

INVESTIGATION OF THE INSTANT EFFECT OF SPINAL MANIPULATION IN HOUSEWIFE'S WITH LOW BACK PAIN

EV HANIMLARINDA BEL AĞRISI ŞİKAYETİNDE SPİNAL MANİPÜLASYONUN ANLIK ETKİSİNİN ARAŞTIRILMASI

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ABSTRACT

Objective: The aim of the study is to investigate the immediate effect of spinal manipulation methods on low back pain in low back pain problem seen in housewives.

Methods: Research data were obtained from 20 housewives with low back pain who voluntarily accepted to participate in the study. The pain of the patients was determined with the Visual Analogue Scale (VAS). Trunk movements evaluated (flexion, extension, right-left lateral flexion) were performed using a goniometer. Right-left leg length difference, right-left Spina Iliaca Posterior Superior (SIPS) levels and finger to floor distance were measured with a tape measure. Postural assessment was evaluated from the front and side using the PosturScreen phone application. Evaluations were made before and immediately after mobilization and manipulation techniques applied to the lumbar region.

Results: Data analysis was performed with descriptive statistics and changes difference pretreatment and posttreatment with Paired Samples T test. The change in VAS score difference pretreatment and posttreatment was significant ($p<0.001$). There was an increase in the flexion, extension and right lateral flexion angles of the trunk and the change was significant ($p<0.05$). There was no difference finger to floor distance measurements difference pretreatment and posttreatment ($p>0.05$). There was a decrease in the difference between each leg length and two SIPS difference pretreatment and posttreatment, and the change was significant ($p<0.05$). There was no difference pretreatment and posttreatment in the front and side posture analysis ($p>0.05$).

Conclusion: In our study on housewives, it was seen that manipulative techniques reduce low back pain, increase joint range of motion, and are an effective method in correcting differences in leg length and SIPS.

Keywords: Housewife, Low back pain, Spinal manipulation

ÖZET

Amaç: Çalışmanın amacı, ev hanımlarında görülen bel ağrısı probleminde spinal manipülasyon yöntemlerinin bel ağrısı üzerine anlık etkisini araştırmaktır.

Gereç ve Yöntem: Araştırma verileri, araştırmaya katılmayı gönüllü olarak kabul eden bel ağrısı şikayeti olan 20 ev hanımından elde edilmiştir. Hastaların ağrısı Vizüel Analog Skala (VAS) ile belirlendi. Gövde hareketleri (fleksiyon, ekstansiyon, sağ-sol lateral fleksiyon) gonyometre kullanılarak değerlendirildi. Sağ-sol bacak uzunluk farkı, sağ-sol Spina Iliaca Posterior Superior (SIPS) seviyeleri ve parmak zemin mesafesi mezura ile ölçüldü. Postural değerlendirme, önden ve yandan PosturScreen telefon uygulamasıyla incelendi. Lomber bölgeye uygulanan mobilizasyon ve manipülasyon teknikleri öncesinde ve hemen ardından değerlendirmeler yapıldı.

Bulgular: Verilerin analizi betimsel istatistikler ve tedavi öncesi ve tedavi sonrası değişimler Paired Samples T testiyle yapıldı. Tedavi öncesi-sonrası VAS skorlarında değişim anlamlıydı ($p<0,001$). Gövdenin fleksiyon, ekstansiyon, sağ lateral fleksiyon açılarında artma vardı ve değişim anlamlıydı ($p<0,05$). Tedavi öncesi ve sonrası parmak zemin mesafesi ölçümlerinde fark yoktu ($p>0,05$). Tedavi öncesi ve sonrası her bacak boyu ve iki SIPS arası farkta azalma vardı ve değişim anlamlıydı ($p<0,05$). Önden ve yandan yapılan postür analizinde tedavi öncesi ve sonrasında fark yoktu ($p>0,05$).

Sonuç: Ev hanımlarında yaptığımız çalışmada manipülatif tekniklerin bel ağrısını azalttığı, eklem hareket açıklığını arttırdığı, bacak boyu ve SIPS farklarını düzeltmede etkili bir yöntem olduğu görüldü.

