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Comparison of the Effects of Kinesio Taping to Local Injection of Methyl Prednisolone in Treating Brachial Biceps Tendonitis

Ahmad Zeinali, Abolghasem Rahimdel, Arezoo Shahidzadeh, Azadeh Shahidzadeh, Ali Mellat*

Neurology Department, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
Email: *Ali_mellat@ssu.ac.ir

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Abstract

Objectives: This study compared the effect of Kinesio Taping (KT) with local Methyl Prednisolone injection in patients with biceps tendonitis based on visual analog scale (VAS) and range of motion (ROM). **Methods:** Thirty-eight patients (15 females and 23 males; mean age: 29.87 ± 6.31, years) with biceps tendonitis were participated in this study during 2014-2015. The patients were randomly assigned into two groups: 19 patients in KT group and 19 patients in injection group. In the first group, KT was used three times for 24 hours sequentially with four-day intervals; in the second group, one dose of Methyl Prednisolone (40 mg) plus 1% lidocaine was injected in the bicipital fissure around the long head of the biceps muscle. The injections and KT therapy were performed by the same physician. The patients were investigated for VAS and ROM in the first, second, seventh and twelfth days. **Results:** VAS and ROM indices were significantly improved in the second and seventh days ($p < 0.05$) in KT group compared to injection group while VAS and ROM had no significant difference in first and 12^{th} days ($p > 0.05$). **Conclusion:** Regarding the more immediate effect of KT on ROM and VAS and the fast restoring of the patient to normal life, it could be used as a noninvasive alternative to injection and as the first line of treatment specially in patients who need the immediate effect of treatment.

Keywords

Brachial Biceps Tendonitis, Methyl Prednisolone Injection, Kinesio Taping

1. Introduction

Shoulder pain is the most common and debilitating musculoskeletal problem affecting 36% - 37% of the population [1] [2]. The most common cause is suba-

cromial impingement syndrome (SIS) [3]. The subacromial space includes the long head of the brachial biceps muscle, the cuff rotator tendons, bursae, and the coracoacromial ligament. Any kind of disturbance in this complex may lead to SIS [4]. One of these impairments is the inflammation of the tendon of the long head of the brachial biceps caused by the repeated use of upper extremities in athletes or by the normal course of aging [5]. There are various therapeutic methods for treating biceps tendonitis including rest, cryotherapy and NSAIDs which form the first line of treatment. In the case of lacking response to treatment, physiotherapy will be used consisting of a range of athletic (motion) exercises, calisthenics (strengthening exercises), heat therapies, laser and electrotherapy methods [6]. Kinesio taping (KT) is a relatively new noninvasive treatment modality which has been popular in recent years. Also, no adverse effects like limited joint movements and limited functional activities have been associated with its use [7] [8] [9] [10] [11]. Although its exact mechanism is unknown yet, some scholars believe that the use of KT may have several good effects including improved muscular functioning, increased deep sensation, reduced pain with neural inhibition, helping the removal of edema by guiding the exudate fluid towards lymphatic duct, correction of malalignment of joints, lifting of the skin, and creation of greater space under the KT area [12]. Local injection is the most common treatment used by various physicians such as specialists in occupational medicine, orthopedists, and rheumatologists for several decades since 1980 [3] [4] [13]. Some authors reject the use of injection which believes that the effect of injection is only for a short time conferring no extra benefit beyond that of NSAIDs [14]. There are also some concerns about its complications including the damage to rotator cuff tendons and the long head of the biceps [15]. Few studies have reported the therapeutic effects of KT and its comparison with other treatment modalities for shoulder pain. The results are, furthermore, controversial [16] [17] [18]. This study compared the effect of Kinesio Taping with local injection of Methyl Prednisolone in patients with biceps tendonitis.

2. Methodology

This study was carried out in the Physical Medicine and Rehabilitation Ward of Shahid Sadoughi Hospital in Yazd, central Iran from 2014 to 2015. The study protocol was approved by the Committee of Ethics in Research at the university and informed written consent was obtained for each patient. Thirty-eight patients (15 females and 23 males; mean age: 29.87 ± 6.31, years) with biceps tendonitis participated in this study. The inclusion criteria were pain onset prior to 150 of active shouldewr elevation in abduction and flexion, pain on activities of daily living, positive Yergason's Test, and age between 18 to 50 years. The exclusion criteria were a history of rheumatic diseases, Shoulder injury, acromioclavicular sprain, concomitant cervical spine symptoms, shoulder fracture, glenohumeral dislocation/subluxation, a history of shoulder surgery within the previous 12 weeks, history of diabetes, osteoporosis, Local infection at the injection site.

Diagnoses of patients were based on pain on bicipital groove and positive test. The specific test for the diagnosis of biceps tendonitis was Yergason's test applied for all participants (19). This test is performed by supination of the forearm against resistance at 90˚ elbow flexion. If the patient's pain increases, the test is rendered as positive [18]. The patients were randomly assigned into two groups: 19 patients in KT group and 19 patients in local injection group. In the first group, KT was used for biceps tendonitis. The Y-form tape was used for the deltoid muscle with slight traction (15% - 25%) applying the "muscle origin and target technique". The first end of the tape was stuck on the frontal part of the deltoid muscle with the upper arm in the abduct horizontal plane with outward rotation. The other end of the tape was applied to the dorsal part of the deltoid with the upper arm in the adduct horizontal plane with inward rotation. The third part of the tape was stuck on the muscle from the coracoid process to dorsal deltoid with 50% - 75% traction to correct mechanically the glenohumeral in all patients by Physical Medicine and Rehabilitation specialist [19]. KT was used three times for 24 hours sequentially with four-day intervals; in the second group, one dose of prednisolone plus 1% lidocaine was injected in the bicipital fissure around the long head of the biceps muscle by the same physician. The injections and KT therapy were performed by the same physician. The patients were investigated for visual analog scale (VAS) and range of motion (ROM) in the baseline, second, seventh and twelfth days of intervention. The required sample volume was 18 patients in each group for statistical power of 80% and confidence level of 95%. The gleaned data were analyzed with spss version 16 using Chi-square (X^2) test, ANOVA, repeated measured, and Least Significant Difference (LSD). The amount of $p < 0.05$ was accepted as statistically significant.

