

EFFECT OF KINESIO TAPING ON FUNCTIONAL PERFORMANCE IN FOOTBALL PLAYERS

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ABSTRACT

The aim of this study was to investigate the effects of Kinesio Taping on functional performance in football players. Eighteen football players from university team volunteered to participate in the study. Their average age, body weight and height were 22.6 ± 1.64 years old, 70.2 ± 4.31 kg, and 176.0 ± 6.36 cm, respectively. Subjects performed vertical jump, standing broad tests, triple-hop test and agility test with and without kinesio taping. Paired samples t-test was used in comparison of the data obtained after the tests conducted with and without kinesio taping application. It was determined that there was no significant difference between the test performances of the subjects in vertical jump, standing broad jump, standing broad jump with dominant leg, triple-hop test and agility with and without Kinesio taping application ($p > 0.05$). As a result, it is thought that Kinesio Taping applied on m. quadriceps may not have an effect on increase or decrease muscle of the performance. Kinesio Taping may not limit the functional performance in football players.

Key words: Kinesiotape application, agility, jumping, football.

INTRODUCTION

Taping made to athletes in accordance with rules has protective feature all by itself. As is known tapings were used only to treat injured athletes for a long time. Nowadays, many athletes prefer to make taping in advance to reduce the risk of injury even if an injury is experienced or not in that area. Taping has the feature of protecting from injury as well as healing (Kuter & Öztürk, 1998).

Taping method is preferred in recent years in physical therapy and rehabilitation applications. This form of treatment known especially in the field of sports medicine and preventive approaches is applied by many different materials. There are 3 kinds of tapings accepted in the literature. These are athletic taping, McConnell taping and Kinesio Taping (Ergun, 1992; Mueller Sport Medicine, 1993). Although Kinesio Taping is one of the taping methods, special tapes which are flexible and which remain on the skin for a long time are used in this method in a different way compared to other methods and these tapes are applied with special techniques and in accordance with different purposes. Kinesio® taping developed by Dr. Kenzo Kase is a special taping method which has begun to be used in recent years in Europe and USA as well as in our country. Application of the band ensures individuals to benefit from the therapeutic effect for 24 hours. Each application

can remain in the body of the individual for several days. Kinesiotape taping is often used in clinics as well as amateur and professional sports teams (Mueller Sport Medicine, 1993).

Kase, Wallis & Kase (2003) have reported that Kinesio tape can increase proprioception by providing cutaneous afferent stimuli from the skin and normalize muscle tension and adjust fascial tissue function, create more space to develop blood and lymph circulation by eliminating excessive fluid and edema or providing sub dermal blood build up, improve muscle function by eliminating muscle weakness and reduce pain by neurologic pressing. Furthermore, it is asserted that Kinesiotape application increases the strength. Kinesiotape used after injury and during rehabilitation has a flexible structure and provides a constant tensile force to the skin (Halseth, McChesney, DeBeliso, Vaughn & Lien, 2004). Slupik, Dwornik, Bialoszewski & Zych (2007) have reported there was increase in the electromyographic activity of the vastus medialis muscle after 24-hour application of Kinesio Taping.

There is no common opinion on the effect of Kinesio tape method on sporting performance in the studies conducted. In some studies it is declared that Kinesio tape method does not limit sports performance (Bicici, Karatas & Baltaci, 2012; Fu, Wong, Pei, Wu, Chou & Lin 2008; Chang, Chou, Lin, Lin & Wang, 2010; Hettle,

Linton, Baker & Donoghue, 2013) while in some studies it has been suggested that this method increases muscular performance (Slupik et al., 2007; Fracocchi et al., 2013). Therefore, the aim of this study was to investigate the effects of Kinesio Taping on functional performance in football players.

METHODS

Subjects

Eighteen football players from university team volunteered to participate in the study. Their average age, body weight and height were 22.6 ± 1.64 years old, 70.2 ± 4.31 kg, and 176.0 ± 6.36 cm, respectively. Subjects were informed of the protocols and procedures before their participation, and written informed consent was obtained from them. The study was immediately performed after the Football Tournament between Universities in Turkey.

