# The Effect of Spinal Stabilization Exercise and Manual Therapy on the Pain Index and Oswestry Disability Index in Patients with Acute or Subacute Low Back Pain

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The purpose of this study was to investigate effect of type of physical therapy (spinal stabilization exercise and manual therapy) on pain index and disability index in acute and subacute patients with low back pain (LBP). 23 patients with LBP participated and were randomly assigned. Manual therapy and spinal stabilization exercise was applied for 15-minute sessions occurred 3 sessions a week, for 4 weeks. All subjects received conservative therapy for 30-minute. Visual analogue scale (VAS) and Korean version of Oswestry disability index (ODI-K) were measured before and after treatment. There was significant difference in VAS and ODI-K between before and after both treatment (p.05). Thus, it is suggested that spinal stabilization exercise is helpful to reduce pain safely in acute and subacute patients with LBP.

Low back pain is caused by various causes such as pregnancy, disc herniation, lumbar spinal sprain, spinal stenosis, and degenerative arthropathy, and more than 80% of the world's population suffer from low back pain at least once in their lifetime. experience. Back pain not only reduces pain, but also reduces muscle strength, endurance, mobility and co-ordination, leading to limitations and disorders in daily life . Effect on Westley Disability Index 1793 Not only is it a major cause of work or early drop-out, but it also leads to depression and dependence on others, which ultimately lowers the quality of life. In addition, the socioeconomic cost of back pain is increasing rapidly every year [1]. There are various physiotherapy techniques for back pain [2]. Traditionally, electrical therapy and physical factor therapy have been applied, and recently, spinal stabilization exercise along with manual therapy has been widely applied in clinical practice for back pain patients. Manual therapy is a treatment method that improves functional activity by resolving pain and joint range of motion problems by applying joint mobility and joint manipulation. In a study conducted on patients with low back pain, it was reported that the Maeland manipulation technique was more effective in improving the joint range of motion and balance ability than the traditional treatment. Cook also reported that pain and Oswestry disability index decreased when manual therapy was applied. However, Hough reported that the effect size of manual therapy for back pain is small and it is influenced by the psychological state, so it is necessary to make a careful decision. Spinal stabilization exercise minimizes the stress on the spinal structure, maintains the balance of the muscles around the spine, restores the function of the deep muscles that contribute to posture control, and reduces harmful stimuli transmitted through ligaments and joint capsules It is a special exercise that improves Previous studies have shown that if there is weakness in the deep muscles of the trunk (eg, biceps and transverse muscles), low back pain is more likely to occur, and if there is low back pain, the ability to control the deep muscles is reduced. Several studies have reported that spinal stabilization exercise is effective in improving the symptoms of back pain patients. Sung [14] reported that as a result of performing spinal stabilization exercise for a patient with back pain 3 times a week for 4 weeks, the pain decreased and the activity level improved. Ahn Jae-

moon et al. [15] also reported the effect of spinal stabilization exercise in patients with chronic low back pain. While treatments such as electrotherapy, hyperthermia, and manual therapy are passive approaches, spinal stabilization exercise is one of the active approaches to induce muscle contraction and induce active participation in treatment. In general, manual therapy is recommended for patients in the acute phase and spinal stabilization exercise is recommended for patients in the chronic phase, but the results vary from study to study. Although several recent studies have reported the effectiveness of the active approach, there is still controversy. Goldby et al. [18] reported that spinal stabilization exercise was more effective than manual therapy, but Aure et al. [19] reported that manual therapy was more effective than stabilization exercise. These different results may be due to the different onset periods (acute or chronic) of study subjects. In general, cases of less than 3 months of onset are classified into acute stage and subacute stage according to the degree of time elapsed, and cases of more than 6 months are classified as chronic stage [20]. Most studies on the effects of spinal stabilization exercise have been conducted on chronic patients. In the study of Grunnesjö et al. [21] and Ladeira [22], despite the emphasis on active exercise for acute and subacute patients, there are still few studies on the effect of spinal stabilization exercise for patients with back pain in this period. . Therefore, this study was conducted to investigate the effect of manual therapy and spinal stabilization exercise on the pain index and disability index for patients with acute and subacute low back pain and to suggest a more effective physical therapy method.

