

## COMPARISON BETWEEN KINESIO TAPING AND PHYSIOTHERAPY IN THE TREATMENT OF de QUERVAIN'S DISEASE

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### ABSTRACT

**Purpose:** The purpose of this study was to compare the effects of a therapeutic Kinesio taping (KT) and physical therapy (PT) modalities for the treatment of de Quervain's disease. **Methods:** In this prospective randomized clinical study, 30 patients were enrolled into the KT group, and 30 other patients were enrolled into the physical therapy group. In the KT group, 3 pieces of Kinesio tapes were used 4 times weekly, and in the PT group 10 min paraffin bath, 5 min ultrasound (US) under water, transcutaneous electrical nerve stimulation (TENS), and a friction massage were applied every 3 days for 10 sessions. Pain severity and the presence of swelling were assessed in all patients before and after the course of 1-month treatment. **Results:** The overall success rate was 80% in the KT group and 30% in the PT group. In the KT group, the baseline visual analog scale (VAS) was 58 and at the end of treatment it changed into 13. In the PT group, these figures were 56 and 38. Swelling was improved in 17 people (73%) and 5 people (19%) in the KT and PT groups, respectively. **Conclusion:** Results revealed that patients with de Quervain's disease respond more favorably to KT rather than PT.

**Keywords:** Kinesio taping; Physical therapy modality; de Quervain's disease.

### INTRODUCTION

de Quervain's disease is a disorder that is characterized by pain, tenderness and edema over the radial side of the wrist. de Quervain, a Swiss

physician, was given credit for describing this condition for the first time in 1895.<sup>18</sup> It is caused by mechanical impingement between the tendons of abductor pollicis longus (APL) and extensor

pollicis brevis (EPB) and their narrowed fibro-osseous tendon sheet.<sup>3,18</sup> Physical examination frequently demonstrates mild edema and tenderness over the thumb side of the wrist. Finkelstein's test is pathognomonic for the diagnosis.<sup>2</sup>

There is no consensus in the treatment of de Quervain's tenosynovitis. Some treatments for de Quervain's syndrome include rest, physical therapy (PT) modalities, analgesics, a thumb Spica splint, corticosteroid injection and surgery.<sup>2,6,23</sup> The exact efficacy rate of these therapies is not clear. Corticosteroid injection is helpful in about 80% of patients,<sup>6</sup> but its adverse effects such as atrophy, hypo pigmentation<sup>4,5,12,21</sup> and tendon rupture<sup>5,17</sup> limit its functions. Kinesio taping (KT) is suggested as a new treatment of this disease.<sup>9,11</sup> Kinesio tape is thin, cotton and porous fabric with acrylic adhesive which is nonmediated and latex free. It is characterized by the ability to stretch to 120–140% of its original length and recoil back toward its primary length following the application.<sup>1</sup>

According to previous studies, KT has been used in reducing pain and increasing the bioelectric activity of muscles such as trapezius,<sup>8</sup> rotator cuff muscles,<sup>8,19</sup> treatment of sacroiliac joint dysfunction,<sup>15</sup> patelofemoral pain syndrome,<sup>7,13</sup> low back pain,<sup>14</sup> Achill tendon pain<sup>15</sup> and lymph edema.<sup>20</sup>

We hypothesized that KT would be effective to reduce the pain and inflammation of APL and EPB tendon sheets. So, the purpose of this study is to compare the effects of KT application on reducing pain and swelling in subjects with de Quervain's disease with the PT modalities.

## METHODS

### Patients and Methods

This prospective randomized clinical study which is approved by the ethical committee in

Shiraz University of Medical Sciences has been carried out since September 2011 and December 2012 at a physical medicine and rehabilitation clinic in Shiraz, Iran. Patients with more than 4 weeks having de Quervain disease (pain, swelling, tenderness over the first extensor compartment and a positive Finkelstein test) at ages 18 to 65 were included. Exclusion criteria were pregnancy, history of hand or wrist fracture or acute trauma, dislocation or surgery, rheumatoid arthritis (RA), wrist injection in the three last months. Written informed consents were given to all patients, and then they were randomly assigned to two groups based on their admission number and the table of random numbers. A total of 65 patients were presented with de Quervain's disease; 5 patients were excluded from the study because of old wrist fracture (2 persons), RA (1 person) and pregnancy (2 persons). Therefore, 60 patients entered the study. All subjects got informed consent to the work. A total of 30 patients were enrolled into the PT group, and 30 other patients were enrolled into the KT group.

