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The effectiveness of mobilization and manipulation on patients suffering from cervical spine injuries

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Abstract---Patients with neck pain undergoing cervical mobilization and manipulation were monitored for changes in ROM and pain. The cervical spine was manipulated and mobilized. An inclinometer was used to measure cervical range of motion. VAS was used to gauge the severity of the pain in the cervical region (VAS). A total of 35 patients agreed to participate. The participants' ages ranged from 15 to 70, with an average of 46.5 years. Neck pain and limited cervical range of motion were common symptoms among the participants in this study. We saw a decrease in pain intensity and an increase in cervical range of motion in our patients. All metrics had significant pre-treatment variations ($p < 0.01$ at the first, fourth, and tenth visits). Patients with neck pain may benefit from the use of cervical spine Mobilization and Manipulation procedures, according to the findings of this study.

Keywords---neck pain, cervical pain, mobilization, manipulation.

Introduction

Neck pain affects 50 to 70 percent of people at some point in their lives, and that number rises to 30 percent each year. Neck pain affects about 10% of the population at any given time (Walton et al., 2013; Bryans et al., 2014). Following a diagnosis of low back pain, neck pain is the second most common reason for chiropractic patients to seek treatment with manipulative therapy (Rodine & Vernon, 2012). An estimated 31% of all alternative health care visits in the United States were made to chiropractors in 2016 (Manchikanti et al., 2017).

Randomized clinical trials show only limited evidence in favor of cervical spine manipulation and mobilization, but many randomized clinical trials have shown that manipulation and mobilization may be more effective than muscle relaxants or conventional medical care in producing short-term pain relief for some

patients. People with neck pain often have a limited range of motion (ROM) in their necks (Howell, 2011). A flurry of new studies suggests that neck-focused treatments may be effective in treating neck pain. This is even though there is still no scientific evidence to back up these assertions." Because of this, the study's purpose was to assess how changes in the range of motion and discomfort were altered by cervical spine vertebral mobilization and manipulation (Lee, 2016).

Materials and Methods

Participants frequently complained of neck aches. 15 females and 20 males made up the study's 35 participants. A total of 46.5 percent of the participants were over the age of 45. Physical therapy institutes in the United States have given it their seal of approval (Libya). All participants in the study signed informed consent forms. Neck pain and restricted motion were found to be the most common symptoms reported by the trial participants. Procedures employed in the first visit included an anamnesis, physical examination, orthopedic tests on the cervical spine, tendon reflexes, sensory and motor evaluation of the upper limbs, vital signs, assessment of ROM/neck pain, and review of imaging studies of the cervical spine. ROM was measured using a manual inclinometer (Inclinometer) with a range of 0°–110°. To conduct the cervical range of motion test, the subjects sat in a chair with a backrest in a relaxed position, looking forward. Head movement was observed between its neutral position and its maximal angular displacement. Volunteers were instructed to move their heads in every direction and position imaginable during the testing process. Measurements are taken by averaging three successive motions in each direction. On the first, fourth, and 10th visits, a 20-minute operation was carried out. A visual analog scale (VAS) of pain was employed for evaluations on the first, fourth, and tenth appointments. Cervical vertebrae were examined using both static and dynamic palpation to find the areas of limitation and fixation.

Data collection

Each participant's socio-demographic information was gathered at the beginning of the study (age, height, weight, occupation and present activity level). After cervical spine Mobilization and Manipulation, data were obtained from the same participant three times, once in the first, fourth and tenth visits, with the sessions taking place every day.

Statistical analysis

On the graphs, the mean and SEM (standard error of the mean) of the scores obtained for each of the criteria assessed throughout the several visits are shown as values and points/bars. ANOVA was used to make statistical comparisons between repeated measurements. Alpha errors of less than 5% were considered significant, and those of less than 1% were regarded as extremely significant (p 0.01).

Results

The pre-and post-intervention groups' mean for cervical ROM in flexion were 33.00 degrees and 44.7 degrees, respectively (Figure 1). A statistically significant ($p < 0.01$) improvement was achieved.

