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Research

Current evidence does not support the use of Kinesio Taping in clinical practice: a systematic review

Patrícia do Carmo Silva Parreira^a, Lucíola da Cunha Menezes Costa^a, Luiz Carlos Hespanhol Junior^a, Alexandre Dias Lopes^a, Leonardo Oliveira Pena Costa^{a,b}^a Masters and Doctoral Programs in Physical Therapy, Universidade Cidade de São Paulo, Brazil; ^b Musculoskeletal Division, The George Institute for Global Health, Australia

KEY WORDS

Kinesio taping
Systematic review
Musculoskeletal conditions

ABSTRACT

Questions: Is Kinesio Taping more effective than a sham taping/placebo, no treatment or other interventions in people with musculoskeletal conditions? Is the addition of Kinesio Taping to other interventions more effective than other interventions alone in people with musculoskeletal conditions? **Design:** Systematic review of randomised trials. **Participants:** People with musculoskeletal conditions. **Intervention:** Kinesio Taping was compared with sham taping/placebo, no treatment, exercises, manual therapy and conventional physiotherapy. **Outcome measures:** Pain intensity, disability, quality of life, return to work, and global impression of recovery. **Results:** Twelve randomised trials involving 495 participants were included in the review. The effectiveness of the Kinesio Taping was tested in participants with: shoulder pain in two trials; knee pain in three trials; chronic low back pain in two trials; neck pain in three trials; plantar fasciitis in one trial; and multiple musculoskeletal conditions in one trial. The methodological quality of eligible trials was moderate, with a mean of 6.1 points on the 10-point PEDro Scale score. Overall, Kinesio Taping was no better than sham taping/placebo and active comparison groups. In all comparisons where Kinesio Taping was better than an active or a sham control group, the effect sizes were small and probably not clinically significant or the trials were of low quality. **Conclusion:** This review provides the most updated evidence on the effectiveness of the Kinesio Taping for musculoskeletal conditions. The current evidence does not support the use of this intervention in these clinical populations. **PROSPERO registration:** CRD42012003436. [Parreira PdCS, Costa LdCM, Hespanhol Junior LC, Lopes AD, Costa LOP (2014) Current evidence does not support the use of Kinesio Taping in clinical practice: a systematic review. *Journal of Physiotherapy* 60: 31–39]

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Introduction

Kinesio Taping has become a very popular treatment for several health conditions over the last decade. This method of taping was created by a Japanese chiropractor in the 1970s.¹ Kinesio Taping uses elastic tape that is fixed onto the skin. Kinesio Tape is thinner and more elastic than conventional tape, which is hypothesised to allow greater mobility and skin traction.^{2,3} Kinesio Taping involves a combination of applying tension along the tape and placing the target muscle in a stretched position, so that convolutions in the tape occur after the application.¹ During assessment, the therapist decides what level of tension will generate an appropriate level of traction on the skin. According to the Kinesio Taping Method manual, this traction promotes an elevation of the epidermis and reduces the pressure on the mechanoreceptors that are situated below the dermis, thus reducing the nociceptive stimuli.¹ Other proposed benefits include improved blood and lymphatic circulation, reduced pain intensity, realignment of joints and change in

the recruitment activity patterns of the treated muscles.¹ Although widely used in clinical practice by many physiotherapists worldwide, there is little evidence about the efficacy or effectiveness of this intervention.^{2,4,5}

Five systematic reviews have evaluated the effect of Kinesio Taping on selected outcomes in different populations. Williams et al⁶ assessed Kinesio Taping only in the prevention and treatment of sports injuries. Bassett et al and Mostafavifar et al^{7,8} assessed the effects of Kinesio Taping in people with musculoskeletal conditions. Morris et al and Kalron et al^{9,10} widened the musculoskeletal focus to other clinical areas, such as neurological and lymphatic conditions. Currently, new trials of Kinesio Taping are frequently being published. Although these five reviews were published recently, none of them included all of the following recent trials: ^{3,11,12,13,14}. Given this substantial amount of new data, an updated systematic review was needed to inform clinicians and patients about the effects of this intervention in musculoskeletal conditions. The research questions of this systematic review were:

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Is Kinesio Taping more effective than no treatment or sham/placebo in people with musculoskeletal conditions for the outcomes of pain intensity, disability, quality of life, return to work and global impression of recovery?

Is Kinesio Taping more effective than other interventions in people with musculoskeletal conditions for these outcomes?

Is the addition of Kinesio Taping over other interventions more effective than other interventions alone in people with musculoskeletal conditions for these outcomes?

Method

Identification and selection of studies

Systematic searches were conducted of MEDLINE, Embase, CENTRAL, PEDro, SPORTDiscus, CINAHL, LILACS and SciELO. Papers were accepted in any language if a translation could be obtained. Search strategies followed the recommendations of the Cochrane Back Review Group³³. Detailed search strategies used in each database are described in Appendix 1 (see eAddenda for Appendix 1). The date of the last search was 10 June 2013. All clinical trial registers were also searched and manual searches were performed by checking the reference lists of each eligible article.

Studies were considered for inclusion if they met the criteria presented in Box 1. Conference abstracts were excluded. Studies that were conducted on healthy participants or that only collected outcomes relating to physical performance (eg, muscle strength, vertical jumping) were also excluded. The primary outcomes were pain intensity and disability measured by any validated outcome measure.

The study selection process involved screening the titles and reading the abstracts, after which potentially relevant articles were obtained in full text for further eligibility analysis. Two independent reviewers performed the selection of the studies and, in the case of disagreement, a third reviewer obtained a consensus through discussion or arbitration.

Two independent reviewers, using a standardised data extraction form, performed data extraction. In the case of disagreement, a third reviewer provided consensus through discussion or arbitration. The following data were extracted: authors, year of publication, musculoskeletal condition of the study participants, study objectives, description of the sample, description of the Kinesio Taping Method intervention, description of the control group (ie, placebo, no intervention or other intervention), study outcomes, assessment times, study results and study conclusions. When insufficient data were presented, the authors were contacted by email and further data were requested.

Box 1. Inclusion criteria.

Design

- randomised controlled trials
- published in a peer-reviewed journal

Participants

- people with musculoskeletal conditions

Intervention

- interventions using the Kinesio Taping method

Outcome measures

- pain intensity
- disability
- quality of life
- return to work
- global impression of recovery

Assessment of characteristics of studies

Quality

The methodological quality studies included in this systematic review were assessed using the PEDro scale.¹⁵ This scale assesses the risk of bias and statistical reporting of randomised controlled trials. This scale has 11 items: eight items relate to methodological quality (ie, random allocation, concealed allocation, baseline comparability, blinded subjects, blinded therapists, blinded assessors, adequate follow-up and intention-to-treat analysis) and two items relate to the statistical reporting (between-group comparisons, and point estimates and variability). The first item (eligibility criteria) is not considered in the total score since it is related to external validity. The total PEDro score ranges from 0 to 10 points; higher scores mean greater methodological quality. This scale has good levels of validity and reliability.^{16,17,18}

Data relating to trial registration, funding, sample size calculation, and whether a primary outcome was nominated were also extracted. These four items were selected from the CONSORT statement and are associated with better transparency and methodological quality.^{19,20}

Participants

Trials involving people with musculoskeletal conditions were considered for inclusion. Age and sample size were used to characterise the groups of participants.

