

# Efficacy of Kinesiological Taping in de Quervain's Tenosynovitis: Case Series and Review of Literature

## Quervain Tenosinovitinde Kinezyolojik Bantlamanın Etkinliği: Olgu Serisi ve Literatürün Gözden Geçirilmesi

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### ABSTRACT

**Objective:** Kinesiological tapes are used for therapeutic purposes to reduce the pain, improve the bioelectrical activity of the muscles, and to reduce the edema. The repetitive movements of the abductor pollicis longus and extensor pollicis brevis muscles result in pain in wrist. This is called De Quervain tenosynovitis. The aim of this study was to investigate the efficacy of kinesiological taping as a conservative treatment method for de Quervain's tenosynovitis.

**Methods:** Fifteen patients between 20 and 60 years of age who were treated with kinesiological taping for De Quervain's tenosynovitis included in the study. The pain and function scores before and after the implementation of kinesiological taping were gathered from patient files. Pain was measured using the visual analog scale (VAS), and functions were evaluated using the quick disabilities of the arm, shoulder, and hand (Q DASH) score and Michigan Hand Outcomes Questionnaire. The differences between the pre and post-treatment scores were observed to determine the efficacy of kinesiological taping in the treatment of de Quervain's tenosynovitis.

**Results:** All but three of the 15 patients showed improvement in pain and functional scores (VAS, Q DASH, Michigan). Favorable outcomes were obtained with kinesiological taping in terms of pain and function scores in 12 out of 15 patients included in our study indicates that kinesiological taping is a feasible and useful technique in de Quervain's disease. None of the patients suffered from any complications.

**Conclusion:** We pointed that kinesiological taping is an effective treatment method for de Quervain's tenosynovitis in terms of pain and function with no complication. According to this study kinesiological taping is a good alternative in the conservative treatment of de Quervain's tenosynovitis.

**Keywords:** Tenosynovitis, kinesiology, conservative treatment, De Quervain disease

### ÖZ

**Amaç:** Kinezyolojik bantlar ağrıyı azaltmak, kasların biyoelektrik aktivitesini arttırmak ve ödemi azaltmak için terapötik amaçlar için kullanılırlar. Abdüktör pollicis longus ve ekstansör pollicis brevis kaslarının tekrarlayan hareketleri el bileğinde ağrı ile sonuçlanır. Bu durum De Quervain tenosinoviti olarak isimlendirilir. Bu çalışmanın amacı, De Quervain'in tenosinovitinde konservatif bir tedavi yöntemi olarak kinezyolojik bantlamanın etkinliğini araştırmaktır.

**Yöntemler:** Çalışmaya, De Quervain'in tenosinoviti için kinezyolojik bantlama uygulanmış, 20-60 yaş arası 15 hasta dahil edildi. Kinezyolojik bantlamanın uygulanmasından önceki ve sonraki ağrı ve fonksiyon skorları hasta dosyalarından araştırıldı. Ağrı, visual analog scale (VAS) kullanılarak ölçüldü ve fonksiyonlar, quick disabilities of the arm, shoulder, and hand (Q DASH) ve Michigan Hand Outcomes Questionnaire kullanılarak değerlendirildi. Tedavi öncesi ve sonrası puanlar arasındaki fark De Quervain tenosinovitinin tedavisinde kinezyolojik bantlamanın etkinliğini göstermiştir.

**Bulgular:** On beş hastanın üçü dışında tüm hastaların ağrı ve fonksiyonel skorlarında (VAS, Q DASH, Michigan) düzelme görüldü. Çalışmamızdaki 15 hastanın 12'sinde kinezyolojik bantlamanın fonksiyonel sonuçlar üzerinde olumlu etkisi olduğu gözlemlendi. Hiçbir hastada komplikasyon gelişmedi.

**Sonuç:** Çalışmada kinezyolojik bantlamanın, De Quervain'in tenosinoviti tedavisinde ağrı ve işlev açısından komplikasyona neden olmayan, etkili bir yöntem olduğunu gördük. Bu çalışmaya göre, kinezyolojik bantlama, De Quervain'in tenosinovitinin konservatif tedavisinde iyi bir alternatiftir.

