



**THE EFFECTS OF ADDING LUMBAR TRACTION DEVICE WITH CONVENTIONAL
THERAPY IN PATIENTS WITH CHRONIC LOW BACK PAIN DUE TO LUMBAR
DISC**

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ABSTRACT

One of the most common causes for work absence is chronic low back pain. One of the reasons for the disease is spinal disk herniation; the chronic disk herniation is of high prevalence. Usually, diagnosis of chronic low back pain will be on the basis of pain, lumbar traction, and local stiffness under, upper gluteal. For this, the present study aims at comparing the effects of adding lumbar traction device with conventional therapy in patients with chronic low back pain due to lumbar disc using random and single – blind clinical experiments. The population is composed of 120 patients aged 25-65 with chronic low back pain, selected and categorized into two groups randomly. The results of the experiments show decreased disability, lumbar lordosis and reduced low back pain. Therefore, it can be concluded that traction with machine and pharmacotherapy and physical therapy can be an effective and useful treatment for reduced pain, decreased disability, decreased lumbar lordosis and increased flexibility.

**Keywords: low back pain; disk herniation; lumbar traction with machine, spinal disk
herniation**

INTRODUCTION

Backache is one of the most common reasons for patients visiting medical centers, so that it is the most prevalent disease after catching cold and minor injuries. Backache is the first reason for visiting orthopedic specialists and, generally, the third factor for referring to doctors. At least, more than 90 percent people experience once in their lives, and more than 50 percent people involve in such disease more than once. There are various causes for backache. Nearly in 85 percent people visiting doctors because of backache, no clear cause will be found. After cold, backache is the second prevalent reason for those being absent from their work. It is one of the most widespread reasons for visiting doctors, and more than 90 percent people suffering from backache will recover from the disease within two months.

According to various statistics, backache is the highest ranked among the diseases resulting in disablement, inability to work and taking vacation in under 45 persons. Backache is an annoying pain which prevent people from their daily routines forcing them to bed rest. Therefore, other than physical troubles, this disease can cause spiritual difficulties having bad effects on economic conditions of family and, as a general, society. About twenty years ago, the most

people referring to physiotherapists and orthopedists for musculoskeletal were older than 55-60 years old because articular cartilage will be degenerated in old ages, but nowadays, this phenomenon may be found in thirties.

These days, with modern society, the spread of backache is happening easily and rapidly. Surprisingly, its spread rate is higher than growth rate of population. Unfortunately, this disease is found among children. As figures shown, 60 percent of children between 15-16 ages have become infected. The prevalence of backache is higher among 25-55 year males but this is the case in fifties. Unfortunately, physical examinations cannot predict backache because there are many people suffering from Arthritis of the spine but they have no pain.

ETIOLOGY AND UNDERLYING FACTORS

Generally, backache can be classified into two main categories: those with mechanical cause and those with non-mechanical cause.

Backache with mechanical factors is among those diseases occurred due to a mechanical factor such as impact, improper physical movements, decreased muscle strength, high pressure on vertebral column and bad position of body while sitting or

standing. These factors account for 90 percent of causes of backache. Two kinds of factors can damage vertebral column and incidence of mechanical backache.

A) Underlying factors including

1. Bad positioning of body
2. Decreased movement due to insufficient recovery
3. Work-related stress
4. Obesity

B) Detecting factors

1. New use
2. Incorrect use
3. Excessive use
4. Impact

NON-MECHANICAL FACTORS

Non-mechanical factors include those medical causes or systematic diseases that may cause backache during the process of this disease. The most common medical causes are inflammatory diseases, infectious diseases, cancers, metabolic diseases, and poisoning with Radium.

GENERALLY, THE FACTORS OF BACKACHE ARE:

1. Backache due to muscle strain or Rabat waist
2. Spinal nerves being under pressure
3. Pain due to spinal infection
4. Pain due to spinal tumors

SYMPTOMS DIAGNOSIS

In the patients suffering from backache arising from radiculopathy, spinal stenosis or other spinal factors (MRI), CT scan can diagnose the disease and steer treatment process. Medical history should cover some information about osteoporosis, osteoarthritis, cancers and review of all previous CT scan. In examination of organs, the focus should mainly be on unjustified fever, losing weight, osteoarthritis (morning stiffness), gynecologic symptoms, urinary and digestive problems. The physical examination should include the test of directly raising the lower limb and intended neuromuscular examination. The positive test for directly raising the lower limb (i.e. feeling pain when raising lower limb while knee is completely wide and hip is bent in 30-70 degrees) can be indicative of lumbar disc herniation. In this test, the pain is more sensitive in the infected side (i.e. being better to reject lumbar disc herniation in the case of negative test) and more specialized in the opposite side (i.e. being better to confirm lumbar disc in the case of positive test). Such tests as deep tendon reflection, muscle strength and sensibility can be effective for identification of involved nerve roots.

