



Original Article

# The impact of manual spinal traction therapy on the pain and Oswestry disability index of patients with chronic back pain

HYUNJU OH, PhD, PT<sup>1)</sup>, SEOKJOO CHOI<sup>1)</sup>, SANGYONG LEE, PhD, PT<sup>2)</sup>, JIOUN CHOI, PhD, PT<sup>3)</sup>, KWANSUB LEE, PhD, PT<sup>4)</sup>\*

<sup>1)</sup> Department of Physical Therapy, Taegu Science University, Republic of Korea

<sup>2)</sup> Department of Physical Therapy, U1 University, Republic of Korea

<sup>3)</sup> Department of Physical Therapy, Shin Orthopedic Hospital, Republic of Korea

<sup>4)</sup> Department of Physical Therapy, Daegu Health College: 15 Taejeondong, Yeongsongro, Buk-gu, Daegu 41453, Republic of Korea

**Abstract.** [Purpose] The purpose of this study was to examine the effect of manual spinal traction therapy on the pain and Oswestry disability index of patients with chronic back pain. [Participants and Methods] In this study, 30 patients with chronic back pain were evenly divided into an experimental group 1, who received manual traction therapy, and an experimental group 2, who received intermittent traction therapy. Both groups received therapy three times a week for eight weeks. A visual analogue scale was used to measure participants' back pain, and the Oswestry disability index was used to check the functional impediment they experienced as a result. [Results] In a within-group comparison, visual analogue scale and Oswestry disability index significantly decreased in both the experimental 1 and experimental 2. In a between-group comparison after treatment, there was a significantly greater decrease in visual analogue scale and Oswestry disability index in the experimental group 1 compared to the experimental 2. [Conclusion] The manual spinal traction therapy was an effective intervention scheme for the treatment of pain and disorder in patients with chronic back pain.

**Key words:** Manual spinal traction, Pain, Oswestry disability index

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## INTRODUCTION

Technological advances and improvements in living standards in modern time have reduced the amount of physical activity undertaken by individuals, which may weaken their muscles. As a result, the number of people complaining of back pain has increased in recent times<sup>1)</sup>. In most cases, patients' back pain is relieved within two weeks. However, approximately 20% suffer from continuous pain that does not respond to therapy, which is known as chronic back pain<sup>2)</sup>.

Medical treatment, physiotherapy, exercise therapy, traction therapy, and manual therapy are some of the methods used in the treatment of chronic back pain. Surgery may be implemented if these treatments have no effect or if the pain is severe. Manual therapy techniques include chiropractic, manual traction, osteopathy, joint mobilization, myofascial release, the muscle energy technique, and the correction of soft tissue<sup>3)</sup>. Among them, chiropractic aims to improve the kinetic function of the body by correcting the spine and pelvis and searching for the fundamental cause of disease rather than looking only at a certain part of human body<sup>4)</sup>. Chiropractic is one of the most frequently used complementary treatments for back pain. Among chiropractic therapy methods, manual spinal traction therapy has been shown to reduce back pain<sup>5)</sup>.

Several different manual therapy methods for patients with chronic back pain have been studied in the literature. In

\*Corresponding author. Kwansub Lee (E-mail: pt1026@nate.com)

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particular, there is rich literature on the non-surgical method of manual therapy for chronic back pain<sup>6</sup>). Although manual traction therapy and intermittent spinal traction therapy have been proven to be more effective than other preservative therapy methods, there have been few studies that have compared their effects. This study aimed to confirm the clinical effects of manual spinal traction therapy and intermittent manual traction therapy by conducting a comparison analysis of their effects on patients with chronic back pain.

## PARTICIPANTS AND METHODS

At Hospital Y in Daegu, South Korea, hospitalized patients and outpatients who regularly reported continuous back pain over the course of three months without relief were identified as potential participants. Of these, 30 patients were diagnosed, by the doctor in charge, with chronic back pain based on clinical, radiological, and neurological findings relating to their complaints of pain. These patients were recruited to the study. Patients who had a history of surgery to their lumbar region, those who had an inflammatory disease, such as rheumatism, and those with contraindications for manual therapy were excluded from the sample. The experimental group 1 (n=15) received manual spinal traction therapy and had an average age of  $42.6 \pm 5.6$  years, an average height of  $161.1 \pm 5.4$  cm, and an average weight of  $58.7 \pm 11.4$  kg. The experimental group 2 (n=15) received intermittent traction therapy and had an average age of  $42.0 \pm 6.3$  years, an average height of  $162.5 \pm 8.2$  cm, and an average weight of  $59.9 \pm 11.0$  kg. Both groups showed no significant difference in the homogeneity test. Ethical approval for the study was granted by the Daegu University Institutional Review Board (1040621–201804-HR-017–02). All participants read and signed consent forms in accordance with the ethical standards of the Declaration of Helsinki. After the end of the experiment, compensation treatment was not given to the participants in the experimental group 2.

