Majalah Ilmiah Fisioterapi Indonesia
Indonesian Scientific Journal of Physiotherapy

Case Reports
ISSN (Print): 2303-1921
ISSN (Online): 2722-0443
Volume 13, Number 3, Pages 430-435 (2025)
DOI: https://doi.org/10.24843/mifi.000000334

Effectiveness of Upper Limb Tension Test and Kinesiotaping in Carpal Tunnel Syndrome: A Case Report

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Received 22 August 2025; Revised 27 August 2025; Accepted 29 August 2025; Published 01 September 2025

Abstract

Introduction: Carpal Tunnel Syndrome (CTS) is a neuropathic disorder caused by compression of the median nerve, leading to pain, tingling, and impaired hand function. The Upper Limb Tension Test (ULTT) and Kinesiotaping are physiotherapy techniques that have shown individual benefits in managing CTS, yet their combined application remains underexplored. This case report aimed to evaluate the effectiveness of combining ULTT and Kinesiotaping in reducing pain and improving function in a CTS patient.

Methods: A 19-year-old female physiotherapy student diagnosed with CTS was treated with ULTT exercises to promote neural mobility and Kinesiotaping applied to the affected wrist to provide structural support and enhance circulation. Pain intensity was measured using the Visual Analog Scale (VAS) before and after the intervention. Observations on hand mobility and functional performance were also documented.

Results: The patient demonstrated a marked reduction in VAS pain scores following the intervention. Additionally, functional improvements in hand movement and daily activity performance were observed, suggesting enhanced neuromuscular performance and reduced soft tissue stress.

Conclusion: The combined application of ULTT and Kinesiotaping was effective in reducing pain and improving hand function in a young patient with CTS. This multimodal physiotherapy approach may provide a promising option for conservative management of CTS. Further studies are recommended to validate these findings in larger populations.

Keywords

Carpal Tunnel Syndrome, neuropathy, physiotherapy, Kinesiotaping, Upper Limb Tension Test

Introduction

Carpal Tunnel Syndrome (CTS) is a health condition caused by compression of the median nerve within the carpal tunnel of the wrist. Symptoms may vary, ranging from morning tingling sensations in the fingers, early fatigue, burning pain, numbness, or electric shock-like sensations in the fingers.[1] The median nerve is responsible for sensation in the thumb, index finger, middle finger, and part of the ring finger, and also contributes to the motor control of certain hand muscles.[2] The anatomical system of the wrist includes bones, muscles, ligaments, nerves, and blood vessels that work synergistically to produce synchronized movements.[3]

The prevalence of CTS in Indonesia, particularly in Central Java, is notably high. A study in Pekalongan reported a prevalence of 49.5% among workers with intensive wrist use. In Karanganyar, Central Java, 62% of workers in soy sauce and condiment factories were diagnosed with CTS.[4] In general, the prevalence of CTS among occupations involving repetitive wrist and arm movements ranges between 5.6% and 15%, underscoring the importance of addressing CTS risk factors in the workplace.[5]

Early symptoms of CTS are typically sensory disturbances, while motor deficits appear in more advanced stages. Sensory symptoms may include paresthesia, numbness, or electric shock-like sensations in the fingers, particularly in the radial one-third distribution consistent with the sensory area of the median nerve. Occasionally, these sensations may radiate to all fingers. Patients may also report pain, tingling, numbness in the median nerve projection area, burning sensations, reduced grip strength, and finger swelling.[6]

The Upper Limb Tension Test (ULTT) exercise is designed to mobilize neural structures, particularly the radial nerve. The procedure involves shoulder depression and internal rotation of the arm to approximately 10°. The ULTT aims to provoke symptoms by positioning the shoulder, elbow, forearm, wrist, and fingers in a way that places tension on neural structures.[7] Although no standardized dosage for ULTT exists, case studies on its use in physical therapy for CTS provide relevant insights. One study applied ULTT 3 with 8 repetitions, twice a week, in three sets for 10 minutes, focusing on stretching and strengthening.[8] This approach aims to enhance median nerve mobility and reduce CTS symptoms.

