Middle East Journal of Rehabilitation and Health Studies
Volume 8 · Issue 3 · e111123

OPEN PEER REVIEW

The Immediate Effect of Kinesio Taping on the Balance Performance of Patients with Chronic Ankle Sprains: A Randomized Controlled Trial

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SUBMITTED	REVISED	ACCEPTED	DOI
10 Nov 2020	5 May 2021	22 May 2021	10.5812/mejrh.111123

About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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1 Original submission

4 comments · 25 Nov 2020 – 19 Dec 2020

Referee 1 Reviewer

MAJOR REVISION 25 Nov 2020

Dear AE,
Comments for the authors:
1- There is no gap.
2- “for different purposes, among which are pain reduction, muscle strengthening, injury prevention, functional improvement, and alterations in muscle activity and extensibility3”: for each purpose, at least one reference must be added.
3- Please add a reference for ” (Mean±SD:(2.53±2.37) and (1.29±1.05))”.
4- Please add a flowchart.
5- The author has mentioned “one or more than one unilateral inversion ankle sprain during the last 12 months” in the inclusion criteria and “recurrent ankle sprain” in the exclusion criteria. These two criteria are the same.
6- Please add a reference for each inclusion and exclusion criterion.
7- In the test procedure section, there is no figure 1.
8- In the section on applying Kinesio tape, there is no figure 2.
9- Instead of mentioning the history of KT, it is better to describe the method of taping carefully.
10- Please add the company name in “Kistler force plate (model 9286B, USA)”.
11- Please add the company name and country in “Quaysis software (version 2.7)”.
12- The author has mentioned “another person had covered the participant’s leg and foot” and, in the next lines, “The subject was asked to stand on the affected foot in an upright position with barefoot on the center of the force plate”. These statements are contradictory.
13- In the discussion, please add a reference for the first sentence.
14- I think that this statement, “Our results confirm that ankle KT may improve the balance control during the anterior perturbation compared to no-KT condition”, has not been demonstrated in this paper.
15- “In the present study, the measuring of COP displacement, the speed of COP displacement, and SD of COP displacement showed that using KT in patients with chronic ankle sprain was not able to improve the balance control, that had been disturbed by applied (which one? AP or inversion) perturbation, immediately and after 24 hours of KT application.”
16- In the discussion, only similarities and contradictions between the studies have been cited, and how or why these occur has not been explored.
Thanks.

Referee 2 Reviewer

MINOR REVISION 16 Dec 2020

Dear AE,
Thank you for giving me the chance to review this valuable manuscript. The study is well designed but not well presented. A considerable number of minor concerns are noted in the Word version of the manuscript.
Thanks.

Associate Editor

MAJOR REVISION 18 Dec 2020

Dear EIC,
Both reviewers asked that the manuscript should be revised and reviewed by them again. If the authors think they can address the concerns of the reviewers, they will be given the chance to have their article re-reviewed.
Thanks.

Editor-in-Chief

MAJOR REVISION 19 Dec 2020

Dear Authors
According to the reviewers' and associate editor's comments, your article needs major revision.
Thanks.

2

Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

2021/1/1

Dear Referee,

Thank you very much for your careful review and valuable suggestions, the revision was made as follows:

Reviewer 1

1- There is no Gap

The following paragraph was added to the text:

However, several studies have been conducted to analyze balance indices of patients with a chronic ankle sprain after the application of Kinesio taping treatment, but most of these studies did not apply perturbation or just used perturbation in one direction. The present study examined the immediate effect of Kinesio taping on balance performance during inversion and anterior perturbation in patients with a chronic ankle sprain.

2- "for different purposes, among which are pain reduction, muscle strengthening, injury prevention, functional improvement, and alterations in muscle activity and extensibility3" for each purpose a reference (minimum) must be added.

The references were added as follow:

for different purposes, among which are pain reduction[7], muscle strengthening[8], injury prevention[9], functional improvement[7, 10], and alterations in muscle activity and extensibility[11].

3- Please add ref for " (Mean±SD:(2.53±2.37) and (1.29±1.05))"

As we used the data from our pilot study to estimate sample size, the following phrases were added to the text;

Data obtained from the pilot study (n=9, Mean ± SD from pre-KT (2.53±2.37) and post-KT (1.29±1.05)) was used to calculate the sample size by the G*power software. The power, α, and the effect size was set at 0.80, 0.05, and 0.68, respectively. The minimal number of subjects obtained was 30.

4- Please add a flowchart

Flowchart adds as follow:

