The Effects of Stretching with Lumbar Traction on VAS and Oswestry Scales of Patients with Lumbar 4–5 Herniated Intervertebral Disc

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Abstract. [Purpose] This study investigated the effect of stretching with lumbar traction on VAS and Oswestry scale scores of lumbar 4–5 herniated intervertebral disc (HIVD) patients. [Subjects] We recruited 20 lumbar 4–5 HIVD patients. [Methods] We performed stretching with lumbar traction for lumbar 4–5 HIVD patients during 4 weeks. The VAS and Oswestry scales were measured before and 4 weeks after the intervention. [Results] The results showed a significant decrease in VAS scale scores for stretching with lumbar traction in lumbar 4–5 HIVD patients, from 18±1.29 to 2.1±1.35. The Oswestry scale scores also decreased significantly, from 20.35±2.01 to 3.5±2.84, after stretching with lumbar traction. [Conclusion] Thus, we suggest stretching with lumbar traction for lumbar 4–5 HIVD patients.

Key words: HIVD, Lumbar traction, Stretching

INTRODUCTION

Pain experienced over long periods, such as with herniated intervertebral disc (HIVD), shows abnormal aspects in terms of its neurological mechanism1). Changes in the neurological mechanism in HIVD patients lead them to perform abnormal patterns of movement2). HIVD patients have shown both asymmetry and atrophy of the spinal muscles on the side of the pain. Muscle spasms result in nonalignment of the vertebrae1, 2). Consequently, muscle spasm leads to pain and adhesion1, 2). Subjects have a decreased ability to recruit spinal muscles in chronic HIVD. Lumbar traction reduces pressure on the vertebral foramen by releasing tension in the spinal muscles2, 3). It is used to improve alignment and reduce muscle spasms3). Lumbar traction reduces tension in soft tissue and pressure on the vertebrae3, 4). Also, the nucleus pulposus can be moved inward by lumbar traction. A previous study showed significant improvements in VAS and the Oswestry scale scores between traditional physical therapy and traction3). However, traction requires more time and effort. Some studies have reported no effect of traction, continuous lumbar traction, vertical traction for patients with radiating pain, self-traction for location and size of disc herniation, and traction for acute disc herniation4). Stretching alone can help to release muscle spasms and is more rapid. Hamstring stretching affects lumbar lordosis. The connective tissue of the body is one unit in terms of structure and function; the hamstring is attached to the hip bone and the knee. Hamstring flexibility reduces back pain, increasing flexibility and coordination of the muscles without pain; hamstring stretching resulted in significant improvements in a previous study5). Thus, we investigated the effect of stretching with lumbar traction on VAS and Oswestry scale scores of lumbar 4–5 HIVD patients.

SUBJECTS AND METHODS

The subjects were 20 patients, aged 20–55, who consented to participate. They had no acute inflammation, instability of the cervical spine or joints, cervical flexion or extension, outflow of disc fragments, or lumbar, cardiac, or respiratory dysfunction, and none of them were pregnant. Their average age, height, and weight were 41.1±11.03 years, 168.4±8.8 cm, and 69.5±11.03 kg, respectively. Each subject provided informed consent before participating in the study. This study was approved by the Inje University Faculty of Health Sciences Human Ethics Committee.

All subjects began treatment sessions with a 5-min hot pack. They then performed 10 min of hamstring stretching. The subject were asked to lie on their back with their legs straight. An assistant stood next to the side of the subject to be exercised and held the leg under the ankle and on top of the knee. The assistant lifted the leg as far as possible while keeping the knee straight. This stretching was progressed by the physical therapist according to symptom response. Lumbar traction was applied to produce a lordosis angle of 15° at the lumbar 4–5 disc with an Electric Ortho Traction
Apparatus (STC-200N, Shin Jin Medical Co., Seoul, Republic of Korea). Subjects were positioned supine with the knee flexed on a wedge. The chest and pelvic were belted to provide support. For the first time, the traction was 25% of the body weight and was increased gradually by 2.25 kg/day. The maximum lumbar traction was 25% of the body weight plus13.5 kg. Stretching with lumbar traction was provided 6 days/week for 4 weeks. The VAS and Oswestry scales were measured on the day before and 4 weeks after the intervention. The participant’s perceived disability was assessed using the modified Oswestry disability questionnaire (ODI). The contents of the ODI include 10 items concerning pain intensity, personal care, lifting, walking, sitting, standing, sleep, sex life, social life, and traveling. The 10 items are scored from 0 to 5. The sum total score is then doubled and reported as a percentage, from 0–100, with a higher score indicating greater disability. The data were analyzed using the paired t-test. The significance level was set at p < 0.05. The SPSS software (ver. 12.0) was used for the analyses.

RESULTS

The results showed a significant decrease in VAS scale scores for stretching with lumbar traction in lumbar 4–5 HIVD patients, from 18±1.29 to 2.1±1.35 (p < 0.05). The Oswestry scale scores also decreased significantly, from 20.35±2.01 to 3.5±2.84, after stretching with lumbar traction (p < 0.05).

DISCUSSION

In this study, we investigated VAS and Oswestry scale scores of lumbar 4–5 HIVD patients with stretching and lumbar traction. The VAS scores decreased significantly after stretching with lumbar traction, as did the Oswestry scale scores. Gose et al. suggested that lumbar traction influenced disc herniation, degenerative discs, and facet joint syndrome and thus affected pain, mobility, and daily living function. Kisner and Colby suggested that there was a limit to correction of the symmetric stability in scoliosis using lumbar traction alone. Subsequently, it was shown that traction with exercise affected thoracic expansion in scoliosis. Therapeutic application of a stretching motion in scoliosis to increase flexibility may affect abdominal and pelvic muscles. Previous in vivo studies assessing the effect of stretching on the hamstring muscle-tendon complex have demonstrated significant load-relaxation behavior. These results indicate that stretching to reduce muscle spasm influences VAS and Oswestry scale scores, as does stretching with lumbar traction. A study of children with scoliosis also showed that traction significantly influenced related exercises. The present results indicate that stretching with lumbar traction reduced VAS and Oswestry scale scores in lumbar 4–5 HIVD patients. We believe that lumbar stretching with lumbar traction was shown to be more beneficial for reducing the tension on back muscles.

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