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Futbolcularda Uygulanan Kuru Kupa Uygulamasının Bazı Performans Parametrelerine Akut Etkisi

Acute Effects on Some Performance Parameters of The Dry Cupping Therapy by Soccer Players

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ÖZ

Amaç: Bu çalışma, futbolculara hamstring kasına uygulanan kuru kupa uygulamasının esneklik, sıçrama, kuvvet ve eklem hareket açıklığına akut etkisini incelemek amacıyla yapılmıştır.

Materyal ve Metot: Bu çalışmaya Yukatel Denizlispor kulübünün altyapı takımlarından U-19 futbol takımındaki yaşları ortalaması 18,80 ± 0,41 yıl olan 25 erkek sporcu gönüllü olarak katılmıştır. Futbolcularda ilk önce hamstring esnekliği, normal eklem hareket açıklığı, sıçrama ve kas kuvvet testleri bilateral olarak değerlendirildi. Tüm sporcular ilk değelendirilmelerinden sonra hamstring kasına bilateral olarak kasın insersio ve origo hattı boyunca 10 dakikalık kuru kupa uygulandı. Daha sonra tüm ilk değerlendirmeler tekrar edilip veriler kaydedildi.

Bulgular: Kuru kupa uygulamasının hamstring kasının esneklik parametresinde ve bilateral olarak değerlendirilen diz fleksiyon ve kalça ekstansiyon normal eklem hareketi açıklığında istatiksel olarak anlamlı bir etkisi olduğu bulunmuştur ($p<0,05$). Kuru kupa uygulamasının sıçrama ve bilateral olarak değerlendirilen diz fleksiyon ve kalça ekstansiyon kuvvet parametrelerinde ise istatiksel olarak anlamlı bir etkisi olmadığı bulunmuştur ($p>0,05$).

Sonuç: Sonuç olarak kuru kupa uygulaması, daha az masrafla non-invaziv bir yöntem olması ve daha kolay uygulanabilen bir tamamlayıcı tıp uygulaması olarak futbolcularda esneklik ve eklem hareket açıklığı parametrelerini arttırmada kullanışlı bir yöntemdir.

Anahtar Kelimeler: Esneklik, kuru kupa, sportif performans, tamamlayıcı tıp

ABSTRACT

Objective: This study aimed to examine the acute effect of dry cupping therapy applied to the hamstring muscle in footballers on flexibility, jumping, strength and range of motion.

Materials and Methods: 25 male athletes with an average age of 18.80 ± 0.41 in the U-19 football team, one of the infrastructure teams of Yukatel Denizlispor club, voluntarily participated in this study. Soccer players first evaluated flexibility, range of motion, jumping and strength tests bilaterally. All athletes were administered a 10-minute dry cupping along the muscle bilaterally to the hamstring muscle after their initial change. Then all initial assessments were repeated and data recorded.

Results: Dry cupping therapy was found to have a statistically significant effect on the flexibility parameter of the hamstring muscle and bilateral evaluated knee flexion and hip extension range of motion ($p>0.05$). Dry cupping therapy was found to have no statistically significant effect on the strength parameters of knee flexion and hip extension, which were evaluated bilaterally and jumping parameters ($p>0.05$).

Conclusion: We concluded that, dry cupping therapy is a useful method as a non-invasive, easy-to-apply and economical complementary medicine application to increase flexibility and range of motion parameters in football players.

Keywords: Complementary medicine , dry cupping, flexibility, sporting performance

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INTRODUCTION

Interest in Traditional and Complementary Medicine (TCM) applications has increased significantly in the last 50 years, although TCM applications have existed for thousands of years. There are many different reasons for this increasing interest, but one of the main reasons is that it includes more economical and effective methods. In the report published by the World Health Organization (WHO) in 2019, it has been seen that more countries recognize the effects of TCM applications in the health systems of countries and are used officially.[1]

In recent years, studies have focused more on treating pain-related diseases and the beneficial effects of cupping, and the evidence in this regard is increasing.[2] Even increase the well-being of the person, not only the pain, and can be used for sports performance.[3-5] Cupping applications, a negative vacuum effect is applied with cuppings of different shapes and sizes (2.5-7.5 cm), such as balls. While tools such as horn and bamboo have been used in history. Today, they are applied with hard plastic glass or modern pulsative cup technologies.[6,7]