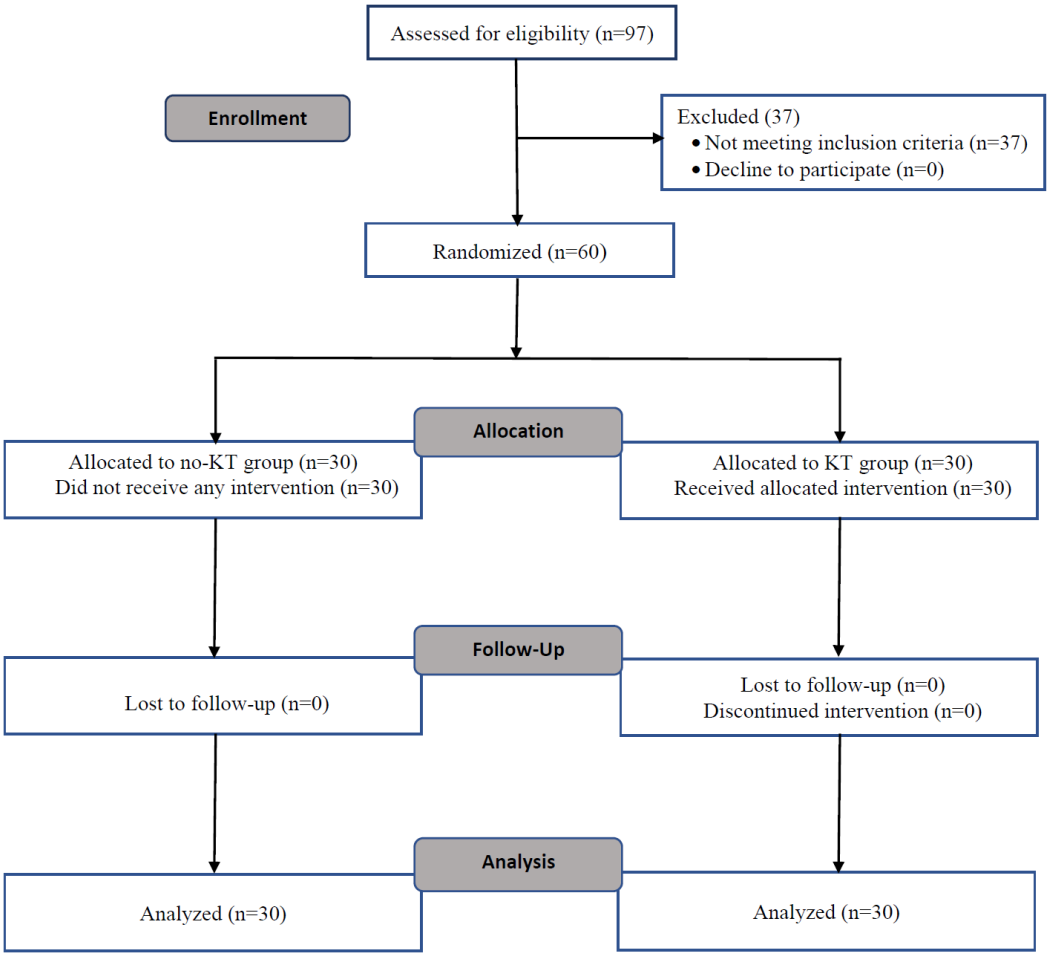


Figure1: Consolidated Standards of Reporting Trials flowchart of the Study.

5- The author in inclusion criteria has been mentioned "one or more than one unilateral inversion ankle sprain during the last 12 months" and in exclusion criteria has been mentioned "recurrent ankle sprain" which two criteria are the same.

Thank you for your accuracy. The phrase"recurrent ankle sprain" was a mistake in typing and was omitted.

6- Please add a ref for each inclusion and exclusion criteria.

Thank you very much for your valuable suggestion but it is not very common that add references for the inclusion and exclusion criteria. Because it just provides some limitations for the population of subjects who participate in the study. However, please let me know if references are required for this part in your journal.

7- In the test procedures section there is no figure 1.

Figure 1 is the above flowchart

8- In applying Kinesio tape there is no figure 2

Figure 2 added as follow:



Figure 2: A. The first layer, from the anterior midfoot to just below the anterior tibial tuberosity **B**. The second layer was wrapped around the heel, from the above of medial malleolus, passed the below of heel **C**.to the lateral side of the ankle and attaching just lateral to the first layer of tape **D**. The third layer covered both medial and lateral malleolus and the anterior of ankle **E**. The fourth strip began at the arch of the foot and attaches proximally to both the medial and lateral malleolus.

9- Instead of mentioning the history of KT, it is better to describe the method of taping carefully

The first layer, from the anterior midfoot to just below the anterior tibial tuberosity. The second layer was wrapped around the heel, from the above of medial malleolus, passed the below of heel to the lateral side of the ankle, and attaching just lateral to the first layer of tape. The third layer covered both medial and lateral malleolus and the anterior of the ankle. The fourth

strip began at the arch of the foot and attaches proximally to both the medial and lateral malleolus [13].

10- Please add a company in "Kistler force plate (model 9286B, USA)"

Force plate (Kistler, model 9286B. USA)

11- Please add company and country in "Quaysis software (version 2.7)"

Gait analysis software (Qualisys, version 2.7, Sweden)

12- The author has been mentioned "another person had covered the participant's leg and foot" and in the next lines mentioned "The subject was asked to stand on the affected foot in an upright position with barefoot on the center of the force plate" which is contradictory.

Thank you for your accuracy.

Blindness was about having kinesio taping or not (*participant's leg and foot were covered*). But I omitted this sentence and the following paragraph was added to the text at **"**Test procedure" section :

"All recorded files had been codded, therefore the person, who extracted and analyzed the data, did not know that the subject belongs to the KT or non-KT group"

13- In discussion please add ref for the first sentence.

It was added as follow:

"The use ankle Kinesio tape has been widely advised for people with an ankle sprain, to improve the function of the ankle joint [7, 10]"

14- I think that this sentence "Our results confirm that ankle KT may improve the balance control during the anterior perturbation compared to no-KT condition" had not been demonstrated by this paper.

The following paragraph was replaced :

"Our results confirm that during inversion perturbation, in the mediolateral axis, COP displacement, as well as the velocity of COP displacement and the SD of COP displacement increased in the KT group compared to the no-KT group. Moreover, during anteroposterior perturbation, in the mediolateral axis, among all of these balance indices, just SD of COP displacement increased in KT group in comparison with no-KT group."

15- "In the present study, the measuring of COP displacement, the speed of COP displacement, and SD of COP displacement showed that using KT in patients with chronic ankle sprain was not able to improve the balance control, that had been disturbed by applied (which one? AP or inversion) perturbation, immediately and after 24 hours of KT application."

In the present study, using KT in patients with chronic ankle sprain was not able to improve the balance control, that had been disturbed by applied

inversion and anterior perturbation, immediately and after 24 hours of KT application. Nevertheless, the Kinesio taping technique has become a popular treatment among athletes; however, its real effects are still being investigated. Further investigation should consider the application of Kinesio Taping for more than 24 hours and in balance control in ankle sprain during perturbation.

16- In discussion, only similarities and contradictions between the studies had been cited and how or why are not explored.

