

## **Efficiency of application of interference therapy in complex with spine traction in patients with radicular back pain**

**Akhundov Parviz** Yashar

*Researcher in medical rehabilitation department,*

*Scientific Research Institute of Medical Rehabilitation, Baku, Azerbaijan*

Guseinova Sadagat Qanbar

*Doctor of Medical Sciences, Professor,*

*Head of the neurophysiology Laboratory*

*Scientific Research Institute of Medical Rehabilitation, Baku, Azerbaijan*

**Annotation.** A prospective study evaluating efficiency of application of interference therapy in complex with spine traction in patients with radicular back pain. The study was conducted on 64 patients of age from 20 to 69. Patients were divided into two groups. The first–control group included 32 patients who were treated by using spine traction as a treatment. The second– treatment group included 32 patients who were treated by using the spine traction and interference current therapy on the same day. The course of treatment lasted 10-12 days. The patients were evaluated before and after the treatment. Pain was assessed using the Visual Analog Scale (VAS), and the short-form McGill Pain Questionnaire (SF-MPQ) were used to assess characteristics of pain. Disability level measured by the Roland-Morris “Disability Questionnaire”.

Our study results show that interference therapy complex with spine traction in the treatment of patients with radicular back pain is an effective approach. The beneficial effect of this therapeutic complex on the clinical course of the disease, more pronounced analgesic effect, and improving the indicators of the quality of life ( $p < 0,001$ ).

**Keywords:** low back pain, radiculopathy, interference therapy, spine traction

### **Introduction**

Low back pain (LBP) is one of the most common musculoskeletal complaints encountered in clinical practice with a lifetime prevalence of 70% to 85%. It is the leading cause of disability in the developed world. Lumbosacral radiculopathy can also appear in the absence of actual lumbar pain [2,3]. Lumbosacral radiculopathy (LSR) is one of the most common disorders evaluated by neurologists. Its prevalence has been estimated to be 3% – 5% of the population, affecting both men and women. Symptoms typically begin in midlife [9,10]. Moreover, the condition constitutes a significant reason for patient referral to either neurologists, neurosurgeons, or orthopedic spine

surgeons therefore treatment of LSR requires a multimodal and multispecialty team. Physiotherapy interventions for the management of LBP are wide and variable, but the efficacy of many is still questionable. There are a wide range of modalities that can serve many purposes including reducing inflammation, decreasing muscle spasm, and increasing local blood flow to improve the rate of tissue healing, and decreasing pain [1,5,7]. Interferential therapy (IFT) has been widely used for many years. Several reviews are indicating it is an overall supportive evidence base, especially for pain based management (e.g. Fuentes et al, 2010) [4]. The result of applying a higher frequency is that it will pass more easily through the skin, requiring less electrical energy input to reach the deeper tissues & giving rise to less discomfort. Lumbar traction is a traditional treatment modality. Several studies have investigated the effect of lumbar traction on lumbar disc herniation [11]. Traction has been prescribed to treat various spinal disorders, including radiculopathy, disk herniation, disk degeneration, and nonspecific low back pain. Research in this area has been confounded by the multiple types of traction techniques and treatment protocols and by methodological flaws. Axial distraction of the motion segment is thought to change the position of the nucleus pulposus relative to the posterior annulus fibrosus or change the disc-nerve interface, which could decrease mechanical pressure exerted on a nerve by a displaced disc [6,8].

### **The aim of the study**

The purpose of this study is to determine the efficacy of complex application of IFT and spine traction (ST) in patients with radicular back pain.

### **Materials and methods**

A prospective open controlled randomized study was conducted to assess the efficacy of complex application IFT and ST in patients with LSR.

Inclusion criteria: the age of patients older than 18 years, less than 70 years, one or more lumbar radiculopathy confirmed with clinical studies and MRI. Exclusion criteria: patients with corresponding contraindications for physical therapy, also pregnancy, diabetes.

Imaging plays a critical role in the diagnosis of low back pain. MRI has become a mainstay in the workup of low back pain due to its excellent soft tissue contrast, cross-sectional capability, and lack of ionizing radiation.

