endings in articular ligaments and advocated the infiltration of these ligaments with local anesthetics for the relief of pain after sprains and fractures. The studies of Steindler and Luck (2), (1925 and 1938) indicated that irritation of ligaments of the lumbosacral region may act as trigger points resulting in local pain and in secondary conducted pain to specific dermatome or areas in the lower extremities. Infiltration of these regions with a local anesthetic, abolishes both the local and referred pain. Hackett (3), Baer (4), Steinbrocher (5), Travel and Travel (6), confirmed the above work and concluded that both the local and referred pain has its origin within the ligaments.

In the low back as in other joints, injured ligaments heal by scar tissue formation. In unprotected cases or where healing power is poor, lengthening of the ligaments results. Lengthening permits an abnormal range of movement in the joints which in turn stretches the inelastic nerve fibers contained in the ligaments causing local and referred or conducted pain.

The knowledge of the histology of tissue reactions following the use of proliferating solutions dates back to the Civil War Period when these solutions were used in the treatment of hernias. Rice, C.O. and Aratson (7) studied the histologic changes in the tissues of man and animals following injection of irritating solutions in the cure of hernia in 1936. They in turn refer to surgical articles written in 1832 by Janes (8) on the histology of these reactions. Rice indicates that fibrosis begins fifteen hours after injection of sclerosing solution into the tissues. The fibrous tissue is firm by seven days and progresses to adult compact bundles in eighteen days. Hackett (3) corroborates these findings and indicates that this tissue formation is permanent and rearrangement to tendinous and ligamentous structure occurs and that Prolotherapy results in stabilization of unstable joints. Alpers (9) (1953) on the problem of sciatica states that "herniated disc is preceded by relaxation of the spinal ligaments."

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Steindler (10) (1959) states that "Stabilization is indicated in treatment of cases of lumbosacral and sacroiliac pain and that the method of Hackett of causing a sclerosis of chronically relaxed ligaments of the back by injection is new and seems to recommend itself for its simplicity. Its purpose is stabilization by sclerosing the relaxed ligaments, the method is thus competitive to spinal fusion over which it has the advantage of simplicity."

The rationale of the prolotherapy treatment of low back pain and sciatica is based on the traditional orthopedic principle of stabilization of weakened joints and ligaments. Hackett (3) directs attention to the "ligaments" as being the cause of joint pain. As stated by Hackett, "joint pain is ligament pain." Hackett, Gormley (11) and Steindler (10) recall that the sacroiliac joint is frequently the site of low back pain and regret the recent tendency to forget it. Their statistics indicate that 58.5 % of low back pain is sacroiliac and 36.5 is lumbosacral and 5 % were combined. No controversy is intended against the treatment of extruded or protruded herniated discs by laminectomy and spine fusion. Many cases of disc syndrome respond to treatment by Prolotherapy and the selection of cases requiring surgery is facilitated by excluding sciaticas resulting from relaxed ligaments. The lower extremity pain resulting from nerve root pressure or referred pain from painful ligaments is similar. The lumbar and pelvic articular ligaments may be accompanied by sciatic pain on stretching as in the Lasague test, loss of ankle and knee reflexes, atrophy of the thigh and calf muscles and sciatic scoliosis or body list. Differential diagnosis is aided by identifying trigger point tenderness of the posterior sacroiliac, sacrotuberous and sacrospinous ligaments by finger point pressure or by needling.

My report is based on the treatment of 267 private cases of low back pain with or without sciatica from May 1956 to October, 1960. These are the problem type cases which are presented to the orthopedist most of which have not responded to or which have recurred after routine orthopedic treatment. Self limiting cases are excluded and Prolotherapy is not instituted unless pain persists for more than 4 to 6 weeks. Many have refused surgery or wish to try one more nonoperative form of therapy before submitting to surgery.

For this discussion, the classification of low back pain and sciatica is simplified into two groups. 1. Acute trauma. 2. Unstable backs. The unstable back group includes cases of herniated discs, acute or degenerative osteoarthritic spines, spondylolisthesis, anomalous facets and sacralized transverse processes. Response to treatment is satisfactory in post-operative laminectomy and fusion; when the x-ray reveals arthritis, or congenital or acquired deformities; degenerative displacements and disc narrowing.