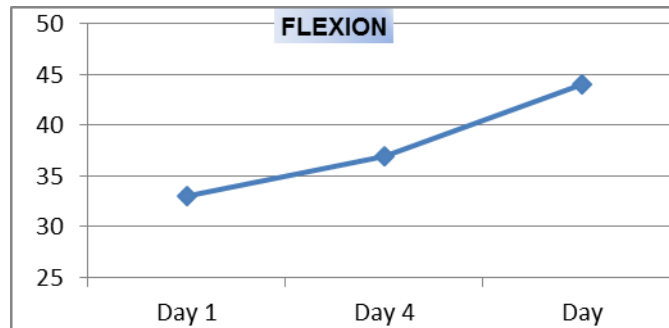


Figure 1. Cervical flexion range of motion. There are statistically significant differences between the first and subsequent visits, as well as between the 4th and 10th visits ($p < 0.01$)

As shown in Figure 2, there was a significant improvement in cervical extension between the pre-and post-intervention groups (39.7 and 51.2 degrees for the pre- and post-intervention groups, respectively, to 44.2 degrees).

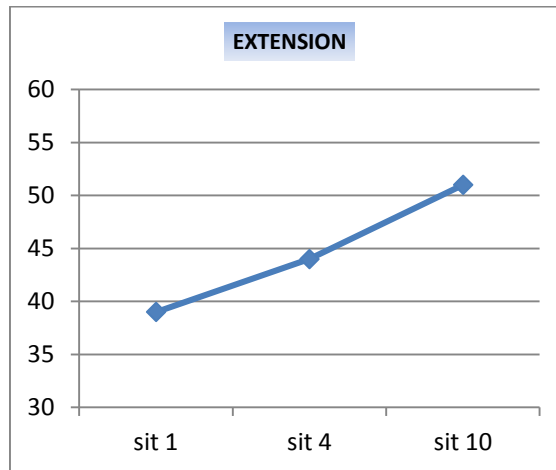


Figure 2. Cervical extension range of motion. Disparities between the first and subsequent visits are statistically significant ($p < 0.01$)

A clear statistical significance ($p < 0.01$ in both cases) was found in cervical range of motion in later right and left flexion (Figures 3 and 4) and rotation (Figures 5 and 6), with a range of motion increasing to normal values.

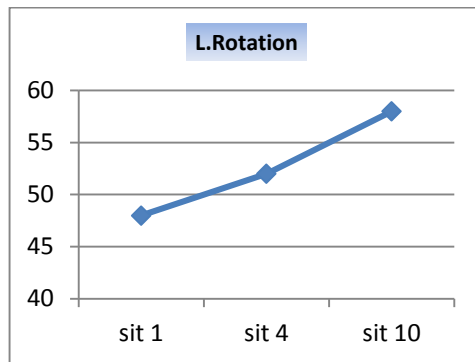


Figure 3

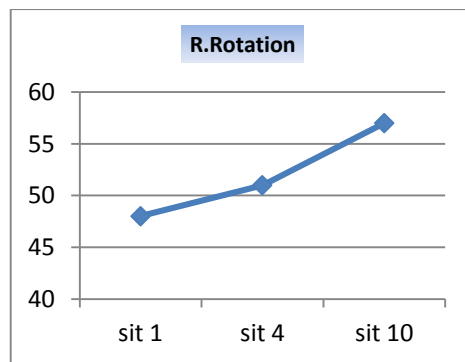


Figure 4

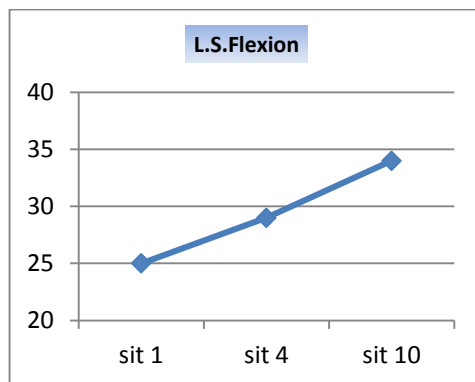


Figure 5

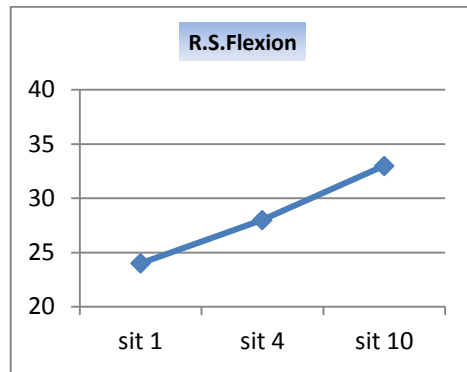


Figure 6

On the initial and subsequent visits, cervical spine mobilization and manipulation resulted in significant decreases in scores (Figure 7). It was shown that after four cervical spine adjustments, the pre-treatment average for neck discomfort had dropped from 5.8 to 3.6 and that after ten sessions, it had dropped to 2.5. (Figure 7). First and subsequent visits ($p < 0.01$) showed significant differences, although differences were also found in ratings on the 4th and 10th visits, suggesting that the more mobilization and manipulation, the greater the pain reduction (Figure 7).

