Musculoskeletal Annotated Bibliography

Clinical Question: “Is Kinesio taping effective in improving ROM and/or pain in the treatment of shoulder injuries?”


Findings: This study was a prospective, randomized, double-blinded clinical trial of 42 subjects with shoulder pain. Subjects were randomized to two groups, one group received therapeutic Kinesio taping; the other “sham” Kinesio taping. One author applied all tape, while another blinded author performed all measurements. A repeated measures design looked at three outcomes: the Shoulder Pain and Disability Index (SPADI), pain-free active range of motion (ROM), and pain measured on a 100-mm visual analog scale (VAS). These outcomes were assessed at baseline, immediately after the application of Kinesio tape (KT), 3 days after application, and 6 days after application. The authors predetermined a 20-mm decrease on the VAS by day 6 to be considered clinically meaningful.

The authors found no meaningful differences between the two groups at baseline, demonstrating success of randomization. The immediate post-application assessment showed a statistically significant difference of 19.1 degrees (p<.0005) in pain-free shoulder abduction in the treatment group versus the sham group. While all ROM measures (abduction, forward flexion and scapular plane elevation) were higher in the treatment group, this initial finding was the only one which demonstrated statistical significance between groups. Both groups significantly improved over time with a main effect for change in all outcomes measures by day 6 (p<.001).

Strengths: This study was well designed with regard to randomization, blinding of the researcher taking all measurements, and inclusion/exclusion criteria. Additionally, the same therapist applied all taping, and one blinded therapist performed all measurements which eliminated the issue of inter-rater reliability. This study is also strong in that it is the first prospective, randomized, blinded clinical trial to evaluate the efficacy of what is considered therapeutic Kinesio taping of the shoulder.

Caution: All subjects in this study were cadets in a United States military academy, predominantly male (36 men, 6 women) and the age range was 18-24 years. These subject characteristics limit the generalizability of the study to the general population. Additionally, as the subjects were young and otherwise in good health, improvement over time was expected.
thus making it difficult to assess the true effect of the tape applications. The most critical weakness was the lack of a true control group which received no KT at all. The authors acknowledge that previous literature has demonstrated a strong placebo effect of taping in other musculoskeletal conditions, and the lack of a control group makes it impossible to rule out a placebo effect in this study. A final caution is the relatively small sample size; a trend toward increasing pain-free ROM across all measures was found and might have shown significance in a larger sample with greater power.

**Implications:** The authors concluded that therapeutic KT application for individuals with shoulder pain may provide an early benefit for pain free shoulder abduction immediately following application. Future clinical trials are recommended by the authors to include a control group and a larger sample size. An additional consideration would be a more specific diagnosis than simply shoulder pain, such as impingement syndrome.

**Comparison:** Overall, this study was the best designed. Williams' meta-analysis (included in this bibliography) agreed, giving the Thelen study their highest rating of 4 (defined as a controlled experimental study, with randomization of subject allocation, and blinding of subjects and assessors). A repeat trial with this design with a broader demographic range of subjects and a control group would provide valuable information.


**Findings:** This study compared two groups of subjects with shoulder impingement syndrome. Group 1 (n=30) received treatment with Kinesio tape (KT) three times, three days apart and performed a home exercise program. Group 2 (n=25) received traditional physical therapy for two weeks, which consisted of daily modalities and the same home exercise program as the KT group. The primary outcomes measure was the Disability of Arm, Shoulder, and Hand (DASH) scale; a secondary outcomes measure of function and pain using a visual analog scale (VAS) was also performed at baseline, week 1 and week 2 of treatment. All KT was applied by the same author, the two other authors performed the assessments. The authors found significantly lower pain scores in the KT group at week 1 (p<.01); however, there was no significant difference in these same scores at week 2. At the final assessment, both groups demonstrated significantly lower DASH and VAS scores compared to baseline, indicating equivalent
outcomes. The authors concluded that no difference existed for pain and/or disability measures between groups in this study.

**Strengths:** This study was strong with regard to patient inclusion and exclusion criteria; patients were clearly diagnosed with impingement syndrome. Additionally, subjects were well balanced with regard to age, duration of pain prior to the study, and baseline assessment scores. Additional strengths are that subjects included a wide range of ages, 18-70 years, and one therapist performed all KT applications.

**Caution:** This study’s reliance on a home exercise program is problematic as it is hard to verify that subjects actually completed these exercises; especially considering that patients were not randomized—they were sequentially enrolled. A better design would be to compare a KT + therapy group with a therapy only group and have all therapy completed with an actual PT. A third comparison with "sham" KT would also add to the study. Both groups originated with 30 subjects and Group 1, home exercise program only, lost 5 subjects to attrition. This disparity in sample numbers could have produced a drop out bias, making it difficult to judge accuracy of the results.

**Implications:** While no difference was found between groups at the final assessment, there was a statistically significant difference in favor of the KT group at the week 1 assessment for pain reduction. The authors reference the potential practical benefit of KT, which was applied every 3 days and is a very quick process, vs. daily PT modalities; thus concluding that when an immediate effect is needed, KT might be a preferred and more economical treatment option.