The discussion part was changed and corrected as follow:

The use of ankle Kinesio tape has been widely advised for people with an ankle sprain, to improve the function of the ankle joint [7, 10]. This IRCT was designed to investigate the effect of ankle Kinesio tape on the balance indices in patients with a chronic ankle sprain. Our results confirm that during inversion perturbation, in the mediolateral axis, COP displacement, the velocity of COP displacement, and the SD of COP displacement increased in the KT group compared to the no-KT group. Moreover, during anterior perturbation, in the mediolateral axis, among all of these balance indices, just SD of COP displacement increased in the KT group in comparison with the no-KT group.

In the present study, Kinesio taping was applied as an adjunct therapy to improve the balance in patients with chronic ankle sprain because according to some studies Kinesio taping is effective in the balance of patients with ankle sprain [26-28]. The lack of an effect from Kinesio taping seen in the present study differs from the result of some trials. Kristen Jackson et al. [24] In 2016 carried out a study to determine the relationship between

Kinesiology tape and Balance in Participants With Chronic Ankle Instability. Balance was assessed using the Balance Error Scoring System (BESS). They have shown that the KT improved balance after it had been applied for 48 hours when compared with the pretest and with the no-KT group. One of the most clinically important findings is that balance improvements were retained even after the tape had been removed for 72 hours. In 2015, Carlos et al.[29] studied the effect of Kinesiology tape on measurements of balance in subjects with chronic ankle instability. Balance was assessed under the following 3 conditions: without taping, immediately after application, and after 7 days of use. The analysis showed the SOT(Sensory Organization Test) scores of both the KT and control groups improved during follow-up but no differences between them were observed during follow-up in the balance measurements. In 2018, another systematic review article compared the effect of Kinesio taping on ankle functional performance with other taping methods (non-elastic taping) in healthy individuals and patients with an ankle sprain. The Star Excursion Balance Test results indicated that Kinesio taping was superior to other taping methods (placebo taping or tension-free taping) [10]. These results are in contrast with our study. One explanation for this discrepancy is that according to a study, the improvements observed in previous studies could be related to other aspects (eg, an increased sense of confidence, stability, and reassurance) that the individual experiences when performing a dynamic balance activity using ankle taping. Therefore, KT would not affect the proprioception [30]. Another possibility that needs to be considered is that with regard to Kinesio taping application time, it is recommended that It can be applied continuously for 3 to5 days, while the tape Still holds its elastic properties [23]. It is possible that the time of application that we used was insufficient to generate the positive results seen in other studies because in some of these studies, the time of application was longer than 24

hours [29]. Moreover, using external perturbation is a known tool to investigate the ankle strategy of balance control [25, 31]. And only a few studies have used external perturbation to examine the balance in patients with lateral ankle sprain [32, 33]. Nevertheless, we used perturbation at the shoulder level in both, inversion and anterior directions. These reasons may explain the lack of differences between the 2 groups observed in our study.

Some recent studies are in line with our study. In a recent systematic review study eight studies were included in this review. Studies measured either sense of movement or sense of joint position in people with a history of an ankle sprain. The authors reported no beneficial effect of KT on the proprioceptive sense in patients [18]. Also, Briem et al. [32] in 2011studied in Fifty-one male premier-league athletes. Participants were tested for functional stability of both ankles with the Star Excursion Balance Test. They demonstrated KT application does not affect the evertor muscles which control the lateral ankle sprain. The current results, therefore, provide further support for the idea that using KT in patients with chronic ankle sprain was not able to improve balance control.

Also, our findings are supported by Shields et al. [34] who claimed that KT may not improve the postural control in subjects with an ankle sprain. It seems that applying perturbation could provide more challenges for balance control instead of the static balance control method which was used by Shields and colleagues in their study.

In the present study, using KT in patients with chronic ankle sprain was not able to improve the balance control, that had been disturbed by applied inversion perturbation, immediately and after 24 hours of KT application. Nevertheless, the Kinesio taping technique has become a popular treatment

among athletes; however, its real effects are still being investigated. Further investigation should consider the application of Kinesio Taping for more than 24 hours and in balance control in ankle sprain during perturbation.

Thank you for your valuable comments.

2021/1/1

Dear Referee,

Thank you very much for your careful review and valuable suggestions, the revision was made as follows:

Comment [h1]: *It is strongly recommended to the authors to do manuscript editing by a native*

A native edited manuscript according to the suggestion of referee and this sentence in the abstract (background) was changed as follow:

“Lateral ankle sprains are a common injury resulting from a rapid supination moment that damages lateral ligaments and cartilaginous surfaces, and contributes to a deterioration in functional ankle stability and balance among individuals[1-3].”

Comment [h2]: *was*

The purpose of this study was to investigate the immediate effect of Kinesio taping (KT) on balance performance in patients with a chronic ankle sprain.

Comment [h3]: *The type of study should be written in the method of the abstract and should include the IRCT number in parentheses. It is strongly recommended to write about the study design, and the statistical methods used in the study.*

The type of study, IRCT number and study design were added to the method of abstract as follow;

Methods: The study was a randomized, single-blind, and parallel-group study with the concealed allocation. Sixty subjects with a history of ankle sprain (27 males and 33 females) were recruited and randomly assigned to one of the Kinesio taping (KT, n=30) or no taping-control (no-KT, n=30) groups. The subjects were asked to participate in 2 consecutive days of study, including 4 evaluation sessions. The first and second sessions were before and after taping on the first day, third and fourth sessions were before and after removal of taping on the second day. The displacement of the center of pressure (COP), the speed, and the standard deviation (SD) of COP displacement in the anteroposterior and Medio-lateral directions, following inversion and anterior perturbation, were measured before and after KT application, as well as before and after removal of 24 hours of KT use. The same interval measurement was performed for the no-KT; control group. SPSS version 22 was used to apply the ANOVA statistical method. It was registered at the Iranian Registry of Clinical Trials(IRCT2013110415262N1).