Experimental examination including erythrocyte sedimentation, accurate number of blood cells, reactive protein C should be

considered when there are symptoms indicative of acute disease. Urinary test may be useful in the cases that we are doubtful about urinary tract and alkaline phosphatase and calcium levels can be effective for diagnosis of such diseases as Paget's diseases infecting bone metabolism; it should be noted that these tests are not required in all patients with chronic backache.

LOW BACK PAIN THERAPY:

Medicine: includes specific drugs and prescribing pain reliever for curing the symptoms of pain.

Medicine is prescribed as pain reliever when the cause of the disease is not treatable or is among the mechanical factors of the low back pain which it is recommended to be non-steroidal and Curtin free.

It is evident that in such cases using pain reliever can help in short time and it is necessary to use physical method like physiotherapy and therapeutic exercises. Acetaminophen is in the front line of cure because of its good safety. NSAIDs have the similar pain relief property but have significant digestive and renal arteries side effects. There are various groups of NSAIDs which if one group doesn't have efficacy, we can try the other groups before stop using all of these groups. Tramadol, Opioids and the other adjuvant drugs can be

useful for some patients who don't response to NSAIDs. Tramadol is a pain reliever drug which has weak Serotonin and Norepinephrine reuptake inhibitory and opioid property [1].

Studies show the short term relief and function but there isn't long term data in this regard. Because of opioid property, Tramadol should not be used by patients who are recovering from drugs. Its side effects include drowsiness, constipation and nausea.

PHYSICAL THERAPIES

For treatment of some patients with low back pain, some physical therapies are necessary in addition to the symptomatic treatment. These treatments are various and include the old treatment methods of acupuncture (China) and massage (France) and new physiotherapy techniques.

Some of physiotherapy techniques which are used to treat the low back pain include: heat treatment: for a long time heating and icing painful member has been used to reduce pain. Today heat treatment is applied via the two superficial (for skin) and deep (joints or muscle) forms by the advanced physiotherapy plants [1].

Electrotherapy: it has been confirmed that wavelength and special frequencies of electrical current are effective in controlling pain, sore cure, muscle improvement, and so

many other cases and today advanced pants have been designed for this purpose. Manipulation: it is commonly known as set of joints. This technique can be applied for correction of cases of small scoliosis (curvature of the Spine). This technique should be done by an expert therapist, else it may damage spinal cord or even break vertebra in person with osteoporosis [1].

Laser therapy: Low power lasers like Helium-Argon and Ruby lasers are effective in reducing pain, recovering sores, decreasing inflammation and so many other cases and today are used by physiotherapists. Aquatic therapy: refers to treatments and exercises performed in water and is very useful for low back pain relief [1].

LOW BACK STRETCH MACHINE:

Stretching or traction is applying a mechanical force on body to separate the articular surfaces and stretching the soft tissue around a joint. This stretch is done by machine under supervision of a physical therapist in a specific rate and direction. The rate of tension is scalable and is applied for a longer term. In this method there is the possibility of stretching a special cervical-vertebra and lumbar vertebra which help reduce pressure on a special back vertebra and patient with intervertebral disc herniation feels pain relief.

The stretch is done in this way that patient lies over back with a hand beneath his knees to bend them and one belt is fasten over chest and other one beneath hip and then stretch is done by stretching low back machine [2].

THE EFFECTS OF STRETCHING LOW BACK ON INTERVERTEBRAL DISC HERNIATION:

The effects on intervertebral disc

Most studies have introduced the stretch as a therapy way of BULGING, Protrusion discs. Some mechanisms justifying reduction of disc Herniation and nucleus travel toward the disc center are as follow:

REDUCTION OF PRESSURE INSIDE THE DISC

Following stretch, the created vacuum grasp the disc nucleus inside, and the posterior longitudinal ligament stretch also returns the nucleus toward the disc center. Studies performed by some imaging methods like CT scan, MRI and Discography shows that applying force of 27-55 Kg can reduce protrusion of disc and improve clinical signs resulting from sever intervertebral disc Herniation which has filled the spinal canal. Stretch can increase the movement segments and vertebral column. 1-2 millimeter detachment of articular surfaces has been reported which is transient and resets after stretching the movement segments.

Paresthesia, pain relief and Tingling occur after stretching resulting from detachment of articular surfaces [2].

The Effect on Bone

According to Wolff's law, density of bone is increased in the direction of the applied force but the disease symptoms can't be improved.

The Effect on Facet Joints

The required force for the detachment of Facet joints in the area of low back is 50% of the body weight and that of cervical Facet joints is 7-9% of body weight. The stretching can help in feeding articular cartilage, reducing pressure on the articular surfaces, increasing the intervertebral foramen and decreasing pressure on the neural roots [2].

