

Introduction

Kinesio-tape (KT) is an elastic adhesive tape developed by Mr Kenso Kase in the 1970s (1). The method consists in applying adhesive strips of KT in ‘‘I’’, ‘‘X’’ or ‘‘Y’’ shape on the dysfunctional area with the correct stretching (2). Made of cotton fiber strip and with medical grade acrylic adhesive, KT is a latex-free tape and is said to reproduce the elastic properties of the skin. The therapeutic advantage is claimed to be in effect when stretch between 30% and 60% of the original length of the tape. KT works by ‘‘lifting’’ the skin, which is said to increase blood and lymphatic flow, and to decrease inflammation (1). Moreover Kenso Kase claims that KT help therapeutic objectives by inhibiting the pain, reducing the muscle soreness, and providing a proprioceptive support. KT methods became known for the first time after 1988 Seoul games and after 2008 Olympic games where kinesio-tape was given to 58 different countries delegations for the use of the professional athletes (3). These last years showed a quick rise in taping’s sales, numbers of trials and formation about KT (4). Furthermore, lots of medical professionals use this technique in addition of their classical care and a lot of amateurs sportsmen use it during trainings and competitions (5).

However the scientific literature is controversial about Tape’s effect (6). In some reviews, the authors found that the articles bringing proofs in Tape’s favor have a lower methodology than those showing no effect. For now some authors came to the conclusion that the current evidence does not support the use of KT in clinical practice (6,8,9,44). But, in contrary of those authors we can find some articles that support the use of KT, especially in the KT world website kinesiotaping.com.

Therefore, we decided to randomly analyze two articles coming from the library of the website kinesiotaping.com and which says to bring evidence in favor of the KT use. We will analyze them with the following hypothesis: ‘‘The articles from this website are not enough to promote the use of KT’’

Methodology

We choose to analyze two articles coming from the website ‘‘Kinesio Tape’’, which is the world’s site for Kenso Kase kinesio taping. It is also a web site who promotes the use of KT and proposes formation and materials to medical professionals. We can find 34 articles in the rubric ‘‘Published Research’’, which are implicitly present to bring proof in favor of the use of KT. We wanted to only keep the experimental studies, because it’s the sort of studies which allow to put

forth a specific efficiency of a therapy. So we made a quick selection using the title and an instant playback of the different articles, results are shown in figure.

Two articles were not about Kinesio-taping (10,11), 4 were experts opinions(12–15), 2 cases reports(16,17), 5 pilots studies(18–22), 1 observational study (23),2 literature reviews(24,25) and 2 meta-analyzis (3,6). Finally we sort-out 16 experimental studies (26–41)