Kinesiotaping functions to maintain motor activity, improve blood and lymphatic circulation, and accelerate the healing of inflamed tissues. It is also effective in relieving pathological muscle tension. Kinesiotaping can directly

enhance muscle strength by facilitating concentric fascia contractions, thereby improving tissue contribution and promoting better muscle contractions and wrist function. Additionally, it may inhibit muscle spasms near the median nerve, reducing excessive pressure and thereby alleviating both sensory and motor symptoms of CTS [Oktaviani & Nurul Aktifah, 2021]. The analgesic effect is explained through the gate control theory, in which kinesiotaping enhances afferent input and mechanical receptor discharge toward the spinal cord. As a non-invasive therapy that does not interfere with daily activities, kinesiotaping may help reduce pain and improve functional hand status. When applied, kinesiotaping lifts the fascia and soft tissue, creating more space around inflamed areas.[9]

Previous research has shown that ULTT, particularly ULTT 1, is a reliable diagnostic and management tool for CTS. ULTT 1 has been proven effective in physical therapy assessment of CTS, although it primarily emphasizes elbow extension as a key measurement outcome. Other physiotherapy interventions have also demonstrated effectiveness in reducing pain, enhancing muscle strength, and improving hand function, including Transcutaneous Electrical Nerve Stimulation (TENS), ultrasound therapy, and strengthening exercises.[10]

This study aims to deepen understanding of the mechanisms of action of ULTT and kinesiotaping. Both interventions are believed to reduce pressure on the median nerve, facilitate tendon mobility, and improve blood circulation in the affected area, thus supporting the healing process and alleviating CTS symptoms. The combined use of these interventions is worth reporting, as few studies have examined their short-term effectiveness when used together.

While prior studies have demonstrated that ULTT helps alleviate symptoms such as pain and impaired hand use in CTS patients, this case report contributes further by explaining the underlying mechanisms by which ULTT benefits median nerve function and improves daily activities. Furthermore, this study presents a comparative perspective by integrating ULTT with kinesiotaping, allowing for better-informed clinical decision-making in choosing the most appropriate therapeutic intervention for CTS.

This case report focuses on a 19-year-old female physiotherapy student, Ms. N, who reported left-hand pain and tingling sensations, especially stiffness in three fingers, predominantly at night. Pain was aggravated by activities such as prolonged typing or motorcycle riding and significantly interfered with her academic and daily life. The symptoms had persisted for six months, associated with frequent laptop use. The patient also had a habit of using her phone while lying on her side, with the wrist bearing weight. She had a history of wrist injury but had not received specific physical therapy before, relying only on general stretching. She did not take any oral analgesics.

Methods

This study employed a case study design, selected for its capacity to explore in-depth the individual response of a patient to a combined intervention of Upper Limb Tension Test (ULTT) exercises and kinesiotaping in the management of Carpal Tunnel Syndrome (CTS). A case study was deemed more appropriate than an experimental design due to the relatively rare incidence of CTS among young individuals—particularly physiotherapy students—and the suboptimal response to previous conventional therapies. This approach enabled a detailed evaluation of the patient's condition before and after the intervention within a short timeframe.

The subject of this study was Ms. N, a 19-year-old physiotherapy student at Muhammadiyah University of Pekajangan, Pekalongan. The patient had no history of systemic disease, trauma, or other neurological disorders that could influence the study outcome. Inclusion criteria consisted of patients aged 18 to 25 years with a diagnosis of mild to moderate CTS and not currently undergoing other therapies. Exclusion criteria included acute injury to the upper extremity, allergy to kinesiotaping materials, or the presence of severe comorbidities.

The CTS timeline began in the first month, when the patient reported pain, tingling, numbness, and stiffness in the fingers of the left hand during activity. In the third month, the patient consulted a physiotherapist, underwent a physical examination and specific tests, and was diagnosed with CTS. By the seventh month, the symptoms had significantly interfered with daily activities. As the patient had not previously received medical or physiotherapy treatment, it was decided to initiate a combined intervention of ULTT exercises and kinesiotaping.

