

## Discussion on lumbar traction JOSPT 2014

Acute and chronic LBP are complex disorders that must be managed with a multidisciplinary approach addressing physical and socioeconomic aspects of the illness. Medication and physical therapy methods including traction have proven to be useful adjuncts to an active program of exercise and education that promotes functional restoration [37].

Traction mechanism to relieve pain seems to separate the vertebrae, remove pressure or contact forces from injured tissue, increase peripheral circulation by a massage effect, and reduce muscle spasm [38]. The results of previous studies examining the efficacy of lumbar traction yielded conflicting results [6,39-41]. The aim of this short review is to discuss and analyze the latest result regarding lumbar traction in order to clarify some aspects of this specific and useful physical therapy.

The majority of included studies employed traction on patients that suffered nerve root compression symptoms (radiculopathy, sciatica, discogenic pain). Mustafa, in his randomized clinical trial, aims to investigate the effects of lumbar extension traction in patients with unilateral lumbosacral radiculopathy due to L5-S1 disc herniation. All patients has also hypolordotic lumbar spine ( $<39^\circ$ ). The control group received hot packs and interferential therapy, whereas the traction group received lumbar extension traction in addition to hot packs and interferential therapy. He concluded that traction group had better effects than the control one with regard to pain, disability, H-reflex parameters and segmental intervertebral movements [33]. Fritz et al. performed a RCT in order to identify a subgroup of patients with low back pain who are likely to respond favorably to an intervention including mechanical traction. The results of this study suggest this subgroup is characterized by the presence of leg symptoms, signs of nerve root compression, and either peripheralization with extension movements or a crossed straight leg raise [26]. Some years later, the same author conducted a preliminary study on 120 patients examining the effectiveness of a treatment protocol of mechanical traction with extension-oriented activities for patients with low back pain and signs of nerve root irritation. The authors proved that add traction to extension-oriented activities lead to a better clinical outcome. Moreover, they examine a validity of a subgrouping method based on the presence peripheralization of symptoms with extension movement and/or a positive crossed straight leg raise test. This screening will allows the identification of patients who could take advantage from traction therapy [30].

The use of mechanical traction in the management of patients with chronic low back pain/ degenerative spine disorders has generally not been endorsed by evidence-based practice guidelines. Diab et al. aim to investigate the effects of lumbar extension traction with stretching and infrared radiation compared with stretching and infrared radiation alone on the lumbar curve, pain, and intervertebral movements of 80 patients with chronic mechanical low back pain (CMLBP). They stated that lumbar extension traction with stretching exercises and infrared radiation was statistically superior to stretching exercises and infrared radiation alone for improving the sagittal lumbar curve, pain, and intervertebral movement in CMLBP [11]. Beyki et al. compared the outcomes of prone and supine lumbar traction in patients with chronic discogenic low back pain. They noted that prone traction was associated with improvements in pain intensity and ODI scores at discharge but they cannot imply a long lasting relationship between the traction and outcomes [25].

Some studies tried to investigate the radiological (MRI or CT) outcome of lumbar traction therapy along with clinical ones. Unlu et al. compared the outcome of traction, ultrasound, and low-power laser (LPL) therapies by using magnetic resonance imaging and clinical parameters in patients with nerve root compression symptoms. 60 patients were randomly assigned into 1 of 3 groups equally according to the therapies applied. There were significant reductions in pain and disability scores between baseline and follow-up periods, but there was not a significant difference between the 3 treatment groups at any of the 4 interview times. There were significant reductions of size of the herniated mass on magnetic resonance imaging immediately after treatment, but no differences between groups [28]. Kamanli et al. measured 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. Magnetic resonance imaging examinations were carried out before and 4-6 weeks after the treatment. There were significant improvement in clinical outcomes 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. These results suggest that clinical improvement is not correlated with the finding of MRI. Patients with lumbar disc herniation should be monitored clinically [36]. In 2006, Ozturk et al. investigated the effects of continuous lumbar traction in patients with lumbar disc herniation on clinical findings, and size of the herniated disc measured by computed tomography (CT). 46 patients with lumbar disc herniation were included, and randomized into two groups as the traction group (24 patients), and the control group (22 patients). The traction group was given a physical therapy program and continuous lumbar traction. The control group was given the same physical therapy program without traction, for the same duration of time. They achieved statistically relevant improvement in their results concluding that lumbar traction is both effective in improving symptoms and clinical findings in patients with lumbar disc herniation and also in decreasing the size of the herniated disc material as measured by CT [24]. The goal of the study carried out by Apfel et al. was to determine if changes in LBP, as measured on a verbal rating scale, before and after a 6-week treatment period with non-surgical spinal decompression, correlate with changes in lumbar disc height, as measured on computed tomography (CT) scans. 30 patients were enrolled for this study. They concluded that non-surgical spinal decompression was associated with a reduction in pain and an increase in disc height. The correlation of these variables suggests that pain reduction may be mediated, at least in part, through a restoration of disc height. Nevertheless, authors stated that randomized controlled trials is needed to confirm these promising results [34].

