THE EFFECTS OF KINESIO-TAPING ON QUADRICEPS STRENGTH DURING STANDING LONG JUMP AMONG PHYSICALLY ACTIVE UNIVERSITY FEMALE STUDENTS

BY

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We hereby recommend that the Honours Project by Miss. Tse Yuen Man Yemi entitled “The Effects of KINESIO-TAPING on Quadriceps Strength during Standing Long Jump among Physically Active University Female Students” be accepted in partial fulfillment of the requirements for the Bachelor of Arts Honours Degree in Physical Education And Recreation Management.

_________________________            ________________________
Prof. Chung, Pak Kwong               Mr. Liu, Jing Dong

Chief Adviser                      Second Reader
Declaration

I hereby declare that this Honours Project “The Effects on KINESIO-TAPING on Quadriceps Strength during Standing Long Jump among Physically Active University Female Students” represents my own work and had not been previously submitted to this or institution for a degree, diploma or other qualification. Citations from the other authors were listed in the references.

________________

Tse Yuen Man Yemi

25th April, 2014
ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my chief advisor, Prof. Chung Pak Kwong, for his valuable advices and professional suggestions and guidance on the study. In addition, I would also like to express my gratitude to my second reader, Mr. Liu Jing Dong for his effort on this study.

In addition, I would like to express special thanks to all subjects for their sincere participation in the study and Sportsline Company’s sponsor for the KT tape Pro.

____________________

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Date: 25th April, 2014
Abstract

Kinesio taping is becoming a trend in the sports field as it claims that it can enhance muscle strength. Muscular strength is an important factor for performing well in many sports. This study aimed at investigating the effect of kinesio taping on quadriceps in standing long jump test among university students. Twenty four female subjects (n=24) from the Hong Kong Baptist University aged between 19-25 participated in the study. (Age: 21.46± 1.79, body height: 160.5cm ±7.57cm, body weight: 56.75kg ±8.093kg.) The study included a control group and experiment group. Ordering effect was eliminated by dividing the experimental groups into 1 and 2. No significant differences were found in experimental groups using pair sample t-tests analysis (P>0.05). The result suggested that there were no effect of kinesio taping on quadriceps in standing long jump test.
# Table of contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>9</td>
</tr>
<tr>
<td>Statement of Problem</td>
<td>11</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>12</td>
</tr>
<tr>
<td>Definition of Term</td>
<td>13</td>
</tr>
<tr>
<td>Delimitations</td>
<td>15</td>
</tr>
<tr>
<td>Limitations</td>
<td>16</td>
</tr>
<tr>
<td>Assumptions</td>
<td>16</td>
</tr>
<tr>
<td>Significance of study</td>
<td>17</td>
</tr>
<tr>
<td>2. Review of literature</td>
<td>19</td>
</tr>
<tr>
<td>Kinesiology taping</td>
<td>20</td>
</tr>
<tr>
<td>Muscular strength and Power measuring method</td>
<td>22</td>
</tr>
<tr>
<td>Relationship between kinesio taping and muscular strength</td>
<td>24</td>
</tr>
<tr>
<td>Summary</td>
<td>27</td>
</tr>
<tr>
<td>3. Method</td>
<td>29</td>
</tr>
</tbody>
</table>
Testing Apparatus ........................................29
Testing Procedure ........................................30
Treatment ....................................................31
Standing long jump measurement ......................31
Method of analysis ........................................32
4. Analysis of Data ........................................34
Results ......................................................34
Discussion ....................................................39
5. Summary and Conclusions ............................45
Summary of Results .......................................45
Conclusions .................................................46
Recommendations for Further Study ..................47
References ....................................................48
Appendix .......................................................51
A. Consent Form of participants ........................51
B. Data Collection Form ..................................52
C. Physical Activity Readiness Questionnaire (PAR-Q Form) .......................................53
List of Tables