Physical examination revealed pain during flexion of the left wrist. Both Phalen's and Tinel's tests yielded positive results. The severity of numbness and tingling sensations was assessed using the Visual Analog Scale (VAS), with initial scores of 6/10 for both pain and numbness. No muscle atrophy or joint range of motion limitations were observed.

The CTS diagnosis was established based on clinical history, physical examination, and specific tests (Phalen's and Tinel's). A key diagnostic challenge was differentiating CTS from other peripheral neuropathies or cervical radiculopathy, thus necessitating thorough physical and medical history assessments. Electromyographic evaluation was not conducted due to facility limitations.

ULTT exercises were administered twice weekly, with each session consisting of three sets lasting 10 minutes each, over a period of four weeks. Exercises were supervised by a physiotherapist according to the standard protocol for median nerve mobilization. Kinesiotaping was applied every 2 to 3 days during the first two weeks or until the patient reported significant improvement. The taping technique followed established protocols for CTS, involving application on the wrist and forearm with 10–15% tension. Each application session lasted approximately 10 minutes, and the patient was educated on tape maintenance at home.

Pain intensity was measured using the VAS before and after the intervention. Descriptive analysis was used to compare VAS scores and the patient's subjective reports before and after the intervention. Evaluations were conducted at baseline, mid-intervention (week 2), and post-intervention (week 4). The data were analyzed to assess changes both numerically and qualitatively in response to the therapy.

After four weeks of intervention, the VAS pain score decreased from 6/10 to 3/10, and numbness symptoms were significantly reduced. The patient reported improved ability to perform daily activities and a reduction in the frequency of tingling. No adverse effects from kinesiotaping were observed.

This case study demonstrates that a tailored combination of ULTT exercises and kinesiotaping can yield optimal outcomes in managing CTS, particularly in younger patients. The detailed intervention protocol presented here may be applicable to similar cases. Physiotherapists are encouraged to individualize treatment plans based on patient characteristics and to conduct ongoing monitoring to ensure sustained therapeutic outcomes.

Results

Pain Assessment

To provide an overview of the patient's clinical status and treatment outcomes, the following tables present the vital signs and changes in pain scores during therapy sessions. The patient's baseline physiological condition was first assessed to ensure safety prior to intervention. Table 1 presents the patient's vital signs, including heart rate, respiratory rate, blood pressure, and temperature, which remained within normal ranges throughout the observation period.

Table 1. Vital Signs

Parameter	Value
Blood Pressure	130/80 mmHg
Respiratory Rate	20 breaths/min
Heart Rate	70 beats/min
Body Temperature	36°C

To evaluate the clinical effectiveness of the combined intervention, pain levels were monitored across therapy sessions. Table 2 summarizes the changes in pain scores, measured using the Visual Analog Scale (VAS), demonstrating a progressive reduction in pain intensity following treatment.

Table 2. Pain Scores Across Therapy Sessions

Pain Condition	Baseline (T0)	Final Session (T4)
At Rest	3	3
On Pressure	6	3
During Movement	3	3

Intervention Outcomes

The Upper Limb Tension Test (ULTT) was administered as a therapeutic intervention aimed at mobilizing the median nerve, thereby reducing pain and enhancing nerve mobility. ULTT sessions were conducted twice weekly, comprising three sets of 10-minute exercises over a four-week period. This approach aligns with established protocols for neurodynamic mobilization in cases of median nerve compression.

Kinesiotaping was applied every 2–3 days during the initial two weeks of therapy or until significant symptom improvement was observed. The taping technique targeted the wrist and forearm areas with a tension of 10–15%, adhering to standard kinesiotaping protocols for carpal tunnel syndrome (CTS). Each application session lasted approximately 10 minutes, and patients received guidance on tape maintenance at home.

Tendon Gliding Exercises were incorporated to facilitate median nerve mobilization and improve tendon excursion within the carpal tunnel. These exercises are designed to enhance flexibility and reduce the risk of adhesions, contributing to symptom relief in CTS.