Dry cupping therapy is the application of the cup to the epidermis surface by creating negative pressure on the skin. This allows the skin to be drawn into the cup. Increasing the regional blood circulation and the flow of the lymphatic system, can reduce pain and improve the person's general well-being.[8,9] It can be used in the treatment of dysfunctions and disorders in the superficial and deep fascia. It can also be used to increase sportive performance in healthy individuals and athletes in some branches.[10]

The effect of dry cupping therapy can also be explained by the activation of the same physiological mechanisms.[5] For this reason, TCM practitioners sometimes apply cups to acupressure points. The hypotheses proposed to date to explain the analgesic effects of acupuncture, the broadest one is the neural mechanism theorem. It has been proven that acupuncture, in addition to changing the physiological state of the individual, releases morphine-like substances (endorphins, serotonin, cortisol) which reduce pain.[11]

In this study, we aimed to determine whether the dry cup application applied to the athletes has an acute effect on the performance parameter according to the evaluated parameters and to bring a new perspective to the literature on dry cupping therapy and sportive performance.

MATERIALS AND METHODS

Ethics Committee Approval: The study was carried out in Pamukkale University sports health laboratory in 2020. In order to carry out the study, the ethics committee approval of Pamukkale University Faculty of Medicine "Non-Invasıve Clinical Research Ethics Committee" was obtained (Date: 11/08/2020, decision no: 15).

25 male athletes, 19 years old, in the U19 football team, one of the infrastructure teams of Yukatel Denizlispor club in the Turkish Super League, voluntarily participated in this research. Before the study, each of the subjects was given detailed information about the risks and discomforts that may be encountered in the study. Inclusion criteria from the study, playing in the U19 team, playing in amateur leagues for at least one year, not having any systemic disease. Exclusion criteria, having pain that would prevent cupping therapy, being uninjured in the last six months. Firstly, hamstring flexibility assessment, range of motion, jumping and isometric muscle strength tests were evaluated bilaterally. After the initial evaluation of all subjects, a 10-minute dry cup was applied bilaterally to the hamstring muscle along the insertion and origo line of the hamstring muscle. Afterwards, all initial evaluations were repeated, and the data were recorded. Cupping therapy and measurements; Specially trained and experienced physiotherapist performed this issue.

Anthropometric Measurements: The height was measured in cm while the subject was in the anatomical stance, during the inspiration phase, by placing the head in the frontal plane and the overhead plate touching the vertex point. Body weights and body mass indexes of the subjects participating in the tests were measured with a SECA (Germany) brand stadiometer with a sensitivity of ± 1mm.

Evaluation of Flexibility: The hamstring flexibility of the athletes was evaluated with the sit-reach test. The measurements were taken 3 times and the average was recorded.[12]

Evaluation of Range of Motion (ROM): ROM measurements were made with a universal goniometer. Knee flexion ROM and hip extension ROM were actively evaluated bilaterally.

Evaluation of Jumping Performance: The iOS application called "My Jump 2" was used in the evaluation of the jumping test. With this application, the jump video of the participants is recorded using the video recording feature of the iPhone.

Isometric Muscle Strength Assessment: Maximum isometric muscle strength was measured using the Powertrak Hand-Held Dynamometer on the hamstring muscles and the gluteus maximus muscles, which are the major muscles responsible for the knee flexion and hip extension movement.

Dry Cupping Therapy: It was applied while the athletes were in the prone position. By creating negative pressure with a manual pump, it is ensured that the cup remains stable on the skin. Care was taken to ensure that the negative pressure would not cause

increased pain and would allow the cup to slide. In the dry cupping application, 10 cups numbered 6 were used (Figure 1). From the hamstring parts; Biceps femoris muscle, semitendinosus muscle and semimembranosus muscle were applied in the direction of origo-insertion. The cups remained continuously for 10 minutes. After the cupping application, natural redness occurred on the skin.

Figure 1. Dry cupping therapy application

Statistical Analysis: Data were analyzed with SPSS 25.0 package program. In the evaluation of the data, besides descriptive statistical methods (mean, standard deviation, median, interquartil range, frequency and percentage distributions), the distribution of variables was examined with the Shapiro-Wilk normality test. Wilcoxon test was used for pre- and post -application evaluations. The results were evaluated at the significance level of $p<0,05$.

RESULTS

Demographic characteristics of the group in the study are given in Table 1.

