

CLINICAL STUDY

Conventional physical therapy with lumbar traction; clinical evaluation and magnetic resonance imaging for lumbar disc herniation

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Abstract: *Objective:* This study measures and compares the outcome of conservative physical therapy with traction, by using magnetic resonance imaging and clinical parameters in patients presenting with low back pain caused by lumbar disc herniation.

Methods: A total of 26 patients with LDH (14F, 12M with mean aged 37 ±11) were enrolled in this study and 15 sessions (per day on 3 weeks) of physical therapy were applied. That included hot pack, ultrasound, electrotherapy and lumbar traction. Physical examination of the lumbar spine, severity of pain, sleeping order, patient and physician global assessment with visual analogue scale, functional disability by HAQ, Roland Disability Questionnaire, and Modified Oswestry Disability Questionnaire were assessed at baseline and at 4–6 weeks after treatment. Magnetic resonance imaging examinations were carried out before and 4–6 weeks after the treatment. *Results:* All patients completed the therapy session. There were significant reductions in pain, sleeping disturbances, patient and physician global assessment and disability scores, and significant increases in lumbar movements between baseline and follow-up periods. There were significant reductions of size of the herniated mass in five patients, and significant increase in 3 patients on magnetic resonance imaging after treatment, but no differences in other patients.

Conclusions: This study showed that conventional physical therapies with lumbar traction were effective in the treatment of patient with subacute LDH. These results suggest that clinical improvement is not correlated with the finding of MRI. Patients with LDH should be monitored clinically (Fig. 3, Ref. 18). Full Text in free PDF www.bmj.sk. Key words: low back pain; lumbar disc herniation, magnetic resonance imaging; physical therapy, lumbar traction.

Low back pain is a common problem all over the world. It is a clinical case causing important problems in terms of social and economical status, and workforce loss. Approximately eighty percent of people at the age of fifty suffer from low back pain in certain period of their lives. 90 % of acute low back pains improve in days or weeks and recover in two months, while approximately 10 % of them become chronic. These chronic cases cause further disability, increase in health expenses and workforce loss because of low back pains. In recent years, no increase occurred in the incidence of low back pain, while workforce loss related to low back pain increased (1, 2).

Lumbar disc herniation (LDH) is one of the frequent reasons of acute, chronic and recurrent low back pains. It is seen at L4–L5 and L5–S1 levels with a rate as high as 98 %. It frequently develops in the weakest part of the disc which is the posterolateral side. Although it can occur at any age, it is most frequently

encountered in males and at ages between 30 and 50. LDH can occur in different types and degrees. The herniation is classified into 3 types, median, lateral and posterolateral according to its location. Symptoms are developed according to compression and irritation of adjacent nerve root (3, 4).

Treatment of lumbar disc herniation is primarily conservative. The purpose is the relief from pain and inflammation, increased function, to enable early activity, to prevent recurrence, to inform the patient and enable him/her to turn back to life. In most of the researches on non-surgical treatments of lumbar disc herniation, efficacy of medical treatments, manipulation, epidural injections, nerve root blocks and several physical therapy modalities are shown (5–7).

The literature on the efficacy of traction as a part of physical therapy in the treatment of LBP is conflicting. Lumbar traction has long been a preferred method for treating lumbar disc problems, but in light of the effectiveness of more active treatment, it is generally not recommended in the treatment of acute cases. Traction has effects such as reducing pressure on disc by enabling vertebral separation, reducing pressure on the nerve root by enabling expansion of neural foramen, enabling to stop edema and inflammation, helping the disc to be repressed to back by creating tension on ligamentous structures besides having aspects such

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as acting as anti-spasmodic in paravertebral muscle spasm, creating intra-articular expansion and recovery of spinal incline (8, 9).

The purpose of this study is to compare the outcome of conservative physical therapy with lumbar traction by using Magnetic Resonance Imaging and clinical parameters in patients with subacute low back pain caused by lumbar disc herniation.

