

Philadelphia College of Osteopathic Medicine

DigitalCommons@PCOM

PCOM Physician Assistant Studies Student
Scholarship

Student Dissertations, Theses and Papers

1-1-2022

Does the application of KT tape decrease pain in chronic low back pain?

Jordan Vitelli

Philadelphia College of Osteopathic Medicine

Follow this and additional works at: https://digitalcommons.pcom.edu/pa_systematic_reviews



Part of the [Mental Disorders Commons](#), and the [Physical Therapy Commons](#)

Recommended Citation

Vitelli, Jordan, "Does the application of KT tape decrease pain in chronic low back pain?" (2022). *PCOM Physician Assistant Studies Student Scholarship*. 637.

https://digitalcommons.pcom.edu/pa_systematic_reviews/637

This Selective Evidence-Based Medicine Review is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Physician Assistant Studies Student Scholarship by an authorized administrator of DigitalCommons@PCOM. For more information, please contact jaclynwe@pcom.edu.

Does the application of KT tape decrease pain in chronic low back pain ?

Jordan Vitelli, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Masters of Science

In

Health Sciences -- Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
Philadelphia, Pennsylvania

December 17, 2021

ABSTRACT

Objective: The objective of this selective EBM review is to determine “Does the application of KT tape decrease pain in chronic low back pain?”

Study Design: A systematic review of three randomized controlled trials (RCTs) published between 2018 and 2019.

Date Sources: The three RCTs were published in English in peer reviewed journals and obtained from PubMed. The studies were selected based on their relevance to the clinical question.

Outcome Measured: The outcome measured within all three RCTs was pain intensity using the Visual Analog Scale (VAS). The VAS scoring ranges from 0 to 10, defining 0 as no pain and 10 as intolerable pain. Participants’ pain level was assessed before the intervention of KT tape and after at, which varied in length between studies.

Results: In the RCT led by Mengi et al., KT with fascia correction did not lead to a statistically significant reduction in pain compared to the sham KT group ($P > 0.05$), which was indicated by mean difference 0.4 between the two groups after 21 days. In the RCT led by Marcedo et al, KT tape (KTT) with tension led to statistically significant reduction in pain after 3 days as well as the sham KT group ($P < 0.001$). The difference between their mean changes of 0.1 was calculated to not be clinically significant ($P = 1.000$). In the RCT led by Uzunkulaoğlu et al., KT tape led to a statistically significant reduction in pain compared to the control, indicated by a mean difference of 2.07 between the groups after one month of intervention.

Conclusion: The results from the separate three RCTs within this review were conflicting in determining if KT tapes reduction in pain intensity was clinically significant. The results of this review were inconclusive in evaluating application of KT as an effective method of adjunctive treatment for non-specific low back pain. Further studies should determine the gold standard technique of application as well as duration of treatment.

Key Words: chronic low back pain, kinesio tape or KT, pain

INTRODUCTION

Low back pain is defined as a musculoskeletal disorder characterized by pain, stiffness, or muscle tension localized below the costal margins and above the inferior gluteal folds. In addition to a history, further investigation, such as MRIs and XRays, are utilized to uncover the exact etiology of a patient's pain. In the setting of inconclusive imaging with persisting pain greater than 12 weeks, a diagnosis of chronic nonspecific low back pain is considered to be "ruled in." Low back pain is a very common symptom that affects those of all ages with a lifetime prevalence in the United States of 70-85%.¹ For those under 45 years old, it is noted to be the most common cause of physical activity limitations, a leading cause of lost work, as well as the second leading cause of disability.^{1,2} Coinciding with the high prevalence, low back pain also accounts for roughly \$50 billion in medical cost annually.¹

With a nonspecific complaint of low back pain, it is important for practitioners to conduct diagnostic studies in order to rule out serious pathology that can commonly present as such. This includes, but is not limited to, disorders of the lumbar spine such as compression fractures, cauda equina, disc herniation, or spinal stenosis. When these pathologies are able to be excluded, nonspecific low back pain is considered to be the diagnosis with treatment aimed at pain reduction as well as increasing their strength and range of motion. Current management options are individualized and can be multidimensional including physiotherapy, pharmacological therapy, and cognitive behavioral therapy. For the acute management of pain, nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen can be useful, reserving muscle relaxants and narcotics for severe pain.^{1,3} The most frequently utilized method of management is physical therapy. The goal of physical therapy is aimed at improving the strength and range of motion of

the low back muscles.³ This can be used alone or in combination with other physiotherapy techniques such as hot/cold compresses and acupuncture.