### KT Method

We used three type I pieces of Kinesio tape, Tem Tx, which is made in Korea. First of all, we curved all borders of tapes to prevent early separation. The first strip (1-inch wide and 6-inches long) was used to unload from APL and EPB tendons. The tape was placed on the insertion of EPB, the base of the thumb, and was stretched by approximately 70% over the original length applied along the radial aspect of the wrist and up onto the extensor surface, ending at the mid-forearm (origin of APL).

The second and the third type I strips with 2-inches width and 4-inches length have correction roles. The second one is named "function correcting" tape, with the wrist extended, putting the end of the tape at the dorsum of the hand and



Fig. 1. Taping method.

another end at the distal forearm, 1 inch upper than styloids. Then by flexing the wrist, the tape was fixed. The third tape which is called "space correcting", originates from the volar side of distal of radius and stretched obliquely to the dorsum of the hand with a lighter tension which is shown at 50% (figure). Then we fixed them with a light massage and suggested not to use water for 6 hour in this area. All the taping was applied by the physiotherapist fully trained in KT (the first author). These procedures of taping were repeated for four times weekly.

### Physiotherapy

In the PT group, 10 sessions of PT modalities, paraffin bath, ultrasound (US) under water, transcutaneous electrical nerve stimulation (TENS) and friction massage were applied every 3 days for 10 sessions. In 10-min paraffin bath, mineral oil and paraffin were mixed in a ratio of 1:6, at a temperature of 53°C. About 5 min pulsed US of 1 MHz and 1 W/cm<sup>2</sup>, 20 min reciprocal and low TENS with frequency of 4 Hz and duration of 200 millisecond and 5 min gentle clockwise and nonclockwise friction massage of APL and EPB tendons were conducted.

All PT sessions were done by constantly trained physiotherapists in physical medicine and rehabilitation clinic of Shiraz University of Medical Sciences.

### Outcome Measures

Pain severity was questioned with 100-mm visual analog scale (VAS) (a subjective scale). Assessing the presence or absence of swelling based on physician inspection and palpation (an objective scale) was conducted. In this study, "success rate" of treatment means the percentage of improvement of wrist pain (at least 30 mm VAS decrease) or swelling (by inspection and palpation).

All measures were obtained at baseline, at the end of the course of treatment. The assessments were carried out by the second author.

### Statistical Analysis

Pain severity (VAS mm) represented as mean  $\pm$  SD and differences between two groups were assessed by unpaired *t*-test. The comparison of swelling, a binary qualitative variable between PT and KT groups were assessed by chi-square test. All statistics were calculated by SPSS, Version 11.5 software. A *p* value of  $< 0.05$  was considered as significant.

### RESULTS

We enrolled 60 subjects into the study. Demographic characteristics and baseline findings are shown in Table 1. There were no significant differences between the two groups at baseline

Table 1 Descriptive Characteristics of Patients.

	KT	PT
Age (y)	45.2 $\pm$ 2.2	46 $\pm$ 1.3
Pain (Baseline VAS mm)	58	56
Presence of swelling (baseline)	23	26
Duration of pain (w)	8.1 $\pm$ 2.2	7.3 $\pm$ 2.8
female	17	16
male	13	14
weight (kg)	64.3 $\pm$ 3.2	62.1 $\pm$ 4.1
height (cm)	165 $\pm$ 7.5	166 $\pm$ 6.7

Note: Y: year, w: week, kg: Kilogram, cm: centimeter.

in terms of VAS scores and swelling which are presented in Table 1. No side effect was observed in any of the subjects during the treatment. None of the patients dropped out during the research.