**Anahtar Kelimeler:** Tenosinovit, kinezyoloji, konservatif tedavi, De Quervain hastalığı

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## INTRODUCTION

De Quervain's disease (radial tenosynovitis) is caused by the entrapment of the tendons in the first dorsal compartment, at the area between the radial styloid and the extensor retinaculum (1). It is known to occur as a result of repetitive motion and overuse. The repetitive gliding movements of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) muscles result in a thickening of the extensor retinaculum, which leads to an entrapment of the tendons (2,3). This trauma may arise during sports or occupations which involve repetitive wrist movements or during daily tasks. The disease is also common in housewives who are exposed to manual work. The tenosynovitis causes symptoms such as pain at the radial styloid which increases with thumb movements and tenderness over the first dorsal compartment (2). The Finkelstein test, which provokes this pain, is used for diagnostic purposes (3). The disease is usually seen in the 5<sup>th</sup> and 6<sup>th</sup> decades, but recent studies show that it is also common during pregnancy and lactation (1).

There is no consensus on the treatment of de Quervain's tenosynovitis. Treatment options include rest, physiotherapy, analgesics, corticosteroid use, thumb spica splinting, and surgical repair (4,5). Kinesio logic taping has recently begun to be acknowledged as a conservative treatment option for de Quervain's tenosynovitis. Kinesio logic tapes are used for therapeutic purposes to reduce the pain, improve the bioelectrical activity of the muscles, and to reduce the edema (6-8).

Corticosteroid injection is one of the most effective methods of conservative treatment. Harvey et al. (4) reported a success rate of 80% with corticosteroid injection. However, the fact that corticosteroid injections may cause atrophy, hypopigmentation and tendon rupture is an important drawback (9-13).

Splinting with a thumb spica immobilizes the inflamed tissue, and preserves the range of motion and the muscle strength of the finger. However, during this treatment, the immobilization of the healthy connective tissue leads to some physiological and biomechanical changes, which disturbs tissue homeostasis. On the other hand, kinesio logic taping supports the inflamed and damaged tissue without immobilizing it (14). Long-term use of splints affects patient comfort and hinders daily activities according to our clinical observation. In contrast, kinesio logic taping does restrict hand and finger movements. On the contrary,

according to the application technique, kinesio logic taping helps with the thumb movements. This also improves compliance with treatment.

In the literature, kinesio logic taping has been shown to accelerate lymphatic drainage by stretching and lifting the skin during thumb movements. The increase in the lymphatic drainage causes the edema and inflammation to resolve more easily. Through these mechanisms, kinesio logic taping has become an alternative method for the treatment of radial tenosynovitis (15). In the literature, there is no clear information about the method of taping and its duration in de Quervain's disease.

The hypothesis of the study is that kinesio logic taping is a suitable method of treatment for pain and function in de Quervain's tenosynovitis patients.

## METHOD

This retrospective study was conducted between March 2017 and September 2017 in the orthopedics and traumatology outpatient clinic of training and research hospital. Twenty patients between 20 and 60 years of age who had symptoms of left or right radial tenosynovitis for 1 month and who were diagnosed with de Quervain's tenosynovitis were included in the study. During the study period, 5 patients who used non-steroidal anti-inflammatory drugs, received physiotherapy, were non-compliant with kinesio logic taping or were lost to follow-up were excluded. As a result, the study was conducted with 15 patients who received kinesio logic taping for 30 days, with the tapes being replaced with new ones every 7 days. None of the patients received any additional treatment such as splint, corticosteroid injection or exercises. All of the patients were housewives and no one had any sporting activity.

