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Kinesio taping application for rotator cuff disease: Beneficial or harmful? - A Cochrane Review summary with commentary

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The aim of this commentary is to discuss from a rehabilitation perspective the Cochrane Review "Kinesio taping for rotator cuff disease"[1] by Gianola, Iannicelli, Fascio, Andreano, Li, Valsecchi, Moja, Castellini published by Cochrane Musculoskeletal Group. This Cochrane Corner is produced in agreement with the *Turkish Journal of Physical Medicine and Rehabilitation* by Cochrane Rehabilitation with views* of the review summary authors in the "implications for practice" section.

Diseases related to rotator cuff affect millions of patients globally and are estimated to affect 30-50% of people over the age of 50.[2,3] Rotator cuff disease is an umbrella term encompassing a wide spectrum of pathologies from tendinopathies to tears.[3,4] Several factors, such as vascular changes, age, sex, genetics, tensile forces, sports, occupation, smoking and medical comorbidities (e.g. dyslipidemia, hypertension, hyperglycemia), have been associated with rotator cuff syndrome.[2,4] Rotator cuff disease leads to shoulder pain, especially with overhead activities, night pain, decreased range of motion and functional loss.[3,5] Conservative treatment options include, but are not limited to, activity modification, nonsteroidal anti-inflammatory drugs, physical therapy and subacromial injections.[5,6] As one of the conservative treatment options, kinesio taping is an elastic, adhesive, latex-free taping made from cotton, without active pharmacological agents, designed to facilitate the body's own natural healing process.[7] Although its mechanism of action is not fully understood, it is suggested that kinesio taping supports muscles, facilitates lymphatic drainage around inflamed tissues and enables sensory stimulation and mechanical support without restricting the body's range of motion.[7,8] These proposed mechanisms may relieve shoulder pain caused by rotator cuff disease. Although there is still no conclusive evidence on the benefits of kinesio taping, clinicians have embraced its use in the treatment of painful conditions including shoulder pain due to rotator cuff disease. A Cochrane review looked at evidence for beneficial effects of kinesio taping on shoulder pain resulting from rotator cuff disease.[1]

Kinesio taping for rotator cuff disease (Gianola et al., 2021)[1]

What is the aim of this Cochrane review?

The aim of this Cochrane review was to assess the benefits and harms of kinesio taping in adults with shoulder pain due to rotator cuff disease.

What was studied in the Cochrane review?

The population addressed in this review was adults with rotator cuff disease (including subacromial impingement syndrome, rotator cuff tendonitis or

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** The views expressed in the summary with commentary are those of the Cochrane Corner authors (different than the original Cochrane Review authors) and do not represent the Cochrane Library or Wiley.*

tendinopathy, subacromial bursitis, or rotator cuff tears) for any duration. Studies with participants with unspecified shoulder pain (if the studies' inclusion criteria were concordant with rotator cuff disease) and mixed shoulder disorders (if the patients with mixed shoulder disorders were less than 20% of the study population or if the data of the participants with rotator cuff disease could be separated from other trialists) were also included. Trials including participants with a significant trauma or a systemic inflammatory condition history, shoulder pain related to hemiplegia or as part of a complex myofascial pain syndrome and those with adhesive capsulitis, shoulder instability and rotator cuff arthropathy were not included. The interventions studied were kinesio taping applications without any restriction on the number of applications or duration. Kinesio taping applications were performed alone or in combination with another intervention that was given equally to both experimental and control groups. The interventions were compared to sham taping or conservative interventions such as, but not limited to, conventional taping, physical therapies, exercise, glucocorticoid injection, and oral medication. The major outcomes studied were overall pain and pain on motion measured by visual analog scale, numerical or categorical rating scale; function as measured with a function scale such as, but not limited to, the Shoulder Pain and Disability Index, Croft Shoulder Disability Questionnaire, Constant-Murley Score, Disability of Arm Shoulder and Hand; active range of shoulder abduction or elevation without pain, global assessment of treatment success, quality of life as measured with generic measures or disease-specific tools; and adverse events measured by number of participants who experienced any adverse event.

Search methodology and up-to-dateness of the Cochrane review?