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Descriptive statistic of the experiment group and control group (n=24)</td>
<td>35</td>
</tr>
<tr>
<td>2 Dependent paired t test results of group one (n=6)</td>
<td>36</td>
</tr>
<tr>
<td>3 Dependent paired t test results of group two (n=6)</td>
<td>37</td>
</tr>
<tr>
<td>4 Dependent paired t test results of Control group (n=12)</td>
<td>38</td>
</tr>
<tr>
<td>5 Dependent paired t test results of Group one and group two (n=12)</td>
<td>38</td>
</tr>
</tbody>
</table>
Chapter 1

Introduction

Muscular strength is an important factor in performing many sports, such as baseball, basketball, football, rugby and sprint running (Miller, 2012, p. 158). Muscular strength is defined as the ability for a muscle or group of muscles to produce a force against an external resistance. (Miller, 2012, p. 158) Muscular strength is one of the components in health related fitness which is important for human health.

Kinesio-taping is now widely used in the sports field. In 2008 Beijing Olympic and 2012 London Olympic, it was very easy to find that the Athletes were applying those bright, colorful strips on their muscle or joints. The strips are called kinesio tape. The manufacturing company of kinesio-tape claimed that the tape can help rehabilitation, pain relief, speeding up recovery and enhancing muscle strength in weak or injured muscles. Unlike the traditional hard tape, kinesio tape does
not restrict the range of movement as much as the traditional hard tape.

More and more people are using kinesio taping as a purpose of rehabilitation or preventing injuries. Using kinesio tape is just like a trend in these years, the tapes were very colorful and fancy, and it started to become a sports fashion, just like a part of the outfit. People may use the tape just because they look fancy or professional, there are people even applying the kinesio tape without any injuries or without enough knowledge about the kinesio tape. The eye catching colors of the kinesio tape may be one of the marketing tricks of kinesio Tape Company. Sponsoring the top athletes all over the world and increasing the exposure of the kinesio tape so that people know the product of kinesio tape might be another marketing strategy.

Although kinesio tape was becoming more and more popular
in these few years, people did not really have enough knowledge or understanding about the kinesio tape. There are people who were curious about what if they do not have any injuries, will the kinesio tape be able to help them enhancing their sports performance such as muscular strength, endurance and power. This study focused on finding the effects of Kinesio-Taping on quadriceps strength during standing long jump among physically active university female students.

Statement of Problem

The purpose of this study was to investigate the effects of Kinesio-Taping on quadriceps strength by standing long jump among physically active university female students and to compare with those physically active university female students without applying the kinesio-tape. There are more and more people in Hong Kong starting to use the Kinesio-tape, some people wearing tape even when they had no injury. In this study, the effect of the kinesio tape can be found. According
to the results, we can find out if the strength and power of quadriceps will increase after using the kinesio tape.

**Hypotheses**

The hypothesis of this study was as follow:

1. There would be no mean difference in standing long jump distance between the first test and the second test in control group at the 0.05 level of significance.

2. There would be no mean difference in standing long jump distance between the first test and the second test in group 2 at the 0.05 level of significance.

3. There would be no mean difference in standing long jump distance between the first test and the second test in group 1 at the 0.05 level of significance.

4. There would be no mean difference in standing long jump distance between the first test and the second test in group 1 and 2 at the 0.05 level of significance.
Definition of Term

The following terms were operationally defined as:

Kinesio-Taping

This was an elastic cotton strip with an acrylic adhesive that is used for treating athletic injuries and enhancing sports performance which was invented by Japanese chiropractor Kenzo Kase. (Elastic therapeutic tape, n.d.)

Quadriceps

A large muscle in front of the thigh, the action of which extends the leg or bends the hip joint. (Quadriceps, n.d.)

Muscular Strength

It was defined as the ability of the body to exert force against a resistance in a short period of time. (Mackenzie, 1997)
Power

It was defined as the ability to exert maximum muscular contraction instantly in an explosive burst of movements. (Mackenzie, 1997)

Standing Long Jump

A test used to test the lower body explosive performance and elastic strength. (Mackenzie, 2000)

Physically Active

People who have moderate intensity aerobic exercise for at least 150 minutes per week. (World Health Organization (WHO), 2014)

University Female Students

The females are majoring in Physical Education and Recreation Management program in Hong Kong Baptist University and in the age between 19-25.
Delimitations

The study would be implemented based on the following delimitations:

1. 24 sample subjects were selected as the study participants in this study; they were the female students majoring in Physical Education and Recreation Management program in Hong Kong Baptist University between 19-25 years old that are having a physically active lifestyle.

