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Effect of Trigger Point Injection on Lumbosacral Radiculopathy Source

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Background: Active muscular trigger points (aMTPs) presenting with radiating pain can interfere in diagnosis and treatment of patients suffering from lumbosacral radiculopathy.
Objectives: We aimed to diagnose and evaluate the trigger point therapy on the outcome of pain in patients with lumbosacral radiculopathy.
Materials and Methods: A total of 98 patients were enrolled suffered with chronic pain andlumbosacral radiculopathy at L4-L5 and L5-S1 who were candidates of non-surgical management. All patients received conservative modalities, including bed rest, non-steroidal anti-inflammatory agents (NSAID), and physiotherapy. These treatments continued for a week. Patients were examined for the presence of trigger points in their lower extremities. Those who had trigger points were divided into 2 groups (TP and N). Patients in TP group underwent trigger point injection therapy. No further therapy was done for the N group. Pain scores and straight leg raise (SLR) test in both groups were collected and analyzed on the seventh and 10th days of the therapy. Results were analyzed by paired t test and chi-square test.
Results: Out of 98 patients, 64 had trigger points. Thirty-two patients were assigned to each group. Pain scores (Mean ± SD) in TP group was 7.12 ± 1.13 and in N group was 6.7 ± 1.16, P = 0.196. Following the treatment, pain scores were 2.4 ± 1.5 in TP group and 4.06 ± 1.76 in N group P = 0.008. SLR test became negative in all patients in TP group but only in 6 (19%) patients in N group, P = 0.001.
Conclusions: Results show that trigger point injection therapy in patients suffering from chronic lumbosacral radiculopathy with trigger points can significantly improve their recovery, and conservative therapy may not be adequate.

Keywords: Trigger Point; Radiculopathy; Low Back Pain

1. Background

Lumbosacral radiculopathy is a common complaint in musculoskeletal consultation clinics (1). It develops due to pressure or injury to the nerve roots in this region, which results in related clinical signs, like positive straight leg raise (SLR) test (2). Other interfering diseases include disk herniation, diabetes mellitus, scoliosis, osteoarthritis, rheumatologic diseases, infectious diseases, vascular diseases, and tumors (3, 4). Trigger points are alsovery painful musculoskeletal points with palpable nodules in muscle fibers (5), and their pain may be severe and radiates to extensive areas. It has some specifications such as limitation of joints ranges of motion (ROM), palpable nodules, and radiating pain (6). These points are only formed in muscles. Physical examination is not the only reliable and diagnostic tool (7). These points may be formed in acute muscle overload, muscle fatigue, chilling, gross trauma, cardiac and visceral diseases such as gall bladder problems and renal colic, arthritic joints, and emotional distresses (5).

Primary treatment of chronic lumbosacral radiculopathy includes bed rest, physiotherapy, and administration of anti-inflammatory drugs. Patients generally respond well to the treatment in 6 to 12 weeks. Those who do not show improvement may need steroid injection. Steroids can reduce pressure and edema on nerves and alleviate the pain. However, few patients may need surgery (2). Trigger point therapy includes myotherapy, (massage, deep pressure, or stretching), heat therapy, electrotherapy, low laser therapy, and injection therapy (8, 9). Pain due to trigger points often coexists with lumbosacral radiculopathy. Based on some investigations, Trigger point are probably more common in patients with radiculopathy. The incidence was noted to be as high as 51% in cervical radiculopathy. Pain due to the active TPx may coexist with radiculopathy and add to the patient discomfort.

With regard to the diagnostic and therapeutic importance of TPx, more studies are required for the differentiation of these superimposed pain sources. Moreover, other musculoskeletal disorders that induce trigger points may coexist with lumbosacral radiculopathy. In cases of combined pain, treatment of active TPx is important because, standard treatment of radiculopathy may fail. Early treatment of TPx may avoid unnecessary interventional and costly diagnostic procedures (10, 11).

This study aimed to determine the prevalence of active trigger points accompanying lumbosacral radiculopathy and to evaluate the effect of TPx injection on patient's pain scores and SLR.

2. Objectives

Although the present study did not aim to evaluate the impact of rehabilitation on disk disease, it is hoped that the prescribed physical therapy prevents complications of inactivity.