Anahtar Kelimeler: Ev hanımı, Bel ağrısı, Spinal Manipülasyon

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INTRODUCTION

Low back pain is one of the most common musculoskeletal problems that cause loss of work force, with approximately one in every four people in the community. Although low back pain improves without any treatment in many individuals, it often turns into recurrent or chronic pain, affecting the quality of life and work life (Wong et al., 2017). Considering public health, low back pain caused by mechanical factors in the lumbar region is at the top of the list of musculoskeletal problems. (Rezai et al., 2021). It has been stated that the change in the fulfillment problem position in the pelvis changes the position of the sacrum, affecting the posture it has to do (Chevilotte et al., 2018). Recently, 75-85% of adults have experienced back pain at least once in their lives, and 80% of them recur during the rest of their lives. (Kopec et al., 2004). Low back pain is one of the most common health problems in certain occupational groups. It is among the health problems that housewives complain about the most (Mehrdad et al., 2016). Studies showing that activities such as washing, ironing, and carrying loads of housewives are associated with low back pain appear to be a serious problem for housewives (Uçar et al., 2011). Considering the relationship between low back pain and physical activity, it has been found that the profession is effective and common among housewives (Azfar et al., 2019). In a study conducted on patients with low back pain, it was reported that hamstring tension was more intense in individuals engaged in housework (Batoool et al., 2019). Manipulative techniques are manual treatment methods on joints and tissues to relieve pain or improve normal joint motion. Reflex is one of the effective treatment methods preferred in relieving pain and re-expanding the range of motion. Basically, manipulative techniques develop over two main applications as mobilization and manipulation (Bishop et al., 2015). Manipulation was found to be more effective on low back pain than the placebo effect (Thomas et al., 2020) the training program provided, transcutaneous electrical nerve stimulation or other interventions (van Middelkoop et al., 2011).

In the Clinical Guide for the Treatment of Acute Low Back Pain published by the Royal College of General Practitioners, it is stated that manipulative treatment provides a short-term improvement in acute and subacute low back pain, but manipulations are more successful than other treatments in improving the level of pain and activity and patient satisfaction (Dey et al., 2004)

The aim of this study is to investigate the immediate effect of manipulation on this common complaint among housewives.

MATERIAL AND METHOD

The Universe and Sample of The Study

20 patients who applied to Alanya Şifa Medical Center in 2018 with complaints of low back pain and met the inclusion criteria were included in our study. Study data were collected using face-to-face interview method.

Inclusion criteria in the study;

- Presence of chronic low back pain,
- The gender being a woman,
- Being a housewife,
- To be able to communicate in Turkish,
- Voluntary acceptance to participate in the study.
- Doing the specified job.
- Exclusion criteria from the study;
- Cognitive, cognitive and mental problems,
- Having a history of surgery in the lumbar region,
- Neurological desifitis,
- Romatiod factor presence,

Data Collection Tools

Patient Information Form; the patient introduction form was used to determine the personal information and demographic characteristics (age, height, weight, gender, occupation), disease information and pain status of individuals with chronic low back pain.

Visual Analogue Scale (VAS); it is the evaluation made by marking the current pain intensity of the patient on a 10 cm long linear line, either vertically or horizontally, between 0-10. 10 means unbearable pain, 0 means no pain at all. (Ctananti et al., 2010).

Body Movement Range; joint movements measurement is evaluated with active or passive movements. Goniometers are the most commonly used instruments in the objective evaluation of these movements. All joints are placed according to the anatomical position before measurement, and this position is considered the zero starting position. He asked the patient to perform movement and the data obtained were recorded (Soucie et al., 2011).

Leg Length Difference; in the studies conducted, it has been observed that pelvic symmetry is also impaired in patients with leg length difference in patients with leg length difference. It has been observed that the greater the deviation in pelvic symmetry, the greater the rise in the leg (Rannisto et al., 2015). During the evaluation in the prepared study, the legs of the patients were brought to the neutral position in the prone position and leg length difference measurements were made.

SIPS Difference in Body Flexion; the multitude of forces and structures acting on the pelvis are striking. Those that can be associated with low back pain are the gluteus maximus, erector spina muscles, sacrotuberus and long ligaments. Studies have shown that these structures may be the cause of the symmetry disorder in the pelvis causing low back pain (Ojoawo et al., 2017). In our study, the difference between the two SIPS was measured by asking the patient to perform trunk flexion.

Finger to Floor Distance Test; It expresses the distance between the longest finger and the ground when the patient standing upright flexes the trunk without bending the knees. The normal value for women is considered to be "0". The longest finger should touch the floor. It is a test that evaluates the waist and hips together. The test is done 3 times and the best score is recorded (Ekedahl et al., 2012).