Methods

Twenty six patients (14 F, 12 M), diagnosed with lumbar disc herniation with clinical and Magnetic Resonance Imaging parameters and resorted to Department of Physical Therapy and Rehabilitation out patient clinic of our hospital, were enrolled in this study.

In order to eliminate etiological effects other than disc herniation, clinical examination, complete blood count and erythrocyte sedimentation rate, C-reactive protein, biochemical analyses and urine and brucella examination were performed. Exclusion criteria in the study: patients with uncontrolled hypertension, osteoporosis, severe degenerative changes, inflammatory low back pain, any kind of infectious disease (systemic or localized), malignancy, and patients who are pregnant and patients diagnosed with extruded disc and disc sequestrum after imaging techniques were not enrolled in the study.

Physical examination of the lumbar spine, severity of pain, sleeping status, patient and physician global assessment with visual analogue scale, functional disability by health assessment Questionnaire (HAQ), Roland Disability Questionnaire (RDQ), and Oswestry Disability Questionnaire (ODQ) were assessed at baseline and 4–6 weeks after treatment. Magnetic resonance imaging examinations were carried out before and 4–6 weeks after the treatment.

The Oswestry Disability Index (ODI) and the RDQ are hands-down the most commonly used and recommend outcome measure tools used for assessing the disabling effects of lumbar spinal disorders (10–13). RDQ is calculated by adding total positive scores of the patient (0; no disability, 24; severe disability). Functions of ODQ consist of 10 items, which are grad from 0 (very good) to 5 (very bad disability) or percentage, such as; 0 % to 20 % – minimal disability, 20 % to 40 % – moderate disability, 40 % to 60 % – severe disability, 60 % to 80 % – crippled, 80 % to 100 % – bed bound (or exaggerating symptoms).

Additionally, in locomotor system examination carried out before treatment and after treatment, posture, pelvic tilt, Schober test, paravertebral muscle spasm, walking type, straight leg raised test and femoral nerve stretch test and neurological examination were evaluated.

Fifteen sessions (per day during 3 weeks) of physical therapy were applied. That included hot pack, ultrasound, electrotherapy (TENS) and lumbar traction. The intermittent lumbar traction treatment (10 seconds pulling and 10 seconds relaxing) was performed in supine position with a pulling force of one third of his/her own weight for a total of 15 sessions, each of which lasted 10 minutes for once a day. Pulling weight was increased by 5 kg in every three sessions in a way that can be tolerated by the patient.

Clinical and radiological evaluations before and after treatment were made by researchers (HY and MK), one of whom has at least 10 years of experience.

All data analyses were done with SPSS statistical software (SPSS Inc, Chicago, IL) and presented as mean value. The size of herniation after the treatment was compared in patients with herniation at multiple levels. *Student t* test and equivalents and chi-square tests were used. *p* value less than 0.05 were accepted as significant.

Results

All of the patients (26 patients) completed the therapy session. No complications occurred during and after the therapy sessions. All patients benefited from the treatment.

There were significant improvements ($p < 0.001$) in pain, sleeping disturbance, patient and physician global assessment and pain when coughing or sneezing, and significantly increased lumbar movements between baseline and follow-up periods. There were significant improvements of disability scores (RDQ and ODQ, $p < 0.001$) (Figs 1–3).

There were significant reductions of size of the herniated mass in five patients, and significant increases in 3 patients on magnetic resonance imaging after treatment, but no differences in other patients. A slight improvement was observed in lumbar Schober after the treatment. It was also observed that in two thirds of the patients, the pain turned into surface pain instead of deep, burning or stinging pain. It was observed that lumbar paravertebral muscle spasm disappeared in more than half of the patients and that bilateral spasm turned into unilateral spasm. 7 out of 10 patients, showing antalgic walking pattern, began to walk normal.