Although physical therapy and NSAID use are effective in the acute management of low back pain, patient compliance and the side effects of long term NSAID use are barriers to sustained relief for chronic pain. Developed in the late 1970s, kinesio taping (KT) is an elastic bandage that can be applied over the skin that has been a popular modality in the management of sports injuries.² While the exact mechanism of KT tape is not clearly understood, it has shown to be effective in a variety of ways. It is hypothesized it accelerates the recovery of joints, muscles, and soft tissues by improving the flow of blood and lymph, while also reducing muscle tension and pain.^{3,4,5} Therefore, KT tape offers a low maintenance, cost effective option to help reduce pain and improve the range of motion of the back muscles. This paper evaluates three randomized controlled trials comparing the effectiveness of KT tape for management of pain for patients experiencing chronic nonspecific low back pain.

OBJECTIVE

The objective of this selective EBM review is to determine “Does the application of KT tape decrease pain in chronic low back pain?”

METHODS

The studies included in this systematic review were selected based on their relevance to the clinical question along with satisfying the criteria for population, comparison, intervention, and outcome measured. The investigation of articles included the use of PubMed. Keywords utilized to further guide the search included “chronic low back pain”, “kinesio tape”, “KT”, and “pain”. Inclusion criteria consisted of randomized controlled trials, studies published after 2010, and a population of adults. Exclusion criteria included acute low back pain and studies published

prior to 2010. All articles were found to be published in English in peer reviewed journals after 2010.

The population being analyzed are adults with a clinical diagnosis of chronic non-specific low back pain. All the studies compared a placebo group with sham taping to the intervention group with KT tape. The outcome measured was pain intensity using the visual analog scale at baseline and at the end of treatment. In each study, statistical analysis was accomplished by using mean change from baseline and p-values. Table 1 includes supplemental information of demographics and characteristics specific to each study.

Table 1. Demographics & Characteristics of Included Studies

Study	Type	# Patients	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Mengi ³ 2019	Double blinded RCT	125	Adults 20 - 65 yrs	Age between 18-65 yrs, having chronic non-specific LBP > 3 months without leg pain, VAS score of ≥ 3	Neurological deficit, lumbar surgery hx, lumbar stenosis, spondylolisthesis, central or peripheral nervous system disorders, inflammatory LBP, fibromyalgia, severe osteoporosis, or osteomalacia, active psychiatric disease, infectious, malignancy hx, pregnancy, skin conditions	33	KT tape vs placebo group with sham taping Tape was applied for 3 weeks with 5 day intervals . Both groups received physiotherapy modalities and exercise therapy
Macedo ⁴ 2019	RCT	108	Adults > 18 yrs	Age between 18 and 50 yrs, having chronic non-specific LBP > 3 months.	Dx of fractures or tumors in the spine, ankylosing spondylitis, disc herniation, spondylolisthesis with neurological involvement, lumbar stenosis, previous spinal surgery, fibromyalgia and any central or peripheral neurological diseases.	10	KT tape vs placebo group with sham taping. Tape was applied for 3 days
Uzunkulaoğlu ⁵ 2018	RCT	60	Adults 19-25	Aged 18-30, chronic non-specific LBP, min VAS of 3	Congenital spinal pathology, spinal surgery hx, pregnancy, skin conditions, lumbar disc herniation, rheumatoid arthritis or spondyloarthropathy, or physical therapy for LBP during previous 6 months	0	KT tape vs placebo group sham taping. Tape was applied 6 x for intervals of 3 days x 15 days