3. Materials and Methods

Following approval of the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, all patients referred to our orthopedic clinic because of lumbosacral radiculopathy were enrolled in this study during a 3-year-period, and their consents were taken. After history taking and physical examination, the normal blood count, including CBC, FBS, and ESR, as well aslumbosacral x-ray, MRI and EMG studies in favor of the lumbosacral radiculopathy were taken from the study patients. Then, pain severity (using VAS score) and SLR were checked. SLR is considered positive if the patients feel pain during 0 to 70 degrees of leg raising. If leg raising did not provoke any pain it would be considered as a negative SLR (4). All patients were examined and referred by 2 experienced neurosurgeons. They took a lumbosacral x-ray and magnetic resonance image (MRI) study to confirm the L5-S1 disk disease. Thus, the patients diagnosed with spinal tumor, spinal fracture, or spondylolisthesis were excluded from the study.

In the next step, electro diagnostic studies (EDX) were performed in order to prove that patients' root problem were caused by the lumbosacral disk diseases. These studies consisted of measuring lower limbs sensory and motor nerves conduction to screen the presence of peripheral polyneuropathy processes, H-reflex evaluation of bilateral lower limbs, and electromyography studies of adductor long us, medial head of gastrocnemius, tibialisanterior, tibialisposterior, short head of biceps femoris, and lumbar Para spinal muscles of the patients (12). If the EDX revealed the existence of a peripheral polyneuropathy or myopathy process in a patient, he or was excluded from the study (2). Also the patients should have a normal complete blood count (CBC) and erythrocyte sedimentation rate (ESR) to exclude patients with infection or possible inflammatory diseases that caused low back pain. Furthermore, all febrile patients and patients who had a fasting blood sugar (FBS) more than 126 mg/dL were excluded from this study.

Pain severity was assessed using visual analog scale (VAS) scored from 0 (no pain) to 10 (maximum pain), and performing SLR test by slowly raising their lower limb while keeping their knees extended (4). All patients were admitted to in-patient physical medicine and rehabilitation ward for controlling their radicular symptoms, performing initial bed rest accompanied by physical therapy, undertaking essential educations and supervising the study program. As soon as the patients' pain subsided and they learned to avoid heavy activities, which increase intra-disk pressure, so they can carry on most daily activities, they were discharged from the hospital and followed up as the out-patients (13). Patients were examined for the existence of trigger points in their limb- girdles and involved lower extremities before initiation of bed rest.

Trigger points were diagnosed based on clinical signs and pain eliciting character after 2 kg /cm^2 pressure application on the area suspected for the presence of TPx and comparing with their opposite side (5). Daily physiotherapy consists of active assistive back exercises and physical modality agents such as applying hot pack for 10 minutes and transcutaneous electrical nerve stimulations. Also patients received Diclofenac Na, (a fixed dose of 25 mg) orally four times a day (13). After a week, all patients were evaluated for the presence of trigger points and degrees of pain complaints in their back and lower extremities. Those who did not have TPx or pain were excluded and discharged from the hospital. Patients who had trigger points and still complained of radiculopathy were divided into two groups (Group TP and N).

Group N received the former conservative therapy for three more consecutive days. Group TP received injections at their trigger points along with the treatment of the N group (7, 10). The injection performed by using 21 G needle by perpendicular insertion over the center of each active trigger point, three times at one session while injecting 1mL lidocaine 2% for each trigger point. Every patient received 1mL (40 mg) triamcinolone too. In patients suffered from more than one trigger point, the total dose of triamcinolone was fixed so that the triamcinolone was diluted in lidocaine. The pain severity of both groups was compared using paired t test. Furthermore, their SLR tests results on seventh and 10th days of admission were compared by chi-square test. For statistical analysis, SPSS software version 19 was used. P value less than 0.05 was considered significant.