Posture Analysis; posture analysis was performed with the PostureScreen Mobile® (PSM) smartphone application. PSM is a postural screening tool that can be used in the clinical setting (Kripa et al., 2021). The Android® version of the PSM program was used for this study. In order to examine the postural deviations of the participants, photos of the knee, hip, trunk, shoulder and head were taken from the anterior and lateral sides and uploaded to the program. Deviations from the photograph were calculated in degrees and inches using the PSM program. The participants' anterior head offset and tilt, shoulder offset and tilt, trunk shift, hip shift and tilt were calculated. If the participants are from the lateral side; head weight, head shift, shoulder shift, hip shift, knee shift were calculated using the program. All shifts were reported as sideways, forward and backward shifts.

Application of Data Collection Tools

Pre-treatment evaluations were performed by the investigator on the individuals with low back pain who agreed to participate in the study and met the case selection criteria. The treatment was administered and then, the evaluations were repeated. All applications are an average of 30-45 minutes for each patient.

Treatment Applied

The patients participating in the study were manipulated and mobilized to relieve pain caused by dysfunction of the lumbar joint and sacroiliac joint, and to restore normal mobility to a joint with disfunction.

A manipulation applied short leverage rotation technique; the patient lies on his back, hips and knees in flexion. The patient is asked to lift and rotate his hips, continuing this until the painful side is overlapping and the shoulders are relatively parallel to the floor. The therapist takes a standing position facing the patient. While the shoulder is fixed, one hand is stabilized shoulder and the other hand is held the ilium with palm. Force is applied horizontally on the ilium towards yourself. The force is applied at high speed with minimum amplitude after the gap is removed. Applied another technique is the sacroiliac joint-gapping technique; In this technique, the patient is placed on his painful side on top. The lower leg is straight, the upper leg is positioned on the lower leg at 90 ° of knee flexion and hip flexion. The therapist stands in front of the patient with face towards the patient. The therapist's forearm is placed under the ribs to fix the lumbar spines. The other forearm is placed on the ilium. The therapist's knee is placed in order to stabilize the patient's flexed knee and apply force. The therapist applies high-speed thrust and minimal amplitude after closing the gap in the forearm above the ilium (LaPelusa et al., 2023).

The treatment was applied once, and the patients were evaluated before and immediately after the treatment.

Ethical Aspect of Research

The study was carried out in accordance with the principles of human experiments defined in the Declaration of Helsinki and after obtaining the approval of the ethics committee. Ethical approval was obtained for the study with the decision of Medipol University Non-Invasive Clinical Research Ethics Committee dated 25/10/2017 and numbered 10840098-604.01.01-E.39993. The patients participating in the study were informed about the purpose of the study and the questionnaires to be applied. "Informed Consent Form" was signed by those included in the study and a photocopy of the form was given to the patients.

Statistical Analysis

The data of this study were analyzed with the SPSS (IBM SPSS, Chicago, IL, USA) 18.0 package program. Study data were expressed with descriptive statistical methods such as standard deviation, minimum, maximum, and mean. Normality analysis of the data was performed using the Kolmogorov-Smirnov Test. Comparison of normally distributed variables; Analyzed by Paired Samples t test. Statistical significance was accepted as $p < 0.05$.

RESULT

The data obtained as a result of the tests and evaluations performed pre-treatment and post-treatment in order to examine the effectiveness of the manipulative treatment applied to the housewife women with low back pain who participated in the study are presented. The demographic characteristics of the individuals participating in the study are shown in Table 1.

Table 1. Demographic Characteristics of the Participants

Variables	Min.	Max.	$X \pm SD$
Age (year)	26	71	48.5±13.70
Length (cm)	148	168	159,00±5.80
Weight (kg)	55	88	65.00±10.20
BMI	20.10	35.40	26.80±4.33

Min: Minimum, Max: Maximum, X : Mean, SD: Standard Deviation, BMI:Body Mass Index

The pain measurement results of the participants are shown in Table 2. Participants are; 4 patients with low back pain on the right side, 8 patients with low back pain on the left, 3 patients with low back pain in the middle and 5 patients with bilateral low back pain. In addition, the patients are reported their complaints increased; 3 patients when they sat too much, 1 patient when they were standing too much, 2 patients when they worked hard, 2 when they walked too much, and 6 patients stated that their pain appeared in motion. A statistically significant difference was observed in VAS scoring data pretreatment and post-treatment ($p < 0.05$).

A significant difference was observed in the angles of flexion, extension and right lateral flexion movements in normal joint motion ($p < 0.05$). There was no significant difference in left lateral flexion ($p > 0.05$) (Table 2).

No significant difference was found in the finger to floor distance measurements in the measurements made pretreatment and post-treatment ($p > 0.05$) (Table 2).

A significant difference was observed in the Leg Length Difference measurements performed pretreatment and post-treatment ($p < 0.05$) (Table 2).