Intervention

The experimental intervention was the use of the Kinesio Taping method for any musculoskeletal condition. The application procedure and the regimen of taping applications (ie, duration, frequency of re-taping) were used to characterise the interventions.

Outcomes measures

Data were extracted for the following outcomes: pain intensity, disability, quality of life, return to work and global impression of recovery. To summarise the effects of the intervention for continuous data, we extracted the mean between-group difference and their respective 95% confidence intervals for each outcome extracted. One study¹¹ presented non-parametric data only. The data from this study was converted to parametric data in order to calculate confidence intervals following the recommendations of Hozo et al.²¹ For studies that did not present mean differences and confidence intervals, these estimates were calculated using the confidence interval calculator downloaded from the PEDro website.

Data analysis

Due to the clinical heterogeneity of the studies included in this systematic review and the variability between health conditions assessed, a meta-analysis was not possible. Therefore, the data analysis was descriptive. For the primary outcomes of pain intensity and disability, descriptive forest plots without pooling were performed for better visualisation. In all cases of multiple follow up points, only the longest-term measurement point available was plotted. Disability scales were converted to a common 0–100 scale. Forest plots were performed only for comparisons with two or more studies. RevMan 5.1 was used for the analysis.

The overall quality of the evidence and the strength of recommendations were evaluated using the GRADE approach.²² The GRADE approach specifies four levels of quality (high, moderate, low and very low). The overall evidence was downgraded depending on the presence of five factors: limitations (due to risk of bias); consistency of results; directness (eg, whether participants are similar to those about whom conclusions are drawn); precision

(ie, sufficient data to produce narrow confidence intervals); and other (eg, publication bias).

The quality of evidence was then classified for each outcome according to the following criteria:

High-quality evidence

There are consistent findings among at least 75% of the participants from low risk of bias studies; consistent, direct and precise data; and no known or suspected publication biases. Further research is unlikely to change either the estimate or confidence in the results.

Moderate-quality evidence

One of the domains is not met. Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.

Low-quality evidence

Two of the domains are not met. Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.

Very low-quality evidence

Three of the domains are not met and the results are very uncertain.

No evidence

No randomised trials were identified that addressed this outcome.

Single studies with a sample size smaller than the optimal information size ($n=300$) were considered to yield very low-quality evidence if there was also a high risk of bias (PEDro score <6) or low-quality evidence if there was a low risk of bias (PEDro score ≥ 6).

Results

Flow of studies through the review

From the search strategy, 275 potentially relevant studies were retrieved. Of these, 12 studies were considered eligible for data analysis.^{3,4,5,11,12,13,14,23,24,25,26,27} The flow of studies through the selection process is presented in Figure 1.

Description of studies

The 12 eligible trials were published between 2008 and 2013. The sample sizes ranged from 10 to 76 participants^{12,13}. The pooled sample size was 495 patients, with a mean of 41 participants per study. A description of all included studies is presented in Table 1.

Quality

The methodological quality and reporting of the eligible trials is presented in Table 2. The total PEDro score ranged from 3 to 9, with a mean of 6.1. All trials satisfied the items related to random allocation, between-group comparisons, and point estimates and variability. The items least frequently satisfied were blinded therapists, intention-to-treat analysis, blinded participants and concealed allocation. Among the 12 eligible trials, only one was

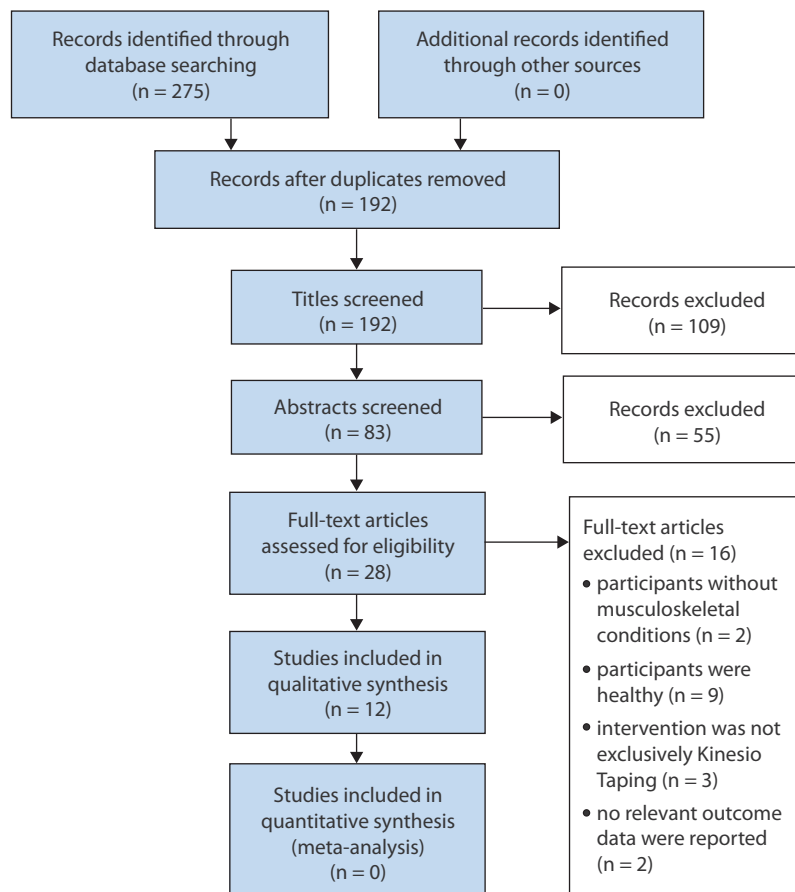


Figure 1. Selection of studies for inclusion in the systematic review.