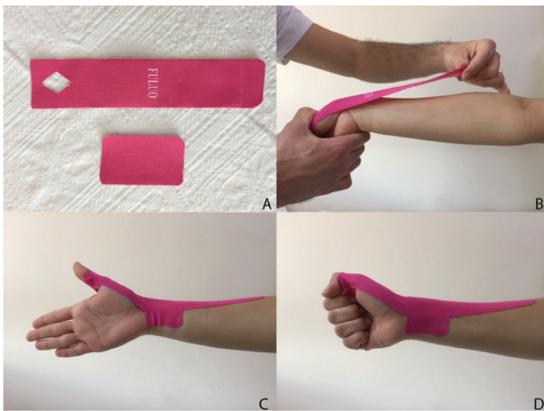
There are several different application methods in the literature. In our study, we preferred a functional support and anti-inflammatory application technique. Two tapes were used. The first was applied with 85% tension while the wrist was in the ulnar deviation and 1. metatarsophalangeal joint in flexion position. The other tape was applied to cover the 1st extensor compartment. The first tape is intended to provide mechanical support to the APL and EPB tendons, while the second tape is intended to demonstrate anti-inflammatory effect (Figure 1).

The pain and function scores before and after the implementation of kinesio logic taping were gathered from

patient files. Pain was measured using the visual analog scale (VAS), and functions were evaluated using the quick disabilities of the arm, shoulder, and hand (Q-DASH) score (16) and Michigan Hand Outcomes Questionnaire (17). The differences between the pre and post-treatment scores were observed to determine the efficacy of kinesiological taping in the treatment of de Quervain's tenosynovitis. The present study protocol was reviewed and approved by the hospital ethics committee (10.01.2018: 69).

### Statistical Analysis

All statistical analyses were performed using SPSS 24.0 (IBM Corporation, Armonk, New York, United States)



**Figure 1:** Taping procedure

**Table 1:** Patients' scores

No	Age (years)	Affected side	VAS.0	VAS.30	Q DASH.0	Q DASH.30	MICHIGAN.0	MICHIGAN.30
1	33	Left	8	7	61.4	90.9	40	22
2	38	Left	6	4	52.3	29.5	58	61
3	38	Left	10	8	86.4	70.5	11	41
4	51	Right	8	4	84.1	43.2	34	78
5	60	Left	10	9	95.5	86.4	18	24
6	42	Left	10	2	65.1	59.1	42	46
7	20	Left	6	8	61.4	68.2	56	36
8	38	Right	9	7	65.9	63.6	45	43
9	45	Left	7	6	45.5	31.8	45	68
10	40	Right	8	6	68.6	60.3	38	46
11	53	Right	8	4	68.2	22.7	39	82
12	38	Right	8	4	79.5	15.9	24	83
13	40	Left	7	4	68.2	52.3	36	50
14	41	Left	8	5	68.6	53.2	37	52
15	42	Right	9	6	70.2	54.4	38	54

VAS: Visual analogue scale, Q DASH: Quick disabilities of the arm, shoulder, and hand

program. The Pearson chi-square test was used to compare the variables. Variables were examined at 95% confidence level and  $p < 0.05$  was accepted as significant. Informed consent was obtained from volunteers who participated in the study. The present study protocol was reviewed and approved by the ethics committee of Tepecik Training and Research Hospital, İzmir, Turkey.

### RESULTS

Fifteen patients who fulfilled the inclusion criteria were analyzed. All patients were female and the mean age was 41.3 (20-60) years. The left wrist was involved in 9 patients and the right in 6 patients. None of the patients had bilateral tenosynovitis. All patients received kinesiological taping for one month, and the tapes were replaced once a week. The mean pre-treatment VAS score was  $8.13 \pm 1.3$  and the mean post-treatment VAS score was  $5.6 \pm 2$ . The mean pre-treatment Q-DASH score was  $69.4 \pm 12.9$  and the mean post-treatment Q-DASH score was  $53.5 \pm 21.9$ . The mean pre-treatment Michigan Hand Outcomes Questionnaire score was  $37.4 \pm 12.5$  and the mean post-treatment Michigan Hand Outcomes Questionnaire score was  $52.4 \pm 19.1$ . Three patients demonstrated unfavorable outcomes in all scoring systems. The changes in patient scores are presented in Table 1 and 2. None of the patients developed any complications. Correlation analysis data are shown in Table 3.