Functional Improvements

Post-intervention assessments indicated a significant reduction in pain and an improvement in wrist mobility. The patient reported decreased tingling sensations and enhanced ability to perform daily activities. No adverse effects were associated with the ULTT or kinesiotaping interventions. However, it was noted that the kinesiotape occasionally detached due to the patient's physical activities, suggesting a need for improved adherence strategies in future applications.[11]

The combination of ULTT and kinesiotaping demonstrated efficacy in alleviating symptoms of CTS in a young adult patient. These findings are consistent with previous studies highlighting the benefits of neurodynamic techniques and kinesiotaping in managing CTS symptoms. The interventions contributed to pain reduction, improved nerve mobility, and enhanced functional capacity of the hand.[12]

Figure 1. Upper Limb Tension Test Exercise

Figure 2. Kinesiotape Application on Patient's Wrist

Note: The figure illustrates the proper application technique of kinesiotape on the patient's wrist, following the described protocol.

In conclusion, the integrated use of ULTT and kinesiotaping presents a viable non-invasive therapeutic approach for managing CTS, particularly in young adults. Further research with larger sample sizes is recommended to generalize these findings and optimize intervention protocols.

Discussion

The present study demonstrates that the combination of Upper Limb Tension Test (ULTT) exercises and kinesiotaping effectively reduces pain intensity in a patient with Carpal Tunnel Syndrome (CTS), as evidenced by a reduction in Visual Analog Scale (VAS) scores from 6/10 to 3/10 over a four-week intervention period. This finding supports the hypothesis that a multimodal approach targeting both neural mobility and soft tissue support may yield superior therapeutic outcomes compared to single-modality treatments.

ULTT functions by mobilizing and stretching the median nerve, which is often compressed in CTS, thereby improving axoplasmic flow, reducing intraneural edema, and facilitating peripheral nerve gliding.[13] Enhanced neural mobility has been associated with decreased nociceptive input and improved sensorimotor function in entrapment neuropathies.[14] Concurrently, kinesiotaping is believed to reduce subcutaneous pressure, improve lymphatic drainage, and facilitate proprioceptive input without restricting range of motion. The elasticity of the tape supports muscle activation and joint stability, contributing to functional improvement.[15]

When applied in combination, ULTT and kinesiotaping appear to act synergistically—ULTT enhances neural dynamics while kinesiotaping provides continuous mechanical and sensory support. This dual-action approach may be especially beneficial in the early to moderate stages of CTS, where reversible neurovascular compromise still predominates. This integrated strategy addresses not only the neural component of CTS but also its musculoskeletal and circulatory dimensions, aligning with contemporary principles of neurodynamic-based rehabilitation.[16]

Previous studies have largely investigated these modalities in isolation. For instance, Fitriani focused on the use of ULTT or passive modalities such as Transcutaneous Electrical Nerve Stimulation (TENS) and ultrasound. Similarly, Haikal Muhammad Rifqi et al. highlighted the efficacy of ULTT alone in reducing CTS symptoms. However, the limited exploration of combined interventions leaves a critical gap in evidence-based practice, particularly regarding synergistic effects and individualized treatment protocols. This study contributes to that gap by illustrating the potential of a combined, patient-centered approach.

Research by Lee et al. further supports the utility of kinesiotaping in CTS, demonstrating improvements in both pain and function. Compared to rigid splints, kinesiotaping provides dynamic support, enabling continued occupational function—a crucial consideration for populations such as students, office workers, and manual laborers. These populations often cannot afford complete immobilization, and thus benefit from interventions that maintain mobility while reducing symptom burden.[17,18]

Despite these promising outcomes, this study has inherent limitations. As a single-case design, the findings cannot be generalized to a broader population. Individual variability, including the severity and chronicity of CTS, comorbid conditions, and adherence to the therapy protocol, may significantly influence outcomes. Furthermore, the

short duration of follow-up (four weeks) precludes conclusions about the long-term sustainability of the observed improvements. Neuropathic symptoms may fluctuate over time, and the absence of long-term data limits the ability to assess recurrence rates or lasting functional gains.