OUTCOME MEASURE

The patient-oriented outcome measured in all three RCTs was pain intensity using the Visual Analog Scale (VAS). The subjective scale provides a numerical value to pain by defining no pain as 0 and intolerable pain as 10. Each study assessed participants' pain at baseline, at the end of their specific treatment duration, and at a follow up. Mengi et al. compared baseline to end of treatment at day 21 with a follow up at day 51.³ Macedo et al compared baseline to end of treatment at day 3 and a follow up at day 10.⁴ Uzunkulaoğlu et al compared baseline to end of treatment at day 30 in addition to a follow up at 6 months.⁵ In this systematic review, the mean change from baseline to the end of treatment per paper will be evaluated.

RESULTS

Mengi et al. conducted a double-blinded randomized controlled trial. Blinding was achieved by the utilization of blind evaluators as well as using sham KT tape in group 2. The study chose patients aged between 20 and 65 years old that were diagnosed with chronic nonspecific low back pain for at least 3 months with a baseline VAS score of greater or equal to 3.³ All groups received the same physiotherapy modalities, which included superficial heating, transcutaneous electrical nerve stimulation, in addition to an exercise program. These were performed at observed sessions that took place five days a week for three weeks with KT tape being reapplied every five days over the three week period. A total of 125 individuals enrolled in the study and were further randomized into one of four groups which are as follows; group one received physiotherapy modalities and exercise alone, group two received sham KT tape in addition, group three received KT with space correction, and group four received KT with fascia correction.³ There was a total loss of 29 patient's at the end of the study, which was distributed

fairly equally across the four groups, and was taken into consideration using a ‘worse case analysis’.³

The main outcome measurement was pain intensity using the Visual Analog Scale (VAS). Patients’ pain was assessed at baseline, at the end of treatment (Day 21), and one month after treatment at (Day 51).³ The study utilized mean values with standard deviation (\pm) at each interval and p-values to analyze if the effectiveness of the interventions were statistically significant. For the purpose of this systematic review, the pain intensity of group 2 and group 4 at baseline and Day 21 will be compared. Group 2 had a mean pain intensity at baseline was measured at 6.1 ± 1.9 and 2.9 ± 2.5 at Day 21, with a mean difference of 3.2.³ Group 4 at baseline measured a mean pain intensity of 6.1 ± 1.5 and 2.5 ± 1.2 at Day 21, with a mean difference of 3.6.³ A summary of results can be found in Table 2 below. The mean difference between the groups was calculated to be 0.4 difference and was found to not be statistically significant ($P > 0.5$).³

Table 2. VAS Change in Pain Intensity from Baseline to End of Treatment at Day 21

	Before Treatment (Mean \pm STD)	Day 21 (Mean \pm STD)	Mean Change from Baseline	P-Value
Group 2	6.1 ± 1.9	2.9 ± 2.5	3.2	<0.05
Group 3	6.1 ± 1.5	2.5 ± 1.2	3.6	<0.05

Macedo et al. conducted a randomized controlled trial which shared similarities with Mengi et al. Blinding was attempted to be preserved by coding the results prior to data analysis by a new group of researchers. The study enrolled 108 females with an average age of 25 with a diagnosis of chronic nonspecific back pain. They were randomly assigned by drawing numbers from concealed envelopes which placed them into one of four groups in a 1:1 ratio with 27 per group.⁴ For the purpose of this review, the KT tape with no tension (KTNT) and KT with tension (KTT) will be compared. The KT tape was applied at baseline and instructed to remain until the

re-evaluation at Day 3. A total of ten participants were lost by the end of the study which included one from CG, three from KTT, two from KTNT, and four from MP.⁴