Table 1
Summary of included studies (n = 12).

| Study | Population | Kinesio Taping group | Comparison group(s) |
|----------------------------------|--|---|---|
| Akbas ²³ | n = 31 Patellofemoral pain syndrome Age (yr) = exp 41 (SD 11), con 45 (SD 8) | Individualised taping over the vastus medialis obliquus, quadriceps, vastus lateralis, iliotibial band/tensor fascia lata and hamstring muscles. The tape was changed every 4–5 days for 6 weeks. Usual care (see right) was also given. | Con: usual care. Six-week home program of stretches of iliotibial band/tensor fascia lata complex, hamstring and quadriceps muscles; strengthening of quadriceps, hip adductors and gluteals; open and closed chain exercises. |
| Aytar ²⁴ | n = 22 Patellofemoral pain syndrome Age (yr) = 24 (SD 3) | In 45 deg knee flexion, two Y-strips were applied to the quadriceps with the tails applied around the patella and just below the tibial tuberosity. Two I-strips were applied around the patella with 50–75% tension. The tape remained in situ during testing only. | Con: sham taping. Sticking plaster was applied in the same configuration but without stretch and remained in situ during testing only. |
| Campolo ¹¹ | n = 20 (crossover) Unilateral anterior knee pain Age (yr) = 24 (SD 3) | One strip was applied over the rectus femoris muscle from the proximal third of the thigh to the patella. At the patella, the strip was divided in two to go around the patellar borders. The tape remained in situ during testing only. | McConnell taping technique: strapping tape was applied across the patellar region and remained in situ during testing only. Con: no tape. |
| Castro-Sanchez ³ | n = 59 Chronic non-specific low back pain Age (yr) = exp 50 (SD 15), con 47 (SD 13) | In sitting, four I-strips were applied at 25% tension overlapping in a star shape over the point of maximum pain in the lumbar area. Strips were applied by pressing the central part before the ends. The tape was kept in situ for 1 week. | Con: sham taping. One I-strip of the same tape was applied transversely across the pain. The tape was kept in situ for 1 week. |
| Evermann ²⁵ | n = 65 Musculoskeletal conditions ^a Age (yr) = exp 23, con 25 | The tape was applied either as whole strips or halved lengthwise and applied as a star shape. Four strips of tape about 20 cm in length in a star shape were applied over painful trigger points. Duration of the intervention is not stated. | Multi-modality: analgesics, heat, cold and unspecified physical therapy techniques. The number and duration of treatments is not stated. |
| González-Iglesias ⁴ | n = 41 Neck pain without nerve conduction loss Age (yr) = exp 33 (SD 6), con 32 (SD 7) | One Y-strip was applied symmetrically over the posterior cervical extensor muscles, with paper-off tension and cervical contralateral side bending and rotation. The tape was applied from the dorsal region (T1–T2) to the upper cervical region (C1–C2). An overlying I-strip was placed perpendicular to the Y-strip, over the midcervical region (C3–C6), with the cervical spine in flexion to apply tension to the posterior structures. The tape was kept in situ for 1 day. | Con: sham taping. With the neck in a neutral position and applying no tension to the tape, one I-strip was placed over C1–T2, and one I-strip was placed perpendicular over the midcervical region. The tape was kept in situ for 1 day. |
| Llopis ¹² | n = 10 Mechanical neck pain Age (yr) = 30 (SD 12) | One strip was anchored at the acromion, with projection to the trapezius muscle. With the neck in flexion, lateral flexion and rotation, a Y-strip was applied from mastoid process to T1–T2. Usual care (see right) was also given. Two treatment sessions were provided each week for 6 weeks. | Con: usual care. Cervical muscle stretching, cervical mobility, muscle strengthening exercises and massage. Two treatment sessions were provided each week for 6 weeks. |
| Paoloni ²⁶ | n = 39 Chronic low back pain Age (yr) = 63 (SD 12) | In forward bend, three strips were applied along the spinous processes and paraspinally between T12 and L5. Subjects were asked to bend forward during the taping procedure; no tension was used other than that required to cover the back in bending position. The tape was changed every 3–4 days for 1 month. Taping and exercise: as described above and right. | Exercises: 30 min of exercises, 3/week x 4 weeks, including relaxation, stretching and active exercises for the abdominal, back extensors, psoas, hamstrings and pelvic muscles. |
| Saavedra-Hernandez ¹³ | n = 76 Mechanical idiopathic neck pain Age (yr) = exp 46 (SD 9), con 44 (SD 10) | One Y-strip was applied symmetrically over the posterior cervical extensor muscles, with paper-off tension and cervical contralateral side bending and rotation. The tape was applied from the dorsal region (T1–T2) to the upper cervical region (C1–C2). An overlying strip was placed perpendicular to the Y-strip, over the midcervical region (C3–C6), with the cervical spine in flexion to apply tension to the posterior structures. The tape was kept in situ for 1 week. | Manipulation: two thrust manipulations were directed at the midcervical spine and cervicothoracic junction. |
| Simsek ¹⁴ | n = 38 Subacromial impingement syndrome Age (yr) = exp 49, con 53 | One Y-strip was applied over deltoid from insertion to origin and one Y-strip was applied over supraspinatus from insertion to origin. An I-strip was applied from the coracoid process to the posterior deltoid with 50–75% tension in a mechanical correction technique. The tape was changed every 3 days for 12 days. Usual care (see right) was also given. | Con: sham taping and usual care. Two I-strips were applied with no tension: over the acromioclavicular joint in the sagittal plane and on the distal deltoid in the transverse plane. The tape was changed every 3 days for 12 days. Usual care was supervised exercises for scapular stabilisation and distal mobility, 5–15 repetitions, twice daily for 2 weeks. |
| Thelen ⁵ | n = 42 Rotator cuff tendonitis/impingement Age (yr) = exp 21 (SD 2), con 20 (SD 2) | One Y-strip was applied over supraspinatus from insertion to origin with contralateral cervical lateral flexion and internal rotation, extension and adduction of the shoulder. One Y-strip was applied over deltoid from insertion to origin with the arm reaching to the contralateral hip. One I-strip was applied from the coracoid process to the posterior deltoid with 50–75% tension. The tape remained in situ for two periods of 48 to 72 hr. | Con: sham taping. Two I-strips were applied with no tension: over the acromioclavicular joint in the sagittal plane and on the distal deltoid in the transverse plane. The tape remained in situ for two periods of 48 to 72 hr. |
| Tsai ²⁷ | n = 52 Plantar fasciitis Age (yr) = exp 53 (SD 29), con 31 (SD 13) | One Y-strip was applied to the gastrocnemius and palm-shaped taping was applied over the plantar fascia. The tape was kept in situ for 1 week. Usual care (see right) was also given. | Con: usual care. Therapeutic ultrasound (3 MHz, 5 min) and low-frequency TENS (120 Hz, 40 ms, 15 min) to the site of pain, six times in 1 week. |

Exp: experimental group; con: control group; TENS: transcutaneous electrical nerve stimulation.

^a low back pain, pes anserinus syndrome, tibialis anterior syndrome, cervical spine syndrome and shoulder-arm syndrome.

