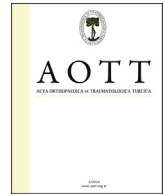


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The comparative efficacy of kinesio taping and local injection therapy in patients with subacromial impingement syndrome

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ABSTRACT

Objective: The aim of this study was to compare the therapeutic effects of kinesio taping (KT) and local subacromial injection in patients with subacromial impingement, syndrome (SIS) with regard to pain, range of motion (ROM) and disability.

Methods: Sixty-one patients (48 females and 13 males; mean age: 43.04 ± 6.31 , years) with SIS were enrolled into the study. The patients were randomized into two treatment groups receiving either a single corticosteroid and local anesthetic (LA) injection, or kinesio taping performed three times by intervals of 3 day. Visual analog scale (VAS) was used to assess pain intensity, range of motion (ROM) degrees of, shoulder were recorded and Shoulder Pain and Disability Index (SPADI) was performed to evaluate functional disability, before treatment, at the first and fourth, weeks after therapies. A exercise program was prescribed for both groups including pendulum, active range of motion (ROM) and strengthening exercises.

Results: Pain, functional outcome measures were determined to have improved significantly in both groups at the end of therapies at first and fourth weeks ($p < 0.05$), but these improvements were more significant in the injection group than in kinesio taping group ($p < 0.05$). The improvements in pain at rest, shoulder abduction degrees, and SPADI scores at first and fourth weeks were statistically higher in injection group than in kinesio taping group.

Conclusion: Although the improvement in pain intensity at rest, ROM and disability were better with local injection, KT may be an alternative noninvasive method to local subacromial injection for patients suffering from subacromial impingement syndrome.

Level of Evidence: Level I, Therapeutic study.

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Introduction

Subacromial impingement syndrome (SIS) is one of the most common causes of shoulder pain and it is suggested that one third of patients presenting with shoulder pain has rotator cuff tendinitis/subacromial impingement.¹ SIS has been defined as compression and mechanic abrasion of rotator cuff structures under coracoacromial arc during arm elevation.^{1–3} Vascular, degenerative, traumatic, anatomic causes and shoulder kinematic abnormalities play important role for shoulder impingement syndrome.^{4–7}

The treatment of subacromial impingement is mainly conservative and encompasses rest, therapeutic exercises, non-steroidal

anti-inflammatory drugs (NSAIDs), physical therapy modalities and local subacromial injection.^{8–10} Subacromial injection of corticosteroid and local anesthetic (LA), is one of the most common non-operative interventions and has been shown to be effective in several studies in the treatment of impingement syndrome.^{11–14} On the other hand a systematic review conducted by the Cochrane Collaboration also concluded that although the available evidence from randomized controlled trials supports the use of subacromial corticosteroid injection for disease of rotator cuff, the effect may be small and short-lived and no better than NSAIDs.^{15–17} Despite considerable research, no real alternative to corticosteroid injections has been found.

Kinesio taping[®] technique (KT) and Kinesio tex tape[®] (KTT) had developed by Japanese chiropraxy specialist Dr. Kenso Kase in 1973 and has been used for musculoskeletal diseases widely in recent years.^{18–21} The effects of KT may be listed as to provide positional stimulus signaling to central nervous system by stimulating

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mechanoreceptors, align fascial tissues, widen the space above area of pain and inflammation by lifting fascia and soft tissues, provide sensory stimulus to limit or assist motion and help to removal of edema by directing exudates to lymphatic ducts.^{21,22}

There are few studies in the literature concerning the efficacy of kinesio taping treatment and conflicting results were indicated for shoulder disorders.^{18–20,23} Frazier et al²³ showed significant improvements in pain and DASH scores of patients with various shoulder diseases by KT and physical therapy. Kaya et al¹⁹ found no statistical differences in pain and disability measures of their patients receiving either KT or physical therapy for SIS. A systematic review concluded a moderate evidence that in the short term, there are no beneficial effects of KT therapy over sham taping for pain, ROM or function in individuals with shoulder impingement syndrome.²⁴ To the best of our knowledge, there is no study in the English literature about the comparative efficacy of local subacromial injection and KT in patients with SIS.

The aim of this study was to compare the therapeutic effects of single local corticosteroid/LA injection and KT in patients with SIS with regard to pain, shoulder ROM and functional outcome measures.

Patients and methods

Subjects

The study comprised 61 consecutive patients who were diagnosed as SIS (clinically and by magnetic resonance imaging) between 2012 and 2013. Fig. 1 summarizes the flowchart regarding patients' enrollment. The study protocol was approved by the local ethics committee.