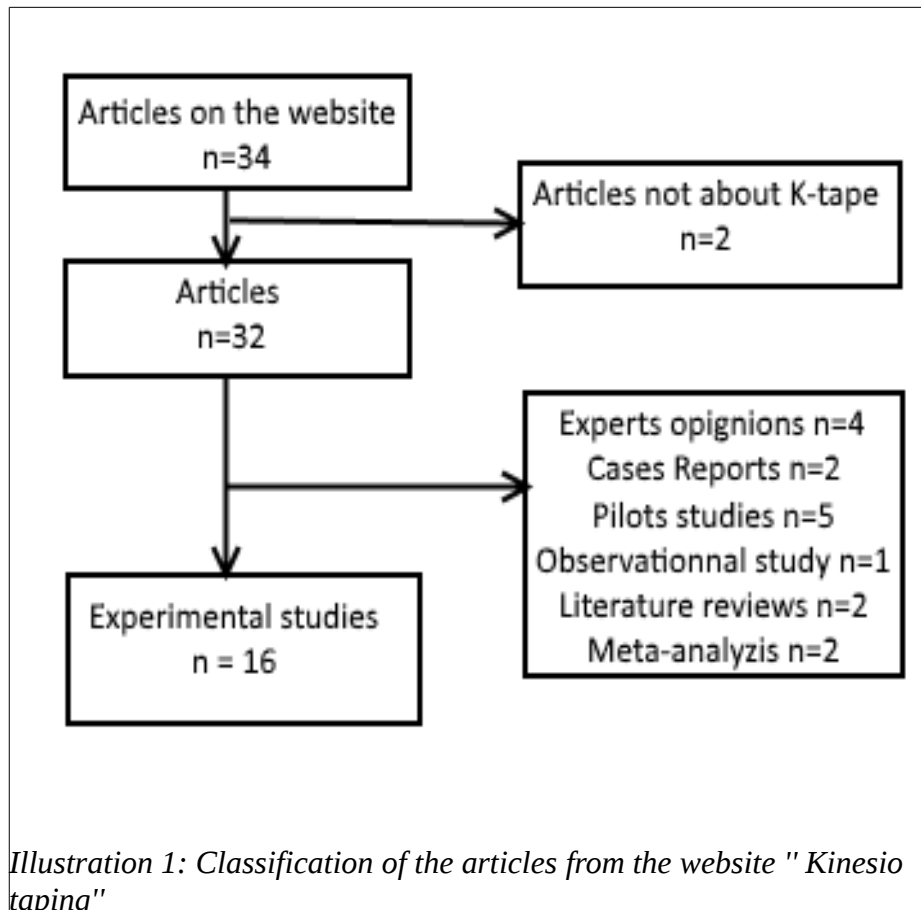


Illustration 1: Classification of the articles from the website " Kinesio taping"

Titre	Créateur
> Efficacy of kinesio taping on isokinetic quadriceps torque in knee osteoarthri...	Anandkumar et al.
> Lymph taping and seroma formation post breast cancer	Bosman
> The Effects of Exercise and Kinesio Tape on Physical Limitations in Patients w...	Castrogiovanni
> Kinesio taping and manual pressure release: Short-term effects in subjects wi...	Chao et al.
> The effect of Kinesio Taping on maximal grip force and key pinch force - Sci...	Donec
> Pain-diminishing effect of Kinesio taping in patients after sternotomy., Pain-...	HM et al.
> Effects of kinesiotaping versus non-steroidal anti-inflammatory drugs and p...	Homayouni et al.
> COMPARISON BETWEEN KINESIO TAPING AND PHYSIOTHERAPY IN THE TR...	Homayouni et al.
> The effect of therapeutic taping on hand function in hemiplegic cerebral pal...	Iraham
> The effects of Kinesio Taping on body functions and activity in unilateral spa...	Kaya Kara et al.
> Effects of kinesio tape compared with non-elastic tape on hand grip strength	Kim et Kim
> The effect of Kinesio Taping on handgrip strength	Lemos et al.
> Short-term effects of high-intensity laser therapy, manual therapy, and Kines...	Pekyavas et Baltaci
> Therapeutic elastic tape reduces morbidity after wisdom teeth removal--a cli...	Ristow et al.
> The clinical efficacy of kinesio tape for shoulder pain: a randomized, double-...	Thelen et al.
> Does correcting position and increasing sensorial input of the foot and ankle ...	Yazici et al.

Illustration 2: Table of the articles by authors alphabetical order

For the random part, we classified the articles by the author's alphabetical order with the program Zotero from number one Anandkumar (28) to number sixteen Yazici (41)(figure 2), then we used “*Random number generator*” to select two trials for the analyze. Out of the 16 possibilities, the software picks out number 10 and number 12, respectively the trials made by Kaya et al, *The effects of Kinesio Taping on body functions and activity in unilateral spastic cerebral palsy: a single-blind randomized controlled trial (37)* and Lemos et al, *The effect of Kinesio Taping on handgrip strength (34)*.

The analysis will be done by two people, both independent. The outcome of the analysis will come after a discussion between the two reviewer. If a disagreement appear, a third reviewer will do the analyze blind to the others outcomes. Then, for each item the final decision will be attain if there is at least two reviewer in accord.

At first, we will briefly introduce the articles by presenting:

- Authors, year of release, journal of release
- Study’s objectives
- Summery table of the principals methodological elements (methods, population, judgment conditions and follow up, interventions, outcomes)
- Author’s conclusion

Steps for the analysis, all the tools and their description can be found in the annex 1

- Step 1: Bias analysis (using the Cochrane collaboration’s tool from assessing risk of bias (42)
- Step 2: Judgment on the risk of bias
- Step 3: Outcome analyze
- Step 4: Free Commentary
- Step 5: Conclusion.

In the first step, for the domain “blinding of participants”, it's really difficult in physiotherapy to completely blind all of the people participating in the study, especially the therapist because he will know what method he will use. Therefore we will not take in account the

lacks in the "blinding" method in the analysis. However we will be looking forward to the others domains.

Table use for the first step ‘ Bias analyze ‘

Domain	Judgment ¹	Argumentation
Sequence generation	Was the allocation sequence adequately generated?	
Allocation concealment	Was allocation adequately concealed?	
Blinding of participants personnel and outcome assessors (Assessments should be made for each main outcome)	Was knowledge of the allocated intervention adequately prevented during the study	
Incomplete outcome data addressed (Assessments should be made for each main outcome)	Were incomplete outcome data adequately addressed?	
Selective reporting	Are reports of the study free of suggestion of selective outcome reporting?	
Other sources of bias	Was the study apparently free of other problems that could put it at a high risk of bias?	