Table 2
Methodological quality and reporting of eligible studies (n = 12).

| Study | PEDro Scale Items ^a | | | | | | | | | | | PEDro Score (0–10) | Registered | Primary outcomes stated | Funded | Sample size calculation presented |
|----------------------------------|--------------------------------|---|---|---|---|---|---|---|---|----|----|--------------------|------------|-------------------------|--------|-----------------------------------|
| | 1 ^b | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | | | | |
| Akbas ²³ | Y | Y | N | Y | N | N | N | Y | N | Y | Y | 5 | N | N | N | N |
| Aytar ²⁴ | Y | Y | N | Y | Y | N | Y | Y | N | Y | Y | 7 | N | N | N | N |
| Campolo ¹¹ | N | Y | N | N | N | N | N | N | N | Y | Y | 3 | N | N | N | N |
| Castro-Sanchez ³ | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | 9 | Y | Y | N | Y |
| Evermann ²⁵ | Y | Y | N | N | N | N | N | N | N | Y | Y | 4 | N | N | N | N |
| González-Iglesias ⁴ | Y | Y | Y | Y | Y | N | Y | Y | N | Y | Y | 8 | N | N | N | N |
| Llopis ¹² | Y | Y | N | N | N | N | N | N | N | Y | Y | 3 | N | N | N | N |
| Paoloni ²⁶ | Y | Y | N | Y | N | N | Y | Y | Y | Y | Y | 7 | N | N | N | N |
| Saavedra-Hernandez ¹³ | Y | Y | Y | Y | N | N | Y | Y | Y | Y | Y | 8 | N | N | N | Y |
| Simsek ¹⁴ | N | Y | N | N | N | N | Y | Y | N | Y | Y | 5 | N | N | N | N |
| Thelen ⁵ | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | 9 | N | N | N | Y |
| Tsai ²⁷ | N | Y | Y | N | N | N | Y | N | N | Y | Y | 5 | N | N | N | N |

Y: yes; N: no.

^a 1: eligibility criteria and source of participants; 2: random allocation; 3: concealed allocation; 4: baseline comparability; 5: blinded participants; 6: blinded therapists; 7: blind assessors; 8: adequate follow-up; 9: intention-to-treat analysis; 10: between-group comparisons; 11: point estimates and variability.

^b Item 1 does not contribute to the total score.

registered, one declared a primary outcome, none received funding and three reported sample size calculation.

Participants

Among the eligible trials, two^{3,26} recruited people with chronic low back pain, two^{23,24} recruited people with patellofemoral pain, two^{5,4} recruited people with shoulder pain, three^{4,12,13} recruited people with neck pain, one¹¹ recruited people with anterior knee pain, one²⁷ recruited people with plantar fasciitis and one²⁵ recruited people with diverse musculoskeletal conditions.

Interventions

Among the eligible trials, one¹¹ compared Kinesio Taping with no treatment, four^{3,4,5,24} compared Kinesio Taping with sham Kinesio Taping, four^{11,13,25,26} compared Kinesio Taping with other interventions, and five^{12,14,23,26,27} compared Kinesio Taping plus other interventions with other interventions alone. The other interventions in the studies ranged from other formal taping methods, exercise, manual techniques, analgesics, heat, cold, stretches and electrotherapy. The treatment periods ranged from a single application of taping to 6 weeks.

Outcomes measures

Pain intensity was measured using a Visual Analogue Scale^{3,5,24,26}, a Numerical Pain Rating Scale^{4,13} and the McGill Melzack Pain Questionnaire.²⁷ Disability was measured using the Oswestry Disability Index,³ the Roland Morris Disability Questionnaire^{3,26}, the Shoulder Pain and Disability Index,⁵ the Anterior Knee Pain Scale,²³ the Kujala Scale²³ and the Neck Disability Index.¹³ Quality of life was measured in one trial¹² using the SF-36 Questionnaire. The follow-up periods ranged from immediately after application of the Kinesio Taping to 6 weeks from randomisation. One trial²⁵ contained insufficient data about eligible outcomes to calculate quantitative results. The authors were

contacted but the requested data were not received, so reporting of this trial is limited to statistical significance.

Effect of Kinesio Taping versus no treatment

One trial compared Kinesio taping versus no treatment,¹¹ with 20 participants assessed under both conditions. Kinesio Taping reduced anterior knee pain during stair ascent/descent, as presented in Table 3. However, the median effect of 0.5 on a pain scale from 0 to 10 was lower than the threshold of clinical importance nominated in the study. Despite this, the authors concluded that Kinesio Taping might be effective. The quality of evidence (GRADE) for this comparison was rated 'very low quality' (ie, single trial with high risk of bias).

Effect of Kinesio Taping versus sham taping

Four randomised trials, involving 164 participants, compared Kinesio Taping versus sham taping^{3,4,5,24}, as presented in Table 4. The four trials involved participants with patellofemoral pain, shoulder pain, whiplash or low back pain; the outcomes evaluated were pain and disability. Kinesio Taping was either no more effective than sham taping, or its effect was too small to be considered clinically worthwhile by the original authors and the reviewers. All four trials were single studies (ie, no two studies examined the same patient population) with low risk of bias; therefore the quality of evidence (GRADE) was rated as 'low quality'.

Figure 2 presents two forest plots for the studies that compared the use of Kinesio Taping versus sham taping. More detailed forest plots are presented in Figure 3 (see eAddenda for Figure 3). These trials could not be pooled into a meta-analysis due to clinical heterogeneity (as the musculoskeletal conditions were different). In general, Kinesio Taping was not better than sham treatment.

Table 3
Results and conclusions of studies of Kinesio Taping versus no treatment (n = 1).

| Study and condition | Time of assessment | Results | Conclusions |
|------------------------------------|---|---|---|
| Campolo ¹¹ Knee pain | Upon application of KT (or no tape condition) | Pain (0 to 10) during weighted squat lift: difference in medians = 1 in favour of KT, $p = 0.275$. Pain (0 to 10) ascending and descending stairs: difference in medians = 0.5 in favour of KT, $p = 0.034$. | <i>Author:</i> KT may be effective in reducing anterior knee pain during stair climbing activities. <i>Review:</i> KT did not significantly reduce pain during squats. KT reduced pain on stairs, but the effect may be too small to be clinically worthwhile. The study had low methodological quality. |

KT: Kinesio Taping.

Table 4
Results and conclusions of studies of Kinesio Taping versus sham taping (n = 4).