Participants are 25 male elite football players. Average age of the participants was 18.80 ± 0.41 years, average height was 1.74±7 m, average weight was 69.00±8.30 kg, average body mass index was 22.70 ±1.69 kg/cm², weekly training number was 4.96±0.20, and training age is 10.72±1.14.

The statistical results of the flexibility and jumping parameters of the athletes who were applied dry cups in the study are show in Table 2.

No statistically significant effect was found in the jumping tests of the athletes before and after the dry cupping therapy ($p>0,05$). A statistically significant effect was found in the flexibility tests of the athletes before and after the dry cupping therapy ($p<0,05$).

The statistical results of the knee and hip normal range of motion of the athletes who were applied dry cups in the study are given in Table 3.

Table 1. Descriptive statistics table of the subjects participating in the study (n=25).

	Min-Max	Mean±Standard D.
Age (year)	18.00-19.00	18.80 ± 0.41
Length (m)	1.59-1.85	1.74 ± 0.07
Body Weight (kg)	52.00-85.00	69.00 ±8.30
BMI* (kg/m2)	19.37-25.85	22.70 ±1.69
Number of Trainings per Week (piece)	4.00-5.00	4.96 ±0.20
Training Age (year)	8.00-13.00	10.72 ±1.14

BMI: Body Mass Index.

Table 2. Statistics table of flexibility and jumping parameters of dry cupping applied athletes.

	Mean	Standard Deviation	Z	P
Jumping Pretest (cm)	32.16	4.75	-0.48	0.63
Jumping Posttest (cm)	32.40	4.39		
Flexibility Pretest (cm)	5.60	7.26	-4.21	0.001*
Flexibility Posttest (cm)	8.16	6.26		

*: $p<0.05$.

Table 3. Statistics table of knee flexion and hip extension normal joint movements of athletes who applied dry cupping.

	Mean	Standard Deviation	Z	P
Knee Flexion Right ROM Pretest (degree)	125.72°	4.14 °	-3.27	0.001*
Knee Flexion Right ROM Posttest (degree)	127.34°	4.00 °		
Knee Flexion Left ROM Pretest (degree)	125.58°	3.85 °	-3.97	0.001*
Knee Flexion Left ROM Posttest (degree)	127.26°	4.17 °		
Hip Extension Right ROM Pretest (degree)	20.58°	2.79 °	-2.44	0.02*
Hip Extension Right ROM Posttest (degree)	21.42°	2.80 °		
Hip Extension Left ROM Pretest (degree)	20.56°	2.23 °	2.87	0.01*
Hip Extension Left ROM Posttest (degree)	20.98°	2.10 °		

ROM: Range of Motion; *: $p<0.05$.

Table 4. Statistics table of knee flexion and hip extension isometric strengths of dry cup applied athletes.

	Mean	Standard Deviation	Z	P
Knee Flexion Right Isometric strengths Pretest (Newton)	131.36	9.33	-0.33	0.74
Knee Flexion Right Isometric strengths Posttest (Newton)	131.28	8.71		
Knee Flexion Left Isometric strengths Pretest (Newton)	129.80	8.53	-1.31	0.19
Knee Flexion Left Isometric strengths Posttest (Newton)	129.40	8.07		
Hip Extension.Right Isometric strengths Pretest (Newton)	97.40	5.93	-0.43	0.67
Hip Extension.Right Isometric strengthsPosttest (Newton)	97.04	4.76		
Hip Extension Left Isometric strengths Pretest (Newton)	98.12	5.77	-0.46	0.58
Hip Extension Left Isometric strengths Posttest (Newton)	97.04	4.97		

*: $p<0.05$

It was determined that there was a statistically significant effect on the knee flexion and hip extension normal range of motion of the athletes before and after the dry cupping therapy ($p<0,05$).

The statistical results of the knee flexion and hip extension strengths of the athletes who were applied dry cups in the study are show in Table 4.

There was no statistically significant effect on the knee flexion and hip extension strengths of the athletes before and after the dry cupping therapy ($p<0.05$).

DISCUSSION AND CONCLUSION

This study investigated, the acute effect of dry cupping therapy applied in sports rehabilitation in football players on flexibility, range of motion, jumping and strength parameters, which are also sportive performance parameters.