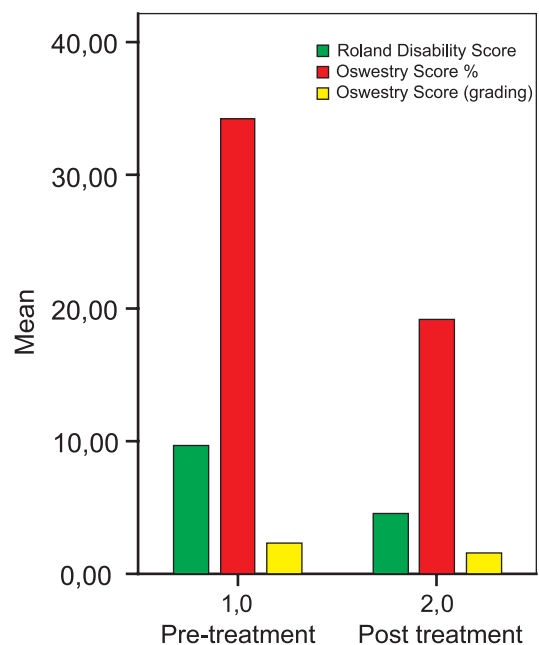


Fig. 1. After treatment changes in disability scores.

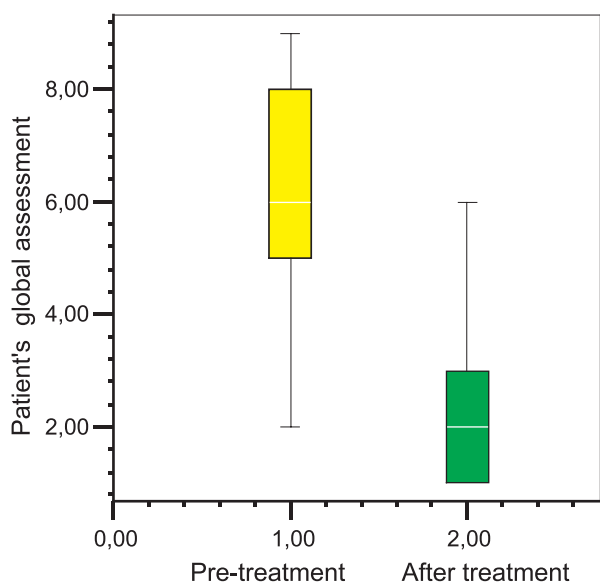


Fig. 2. After treatment changes in VAS-patient's global assessment (0 – very good, 10 – very bad).

Discussion

The management of low back pain includes a range of different interventions, such as; patient education, drug therapy, physical therapy agents, exercise, cognitive-behavioral therapy, alternative therapies, and surgery. Another method is the use of traction which involves weights (after proper positioning) to gradually “pull” the skeletal structure into better alignment and assist muscle relaxation.

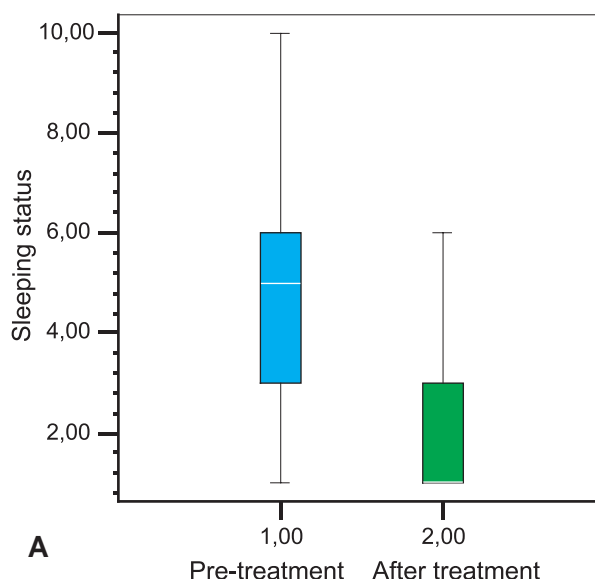
Disc herniation cannot be detected with conventional radiography. However, changes in degenerative process such as narrowing of disc space, end plate disorder, sclerosis or ligament – disc calcification can be seen. Conventional radiography is the primary option in definitive diagnosis of low back pains. Magnetic resonance imaging is superior to other imaging modalities as its resolution is high in spinal region between intervertebral disc and soft tissues. Diagnosis method minimizing invasive procedures with minimum error risk and expenses is recommended for imaging low back pains. Therefore, it causes MRI to be frequently used as a primary option. But, MRI is an expensive with several medical contraindications (metallic prosthesis, cochlear implant, etc) (14, 15).