Comment [h4]: *The authors should refer to the significant results obtained in the study along with mentioning the p- value.*

The significant result and P value were added to the result as follow;

Results: Repeated-measures analysis of variance (ANOVA) demonstrated that there were significant differences in the mean change (SD) of COP displacement, the velocity of COP displacement and SD of COP displacement in inversion perturbation, in the mediolateral axis. Which these factors immediately after taping increased (The p-value of these factors were 0.031, 0.005 and 0.011 respectively). Also these factors after 24 hours of applying Kinesio tape increased in the KT group compared to the no-KT group (p-value of these factors were 0.019, 0.002 and 0.009 respectively). Additionally, SD of COP displacement in anterior perturbation, in mediolateral axis immediately after applying KT and 24 hours of applying kinesio tape in KT group in comparison with a no-KT group showed a significant increase in these parameters (p-value of these factors were 0.022 and 0.016 respectively). In other parameters, there were no significant differences between KT and no-KT groups.

Comment [h5]: *Absoultly, the authors have made no mention of the previous research in the field of the current study, Whereas they should refer to previous RCTs and especially systemic reviews in this regard.*

Previous research was added and highlighted as follow:

Lee et al. [16] reported the effect of ankle taping on the dynamic balance of young soccer players with functionally unstable ankles. Also Kim et al. [17] observed that ankle taping has a therapeutic effect in recovering ankle stability in patients with chronic ankle instability. Raymond et al.[18] in a systematic review investigated the effect of ankle taping or bracing on proprioception in functional ankle instability. This article suggested that

using an ankle brace or ankle tape has no effect on proprioceptive acuity in participants with a recurrent ankle sprain or who have functional ankle instability.

Comment [h6]: *Most importantly, the authors should refer to the innovation aspects of their research and its importance in the introduction*

The following paragraph was added to the introduction :

“However, several studies have been conducted to analyze balance indices of patients with a chronic ankle sprain after the application of kinesio taping treatment, but most of these studies did not apply perturbation or just used perturbation in one direction. The present study examined the immediate effect of Kinesio taping on balance performance during inversion and anterior perturbation in patients with a chronic ankle sprain.**”**

Comment [h7]: *was*

“The purpose of this study was to determine the immediate effect of Kinesio taping (KT) on balance performance in patients with a chronic ankle sprain.”

Comment [h8,9]: *How did you select the participants in this research?*

How people were recruited to the study?

“Two orthopedic surgeons referred their patients (Ninety-seven subjects with a diagnosis of chronic ankle sprain) to the Neuromuscular

Rehabilitation Research Center of Semnan University of Medical Sciences in Semnan, Iran in 2014."

Comment [h10]: *Time and location of data collecting?*

"Neuromuscular Rehabilitation Research Center of Semnan University of Medical Sciences in Semnan, Iran in 2014."

Comment [h11]: *based on which variable?*

"Data obtained from the pilot study (n=9, Mean ± SD from pre-KT (2.53±2.37) and post-KT (1.29±1.05)) was used to calculate the sample size by the G*power software. The power, α, and effect size was set at 0.80, 0.05, and 0.68, respectively. The minimal number of subjects obtained was 30."

Comment [h12]: *Subjects*

"S" have corrected:

"Subjects were included if they presented a history of at least one acute lateral ankle sprain that had resulted in swelling, pain, and temporary loss of function (but none in the prior three months."

Comment [h13]: *Who evaluated the exclusion criteria in the participants?*

"Exclusion criteria included acute inflammation in the ankle, severe ankle instability (grade 3), ligaments rupture, fracture, dislocation or subluxation in the ankle joint and deformity in foot or ankle, which diagnosed by a general physician and an expert physical therapist."

Comment [h14]: *Is the level of physical activity before and after the tests recorded with a questionnaire?*

Physical activity beyond the study intervention was not assessed.

Thank you for your valuable comments on our paper. Our cases were not athletes. And they have usual activity. So professional questionnaires (like the Tenger activity scale) did not use in this study. They just were assessed with brief Yes/No questions. And this was one of our study limitations which we did not assess their physical activity before the examination.

Comment [h15]: *Center*

"3.6. Center of pressure sway measurement"

Comment [h16]: *The first paragraph should be a brief description of the study type and features in methods and most important results.*

The study type and features and most important results were added to the discussion as follow;

"The use ankle Kinesio tape has been widely advised for people with an ankle sprain, to improve the function of the ankle joint [7, 10]. This IRCT was designed to investigate the effect of ankle Kinesio tape on the balance indices in patients with an ankle sprain. Our results confirm that during inversion perturbation, in the mediolateral axis, COP displacement, the velocity of COP displacement and the SD of COP displacement increased in the KT group compared to the no-KT group. Moreover, during anteroposterior perturbation, in the mediolateral axis, among all of these

balance indices, just SD of COP displacement increased in KT group in comparison with the no-KT group."

Comment [h17]: *When you bring the name of the author, you should put the reference number immediately after the name, please correct it all over the text.*

The reference numbers were added after the name of the authors as follow:

Lee et al. [16]

Raymond et al.[18]

Kim et al. [17]

Dr. KenzoKase [22]

KenzoKase's [23]

Kristen Jackson et al. [24]

Carlos et al.[29]

Briem et al. [32]

Shields et al. [34]

Comment [h18]: *that the*

The sentence was changed as follow:

"Kristen Jackson et al. [24] In 2016 carried out a study to determine the relationship between Kinesiology tape and Balance in Participants With Chronic Ankle Instability"

Comment [h19]: *the most*

The first part of the sentence was changed and the correction was done as follow:

“The analysis showed the SOT(Sensory Organization Test) scores of both the KT and control groups improved during follow-up but no differences between them were observed during follow-up in the most balance measurements.”