3. Results

The mean age of the patients was 29.87 ± 6.31 years with a range of 19 - 42 years. Twenty-three patients were males (60.6%) and 15 were females (39.4%). Demographic variables, disease duration, and history of exercises were investigated for the two groups indicating no statistically significant difference (**Table 1**).

The patients were studied for VAS and ROM. Our findings demonstrated that there was a significant difference between groups in the second and seventh days with respect to pain severity and ROM with no significant difference in days 1 and 12 (**Table 2**).

Table 1. The demographic characteristics outcome measures of the groups at baseline.

	Injection	KT	p-value
Sex F/M (15/23)	39.5%/60.5%	39.5%/60.5%	0.72
Age	29.68 ± 6.63	29.68 ± 6.00	0.93
Symptom duration	18.05 ± 8.90	15.47 ± 9.54	0.68
Sports history	1.57 ± 0.50	1.63 ± 0.49	0.93

Table 2. The comparison of VAS and ROM between groups.

	Injection	KT	p-value
VAS1	6.47 ± 1.07	6.68 ± 1.10	0/83
ROM1	109.00 ± 14.28	117.31 ± 16.35	0/19
VAS2	3.60 ± 2.40	3.07 ± 1.18	0/00
ROM2	142.15 ± 31.35	159.57 ± 25.24	0/00
VAS7	3.21 ± 2.25	3.05 ± 1.26	0/01
ROM7	143.26 ± 33.78	159.84 ± 24.09	0/00
VAS12	3.21 ± 2.25	3.09 ± 1.26	0/90
ROM12	146.57 ± 32.95	160.78 ± 25.72	0/12

VAS was not significantly different in the two groups. ROM was also studied between groups indicating that in day 2, the KT group had greater ROM compared to the injection group ($p = 0.03$).

4. Discussion

Various treatments are available for shoulder pain and biceps tendonitis. Kinesio Tape is one of the relatively innovative noninvasive therapies. Different studies have been carried out so far on KT all reporting the improved functioning and reduced pain in patients with shoulder problems. Nevertheless, this number of studies will not suffice as most of them are case reports or are conducted on healthy individuals [20] [21] [22]. Moreover, the comparative studies on KT are deficient in number compared to other methods with contradictory results [16] [20] [21]. So, the present study embarked on comparing the effects of KT to the effects of injection on biceps tendonitis regarding VAS and ROM. Our findings indicated that there was a significant correlation between groups in days 2 and 7 with regard to ROM and VAS with no significant difference in day 12. Moreover, our study suggested that the KT and injection groups were similar in pain, yet, regarding ROM in day 2, KT had greater ROM compared to injection. Kaya, *et al.* compared the effects of KT and physiotherapy in subacromial impingement syndrome (SIS) patients in the first and second weeks. Their findings demonstrated that the effect of KT on pain and disability is greater during the first week of treatment while its effect is similar to physiotherapy in the second week [20]. Hsu, *et al.* also surveyed the effect of KT on shoulder movements and found that KT increased ROM [22]. Frazier, *et al.* showed that KT and physiotherapy significantly improved pain and DASH score in patients with various shoulder impairments [21]. Subasi, *et al.* compared the effects of KT and physiotherapy in day 1 and months 1 and 3 in patients with SIS. They reported that both methods had a similar effect on VAS and SPADI scores at the completion of treatment [16]. The study by Dong, *et al.* conducted on various treatments of scapular pain indicated that in the initial stages of SIS, exercises along with other treatment modalities such as KT are preferable and should be taken as the first line of therapy with injection considered as the second line of treatment [23].

Another study carried out by Bargahi *et al*. in Iran, elucidated the effect of KT on the superior trapezius muscle with regard to VAS, neck ROM, and neuromuscular control in the upper one-fourth part of the body. The general outcome of these studies indicated that KT can exert short-term effects on pain and neck and shoulder ROM [24]. The exact mechanism of KT is still unknown, however, the physiological mechanisms put forth by various studies may suggest that this method induces the deep sensation by irritating the dermal mechanical receptors, reduces pain by neurological inhibition, decreases pressure of the irritated nervous tissue, and corrects the joint malalignment through correcting the involuntary muscular tension and lifting the skin [25]. A noticeable point in the studies conducted so far was that they used different protocols for the frequency of the use of KT in patients with scapular (shoulder) problems [26]. In fact, there was no harmony in these studies in the methods and frequency of the use of KT in patients with SIS culminating in different results of KT application [27]. Anyhow, our findings are relatively consistent with those of the previous reports indicating that KT and injection may exert a positive effect on VAS, ROM, and function.

Some limitations of our study were that there was no control group for each of our experimental groups for comparisons. Also, low sample volumes may reduce the power of our study to indicate the probable differences among the groups. The strong points of our study were random selection of the patients and similar statistical basis of the groups regarding age, gender, and clinical features. Finally, our best approach in this study was the simultaneous investigation of the two main treatment modalities and their inter-comparisons.

5. Conclusion

Generally speaking, all two methods improved the pain and ROM in patients. Regarding the more immediate effect of KT on ROM and the fast restoring of the patient to normal life, it could be used as a noninvasive alternative to injection and as the first line of treatment specially in patients who need the immediate effect of treatment.

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