For the experimental group 1, a physiotherapist with 15 years of clinical experience implemented manual traction therapy using an ERGOSTYLE FX table (Koastron Co., KOR). For The experimental group 2, an electric traction treatment device (Win Trac LC-100, MAJOR medical, KOR) was used to deliver intermittent spinal traction therapy. A preservative physiotherapy scheme was delivered to both groups. This involved applying a hot pack for 20 minutes, followed by 15 minutes of interferential current therapy at 100 bps. Finally, the groups were given 15 minutes of ultrasound therapy. All participants received therapy three times a week for eight weeks.

For manual traction therapy, patients were placed in the prone position. The anterior superior iliac crest (ASIS) was located parallel to the upper part of the pelvic board of the table. An automatic traction program was applied for ten minutes to relax the intervertebral joints and muscles. Next, a manual program was used in which the therapist fixated the prominence of one hand to the spinous process of lumbar vertebrae and manipulated the handle on the tail of the table with their other hand. The therapist lowered the caudal pelvic section of the table by 5 cm to apply traction. Traction movement was applied five times for 4–5 seconds. This produced a total of 20 seconds of traction in each set. In total, three sets were implemented. As long as there were no abnormal symptoms, such as radiating pain, all possible physiological joint mobilizations of the lower back were applied<sup>7</sup>). After applying manual traction that involves flexion, the foramen magnum pump technique was applied 10 times for 20 minutes. To achieve this, the therapist lowered the tail of the table while holding the back of patients' heads with their hand, which allowed traction to be applied to the entire spinal column.

For intermittent traction therapy, patients were placed in a supine position. The pelvic iliac crest was located parallel to the upper part of the pelvis-fixing frame. Patients' knee flexion angle was adjusted to reduce discomfort in their lower back. Fixation belts were fastened to the pelvis and chest before beginning therapy. Traction power started at an initial level of 15 kg and increased gradually at a certain rate. The ratio between hold time and rest time was set at 1:1.

Pain was evaluated using a visual analog scale (VAS). The Oswestry disability index (ODI) was used to check the level of functional impediment patients experienced as a result of back pain. In this scale, patients were asked to score ten questions from 0 to 5 according to their functional ability. A high score meant severe impediment. Scores from each question were summed up and divided by the total score of 45. The resulting index, expressed as a percentage (%), was patients' final measure of functional impediment due to back pain. Statistical analysis comprised a friedman test for the within-group comparison of pain and ODI score, and a wilcoxon rank sum test for post-treatment the between-group comparison of the same variables. The Excel 365 program (Microsoft office Inc., Korea) was used for statistical treatment. Significance (p) was set at 0.05.

## RESULTS

A within-group comparison showed that VAS and ODI scores significantly decreased in both the experimental 1 and experimental 2. A post-treatment between-group comparison showed that this decrease was significantly greater in the experimental group 1 than in the experimental 2 ( $p < 0.05$ ) (Table 1).

## DISCUSSION

Choi et al.<sup>8</sup>) reported that manual therapy using joint mobilization and flexion-distraction techniques improved the pain and disk height of patients with chronic back pain. Sutlive et al.<sup>9</sup>) reported a statistically significant decrease in oswestry

**Table 1.** Comparison of VAS and ODI scores within each group

	Group	Pre	Post
VAS (cm)	EG 1	7.0 ± 0.9	3.3 ± 1.2 **, <sup>††</sup>
	EG 2	6.9 ± 1.1	4.6 ± 1.2 **
ODI (%)	EG 1	34.8 ± 14.2	15.0 ± 3.9 **, <sup>†</sup>
	EG 2	35.4 ± 14.8	22.6 ± 10.3 **

Values are mean ± standard deviation. VAS: visual analog scale; ODI: Oswestry disability index; EG 1: experimental group 1; EG 2: experimental group 2. \*\*paired t-test, \*\*p<0.01, <sup>††</sup>independent samples t-test, <sup>†</sup>p<0.01, <sup>††</sup>p<0.05.

disability index score after applying manual therapy to participants' pelvises and lumbar vertebrae. In this study, a post-treatment between-group comparison showed a greater significant decrease in visual analog scale and Oswestry disability index scores in the experimental group 1 compared to the experimental 2. This could be because manual traction therapy improved the biomechanical function of spine mobility units, including the intervertebral disks and joints and decreased the amount of mechanical stimulation from degenerative or abnormal joint complexes<sup>10</sup>.

Manual traction therapy may increase the disk height by reducing internal pressure so that the pain-sensitive fiber around the annulus fibrosus is not irritated. By resuming the spinal joint to its proper physiological mobile location, manual traction therapy decreases pain and activates physical function through the recovery of normal posture<sup>11</sup>. Sufficient tension separates the spine and extends the intervertebral disk to reduce the amount of force put on the nucleus pulposus, which makes the application of inward-moving force possible<sup>12</sup>. Relaxing the contracture change of musculoskeletal tissues increases the appropriate mobility of spinal segmental muscles.

This study had several limitations. First, the number of participants was small, as only patients who visited our hospital during the 8-week study period were included. The site of lesion was restricted to the lumbar region. The participants' activities of daily living were not entirely tracked and controlled, and long-term therapy was not implemented. More diverse studies that address these limitations are required.

### *Conflict of interest*

None.

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