Exact knowledge of the anatomy of the ligaments of the lumbosacral and sacroiliac areas is necessary. Figure 1 indicates the lumbosacral, ilio-



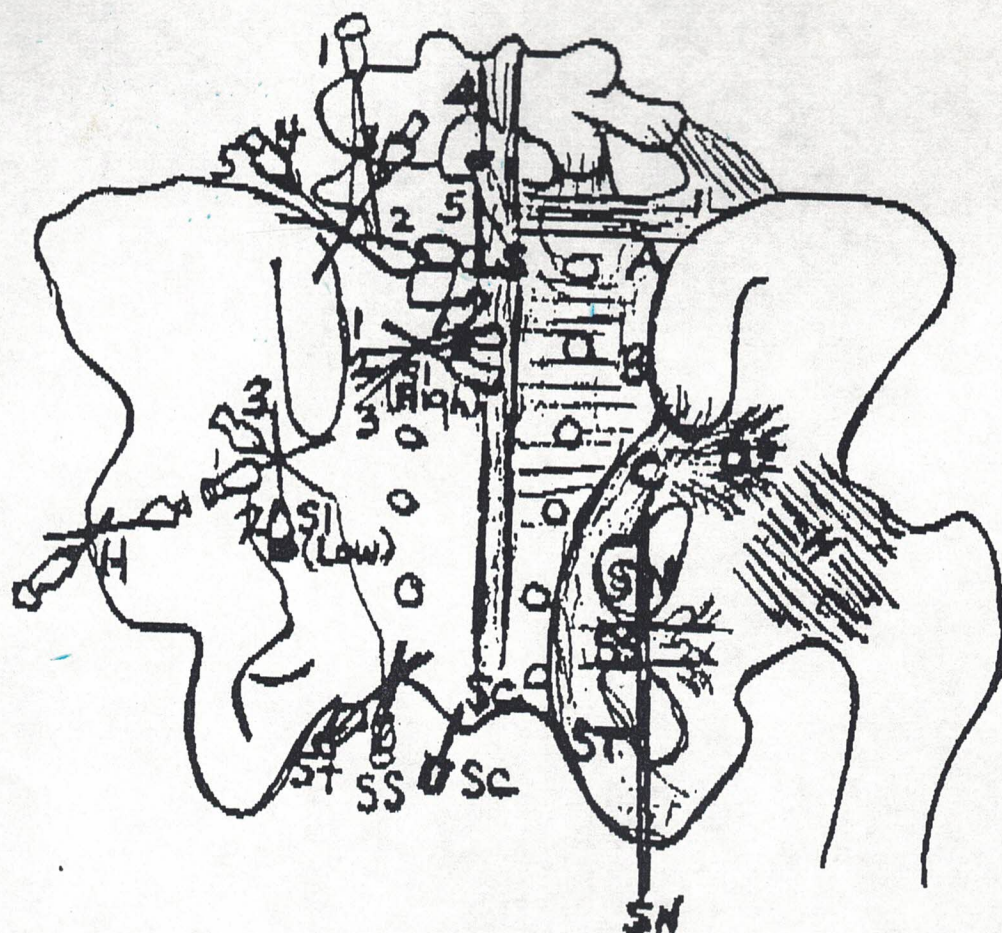


FIG. 1. LS, lumbosacral; IL, ilio lumbar; A&B, high sacro-iliac; C&D, low sacro-iliac; SC, sacro-coccygeal; SS, sacro-sciatic; ST, sacro-tuberous; H, posterior capsule of hip joint; SN, sciatic nerve; on the right, ligaments are illustrated. On the left, sites of injection are numbered.

lumbar, the high and low sacroiliac ligaments, the sacro-sciatic, sacro-tuberous and sacro-coccygeal ligaments. They are labeled, LS, IL, A, B, C, D, SS, ST, SC, and H. The points of insertion of the needle for distribution of the sclerosing solution is also indicated. After the point of insertion of the needle is selected, the bony prominence is outlined by the fingers as illustrated in Figure 2, the soft tissues are depressed and retracted to make the bone more prominent and the needle then inserted between the fingers as a guide until the needle point touches bone. "Always touching bone" is important and prevents injection in a manner which will cause complications. With the needle on bone and with forced aspiration prior to injection, it is unlikely that a nerve root or blood vessel will be entered or that the needle or solution will be injected into the subarachnoid space or epidural space. One cc of solution is injected and the needle is then withdrawn, advanced subcutaneously, always against another portion of bone where additional one cc is deposited. The entire length of the insertion of the ligament under treatment is reached through one skin puncture.