Subjects performed vertical jump, standing broad tests, triple-hop test and agility test with and without Kinesio Taping. All tests with and without Kinesio Taping were randomly applied to the subjects.

Kinesio Tape Applications

A 5 cm wide kinesio tape (Kinesio® Tex) was used in the study. The quadriceps muscles of the dominant and non-dominant legs of the subject were taped by the physiotherapists in Y shape by Kinesio muscle taping technique (Kinesio® KT1 Workbook, 2008; Koç, Atalay Güzel, Akarçeşme, Baltacı & Yarım, 2010). The taping was completed when the subject was laying back and after the first part was attached in full extension of hip and knee along with the complete muscle after hip joint was taken in flexion up to 30° and the knee joint was taken in flexion up to $45-60^\circ$ (Koç et al., 2010). Warm-up exercise was performed by the subjects after approximately 20 -25 minutes of the Kinesio tape application by taking into consideration the adaptation of the tape to the skin and adapting the sensory input generated by the tape.

The Tests Applied

The subjects performed warm-up exercises for about 15-20 minutes prior to tests applied in the study and this warm-up exercise included low intensity jogging, dynamic stretching exercises, jumping and short-term intense activities. All tests were repeated 2 times and the best degree was recorded.

Vertical Jump Test (VJ): Vertical Jump Test was applied by using Jump Meter (Takei, 5105-Jump MD, Tokyo, Japan). The subjects were taken on the jump meter platform with shorts, t-shirts and sneakers. Jump meter's belt was placed on the

waist of the subject in a way that it came to the navel. Flexion and extension movements of the knees were allowed with hands of the subjects on their waist and they were asked to jump to maximum height. Jumping length of the subject was determined in centimeters according to the length of the rope from the digital display when the subject fell to the ground after jumping.

Standing Broad Test (SBT): The test was performed according to the Eurofit test battery (Council of Europe, 1988). A starting line was determined on a non-slip solid ground and a tape measure was extended forward from the starting line. The subjects were asked to stand in a position with their legs open at a normal distance, their toes behind the starting line, parallel to the ground, their front arms extended forward and their knees bent. They were asked to jump forward as far as possible in this position with their arms released and come down to the ground with their two legs at the same time. The test was performed twice and the best degree was recorded as cm. This value was also regarded as the score the subject received from the test.

Standing Broad Test with Dominant Leg (SBTDL):

The test was performed with the dominant leg. Dominant leg was determined by asking the subject who leg the subject preferred to use while hitting a ball. A starting point was set for the test. The subjects took a position in a way that their toes would be at the starting line. The subjects made a maximal jump forward on the dominant limb. They were allowed to jump with their arms released. The test was repeated when the test could not be completed because the subjects lost their balance while jumping or when their opposite leg was in contact with the ground. The test was repeated three times and the best jump distance was recorded.

Triple-Hop Test (THT):

The reliability of the test applied in order to measure the performance of athletes was proved by Hamilton, Shultz, Schmitz & Perrin, (2008). A sticky white band 5cm wide and 7m long was pinned to the ground in a perpendicular way to the starting point. The subjects took a position in a way that their toes would be at the starting line. The subjects jumped forward 3 times in succession on the dominant limb. They were allowed to jump with their arms released. The test was repeated when the test could not be completed because the subjects lost their balance while jumping or when their opposite leg was in contact with the ground. The test was repeated three times and the best jump distance was recorded (Hamilton et al., 2008; Bolgla & Keskula, 1997; Magal, Smith, Dyer & Hoffman, 2009).

Agility: Agility performance of the subjects was determined by T test (Figure 1). This test aims to determine the speed of taking distance of subjects by forward sprinting, changing direction like shifting to right and left and running backwards.

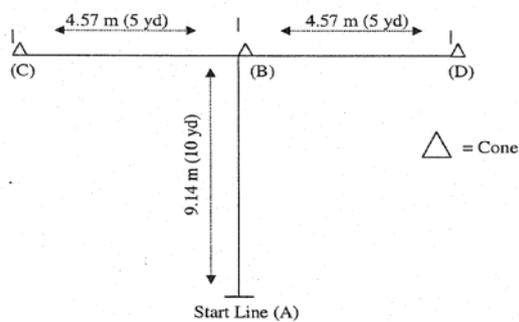


Figure 1. T test for agility (Pauole, Madole, Garhammer, Lacourse & Rozenek, 2000).