2. The subjects were randomly assigned to one of the three groups as follows: 1) Control group (Non taping group) 2) Experiment group 1 (tape at the first test) 3) Experiment group 2 (tape at the second test)

3. The 5 meters measuring tape was used to measure the distance of the standing long jump test.

4. The tests were conducted in two separate days.
5. The 2 inches precut KT tape Pro (KT®) which made by synthetic fiber and claimed that were comfortable to wear were used in this study.

**Limitations**

The study was limited by the following factors:

1. The sample size of this study is small (N=24), so the result of this study could not have good generalization.

2. The sample of the subjects was limited to Physical Education and Recreation Management major’s students in Hong Kong Baptist University.

3. The subjects’ attitude for this test might affect the result of the study.

4. Learning effect may exist in this study.

5. Placebo effect may exist in this study.
Assumptions

The assumptions of this study were as follow:

1. The participants fully understood the procedures as they were guided.

2. The standing long jump test was a good test to measure the quadriceps’ muscular strength and power.

3. The grouping method was a good method to eliminate the ordering effect.

Significance of Study

Kinesio-taping becomes a new trend. It is a boom in the sports field and it is one of the fashions in sportswear. Many athletes were using the tape in the competition and training period. More and more kinesio tape brands are coming out. Because of the advertising and the broadcasting of the sports competition, sports become more and more popular and common for the public. People can see that the athletes are using the fancy kinesio tape. People think that the tape can increase their muscle strength, improve their sport performance, make
them look like more professional and prevent injury. This study can find out the effect of Kinesio-Taping on quadriceps strength and power during the standing long jump test. It can find out does the kinesio tape really help increasing muscular strength and power or it is just the marketing skills or rumors. If it can increase muscular strength and power, the athletes may use it in the competitions. The IOC may ban the kinesio tape on the competitions because the tape may lead to unfair play. If the kinesio tape can increase muscular strength, it would be a good news to the elderly. Comparing with the normal adults, the elderly are easier to get hurt since their muscular strength was decreasing because of the degeneration. If the kinesio tape does work, it might decrease the elderly injuries rates and they can do more exercise and become more physically active. Besides, it can help athletes, when they use it for weight training, they can do a heavier weight and the muscle will get used to that weight. So it will enhance the training outcome.
Chapter 2

Review of literature

Muscular strength is one of the most important components in the health related fitness. They are also very important elements for sports performance because almost all the sports require muscular strength in order to perform well. Also, muscular strength helps to reduce risk of getting injuries.

Kinesio taping is a trend in sports field. In recent years, there were more and more people participate in sports and the people start to be more concern about the health in Hong Kong. The basic functions and effects of kinesio taping are having improvement of muscle function, eliminating the circulatory impairments, reducing pain supporting joint functions and correct postural problem. This review concerns on the kinesio taping and muscular strength. It involves four sessions: 1) kinesio-taping. 2) Muscular strength and power measuring method. 3) Relationship between kinesio taping and muscular strength and a summary formed the last section.
**Kinesio-taping**

"Kinesio taping was developed by a Japanese chiropractor Kenzo Kese on the 1970s. It was used as a method of assisting physical treatment of damaged tissue with full range of motion. There is an association which called Kinesio Taping Association which is training the professional." (Richard, 2012). Kinesio tape is different with the classic taping. The kinesio tape is elastic. It was made by cotton fabric and acrylic coating. It allows the joint to have a full range of movement, which means it would not affect the movement when exercising. On the other hand, generally speaking, the classic tape is used to stabilize the joints to prevent injuries. The purpose of kinesio tape and classic tape are different. Also, the taping methods are different from the classic taping. Kinesio tape is more suitable for exercise if stabilization of the joint is not the purpose.