Figure 3 indicates the needle being placed through the



interspinal ligaments of the lumbar area and adjacent to the spinous process, injecting the fibro-osseous junction where the tendon inserts into the bone. Figure 4 indicates this treatment being directed to the sacroiliac joint area inclining the needle away from the mid-line, touching bone in the depth of the sacroiliac ligaments. One should note the CD, SS area along the edge of the sacrum and distal to the notch of the posterior inferior spine of the ilium. This region is responsible for much of the referred or conducted sciatic pain in the sciatic distribution since it is adjacent to the

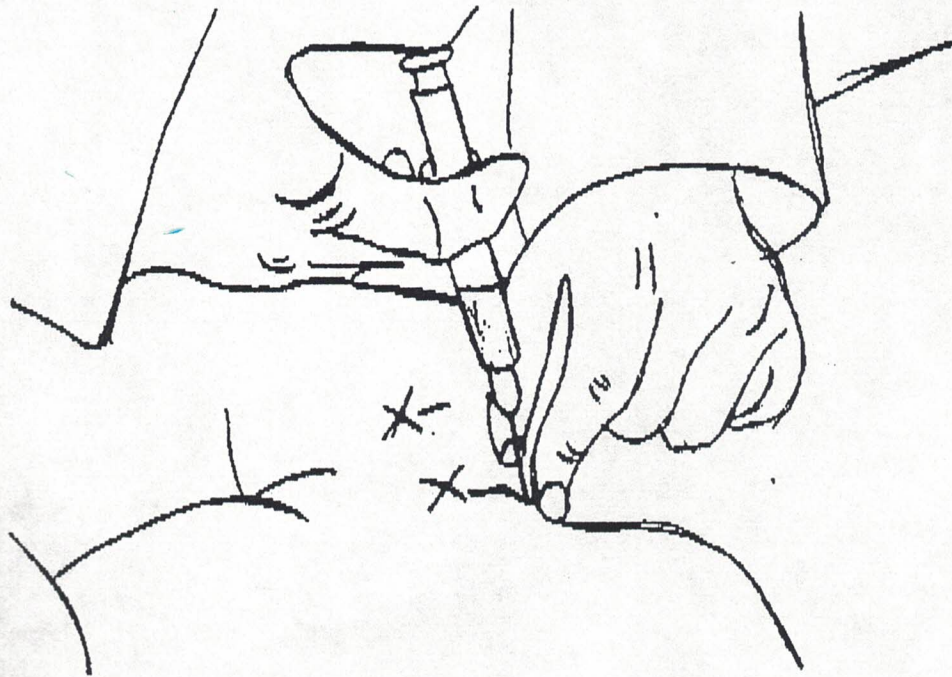
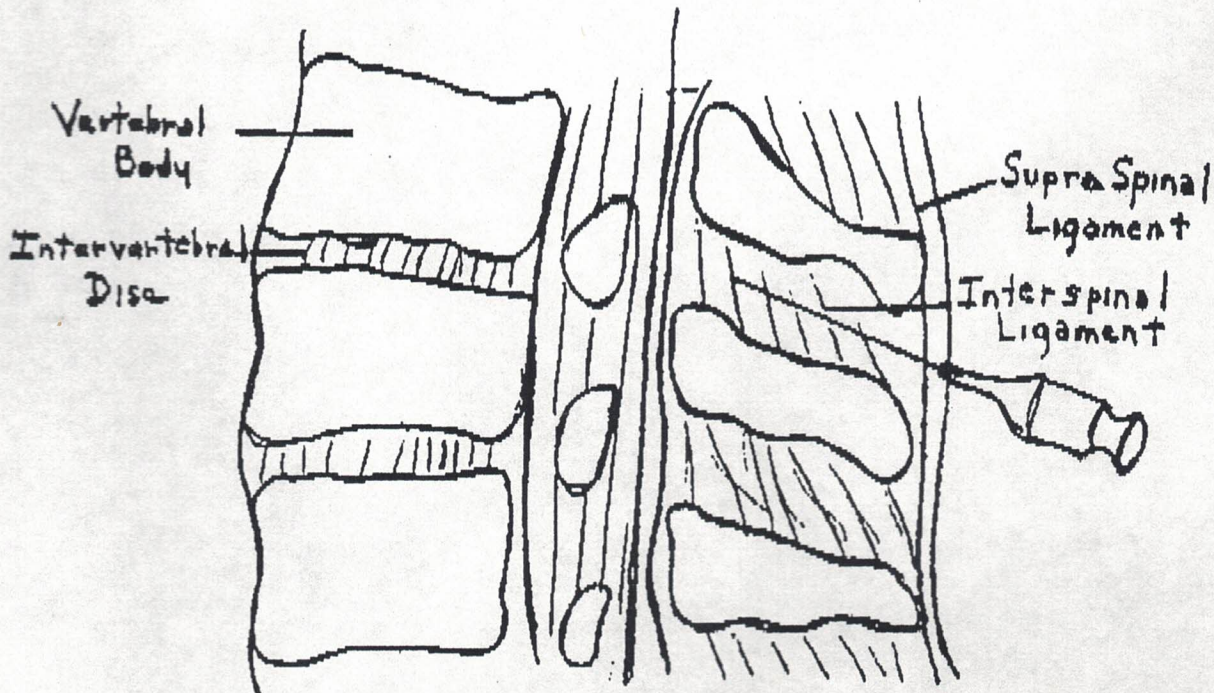