| Study and condition | Time of assessment | Results | Conclusions |
|---|---|---|--|
| Aytar ²⁴ Knee pain | After KT or sham taping had been in situ for 45 min | Pain (0–10) ascending stairs: MD 0.3 (95% CI –1.4 to 2.0) in favour of sham Pain (0–10) descending stairs: MD 1.3 (95% CI –0.7 to 3.3) in favour of sham Pain (0–10) walking: MD 0.1 (95% CI –1.9 to 2.1) in favour of sham | <i>Author:</i> KT did not significantly reduce pain. <i>Review:</i> KT did not significantly reduce pain. |
| Castro-Sanchez ³ Back pain | Immediately after seven days of KT or sham taping | Pain (0–10): MD 1.1 (95% CI 0.3–1.9) in favour of KT Disability ^a (0–100): MD 4 (95% CI 2–6) in favour of KT Disability ^b (0–24): MD 1.2 (95% CI 0.4–2.0) in favour of KT | <i>Author:</i> KT reduced disability and pain, but these effects may be too small to be clinically worthwhile. <i>Review:</i> KT reduced disability (short-term only) and pain, but these effects may be too small to be clinically worthwhile. |
| | Four weeks after the period of KT or sham taping | Pain (0–10): MD 1.0 (95% CI 0.2 to 1.7) in favour of KT Disability ^a (0 to 100): MD 1 (95% CI –1 to 3) in favour of sham Disability ^b (0 to 24): MD 0.1 (95% CI –1.0 to 1.3) in favour of sham | |
| González-Iglesias ⁴ Neck pain | Upon application of KT or sham taping. | Pain (0–10): MD 0.9 (95% CI 0.7 to 1.2) in favour of KT. | <i>Author:</i> KT reduced pain, but the effect may be too small to be clinically worthwhile. |
| | After KT or sham taping had been in situ for 24 h | Pain (0–10): MD 1.1 (95% CI 0.9 to 1.5) in favour of KT | <i>Review:</i> KT reduced pain, but the effect may be too small to be clinically worthwhile. |
| Thelen ⁵ Shoulder pain | Upon application of KT or sham taping | Pain (0–10): MD 0.6 (95% CI –0.2 to 1.5) in favour of KT | <i>Author:</i> KT did not significantly reduce pain or disability. |
| | After KT or sham taping had been in situ for 3 days | Pain (0–10): MD 0.4 (95% CI –1.2 to 1.9) in favour of sham Disability ^c (0–100): MD 0.1 (95% CI –1.0 to 1.2) in favour of KT | <i>Review:</i> KT did not significantly reduce pain or disability. |
| | After KT or sham taping had been in situ for 6 days | Pain (0–10): MD 0.3 (95% CI –1.4 to 2.1) in favour of sham Disability ^c (0–100): MD 0.2 (95% CI –1.0 to 1.5) in favour of KT | |

KT: Kinesio Taping; MD: mean difference; sh: shoulder.

^a Oswestry Disability Index.

^b Roland-Morris Disability Questionnaire.

^c Shoulder Pain & Disability Index.

Table 5
Results and conclusions of studies of Kinesio Taping versus other interventions (n = 4).

| Study and condition | Time of assessment | Results | Conclusions |
|---|--|--|--|
| Campolo ¹¹ Knee pain | Upon application of KT or McConnell patellar taping | Pain (0 to 10) during weighted squat lift: difference in medians = 0.5 in favour of McConnell Patellar Taping, $p = 0.275$. MD: –0.5 (95% CI –0.75 to –0.25). Pain (0 to 10) ascending and descending stairs: difference in medians = 0, $p = 0.87$. MD: 0.0 (95% CI –0.28 to 0.28) | <i>Author:</i> KT did not significantly reduce pain compared to McConnell patellar taping. <i>Review:</i> KT did not significantly reduce pain compared to McConnell patellar taping. The study had low methodological quality. |
| Evermann ²⁵ Musculoskeletal conditions ^a | Upon application of KT or the first multi-modality physiotherapy treatment, and after 1, 2, 3, 7 and 14 days | No data comparing pain severity between groups at equivalent time points were reported. KT caused significantly faster resolution of pain than multi-modality physiotherapy, both overall and within diagnostic subgroups. | <i>Author:</i> KT is effective. KT is superior to conventional, orthodox treatment methods. <i>Review:</i> KT reduced the time to resolution of pain compared to multi-modality physiotherapy. The study had low methodological quality. |
| Paoloni ²⁶ Low back pain | At completion of 4 weeks of KT or supervised group exercises | Pain (0–10): MD 0.4 (95% CI –1.7 to 2.5) in favour of KT Disability ^b (0–24): MD 4.1 (95% CI –0.4 to 8.6) in favour of exercises | <i>Author:</i> KT cannot substitute for therapeutic exercises. <i>Review:</i> KT did not significantly reduce pain or disability compared to supervised exercises. |
| Saavedra-Hernandez ¹³ Neck pain | One week after application of KT or cervical thrust manipulations | Pain (0–10): MD 0.2 (95% CI 0.0–0.5) in favour of KT Disability ^c (0–50): MD 0.3 (95% CI –1.3 to 1.9) in favour of KT | <i>Author:</i> KT and cervical thrust manipulations have similar effects on pain and disability. <i>Review:</i> Compared to cervical thrust manipulations, KT reduces pain but not to a clinically worthwhile degree and does not improve disability. |

KT: Kinesio Taping; MD: mean difference.

^a Low back pain, pes anserinus syndrome, tibialis anterior syndrome, cervical spine syndrome and shoulder-arm syndrome.

^b Roland-Morris Disability Questionnaire.

^c Neck Disability Index.

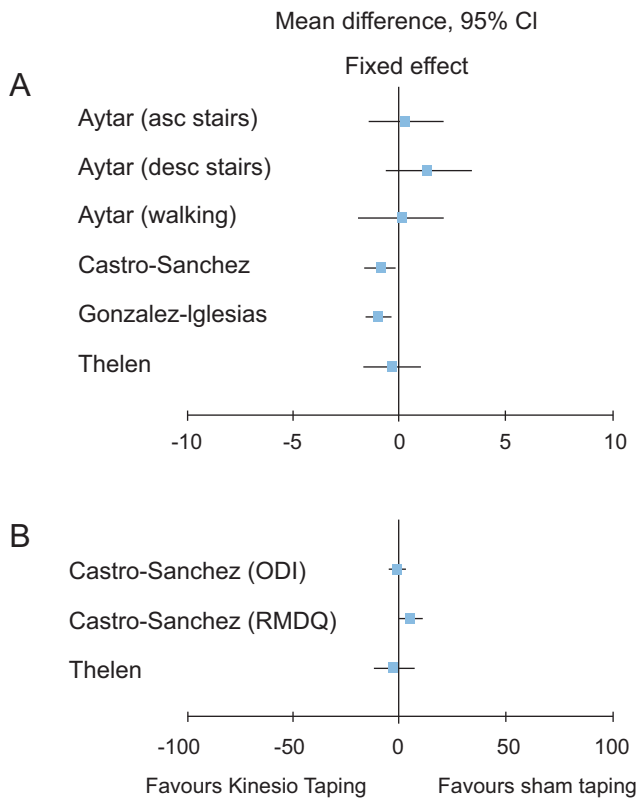


Figure 2. Mean difference (95% CI) of Kinesio Taping versus sham taping in participants with musculoskeletal conditions for the outcomes pain (A) and disability (B). Note that no pooling is conducted because the clinical conditions of the participants differ. Note that these estimates are based on raw means and SDs only, so some differ slightly from the estimates in Table 4 because more complex analyses were used in the original publications. Asc: ascending; desc: descending; ODI: Oswestry Disability Index; RMDQ: Roland-Morris Disability Questionnaire.