The effect on muscles

Electromyography (EMG) studies showed decreasing of muscular activity and relaxation during stretching.

CLINICAL APPLICATION CASES OF STRETCHING VERTEBRAL COLUMN:

- 1-Disc herniation
- 2- nerve root impingement or Sciatic nerve involvement
- 4- Para spinal muscle spasm
- 5- decreasing of intervertebral foramen induced by arthritis or the formation of osteophytes.

CASES WHICH ARE FORBIDDEN FOR USE OF STRETCHING:

- 1- in the cases of unfixed bone fracture
- 2- acute inflammation or injury
- 3- joints with great freedom of movement
- 4- patients with rheumatic diseases record in the neck region
- 5- in the infection or tumors cases [2].

METHODOLOGY

the study aims to investigate the effect of stretching low back pain. The study was performed by random clinical trial. The statistical population includes 120 patients with chronic low back pain referred to the physical medicine of Baghiatollah Hospital. First the subjects were matched according to their age and gender then they evaluated by the diagnostic tests of the chronic low pain (MRI and Electro-Diagnostic tests). The patients with positive tests were chosen by the non-probability convenience method and observing of inclusion and exclusion criteria. In this method the patients were divided into the two study groups. The first group is composed of 60 people who were taken Ibuprofen (TDS-400mg) for treatment and the second group of 60 people who were treated by Ibuprofen plus the low back stretching with an electronic machine (25 percent of body weight of the patient) during 10 sessions. All the patients were assessed after 4 weeks and their rate of pain measured

according to VAS before starting treatment and also 4 weeks after the treatment. Data gathered through a questionnaire and were analyzed by SPSS software. Normal distribution of variables was assessed using Kolmogorov-Smirnov test (KS) ($P > 0.05$). Parametric and non-parametric tests were used for comparison of means of both of the groups. Chi-square test was used for assessment of qualitative variables. In all of the statistical analyses P value achieved less

than 0.05. Data was compared with t test and partial test.

RESULT OF DATA ANALYSES:

Subjects were divided into the two groups of 60 people. The first group consisted of 35 men and 25 women and the second one of 27 women and 33 men. Totally 56.7 percent of the participants were men and 43.3 percent women. There wasn't a significant difference between these two groups in view of demographic variables such as age, gender, and weight, and P value > 0.05 .

Variables	Mean	Standard deviation
Age of men	45/35 ± 1/95	
Age of women	42/23 ± 2/45	
Height of men	173/70 ± 7/33	
Height of women	161/35 ± 5	
Weight of men	74/45 ± 10/96	
Weight of women	57/60 ± 8/06	

Table 1: result of demographic data related to the participant patients in the present study

FINDINGS RELATED TO THE PAIN RATE OF THE PATIENTS:

The mean of pain rate before treatment was calculated for each group. Mean value of the pain rate was 8/90 for the first group (on treatment with Ibuprofen TDS-400mg), and for the second group (on treatment with Ibuprofen TDS-400mg and low back stretch with a mechanic machine) (25% body weight of the patient) during 10 sessions, was 8/817. (Diagram 1-3, table 3-2). After gaining the mean of rate pain before

the intervention we calculated the mean after intervention according to the VAS scale pain. Pain measurement: the visual pain rating scale of Vas was used for measurement of the perceived pain. It ranges from no pain (0) to the worst possible pain (10). This scale is the most valid pain rating scale used for comparison between different periods which is used widely in the studies related to pain. This scale is reliable and valid with reliability factor of 91 percent [3]. We concluded that the mean of pain rate during the four weeks for the first group after intervention was 4/25

(diagram 1, table 2). The measured pain rate of the second group during 4 weeks after intervention was 3/067. It is worth mention

that there wasn't a significant difference for the pain rate of the two groups before treatment.

Table 2: the results of patients' data that took apart in the current study

P VALUE	Min-pain ±standard deviation		Variables
	After interference	Beforeinterference	
P<0/05	4/25±1/09	8/90±/72	Including ibuprofen) TDS-400mg(
P<0/05	3/067±/99	8/817±/74	Ibuprofen(TDS-400mg)and exercises along low back stretch with electronic machine (25% of patient's weight) for 10 sessions

After getting assure of pain limitation normality in each stage of Kolmogorov smirnov-test, in order to compare the test's results before and after the interference in paired samples test according to the carried tests, the mi-pain before interference are placed in A group and after the interference in B group.

Also, after getting assure of average normality in each stage of kolmogorove-smirnov test, to compare the test's results

before and after interference, the paired samples test was applied according to the carried tests, the min-pain after the therapy was placed in A group and before the therapy and after the interference was placed in B group, and they had been compared to each other which had a meaningful difference p<0/05. This result diagram 2 implied that stretch therapy with machine along the drug consuming was more efficient than drug treatment.