The primary outcome of interest was self-reported pain intensity using the VAS. Participants' pain was assessed at baseline, the end of intervention (Day 3), as well as a follow up (Day 10). The study analyzed the results by computing the mean value of a group at each interval with a standard deviation (\pm STD), in addition to a p-value of < 0.001 to define statistically significant changes.⁴ The intervention group, KTT, had a mean pain intensity of 4.9 ± 1.9 at baseline and a 2.5 ± 1.7 at the end of the intervention. The mean change of baseline, 2.4, was found to be clinically significant with p-value < 0.001 .⁴ For the purpose of this systematic review, the KTNT group will be used as the placebo group. This group had similar baseline and Day 3 mean values to the intervention group, therefore their mean change of 2.4 was also found to be statistically significant.⁴ KTT X KTNT calculated to have a mean difference of 0.1 with a 95% confidence interval of -1.5-1.5 and p-value of 1.000.⁴

Table 3. VAS Change in Pain Intensity from Baseline to End of Treatment at Day 3

	Before Treatment (Mean \pm STD)	Day 3 (Mean \pm STD)	Mean Change from Baseline	P-Value
KTT	4.9 \pm 1.9	2.5 \pm 1.7	2.4	<0.001
KTNT	4.9 \pm 1.8	2.5 \pm 1.0	2.4	<0.001

Uzunkulaoglu et al. conducted a randomized control trial. Blinding was achieved through using blind raters as well as sham taping as the placebo, therefore patients and psychiatrists were unaware of treatment allocation. The study included 60 patients, 22 males and 38 females, with a mean age of 21.⁵ Similar to Mengi et al, the participants enrolled must have a diagnosis of chronic nonspecific low back pain with a minimum VAS score of 3. Participants were randomly assigned to either the intervention group (KT) or the placebo group, sham KT tape, in a 1:1 ratio.

The KT tape was reapplied a total of six times by a physiotherapist at intervals of three days for 15 days.⁵ There were no participants lost by the end of the study.

The primary outcome measurement was pain intensity using the VAS. The participants' pain intensity was measured at baseline, at the end of treatment (one month), and at a 6 month follow up.⁵ To analyze the data, the study used mean value with a standard deviation (\pm STD) at each interval in addition to a p-value to determine statistical significance. The intervention group (KT) was found to have a baseline pain at 5.97 ± 1.299 compared to one month's pain at 3.23 ± 1.006 .⁵ Their mean change was calculated to be 2.74 and was found to be statistically significant ($P < 0.05$).⁵ The placebo group had a baseline VAS score of 5.80 ± 1.627 and a score of 5.13 ± 1.408 at the end of treatment. With a mean change in pain intensity from baseline of 0.67, the difference was also found to be statistically significant.⁵ In comparing the mean change from baseline between the two groups, the KT group had a much larger change from baseline and was found to be statistically significant ($P=0.000$).⁵

Table 4. VAS Change in Pain Intensity from Baseline to End of Treatment at One Month

	Before Treatment (Mean \pm STD)	One Month (Mean \pm STD)	Mean Change from Baseline	P-Value
Control	5.80 \pm 1.627	5.13 \pm 1.408	0.67	<0.05
Intervention	5.97 \pm 1.299	3.23 \pm 1.006	2.74	<0.05

DISCUSSION

Chronic nonspecific low back pain is a debilitating condition that will affect more than the majority of the population at some point in their lifetime. It has been proven to be the leading cause of lost work time and most common cause of physical activity limitations across the United States. Current management is individualized and multidimensional including physiotherapy modalities such as physical therapy, heat/cold compresses in addition to pharmacological treatment. Barriers to current treatment include patient compliance, side effects

of long term NSAIDs use, and insurance coverage for long term physical therapy visits. The extremely high prevalence of chronic nonspecific low back pain argues for further evaluation of possible new treatment options to alleviate its crippling effects on the population. KT tape offers a low maintenance, cost effective option to help reduce pain and improve the range of motion in patients' back muscles.