**Table 2:** Before and after treatment scores

	Before treatment	After treatment	p
VAS	8.13±1.3	5.6±2	0.002
Q-DASH	69.4±12.9	53.5±21.9	0.011
Michigan	37.4±12.5	52.4±19.1	0.023

VAS: Visual analogue scale , Q DASH: Quick disabilities of the arm, shoulder, and hand

**Table 3:** Correlation analysis data

	Mean	Standard deviation	Pearson correlation	p
<b>VAS.0</b>	8.13	1.30	0.16	0.56
<b>VAS.30</b>	5.60	1.96		
<b>Q-DASH.0</b>	69.39	12.86	0.28	0.31
<b>Q-DASH.30</b>	53.47	21.85		
<b>Michigan.0</b>	37.40	12.49	0.06	0.82
<b>Michigan.30</b>	52.40	19.07		

VAS: Visual analogue scale , Q-DASH: Quick disabilities of the arm, shoulder, and hand

## DISCUSSION

Conservative treatment options include activity modification, analgesics, corticosteroid injections, splinting and physiotherapy (18) The use of an immobilization splint in order to reduce the edema is one of the most approved treatment methods of de Quervain's tenosynovitis. However, long-term splint treatment may result in muscle atrophy. For this reason, researchers have tried to develop more dynamic treatment methods. Nemati et al. (19) have compared the effects of static and dynamic splints on finger grip strength and patient satisfaction and found that even though there was no significant difference between the two groups in terms of finger grip strength, patient satisfaction was higher in the dynamic splint group. Kinesiologic tape application is a fully dynamic method. Because it is aligned with the axis of movement of the muscles, it both supports the muscles and provides relative rest. It also reduces the edema by creating tension on the skin (20). We do not have a comparison group in our study. But our study supports the results of this comparative study. Patients included in the study were observed to benefit from treatment. It has been observed that patients do not survive the problem of compliance with treatment.

The use of corticosteroids, which is another conservative treatment method, has anti-inflammatory effects and causes a temporary reduction in pain, but it may also cause tendon weakening and rupture. Tendon ruptures have been

reported in the literature, especially after repeated steroid injections (21–23). No such complications are observed in kinesiologic taping treatment in our study and in literature.

In the study by Keynoosh Homayouni et al. (24) patients who underwent kinesiologic taping and patients who underwent physiotherapy were compared in terms of swelling and VAS scores and the results were in favor of kinesiologic taping. In addition, no complications were encountered with kinesiologic taping. In a systematic review evaluating the effectiveness of physiotherapy in the conservative treatment of soft tissue injuries of the hand and wrist, 11 studies were evaluated, and the use of thumb spica splint and kinesiologic taping were found to be effective short-term treatment methods in the conservative management of de Quervain's tenosynovitis (25).

The fact that favorable outcomes were obtained with kinesiologic taping in terms of pain and function scores in 14 out of 15 patients included in our study indicates that kinesiologic taping is a feasible and useful technique in de Quervain's disease. The small sample size, the lack of a control group, the shortness of the follow-up period and the retrospective study design are the limitations of our study. Patients stated that they could make their daily work more comfortable as a result of treatment. However, there is no objective data to measure this. On the other hand, the fact that the treatment was applied by the same doctor using the same method and that no additional treatments were administered are the strengths of our study. Larger prospective studies with control groups are needed in order to better evaluate the efficacy of the kinesiologic taping method.

## CONCLUSION

In conclusion, we believe that kinesiologic taping is a cheap, effective, and easy to implement treatment method with no complications, and thus a good alternative in the conservative treatment of de Quervain's tenosynovitis.

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## Ethics

**Ethics Committee Approval:** İzmir Tepecik Training and Research Hospital Local Ethics Committee 10.01.2018: 69 approval was obtained.

**Informed Consent:** Informed consent was obtained from volunteers who participated in the study.

**Peer-Review:** Externally and internally peer-reviewed.

### Authorship Contributions

Concept: İ.E.K., A.K., C.D.B., Design: İ.E.K., A.K., C.D.B., Data Collection or Processing: İ.E.K., A.K., V.Z., Analysis or Interpretation: İ.E.K., A.K., A.R., Literature Search: İ.E.K., A.K., V.Z., Writing: İ.E.K., A.K.

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