Effect of Kinesio Taping versus other interventions

Four studies compared Kinesio Taping versus other interventions^{11,13,25,26} involving 200 participants. The results and conclusions of these studies are presented in Table 5. Two trials were single studies with low risk of bias involving participants with chronic low back pain²⁶ and acute whiplash.¹³ The quality of evidence (GRADE) for these studies was rated as 'low quality'. These studies showed that the effects of Kinesio Taping were no greater than the interventions to which they were compared (ie, exercises and thrust manipulations, respectively) or any benefit was too small to be clinically worthwhile. Two trials were single studies with high risk of bias involving participants with different musculoskeletal conditions²⁵ and with anterior knee pain.¹¹ Campolo et al¹¹ showed that Kinesio Taping did not have significantly greater benefits than McConnell patellar taping for anterior knee pain. Evermann²⁵ did not report between-group differences in pain severity as a continuous outcome at equivalent time points, but did report significantly more rapid resolution of symptoms with Kinesio Taping than with multi-modality physiotherapy. However, the quality of evidence (GRADE) for these studies was rated as 'very low quality'.

Effect of Kinesio Taping plus other interventions versus other interventions alone

Five studies, involving 170 participants, compared the addition of Kinesio Taping over other interventions versus other interventions alone.^{12,14,23,26,27} In the evaluated outcomes, Kinesio Taping

was no better than other interventions alone for participants with rotator cuff lesion or/and impingement shoulder syndrome, chronic neck pain, patellofemoral pain syndrome and plantar fasciitis. Four trials^{12,14,23,27} were single studies with high risk of bias, therefore the quality of evidence was rated as 'very low quality'. The quality of evidence for one trial in low back pain²⁶ with low risk of bias was rated as 'low quality'. The results and conclusions are presented in Table 6.

Discussion

This review aimed to summarise the current evidence of the effects of Kinesio Taping in people with musculoskeletal conditions. Ten of the included randomised trials estimated the effect of Kinesio Taping by comparing it to sham taping or no intervention, or by comparing its effect when added to other interventions. In general, Kinesio Taping either provided no significant benefit, or its effect was too small to be clinically worthwhile. Two trials did find a significant benefit from Kinesio Taping where the confidence interval was wide enough to include some clinically worthwhile effects, but these trials were of low quality. The effect of Kinesio Taping was also compared to the effects of other physiotherapy interventions in four trials. The only one of these trials to identify a significant benefit was again of low quality.

On average, the trials identified in this review were small with moderate methodological quality. Despite several benefits of registering a clinical trial,^{29,30} only one out of the twelve trials was registered.³ Out of the twelve trials, three provided transparent information on sample size calculation,^{3,5,13} one provided information about primary outcomes³ and none stated that their trial received funding. The quality of evidence (GRADE) for all comparisons ranged from low to very low quality, which means that further robust and low risk of bias evidence is likely to change the estimates of the effects of this intervention.

This systematic review used a highly sensitive search strategy to identify trials in all major databases, following the recommendations from the Cochrane Collaboration.²⁸ Searches were also supplemented by the identification of potential eligible studies from hand searching as well as from clinical trials registers. Therefore, the searches comprehensively identified most or all of the current high-quality evidence about Kinesio Taping in people with musculoskeletal conditions. However, it is possible that some trials might have been published in local databases and as a consequence were not included in this review.

One strength of this review compared to previous reviews is a larger number of relevant clinical trials in participants with musculoskeletal conditions. However, the conclusions from all previous reviews (including this one) are very similar.^{6,7,8,9,10} These findings confirm that this intervention cannot be considered to be effective for this population. In the present review only patient-centred outcomes were described, because these outcomes are the ones that are considered to be the most important in clinical practice for both clinicians and patients.

The included trials compared Kinesio Taping with a large range of other modalities (ie, no treatment, sham taping, exercises, manual therapy and electrotherapy). Regardless of the comparison used or the outcomes investigated, the trials typically showed no significant difference in outcomes between the groups, or a trivial effect in favour of Kinesio Taping (ie, small enough to not be considered clinically worthwhile). It seems that the growing use of Kinesio Taping is due to massive marketing campaigns (such as the ones used during the London 2012 Olympic Games) rather than high-quality, scientific evidence with clinically relevant outcomes. The widespread use of Kinesio Taping in musculoskeletal and sports physical therapy is probably further reinforced by the authors in some of the included trials concluding that Kinesio

Table 6
Results and conclusions of studies of Kinesio Taping plus other intervention versus other intervention only (n = 5).

