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## **KINESIO TAPING IN CONSERVATIVE TREATMENT OF MILD-TO-MODERATE CASES OF CARPAL TUNNEL SYNDROME**

### **KINESIO TAPING W LECZENIU ZACHOWAWCZYM ŁAGODNEGO I UMIARKOWANEGO PRZEBIEGU ZESPOŁU CIEŚNI NADGARSTKA**

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#### **SUMMARY**

Carpal tunnel syndrome (CTS) is the most common peripheral neuropathy. Severe cases are usually treated surgically, while conservative treatment is recommended in mild to moderate cases. The aim of the study was to investigate the effect of kinesiotaping (KT) on pain level, hand functional status, and carpal joint range of movement compared with that of „wait and see” group in mild-to-moderate cases of CTS. In this randomized study, 32 participants (38 hands) of ages between 35-50 years with clinical and electrodiagnostic evidence of carpal tunnel syndrome were allocated into one of two groups: (1) experimental Kinesiotaping group (KG, tape applied with 40% tension from hand to medial epicondyle), and (2) Control Group („wait and see” - without tape applied). Following measures were used in the present study: BCTQ, DASH and VAS scale. In any of the groups reported no statistically significant improvement in the analyzed variables. In conclusion, there is no evidence on the efficacy of KT application for the treatment of CTS.

## **Introduction:**

Kinesiology taping (KT) is a therapeutic tool and has become increasingly popular within the sporting arena and daily physiotherapy practice. It was developed by Dr. Kenzo Kase in the 1970's with the intention to alleviate pain and improve the healing of soft tissues. Many benefits of KT using, including: proprioceptive facilitation, reduced muscle fatigue and delayed-onset muscle soreness, pain inhibition and improvement of lymphatic drainage and blood flow were demonstrated in the literature [1].

Carpal Tunnel Syndrome can result from work related disorders or overuse. It involves sensory and motor deficits arising from median nerve compression. There are several treatment options which they can be broadly categorised into surgical and non-surgical. The various non-surgical methods include: use of hand brace, splinting of the wrist, ultrasonic therapy, laser therapy, oral steroids, non-steroid anti-inflammatory drugs (NSAIDs), oral vitamin B6, local injection of corticosteroids and physiotherapy [2,3]. However, conservative treatment choices are not always satisfactory. Therefore, modern rehabilitation still looking for an effective and non-invasive treatment options. One of this may be a kinesiology taping.

This study was conducted to detect the efficacy of Kinesio tape on the treatment of carpal tunnel syndrome.

## **Material and methods:**

In this randomized study, 32 participants (38 hands) of ages between 35-50 years with clinical and electrodiagnostic evidence of carpal tunnel syndrome were allocated into one of two groups: (1) experimental Kinesiotaping group (KG, tape applied with 40% tension from hand to medial epicondyle), and (2) Control Group („wait and see” - without tape applied). In patients with a two-handed CTS, clinical symptoms and efficacy of KT was evaluated in both hands.

For the present study, the Mueller Kinesiology Tape was used and applied on clean and dry skin. A piece of kinesiology tape from the middle of the fingers to the bend of the elbow with the hand-facing palm up was measured. Two diamond shapes in the tape was cut. Next, patient placed the middle and index finger through diamond holes. Physiotherapist removed of the paper backing from the tape and bring the patients wrist to full extension. Then, the end of the strip was anchored on the backside of hand and the lay it down with 40% stretch and ended at medial epicondyle with no tension. Tape was always administered by the same certified physical therapist. Kinesio Tape was applied at the beginning of the week, to stay on for 5 days, with a 2-day rest, for a total of three times.

Following measures were used in the present study:

1. BCTQ - *The Boston Carpal Tunnel Questionnaire (BCTQ)*, also referred to as the Levine scale, is a patient-based outcome measure that has been developed specifically for patients with CTS. It has two distinct scales, the Symptom Severity Scale (SSS) which has 11 questions and uses a five-point rating scale and the Functional Status Scale (FSS) containing 8 items which have to be rated for degree of difficulty on a five-point scale. Each scale generates a final score (sum of individual scores divided by number of items) which ranges from 1 to 5, with a higher score indicating greater disability [4].
2. DASH – *The Disabilities of the Arm, Shoulder and Hand* was developed by the American Academy of Orthopedic Surgeons as a region-specific instrument for measuring upper-extremity disability and symptoms. The items ask about the degree of difficulty in performing different physical activities because of the arm, shoulder, or hand problem (21 items), the severity of each of the symptoms of pain, activity-related pain, tingling, weakness and stiffness (5 items), as well as the problem's impact on social activities, work, sleep, and self-image (4 items). Each item has five response options. The scores for all items are then used to calculate a scale score ranging from 0 (no disability) to 100 (most severe disability) [5].
3. VAS – *Visual Analogue Scale* is a straight horizontal line of fixed length, usually 100 mm. The ends are defined as the extreme limits of the pain. A higher score indicates greater pain intensity.
4. The active range of motion (ROM) of carpal joints was assessed using a goniometer.