4. Results

MRI pictures of two patients showed tumors around their spines; hence, they were excluded from the study. A total number of 98 patients were entered into study. Sixty-four (65%) of them had the criteria of trigger point and were enrolled in the study. Two groups were matched demographically with respect to age, sex, and duration of their pain (Table 1). Overall, the whole 204 trigger points of patients were injected. The mean number of trigger points in each patient was 3 ± 1. The common affected muscles of the studied patients have shown in Table 1. The EDX findings of all patients were compatible with the clinical impression of L5 and S1 roots involvement. Their lower limbs nerves conduction velocities were within normal range, which excluded the existence of peripheral poly-

neuropathy processes. Sixty-three patients showed H-reflex abnormality indicative of S1 roots lesions. All patients demonstrated electromyography abnormalities in their lower limbs or paraspinal muscles. The mean and standard deviation of patients' hospitalization time were 5 ± 2 d. The total dose of Diclofenac Na was 900 mg for each patient in nine consecutive days. The total injected volume of Xylocaine 2% was 204 mL. On the seventh day, the pain score was 6.7 ± 1.16 in TP group and 7.12 ± 1.13 in N group. On the 10th day TP group had mean pain score of 2.4 ± 1.5 compared with 4.06 ± 1.76 for group N ($P < 0.008$). Moreover, all patients in TP group had negative SLR while only 6 patients (19%) in group N recovered their SLR ($P < 0.01$).

Table 1. Demography of Patient Groups [a,b]

Pain Duration, d	Male/Female Ratio	Age, y	Group
57 ± 36	1.28	49.1 ± 13.4	N
55 ± 37	1.21	46 ± 13	TP
0.77	0.54	0.33	P Value

[a] Data are presented as Mean ± SD.
[b] Demographic data: no significant difference in 2 groups.

5. Discussion

Trigger points are commonly seen in painful skeletal diseases. It follows mechanical or neurologic stimulation. Our study emphasizes that timely trigger point's injection has better prognosis and is important in the treatment of chronic lumbosacral radiculopathy. Pain scores get lower and SLR gets higher. Failure of TPx treatment may result in muscular stiffness and limitation of activity, which can increase disability and worsening of the original ailment. In our study, 65% of lumbosacral radiculopathy cases had positive active trigger points, which are higher than previous reports (8-11). Patients who received TPx injections had lower pain scores and almost full SLR recovery. Coexistence of trigger points and different painful musculoskeletal diseases has been previously reported (12, 13). However, the significance of early trigger point therapy is emphasized by our study.

Sixty-five percent of our patients had lower extremity trigger points which this number is higher than previous reports (7, 11). It is also important to note that SLR may be positive due to active trigger points, which make it of diagnostic significance. Muscular stiffness due to active trigger point pain and reduced range of joint motion can be the comorbid disabling factors which may interfere with the treatment of radiculopathy. Disability may also be due to central sensitization or impaired local tissue circulation (14, 15). In other words, trigger points may induce central sensitization and a chronic pain syndrome.

It has been noted in previous reports that production of calcitonin gene-related protein decreases following trigger point injection. This substance is responsible for inducing a central sensitization process (16). Trigger points resulting from chronic inflammatory causes were not specifically studied in our study. This can be a limiting factor. Craig revealed that the results of SLR could be influenced by determinants such as lumbar spine stability, pelvic-abdominal bracing, and activation of the musculature under the spine (17). The treatment goal in conservative management of lumbar radiculopathy is to reduce inflammation, decrease pain, and resolve the damages of the involved roots. Although bed rest has been an important part of this nonoperative treatment, prolonged bed rest is no longer suggested and is recommended only for symptom control. As long as the patients are educated to avoid activities, which tend to increase intra-disk pressure, they can carry on most of their daily activities. One study explored the effect of 14 days of horizontal bed rest, induce body deconditioning, and changing parameters of body swing and ankle function (18). Another research showed that bed rest still plays an important part in rehabilitation of patients suffering from degenerative disk diseases (13). Trigger points are frequently seen in patients with lumbosacral radiculopathy and their early recognition and treatment could improve patient's pain and motion and eventually the outcome. Injection of trigger points is suggested as a good adjuvant therapy when these points coexist with radiculopathy.

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Author's Contributions

Dr Saedian has collected data and designed the study. Pipelzadeh has analyzed data and wrote manuscript. Dr Zainali and Rasras have referred patients for study and helped in diagnosis.

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