Inclusion criteria

Inclusion criteria were as follows: aged 20–50 years, presented with shoulder pain which had been ongoing for one-three months, pain before 150° in any plane of range of motion, positive Jobe or Hawkins test,²⁵ pain in daily living activities, detection of rotator cuff tendinopathy/subacromial impingement syndrome on magnetic resonance imaging (MRI).²⁶

Exclusion criteria

Subjects with the presence of any of the following were excluded: previous fracture in the shoulder girdle complex, glenohumeral dislocation/subluxation, acromioclavicular sprain or separation, adhesive capsulitis, diabetes mellitus, use of anticoagulants, history of steroid injection therapy for shoulder, total rupture in the rotator cuff tendons on MRI, history of neck and shoulder surgery, or radicular neck pain within previous 3 months, patients taking regular systemic NSAIDs or steroids, pregnant or breastfeeding mothers and malignancy.

Kinesio taping technique

Patients in group 1 received therapeutic KT application three times by 3 days intervals. KT application has been made according to the protocol for rotator cuff tendinitis/impingement suggested by Kase et al.^{21,22} Standard 5-cm beige Kinesio Tex tape was used for all patients in KT group. Initially, a Y-strip for supraspinatus was applied from its insertion to origin with inhibition technique. The length of strip was determined by measuring from acromion to spine scapula. Later in a sitting position base of strip applied to tuberculum major; then superior tale of Y-strip was terminated at the superomedial angle of scapula passing between middle and superior fibers of trapezius

with light tension (% 15–25) while the shoulder was extended, adducted and internal rotated with cervical contralateral bending; final part of the tape (2.5–5 cm) was applied without stretching. The inferior tale of Y-strip was applied similarly with light tension (% 15–25) in the same position and terminated at the spine of scapula.

The second strip was a Y-strip representative of the deltoid and applied with inhibition technique again. First the length of strip was determined by measuring from acromion process to deltoid tuberosity. In sitting position base of tape applied to deltoid tuberosity; then anterior tale of Y-strip was terminated around acromioclavicular joint and lateral 1/3 of clavicle along lateral border of anterior deltoid with light tension (% 15–25) while shoulder was horizontally extended and external rotated. The final part of the tape (2.5–5 cm) was applied without stretching. Posterior tale of Y-strip was applied with light tension (% 15–25) while shoulder was horizontally flexed and internally rotated and terminated around acromioclavicular joint and lateral 1/3 of clavicle. The final part of this tape (2.5–5 cm) was applied without stretching. Finally mechanic correction technique was added. Depending on shoulder contour base of a Y-strip of 15–20 cm in length was applied at the most painful region around coracoid process; thereafter attached to posterior deltoid with severe tension (%50–75) and with downward pressure. After this the tails of Y strip were applied without stretching in a splayed out pattern while shoulder was flexed and horizontally adducted (Fig. 2). KT therapy was performed by the same physician (PB).

Subacromial injection technique

The patients in Group 2 received subacromial corticosteroid injection (1 cc triamsinolone acetone – 40 mg) and 4 cc bupivacaine combination with a 22-G injector using posterior subacromial approach (Fig. 3).²⁵ The injections were performed into the patients' affected subacromial space by the same physician (HG).

Outcome measures

SIS staging was made depending on Zlatkin classification.²⁶ Both groups were educated for home exercise program comprising pendulum exercises and pain-limited active ROM exercises of shoulder elevation, depression, flexion, abduction, rotations, and strengthening exercises. Strengthening exercises were isometric in nature, working on the external shoulder rotators, internal rotators, biceps, deltoid, and scapular stabilizers.²⁷ Prescription details of exercise program for groups were as follows; 10 repetitions in 1 set daily, 30 s rest periods between sets of different types of exercises; 7 sessions with 24 h between sessions.

Outcome measures were active flexion and abduction range of motion, shoulder pain at rest and movement assessed by VAS and shoulder functional status detected by Shoulder Pain and Disability Index (SPADI).^{28,29} Shoulder ROM measurements were taken with a standard goniometry.³⁰ Pain intensity at rest and movement were assessed by a 100-mm VAS. 20 mm reduction on visual analog scale was accepted as clinically meaningful.³¹ The Turkish validated version of SPADI was used to assess functional ability of the shoulder.²⁹ Higher scores indicated greater pain and disability.²⁸ In our study 10 point decrease in scores has been defined as clinically meaningful.³²

Power analyses demonstrated a need for at least 30 participants per group given on SD of 20 mm VAS, a difference in pain intensity between groups of 20 mm on the VAS, on level of 0.05 a power set at 60%.

Procedure

The patients were randomly allocated to receive either single local subacromial corticosteroid/LA injection or KT therapy. Casual

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