Another important consideration is the lack of a control group or comparison to other standard interventions. The inclusion of a randomized control group receiving either a placebo, splinting, or another physiotherapeutic modality would strengthen the validity of the findings. Additionally, outcome measures beyond pain intensity, such as functional scales (e.g., the Boston Carpal Tunnel Questionnaire or grip strength assessments), would offer a more comprehensive evaluation of therapeutic impact.

Despite these limitations, this case underscores the potential clinical value of combining ULTT and kinesiotaping in the conservative management of CTS. As CTS is among the most prevalent entrapment neuropathies, particularly in occupations involving repetitive wrist activity, the development of effective, accessible, and patient-friendly interventions is of high priority in musculoskeletal and neurological rehabilitation.

Implications for future research include conducting larger-scale randomized controlled trials with long-term follow-up periods to assess the durability of effects and establish clinical guidelines. Future studies should also explore the influence of various patient factors (e.g., gender, hand dominance, occupational demands, and symptom duration) on treatment responsiveness. Comparative studies examining ULTT + kinesiotaping against standard treatments like corticosteroid injection, splinting, or surgery would provide valuable insights into their relative efficacy and cost-effectiveness.

In conclusion, the integration of ULTT and kinesiotaping represents a promising, non-invasive approach for managing CTS symptoms, especially in individuals requiring sustained hand functionality. This multimodal strategy aligns with the broader trend in physiotherapy towards individualized, function-oriented care and may contribute to optimizing rehabilitation outcomes in clinical practice.

Conclusion

Based on the identified clinical problem and the patient's condition, the physiotherapy intervention provided in this case consisted of Upper Limb Tension Test (ULTT) exercises and kinesiotaping. This study aimed to evaluate the effect of combining ULTT exercises with kinesiotaping on pain reduction in a patient with Carpal Tunnel Syndrome (CTS). The objective was successfully achieved, as the combined intervention yielded positive results in terms of both pain reduction and improved wrist function.

Over the course of the intervention period, this case study demonstrated that the integration of ULTT exercises and kinesiotaping holds significant potential in alleviating pain and enhancing functional ability in individuals with CTS. However, further research with more robust study designs—such as randomized controlled trials involving larger sample sizes and long-term follow-up—is necessary to confirm these findings. Comparative studies with control groups are also needed to validate the long-term effectiveness and clinical applicability of this multimodal approach.

Author Contribution

Shoffiyatul Mardhiyyah: Conceptualization, Data Collection, Intervention, Writing – Original Draft.
Shofi Adila: Supervision, Methodology, Validation, Writing – Review & Editing.
Siti Sardianti Dwi Tirta: Resources, Project Administration, Critical Review, Writing – Review & Editing.

Acknowledgments

This study and the preparation of the manuscript were made possible through the support and contributions of various individuals and institutions. We extend our deepest gratitude to Universitas Muhammadiyah Pekajangan Pekalongan for providing the facilities and support throughout the research process. With great respect, we express our sincere appreciation to Mrs. Siti Sardianti DT, S.Tr.Kes., M.Fis., our academic supervisor, for her valuable guidance, direction, and constructive feedback during the preparation of this manuscript.

We would also like to thank all the faculty members and staff of the Undergraduate Physiotherapy Program at Universitas Muhammadiyah Pekajangan Pekalongan for their knowledge and support. This article is part of a research proposal submitted in partial fulfillment of the requirements for the bachelor's degree at Universitas Muhammadiyah Pekajangan Pekalongan. We hereby confirm that the patient has provided informed consent for the publication of this article.

Conflict of Interest Statement

The authors declare no conflicts of interest related to this study.

Funding Sources

This study received no specific funding from public, commercial, or not-for-profit organizations.

Ethics Statement

This case report adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from the patient for participation and publication of anonymized clinical information.

References

1. Faizah AH. Penatalaksanaan fisioterapi pada pasien carpal tunnel syndrome dextra dengan ultrasound (US) dan nerve gliding exercise [Skripsi]. Semarang: Universitas Widya Husada Semarang; 2022.