The possibility of lumbar sagittal curve correction with 2 way lumbar traction has been described in literature [12]. In 2013, Diab et al. conducted an RCT to investigate the effect of extension on the , function and whole spine sagittal balance as represented in curvature, thoracic curvature, C7 plumb line, and sacral slope. Eighty patients with chronic mechanical (CMLBP) and definite hypolordosis were randomly assigned to or a control group. The control group (n=40) received stretching exercises and infrared radiation, whereas the traction group (n=40) received lumbar extension traction in addition to stretching exercises and infrared radiation three times a week for 10 weeks. They stated l extension in addition to stretching exercises and infrared radiation improved the spine sagittal balance parameters and decreased the and disability in chronic mechanical LBP.

In lumbar traction therapy, several factors has to be considered [32]. Among other (weight, number and duration of sessions, duration of treatment) the position of traction is of a

paramount importance. No univocal results can be drawn from literature. 8 studies included in our review used supine traction position. According to these findings, the majority of studies found in literature employed supine position for traction therapy. Beattie et al. aim to determine outcomes after administration of a prone lumbar traction protocol in 296 consecutive patients with LBP and evidence of a degenerative and/or herniated intervertebral disk. Traction applied in the prone position for 8 weeks was associated with clinical improvements till the end of follow up (180 days after discharge). Obviously, causal relationships between these outcomes and the intervention should not be made until further study is performed using randomized comparison groups [35]. Only 1 study compared the efficacy of prone and supine lumbar traction. Beyki et al. performed a 4-week course of lumbar traction, prone or supine, in 124 patients randomly divided in case and control groups. Case group (prone traction) had statistically better clinical results compared to control group (supine traction) [25].

Separate mention has to be done for inversion therapy. In “Inversion” or “Backswing”, a tilt table is used and the weight of the entire upper half of the patient’s body assisted by gravity acts as the traction [42]. The traction forces here are likely to be more consistent and tailored to each patient than conventional traction. In our review, we detected only 1 study concerning inversion therapy. It was a prospective randomized controlled trial. 24 patients awaiting surgery for pure lumbar discogenic disease were allocated to either physiotherapy or physiotherapy and intermittent traction with an inversion device. Authors concluded that the association of inversion traction and physiotherapy resulted in a significant reduction in the need for surgery. Along with several supposed benefits, traction therapy has some adverse effects. These effects were in the main not of a serious nature (short-term exacerbation of symptoms, pain on release of traction, headache, difficulty relaxing). In contrast, episodes of cauda equina symptoms and hospitalization because of acute onset of pain are rare but possible complications [43,44].

This short review has several limitations. First of all, we included only English-language studies. Several biases can be introduced by quality of studies. Most of them were RCTs but in many cases authors don’t cleared the randomization protocol. Most of these studies enrolled few patients. In consequence, clear statistical results cannot be drawn. Follow up periods were too short. Lastly, the majority of included papers associated other therapies (physiotherapy, TENS, massage, US) to lumbar traction. This consideration created an heavy bias on the evaluation of traction benefits.

## Conclusion

To conclude, we identified 14 studies (11 RCTs, 1 retrospective cohort study and 2 were case series) that evaluated lumbar traction effects for patients with acute or chronic non-specific LBP. Lumbar traction seems to produce positive results in nerve root compression symptoms. Data in degenerative and discogenic pain are debatable. A subgroup of patients with low back pain (peripheralization of symptoms with extension movement and/or a positive crossed straight leg raise test) may exist for whom mechanical traction is an effective treatment. Nevertheless, the limited quality evidence from the included studies show very small effects that are not clinically relevant. The majority of included studies applied lumbar traction in association with other therapies. Therefore, authors cannot draw definite clinical result. In summary, to date the use of lumbar traction therapy alone in LBP management is not recommended by the best available evidence. For future research the focus should be on high-quality RCTs with sufficient sample size to be able to draw firm conclusions.