There was a significant difference in the difference between pretreatment and post-treatment measurements on the two SIPS performed while the trunk was flexed ($p < 0.05$).

Table 2. Comparison of pre-treatment and post-treatment scores

Variables	Pretreatment X ±SD	Posttreatment X ±SD	p
VAS	5.30±1.98	2.70±1.34	0.001*
Body Movements			
Flexion	75.30±18.71	78.3±17.39	0.039*
Extension	16.10±5.75	19.60±7.44	0.006*
Left Lateral Flexion	21.40±6.15	22.10±6.17	0.126
Right Lateral Flexion	17.70±7.07	20.00±4.22	0.036*
Finger to Floor Distance (cm)	23.35±11.01	22.33±10.96	0.109
Leg Length Difference (cm)	0.91±0.59	0.08±0.18	0.001*
SIPS Difference (cm)	1.15±0.95	0.10±0.26	0.001*

X : Mean, SD: Standard Deviation, *Paired Samples t, p<0,05

Posture analysis was evaluated from anterior and lateral. As a result of the evaluation, there was no difference pretreatment and posttreatment (p> 0.05) (Tables 3-4).

Table 3. Comparison of changes in anterior posture analysis

Variables	Pretreatment X ±SD	Posttreatment X ±SD	p
Anterior			
Head Lateral Shift (cm)	0.41±0.26	0.81±0.53	0.759
Head Tilt (°)	2.34±2.94	1.65±2.76	0.224
Shoulder Lateral Shift (cm)	0.44±0.84	0.40±0.29	0.423
Shoulder Tilt (°)	1.33±1.33	1.07±2.03	0.353
Chest Lateral Shift (cm)	0.40±0.39	0.34±0.37	0.239
Hip Lateral Shift (cm)	0.59±0.42	0.53±0.51	0.348
Hip Tilt (°)	0.34±0.93	0.29±0.78	0.413

X : Mean, SD: Standard Deviation, *Paired Samples t, p<0,05

Table 4. Comparison of changes in lateral posture analysis

Variables	Pretreatment X ±SD	Posttreatment X ±SD	p
Lateral			
Head Sagittal Shift (cm)	1.24±0.72	1.07±0.45	0.141
Shoulder Sagittal Shift (cm)	1.67±0.99	1.42±1.06	0.140
Hip Sagittal Shift (cm)	0.66±0.54	0.57±0.52	0.229
Knee Sagittal Shift (cm)	0.78±0.88	0.73±0.62	0.360

X : Mean, SD: Standard Deviation, *Paired Samples t, p<0,05

DISCUSSION

In our study, it was investigated whether the manipulative techniques used in low back pain have an effect on housewives. Before and after treatment; Pain, normal range of motion, bilateral SIPS difference, leg length difference and changes in posture evaluations were evaluated. Kahere's study reported a higher incidence of low back pain in women (Kahere et al., 2021). Similar to our study, Pasquier et al. reported that women have 2.5 times more thoracic region pain than men, and being a

woman can be seen as a risk factor. Different from our study, he stated that the effect of manipulation approaches may be effective in increasing patient comfort and reducing pain in long-term applications rather than short-term (Pasquier et al., 2022).

The reason why our study was conducted on women was that the housewives' housework activities were not proper, and the living conditions were not suitable for this study.

In a study, a total of 15 sedentary women were included in the study in order to determine the effect of four-week low back exercises on the pain status in middle-aged sedentary women suffering from low back pain. Exercises were started in the 1st week with 5 repetitions, 10 repetitions on the 2nd week, 15 repetitions on the 3rd and 4th weeks. Pain values were determined by applying the Oswestry Pain Scale before and after the exercise program. According to the results of the data obtained from the evaluations made in the study, significant differences were found in favor of reduction of pain after exercise in the Oswestry pain scale and pain, personal care, weight lifting, walking, sitting, standing, sleep, sexual life, social life and travel parameters values before and after the exercise program (Arikan et al., 2010). Yalgin et al. Included patients with mechanical back pain in one group and painless individuals in the other. The pain level and length of the low back pain group were evaluated by VAS, the duration of pain was found to be mean \pm SD 18.1 \pm 14.6 months, and the pain was mean \pm SD 5.7 \pm 1.9 according to the visual analog scale (Yalgin et al., 2008).

In the study of Waqas et al., 100 patients were included in the study. The VAS scores of the experimental group and control group were compared in the application of 8 sessions of spinal manipulation in addition to thoracic exercise. At the end of the study, it was seen that the group with spinal manipulation was more effective in improving chest pain and quality of life than the group in which only thoracic exercise was applied. On the other hand, it has been observed that spinal manipulation is a technique that acts in a short time and its effect does not change in a very long-term application. Similar to our study, there was a decrease in VAS scores in the spinal manipulation group (Waqas et al., 2023).