FIG. 2





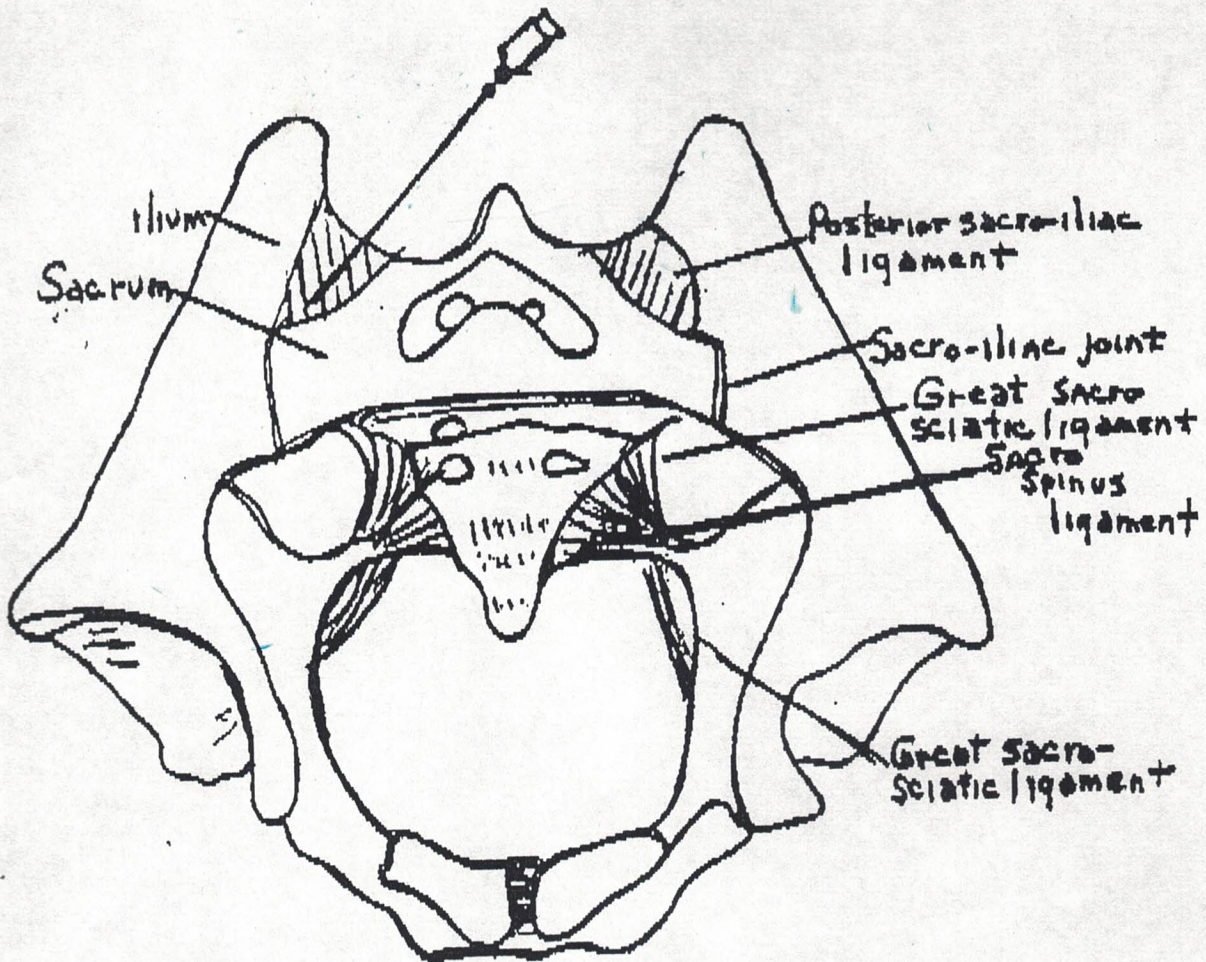


FIG. 4

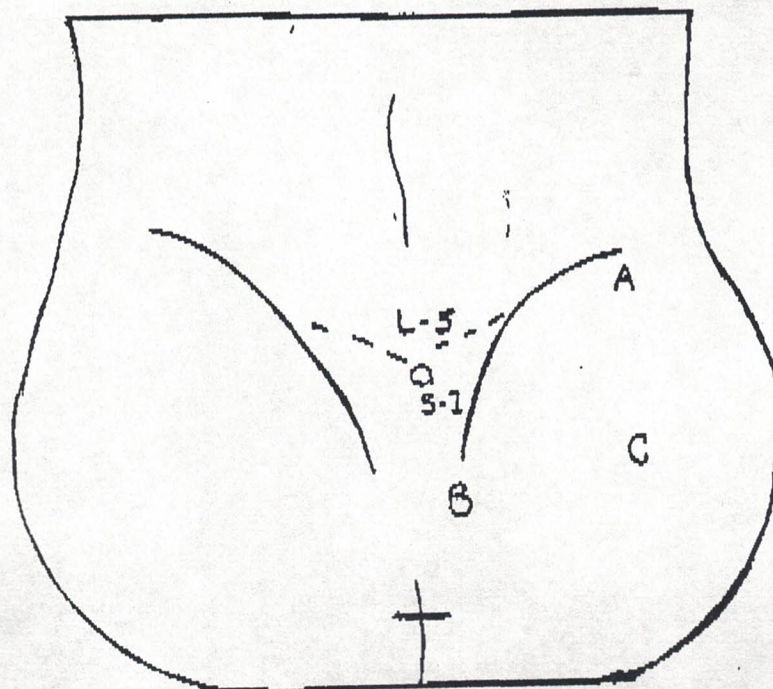


FIG. 5



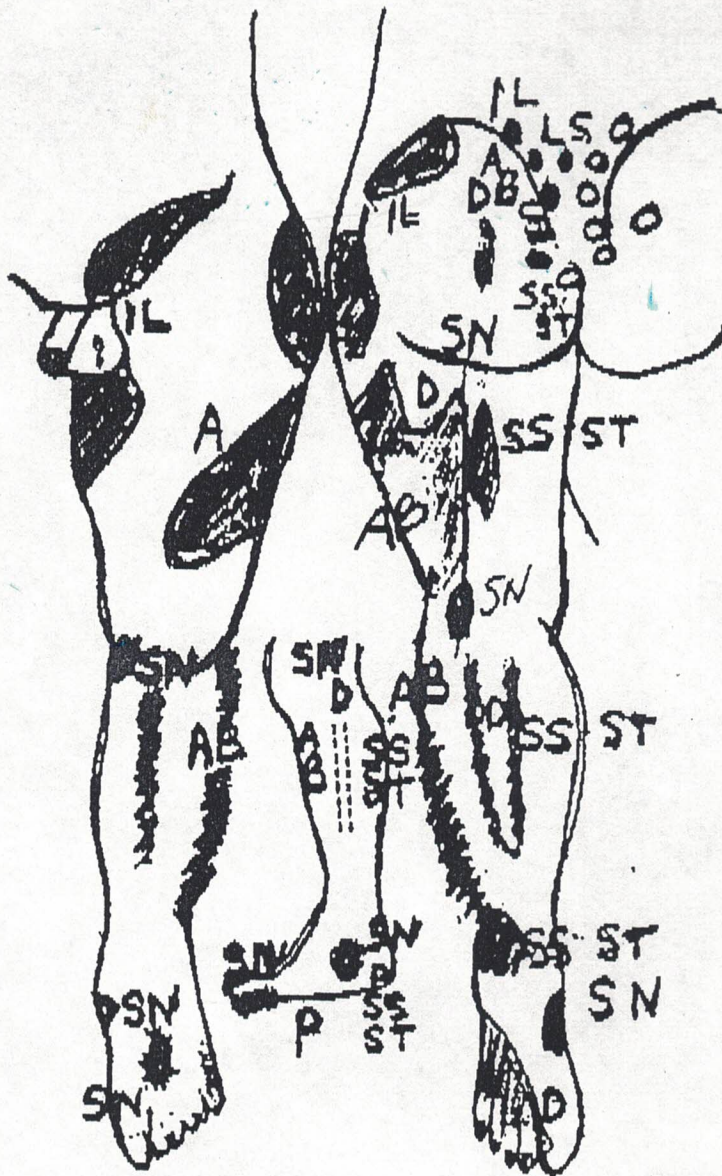


FIG. 6

Pyriformis muscle and related to the sciatic nerve. Figure 5 indicates the topographical anatomy comparable to the ligaments to be treated. It indicates the depression between L-5, S-1, A, the crest of the ilium, B, the notch below the inferior spine, the horizontal cross mark at the sacro-coccygeal region, C, the hip joint area. Figure 6 illustrates the areas of referred pain comparable to the relaxed ligaments of the lumbosacral, sacroiliac areas worked out by Hockett (3). The referred pain pattern is characteristic and if carefully studied, the involved ligaments may be predicted from the patient's description of the location of the pain in the buttocks and lower extremities.

In treating these 267 patients, over 4500 injections have been given without the occurrence of any complications. There has been no shock, no paralysis, no embolic formation and there has been no sloughing of



tissues. Following the injections, there is post-injection pain of varying intensity. Some patients suffer very intense pain while others who have higher pain thresholds are hardly disturbed. It is well to advise that there will be severe pain and to furnish large doses of Demerol and