Traction treatment is usually used in cervical and lumbar region. But, there are some contradictions and controversy over the effectiveness of traction. It was reported that traction may be effective in patients with radicular pain and neurological deficit (16, 17).

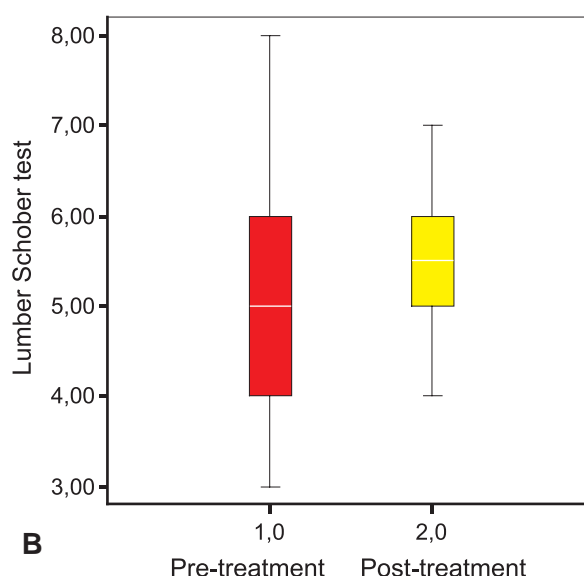
The opinion that traction should not be the only treatment modality but rather should be a part of a treatment program including other physical therapy methods is widespread. Traction treatment is commonly used in neck pains and low back pains resulting from radiculopathy (8, 9). Traction treatment was in-

cluded in to our physical therapy programs because of frequent occurrence of lumbar disc herniation in our daily practice for. In this study, the purpose was to research the effect of the combined physical therapy. Our results showed that clinical parameters of patients improve primarily. Regression of herniation in 5 of 26 patients and increase of herniation in 3 of 26 patients were observed. No change was observed in other patients. Improvement in clinical parameters in two of the patients with increases of herniation and patients with reduction of herniation represent no difference.

In a previous study of Ocak et al (7) was reported that significant improvements are detected in VAS and Oswestry scores



A



B

Fig. 3. After treatment changes in VAS-patient sleeping status (0 – very good, 10 – very bad) (A), after treatment changes in lumbar movement (Schober test) (B).

in patients with lumbar disc herniation treated with physical therapy without traction, exercise and bed rest at the first control after one and a half months and that no significant improvements were detected in lumbar MRG findings. Significant improvements were observed in both clinical parameters and radiological results at the 2nd control four and a half months later compared to pre-treatment. In another study, traction, ultrasound and low powered laser treatment were compared and similar positive effects are reported between clinical parameters and MRG groups at 1st and 3rd month of post-treatment (18). Our study shows that clinical improvement after combined physical therapy program is not correlated to MRI findings.

These results showed that physical therapy programs including conventional lumbar traction are quite beneficial on Lumbar disc herniation without emergent operative indications. Also, these results show that generally clinical improvement occurs prior to radiological improvement, MRI findings and clinical findings are not always correlated. It can be concluded that the clinical parameters should be taken into consideration primarily in evaluation of treatment results of patients with lumbar disc herniation and should be monitored.

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