Comment [h20]: *Please use more recent papers in your discussion*

Recent papers were added to the discussion which was highlighted :

5. Discussion:

The use of ankle Kinesio tape has been widely advised for people with an ankle sprain, to improve the function of the ankle joint **[7, 10]**. This IRCT was designed to investigate the effect of ankle Kinesio tape on the balance indices in patients with a chronic ankle sprain. Our results confirm that during inversion perturbation, in the mediolateral axis, COP displacement, the velocity of COP displacement and the SD of COP displacement increased in the KT group compared to the no-KT group. Moreover, during anterior perturbation, in the mediolateral axis, among all of these balance indices, just SD of COP displacement increased in the KT group in comparison with the no-KT group.

In the present study, Kinesio taping was applied as an adjunct therapy to improve the balance in patients with chronic ankle sprain because according to some studies Kinesio taping is effective in the balance of patients with ankle sprain [26-28]. The lack of an effect from Kinesio taping seen in the present study differs from the result of some trials. Kristen Jackson et al. [24] In 2016 carried out a study to determine the relationship between Kinesiology tape and Balance in Participants With Chronic Ankle

Instability. Balance was assessed using the Balance Error Scoring System (BESS). They have shown that the KT improved balance after it had been applied for 48 hours when compared with the pretest and with the no-KT group. One of the most clinically important findings is that balance improvements were retained even after the tape had been removed for 72 hours. In 2015, Carlos et al.[29] studied the effect of Kinesiology tape on measurements of balance in subjects with chronic ankle instability. Balance was assessed under the following 3 conditions: without taping, immediately after application, and after 7 days of use. The analysis showed the SOT (Sensory Organization Test) scores of both the KT and control groups improved during follow-up but no differences between them were observed during follow-up in most balance measurements. In 2018, another systematic review article compared the effect of Kinesio taping on ankle functional performance with other taping methods (non-elastic taping) in healthy individuals and patients with an ankle sprain. The Star Excursion Balance Test results indicated that Kinesio taping was superior to other taping methods (placebo taping or tension-free taping) **[10].** These results are in contrast with our study. One explanation for this discrepancy is that according to a study, the improvements observed in previous studies could be related to other aspects (eg, an increased sense of confidence, stability, and reassurance) that the individual experiences when performing a dynamic balance activity using ankle taping. Therefore, KT would not affect the proprioception **[30]**. Another possibility that needs to be considered is that with regard to Kinesio taping application time, it is recommended that It can be applied continuously for 3 to5 days, while the tape Still holds its elastic properties [23]. It is possible that the time of application that we used was insufficient to generate the positive results seen in other studies because in some of these studies, the time of application was longer than 24 hours [29]. Moreover, using external perturbation is a known tool to

investigate the ankle strategy of balance control [25, 31]. And only a few studies have used external perturbation to examine the balance in patients with lateral ankle sprain [32, 33]. Nevertheless, we used perturbation at the shoulder level in both, inversion and anterior directions. These reasons may explain the lack of differences between the 2 groups observed in our study.

Some recent studies are in line with our study. In a recent systematic review study eight studies were included in this review. Studies measured either sense of movement or sense of joint position in people with a history of an ankle sprain. The authors reported no beneficial effect of KT on the proprioceptive sense in patients [18]. Also, Briem et al. [32] in 2011studied in Fifty-one male premier-league athletes. Participants were tested for functional stability of both ankles with the Star Excursion Balance Test. They demonstrated KT application does not affect the evertor muscles which control the lateral ankle sprain. The current results, therefore, provide further support for the idea that using KT in patients with chronic ankle sprain was not able to improve balance control.

Also, our findings are supported by Shields et al. [34] who claimed that KT may not improve the postural control in subjects with an ankle sprain. It seems that applying perturbation could provide more challenges for balance control instead of the static balance control method which was used by Shields and colleagues in their study.

In the present study, using KT in patients with chronic ankle sprain was not able to improve the balance control, that had been disturbed by applied inversion perturbation, immediately and after 24 hours of KT application. Nevertheless, the Kinesio taping technique has become a popular treatment among athletes; however, its real effects are still being investigated. Further

investigation should consider the application of Kinesio Taping for more than 24 hours and in balance control in ankle sprain during perturbation.

Thank you for your valuable comments.

2 Revision 1

3 comments · 9 Feb 2021 – 13 Feb 2021

Referee 1 Reviewer

ACCEPT 9 Feb 2021

Dear AE,
The study has been reviewed carefully. Based on the author's comments and revisions, this manuscript is accepted.
Thanks

Associate Editor

ACCEPT 10 Feb 2021

Dear EIC,
Thanks for the corrections that have been made. Congratulations! This manuscript has been accepted.
Thanks.

Editor-in-Chief

MINOR REVISION 13 Feb 2021

Dear Authors
Thank you so much for your efforts to improve the quality of the manuscript. However, some problems are still observed in the manuscript and need to be addressed.
Please add the results of repeated-measures ANOVA in the results section or in a separate table.
In addition, 95% confidence intervals for all mean differences are added in tables 2 and 3. Moreover, the article should be edited by a native English editor to resolve some grammatical problems in the manuscript. Please send the certificate of native English editing to the journal when resubmitting the manuscript.
Thanks.

3

Revision 2

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Dear editor,

Thank you for your helpful comments.

The results of repeated measure ANOVA in the separate table(table 4) and 95% confidence interval of all mean differences was added in the tables of 2 and 3, the article edited by native English editor and native edition certification was attached.