## 2. 연구방법

The subjects of this study were 23 patients with back pain who were being treated in a physical therapy room for back pain. In order to investigate the effects of manual therapy and spinal stabilization exercise for patients in the acute or subacute phase, excluding chronic low back pain patients, patients with low back pain who have had back pain for more than 1 week and whose onset has not been 3 months. was selected [23]. The study subjects took drugs related to back pain, but did not receive injection therapy. Those with central musculoskeletal problems, fractures, or red flags such as urination problems were excluded. The purpose of the study was explained to the subjects and voluntary consent was obtained before proceeding with the study.

Among the 35 patients with back pain who voluntarily agreed to participate in the study, 23 who met the selection criteria were randomly classified into a manual treatment group (passive approach) and a spinal stabilization exercise group (active approach) and treated 3 times a week for 4 weeks. was applied. All subjects who participated in the study received electrical therapy and heat therapy for a total of 30 minutes, followed by manual therapy and spinal stabilization exercise for 15 minutes in each group. A physical therapist with more than 3 years of clinical experience with orthopedic physical therapy license applied manual therapy.

After placing the patient on the table for treatment, the posterior-anterior compression technique was applied to the spinous process for 2 minutes at an intensity corresponding to steps I to II, followed by a break for 1 minute, a total of 5 times. All. Spinal stabilization exercise is an exercise that selectively contracts the biceps and biceps muscles to strengthen the spine before moving the arms and legs. The exercise was performed in the supine position and the prone position. First, the purpose and method of the exercise were explained to the patient and then followed. The patient was instructed to continuously and constantly pull the navel toward the spine so that the pressure of the pressure biofeedback device under the waist was 60mmHg.

To investigate the change in the degree of back pain and disability index according to the type of treatment, the visual analogue scale (VAS) and the Korean version of the Oswestry disability index (ODI) were measured before and 4 weeks after treatment. The intensity of back pain was measured using VAS, and the patient was asked to indicate it. The scale ranges from 0 to 10 cm, with 0 indicating no pain and 10 indicating the most severe pain. The test-retest reliability is very high at .95.

A VAS score of 3 or less is classified as mild pain, 4-6 as moderate pain, and 7-10 as severe pain. To find out the disability index due to back pain, the Korean version of ODI was used. It consists of a total of 10 domains (control, personal hygiene, lifting, walking, sitting, standing, sleeping, sexual life, social life, and travel), with 0-20% moderately disabled and 20-40% moderately disabled. , 40-60% were interpreted as severe disability, and 80-100% were interpreted as only being able to live in bed. The test-retest (.93) and internal product item agreement (.92) are very high.

Because the number of study subjects was small and the collected data were not normally distributed, the data were analyzed through a non-parametric test. The Mann Whitney test and the x 2 test were performed to find out the differences between treatments according to the general characteristics of the study subjects. Before and after each treatment, Wilcoxon rank sign test was performed to determine the difference between the VAS and the Korean version of ODI. In order to investigate the difference in the rate of change of VAS and ODI in Korean version by treatment, Manwitney's test was performed.

General Characteristics of Study Subjects: A total of 10 subjects received manual therapy, of which 4 were male and 6 were female. Three patients were diagnosed with spondylolisthesis and seven patients had non-specific low back pain. The mean age was 38 years and the onset period was 1.4 months. A total of 13 subjects received spinal stabilization exercise, of which 6 were male and 7 were female. Five and eight patients were diagnosed with disc herniation and non-specific low back pain, respectively. The mean age was 39.6 years and the onset period was 2.5 months. There was no significant difference between the two groups except for the onset period.

