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HACAMAT UYGULAMASININ SPORCULARDA BAZI PERFORMANS VE KAN PARAMETRELERİ ÜZERİNE ETKİSİNİN ARAŞTIRILMASI

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A Çalışma Deseni (Study Design)

B Verilerin Toplanması (Data Collection)

C Veri Analizi (Statistical Analysis)

D Makalenin Hazırlanması (Manuscript Preparation)

E Maddi İmkanların Sağlanması (Funds Collection)

Özet: Bu çalışmanın amacı, sporcularda hacamat uygulamasının sporcuların bazı performans ve kan parametreleri üzerine etkisinin araştırılmasıdır.Çalışmaya katılan sporcular (n=23), rastgele örneklem yöntemi ile yaş ortalaması 20,36±1,286 yıl, antrenman yaşı ortalaması 7,45±4,132 yıl, boy uzunlukları ortalaması 177,82±6,585 cm, vücut ağırlıkları ortalaması 74,09±11,476 kg olan kontrol grubu (KG) (n=11) ve yaş ortalaması 21,17±2,290 yıl, antrenman yaşı ortalaması 9,08±3,825 yıl, boy uzunlukları ortalaması 179,67±8,553 cm, vücut ağırlıkları ortalaması 71,25±10,314 kg olan deney grubu (DG) (n=12) olmak üzere iki farklı gruba ayrıldı. Katılımcıların bacak kuvveti, ivmelenme, sürat, dikey sıçrama ve durarak uzun atlama değerleri, kan parametrelerinde ise WBC, RBC, HGB, PLT ve HCT düzeyleri ölçüldü. Çalışmanın istatistiksel analizlerinde tanımlayıcı olarak aritmetik ortalama ve standart sapma değerleri kullanıldı ve dağılımların normalliği için Shapiro-Wilks testi uygulandı. Gruplar arası farkın belirlenmesinde Independent-Sample T testi, grup içi farkın belirlenmesinde ise, Paried-Sample T testi yapıldı. Anlamlılık düzeyi $p<0.05$ olarak alındı. Sonuç olarak hacamat uygulamasının sporcuların bacak kuvveti, ivmelenme, dikey sıçrama ve Yoyo-1 değerleri üzerinde olumlu etkisinin olduğu ifade edilebilir.

Anahtar Kelimeler: hacamat, ivmelenme, sürat, kan değerleri, anaerobik

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INVESTIGATION OF THE EFFECT OF WET CUPPING APPLICATION ON CERTAIN PERFORMANCE AND BLOOD PARAMETERS OF ATHLETES

Abstract: The aim of this study was to investigate how wet cupping effects performance and certain blood parameters of athletes. The athletes participating in the study (n=23) were divided into control group (CG, n=11) and experimental group (EG, n=12) by using random sample method. The athletes in sample group were selected in accordance with following criteria; age average: 20,36±1,286 year, average training age: 7,45±4,132 year, average stature: 177,82±6,585 cm, average body weight: 74,09±11,476 kg. The same criteria for the athletes in experimental group (EG) (n=11) were as follows; age average: 21,17±2,290 year, average training age: 9,08±3,825 year, average stature: 179,67±8,553 cm, average body weight: 71,25±10,314 kg. Leg force, acceleration, speed, vertical jump and standing long jump values of the participants were measured along with their blood parameters such as WBC, RBC, HGB, PLT and HCT levels. In statistical analyses of the study, arithmetic mean and standard deviation values were used as descriptive statistics, and Shapiro-Wilks was made in order to analyze the normality of distributions. Independent-Sample t-Test was made to determine the difference between the groups and Paired Sample t-Test to determine the difference within each group. Significance level was taken as $p<0.05$. Consequently, it can be said that wet cupping has a positive effect on leg force, acceleration, vertical jump and Yoyo-1 values of athletes.