| Study and condition | Time point | Results | Conclusions |
|--|---|--|---|
| Akbas ²³ Knee pain | After 3 weeks of KT plus exercises or exercises only After 6 weeks of KT plus exercises or exercises only | Pain (0 to 10) at rest: MD 0.8 (95% CI -0.4 to 2.0) in favour of exercises only sitting: MD 2.1 (95% CI 0.4 to 3.8) in favour of exercises only kneeling: MD 1.4 (95% CI -0.5 to 3.4) in favour of exercises only walking: MD 1.8 (95% CI 0.2 to 3.4) in favour of exercises only squatting: MD 1.4 (95% CI -0.5 to 3.2) in favour of exercises only asc stairs: MD 1.5 (95% CI -0.2 to 3.2) in favour of exercises only desc stairs: MD 1.4 (95% CI -0.5 to 3.4) in favour of exercises only going uphill: MD 0.3 (95% CI -1.6 to 2.2) in favour of exercises only going downhill: MD 1.1 (95% CI -0.9 to 3.0) in favour of exercises only Pain (0 to 10) at rest: MD 0.9 (95% CI -0.2 to 2.0) in favour of exercises only sitting: MD 1.8 (95% CI 0.3 to 3.8) in favour of exercises only kneeling: MD 0.3 (95% CI -1.5 to 3.4) in favour of exercises only walking: MD 1.0 (95% CI -0.4 to 3.4) in favour of exercises only squatting: MD 1.0 (95% CI -1.1 to 3.2) in favour of exercises only asc stairs: MD 1.5 (95% CI 0.0 to 3.2) in favour of exercises only desc stairs: MD 1.8 (95% CI -0.1 to 3.4) in favour of exercises only going uphill: MD 0.5 (95% CI -0.9 to 2.2) in favour of exercises only going downhill: MD 1.4 (95% CI -0.3 to 3.0) in favour of exercises only Disability ^a (0 to 100): MD 0.4 (95% CI -5.2 to 6.1) in favour of KT plus exercises | <i>Author:</i> Adding KT to conventional exercises does not reduce pain or disability. <i>Review:</i> Adding KT to stretching, strengthening and open and closed-chain exercises does not reduce pain or disability. The study had low methodological quality. |
| Llopis ¹² Neck pain | One week after the 6-week KT plus usual care or usual care only treatment periods ended | Pain (0 to 10) neck: MD 1.6 (95% CI -0.8 to 3.9) in favour of KT plus usual care Pain (0 to 10) arm: MD 2.2 (95% CI -0.7 to 5.2) in favour of KT plus usual care Quality of life ^b (0 to 100) General health: MD 8.4 (95% CI -7.7 to 24.5) in favour of KT plus usual care Social role: MD 5.00 (95% CI -35.8 to 45.7) in favour of KT plus usual care Physical: MD 7.5 (95% CI -19.2 to 34.2) in favour of KT plus usual care Bodily pain: MD 1.40 (95% CI -9.9 to 23.8) in favour of KT plus usual care Vitality: MD 7.0 (95% CI -9.6 to 23.6) in favour of KT plus usual care Emotional Role: MD 5.0 (95% CI -6.5 to 16.5) in favour of KT plus usual care Mental health: MD 9.6 (95% CI -0.5 to 19.7) in favour of KT plus usual care | <i>Author:</i> Adding KT to physiotherapy treatments improves their effects. <i>Review:</i> Adding KT to stretching, mobility and strengthening exercises and massage does not reduce pain or improve quality of life. The study had low methodological quality. |
| Paoloni ²⁶ Low back pain | At completion of 4 weeks of KT plus exercises or exercises only | Pain (0 to 10): MD 0.2 (95% CI -1.8 to 2.2) in favour of KT plus exercises Disability ^c (0 to 24): MD 1.9 (95% CI -1.1 to 4.9) in favour of KT plus exercises | <i>Author:</i> KT may be used in addition to therapeutic exercises as a short-term strategy. <i>Review:</i> Adding KT to relaxation, stretching and active exercises does not reduce pain or disability. |
| Simsek ¹⁴ Shoulder pain | After 5 days of KT plus exercises or sham KT plus exercises After 12 days of KT plus exercises or sham KT plus exercises | Pain (0 to 10) at rest: MD 0.9 (95% CI -0.7 to 2.5) in favour of KT plus exercises at night: MD 2.0 (95% CI 0.0 to 4.1) in favour of KT plus exercises on activity: MD 1.8 (95% CI 0.5 to 3.2) in favour of KT plus exercises Disability ^d (0 to 100): MD 18 (95% CI 6 to 30) in favour of KT plus exercises Pain (0 to 10) at rest: MD 1.2 (95% CI -0.4 to 2.8) in favour of KT plus exercises at night: MD 2.5 (95% CI 0.4 to 4.5) in favour of KT plus exercises on activity: MD 2.0 (95% CI 0.4 to 3.4) in favour of KT plus exercises Disability ^d (0 to 100): MD 22 (95% CI 10 to 34) in favour of KT plus exercises | <i>Author:</i> Adding KT to exercises is more effective than exercises alone. <i>Review:</i> Adding KT to stabilisation and mobility exercises improves pain and disability. The study had low methodological quality. |
| Tsai ²⁷ Foot pain | One week after the KT plus electrotherapy or electrotherapy only | Pain: The number of words chosen to describe the pain on a pain characteristics questionnaire ^e was taken as a measure of pain intensity. Significantly fewer words were used to describe the pain after KT plus electrotherapy than after electrotherapy alone: MD 8 (95% CI 6 to 9) in favour of KT plus electrotherapy. Disability ^f (0 to 100) at worst: MD 24 (95% CI 15 to 34) in favour of KT plus electrotherapy morning: MD 30 (95% CI 18 to 42) in favour of KT plus electrotherapy evening: MD 26 (95% CI 14 to 38) in favour of KT plus electrotherapy walk barefoot: MD 5 (95% CI -6 to 16) in favour of KT plus electrotherapy stand barefoot: MD 14 (95% CI 2 to 27) in favour of KT plus electrotherapy walk shod: MD 16 (95% CI 5 to 27) in favour of KT plus electrotherapy stand shod: MD 21 (95% CI 7 to 35) in favour of KT plus electrotherapy total score: MD 19 (95% CI 8 to 31) in favour of KT plus electrotherapy | <i>Author:</i> Adding KT to electrotherapy might alleviate pain more than electrotherapy alone. <i>Review:</i> Adding KT to electrotherapy may reduce pain, but the measure of pain did not reflect pain intensity well and there was a marked difference in baseline pain between the groups. Adding KT to electrotherapy reduces disability. The study had low methodological quality. |

KT: Kinesio Taping; TENS: transcutaneous electrical nerve stimulation; MD: mean difference.

^a Kujala Scale.

^b Short Form 36 questionnaire.

^c Roland-Morris Disability Questionnaire.

^d Disabilities of the Arm, Shoulder & Hand Questionnaire.

^e McGill Pain Questionnaire.

^f Foot Function Index.

Taping was effective when their data did not identify significant benefits. Policymakers and clinicians should carefully consider the costs and the effectiveness of this intervention when deciding whether to use this intervention.

Although Kinesio Taping is widely used in clinical practice, the current evidence does not support the use of this intervention. However, the conclusions from this review are based on a number of underpowered studies. Therefore large and well-designed trials are greatly needed. The research group for this review is currently conducting two large randomised controlled trials, which are investigating the use of Kinesio Taping in people with chronic low back pain; they should provide new and high-quality information on this topic. One of them³¹ compares different types of application of Kinesio Taping in 148 participants with non-specific chronic low back pain, with the outcomes of pain intensity, disability and global impression of recovery. The second trial³² tests the effectiveness of the addition of Kinesio Taping to conventional physical therapy treatment in 148 participants with chronic non-specific low back pain, with the outcomes of pain intensity, disability, global impression of recovery and satisfaction with care. It is expected that these two trials will contribute to a better understanding of this intervention's effectiveness.

What is already known on this topic: Kinesio Tape is thinner and more elastic than conventional tape. Kinesio Taping involves application of the tape while applying tension to the tape and/or with the target muscle in a stretched position. Recent systematic reviews of trials of Kinesio Taping have identified insufficient, low-quality evidence about its effects, but new trials of Kinesio Taping are being published frequently.

What this study adds: When used for a range of musculoskeletal conditions, Kinesio Taping had no benefit over sham taping/placebo and active comparison therapies, the benefit was too small to be clinically worthwhile, or the trials were of low quality. Therefore, current evidence does not support the use of Kinesio Taping for musculoskeletal conditions. Some authors concluded that Kinesio Taping was effective when their data did not identify significant benefit.

Addenda: Figure 3 and Appendix 1 can be found online at doi:10.1016/j.jphys.2013.12.008

Correspondence: Leonardo Oliveira Pena Costa, Masters and Doctoral Programs in Physical Therapy, Universidade Cidade de São Paulo, Brazil. Email: lcos3060@gmail.com