The review authors searched for studies that had been published up to July 27, 2020 in electronic databases including the Cochrane Central Register of Controlled Trials, MEDLINE and Embase (Ovid), Physiotherapy Evidence database, Cumulative Index to Nursing and Allied Health Literature, US National Institutes of Health Ongoing Trials Register (http://clinicaltrials.gov), and International Clinical Trials Registry Platform of the World Health Organization (http://www.who.int/ictrp/en/).

What are the main results of the Cochrane review?

The review included 23 studies consisting of randomized and quasi-randomized controlled clinical trials (nine studies comparing kinesio taping to sham taping involving 312 participants and 14 studies comparing kinesio taping to another conservative intervention involving 742 participants) with a total of 1054 participants. The mean/median age of the participants was between 20 and 62.5 years. Diagnoses of the patients included in the trials were impingement (16 trials), rotator cuff disease (two trials), both impingement and rotator cuff disease (three trials), and other shoulder disorders (three trials). Experimental intervention was kinesio taping applications. Specific taping techniques were used in 17 studies (protocol for rotator cuff tendonitis/impingement suggested by Kase and colleagues in 16 studies and SpiderTech taping technique in one study). Targeted muscles/structures were deltoid (in 17 studies), supraspinatus (in 16 studies), glenohumeral articulation (in nine studies), lower trapezius (in five studies), coracoid process (in two studies), rhomboid (in one study), teres minor (in one study), infraspinatus (in one study), acromioclavicular joint articulation (in one study), and determined according to the participant's need (in one study). Taping procedures were provided by a clinician in 13 studies. The majority of the number of applications was between three and six applications ranged from one to 18 applications. The majority of the duration of applications was between three and five days ranged from immediate removal to six days. All studies compared pretreatment and post-treatment outcome measures with different post treatment evaluation intervals ranging from three days to six months.

The results of the studies as following:

When comparing kinesio taping to sham taping for rotator cuff disease

- Three studies including a total of 106 participants provided data for overall pain. Mean difference (MD) in overall pain was 0.07 points 95% confidence interval (CI) (0.77 better to 0.9 worse). No statistically significant reduction of overall pain was found in the kinesio taping group compared to sham taping. There was very low-certainty evidence (which was downgraded for bias, imprecision, and indirectness) on whether kinesio taping reduced overall pain at four weeks compared with sham taping.
- Seven studies reported function with six of them reported useful data including a total of 214 participants. A statistically significant reduction of disability was found in the kinesio taping group compared to sham taping

(standardized mean difference [SMD] -0.49, 95% CI [-1.28, 0.30]). Considering a minimal clinically important difference (MCID) of 10.2 points this finding was not clinically relevant. There was very low-certainty evidence (which was downgraded for bias, imprecision, inconsistency, and indirectness) for kinesio taping for improving function compared to sham taping at four weeks.

- Four studies including a total of 153 participants provided useful data for pain on motion. A statistically significant reduction of pain on motion was found in the kinesio taping group compared to sham taping (MD -1.48, 95% CI [2.25 better to 0.71 better]). Considering a MCID of 2.1 points this finding was not clinically relevant. There was very low-certainty evidence (which was downgraded for bias, imprecision, and indirectness) for kinesio taping for reducing pain on motion compared to sham taping at four weeks.
- Among three studies reporting pain-free active range of motion data, two trials including a total of 68 participants provided useful information for active range of shoulder motion without pain. No statistically significant improvement was found in active range of motion for shoulder abduction in the kinesio taping group compared to sham taping (MD 10.23, 95% CI [16.09 worse to 36.56 better]). There was very low-certainty evidence (which was downgraded for publication bias, inconsistency, and imprecision) on whether kinesio taping improved active range of shoulder motion at two weeks compared with sham taping.
- Four studies reported a low rate of adverse effects. The authors were not certain about the safety of kinesio taping for rotator cuff disease compared to sham taping due to lack of data (very low-certainty evidence).

