

THE CLINICAL AND SONOGRAPHIC EFFECTS OF KINESIOTAPING AND EXERCISE IN COMPARISON WITH MANUAL THERAPY AND EXERCISE FOR PATIENTS WITH SUBACROMIAL IMPINGEMENT SYNDROME: A PRELIMINARY TRIAL

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ABSTRACT

Objective: The purpose of this study was to compare the effects of manual therapy with exercise to kinesiotaping with exercise for patients with subacromial impingement syndrome.

Methods: Randomized clinical before and after trial was used. Fifty-four patients diagnosed as having subacromial impingement syndrome who were referred for outpatient treatment were included. Eligible patients (between 30 and 60 years old, with unilateral shoulder pain) were randomly allocated to 2 study groups: kinesiotaping with exercise (n = 28) or manual therapy with exercise (n = 26). In addition, patients were advised to use cold packs 5 times per day to control for pain. Visual analog scale for pain, Disability of Arm and Shoulder Questionnaire for function, and diagnostic ultrasound assessment for supraspinatus tendon thickness were used as main outcome measures. Assessments were applied at the baseline and after completing 6 weeks of related interventions.

Results: At the baseline, there was no difference between the 2 group characteristics ($P > .05$). There were significant differences in both groups before and after treatment in terms of pain decrease and improvement of Disability of Arm and Shoulder Questionnaire scores ($P < .05$). No difference was observed on ultrasound for tendon thickness after treatment in both groups ($P > .05$). The only difference between the groups was at night pain, resulting in favor of the kinesiotaping with exercise group ($P < .05$).

Conclusion: For the group of subjects studied, no differences were found between kinesiotaping with exercise and manual therapy with exercise. Both treatments may have similar results in reducing pain and disability in subacromial impingement in 6 weeks. (*J Manipulative Physiol Ther* 2014;37:422-432)

Key Indexing Terms: *Subacromial Impingement Syndrome; Ultrasonography; Manipulative Therapy; Athletic Tape*

Subacromial impingement syndrome (SIS) was first proposed by Neer¹ as the compression and abrasion of the bursal side of the rotator cuff beneath the anterior acromion and was characterized by pain (44%-65%) and functional restrictions. It is now considered as a much broader category than that first described by Neer, including the following: subacromial impingement or external impingement; internal impingement, which may

be further divided into anterior or posterior²; and coracoid impingement.³ Subacromial impingement syndrome is a common condition believed to lead to the development or progression of rotator cuff disease and is considered to be one of the most common shoulder complaints.^{4,5}

The diagnosis of shoulder pain is too broad to provide sufficient information to develop specific treatment protocols in daily practice.^{6,7} In primary care, general practitioners and

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physiotherapists often rely on clinical signs and symptoms to establish a diagnosis and to determine the focus of treatment.⁸⁻¹⁰ Imaging methods such as roentgenography, ultrasonography, and magnetic resonance imaging (MRI) are helpful for differentiation of potential additional pathologies, if there is suspected red or yellow flags in the patient presentation, or if conservative care fails.¹¹ Lately, ultrasonography was shown as effective and reliable as MRI in showing changes in the soft tissue.¹²⁻¹⁴ Kelly et al¹⁵ examined the diagnostic accuracy of commonly used physical tests for SIS. Using ultrasound as the reference standard, they concluded that the emphasis on the management of dysfunction may be more appropriate rather than a simple reliance on clinical tests with inconclusive sensitivity and specificity if ultrasound scanning is not available. In addition to the diagnosis of rotator cuff tears, sonography could demonstrate abnormalities within the intact rotator cuff tendon including the changes in echogenicity and the tendon thickness. In rotator cuff abnormalities, tendon thickness could occur in comparison with the other side. Thus, the measurement of supraspinatus tendon thickness was found reliable.¹⁶⁻¹⁸ The ultrasonographic diagnosis has the potential for becoming a valuable aid to the clinician in allowing confident diagnosis, and it enables to follow up treatment efficiency.¹⁹⁻²²