**Comparison:** While the design and statistical analyses were different between this study and the study by Thelen, et.al (also annotated in this bibliography), both studies found the benefit of KT to be in the early stages of treatment.


**Findings:** The authors identified 10 papers that met their criteria based on a Cochrane Collection methodology of review with the core requirements of: 1.) subject randomization, 2.) blinding of subjects, and 3.) blinding of assessors. These 10 papers all assessed the use of Kinesio taping for treatment and prevention of sports injuries.
Kinesio taping (KT) in the treatment and prevention of sports injuries and included injuries to the following: shoulder, neck, wrist, knee, ankle and back. With regard to pain, the authors found only one study looking at whiplash injuries which demonstrated a significant difference in pain in the KT group vs. a sham taping group; however, despite the statistical significance, the results did not support a clinically relevant difference. The authors found positive outcomes in range of motion in 4 of the 10 studies, two of which evaluated shoulder injuries (one of these, Thelen, is included elsewhere in this bibliography). For the shoulder specific studies, one (Thelen) found a statistically significant improvement in only 1 of 9 ROM measures; however, the authors of this meta-analysis determined two other ROM outcomes to be clinically beneficial and concluded that KT has a small, immediate effect on pain-free shoulder ROM. The other shoulder study by Hsu (obtained, but not included in this bibliography) also demonstrated only one positive ROM outcome measure for the KT group—statistically significant improvement in scapular orientation for posterior tilt at 30 and 60 degrees of humeral elevation. The authors of this annotated bibliography determined these results to also be clinically relevant and concluded the overall effect of KT to be trivial.

**Strengths:** This meta-analysis clearly defined the population (injured athletes) and specific study design criteria (randomized, double-blinded) they wished to assess. The results included a broad range of injury types and a limited number of studies (10), leading to the very important conclusion that, while some benefit may exist for the use of KT in injured athletes, the evidence is very limited and additional research is necessary. The authors also verified the need for appropriate blinding and a “sham” taping placebo group.

**Caution:** The primary caution of this study is the limited number of studies which met the authors’ criteria for inclusion. However, this caution emphasizes the key implication as well—not enough data supporting the use of KT for sports injuries is yet available to definitively show benefit.

**Implications:** Again, the primary implication of this meta-analysis is the need for additional research and solid research design, including blinding of both subjects and assessors, and a placebo control group.

**Comparison:** The authors of this meta-analysis support the conclusion of the Thelen paper (included elsewhere in this bibliography) that Kinesio taping for shoulder injury may provide

Comment [JF8]: What were they?
some small clinical benefit in pain-free ROM. Ultimately, the overall conclusion supports the need for additional, more rigorous research.


**Findings:** This study evaluated 20 patients with a diagnosis of either rotator cuff and/or impingement syndrome. Patients were randomized into two groups of 10: group 1 was treated with Mobilization with Movement (MWM) therapy and Kinesio taping (KT) and group 2 with a supervised exercise program. Outcomes measured were pain-free active flexion and abduction of the shoulder measured goniometrically on days 0, 5, and 10. Both groups demonstrated improved ROM on day 10, with a significant treatment in time effect between groups (p<.01)—the MVM and KT group demonstrated quicker recovery of pain-free ROM when compared to the exercise group. The authors concluded that MVM and KT may be useful for improving active ROM in patients with shoulder pain.

**Strengths:** The study was well randomized with no significant differences between groups in clinical findings or demographic variables at baseline. Blinding was performed by one therapist performing the initial exam, another measuring outcomes, and a third performing the treatments.

**Caution:** While the authors clearly state this to be a “double-blind randomized cross-sectional study,” the blinding appears questionable. How can the therapist be blinded to the treatment group when one therapist performed all treatment—the MVM and KT as well as the exercise. By virtue of which treatment the patient received, blinding is compromised. Another potential weakness is the small sample size—no a priori analysis of the number of subjects needed for adequate power was referenced, making the results difficult to interpret. The findings are also limited by the lack of a control group—adding a group with MVM only and/or a group with no treatment would provide added interpretive value.

**Implications:** The primary implication is that the use of MVM and KT might be valuable in the treatment of individuals with limited shoulder ROM secondary to pain; however, additional research is necessary.
Comparison: While this study appears to support others in this bibliography (Thelen, Kaya and Williams) with respect to early improvement in the treatment of shoulder pain and/or ROM, the primary comparisons can be made with the Thelen paper. Both of these studies looked at improvement in pain-free shoulder ROM and found some positive results in favor of KT in the early stages of treatment. The results of this trial cannot be considered verification of Thelen’s findings because the KT group also received MVM, thus confounding the results.

Summary: This annotated bibliography provided more questions than answers and demonstrated an overall lack of evidence supporting or rejecting Kinesio taping. In addition, no studies were found comparing traditional taping to Kinesio taping, which would seem like a logical progression. Despite the limited data, Kinesio taping is a non-invasive, and relatively inexpensive, treatment that does not require an intense number of visits or duration of visits. As a result, this treatment option, at a minimum, does no harm and allows for additional research without ethical compromise.

Comment [JF12]: Overall well written; made some especially good points in the Caution sections. I gave you some comments/questions to consider for your future writings.