For each condition, the judgment may be:

- High risk of bias, the question’s answer is no
- Low risk of bias, the question’s answer is yes
- Unclear risk of bias, we can answer yes or no to the question due to insufficient information

For the second step, four judgment can be made, depending of the results from the first step. Theses judgments will impact the rest of the analysis.

- High risk of bias: One or more domains is considered to have a ‘high risk of bias’
- Major uncertainty on the risk of bias: 2 domains or more have an ‘unclear risk of bias’.
- Minor uncertainty on the risk of bias: 1 domain has a ‘unclear risk of bias’
- Low risk of bias: All domains have a ‘low risk of bias’

¹The judgment is made accordingly to the description made in the part ‘Assessing risk of bias in included studies’ page 197 to 202 from Cochrane Handbook for Systematic Reviews of Interventions (42)and with the CONSORT statement (45)

For the third step, we will analyze the outcomes only if we find a low risk of bias or a minor uncertainty of the risk of bias, this analyze will follow the questions stated in annex 2. The Free Commentary and conclusion will follow the outcome analysis.

Results

First Article “The effects of Kinesio Taping on body functions and activity in unilateral spastic cerebral palsy: a single-blind randomized controlled trial” by Kaya kara et al, Developmental Medicine & Child Neurology 2014 (37)

Quick scan

The aim of this study was to evaluate the effect of kinesio taping on body functions and activities in children with unilateral spastic cerebral palsy

Table presenting the article from Kaya et al

Methods	Population	Judgment conditions and follow up	Intervention	Outcome
<p>Single blind, randomised comparative trial of two groups comparing classic care and classic care plus kinesio tape application</p> <p>Randomization Random allocation numbers table.</p> <p>One group of 18 and one of 17</p> <p>Blinding method The examiners were blind to the allocation group.</p> <p>Methods for the secret randomization Independent researcher</p>	<p>37 children with unilateral cerebral palsy</p> <p>Inclusions conditions - Age between 7-14 years - Level I or II of the Gross Motor Function Classification System - Able to accept and follow verbal orders</p> <p>Exclusions conditions - Orthopedic surgery or botulinum injection in the past 6 months - Refusal from the parents - Children with allergic reactions to the adhesive compound of Kinesio tape</p>	<p>No information about primary or secondary outcomes</p> <p>- Gross motor function with the GMFCS² and item D and E of the GMFM³</p> <p>- Motor function with BOTMP⁴(2c⁵)</p> <p>- Self-initiated manual hand function with MACS⁶</p> <p>- Fine motor function with BFMF⁷ scale</p> <p>- Body composition with body-mass index</p> <p>- Body functions with power and peak power from a muscle power sprint test (6 to 15 m) functional muscle</p>	<p>Control group (CG): Classic therapy twice a week for 12 weeks. Neuro-developmental treatment comprising of stretching, weight bearing, walking and functional reaching</p> <p>Test group (TG) Classic therapy plus tape 6 days a week for 12 weeks. Tape kept in position for 3 days plus one day of rest. Use of ‘I’ taping:</p>	<p>12 criteria tested</p> <p>- Significant difference between TG and CG for muscle power test, lateral step-up right, sit to stand, attain stand through half knee right, BOTMP gross score and WeeFIM total self care.</p>

²Gross motor function classification system

³Gross motor function measurement

⁴Bruininks Oseretsky Test of Motor Proficiency version 1

⁵Number of criteria used from the measurement tool (Xc) X is the number c is for criteria

⁶Manual ability classification system

⁷Binomial fine motor scale

		<p>strenght with 30s repetition test, lateral step up test, sit to stand and attain through half kneel</p> <p>-The level of independence in activities of daily living. The Functional Independence Measure for Children WeeFIM (6c)</p> <p>-Oxygen saturation and heart rate with a pulse oximeter</p> <p>Evaluation before and after baseline</p>	<p>- For scapular stabilization and postural control – For Forearm supination support</p> <p>- To facilitate hip abduction</p> <p>- For a functional correction for knee hyper-extension and dorsiflexion.</p>	
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The authors conclude with the following sentences: “*Kinesio Taping is a promising additional approach to increasing proprioceptive feedback and improving physical fitness, gross motor function, and activities of daily living*”.