This systematic review evaluated the efficacy of KT tape on pain reduction for patients with chronic nonspecific low back pain. Isolating the treatment groups values alone, each study was able to determine clinically significant reduction in pain from baseline with the utilization of mean change and p-value. Similar results were also found for the placebo groups, with sham KT tape, as well. Within Macedo et al. and Mengi et al., although each group's reduction in pain separately was clinically significant, the difference between the mean changes was not statistically significant enough to conclude treatment with KT tape was effective. This is in contrast to the findings in Uzunkulaoğlu et al. In this study, even though the placebo group's reduction in pain was likely not due to chance, the change that the treatment group had of 2.74 was significantly more than the placebo group.⁵

A limitation of this systematic review is the result of the variability of KT tape application technique and treatment duration chosen by each study. Considering there is no current gold standard for duration of treatment or application method of KT for chronic nonspecific low back pain, each study differed. Therefore, this review is unable to conclude if these factors could have affected the efficacy of KT tape.

In the study conducted by Macedo et al., a few factors could have affected the validity of their results. First, the study did not conduct a 'worse case analysis' on the 10 patients lost. Secondly, it can be argued a duration of treatment of 3 days, in comparison to the other studies,

was not efficient enough to have an effect. Throughout all three studies, in efforts to reduce bias, sham KT tape was used as a placebo group. Additionally, Mengi et al. and Uzunkulaoğlu et al. used blinded raters, while Macedo et al. used a new set of researchers to analyze the data sets to aid in the reduction of bias and improving the validity of the results. It is important to note Mengi et al. and Macedo et al. did have control groups with no KT tape which the treatment group was found to have a clinically significant difference in pain reduction when compared to them. Therefore, while sham KT tape reduces bias by blinding the patients of their intervention, it may introduce a false sense of improvement in the placebo group which could affect the validity of the results.

CONCLUSION

The treatment groups in each individual study were found to have clinically significant mean changes from baseline, determining that the decrease in pain intensity was not due to chance. Although, when compared to the mean change of a placebo group, the difference between the groups was only found to be significant in Uzunkulaoğlu et al. Since all three studies included in this review were unable to demonstrate KT tape as an effective treatment for reducing pain in chronic nonspecific low back pain, the evidence is inconclusive. Furthermore, the studies included populations from single locations, such as Turkey and Brazil, limiting the generalizability of the results. Considering the high prevalence of this condition, it would be beneficial for future research to encompass a more diverse population. To be able to accurately evaluate the effectiveness of KT tape, it is important for future studies to also analyze different methods of application and to separately determine efficient duration of treatment. Only once a gold standard application technique and duration are defined, can the efficacy of KT tape be correctly investigated.

REFERENCES

1. Ronai P, Sorace P. Chronic nonspecific low back pain and exercise. *Strength and Cond J*. 2013;35(1):29-32. doi:10.1519/SSC.0b013e3182822bb1
2. Maher C, Underwood M, Buchbinder R. Non-specific low back pain. *The Lancet*. 2017;389(10070):736-747. doi:10.1016/S0140-6736(16)30970-9
3. Mengi A, Özdolap Ş, Köksal T, Köktürk F, Sarıkaya S. Comparison of effectiveness of different kinesiological taping techniques in patients with chronic low back pain: A double-blind, randomized-controlled study. *Turkish J Phys Med Rehabil (2587-0823)*. 2020;66(3):252-261. doi:10.5606/tftrd.2020.3712
4. Macedo LdB, Richards J, Borges DT, Melo SA, Brasileiro JS. Kinesio taping reduces pain and improves disability in low back pain patients: a randomised controlled trial. *J Physiother*. 2019;105(1):65-75. [https://www.physiotherapyjournal.com/article/S0031-9406\(18\)30154-8/](https://www.physiotherapyjournal.com/article/S0031-9406(18)30154-8/). doi:10.1016/j.physio.2018.07.005
5. Uzunkulaoglu A, Aytakin MG, Ay S, Ergin S. The effectiveness of kinesio taping on pain and clinical features in chronic non-specific low back pain: A randomized controlled clinical trial. *Turk J Phys Med Rehabil (2587-0823)*. 2018;64(2):126-132. doi:10.5606/tftrd.2018.1896