Three cones are placed in the same line with 4.57 meter distance between them (Figure 1). A cone is placed 9.14 meters from the B cone in the center. The subjects are firstly asked to touch the B cone with right hand, starting from the A point. The subject goes to the C cone from the B cone by side steps and is asked to touch by left hand. The subject goes to the D cone from the C cone by side steps and touches with right hand and again touches the B cone by going by side steps and runs backward toward the A point and

finishes the test. Test completion of the subjects is measured by stopwatch. Each subject repeats the test twice and the best time is recorded in seconds as the degree of the person (Pauole et al., 2000).

Data Analysis

The obtained data were presented as mean and standard deviation. Normality distribution of the data was analyzed by Shapiro-Wilks test. Paired Samples t-Test was used in comparison of the data obtained after the tests conducted with and without Kinesio Taping application. Tests were applied in both directions and the results were evaluated at 0.05 significance level. SPSS for Windows 18.0 package program was used in all statistical evaluations.

RESULTS

The characteristics of football players were presented in Table 1. Averages and comparisons of performance tests of the football players conducted with and without Kinesio Taping application are provided in Table 2. According to the statistical comparison results, it was determined that there was no significant difference at 0.05 level between the test performances of the subjects in vertical jump, standing broad jump, standing broad jump with dominant leg, triple-hop test and agility with and without Kinesio Taping application.

Table 1. The characteristics of football players

| Variables (n=18) | Mean | SD |
|-----------------------------|------|------|
| Age (years) | 22.6 | 1.64 |
| Height (cm) | 176 | 6.36 |
| Body Weight (kg) | 70.2 | 4.31 |
| Training Experience (years) | 5.3 | 1.82 |

Table 2. Mean scores of functional performance tests in football players with and without Kinesio Taping

| Variables | Without Kinesio Taping | | With Kinesio Taping | | t | p |
|---------------|------------------------|-------|---------------------|-------|--------|-------|
| | Mean | SD | Mean | SD | | |
| VJ (cm) | 46.11 | 6.47 | 46.28 | 4.94 | -0.270 | 0.790 |
| SBJ (cm) | 220.83 | 16.60 | 222.17 | 16.07 | -0.533 | 0.601 |
| SBJDL (cm) | 214.22 | 21.75 | 213.00 | 21.19 | 0.433 | 0.671 |
| THT (cm) | 668.94 | 47.18 | 677.06 | 45.85 | -1.263 | 0.224 |
| Agility (sec) | 9.46 | 0.50 | 9.62 | 0.40 | -1.545 | 0.141 |

Figure 3. Subjects' agility performance.

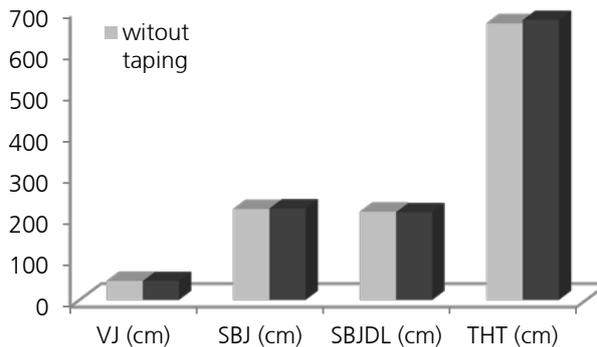
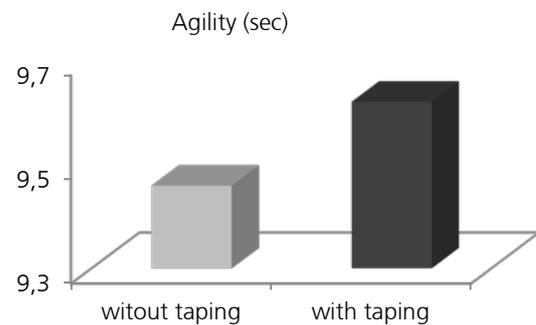


Figure 2. Subjects' jumping tests scores.