References

- Kase K, Wallis J, Kase T. *Clinical Therapeutic Applications of the Kinesio Taping Method*. Tokyo, Japan: Keni-kai Co., Ltd.; 2003.
- Callaghan MJ, Selve J. Patellar taping for patellofemoral pain syndrome in adults. *Cochrane Database Syst Rev*. 2012;4:CD006717.
- Castro-Sanchez AM, Lara-Palomo IC, Mataran-Penarocha GA, Fernandez-Sanchez M, Sanchez-Labraca N, Arroyo-Morales M. Kinesio Taping reduces disability and pain slightly in chronic non-specific low back pain: a randomised trial. *J Physiother*. 2012;58:89–95.
- González-Iglesias J, Fernández-de-las-Penas C, Cleland JA, Huijbregts P. Short-term effects of cervical kinesio taping on pain and cervical range of motion in patients with acute whiplash injury: a randomized clinical trial. *J Orthop Sports Phys Ther*. 2009;39:515–521.
- Thelen MD, Dauber JA, Stoneman PD. The clinical efficacy of kinesio tape for shoulder pain: a randomized, double-blinded, clinical trial. *J Orthop Sports Phys Ther*. 2008;38:389–395.
- Williams S, Whatman C, Hume PA, Sheerin K. Kinesio taping in treatment and prevention of sports injuries: a meta-analysis of the evidence for its effectiveness. *Sports Med*. 2012;42:153–164.
- Bassett K, Lingman S, Ellis R. The use and treatment efficacy of kinaesthetic taping for musculoskeletal conditions: a systematic review. *N Z J Physiother*. 2010;38:56–60.
- Mostafavifar M, Wertz J, Borchers J. A systematic review of the effectiveness of kinesio taping for musculoskeletal injury. *Phys Sportsmed*. 2012;40:33–40.
- Morris D, Jones D, Ryan H, Ryan CG. The clinical effects of Kinesio Tex taping: a systematic review. *Physiother Theory Pract*. 2012;4:259–270.
- Kalron A, Bar-Sela S. A systematic review of the effectiveness of Kinesio Taping® – Fact or fashion? *Eur J Phys Rehabil Med*. 2013;49:699–709.
- Campolo M, Babu J, Dmochowska K, Scariah S, Varughese J. A comparison of two taping techniques (Kinesio and McConnell) and their effect on anterior knee pain during functional activities. *Int J Sports Phys Ther*. 2013;8:105–110.
- Llopis GL, Aranda CM. Physiotherapy intervention with kinesio taping in patients suffering chronic neck pain. A pilot study. *Fisioterapia*. 2012;34:189–195.
- Saavedra-Hernandez M, Castro-Sanchez AM, Arroyo-Morales M, Cleland JA, Lara-Palomo IC, Fernandez-de-Las-Penas C. Short-term effects of kinesio taping versus cervical thrust manipulation in patients with mechanical neck pain: a randomized clinical trial. *J Orthop Sports Phys Ther*. 2012;42:724–730.
- Simsek HH, Balki S, Keklik SS, Ozturk H, Elden H. Does Kinesio taping in addition to exercise therapy improve the outcomes in subacromial impingement syndrome? A randomized, double-blind, controlled clinical trial. *Acta Orthop Traumatol Turc*. 2013;47:104–110.
- Sherrington C, Herbert RD, Maher CG, Moseley AM, Pedro. A database of randomized trials and systematic reviews in physiotherapy. *Man Ther*. 2000;5:223–226.
- Macedo LG, Elkins MR, Maher CG, Moseley AM, Herbert RD, Sherrington C. There was evidence of convergent and construct validity of Physiotherapy Evidence Database quality scale for physiotherapy trials. *J Clin Epidemiol*. 2012;63:920–925.
- Maher CG, Sherrington C, Herbert RD, Moseley AM, Elkins M. Reliability of the PEDro scale for rating quality of randomized controlled trials. *Phys Ther*. 2003;83:713–721.
- Shiwa SR, Costa LO, Costa Lda C, Moseley A, Hespanhol Junior LC, Venancio R, et al. Reproducibility of the Portuguese version of the PEDro Scale. *Cad Saude Publica*. 2011;27:2063–2068.
- Geha NN, Moseley AM, Elkins MR, Chiavegato LD, Shiwa SR, Costa LO. The quality and reporting of randomized trials in cardiothoracic physical therapy could be substantially improved. *Respir Care*. 2013;58:1899–1906.
- Moher D, Hopewell S, Schulz KF, Montori V, Gotzsche PC, Devereaux PJ, et al. CONSORT 2010 Explanation and Elaboration: updated guidelines for reporting parallel group randomised trials. *J Clin Epidemiol*. 2010;63:e1–e37.
- Hozo S, Djulbegovic B, Hozo I. Estimating the mean and variance from the median, range, and the size of a sample. *BMC Med Res Methodol*. 2005;5(13):1–10.
- Guyatt GH, Oxman AD, Kunz R, Woodcock J, Brozek J, Helfand M, et al. GRADE guidelines: 7. Rating the quality of evidence-inconsistency. *J Clin Epidemiol*. 2011;64:1294–1302.
- Akbas E, Atay AO, Yuksel I. The effects of additional kinesio taping over exercise in the treatment of patellofemoral pain syndrome. *Acta Orthop Traumatol Turc*. 2011;45:335–341.
- Aytar A, Ozunlu N, Surenkok O, Karatas M. Initial effects of kinesio® taping in patients with patellofemoral pain syndrome: A randomized, double-blind study. *Isokinet Exerc Sci*. 2011;19:135–142.
- Evermann W. Effekte des elastischen Tapings bei ausgewählten funktionellen Beeinträchtigungen des muskuloligamentären Apparates [Effects of elastic taping on selected functional impairments of the musculoligament apparatus]. *Komplementäre und Integrative Medizin*. 2008;49:32–36 [German].
- Paoloni M, Bernetti A, Fratocchi G, Mangone M, Parrinello L, Del Pilar Cooper M, et al. Kinesio Taping applied to lumbar muscles influences clinical and electromyographic characteristics in chronic low back pain patients. *Eur J Phys Rehabil Med*. 2011;47:237–244.
- Tsai CT, Chang WD, Lee JP. Effects of short-term treatment with kinesiotaping for plantar fasciitis. *J Musculoskel Pain*. 2010;18:71–80.
- Furlan AD, Pennick V, Bombardier C, van Tulder M. 2009 updated method guidelines for systematic reviews in the Cochrane Back Review Group. *Spine (Phila Pa 1976)*. 2009;34:1929–1941.
- Costa LO, Lin CW, Grossi DB, Mancini MC, Swisher AK, Cook C, et al. Clinical trial registration in physiotherapy journals: recommendations from the International Society of Physiotherapy Journal. *J Physiother*. 2012;58:211–213.
- Pinto RZ, Elkins MR, Moseley AM, Sherrington C, Herbert RD, Maher CG, et al. Many randomized trials of physical therapy interventions are not adequately registered: a survey of 200 published trials. *Phys Ther*. 2012;93:299–309.
- Parreira PdoCS, Costa LdaCM, Takahashi R, Hespanhol Junior LC, Motta TM, da Luz Junior MA, et al. Do convolutions in Kinesio Taping matter? Comparison of two Kinesio Taping approaches in patients with chronic non-specific low back pain: protocol of a randomised trial. *J Physiother*. 2013;59:52.
- Added MAN, Costa LOP, Fukuda TY, de Freitas DG, Salomão EC, Monteiro RL, et al. Efficacy of adding the kinesio taping method to guideline-endorsed conventional physiotherapy in patients with chronic nonspecific low back pain: a randomised controlled trial [study protocol]. *BMC Musculoskel Disord*. 2013:301.
- Cochrane Back Review Group (2012) www.back.cochrane.org [accessed 14/12/2012].

Websites

<http://www.pedro.org.au/english/downloads/confidence-interval-calculator>