In the KT group, 23 patients had wrist swelling, and all of them complained about wrist pain. After the course of treatment, all patients had significant pain reduction (decreased VAS at least for 30 mm) and swelling improved in 17 patients out of 23. So, in the KT group the success rate of the treatment was 80% (24 people). In the PT group, all participants had a wrist pain, and 26 people had a wrist swelling. After a one-month PT, wrist swelling remained in 21 patients. In addition, in 6 patients of this subgroup, we did not have any significant pain reduction. So, in the PT group, the success rate of the treatment was 30% (9 people).

In the KT group, the baseline VAS was 58, and at the end of treatment it changed into 13. So VAS difference was 45 ( $PV < 0.001$ ). In the PT group, these figures were 56, 38 and 18 ( $PV < 0.001$ ). VAS differences were significant between the KT and PT groups statistically ( $PV < 0.001$ ) (see Table 2).

Swelling seen in 23 (76%) patients of the KT group and 26 (86%) in the PT group improved in 17 people (73%) and 5 people (19%) people in the KT and PT groups, respectively. Swelling improvement was significant in the KT group ( $PV < 0.001$ ) but not in the PT group ( $PV > 0.05$ ). This improvement was greater in the KT group than the PT group ( $PV < 0.001$ ) (see Table 3).

**Table 2 Pain Score (VAS) at Baseline and 1 Month After Treatment.**

	KT Group	PT Group
Pain (baseline VAS mm)	58	56
Pain (1 month VAS mm)	13	38
<i>p</i> value	<0.001	<0.001

**Table 3 Presence of Swelling at Baseline and 1 Month After Treatment.**

	KT Group	PT Group
Presence of swelling (baseline)	23 (76%)	26 (86%)
Presence of swelling (1 month)	6 (20%)	21 (70%)
<i>p</i> value	<0.001	>0.05

## DISCUSSION

Currently the common treatment modalities for de Quervain's disease are nonoperative and consist of modification of wrist activities, analgesic drugs, corticosteroid injection, bracing, casting and PT modalities such as heat, cold, TENS, laser, massage, etc.<sup>16</sup> In this study, we used a new way of treatment, Kinesio taping and compared its effectiveness with some PT modalities. The application of KT in the treatment of de Quervain's disease was mentioned only in two books.<sup>9,11</sup> In addition, we did not have any article about the rate of effectiveness of this method or any comparison made between the KT method and other therapies of de Quervain's disease in our literature review. Our results revealed that patients respond more favorably to KT rather than PT (see Tables 2 and 3)

KT is a relatively new technique used in rehabilitation programs. Although it has been commonly used in orthopedic and sports settings, it is gradually becoming an adjunct treatment option for other musculoskeletal impairments. Its working mechanism is based on the taping direction and tension. KT applications are for both "muscle facilitation or function correction", "muscle inhibition or muscle unloading" and "space correction" techniques.<sup>22</sup>

It is theorized that Kinesio tape lifts the skin and takes pressure off the interstitial fluid providing better drainage and reducing inflammation.<sup>10</sup>

Therapeutic benefits of KT application to injured tissues are described in these ways: For

concentric facilitation, we should apply KT from the muscle origin to the insertion which increases muscle contraction. To facilitate an eccentric or diminished contraction, applying KT from the insertion to the origin is suggested. An assumption has also been made that decreasing the interstitial pressure also decompresses subcutaneous nociceptors leading to decreased pain. Another theory is gate control theory of pain in which afferent mechanoreceptor signals from KT to the brain down regulate nociceptive input because of skin lifting.<sup>1</sup>

In this study, the success rate of the KT group was significantly greater than the PT group by 80% versus 30%. There are some missing points in our study one of which is the absence of a sham application to compare with taping. Additionally, it would be better to use taping and PT as a combination and compare them with other groups as well as the sham group. We evaluated patients two times before and just after finishing the one-month course of treatment. Longer follow-ups should have been considered which is recommended for the next research. Another limitation of the study was the nonblinding method. In addition, potential economic consequences between the two treatment programs, due to various factors such as less frequent visits and shorter duration of therapy, should also be considered.

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