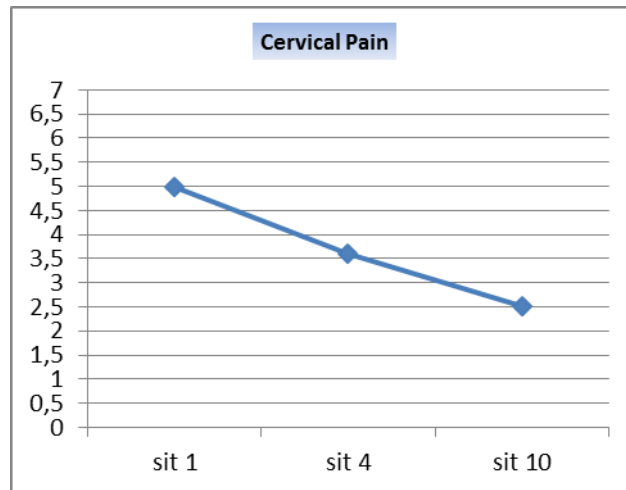


Figure 7. The intensity of cervical pain in the 1st, 4th and 10th visits was recorded through a VAS. Significant differences between the 1st visit and the remaining visits; and between the 4th and 10th visits ($p < 0.01$).

Discussion

For individuals with neck pain, the study found a significant increase in cervical mobility and a decrease in pain following cervical mobilization and manipulation treatments. The ROM of patients with neck discomfort is significantly lowered in numerous investigations (Howell, 2011). According to inclinometer testing, healthy persons should score 60 in cervical flexion, 70 in cervical extension, 45 in lateral flexion, and 80 degrees of rotation for each movement of the cervical spine

in healthy adults (LoPresti et al., 2000). Using the cervical ROM test, doctors can better understand how patients with cervical spine joint dysfunction are affected and whether or not a treatment plan is working (Cagnie et al., 2007).

Results showed that cervical vertebral mobilization and manipulation restored range of motion (ROM) values that were extremely near to the range normally considered to be healthy for the neck. Lesions in the cervical spine are more likely to occur in this area because it is less stable than the rest of the spine (Swartz et al., 2005). It is the osteo ligamentous and muscular system that contributes to the cervical spine's mechanical stability. The osteo ligamentous system provides 20% of the stabilization, while the deep muscles of the cervical spine give the remaining 80%, which is routinely used in everyday duties (Kogler et al., 2000). The efficacy of spinal manual therapy, medicines, and acupuncture was evaluated in a randomized clinical trial by (Giles & Muller, 2003) in patients suffering from cervical and lumbar pain. As long as there are no contraindications, the manipulation produces a better reduction in pain and a higher improvement in joint mobility. Cervical spine movement, according to (Lee & Kim, 2016), is useful in alleviating neck pain. After a course of manual therapy (manipulation and mobilization), (Coelho et al., 2019) found that patients with chronic neck pain had a better outcome (in terms of recovery) when compared to those who received physical therapy or a general practitioner's care (conservative care).

Cervical manual therapy was found to reduce pain and improve range of motion more than a placebo in a study by (Bernal-Utrera et al., 2020). A prior study by (Vernon et al., 2009) similarly examined the relationship between spinal manual therapy and the placebo effect. In the paravertebral zone surrounding a manipulable spinal cord lesion, patients with neck discomfort were tested for pain threshold to pressure. After receiving spinal manual treatment, pain thresholds were significantly reduced. There was no difference in pressure-induced pain thresholds between the control group and the placebo group. Local paraspinal pain thresholds can be raised with physical therapy, as this study shows. This positive impact on deep tissues could be measured with the help of a pressure pain threshold gauge. Vertebral manual treatment reduced pain and enhanced cervical range of motion in patients with neck pain, compared to ultrasounds. Spinal adjustments proved to be more successful than other treatments.

Conclusion

Cervical ROM was restricted in at least one movement for the participants in this study due to chronic neck pain. Vertebral manipulation in the cervical spine employing mobilization and manipulation techniques has been shown in this study to reduce subjective pain and increase cervical ROM significantly in individuals with neck discomfort. However, despite the hopeful results, the study's shortcomings must be acknowledged. Only three locations have been used to gather the participants, which means that the data can only be extrapolated so far. To verify the findings of this study and draw any conclusions about cause and effect, further research with larger samples and comparison groups, as well as studies that outline precise techniques by eliminating factors, is required.

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