As seen in studies, pain is an important factor in low back pain. It is seen that as the pain increases, the psychological state and quality of life decrease. Therefore, when the pain was measured after the treatment application, a significant reduction in pain was observed. Even instant treatment has been found to have positive effects on low back pain. We think that it would be beneficial to use manipulative practices to increase the psychological state and quality of life of the patient, since they reduce pain.

Becker et al., in their study (Becker et al., 2023), stated that finger to floor distance is not an effective method in the evaluation of lumbar mobility and it has lost its validity. On the other hand, in studies conducted with male and female participants, we suggest that the change in finger base distance in participants with and without low back pain is a method that can be used when objective data cannot be reached. In our study, the finger to floor distance was evaluated for these purposes.

Chiradejnant et al. Randomized controlled study on low back pain of randomly selected mobilization with a selected therapist was conducted on two physiotherapists and 140 patients with nonspecific low back pain. Baseline measurements were taken prior to treatment distribution; The therapist then evaluated the subjects and indicated the preferred degree of treatment, the spinal level to be treated, and the mobilization technique to be used. Subjects were then randomly divided into one of the two groups. One group was treated by the chosen therapist, while the other group was treated by the randomly selected therapist. The second evaluation was made immediately after the treatment to analyze the data. Modified finger to floor distance measurement was used to evaluate trunk flexion in the measurements. In this measurement, the patient was asked to stand on the 13 cm platform with the toes at the edge, and the measurement was performed by flexing in this way. In the measurements, it was observed that there was an average of 2 cm difference in mixed therapist applications in selected therapists, but the normal range of motion was negatively affected in other measurements. It was observed that the choice made did not cause any changes in the measurements (Chiradejnant, 2003).

In the study by Carvalho et al., it was specifically suggested that lumbar paraspinal muscle activity decreases in forward trunk flexion and may have a role in recovery as trunk flexion is maintained during sitting. We think that reduction in pain and increase in range of motion can be achieved by decreasing muscle activation with trunk flexion in manipulation interventions (Carvalho et al., 2022).

In a study conducted by Unsgaard-Tondel et al to compare different exercises, they used the fingertips to floor test to evaluate trunk flexibility. It was observed that after the treatment, positive

results were obtained in the elasticity data compared to before. It has been stated that motor control exercises are a method that provides more effect on flexibility than standard exercise methods (Unsgaard-Tondel et al., 2010). In the study of Brandl et al., he stated that although finger to floor distance is a practical method in patients with acute and chronic low back pain, video evaluation methods have high evidence value in obtaining objective data. In addition, the traditional method is preferred in most of the randomized controlled studies in the literature (Brandl et al., 2022).

As seen in the studies, it is widely preferred in the clinic that the fingertips to floor test is useful in clinical practice in measuring body movements in order to evaluate the effectiveness of the treatments applied. In our study, the finger place test results, which we applied to evaluate the flexibility after manipulative treatment, were examined before and after the treatment and no significant difference was found. It is thought that the efficacy will be increased by extending the treatment period or if the post-evaluation is delayed.

In a study conducted by İnanoğlu et al to investigate the effects of taping techniques on pain and quality of life in low back problems without neurological deficits, the patients measured flexion, extension, right and left lateral flexion lumbar joint range of motion in the evaluations before and after physiotherapy. Placebo before and after banding. VAS values were found to differ significantly in the group, but no significant difference was observed in goniometer measurements (İnanoğlu et al., 2014). In a study by Waqas et al. investigating the effect of spinal manipulation on the joint range of motion in the thoracic region, the group in which spinal manipulation and thoracic exercises were applied together had a greater improvement in thoracic range of motion, chest expansion and functionality at the end of the 8th session compared to the group in which only exercise was applied (Waqas et al., 2023).

When the literature is reviewed, it has been observed that normal joint motion is affected in patients with low back pain and therefore normal joint motion is important in the evaluation of patients. For this reason, in our study, normal range of motion was examined in the evaluations before and after the treatment; Apart from left lateral flexion, a significant difference was found in flexion, extension, and right lateral flexion angles. Especially, it is thought that early initiation of manipulative treatments for such patients will be effective.

