Effects of the MWM Technique Accompanied by Trunk Stabilization Exercises on Pain and Physical Dysfunctions Caused by Degenerative Osteoarthritis

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Abstract. [Purpose] This study aimed to identify how treatment with the Mulligan technique of mobilization with movement (MWM) influences pain and physical function of patients with degenerative osteoarthritis. [Subjects] Thirty patients diagnosed with degenerative osteoarthritis were divided into an experimental group (n=15), and a control group (n=15). [Methods] The experimental group was treated with general physical therapy, trunk stabilization exercises, and performed the MWM using the Mulligan technique. The control group was treated with general physical therapy, and then performed trunk stabilization exercises. [Results] Statistically significant differences were found after the intervention in the experimental group in the visual analog scale and Western Ontario and McMaster Universities osteoarthritis index pain, stiffening, and physical function scores. [Conclusion] We consider the treatment of degenerative osteoarthritis patients using the MWM technique is effective for reducing pain and improving physical functions.

Key words: Osteoarthritis, MWM, Knee

INTRODUCTION

Humans repeat transfer activities such as walking and running to manage their daily lives. Identifying the transfer activities of humans in mechanical terms is necessary to understand neuromuscular control\(^1\). In particular, the knee joint plays an important role in walking and other transfer activities.

The recent increase in human life expectancy resulting from scientific and medical advances has increased elderly populations, which has, in turn, caused a higher incidence of degenerative diseases. In particular, chronic degenerative osteoarthritis, which is one of several musculoskeletal diseases, has become a leading geriatric disease with a high prevalence. Degenerative osteoarthritis is emerging as an important area of interest as it creates a number of obstacles to elderly peoples’ daily lives and physical activities, thereby lowering their quality of life\(^2,3\).

Degenerative osteoarthritis can be accompanied by joint pain, joint dysfunction, stiffening, pressure pain, joint hypertrophy, and muscle weakening. In addition, it gradually limits the range of motion (ROM) and reduces functional activities of the knee joint\(^4\).

Both drug-based and a variety of non-drug treatments are used to treat degenerative osteoarthritis. Drug treatments are effective at pain reduction and symptom improvement, but carry the risks of side effects and drug overdose. Non-drug treatments include physical therapies such as electrotherapy, hyperthermia, phototherapy, exercise therapy, and manual therapy. These treatments reduce patients’ reliance on drugs and pain, and improve muscular endurance, coordination, and muscular strength\(^5\).

Mulligan techniques are a kind of manual therapy for spinal or upper and lower extremity pain which use NAG (Natural Apophyseal Glide), SNAG (Sustained Natural Apophyseal Glide), or MWM (Mobilization with Movement) techniques.

Mulligan techniques do not cause patients pain and have no side effects. These techniques are also not physically intensive for therapists to practice due to their use of belts and patients’ voluntary movements. Moreover, they are easy to learn, which makes them useful for clinical applications. If applied properly, they have some effect on various types of pain. However, most studies of Mulligan techniques have investigated their effect on diseases of the lumbar and thoracic regions. In this study, aimed to identify how the application of the MWM Mulligan technique influences pain and physical function of patients with degenerative osteoarthritis when walking.
The tibia inward upon the thigh while the patient flexed his/
The experimental group showed statistically significant differences in the VAS pain scores and WOMAC pain, stiffening, and physical function scores between the pre- and post-tests (p<0.05) (Table 3). The experimental and control groups showed statistically significant between group differences in VAS pain scores and WOMAC pain and physical function scores (p<0.05) (Table 4).

**DISCUSSION**

This study was performed using an experimental group that underwent general physical therapy, trunk stabilization exercises, and MWM using Mulligan techniques and a control group that received only general therapy and trunk stabilization exercises. Each group consisted of 15 subjects, and over a six-week period, three treatment sessions were conducted weekly. During the practice of the manual therapy on the knee joint, changes in the patients’ pain, stiffening, and physical functions were evaluated.

Osteoarthritis is the most common type of arthritis that causes disabilities or problems in elderly populations. Women have a higher incidence of degenerative osteoarthritis than men. In addition, if the condition is untreated, it increases the risk, as patients age, of their being injured in falls which, in turn, decreases human life expectancy. While degenerative osteoarthritis has not clearly been defined to date, it is a disease that exhibits local degenerative changes due to the physical activities that place repetitive or large loads on the articular cartilage.

As people age, they experience functional deterioration and weakening of their body parts. Likewise, the articular cartilage exhibits limited regenerative abilities and degeneration with aging. A study which performed radiographic tests on groups of various ages reported that about 80% of the population aged 60 or older, and about 95% of the population aged 75 or older exhibit symptoms of degenerative osteoarthritis.

The degrees of pain and functional disorders caused by degenerative osteoarthritis are highly complicated and their clinical mechanism has not been firmly established. However, some researchers have put forward a plausible biomechanical regarding the mechanism of the occurrence of pain due to degenerative osteoarthritis. Degenerative osteoarthritis is a chronic disease that progresses over a long period of time. Therefore, pain becomes an indicator of degenerative osteoarthritis and the treatment of the condition is focused on reducing pain rather than dealing with the progress of arthritis.
A complete recovery from degenerative osteoarthritis is difficult and the prevention of its pathological progress is often problematic. Thus, the purpose of its treatment should be the inhibition of the causes of degenerative osteoarthritis, pain reduction, and improvement in physical function. One study noted that the purpose of treating degenerative osteoarthritis patients is to maintain the best possible physical function and reduce pain. Among joint diseases that damage the articular cartilage due to aging or weight-bearing during walking, degenerative osteoarthritis frequently occurs in elderly populations. It is also considered a key disease that causes physical dysfunction.

The goal of treatment for degenerative osteoarthritis patients is to control pain, minimize the side effects of treatments, and improve patients’ knee joint functions and quality of life. Patients also need to be educated to control loads on the knee joint, through changes in life patterns, exercises, control of physical activities, and weight loss. In this study, MWM using Mulligan techniques, which were implemented while the patients placed their knee joint on the affected side on a 30 cm high table, is similar to the motions of lunge and a single limb squat. These motions are closed chain exercises as well as functional exercises for the knee joint, and thus, are frequently used in lower-extremity rehabilitation exercises.

A study by Fisher reported that, after the implementation of muscular function improvement exercises for degenerative osteoarthritis patients for 16 weeks, the patients showed reductions of 40%, 10%, and 30% in pain, reliance, and dysfunction, respectively. Previous studies related to degenerative osteoarthritis have reported that manual therapy MWM is an effective treatment for pain and physical dysfunction caused by degenerative osteoarthritis. A comparison of the experimental and control groups of the present study revealed that the experimental group showed greater improvements in both pain and physical function. Damage of the joints causes pain and limitation of motion (LOM) due to sprain of soft tissues. Pain and LOM cause more damage to the joint. Joint control of MWM can reduce the emission of noxious stimuli from a damaged joint, and when pain is reduced, LOM is also reduced leading to improvement in physical function.

In the present study, regarding Mulligan Technique MWM was verified as effective at ameliorating pain and physical dysfunction caused by degenerative osteoarthritis. Therefore, MWM can be suggested as an effective treatment for relieving pain and physical functions in degenerative osteoarthritis patients. Limitations of this study include the small number of subjects, which makes it difficult to make generalizations of the findings, and the selection of subjects within a limited geographical area, which precludes comparison with other regions. In addition, the effects of subjects’ physical characteristics, life patterns and personal post-treatment exercises could not be entirely controlled. Therefore, further research is necessary investigation the MWM technique for other diseases and body regions.

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