Table presenting the bias analyze for the article of Kaya et al

Domain	Judgment	Argumentation
Sequence generation	Low risk of bias	Random allocation numbers table Independent researcher
Allocation concealment	Unclear risk of bias	No information
Blinding of participants personnel and outcome assessors	High risk of bias	No blinding of patients or therapist
Incomplete outcome data addressed	Unclear risk of bias	No information
Selective reporting	Low risk of bias	The study protocol is available and all pré-specified outcomes have been reported
Other sources of bias	Unclear risk of bias	Not enough information to answer the CONSORT check list

General assessment of the risk of bias

With three domains link to an unclear risk of bias and the item “blinding” link to a high risk of bias we judge this study to have a high risk of bias.

Outcome analyze:

Due to the high risk of bias, we won't analyze the outcomes find by *Kaya et al*

Free commentary

The first problem in this article is the lack of information about the concealment procedure and about the drop outs. The control group lack of a placebo procedure which could have been made with strips without stretch

We can also point out that the title says “single blind”, however the blinding is only for the examiner, whereas it's the therapist and the subjects who should be "blind".

There is no information on the necessary sample size and no information on the alpha inflation risk due to multiples variables. And between the twelve conditions measured, we don't know which is the primary outcome and which are the secondary outcomes.

Conclusion

Considering the high risk of bias of the study, we can't view it as an evidence for the efficiency of the kinesio taping to increase the proprioceptive feedback, improving physical fitness and gross motor function in children affect by unilateral cerebral palsy.

Second article “The effect of kinesio taping on handgrip strength” by Lemos et al Journal of physical therapy science, 2015 (34)

Quick scan.

The aim of this research is to evaluate the change in hand-grip strength induced by a Kinesio Tape application with no or moderate tension, to the dominant and non-dominant arms in healthy women using a hand-grip dynamo-meter.

Table presenting the article from Lemos et al

Methods	Population	Judgment conditions and follow up	Intervention	Outcome
<p>Randomised comparative trial of three groups comparing Kinesio, kinesio without tension and control group</p> <p>Randomization Made but no information about it.</p> <p>Three groups of 25</p> <p>Blinding method No information</p> <p>Methods for the secret randomization No information</p>	<p>75 healthy women</p> <p>Inclusions conditions</p> <ul style="list-style-type: none"> - People from the University Salgado de Oliveira in Brazil - Agreement and consent to participate in all of the trials phases <p>Exclusions conditions</p> <ul style="list-style-type: none"> - Age outside 18-30 years old - Absence in the follow up - Presence of limiting factors such as cardiopulmonary, hormonal, or osteomyoarticular disorders; joint or bone deformities of the upper extremities; central or peripheral neurological deficits; use of anabolic substances; injury or surgery to the upper extremities within the last six months; or consumption of alcoholic beverages or pharmaceutical substances 	<p>Only one primary outcome</p> <p>Hand-grip strength using a JAMAR dynamo-meter placed in the second position for measurement. The position of the subject is standardized. Sat on a chair, knee, hips elbow with 90° flexion. Shoulder in adduction, wrist and forearm in neutral position. Arm unsupported. Dynamometer held by the examiners</p> <p>The subject perform a maximal 5s hand grip, three times for each hand, 60s between each try. The average of the three try was calculated.</p> <p>The measurement were taken 30min, 24hours and 48 hours after the initial one.</p>	<p>Control group (CG):No application of tape</p> <p>Kinesio group (KG)</p> <p>Application of kinesiotape with 25% to 35% and tension.</p> <p>Kinesio group without tension(KGWT)</p> <p>Application of Kinesiotape without tension.</p>	<p>6criteria tested</p> <p>Control group Vs Kinesio group Significant results for the right hand and the left hand after 48h</p> <p>Kinesio group without tension Vs Kinesio group Significant result for the right hand after 24 hours</p> <p>Control group vs Kinesio group without tension No significant measurement</p>

	24 hours prior to the start of this study			
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The authors conclude with the following sentences ‘ *Kinesio Taping can increase handgrip strength when applied with systematic standards for that purpose. Accordingly, this confirms that Kinesio Taping is capable of augmenting muscle function*’

Table presenting the bias analyze for the article of Lemos et al

Domain	Judgment	Argumentation
Sequence generation	Unclear risk of bias	We only know that the subjects were randomly subdivided
Allocation concealment	Unclear risk of bias	No information
Blinding of participants personnel and outcome assessors	High risk of bias	No blinding of patients or therapist
Incomplete outcome data addressed	Unclear risk of bias	No information about the drop out
Selective reporting	Low risk of bias	The study protocol is available and all pré-specified outcomes have been reported
Other sources of bias	Unclear risk of bias	Not enough information to answer the CONSORT check list

General assessment of the risk of bias

With Four domains link to an unclear risk of bias and the item ‘blinding’ link to a high risk of bias we judge this study to have a high risk of bias.