Phenergan. Injections are made at weekly intervals until all the ligaments are injected, doing as many as the patient permits or the operator feels he can tolerate. I usually give no pre-injection preparation but at times if the patient is accompanied may give an intramuscular injection of narcotic to facilitate more numerous injections. I now spray Ethyl Chloride at the site of injection. From 3 to 6 visits completes the series, a rest period of 6 to 8 weeks is suggested and then monthly follow-up visits or return visits for recurrences. Although one can inject specific ligaments if indicated, I have been injecting the entire low back area, mid-line L-3,L-4,L-5 transverse and facets, ligaments, iliolumbar, high and low sacroiliac, sacroscliotic, sacrotuberous ligaments in most patients. I have not found it necessary to resort to the use of traction since using Prolotherapy (1956). After 6 to 8 weeks, therapeutic exercises are started.

There are two solutions of choice, either a combination of 1: Sylnasol to 3: Pontocaine solution; or a solution of zinc and Phenol. I have eliminated Phenol because of its toxicity. I have used zinc but find that there is severe prolonged pain following the zinc solution and have limited myself principally to the Sylnasol-Pontocaine solution. Since this work has been performed a Dextrose-Phenol solution is being used which is almost painless.

I have treated 100 cases in the hospital under intravenous Pentothal anesthesia and feel that this is the preferred method of treatment. Treatment is completed at one time thereby eliminating the possibility that the series will be incomplete. A greater volume of sclerosing solution is injected and the sclerosing effect is better and severely incapacitated patients are quickly relieved of pain and disability. It was noted in the hospital cases that there was fever of one or two days duration following the injections probably on an allergic basis.

Dr. Hackett's statistics indicate that 82 per cent of the patients were cured in a 19 year follow-up period. My percentages are similar although my follow-up period is shorter (1956 to November 1960).

Prolotherapy treatment of low back pain and sciatica is a rational method of stabilizing weak backs and it is complimentary to the conventional orthopedic methods of treatment. It is suggested that the two cases of unfortunate complications reported in the literature (12, 13), should be carefully noted but not be permitted to discredit a valuable therapeutic method. Prolotherapy treatment of low back pain and relaxation of joint ligaments and tendons warrants further consideration by the orthopedic



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