DISCUSSION

The main finding of this research is that kinesio tape application has not affected the vertical jump, standing broad jump, standing broad jump with dominant leg, triple jump and agility performances of football players. It has been determined that the performances of football players did not change in tests conducted with and without application of Kinesio Taping.

Usage of kinesio with elastic property has become widespread in recent years due to the thought that tape non-elastic taping may limit the performance (Sanioglu et al., 2009). Some studies investigating the effect of Kinesio Tape indicate that it does not limit or develop performance (Bicici et al., 2012; Fu et al., 2008; Chang et al., 2010; Koç et al., 2010; Kümmel, Mauz, Blab & Vieten, 2011; Wong, Cheung & Li, 2012). In the study conducted by Koç et al. (2010) the effect of Kinesio Taping to isokinetic strength was investigated in women volleyball players. It was reported that no significant differences were determined statistically in isokinetic strength of the quadriceps muscle after Kinesio Taping.

Bicici et al. (2012) declared that kinesio tape had no effect of hopping and the single limb hurdle performance. In another study it was found that kinesio tape applied to knee extensors did not develop the jumping performance (Kümmel et al., 2011). Davis (2013) has explained that Kinesio tape has not changed the throwing speed of the ball of college baseball players significantly.

Fu et al. (2008) examined the effect of Kinesio Taping on quadriceps strength of healthy athletes by isokinetic dynamometry. They concluded that no significant difference in muscle strength was found either immediately after tape application or after 12 h of taping (Fu et al., 2008). It has been reported that Kinesio tape application on the forearm improve the force feeling of the forearm

muscles in healthy subjects. But there was no statistically significant improvement in maximal grip strength after Kinesio tape (Chang et al., 2010).

It has been reported that use of elastic taping application in order to increase vertical jump performance of healthy active gymnasts shall not give the expected result (Vinken, 2015).

Yeung et al. (2015) examined the effects of kinesio tape on knee extensor peak torque and EMG activities after depletion isometric knee extension in healthy young adults. It has been determined as a result of the research that kinesio tape does not develop isometric peak torque or EMG activities after fatigue. However, shortening was observed in peak torque production time in the knee extensor.

On the other hand, there are studies reporting the positive effects of Kinesio tape application. Başkurt, Başkurt & Parpucu (2010) have reported that kinesio band application on lumbar muscles may increase the lumbar mobility. Slupik et al. (2007) determined the effect of Kinesio Taping on bioelectrical activity of vastus medialis muscle. The results revealed an increase in the electromyographic activity in the vastus medialis muscle after 24 h of Kinesio taping (Slupik et al., 2007).

Fratocch et al. (2013) have also reported that kinesio tape improves performance. Authors have stated that it was observed that Kinesio tape applied on biceps brachi in healthy individuals increase concentric elbow peak torque. Wong et al. (2012) have determined that kinesio tape applied on vastus medialis muscles have not changed the concentric knee flexion and peak torque production of the muscles. But the authors have pointed out that kinesio tape application has led to shortening in the time of the peak extensor torque production (Wong et al., 2012). Yoshida and Kahanov (200) have reported that the Y -

shaped Kinesio Taping applied on the lower trunk of the healthy female and male subjects may increase the active range of motion.

In another study, increase in handgrip strength has been reported 30 minutes 24 hours and 48 hours after the kinesio tape application and it has been argued that kinesio tape may provide increase in muscle function (Lemos, Pereira, Protássio, Lucas & Matheus, 2015).

It has been reported that the performance of postural control may increase after the elastic tape applied to ballet dancers but the same method can be prohibitive for routines of classical and modern ballet (Vinken, Hennig & Heinen, 2014).

CONCLUSION

The results of studies examining the effects of Kinesio tape on performance are in conflict with each other. In this study, a significant improvement of performance was not observed in vertical jump, standing long jump, triple jump and agility by applying Kinesio tape. As a result, it is thought that Kinesio Taping applied on m.quadriceps may not have an effect on increase or decrease muscle of the performance. In other words, this illustrates that kinesio tape may not limit the performance of football players. It may be useful to examine the effect of Kinesio Taping on performance by applying it to other muscle groups of lower extremities in subsequent studies.

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