Keywords: wet cupping, acceleration, speed, blood values, anaerobic

1. INTRODUCTION

Wet cupping therapy has been an alternative medical practice or a tradition found in different cultures such as Chinese, Greek, Arab, Turkish, and Persian. This practice is believed to be as old as 2000 years (Albedah et al., 2011; Abbasi et al., 2014.; Tağıl et al., 2014; Chen et al., 2015.; Noorelahi et al., 2016.; Moawia et al., 2018.; Umar et al., 2018). This therapy is gradually gaining recognition in different parts of the world because of its ability to alleviate symptoms of several ailments (Farhadi et al., 2009; Michalsen et al., 2009; Lauche et al., 2011; Hanan and Eman, 2013; Umar et al., 2018).

Wet cupping practice can be applied both as preventive and treatment purposes. Although there are different methods the process usually inoves creating a mild suction for about three minutes and making a light, tiny cut on the skin by using a small scalpel. Next a second suction draws out a small quantity of blood (Farhadi et al. 2009; Goodwin and Mclvor 2011; Sert et al., 2015; Okumuş, 2016). The main purpose of this therapy is to precipitate the circulation of blood and to remove blood-stasis and waste from the body (Guimberteau et al., 2010; Kim et al., 2011; El Sayed et al., 2013b; Hanan and Eman, 2013; Tağıl et al., 2014; Umar et al., 2018).

At the same time, wet cupping is used as a means to reduce muscle pain, muscle tenderness, improving a range of motions and fatigue among athletes (Kim et al., 2011; Hanan and Eman, 2013; Ma et al., 2013; Kim et al., 2017). Wet cupping is thought to act mainly by increasing local blood circulation and relieving the painful muscle tension (Lauche et al., 2011; Mehta and Dhapte, 2015). Based on prior studies,

the effects of wet cupping therapy can be divided into mechanical and chemical components. The mechanical effects induce free movement of deep fascia and muscles by activating lubrication of superficial fascia between skin and deep fascia (Guimberteau et al., 2010; Lauche et al., 2013). This eases the restriction caused by adhesion of the deep fascia and enables independent movement of muscle by intensive application of wet cupping therapy (Lee et al., 2011; Kim et al., 2017).

Although it was found to be safe based on long-term clinical use. Previous studies on wet cupping are limited, and several of them are influenced by cultural, social, and religious factors that cause a risk of bias (Ludtke et al., 2006; Ma et al., 2013).

However, it was recently argued that the technique is beneficial because it promotes the elimination of oxidants from the blood (Mehta and Dhapte, 2015). Overall, the possible mechanisms of wet cupping may be classified as neurological/psychological and hematological/immunological (Michalsen et al., 2009; Musumeci, 2016). One published theory about the possible mechanism of lowering blood pressure of hijamah named the "Taibah Theory", stated that hijamah helps to remove the interstitial fluids, extra intravascular fluid, and destructive or harmful substances from the body. This theory also postulates that hijama lead to elimination of free radicals and vasoactive fluids. In addition, stimulation of production of nitric oxide which will help to keep the balance between antioxidants and free radicals (Niasari et al., 2007; Musumeci, 2016).

Different types wet cupping therapy have been used to treat different diseases and for different purposes which include the improvement of sport performance. In the 1996 Olympic games in Brazil, many athletes including the 23-time Olympic gold-medal winner Michael Phelps, the greatest swimmer of all time, were noticed with wetcupping impressures on their skin (Nimrouzi et al., 2014; Musumeci, 2016). These athletes might have gone through wetcupping treatment for other healtreasons as well as for performance improvement. However we have not come acroos any study that focus on the effects of wet cupping on athletic performance. Therefore this study attempts to examine the effetcs of this practice on certain performance and blood parameters of athletes.