Brigit, 2012 stated that "kinesio taping application
simultaneously facilitates the reduction of edema, improves lymph and blood circulation and contributes, through proprioception.” And it can improve muscle function.

There were many brand of kinesio tape, and here were the most common brand: 1) KT Tape. 2) Rock Tape. And 3) Kinesio Tex Gold. KT Tape and Rock tape was made by United Stated Company and Kinesio Tex Gold was which original from Dr. Kenzo Kase. The advantages of KT Tape were, it had a good stretch and it was precut, so it was really easy and convenient to apply. The advantages of Rock Tape were, it had a good stretch and it was performed well in the stick. However, sometimes people would like to buy the non cut kinesio tape for different body part. For study, the pre cut one can ensure the length of each tape were the same and provided a same condition for the study.
Muscular strength and power measuring method

According to Mackenzie (1997) article, he stated that there are two kinds of fitness, physical fitness and motor fitness. "Physical fitness refers to the capacity of an athlete to meet the varied physical demands of their sport without reducing the athlete to a fatigued state." (Mackenzie, 1997)

Mackenzie (1997) also stated that "Motor fitness refers to the ability of an athlete to perform successfully at their sport." The components of physical fitness are body composition, endurance, flexibility, strength and speed. The components of motor fitness are agility, balance, co-ordination, power and reaction time. (Mackenzie, 1997)

Muscular movements were divided into three types, isometric contraction, isotonic contraction and isokinetic contraction. Isotonic contraction divided into concentric contraction and eccentric contraction. Isotonic concentric
contraction is the muscle shortens when its tension is greater than the force opposing it. Eccentric contraction is when the force is greater than the muscle tension. (Barrows, 2013) Isometric contraction means the same length of muscle contraction and isokinetic contraction means the muscle shortens at a consistent rate throughout the motion. There are a lot of muscular strength measuring method can found in NSCA’s Guide to Tests and Assessments (Miller, 2012). Such as, 1RM bilateral back squat, 1RM unilateral back squat, 1RM machine leg press, 1RM eccentric machine leg press, 1RM bench press (free weight or machine). Also, standing long jump test can be used to evaluate the lower limb body explosive strength. Standing long jump was a common test for investigating lower limb’s explosive muscular strength. In Jiménez-pavón et al., 2012 study, they were trying to find out the explosive muscular strength of the European adolescents, standing long jump was used as the test to measure the lower limb explosive muscular strength. (Jiménez-pavón et al., 2012) In Will, Jared and Lee
(2012) study, they were evaluating the peak force and jump performance. Standing long jump was used to evaluate the jump performance. (Will, Jared and Lee, 2012) For isokinetic knee flexion and extension test, peak torque can be found and use as the indicator.

According to Mackenzie (1997), power is one of the components of fitness. Power is the ability to exert maximum muscular contraction instantly in an explosive burst of movements. The two components of power are strength and speed. (Mackenzie, 1997)

**Relationship between kinesio taping and muscular strength**

According to Moore (2012), after applying the kinesio tape to quadriceps and around patella, the muscular strength of the subjects had improved. In Hsu et al. 2009 study, there was an increase in muscular strength of lower trapezius in Kinesio taping group. In Murray (2000) study, which the topic
is “effects of kinesio taping on muscle strength after ACL repair”, EMG measurements are used to measure the muscle contraction and when it is under the kinesio tape condition there was an immediate increase of approximately 1.5 times in amplitude compared to the no tape and athletic tape condition. The increase in amplitude means the more muscle are recruited for the muscle contraction.

There is a study which is about the effect of kinesio taping on the change of muscle strength and endurance in trunk flexion and extension in chronic low back pain conducted by Kim Su-Hyung (2005). Kim (2005) indicated that there were changes in muscle strength and endurance of the hip flexion and extension after application of Y-shaped muscle taping. In this study, we know that there was a positive effect of kinesio taping in muscular strength.