STATISTICA StatSoft version 10.0. was used. Descriptive statistics (mean and standard deviation) were performed. The differences between a before and after measurement were evaluated by non-parametric Wilcoxon signed-rank test. Statistical significance was set at  $P < 0,05$ .

## **Results:**

Clinical characteristics of both groups are presented in table 1. The scores obtained by subjects in BCTQ, DASH and VAS scale before and after kinesio taping intervention were shown in table 2. Values of carpal joint range of movement are demonstrated in Table 3.

**Table 1. Clinical characteristics of samples and level of differences between groups**

VARIABLES	Group I (n=16)	Group II (n=16)	p-value
Mean Age	42,21±8,85	44,69±9,11	0,753
Gender (female/male)	10/6	9/7	0,881
Dominant hand: right left	14 2	15 1	0,946
Total number of wrists	20	20	-
Stage of CTS: mild moderate	8 8	6 10	0,347
Duration of CTS in months (Mean±SD)	9,3±3,4	10,2±3,6	0,415

**Table 2. BCTQ, DASH and VAS: descriptive statistics (mean±standard deviation) and level of differences (p) before and after intervention**

VARIABLES	Group I			Group II		
	M±SD		p	M±SD		p
	before	after		before	after	
BCTQ - FSS	3,0±0,9	2,9±0,8	0,911	2,9±0,8	3,0±0,9	0,924
BCTQ - SSS	2,8±0,8	2,6±0,8	0,846	3,0±0,8	3,1±1,0	0,933
DASH	44,3±13,1	42,8±12,9	0,574	45,2±14,6	45,3±14,8	0,962
VAS	4,6±1,2	4,3±1,1	0,719	4,3±1,3	4,5±1,3	0,879

Notes: BCTQ-FSS: Boston Carpal Tunnel Questionnaire Functional Severity Scale; BCTQ-SSS: Boston Carpal Tunnel Questionnaire Symptom Status Scale;

**Table 3. Carpal joint range of movement: descriptive statistics (mean±standard deviation) and level of differences (p) before and after intervention**

VARIABLES	Group I			Group II		
	M±SD		p	M±SD		p
	before	after		before	after	
palmar flexion	60,0±8,5	61,3±9,4	0,461	62,0±7,7	62,3±8,2	0,838
dorsal flexion	54,0±7,2	58,1±7,1	0,074	52,8±8,8	52,5±8,4	0,917
radial deviation	11,0±2,5	11,3±2,8	0,875	11,5±2,0	11,4±2,2	0,967
ulnar deviation	26,0±5,0	26,8±4,8	0,699	28,5±4,0	28,3±3,7	0,902

## Discussion:

Kinesio Taping is used to successfully treat a variety of orthopedic, neuromuscular, neurological and medical conditions [6,7]. The goal of treatment for carpal tunnel syndrome is to

allow to return to normal function and activities and to prevent nerve damage and loss of muscle strength in fingers and hand. The narrow carpal tunnel physically restricts overused and compromised nerve tissue between its surrounding structures, causing pain, numbness, and/or tingling in the wrist and forearm and reducing or seriously hampering proper wrist function. Kinesio taping techniques can help decrease discomfort, increase range of motion, and increase function. Furthermore KT helps reduce inflammation by improving circulation of blood and lymph creating an environment that is conducive to healing [1,8]. However, to date still is little known about effect of KT method in carpal tunnel syndrome.

The present study was designed to determine the efficacy of Kinesio tape on the treatment of carpal tunnel syndrome in a mild and moderate degree of symptoms. Results of the study presented here showed no clinical benefits of KT use. The data presented in table 2 showed no significant differences between pre-treatment and post-treatment values in clinical group where KT was applied, as well as, in control "wait and see" group. However, in KT group mean values obtained in BCTQ, DASH and VAS scale after intervention were slightly better - compared to results obtained in control group, where mean scores increased to terms of baseline data.

Only in one previous study assessed effect of KT and described of this method as an alternative in treatment of CTS. Kulcu et al., in randomized, placebo-controlled study reported significantly improved in terms of VAS scores and BCTQ scores - compared to results in control group and splinting group. However, there was no association between grip strength and KT treatment [6]. In the present study, the carpal joint range of movement was also evaluated. According to values presented in Table 3, only in case of dorsal flexion noticeable increase active ROM were noted, but the result was no statistically significant ( $p=0,074$ ). Other motions were slightly better in KT group - compare to pre-treatment values. In control group, after 3 weeks of "wait and see", 3 from 4 movements direction were more restricted.

In conclusion, there is no evidence on the efficacy of KT application for the treatment of CTS. Further clinical studies with larger sample sizes are needed.

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