2. MATERIAL AND METHOD

Sampling: A total of 23 volunteer athletes participated in this study and they were divided into control group (CG, 11 athletes) and experimental group (EG, 12 athletes). The athletes in sample group were selected in accordance with following criteria; age average: 20,36±1,286 year, average training age: 7,45±4,132 year, average stature: 177,82±6,585 cm, average body weight: 74,09±11,476 kg. The same criteria for the athletes in experimental group (EG) (n=11) were as follows; age average:

21,17±2,290 year, average training age: 9,08±3,825 year, average stature: 179,67±8,553 cm, average body weight: 71,25±10,314 kg. The participants were selected from among the athletes who actively play sports and were in winter break.
The measurements were taken in a sports hall between 2:00 – 6:00 pm. 48 hours after the preliminary tests, the members of experimental group were wet cupped in laboratory environment. A week later, the groups were put to final tests. Each participant was allowed to make two trials and best score was recorded.

Data Collection Tools
Height measurements: Height measurements of the athletes were measured by using a wall-mounted stadiometer (Holtain Ltd. U.K.) at anatomic standing structure, barefoot, head at frontal plane position to the nearest 1 mm.
Body mass measurements: Body mass measurements of athletes were measured using digital weighing scale (Tanita TBF 401 A Japan) in standard sportswear (shorts and t-shirts) to the nearest 0.1 kg
Leg Strength: The subjects' isometric leg strength was measured using a digital back dynamometer (TKK 5402, Takei Scientific Instruments, Japan). Each subject stood on the dynamometer foot stand and gripped the handle in both hands. A pulling force was then applied to the handle by straightening the knees and lifting the dynamometer chain. The leg strength was recorded on the dial of the dynamometer as the best value of two trials, in kg.
10m Acceleration ve 30m Speed Test: A 10m and 30m fields with predetermined starting and ending lines were created in the sports hall. Test starting and ending points on these fields were equipped with photocell (Newest Powertime) at 0.01sensitivity. Tests were repeated twice with intermittent rests and the higher results were recorded as the test results.
Jumping Measurements: The vertical jumping test was performed on a force platform (Newtest Powertimer 300-series, Finland). Participants were asked to jump upward while maintaining their hands on their waists, their feet open to shoulder width, and their trunk straight, with their knees in a half-flexed position. The test was performed twice, and the better result was recorded in centimeters.
Long Jump: The athlete stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Test was repeated twice for each participant and the better score was recorded as the test score
Yo-Yo Intermittent Recovery Test: To detect running distance of the participants, Yo-Yo Intermittent Recovery Level 1 Test, which was designed by Bangsbo as a field test, was used in the scope of the study. This test is controlled by 10-second automatic signals, involves active recovery periods interjected between 2x20 m shuttles at gradually increasing speeds, during which the subject must walk or jog. In

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the present study, cones were used to mark out 2x20 m shuttle lines. For each line, a cone was located 5 m behind the starting line. This area represented active recovery area. The test was ended when a participant run out of her all power or failed to reach ending point twice.

Blood Values: Blood drawn from the radial veins of participants into 5-ml test tubes and their WBC, RBC, HGB, PLT and HCT levels were determined with blood count device in the laboratory.

Wet cupping: An expert has determined two zones on the leg (calf and hamstring) in hygienic environment. A PVC cup was placed on these zones and negative pressure was generated with manual pump. 5 minutes later, the part of the skin exposed to negative pressure was incised with razor blade and negative pressure was generated with cup again. Negative pressure was applied until the liquid flow is over. Then the liquid accumulated in the cup is discharged and application is terminated.

Statistics Analysis: The statistical analyses were performed using the SPSS version 23.0 software package (SPSS Inc., Chicago, IL, USA). Date are presented as mean ± SD. SPSS 23.0 software package was used for the statistical analysis of the data obtained from the research. The data are presented as arithmetic mean and standard deviation. Shapiro-Wilks Test was used for the normality of distributions. Difference between the groups is determined with Independent Sample T-Test and within-group difference is determined with Paired Sample T-Test. Statistical results are assessed on the significance level of $p<0,05$.