Table 2: Mean changes,SD and 95% CI during inversion perturbation in terms of COP displacement, COP displacement velocity, and COP displacement SD between the KT and non-KT groups in the ant-post and med-lat axes

		Before and immediately after					Before and 24 hours after				
		No-KT(n=30)		No-KT(n=30)			No-KT(n=30)		No-KT(n=30)		
Balance indices parameters	Axis	Mean (SD)	%95CI	Mean (SD)	%95CI	p value	Mean (SD)	%95CI	Mean (SD)	%95CI	p value
COP Displacement (mm)	A-P	3.1 (1.1)	2.70 -3.49	3.3 (1.2)	2.87-3.72	0.631	2.7 (0.9)	2.37-3.02	2.5 (1.1)	2.10-2.89	0.561
	M-L	4.6 (1.9)	3.91-5.28	10.2(3.9)	8.80-11.59	0.031*	3.4 (2.1)	2.64-4.15	12.5 (3.4)	11.28-13.71	0.019*
V of COP Displacement (mm/sec)	A-P	5.1 (2.2)	4.31-5.88	8.6 (2.8)	7.59-9.60	0.391	6.6 (1.3)	6.13-7.06	8.9 (3.1)	7.78-10.01	0.515
	M-L	6.5 (4.4)	4.92-8.07	16.3 (5.1)	14.47-18.12	0.005*	8.9 (3.8)	7.53-10.26	18.7 (6.2)	16.47-20.92	0.002*
SD of COP Displacement (mm)	A-P	9.6 (3.1)	8.48-10.71	10.2 (4.3)	8.65-11.74	0.711	10.1(4.4)	8.52-11.67	13.7 (4.2)	12.19-15.20	0.641
	M-L	7.3 (6.3)	5.04-9.55	19.6 (4.1)	18.13-21.06	0.011*	10.4 (4.4)	8.82-11.97	21.5 (4.9)	19.74-23.25	0.009*

*= significant difference, SD= Standard deviation, COP= Centre of pressure,V=Velosity,A-P=Antero-posterior,M-L=Medio-lateral.

Table 3: Mean changes, SD and 95% CI during anterior perturbation in terms of COP displacement, COP displacement velocity, and COP displacement SD between the KT and non-KT groups in the ant-post and med-lat axes

		Before and immediately after					Before and 24 hours after				
		No-KT(n=30)		No-KT(n=30)			No-KT(n=30)		No-KT(n=30)		
Balance indices parameters	Axis	Mean (SD)	%95CI	Mean (SD)	%95CI	p value	Mean (SD)	%95CI	Mean (SD)	%95CI	p value
COP Displacement (mm)	A-P	4.2(2.1)	3.44-4.95	3.3(3.4)	2.08-4.51	0.481	5.5(3.8)	4.13-6.81	4.7(2.90	3.66-5.37	0.676
	M-L	5.1(2.9)	4.06-6.13	6.3(2.1)	5.54-7.05	0.811	6.5(3.9)	5.10-7.89	7.5(3.3)	6.31-8.68	0.782
V of COP Displacement (mm/sec)	A-P	7.2(3.6)	5.91-8.48	5.4(4.9)	3.64-7.15	0.833	6.8(4.1)	5.33-8.26	4.6(4.4)	3.02-6.17	0.788
	M-L	9.4(4.3)	7.85-10.94	12.7(5.3)	10.80-14.59	0.363	10.1(3.8)	8.73-11.46	9.8(4.1)	8.33-11.26	0.451
SD of COP Displacement (mm)	A-P	9.2(5.4)	7.26-11.13	7.5(4.1)	6.03-8.96	0.518	10.6(4.9)	8.84-12.35	8.9(3.2)	7.75-10.04	0.693
	M-L	8.1(3.3)	6.91-9.28	18.6(3.9)	17.20-19.99	0.022*	9.9(4.2)	8.39-11.40	20.9(4.6)	19.25-22.54	0.016*

*= significant difference, SD= Standard deviation, COP= Centre of pressure,V=Velosity,A-P=Antero-posterior,M-L=Medio-lateral.

Table 4: Results of ANOVA models with adjustment for time as the repeatedvariable forCOP Displacement, Velocity of COP DisplacementandSD of COP Displacement considering axis, perturbation and all their interaction terms with time in KT group

Value	Effect	Source	Sum of squares	df	Mean square	F	Sig.	Effect size	Power
COP Displacement (mm)	Within-Subjects (Lower-Bound)	Time	1124.021	1.0	1124.021	7.392	.008	.081	.767
		Time * Perturbation	1011.533	2.0	505.767	3.326	.041	.073	.615
		Time * Axis	400.331	1.0	400.331	2.633	.108	.030	.361
		Time * Perturbation * Axis	460.616	2.0	230.308	1.515	.226	.035	.314
		Error(Time)	12772.279	84.0	152.051	-	-	-	-
	Between-Subjects	Intercept	104561.950	1	104561.950	352.287	<.001	.807	1
		Perturbation	26263.811	2	13131.905	44.244	<.001	.513	1
		Axis	15557.892	1	15557.892	52.417	<.001	.384	1
		Perturbation * Axis	11021.166	2	5510.583	18.566	<.001	.307	1
		Error	24931.990	84	296.809	-	-	-	-
Velocity of COP Displacement (mm/sec)	Within-Subjects (Lower-Bound)	Time	5431.568	1.0	5431.568	4.876	.030	.055	.588
		Time * Perturbation	5201.690	2.0	2600.845	2.335	.103	.053	.461
		Time * Axis	2223.825	1.0	2223.825	1.996	.161	.023	.287
		Time * Perturbation * Axis	2346.333	2.0	1173.167	1.053	.353	.024	.229
		Error(Time)	93564.892	84.0	1113.868	-	-	-	-
	Between-Subjects	Intercept	675671.350	1	675671.350	395.656	<.001	.825	1
		Perturbation	190493.779	2	95246.889	55.774	<.001	.570	1
		Axis	106788.230	1	106788.230	62.532	<.001	.427	1
		Perturbation * Axis	85227.470	2	42613.735	24.954	<.001	.373	1
		Error	143448.940	84	1707.725	-	-	-	-
SD of COP Displacement (mm)	Within-Subjects (Lower-Bound)	Time	5338.621	1.0	5338.621	2.658	.107	.031	.364
		Time * Perturbation	9369.588	2.0	4684.794	2.333	.103	.053	.461
		Time * Axis	817.337	1.0	817.337	.407	.525	.005	.097
		Time * Perturbation * Axis	4181.364	2.0	2090.682	1.041	.358	.024	.226
		Error(Time)	168708.542	84.0	2008.435				
	Between-Subjects	Intercept	324223.981	1	324223.981	292.735	<.001	.777	1
		Perturbation	70120.608	2	35060.304	31.655	<.001	.430	1
		Axis	6681.063	1	6681.063	6.032	.016	.067	.680
		Perturbation * Axis	5559.709	2	2779.854	2.510	.087	.056	.490
		Error	93035.634	84	1107.567				

df: degree of freedom, time

3 Revision 2

1 comment · 15 Mar 2021

Editor-in-Chief

MINOR REVISION 15 Mar 2021

Dear Authors,
The submitted manuscript has no in-text references. Please submit the final version of the revised manuscript based on all required comments from the previous stages. In addition, revise the grouping of tables 2 and 3.
Thanks.

