

Clinical Effect Analysis of Combination of Short-term Ketoprofen Plaster and Kinesio Taping for Patients with Chronic Low Back Pain: Case Study

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Received date: December 13, 2018; Accepted date: January 08, 2019; Published date: January 15, 2019

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Abstract

Purpose

The purpose of this study is to analyse the clinical effects of a combination of short-term application of ketoprofen plaster and kinesio taping to patients with chronic low back pain.

Participants and Methods

This study was conducted on a 43-year-old male patient with chronic low back pain. A combination of ketoprofen plaster and kinesio taping was applied for 1 week. To analyse the clinical effect, lumbar muscular function was measured using One Repetition Maximum (1RM) of total abdominal and of Repetition Maximum (RM) of back extension and pain degree was assessed using Visual Analogue Scale (VAS).

Results

In the measurement results, 1RM of total abdominal and RM of back extension and appeared to increase after the application compared to the result beforehand, while pain degree decreased after the application compared to the outcome beforehand.

Conclusion

This study confirmed that application of a combination of short-term ketoprofen plaster and kinesio taping to chronic low back pain patients is clinically effective in improving lumbar muscular function and reducing pain.

Keywords Chronic low back pain; Ketoprofen plaster; Kinesio taping

Introduction

Low back pain refers to the case where lumbar pain caused by musculoskeletal system lasts more than 3 days. Symptoms of back pain are more likely caused by the deterioration of muscular function, stability of muscles and ligaments that support the lumbar vertebra, rather than the disability of the lumbar vertebra itself. Symptoms may include muscle weakness, loss of flexibility, a range of motion limitation in lumbar and lower extremities joint and an increase of pain [1-3]. In addition, due to the high recurrence rate of lower back pain, various conservative programs are required to prevent chronic low back pain and relieve pain.

Ketoprofen is a non-steroidal and anti-inflammatory analgesic drug with antifebrile and analgesic effects and is widely used for the treatment of arthritis, myalgia and acute gout [4]. Ketoprofen plaster refers to a method of percutaneous absorption for lesser systemic side effects caused by nonsteroidal anti-inflammatory analgesic drug. It penetrates directly into deep tissues such as subcutaneous tissue, fascia, tendon, synovial membrane and synovial fluid under the skin stratum

corneum instead of penetrating *via* blood flow and has been effectively used in treating acute chronic musculoskeletal diseases by inhibiting the activity of cyclooxygenase and prostaglandin biosynthesis [5,6]. For reasons explained above, ketoprofen plaster has become a popular therapy for various musculoskeletal diseases, such as arthritis and chronic lower back pain.

Kinesio taping has been shown to balance the body by adjusting the tension of muscles with pain and maintain the balance between the muscles as in an ideal body posture, thus helping the regulation of pain and restoration of muscular function [7]. In addition, it improves proprioception feedback mechanism that shortens the mobilization time of the muscles and activates the muscles [8]. Therefore, kinesio taping therapy is widely used in clinical practice to alleviate musculoskeletal pain. The purpose of this study is to analyse the clinical effects of a short-term application of ketoprofen plaster and kinesio taping to patients with chronic low back pain.

Participants and Methods

The participant of single case study was a 43-year-old male (height: 180 cm, weight: 77 kg), who was diagnosed with chronic lower back

pain by an orthopaedic surgeon's physical examination and a simple radiologic study and also claimed to have pain for more than 6 months. The purpose and procedures of this study were described to the subject beforehand and the subject signed the consent form and voluntarily participated. The study adhered to the principles of the Declaration of Helsinki. The combination of ketoprofen plaster and kinesio taping was applied by attaching Kefentech Plaster (Jeil Pharmaceutical, Korea) with 30 mg ketoprofen to the lumbar for a week and by attaching a straight type and "Y" type taping to the erector spinae muscle and quadratus lumborum muscle above, using the 5 cm-long kinesio tape (Nasara, Korea). Ketoprofen plaster and kinesio tapes were replaced every day for 1 week. To analyse the clinical effect, lumbar muscular function was measured using the One Repetition Maximum (1RM) of total abdominal machine (TechnoGym, USA) and Repetition Maximum (RM) of back extension machine (TechnoGym, USA) and pain degree was assessed using Visual Analogue Scale (VAS).

Results

In the measurement results, the 1RM of total abdominal increased from 35 kg to 80 kg, the RM of back extension increased from 3 to 15 times after the application and the pain degree decreased from 8 to 3 after the application.

Discussion

The purpose of this study was to analyse the clinical effects of a short-term application of ketoprofen plaster and kinesio taping to chronic lower back pain patients. There has been no previous study that analyzed the effectiveness of the combination of ketoprofen plaster and kinesio taping and thus, this study aimed to maximize the clinical effect by first applying Ketoprofen plaster to the region of the lumbar with pain and then applying kinesio taping on the top. As a result, an increase in 1RM of total abdominal and RM of back extension, an improvement of lumbar muscular function and a reduction of pain were observed.

The main action mechanism of ketoprofen is to inhibit the synthesis of prostaglandins and thromboxane by inhibiting the activity of COX. In addition, it inhibits the action of lipoxygenase, thereby reducing cell-mediated inflammation and delaying the progression of tissue destruction at the inflammatory joint region. Moreover, it also inhibits bradykinin, stabilizes the lysosomal membrane that inhibits osmotic damage and regulates pain by inhibiting the secretion of lysosomal enzymes that damage tissues through inflammation [9,10].

Kinesio taping creates a space between skin and muscle, which reduces the compression of nerve and blood vessels to relieve physical pain, decreases the signs of inflammation by increasing the circulation of the area where taping is applied and activates muscles to increase

the circulation of blood and lymph [11]. In the case of chronic lower back pain, lumbar taping is shown to be effective in improving lumbar muscular function and pain regulation [12].

This study showed that a combination of short-term ketoprofen plaster and kinesio taping was effective in improving lumbar muscular function and reducing pain in chronic lower back pain patients. Although this study is meaningful in that it has confirmed the effectiveness of a new model, which combines the application of ketoprofen plaster and kinesio taping, it still has a limitation as being a case study of a single person. Further studies should be conducted to generalize the results through an expansion of subjects and study period and a comparison of different treatment methods.

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