In studies investigating pelvic rotation, Rannisto et al. investigated the relationship between leg difference and low back pain in individuals who had to stand up and did not see the difference in low back pain and leg length in their advertisements in some studies. They used a laser distance meter to transmit leg length and a visual analog scale to hear pain on individuals aged 35 years and at least 10 years of work. In all visits with 114 butchers and 34 customer service staff included in the study, a significant relationship was observed in low back pain and pain duration in individuals with a leg length of 6 mm or more (Rannisto et al., 2015).

Zamanlou et al., in their study, suggest pelvic rotations that can help correct the asymmetry in the pelvis and lumbar regions, considering the asymmetric distribution of muscle tone around the pelvis in low back pain and sacroiliac joint dysfunction, and in this case, lumbar motion asymmetry. In biomechanical analyzes alone, this was not seen as a proven treatment modality. Its use is recommended if it provides functionality and pain relief. For this purpose, in our study, the difference in leg length of the patients and the difference in SIPS distance in trunk flexion were taken into account in the evaluations before and after the treatment, which we applied with manipulative treatment techniques in patients with low back pain. A significant difference in leg length was observed in patients after treatment. It was also found that there was a significant difference when looking at the SIPS distance differences after the treatment. For this reason, it is thought that manipulative techniques may also have an effect on foot problems. (Zamanlou et al., 2019).

In studies investigating the effects of spinal manipulation on posture, Morningstar et al. Conducted a study to evaluate the effect of "Pettibon" manipulation and primarily anterior weight reduction in reducing cervical lordosis and correcting anterior tilt head posture. 15 people included in the study also measured the cervical posture and the anterior position of the head on radiographs, and it was observed that there was an average improvement of 2.1082 cm in the anterior position of the head among all subjects. No difference was observed in an individual. The largest and smallest improvements in cervical lordosis were measured at 23 ° and 4 °, respectively. In all cases included in the study, an average increase of 9.9 degrees was found in the evaluations of cervical lordosis (Morningstar, 2003). Similar to our study, Loss et al. investigated the immediate effects of lumbar spine manipulation on pain

sensitivity and postural control in individuals with non-specific low back pain. In the study, it was observed that there was no change in posture. (Loss et al., 2020).

When the literature is reviewed, it has been seen that one of the evaluation criteria in the studies is posture evaluation. For this reason, in our study conducted on individuals with low back pain, PostureScreen application was used as a tool for posture assessment, and when the resulting data were compared, it was observed that there was no significant difference in the anterior and lateral postural data before and after the treatment. In the study, it is thought that a difference will be seen if the posture assessment is applied and repeated after a period of treatment.

Limitations

One of the limitations of our study is that it was done in a small number of cases. The study could be continued with more cases. The duration of the pain could be questioned in the evaluation parameters. In addition, another limitation is that it is performed only in women. It can be repeated by including male patients in the study. It is thought that the patients will have an improvement in their posture after 1-2 weeks. Therefore, the short-term effect of treatment on posture could be examined.

CONCLUSION

According to our study examining the immediate effect of manipulative treatment technique in housewife patients with low back pain, it was observed that there was a significant difference in pain reduction, increase in normal joint motion, Leg Length Difference measurements and the difference between the two SIPS measurements when the trunk was flexed. No difference was found in posture analysis.

Conflict of interest

The authors report no actual or potential conflicts of interest.

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Authors Contributions

Plan, design: Ş.O, E.A, G.B.E; **Material, methods and data collection:** Ş.O, G.B.E, E.A; **Data analysis and comments:** G.B.E, E.A; **Writing and corrections:** G.B.E, E.A