In Lumbroso, Ziv, Vered & Kalichman (2014) study, there
were a significant increase of peak force in the gastronomies group appeared immediately but there were no significant increase in hamstrings group, but two days later, the peak force of hamstrings group had significantly increased. It showed that the muscles react differently when Kinesio tape is applied.

From Vithoulk, Beneka, Malliou, Aggelousis, Karatsolis and Diamantopoulos (2010) research:

“We can found that the application of Kinesio tape on the anterior surface of the thigh, in the direction of the fascia may increase the eccentric muscle strength (isokinetic eccentric peak torque) in healthy adults.”

In the literature review written by Richard Moore (2012), he reviewed some studies which is about muscular strength and kinesio taping and find out that muscle strength were increased in the experiment group (with kinesio taping). But at the same time some of the study
also mentioned that there was muscular strength improvement in the control group which is using the non-flexible tape.

From those researches, we can know that, there was some relationship between kinesio taping and muscular strength, but there were different effects in different muscles.

Summary

From the literature review, it showed that the elastic kinesio tape is more suitable than the classic non elastic tape in the exercise situation. The classic non elastic tape’s main purpose is to stabilize the joint and it restricts the range of motion of the joint, so when it was comparing to the kinesio tape in exercise situation, the kinesio tape will be a better choice.

There were three types of muscle contraction, isotonic
muscle contraction, isometric muscle contraction and isokinetic muscle contraction. Each of them has their specific measuring method. Also, there were some evidences showing that the kinesio taping and muscular strength were related. However, the effects were different especially when it is depended on different people and different part of muscles.
Chapter 3

Method

This study was to assess the effect of Kinesio-Taping on quadriceps strength during standing long jump test in physically active university female students. The data was obtained from 24 subjects studying in Physical Education and Recreation Management in Hong Kong Baptist University. The subjects need to perform the standing long jump test. Participants were fully informed of the aim and the procedure of the test. They had signed the consent form and PAR-Q form voluntarily before the test starts. They were also informed the possible risk of the test.

Testing Apparatus

The 5 meters measuring tape was used for measuring the distance of the standing long jump test.
Testing Procedure

Before the test start, a Physical Activities Readiness Questionnaire (PAR-Q) form and a consent form were signed by the participants voluntarily to prove the subjects’ health status were good and they fully understand the aim and the procedure of the test.

Also, before the test start, the 5 meters measuring tape would be set on a dry and non-slippery floor.

The participants were randomly divided into three groups: 1) Control group (Non-taping group) 2) Experiment group 1 (tape at the first test) 3) Experiment group 2 (tape at the second test) All of the groups will conduct the test twice. For non-taping group, the subjects were not taped in the whole study. For Experiment group 1, the subjects were taped for the first time and non-taped for the second time. For Experiment group 2, the subjects were non-taped for the first
time and taped for the second time. The reason of setting two experiment groups was to minimize the ordering effect in the study. The measures were conducted in the lounge of Hong Kong Baptist University Student Residential Hall. All the measures were conducted on both legs. The subjects were told to avoid high-intensity exercise two days prior the test.

**Treatment**

The KT® Tape was chosen to be the kinesio tape in this study. Both of the quadriceps of the subjects was taped.

The application method of quadriceps: Two precut tape were used in the study. Both tapes were tape to the bottom of the patella in the resting position with the knee bent 90° with no stretch. Then the tapes were 20% stretch and taped to the quadriceps along with the patella.

**Standing Long Jump Measurements**

Standing long jump is a common and easy test about explosive
leg power and leg elastic strength. The measuring tape should be set before the test start.

The subjects need to stand behind a line marked on the ground with feet slightly apart. The subjects should be crouches down and using the arms and legs then jumps horizontally as far as possible and lands with both feet without falling backward. (Mackenzie, 2000). Three attempts are allowed. The best score were used for the study. The measurement is taken from take-off line to the nearest point of contact on the landing, which means the back of the heels.