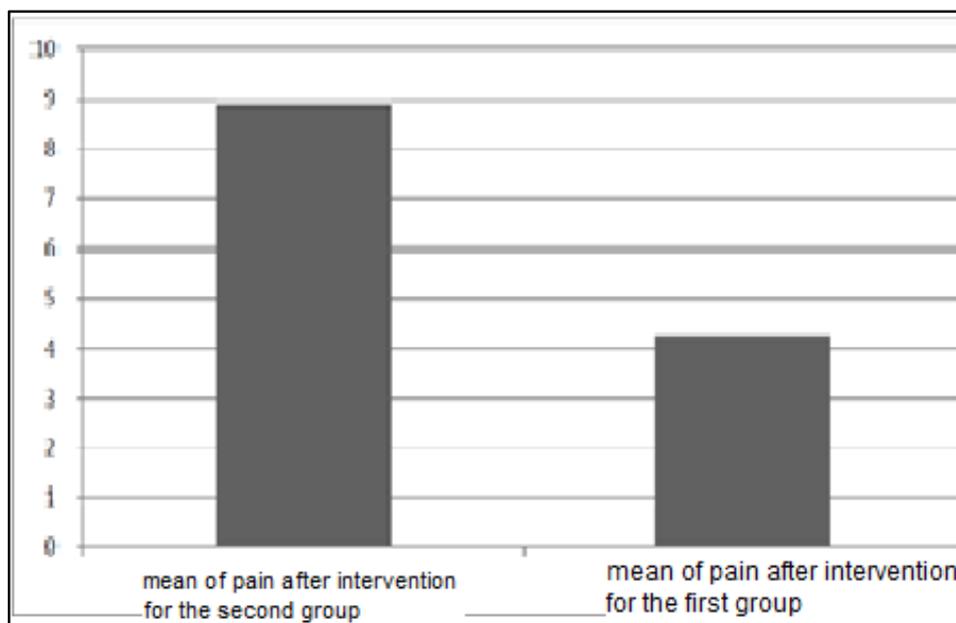


Diagram 1: mean of pain before intervention for the first group

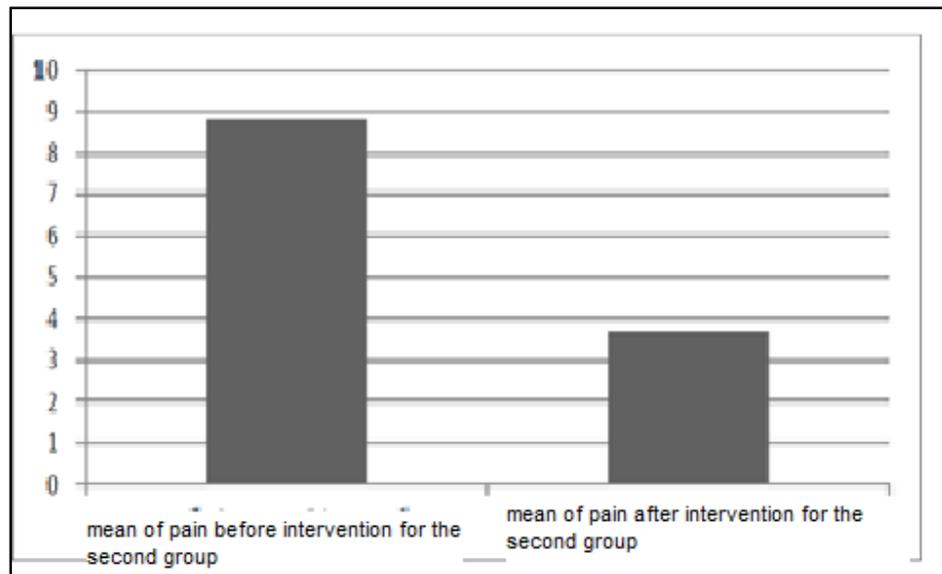


Diagram 2: mean of pain before and after intervention for the second group

CONCLUSION

The results of the current article study the effect of low back stretch excess by machine through therapy of chronic Intervertebral Disc Herniation patients which there was any meaningful difference through the demographic variables such age, sex and weight between the two groups. And overall, the results indicate positive effect of this protocol in improvement of the patients and their normalization to back to routine life. Various studies carried out in that fields which refer to the effective role of these exercises in reduction of pain and normalization of patient's activities and improvement in their physical movements. In the review of Rejeksi and his colleagues' study, the improvement of physical activities was seen in physical movements [4]. However, the article demonstrate that doing

the strength exercises by means of low back stretch machine can reduce the pain in chronic Intervertebral Disc Herniation patients.

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