2. Triana D, Agustini D, Bustamam DN. Hubungan konfigurasi tangan, pergelangan tangan dan pergerakan repetitif terhadap skor Boston Carpal Tunnel Questionnaire pada pekerja sewing di pabrik sepatu. In: Prosiding Seminar Nasional Riset Kedokteran; 2020. p. 162–72.
3. Sihaloho YC, Ismunandar H, Maulana M. Penatalaksanaan sindrom terowongan karpal: tinjauan literatur. Medula. 2024;14(11):2177–82.
4. Setyawan H. Risk factors of carpal tunnel syndrome in food-packing workers Karanganyar. Kesmas Natl Public Health J. 2017;11(3):123–6.
5. Dzaki FF, Fidiana D, Kusumawardani MK, Fadil D. Occupational risk factors, job types, and physical activity in carpal tunnel syndrome: a literature review. Int J Res Publ. 2023;140(1).
6. Khayana SA, Ravinka RE, Thalib MS. Laporan kasus carpal tunnel syndrome pada petugas data analis. J Akta Trimedika. 2024;1(3):276–84.
7. Mumpuni W. Penatalaksanaan fisioterapi dengan modalitas ultrasound dan mobilisasi saraf teknik Upper Limb Tension Test 1 pada carpal tunnel syndrome. Jurnal Fisioterapi. 2021;4:1–7.
8. Alfaini J. Penatalaksanaan fisioterapi pada kasus De Quervain syndrome sinistra dengan ultrasound dan terapi latihan [Skripsi]. Surabaya: Universitas Widya Husada; 2021.
9. Rifqi HM, Arsyiana F, Sanyoto DD. Efektivitas kinesio taping dan exercise terhadap intensitas nyeri pada pasien carpal tunnel syndrome. Homeostasis. 2022;5(1):161–70.
10. Kartika S, Pradana NW, Perdana SS. Penatalaksanaan program fisioterapi pada carpal tunnel syndrome (CTS): case report. Cont Med Educ. 2023;378–85.
11. Talebi GA, Oskouei AE, Shakori SK. Reliability of upper limb tension test 1 in normal subjects and patients with carpal tunnel syndrome. J Back Musculoskelet Rehabil. 2012;25(3):209–14.
12. Tomás-Escolar A, Merino-Andrés J, Sánchez-Sierra A, Aceituno-Gómez J, Fernández-Pérez JJ. Short-term effectiveness of kinesio taping as therapeutic tool in conservative treatment of carpal tunnel syndrome: a systematic review and meta-analysis. Physiother Res Int. 2023;28(3):e1986.
13. Wibisono LS, Najizah F, Patrisia NKKD, Purwanti LF. The effect of ULLTT on reducing pain in carpal tunnel syndrome cases. Int Sci Health J. 2023;1(3):31–41.
14. Goyal M, Mehta S, Rana N, Singal R, Mittal A, Goyal K, et al. Motor nerve conduction velocity and function in carpal tunnel syndrome following neural mobilization: a randomized clinical trial. Int J Health Allied Sci. 2016;5(2):104–9.
15. Tornatore L, De Luca ML, Ciccarello M, Benedetti MG. Effects of combining manual lymphatic drainage and kinesiotaping on pain, edema, and range of motion in patients with total knee replacement: a randomized clinical trial. Int J Rehabil Res. 2020;43(3):240–6.
16. Zaheer SA, Ahmed Z. Neurodynamic techniques in the treatment of mild-to-moderate carpal tunnel syndrome: a systematic review and meta-analysis. J Clin Med. 2023;12(15):4888.
17. Talay Calis H, Aslaner H, Dogan Sunkak S, Sedefoglu N, Tomruk Sutbeyaz S, Guler E. Comparison of therapeutic effectiveness between kinesio taping technique and static resting splint in carpal tunnel syndrome. Eur J Ther. 2021;27(1):14–9.
18. Mansiz Kaplan B, Akyuz G, Kokar S, Yagci I. Comparison of the effectiveness of orthotic intervention, kinesiotaping, and paraffin treatments in patients with carpal tunnel syndrome: a single-blind and randomized controlled study. J Hand Ther. 2019;32(3):297–304.