**Method of Analysis**

Statistical analysis was performed with the Statistical Package for Social Science (SPSS 20.0). The standing long jump results for both taped group and the non-taped group will be compared. Also, the results of the standing long jump test for the first test and the second test in control group will
be compared; the results of the standing long jump test for the first test and the second test in experiment group 1 and 2 will be compared separately in their own group. Sample paired t test will be used to compare the data between the three groups. It will also compare the data between experiment group and control group. The demographic factor will also be shown in the data. The significance level was set at 0.05.
Chapter 4

ANALYSIS OF DATA

Results

Twenty-four (N=24) physically active female students aged between 19 to 25 years old who are studying in the Hong Kong Baptist University were invited to participate in this study. The purpose of this study was to find out the effect of the kinesio-taping on quadriceps strength during standing long jump in physically active university female. The participants were randomly divided into three groups: 1) Experiment group 1 (n=6) (tape at the first test) 2) Experiment group 2 (n=6) (tape at the second test) 3) Control group (n=12) (Non-taping group) All of the groups will conduct the test twice. For group 1, the subjects were taped at the first time and non-taped at the second time. For group 2, the subjects were non-taped at the first time and taped at the second time. The order effect was minimized in this setting. For group 3,
The demographic data of the subjects were recorded. The mean age of the subjects was $21.46 \pm 1.79$, the mean body height
of the subjects was 160.5cm ±7.57cm with the range from 142cm to 175cm, and the mean body weight of the subjects was 56.75kg ±8.093kg with the range from 44kg to 80kg. The mean of taped test in group 1 and 2 was 187.75cm± 15.46cm. The mean of non taped test in group 1 and 2 was 184.42cm± 14.63cm. The mean of first test of control group was 181.17cm± 18.46cm. The mean of second test of control group was 180.42cm± 17.47cm.

Table 2. Dependent paired t test of group one (n=6)

<table>
<thead>
<tr>
<th>Paired Samples Test table</th>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 Tape_best - No_tape_best</td>
<td>.500</td>
<td>3.886</td>
<td>1.586</td>
<td>.315</td>
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<table>
<thead>
<tr>
<th>Paired Samples Test table</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
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<tbody>
<tr>
<td>Pair 1 Tape_best - No_tape_best</td>
<td>.315</td>
<td>5</td>
<td>.765</td>
</tr>
</tbody>
</table>

It was found that there were no significant mean differences (t=0.315, df=5, p=0.765) between the taped and non taped test in group 1. The null hypothesis, there would
be no mean difference in standing long jump distance between first test and second test in group 1 at the 0.05 level of significance was accepted.

**Table 3. Dependent paired t test of group two (n=6)**

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
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<tr>
<td>Tape_best - No_tape_best</td>
<td>2.167</td>
<td>3.312</td>
<td>1.352</td>
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<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>t</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pair 1 Tape_best - No_tape_best</td>
</tr>
</tbody>
</table>

It was found that there were no significant mean differences \( (t=1.603, \text{ df}=5, p=0.170) \) between the taped and non taped test in group 2. The null hypothesis, there would be no mean difference in standing long jump distance between first test and second test in group 2 at the 0.05 level of significance was accepted.
Table 4. Dependent paired t test of control group (n=12)

<table>
<thead>
<tr>
<th>Paired Samples Test table</th>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Tape_best - No_tape_best</td>
<td>.750</td>
<td>1.960</td>
<td>.566</td>
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</tbody>
</table>

<table>
<thead>
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<th>Paired Samples Test table</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 Tape_best - No_tape_best</td>
<td>1.326</td>
<td>11</td>
<td>.212</td>
</tr>
</tbody>
</table>

It was found that there were no significant mean differences (t=1.326, df=11, p=0.212) between the taped and non taped test in group 3. The null hypothesis, there would be no mean difference in standing long jump distance between first test and second test in group 3 at the 0.05 level of significance was accepted.

Table 5. Dependent paired t test of group one and two (n=12)

<table>
<thead>
<tr>
<th>Paired Samples Test table</th>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Tape_best - No_tape_best</td>
<td>1.333</td>
<td>3.551</td>
<td>1.025</td>
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</table>
Paired Samples Test table

<table>
<thead>
<tr>
<th>Pair 1 Tape_best - No_tape_best</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.301</td>
<td>11</td>
<td>.220</td>
</tr>
</tbody>
</table>

It was found that there were no significant mean differences (t=1.301, df=11, p=0.220) between the taped and non taped test in group 1 and 2. The null hypothesis, there would be no mean difference in standing long jump distance between first test and second test in group 1 and 2 at the 0.05 level of significance was accepted.