3. RESULTS

Table 1. Physical Characteristics of Participating Athletes

Physical Characteristic	Experimental Group (n=12)	Control Group (n=11)
Age (year)	21,17 ± 2,290	20,36 ± 1,286
Training Age (year)	9,08 ± 3,825	7,45 ± 4,132
Stature (cm)	179,67 ± 8,553	177,82 ± 6,585
Body weight (kg)	71,25 ± 10,314	74,09 ± 11,476

Age average, average training age, average stature and average body weight of the athletes in Experimental Group (EG, n=12) were found as 22,20±1,89 years, 9,08±3,825 years, 179,67±8,553 cm and 71,25±10,314 kg respectively. Age average, average training age, average stature and average body weight of the athletes in Control Group (CG, n=11) were found as 20,36±1,286 years, 7,45±4,132 years, 177,82±6,585 cm and 74,09±11,476 kg respectively.

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Table 2. Comparison of Performances and Blood Parameters of Experimental and Control Groups Before and After Wet cupping

	Before				After			
	Experimental Group	**Control Group**	**t**	**p**	**Experimental Group**	**Control Group**	**t**	**p**
Leg Force (kg)	117,42 ± 29,992	113,50 ± 23,724	,345	,733	128,92 ± 30,228	114,36 ± 21,099	1,327	,199
10 Meters (m/sec)	1,67 ± 0,910	1,68 ± 0,103	-,137	,892	1,56 ± 0,079	1,66 ± 0,113	-2,438	**,024***
30 Meters (m/sec)	4,14 ± 0,137	4,25 ± 0,170	-1,743	,096	4,12 ± 0,168	4,22 ± 0,186	-1,440	,165
Vertical Jump (cm)	57,58 ± 9,662	55,18 ± 9,918	,588	,563	62,00 ± 7,758	55,00 ± 9,808	1,907	,070
Standing L. J. (cm)	236,00 ± 23,572	233,27 ± 26,945	,259	,798	243,08 ± 22,427	233,27 ± 24,092	1,012	,323
Yoyo-1 (m)	1581,67 ± 600,088	1163,64 ± 385,416	1,966	,063	1886,67 ± 632,877	1225,45 ± 396,393	2,969	**,007***
WBC	6,04 ± 1,868	5,29 ± 1,736	,994	,332	6,19 ± 1,276	6,13 ± 1,045	,121	,905
RBC	4,81 ± 0,335	4,86 ± 0,480	-,272	,789	5,07 ± 0,461	4,92 ± 0,535	,737	,469
HGB	14,28 ± 1,632	14,38 ± 1,530	-,156	,877	14,23 ± 2,721	14,57 ± 1,727	-,356	,725
HCT	44,57 ± 3,179	46,25 ± 4,740	-,998	,329	44,23 ± 2,619	45,76 ± 4,575	-,974	,341
PLT	197,83 ± 47,870	207,82 ± 45,670	-,510	,616	203,83 ± 48,885	200,45 ± 43,776	,174	,864

*p<0,05

Results of preliminary and final tests of experimental and control groups regarding performance and blood parameters before and after wet cupping are given in Table 2. The analyses have revealed a statistically significant difference between the values of 10 meter acceleration and Yoyo-1 tests of experimental and control groups before and after wet cupping ($p<0,05$) but no significant difference was found in other performance and blood parameter values ($p>0,05$).

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Table 3: Comparison of Performances and Blood Parameters of Experimental and Control Groups Before and After Wet cupping