REFERENCES

- Arikan, B, S, Hazar, E, Arikan (2010). Bel Ağrısı Çeken Sedanter Bayanlarda Bel Egzersizlerinin Ağrı Durumlarına Etkisi. *Uluslararası İnsan Bilimleri Dergisi*, 7(2), 671-681.
- Azfar, SM, Murad, MA, Azim, S, Baig, M (2019). Rapid Assessment of Physical Activity and its Association Among Patients with Low Back Pain. *Cureus Journal of Medical Sciences*, 11(12), e6373. <https://doi.org/10.7759/cureus.6373>
- Batool, F, Muaz, F, Tariq, K, Sarfraz, N (2019). Relationship of Chronic LBP (Low Back Pain) with Hamstring Tightness in Professionals. *Journal of Liaquat University of Medical & Health Sciences*, 18(03), 236–240.
- Becker, L, Schömig, F, Cordes, LM, Duda, GN, Pumberger, M, Schmidt, H (2023). Finger-Floor Distance Is Not a Valid Parameter for the Assessment of Lumbar Mobility. *Diagnostics (Basel, Switzerland)*, 13(4), 638. <https://doi.org/10.3390/diagnostics13040638>
- Bishop, MD, Torres-Cueco, R, Gay, CW, Lluch-Girbés, E, Beneciuk, JM, Bialosky, JE (2015). What effect can manual therapy have on a patient's pain experience?. *Pain management*, 5(6), 455–464. <https://doi.org/10.2217/pmt.15.39>
- Brandl, A, Egener, C, Schleip, R (2022). Practical Measurement of Changes in Leg Length Discrepancy After a Myofascial Release on the Thoracolumbar Fascia in Patients With Acute Low Back Pain: A Pilot Study. *Cureus*, 14(9), e29084. <https://doi.org/10.7759/cureus.29084>
- Chevillotte, T, Coudert, P, Cawley, D, Bouloussa, H, Mazas, S, Boissière, L, Gille, O (2018). Influence of posture on relationships between pelvic parameters and lumbar lordosis: Comparison of the standing, seated, and supine positions. A preliminary study. *Orthopaedics & traumatology, surgery & research : OTSR*, 104 (5), 565–568. <https://doi.org/10.1016/j.otsr.2018.06.005>
- Chiradejnant, A, Maher, CG, Latimer, J, Stepkovitch, N (2003). Efficacy of "therapist-selected" versus "randomly selected" mobilisation techniques for the treatment of low back pain: a randomised controlled trial. *The Australian journal of physiotherapy*, 49(4), 233–241. [https://doi.org/10.1016/s0004-9514\(14\)60139-2](https://doi.org/10.1016/s0004-9514(14)60139-2)