Participants were randomly assigned into treatment (n=32), and control group (n=32). The first control group included 32 patients were treated by using spine traction as a treatment. Traction was horizontal, 20% to 40% of the patient's body weight force used. Duration was 10-30 min. The treatment group included 32 patients who treated by using the spine traction and interference

therapy on the same day. Frequencies of 30-100 Hz were used for IFT. IFT duration was 12-15 min. In both group lumbar exercises and medical massage therapy also was utilized for improving the efficiency. Course of treatment lasted 10-12 days. The patients were evaluated before and after the treatment. In this study, pain was assessed using the Visual Analog Scale (VAS).

The short-form McGill Pain Questionnaire (SF-MPQ) were used to assess characteristics of pain, particularly sensory and affective qualities. Disability level measured by the Roland-Morris “Disability Questionnaire” (RDQ). All the data collected from this study were analyzed using a statistical processing program (SPSS statistics 26)

### Results and discussion

Among the examined patients, male patients prevailed the age ranged from 18 to 70 years, averaging  $41.7 \pm 1.4$  years. The overwhelming majority (70.1 %) were patients of working age.

Patients studied on a 1.5 Tesla Magnetic Resonance Imaging machine. MRI findings like lumbar lordosis, Schmorl’s nodes, decreased disk height, disc annular tear, disc bulge, disc protrusion, and disc herniation were observed (Fig 1). In part of patients ligamentum flavum thickening and facet arthropathy was also observed. Disc herniation & protrusion played a special role in compression of the nerve roots, however, in some cases also facet arthropathy takes a role. The L<sub>4</sub>-L<sub>5</sub> & L<sub>5</sub>-S<sub>1</sub> intervertebral discs were the most commonly involved.

### Figure 1.

Degenerative disc disease in a patient with LBP. Lateral paramedian lumbar disc herniation at L<sub>4</sub>-L<sub>5</sub> intervertebral area (affects L<sub>5</sub> nerve roots). Asymmetric disc bulges in the L<sub>5</sub> - S<sub>1</sub> intervertebral area. Narrowing of the spinal canal. Osteo-degenerative changes in the lumbar spine



In the examined patients, the main symptom was LBP, in most cases radiating to the lower extremities. Clinically, infraction of the biomechanics of the spine was often noted - in most cases (76.3%) there was a restriction ROM lumbar spine, mainly bending forward. Sensory root involvement caused sensory impairment in a dermatomal distribution in 65 % of patients.

Results showed that the mean pain score (VAS), (SF)-MPQ and RMDQ) were similar at baseline: the mean for pain score (VAS) at the baseline period ranged from 6.31 to 6.53 cm, number of selected descriptors (NSD) on SF-MPQ from 2.21 to 2.3, Pain Rating Index (PRI) from 4.17 to 4.63, disability level on the RMQ from 51.7 % to 56.8 %. Before treatment RMQ total score was  $9.57 \pm 2.43$  in control group,  $10.23 \pm 2.41$  in treatment group. However, during 10-12 days treatment periods, the VAS mean values were decreased to  $2.91 \pm 1.53$  cm ( $p < 0.001$ ), NSD on SF-MPQ  $1.33 \pm 0.71$  ( $p < 0.01$ ), PRI  $1.63 \pm 0.81$  ( $p < 0.005$ ) for the treatment group,  $3.88 \pm 2,0$  ( $p < 0,001$ ),  $1.55 \pm 0,69$  and  $1.92 \pm 1.21$  ( $p < 0.01$ ) for the control group (table 1).

**Table 1.**

**Dynamics of pain scores scale indicators**

Indicators	Treatment Group			Control Group		
	Before treat. Mean±SD	After treat. Mean±SD	p value	Before treat. Mean±SD	After treat. Mean±SD	p value
Pain Score (VAS)	6,53 ± 0,95	2,91 ± 1,53	p<0,001	6,31 ± 1,31	3,88 ± 2,0	p<0,01
SF - MPQ (NSD)	2,3 ± 0,53	1,33 ± 0,71	p<0,01	2,21 ± 0,49	1,55 ± 0,69	p>0,05
SF- MPQ (PRI)	4,63 ± 1,38	1,63 ± 0,81	p<0,005	4,17 ± 1,23	1,92 ± 1,21	p<0,01