The phenomenon of sportive performance is defined as the level of sportive success that the athlete can reach in the branch he is engaged in. In one thing that is certain in sporting performance, sporting success must fully encompass many parameters (physical, mental, and psychological). Athletes and clubs make serious expenditures for even a small increase in the performance of their athletes. It is important to examine the applications that will reduce these expenditures and cause a positive increase in performance in the light of science. Today, TCM applications are becoming more popular among societies. In addition, its reliability in health services in the community is increasing.[13] Cupping therapy is one of the TCM methods applied worldwide.[3] Although it is stated in the literature that cupping therapy are used in the treatment of many musculoskeletal problems such as facial paralysis, neuralgia, cervical spondylosis, dysmenorrhea, carpal tunnel syndrome, knee osteoarthritis, chronic low back and neck pain has not been found in a study examining the effects of dry cupping therapy on flexibility, range of motion, jumping and strength parameters at the point of sportive performance in football players. It is thought that the study will benefit the scientific literature in this respect and will change the existing prejudices about cupping therapy.[4,13,14]

Cupping therapy is used to treat painful conditions of many musculoskeletal systems and for performance in many different sports branches.[5,15,16]

Studies investigating the physiological effects of dry cupping and its impact on performance are very few and limited in the literature. It is stated that the cupping therapy is especially effective on flexibility, range of motion, pain, functionality, and quality of life. However, studies on sportive performance parameters are much less.[5,15-19]

In the systematic review study examined in the literature; they also reported that cupping therapy increased the ROM in 498 different branches from 5 different countries, both amateur and professional athletes, and although there were positive results in many muscle parameters, there were different results between studies.[15] They also reported that there is a large bias against the cupping therapy. In the literature, similar results with our study, it was reported that a single session of dry cupping applied to the hamstring muscle of 21 athletes caused a significant increase in knee and hip ROM and flexibility, while it did not cause a significant increase in the strength parameter measured by isokinetic dynamometer.[18] In 2021, myofascial relaxation was aimed with dry cupping and foam roller application applied to the hamstring muscle of 17 athletes in a single session, and it was found that dry cupping therapy was an effective and reliable method in increasing flexibility.[10] In our study, we think that the statistical effect of cupping therapy on flexibility and ROM performance may be related to the high circulation velocity provided by the negative pressure of cupping therapy and the decrease in peripheral sensitization in deep myofascia. Due to this effect, we also think that cupping therapy can be used as a myofascial massage. We think that cup therapy did not have a statistically significant effect on strength and jumping performance in our study, because cupping therapy did not have a procedure that would lead to an increase in the number of intramuscular motor units.

Manual therapy applications such as therapeutic

massage techniques or myofascial relaxation applied to increase performance or in cases of pain due to the musculoskeletal system in clinics and clubs health rooms are a few of the methods used by sports physiotherapists to increase the blood circulation of the problematic tissue and reduce pain, while increasing performance. In sports clubs, doctors, physiotherapists, athletic performance specialists and masseurs work as a multidisciplinary team. The article a showed that cups should be practiced and cups should be found in these health rooms.[20] It is seen that most of the studies on the dry cupping method are done in team sports. In a study conducted in Korea in 2016; the methods used for the treatment and performance parameters of the athletes in the Korean national volleyball team were classified and they reported that 40.4% used acupuncture, 16% manual therapy, 15.2% physical therapy modalities, 9% taping and 7.2% cupping applications.[21]

The changes in disability, pain, flexibility, ROM, strength,muscle fatigue and quality of daily life are evaluated in studies related to cupping therapy in musculoskeletal problems and sportive performance.[17] Our study is similar to other studies in the literature in terms of investigating whether there is a statistical change in sportive performance in elite football players and their musculoskeletal systems and the evaluations made in this research. Although these results are similar to the literature, studies with larger sample groups and in different branches are needed.

In addition to these applications, with the ease of application of the dry cupping therapy, it can reduce the current workload of the personnel and at the same time provide energy savings to the personnel.[20] Dry cupping therapy is thought to be a non-invasive and very low-cost TCM application that can be used by health professionals in athletes to increase hamstring muscle flexibility and joint movement in clinics and health rooms of clubs. One of the limitations of the study is its application to football players and absence of control group. Different performance parameters in different branches can be evaluated.

We concluded that dry cupping is a non-invasive method with less cost and can be used as a complementary medicine application that can be applied more easily to increase flexibility and range of motion parameters in football players.

Ethics Committee Approval: In order to carry out the study, the ethics committee approval of Pamukkale University Faculty of Medicine "Non-Invasıve Clinical Research Ethics Committee" was obtained (Date: 11/08/2020, decision no: 15).

Conflict of Interest: No conflict of interest was declared by the authors.

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