- Catananti, C, Gambassi, G (2010). Pain assessment in the elderly. *Surgical oncology*, 19(3), 140–148. <https://doi.org/10.1016/j.suronc.2009.11.010>
- De Carvalho, DE, Callaghan JP (2022). The effect of lumbar spinal manipulation on biomechanical factors and perceived transient pain during prolonged sitting: a laboratory-controlled cross-sectional study. *Chiropractic & manual therapies*, 30(1), 62. <https://doi.org/10.1186/s12998-022-00472-y>
- Dey, P, Simpson, CW, Collins, SI, Hodgson, G, Dowrick, CF, Simison, AJ, Rose, MJ (2004). Implementation of RCGP guidelines for acute low back pain: a cluster randomised controlled trial. *The British journal of general practice : the journal of the Royal College of General Practitioners*, 54(498), 33–37.
- Ekedahl, H, Jönsson, B, Frobell, RB (2012). Fingertip-to-floor test and straight leg raising test: validity, responsiveness, and predictive value in patients with acute/subacute low back pain. *Archives of physical medicine and rehabilitation*, 93(12), 2210–2215. <https://doi.org/10.1016/j.apmr.2012.04.020>
- Fagundes Loss, J, de Souza da Silva, L, Ferreira Miranda, I, Groisman, S, Santiago Wagner Neto, E, Souza, C, Tarragô Candotti, C (2020). Immediate effects of a lumbar spine manipulation on pain sensitivity and postural control in individuals with nonspecific low back pain: a randomized controlled trial. *Chiropractic & manual therapies*, 28(1), 25. <https://doi.org/10.1186/s12998-020-00316-7>
- Kahere, M, Ginindza, T (2021). The prevalence and risk factors of chronic low back pain among adults in KwaZulu-Natal, South Africa: an observational cross-sectional hospital-based study. *BMC musculoskeletal disorders*, 22(1), 955. <https://doi.org/10.1186/s12891-021-04790-9>
- Kopec, JA, Sayre, EC, Esdaile, JM (2004). Predictors of back pain in a general population cohort. *Spine*, 29(1), 70–78. <https://doi.org/10.1097/01.BRS.0000103942.81227.7F>
- Kripa, S, Kaur, H (2021). Identifying relations between posture and pain in lower back pain patients: a narrative review. *Bull Fac Phys Ther*, 26, 34. <https://doi.org/10.1186/s43161-021-00052-w>
- LaPelusa, A, Bordoni, B (2023). High Velocity Low Amplitude Manipulation Techniques. In *StatPearls*. StatPearls Publishing.
- Zamanlou M, Akbari M, Jamshidi AA, Amiri A, Nabiyouni I (2019). Manipulation Effect on Lumbar Kinematics in Patients with Unilateral Innominate Rotation and Comparison with Asymptomatic Subjects. *Journal of biomedical physics & engineering*, 9(3), 295–302. <https://doi.org/10.31661/jbpe.v0i0.760>
- Mehrdad, R, Shams-Hosseini, NS, Aghdaei, S, Yousefian, M (2016). Prevalence of Low Back Pain in Health Care Workers and Comparison with Other Occupational Categories in Iran: A Systematic Review. *Iranian journal of medical sciences*, 41(6), 467–478.
- Morningstar, MW, Strauchman, MN, Weeks, DA (2003). Spinal manipulation and anterior headweighting for the correction of forward head posture and cervical hypolordosis: A pilot study. *Journal of chiropractic medicine*, 2(2), 51–54. [https://doi.org/10.1016/S0899-3467\(07\)60042-1](https://doi.org/10.1016/S0899-3467(07)60042-1)
- Ojoawo, AO, Hassan, MA, Olaogun, MOB, Johnson, EO, Mbada, CE (2017). Comparative effectiveness of two stabilization exercise positions on pain and functional disability of patients with low back pain. *Journal of exercise rehabilitation*, 13(3), 363–371. <https://doi.org/10.12965//jer.1734932.466>
- Pasquier, M, Young, JJ, Lardon, A, Descarreaux, M (2022). Factors Associated With Clinical Responses to Spinal Manipulation in Patients With Non-specific Thoracic Back Pain: A Prospective Cohort Study. *Frontiers in pain research (Lausanne, Switzerland)*, 2, 742119. <https://doi.org/10.3389/fpain.2021.742119>
- Rannisto, S, Okuloff, A, Uitti, J, Paananen, M, Rannisto, PH, Malmivaara A, Karppinen, J (2015). Leg-length discrepancy is associated with low back pain among those who must stand while working. *BMC musculoskeletal disorders*, 16, 110. <https://doi.org/10.1186/s12891-015-0571-9>
- Rezaei, B, Mousavi, E, Heshmati, B, Asadi, S (2021). Low back pain and its related risk factors in health care providers at hospitals: A systematic review. *Annals of medicine and surgery*, 70, 102903. <https://doi.org/10.1016/j.amsu.2021.102903>
- Soucie, JM, Wang, C, Forsyth, A, Funk, S, Denny, M, Roach, KE, Boone, D, Hemophilia Treatment Center Network (2011). Range of motion measurements: reference values and a database for comparison studies. *Haemophilia : the official journal of the World Federation of Hemophilia*, 17(3), 500–507. <https://doi.org/10.1111/j.1365-2516.2010.02399.x>
- Thomas, JS, Clark, BC, Russ, DW, France, CR, Ploutz-Snyder, R, Corcos, DM, RELIEF Study Investigators (2020). Effect of Spinal Manipulative and Mobilization Therapies in Young Adults With Mild to Moderate Chronic Low Back Pain: A Randomized Clinical Trial. *JAMA network open*, 3(8), e2012589. <https://doi.org/10.1001/jamanetworkopen.2020.12589>
- Uçar, D, Bozkurt, M, Uçar, BY, Bulut, M, Azboy, İ (2011). Ev hanımlarında kronik bel ağrısı . *Journal of Clinical and Experimental Investigations* , 2 (3) , 295-298 . DOI: 10.5799/ahinj.01.2011.03.0058
- Unsgaard-Tøndel, M, Fladmark, AM, Salvesen, Ø, Vasseljen, O (2010). Motor control exercises, sling exercises, and general exercises for patients with chronic low back pain: a randomized controlled trial with 1-year follow-up. *Physical therapy*, 90(10), 1426–1440. <https://doi.org/10.2522/ptj.20090421>
- van Middelkoop, M, Rubinstein, SM, Kuijpers, T, Verhagen, AP, Ostelo, R, Koes, BW, van Tulder, MW (2011). A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-

- specific low back pain. *European spine journal* : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society, 20(1), 19–39. <https://doi.org/10.1007/s00586-010-1518-3>
- Waqas, MS, Karimi, H, Ahmad, A, Rafiq, S, Anwar, N, Liaqat, S (2023). The Effects of Spinal Manipulation Added to Exercise on Pain and Quality of Life in Patients with Thoracic Spinal Pain: A Randomized Controlled Trial. *BioMed research international*, 2023, 7537335. <https://doi.org/10.1155/2023/7537335>
- Wong, AYL, Karppinen, J, Samartzis, D (2017). Low back pain in older adults: risk factors, management options and future directions. *Scoliosis and spinal disorders*, 12, 14. <https://doi.org/10.1186/s13013-017-0121-3>
- Yalgın, S, İ, Karacan, A, Çelikdelen (2008). Mekanik Bel Ağrısı Şiddeti Ve Süresi İle Kas Kuvveti İlişkisinin Değerlendirmesi. *Dirim Tıp Gazetesi*, (83), 117-123.