	Experimental Group				Control Group			
	Before	**After**	**t**	**p**	**Before**	**After**	**t**	**p**
Leg Force (kg)	117,42 ± 29,992	128,92 ± 30,228	-3,496	**,005***	113,50 ± 23,724	114,36 ± 21,099	-,158	,878
10 Meters (m/sec)	1,67 ± 0,910	1,56 ± 0,079	3,425	**,006***	1,68 ± 0,103	1,66 ± 0,113	,717	,490
30 Meters (m/sec)	4,14 ± 0,137	4,12 ± 0,168	,763	,462	4,25 ± 0,170	4,22 ± 0,186	,816	,434
Vertical Jump (cm)	57,58 ± 9,662	62,00 ± 7,758	-2,541	**,027***	55,18 ± 9,918	55,00 ± 9,808	,195	,849
Standing L. J. (cm)	236,00 ± 23,572	243,08 ± 22,427	-1,670	,123	233,27 ± 26,945	233,27 ± 24,092	,000	1,000
Yoyo-1	1581,67 ± 600,088	1886,67 ± 632,877	-4,726	**,001***	1163,64 ± 385,416	1225,45 ± 396,393	-,792	,447
WBC	6,04 ± 1,868	6,19 ± 1,276	-,214	,834	5,29 ± 1,736	6,13 ± 1,045	-1,185	,263
RBC	4,81 ± 0,335	5,07 ± 0,461	-2,229	,068	4,86 ± 0,480	4,92 ± 0,535	-,786	,450
HGB	14,28 ± 1,632	14,23 ± 2,721	,220	,826	14,38 ± 1,530	14,57 ± 1,727	-,602	,556
HCT	44,57 ± 3,179	44,23 ± 2,619	,751	,463	46,25 ± 4,740	45,76 ± 4,575	,956	,357
PLT	197,83 ± 47,870	203,83 ± 48,885	-,522	,607	207,82 ± 45,670	200,45 ± 43,776	1,126	,283

*p<0,05

Results of preliminary and final tests of experimental and control groups regarding performance and blood parameters before and after wet cupping are given in Table 3. The analyses have revealed a statistically significant difference between the values of leg force, 10 meter acceleration, vertical jump and Yoyo-1 tests of experimental group and the corresponding values obtained in preliminary tests (p<0,05) but no significant difference was found in other performance and blood parameter values (p>0,05). No statistically significant difference was found between the values of preliminary and final tests of control group (p>0,05).

4. DISCUSSION

The purpose of this study was to investigate the effects of wet cupping on certain performance and blood parameters of athletes. At the end of the study, significant increases were determined in leg force, 10m acceleration, vertical jump and Yoyo-1 performances.

The athletes have used various types of training, training materials, supplements and doping to increase their performance from past to present. In recent

years, wet cupping which is used as an alternative treatment method has been used by the athletes to increase their performance.

Stuıdies showed that wet cupping has increased athletes blood flow, removed the toxins from their bodies and physically healed them (Yoo and Tausk, 2004; Tham et al., 2006; El Sayed et al. 2013a). In addition, it was stated in many studies that wet cupping is also effective on muscle pain in particular (Farhadi et al., 2009; Hanan and Eman, 2013). In a study conducted by Ranaei-siadat et al. (2004) to compare venous and cup blood parameters, it was observed that it also regulates cholesterol, HDL and LDL levels. It was stated that wet cupping would increase physical performance during sportive activity as it decreases inflammation and pain of muscles and joints (Musumeci, 2016). It is stated that wet cupping treatment has a massaging effect and it is the best deep tissue massage (El Sayed et al., 2013a; Hanan and Eman, 2013).

In consideration of the results obtained from these studies, it can be stated that wet cupping is effective on all factors affecting the performance of an athlete. Kargar-Shoragi et al. (2016) have revealed the positive effect of wet cupping on muscular damages inflicted by trainings of handball players. Kim et al. (2017) have concluded that wet cupping increases the flexibility of athletes and has a positive effect on pain. In consideration of these studies, it is thought that short recovery time, cease in muscular pains and increased muscular flexibility would positively contribute to the performance of athletes. It can be stated that the increases found in 10m acceleration, leg power and vertical jump values of the athletes found in our study support these findings. Refaat et al. have concluded in a study they have conducted on young males in 2014 that wet cupping has positive effects on cardiovascular system. The results obtained in our study regarding aerobic endurance associated with cardiovascular system (YOYO-1) supports the possibility of a positive development. Since the number of studies on the effect of wet cupping on sportive performance is rather limited, more studies are needed in this field to generalize the conclusions of our study.

5. CONCLUSION

As a conclusion, it can be stated that wet cupping has a positive effect on 10m acceleration, leg power, vertical jump and aerobic endurance of athletes.

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