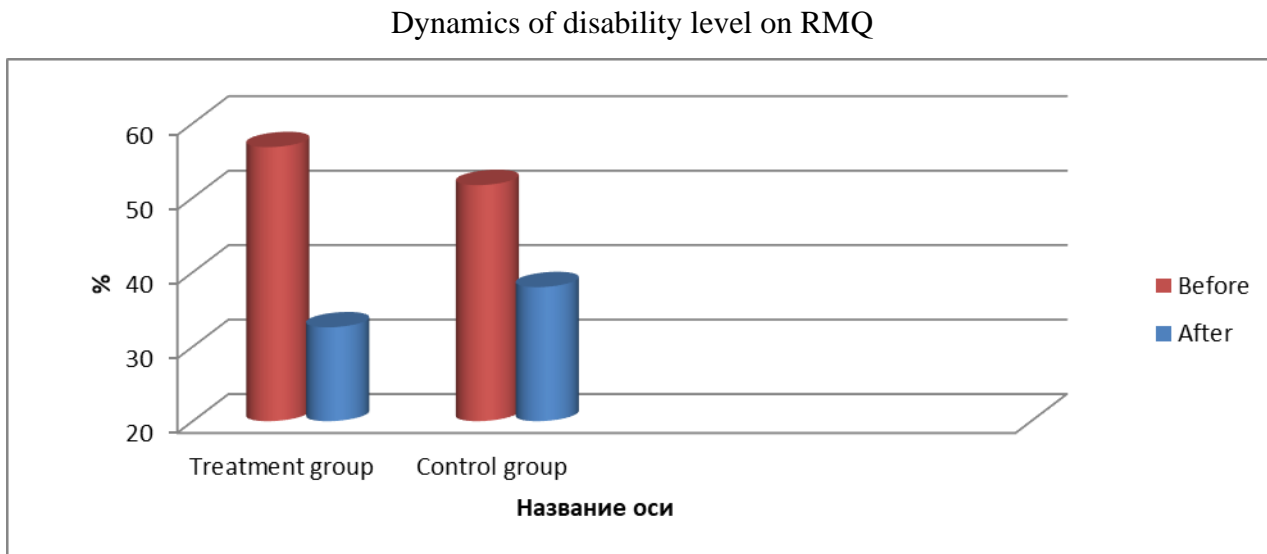
Due to the decreasing of pain, static-dynamic disturbances diminished, ROM in the lumbar spine increased, and the gait improved. It should be noted that such changes were most pronounced in the treatment group.

Daily functional activity were grouped into overarching themes of mobility (walking, stairs, sitting/standing, bending/kneeling, lifting, lying down), activities (chores/housework, dressing, washing, driving, work) and other (relationships/socializing, mood, sleep, appetite), which are consistent with those evaluated within the RMDQ. Regression of pain also take a role to improve the quality of life for patients. After treatment, disability level on the RMQ decreased from 56.8% to 32.6 % for the treatment group and from 51.7 % to 38 % in control group (diagram 1). RMQ total

score decreased from  $9.57 \pm 2.43$  to  $6.86 \pm 3.17$  in control group,  $10.23 \pm 2.41$  to  $5.87 \pm 2.22$  in treatment group ( $p < 0.001$ ).

Complications during and after IFT and ST were not observed.

**Diagram 1.**



### Conclusion

In this study, combination types of therapeutic interventions (IFT and ST in the complex, ST as monotherapy) were chosen for the management of LSR within the framework of these principles. The analysis highlighted no statistically significant differences found between the two study groups in pre-treatment assessments. This indicates that the patients in the two groups were homogenous.

Overall improvement rate in experimental group was 62,5%, in treatment group 84,4 %. Analyzing the results of our study, it can be noted that the treatment of ST as a monotherapy or with combination IFT had a positive effect in patients. However, the use of ST in combination with IF showed more statistical significance and efficiency in reducing back pain and disability. The beneficial effect of this therapeutic complex on the clinical course of the disease, more pronounced analgesic effect, and regression of clinical manifestations, as well as improvement of quality of life indicators.

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