## 4. 논의 및 고찰

Because back pain has a high recurrence rate and high social costs, it is necessary to apply effective interventions early. Although several recent studies have reported the effect of spinal stabilization exercise, most of these studies were conducted on chronic patients. Considering that the recent trend for back pain patients emphasizes active exercise, it is necessary to study whether spinal stabilization exercise has a positive effect on back pain patients before the chronic stage. When back pain occurs, patients tend to reduce bed rest or possible physical activity under the influence of cognitive and psychological factors, which eventually leads to recurrence of back pain and worsening of disability. This is probably because severe back pain and fear of injury cause psychological atrophy, and psychological atrophy increases the burden on the spine. Recently, Matsudaira et al. [29] emphasized active activities such as muscle strength and gymnastics even in acute low back pain, but many therapists still apply electrotherapy or manual therapy, which are passive approaches centered on manual therapy. This study was conducted to examine the effectiveness of spinal stabilization exercise during exercise therapy compared to manual therapy for patients with acute or subacute low back pain.

According to previous studies, manual therapy has been recommended for acute stage patients. In this study, when manual therapy was applied, the pain index and disability index significantly decreased after treatment compared to before treatment. Similarly, when spinal stabilization exercise was applied, the pain index and disability index were significantly decreased. Also, during the treatment period, none of the subjects discontinued treatment due to worsening pain or side effects. This shows that the treatment effect is higher than that of a previous study [31] that applied a traditional physical therapy technique (electrical therapy) to patients in the subacute phase, indicating that not only manual therapy but also spinal stabilization exercise are effective for patients with low back pain before the chronic phase. Also, as a result of examining the pain index and disability index by classifying them into non-specificity and disc herniation, there was no significant difference similar to the previous study [32]. As a result of examining the change in pain level and disability index to find out how effective spinal stabilization exercise was compared to manual therapy, the pain index decreased significantly in the spinal stabilization exercise group than in manual therapy, but the disability index was determined by the treatment method. There was no significant difference between This shows that spinal stabilization exercise can be safely applied without causing negative changes in patients with subacute or lower back pain, and it is particularly effective than manual therapy in reducing the degree of pain. Fritz et al. [33] stated that there was no one-to-one correlation between the level of injury (pain index) and activity level (disability index). Since disability level is a measure of the difficulty of activities in daily life, the level of disability did not improve as much as the pain decreased after physical therapy. In this study, spinal stabilization exercise was performed in supine and prone position, but it is considered necessary to perform spinal stabilization exercise during various activities to reduce the level of disability. Previous studies have reported the effect of spinal stabilization exercise for patients with chronic low back pain. In the case of chronic patients, Jaemoon Lee et al. [15] reported that the pain index improved by 38.5% and the disability index by 6.25%, and Franca et al. [34] reported that the pain index and disability index improved by 99% and 90%, respectively, after 6 weeks of exercise. In this study, the pain index and disability index improved by an average of 36.44% and 11.47%, respectively, after 4 weeks of spinal stabilization exercise. The improvement effect was relatively low compared to the chronic stage patients. This may be because the treatment period and one exercise time are relatively short. In this study, it is expected that the pain and disability index were affected to some extent in this study because conservative electricity and heat treatment were applied in consideration of the clinical reality before applying manual therapy and spinal stabilization exercise. In this case, it was said that electric and thermal treatment and drug treatment had little effect on the pain and functional improvement of back pain patients, and the previous study [21] that the effect of electric treatment was weak, and that both the manual treatment group and the spinal stabilization group were Considering that heat treatment was given, the effect of electrotherapy and heat treatment on pain and disability index in this study was insignificant.

## Conclusion

Based on the previous study that active activity is helpful for patients with acute and subacute low back pain, this study investigated the extent to which spinal stabilization exercise helps to reduce the pain index and disability index compared to manual therapy. Although spinal stabilization exercise was more effective than manual treatment, the disability index showed similar results. Therefore, it is believed that spinal stabilization exercise will contribute to

safely reducing pain even for patients with acute and subacute low back pain. This study is limited in generalization of the study results because the number of study subjects is small and it is biased toward patients with relatively mild pain and disability index. In the future, it will be necessary to study whether spinal stabilization exercise is effective for patients with more severe pain and disability.

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