Discussion

The purpose of this study was to investigate the effect of Kinesio-Taping on quadriceps strength by standing long jump among physically active university female students and compared with those physically active university female students without applied kinesio-tape. Also, the researcher would like to find out the effect of Kinesio-Taping on quadriceps strength in healthy female university students.
This part of discussion was divided into three parts: 1) the relationship between kinesio tape and muscular strength in standing long jump test. 2) Reason for the insignificant result of the study, and 3) factors affecting the result of the test.

1) Relationship between kinesio tape and muscular strength in standing long jump test

There were three groups in this study with one control group and two experiment groups. The value of group 1 were \( t=0.315, p>0.05 \). The value of group 2 were \( t=1.603, p>0.05 \). The value of group 3 were \( t=1.326, p>0.05 \) and the value of group 1 and 2 were \( t=1.301, p>0.05 \).

There were no significant mean differences between all the groups. For control group, there were no significant differences which means there were no learning effect for
standing long jump. In the other two groups, the ordering effect were eliminated and there were no significant differences which means the kinesio tape could not enhance the quadriceps strength in this condition.

2) Reason for the insignificant result of the study

The researcher aimed to find out the relationship between kinesio tape and muscular strength in standing long jump test. The control group was used to find out is there any learning effect in standing long jump test. As the result was not significant, it can prove that there was no learning effect in this condition. Experiment Group 1 was taped in the first test and not taped in the second test. For experiment group 2, not taped in the first test and taped in the second test. This grouping method can eliminate the ordering effect. Ordering effect means the people’s judgment may be affected by the investigation order.
In the study, there were no significant differences founded. The reasons for the insignificant result of the study were believed as below:

There were some past studies had proved that the kinesio tape can enhance the muscular strength and endurance. According to Murray (2000), the taped was proved that which can enhance muscular strength for the subjects who had ACL reconstruction. So, the tape may not work on healthy people.

As the kinesio tape was something that can reduce the range of motion and the subjects may feel uncomfortable after applied the tape. It may affect the subjects’ performances and psychological feeling. Also, according to Lumbroso, Ziv, Vered & Kalichman (2014) study, there was a time difference on different muscle after applied the kinesio tape. Furthermore, every people will have different effect on the different time and different muscles.
According to the research, most of the studies which had significant results were indicated by isokinetic exercise. Since standing long jump was an isotonic exercise, the kinesio tape may not have big influence on the isotonic exercise. Also, the exercise duration of standing long jump test was too short, maybe it would be more significant if the duration of the test increase or wait 30 minutes after applied the kinesio tape.

3) Factors affecting the result of the test

1) Selection of subjects

Since all the subjects (n=24) are majoring in Physical Education and Recreation Management, the physical ability and the muscle of the subjects were relatively higher and bigger than the normal people, the kinesio tape may not be useful on the normal condition muscle. To have a better observation on this situation, it would be better if the test can include both physical active people and non-physically active people. In addition, some of the athletes were more aggressive, they
would like to have a better performance, and their psychology condition may affect their performance significantly.

2) Different condition

Since all the subjects were students, they need to study and might need to wake up early and sleep late. Also, the tests were carrying out after school. The subjects might feel tired and unwilling to participate in the test. So, the different condition of the same subject on the separate day will affect the results.
Chapter 5

Summary and Conclusion

Summary of Results

This study was designed to investigate the effect of Kinesio-Taping on quadriceps strength by standing long jump in physically active university female students and compared with those physically active university female students without applied kinesio-tape. 24 subjects participate in the test and they were randomly divided into three groups. All of the groups will conduct the test twice. For 1) non-taping group, the subjects were not taped in the whole study. For 2) Experiment group 1, the subjects were taped at the first time and non-taped at the second time. For 3) Experiment group 2, the subjects were non-taped at the first time and taped at the second time. The reason for setting two experiment groups was to eliminate the ordering effect in the study. The data were analyzed by Statistical Package of Social Science (SPSS) and paired T-test was used. The 0.05 level of
significance was used for all statistical tests.