When comparing kinesio taping to other conservative treatment for rotator cuff disease

- Five studies including a total of 266 participants provided data for overall pain. Results showed neither statistically (MD -0.44, 95% CI [1.33 better to 0.46 worse]) nor clinically (MCID of 1.5 points) significant reduction of overall pain in the kinesio taping group compared to the group receiving other conservative treatments. There was very low-certainty evidence (which was downgraded for bias, inconsistency, and indirectness) on whether kinesio taping improves overall pain when compared with other conservative treatments at six weeks.
- Fourteen studies reported function, but only 10 of them with 499 participants provided useful data. A statistically significant reduction of disability was found in the kinesio taping group (SMD -0.66, 95% CI [-1.22 to -0.10]), and this finding reached the MCID of 13 points (MD -13.13, 95% CI [1.99 better to 24.28 better]). Kinesio taping has uncertain effects on function when compared with other conservative treatments at four weeks (very low-certainty evidence downgraded for publication bias, inconsistency, and indirectness).
- Among six studies reporting pain on motion, four of them provided useful data involving 225 participants. Results showed neither statistically (MD 0.06, 95% CI [0.68 better to 0.80 worse]) nor clinically (MCID of 2.1 points) significant reduction of pain on motion in the kinesio taping group compared to the group receiving other conservative treatments. There was very low-certainty evidence (which was downgraded for imprecision, bias, and indirectness) on whether kinesio taping improves pain on motion when compared with other conservative treatments at four weeks.
- Three trials including a total of 143 participants provided information on active range of shoulder motion without pain. A not statistically significant improvement for shoulder abduction was found in the kinesio taping group compared to the group receiving other conservative treatments (MD 3.04, 95% CI [10.89 worse to 16.96 better]). There was very low-certainty evidence (which was downgraded for inconsistency, imprecision, and indirectness) on whether kinesio taping improves active range of shoulder motion without pain when compared with other conservative treatments at six weeks.
- One study with 30 participants provided information on quality of life using the 12-item Short Form Health Survey. A statistically significant improvement was found in quality of life with kinesio taping compared to other conservative treatments (MD 18.70, 95% CI [14.48 better to 22.92 better]). This result was also found to be clinically important

(considering 10% of improvement as MCID). There was low certainty evidence (which was downgraded for indirectness and imprecision) showing that kinesio taping may improve quality of life at four weeks when compared with other conservative treatments.

- Seven studies reported a low rate of adverse effects. The authors were not certain about the safety of kinesio taping for rotator cuff disease compared to other conservative treatments due to lack of data (very low-certainty evidence).

How did the authors conclude?

The authors concluded that due to very low certainty of evidence, they are uncertain if kinesio taping improves overall pain, function, pain on motion and pain-free active range of motion compared to sham taping or other conservative treatments. They are also uncertain about the safety of the applications due to scarcity of the available data about adverse events. Kinesio taping compared to conservative treatment may improve quality of life with low certainty of evidence. In general, all major outcomes were downgraded because of concerns related to imprecision, inconsistency, indirectness, or study design limitations.

What are the implications of the Cochrane evidence for practice in rehabilitation?

This Cochrane review showed that although kinesio taping is commonly used in clinical practice due to its practicality, it still lacks strong scientific evidence on its efficacy and harms. It is important to remember that imprecision, inconsistency, indirectness, and study design limitations detected in almost all of the studies led to downgrading of the evidence and may have prevented demonstration of beneficial effects of kinesio taping. When the studies with non-statistically significant results were examined, it was shown that 60% of the studies could not reach the targeted sample sizes, which led to the imprecision of the effects.[9] In addition, considering that a general rehabilitation program or other conservative treatments may improve rotator cuff disease, it may be expected that kinesio taping alone may not provide any additional benefit. With all these mentioned, the current review may not support the use of kinesio taping in the clinical management of rotator cuff disease due to the lack of clear evidence of its benefits and harms. It is recommended that when planning future studies, the authors should include adequate number of participants, use proper statistical analysis, and clearly report outcome data with standardized outcome measurements to improve the quality of the evidence. In addition, studies should clearly define all details such as provider, target muscles, application technique, schedule, and duration in order to better determine the appropriate application and use of kinesio taping. Accordingly, clinicians should consider the aforementioned limitations while using kinesio taping for their patients.

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