4

Revision 3

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Dear Referee,

Thank you very much for your careful review and valuable suggestions, the revision was made as follows:

1-Please add the results of repeated measure ANOVA in the result section or in the separate table.

The results of repeated measure ANOVA was added in the separate table (table 4)

Table 4: Results of ANOVA models with adjustment for time as the repeatedvariable forCOP Displacement, Velocity of COP DisplacementandSD of COP Displacement considering axis, perturbation and all their interaction terms with time in KT group

Value	Effect	Source	Sum of squares	df	Mean square	F	Sig.	Effect size	Power
COP Displacement (mm)	Within-Subjects (Lower-Bound)	Time	1124.021	1.0	1124.021	7.392	.008	.081	.767
		Time * Perturbation	1011.533	2.0	505.767	3.326	.041	.073	.615
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		Error(Time)	12772.279	84.0	152.051	-	-	-	-
	Between-Subjects	Intercept	104561.950	1	104561.950	352.287	<.001	.807	1
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		Perturbation * Axis	11021.166	2	5510.583	18.566	<.001	.307	1
		Error	24931.990	84	296.809	-	-	-	-
Velocity of COP Displacement (mm/sec)	Within-Subjects (Lower-Bound)	Time	5431.568	1.0	5431.568	4.876	.030	.055	.588
		Time * Perturbation	5201.690	2.0	2600.845	2.335	.103	.053	.461
		Time * Axis	2223.825	1.0	2223.825	1.996	.161	.023	.287
		Time * Perturbation * Axis	2346.333	2.0	1173.167	1.053	.353	.024	.229
		Error(Time)	93564.892	84.0	1113.868	-	-	-	-
	Between-Subjects	Intercept	675671.350	1	675671.350	395.656	<.001	.825	1
		Perturbation	190493.779	2	95246.889	55.774	<.001	.570	1
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		Perturbation * Axis	85227.470	2	42613.735	24.954	<.001	.373	1
		Error	143448.940	84	1707.725	-	-	-	-

SD of COP Displacement (mm)	Within-Subjects (Lower-Bound)	Time	5338.621	1.0	5338.621	2.658	.107	.031	.364
		Time * Perturbation	9369.588	2.0	4684.794	2.333	.103	.053	.461
		Time * Axis	817.337	1.0	817.337	.407	.525	.005	.097
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		Axis	6681.063	1	6681.063	6.032	.016	.067	.680
		Perturbation * Axis	5559.709	2	2779.854	2.510	.087	.056	.490
		Error	93035.634	84	1107.567				

df: degree of freedom, time

2- 95% confidence interval of all mean differences are added in the tables of 2 and 3.

95% confidence interval of all mean differences was added in the tables of 2 and 3

Table 2: Mean changes,SD and 95% CI during inversion perturbation in terms of COP displacement, COP displacement velocity, and COP displacement SD between the KT and non-KT groups in the ant-post and med-lat axes

		Before and immediately after					**Before and 24 hours after**				
		No-KT(n=30)		KT(n=30)			No-KT(n=30)		KT(n=30)		
Balance indices parameters	Axis	Mean (SD)	%95CI	Mean (SD)	%95CI	p value	Mean (SD)	%95CI	Mean (SD)	%95CI	p value
COP Displacement (mm)	A-P	3.1 (1.1)	2.70 -3.49	3.3 (1.2)	2.87-3.72	0.631	2.7 (0.9)	2.37-3.02	2.5 (1.1)	2.10-2.89	0.561
	M-L	4.6 (1.9)	3.91-5.28	10.2(3.9)	8.80-11.59	0.031*	3.4 (2.1)	2.64-4.15	12.5 (3.4)	11.28-13.71	0.019*

V of COP Displacement (mm/sec)	A-P	5.1 (2.2)	4.31-5.88	8.6 (2.8)	7.59-9.60	0.391	6.6 (1.3)	6.13-7.06	8.9 (3.1)	7.78-10.01	0.515
	M-L	6.5 (4.4)	4.92-8.07	16.3 (5.1)	14.47-18.12	0.005*	8.9 (3.8)	7.53-10.26	18.7 (6.2)	16.47-20.92	0.002*
SD of COP Displacement (mm)	A-P	9.6 (3.1)	8.48-10.71	10.2 (4.3)	8.65-11.74	0.711	10.1(4.4)	8.52-11.67	13.7 (4.2)	12.19-15.20	0.641
	M-L	7.3 (6.3)	5.04-9.55	19.6 (4.1)	18.13-21.06	0.011*	10.4 (4.4)	8.82-11.97	21.5 (4.9)	19.74-23.25	0.009*

*= significant difference, SD= Standard deviation, COP= Centre of pressure,V=Velosity,A-P=Antero-posterior,M-L=Medio-lateral.

Table 3: Mean changes, SD and 95% CI during anterior perturbation in terms of COP displacement, COP displacement velocity, and COP displacement SD between the KT and non-KT groups in the ant-post and med-lat axes

3 -the article should be edit by native English editor to resolve some grammatical problems of manuscript.