Outcome analyze:

Due to the high risk of bias, we won’t analyze the outcomes find by *Lemos et al.*

Free commentary

The main problems in this article are the lack of information about the concealment procedure, randomization and about the drop outs.

We can also point out that there is no blinding of subject or assessors.

There is no calculation of a necessary sample size.

The use of the measurement methods is not taking in account problems who brings an inflation of the alpha's risk, inflation who needs to be calculated before the study's beginning because it lower the significant alpha threshold.

Conclusion

Considering the high risk of bias of the study, we can't view it as an evidence for the efficiency of the kinesio taping to increase the hand-grip strength nor the muscular function.

Discussion

In our work we have randomly analyze two studies from the website "*kinesiotaping.com*" to see if the methodology use is correct and thus to know if we can trust the results and conclusions. In our own methodology we tried to be as clear as possible, using specific tools made by the Cochrane association, tools already used a rapport about osteopathy, in whose we took a large part of our methodology (43). In the two articles the major problem was the lack of information concerning important methodological point like the "allocation concealment" and about "incomplete outcome". We can also point on the multiplicity of tested criteria with no calculation of the inflation risk. These lack bring an uncertainty about possible bias that will hinder the interpretation of the results. Thus we can't say those articles bring evidences regarding the efficiency of KT. So we can answer favourably to our hypothesis.

Perhaps those articles are of a lower methodology because they are only here as a purchase argument and not to inform peoples. Perhaps the owners of this site are unable to critically analyze a study and also unable to see the flaws present in the ones they put forth; or maybe we have here an illustration of the confirmation bias, people tend to prioritize idea, comment, articles in agreement with their hypothesis and to avoid the opinions who differs. More works are needed to answer those hypothesis. This conclude our work which have no ambitions to settling the debate about kinesiotaping efficiency. We only wanted to show generals flaws existing in studies, a

methodology who can help people to analyze them and also to remind that we can't trust open bibliography or information without verifying the source first.

Conclusion

We analyze two studies from the site "*kinesiotaping.com*" using specific tools made by the Cochrane and consort association. For the two trails we find a high risk of bias. So we can say those articles don't bring evidences in favor of the tape use. If the authors truly want to showcase the efficiency of KT with well made studies, those two should be removed from their website, or at least carry a mention about the level of quality and the extend of trust we can put in their results

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Annex 1

The Cochrane Collaboration's tool for assessing risk of bias

D

Domain	Description	Judgment
Sequence generation	Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.	Was the allocation sequence adequately generated?
Allocation concealment	Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrollment	Was allocation adequately concealed?
Blinding of participants personnel and outcome assessors (Assessments should be made for each main outcome)	Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective.	Was knowledge of the allocated intervention adequately prevented during the study
Incomplete outcome (Assessments should be made for each main outcome)	Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors	Were incomplete outcome data adequately addressed?
Selective outcome reporting	State how the possibility of selective outcome reporting was examined by the review authors, and what was found	Are reports of the study free of suggestion of selective outcome reporting?
Other sources of bias	State any important concerns about bias not addressed in the other domains in the tool If particular questions/entries were pre-specified in the review's protocol, responses should be provided for each question/entry.	Was the study apparently free of other problems that could put it at a high risk of bias?

Annex 2

Outcome analyze

For this part we will try to answer the following question to see if the trial's parameters, measurement methods are well made and to discuss the signification of the results:

1) Quality of the blinding procedure:

- Is the placebo of equal value on time and modality than the test care ?
- Is there a procedure to reduce the "treatment visibility" of the subjects? If there is has it credibility been evaluated ?
- Is there a procedure to limit the implication of the therapist who deliver the care (like a standard model to follow)?

2) Quality of the judgment conditions:

- Is there one primary condition and secondaries conditions?
- If there is, are this conditions subjective of objectives ones? Auto or hetero-evaluated,
- Is there a blinding of the examiners? What are the results and how can we interpret them?

3) Quality of the results:

- Was the sample size needed to have significant power calculated?
- How many conditions were evaluated
- In the case of multiples conditions, was there a statistical correction of the inflate risk alpha calculated ? -

Is the significance of the results subject to discussion?

Is there an other possible interpretation than the one the authors made?