The paired t-test results were as follow: group 1 (t=0.315, p=0.765), group 2 (t=1.603, p=0.170), group 3 (t=1.326, p=0.212) and group 4 (t=1.301, p=0.220). Hence, from the study, there were no significance differences in between the groups.

**Conclusion**

From this study, according to the results, conclusions were made and showed as follow:

1. There were no difference in standing long jump distance between the first test and the second test in control group.
2. There were no difference in standing long jump distance between the first test and the second test in group 2.
3. There were no difference in standing long jump distance between the first test and the second test in group 1.
4. There were no difference in standing long jump distance between the first test and the second test in group 1 and 2.
Recommendations for Further Study

1) A larger sample size should be enlisted and with a variety group of subjects. For example, male, non-physically active people should be included in the study.

2) Other test required less skill and more focus on quadriceps and calf such as vertical jump can be used for the study which can minimize the differences between the two trials.

3) Conducting a fatigue condition and try the test again to compare with the control group, experimental group 1 and experimental group 2 may have a difference results which may improve the significant.

4) To ensure the subjects have good mental and physical state, morning test is recommended.
Reference


Appendix A
Consent Form of standing long jump test

Explanation of the tests
For standing long jump testing, you will have three trials in one test and there will be totally two tests. These tests assess the strength of the lower limb. Moreover, maximum effort testing is needed.

Risks and discomforts
There is a slight possibility of pulling a muscle or spraining a ligament during the standing long jump testing. In addition, you may experience muscle soreness 24 or 48 hours after testing. These risks can be minimized by performing warm-up exercises prior to taking the tests. If muscle soreness occurs, appropriate stretching exercises to relieve this soreness will be demonstrated.

Expected benefits from testing
The test allows us to assess your elastic leg strength. The results are used to prescribe a safe, sound exercise program for you. Records are kept strictly confidential unless you consent to release this information. Should I have any questions afterwards, I would be available to contact Tse Yuen Man Yemi (65909060).

Inquiries
Questions about the procedures used in the standing long jump test are encouraged. If you have any questions or need additional information, please ask us to explain further.

Freedom of Consent
Your permission to perform these physical fitness tests is strictly voluntary. You are free to stop the tests at any point, if you so desire.

_____________________________________________________________________
I have read this form carefully and I fully understand the test procedures that I will perform and the risks and discomforts. Knowing these risks and having had the opportunity to ask questions that have been answered to my satisfaction, I consent to participate in these tests.

Date: _________________ Signature of patient: ____________________

Date: _________________ Signature of witness: ___________________

(Champaign, IL: Human Kinetics)
Appendix B
Data Collection Form

Name: _______________________
Age: ____
Gender: ______
Height: ___________ cm
Weight: ___________ kg
Group:    N / 1 / 2

<table>
<thead>
<tr>
<th></th>
<th>Test 1  Date( )</th>
<th>Test 2  Date( )</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<tr>
<td>2nd Trial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Trial</td>
<td></td>
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</tbody>
</table>
Appendix C

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, if you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES NO

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?

2. Do you feel pain in your chest when you do physical activity?

3. In the past month, have you had chest pain when you were not doing physical activity?

4. Do you lose your balance because of dizziness or do you ever lose consciousness?

5. Do you have a bone or joint problem (for example, back, knee, hip) that could be made worse by a change in your physical activity?

6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?

7. Do you know of any other reason why you should not do physical activity?

If you answered YES to one or more questions

TALK with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES:

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.

- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- Start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way.

- Take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/84, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- If you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better.
- If you are or may be pregnant — talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.

NAME ____________________________

SIGNATURE ____________________________

DATE __________

SIGNATURE OF PARENT or GUARDIAN (for persons under the age of majority) ____________________________

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

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