Rehabilitation of the patients with SIS is a complex process that requires a comprehensive evaluation and multifactorial treatment program. Lately, it was shown in an evidence-based systematic review that there was an equal effectiveness of physiotherapist-led exercises when compared with surgery in the long term.^{23,24} The restoration of parascapular muscles for scapular control was recommended as one strategy to restore shoulder function with exercise for various muscles along the scapulohumeral joint.²⁴⁻²⁶ In the rehabilitation process, some additional techniques may also be used to restore function and decrease pain. One useful method might be manual therapy to restore range of motion and function to the soft tissue and joints. This may influence the overall neuromusculoskeletal system by influencing physical and mechanical properties of tissues and changes in tissue fluid dynamics (blood, lymph, extracellular and synovial fluids).²⁷⁻³¹ Low level to fair evidence was shown for the treatment of shoulder pain by manipulative therapy in the literature, and a need for new trials was focused.^{32,33}

Another approach is the use of taping techniques with different materials and methods. Although the underlying mechanisms of the taping effects are still unclear, many believe that taping works by offering constant proprioceptive feedback or by providing alignment during dynamic movements.^{34,35} The kinesiotaping method is a relatively new technique used in rehabilitation programs to treat upper arm or hand pain. It has been used as an adjunct in the treatment of some impairments.^{36,37} Kase et al³⁸ claimed that applying kinesiotape would have physiological effects

including decreasing pain or abnormal sensation, supporting the movement of muscles, removing congestion of lymphatic fluid or hemorrhages under the skin, and correcting misalignment of joints. Theories report that it provides a constant pulling force to the skin and improvement of blood and lymph circulation, and it decreases pain through the restoration of superficial and deep fascia function.³⁸ When the tape is applied properly, patients often report symptom relief, comfort, or stability of the involved joint.³⁷⁻⁴⁰ This would be a beneficial choice for treating patients with SIS. Thelen et al³⁹ declared the assistance of the tape in improving pain-free active range of motion immediately after the application, but they could not support the use of taping for decreasing pain intensity or disability for SIS. Both taping and manual therapy can be an effective and fast method to enhance the healing in a similar fashion by means of local changes in tissue fluid dynamics, repositioning of soft tissue and joints, changes in the physical and mechanical properties of tissues, and somatosensory input. To our knowledge, no study exists that compare the effects of kinesiotaping and manual therapy as an adjunct to exercise therapy with functional and sonographic aspects. Therefore, the aim of this study was to investigate the effectiveness of 2 different shoulder rehabilitation interventions on pain, function, and sonographic findings of supraspinatus tendon.

METHODS

Participants

Participants between 30 and 60 years old who were diagnosed as having SIS by an orthopedic surgeon were considered for inclusion. The assessment form, designed by the physiotherapists and the orthopedic surgeon, was used to diagnose and differentiate the participants. The form included the pain severity assessment, shoulder range of motion, shoulder muscle strength, and special tests including Neer painful arc, Hawkins-Kennedy, sulcus sign, and apprehension tests for instability. The combination of the Hawkins-Kennedy impingement sign, the painful arc sign, and the infraspinatus muscle test was used to diagnose SIS and showed that the tests could yield the best posttest probability (95%) for any degree of impingement syndrome, as claimed by Park et al.⁴¹ Eighty-nine participants were referred to the outpatient physiotherapy clinic for the study.

Potential participants (n = 26) were excluded if there is a cervical spine involvement; the presence of a glenohumeral joint adhesive capsulitis, or instability; a history of previous shoulder surgery; having another physiotherapy treatment of this disorder in the past 6 weeks; or steroid injection into or around the shoulder in the past 2 months. The patients with recurrent complaints or long history of complain over a year were also excluded. Furthermore, MRI scans were

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