		Before and immediately after					**Before and 24 hours after**				
		No-KT(n=30)		KT(n=30)			No-KT(n=30)		KT(n=30)		
Balance indices parameters	Axis	Mean (SD)	%95CI	Mean (SD)	%95CI	p value	Mean (SD)	%95CI	Mean (SD)	%95CI	p value
COP Displacement (mm)	A-P	4.2(2.1)	3.44-4.95	3.3(3.4)	2.08-4.51	0.481	5.5(3.8)	4.13-6.81	4.7(2.90)	3.66-5.73	0.676

	M-L	5.1(2.9)	4.06-6.13	6.3(2.1)	5.54-7.05	0.811	6.5(3.9)	5.10-7.89	7.5(3.3)	6.31-8.68	0.782
V of COP Displacement (mm/sec)	A-P	7.2(3.6)	5.91-8.48	5.4(4.9)	3.64-7.15	0.833	6.8(4.1)	5.33-8.26	4.6(4.4)	3.02-6.17	0.788
	M-L	9.4(4.3)	7.85-10.94	12.7(5.3)	10.80-14.59	0.363	10.1(3.8)	8.73-11.46	9.8(4.1)	8.33-11.26	0.451
SD of COP Displacement (mm)	A-P	9.2(5.4)	7.26-11.13	7.5(4.1)	6.03-8.96	0.518	10.6(4.9)	8.84-12.35	8.9(3.2)	7.75-10.04	0.693
	M-L	8.1(3.3)	6.91-9.28	18.6(3.9)	17.20-19.99	0.022*	9.9(4.2)	8.39-11.40	20.9(4.6)	19.25-22.54	0.016*

*= significant difference, SD= Standard deviation, COP= Centre of pressure,V=Velosity,A-P=Antero-posterior,M-L=Medio-lateral.

3 -the article should be edit by native English editor to resolve some grammatical problems of manuscript.

the article was edited by native English editor and native edition certification was attached

4 -The submitted manuscript is without any reference in the text.

Refrences was added in the text and highlighted.

5 - Revise the grouping of tables 2 and 3.

Grouping of tables 2 and 3 was corrected

6- Authors should upload a copy of the Informed Consent form on the journal website.

Informed consent which was approved by University research council was added as separate file.

Table 2: Mean changes,SD and 95% CI during inversion perturbation in terms of COP displacement, COP displacement velocity, and COP displacement SD between the KT and non-KT groups in the ant-post and med-lat axes

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	M-L	4.6 (1.9)	3.91-5.28	10.2(3.9)	8.80-11.59	0.031*	3.4 (2.1)	2.64-4.15	12.5 (3.4)	11.28-13.71	0.019*
V of COP Displacement (mm/sec)	A-P	5.1 (2.2)	4.31-5.88	8.6 (2.8)	7.59-9.60	0.391	6.6 (1.3)	6.13-7.06	8.9 (3.1)	7.78-10.01	0.515
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	M-L	8.1(3.3)	6.91-9.28	18.6(3.9)	17.20-19.99	0.022*	9.9(4.2)	8.39-11.40	20.9(4.6)	19.25-22.54	0.016*

*= significant difference, SD= Standard deviation, COP= Centre of pressure,V=Velosity,A-P=Antero-posterior,M-L=Medio-lateral.

4 Revision 3

1 comment · 10 Apr 2021

Editor-in-Chief

MINOR REVISION 10 Apr 2021

Dear Authors
The reporting of the ANOVA data in table 4 has not been corrected. Please consult a statistician and revise it.
Please also highlight any section of the manuscript in which the English has been edited.
Thanks.

5

Revision 4

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Dear Referee,

Thank you very much for your careful review and valuable suggestions, the revision was made as follows:

1-The report of ANOVA data in table 4 is not corrected. Please consult a statistician and revise it.

It was corrected by statistician.

Table 4: Results of repeated measures ANOVA models for COP Displacement, Velocity of COP Displacement and SD of COP Displacement considering axis, perturbation and all their interaction terms with time in KT group

Measurement		F(df)	η2	Power	P
COP Displacement (mm)	Time	7.392(1)	.081	.767	.008
	Time * Perturbation	3.326(2)	.073	.615	.041
	Time * Axis	2.633(1)	.030	.361	.108
	Time * Perturbation * Axis	1.515(2)	.035	.314	.226
	Perturbation	44.244(2)	.513	1	<.001
	Axis	52.417(1)	.384	1	<.001
	Perturbation * Axis	18.566(2)	.307	1	<.001
Velocity of COP Displacement (mm/sec)	Time	4.876(1)	.055	.588	.030
	Time * Perturbation	2.335(1)	.053	.461	.103
	Time * Axis	1.996(1)	.023	.287	.161
	Time * Perturbation * Axis	1.053(2)	.024	.229	.353
	Perturbation	55.774(2)	.570	1	<.001
	Axis	62.532(1)	.427	1	<.001
	Perturbation * Axis	24.954(2)	.373	1	<.001
SD of COP Displacement (mm)	Time	2.658(1)	.031	.364	.107
	Time * Perturbation	2.333(2)	.053	.461	.103
	Time * Axis	.407(1)	.005	.097	.525
	Time * Perturbation * Axis	1.041(2)	.024	.226	.358
	Perturbation	31.655(2)	.430	1	<.001
	Axis	6.032(1)	.067	.680	.016
	Perturbation * Axis	2.510(2)	.056	.490	.087

η2: effect size, df: degree of freedom

2- Highlight any section of manuscript which edit English.

Edited sections was highlighted.

5 Revision 4

2 comments · 21 May 2021 – 22 May 2021

Associate Editor

ACCEPT 21 May 2021

Dear EIC
Based on the authors' answers to the reviewers' comments, the reviewer(s) have recommended publication.
Kind regards.

Editor-in-Chief

ACCEPT 22 May 2021

Dear Authors
We are pleased to inform you that your article is accepted for publication in the MEJRHS. We hope to receive other suitable articles from your group.
Thanks.