EFFECT OF MASSAGE ON RECOVERY AFTER AN EXERCISE
MASAJIN EGZERSİZ SONRASI TOPARLANMAYA ETKİSİ

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ABSTRACT

The purpose of this study is to examine whether massage has an effect on recovery after high intensity exercise. 20 male volunteer students (age 23.00 ± 2.99 years) attending the Faculty of Sports Sciences were participated the study. Repeated vertical jump test (DST) was applied 30 seconds with one week intervals as an anaerobic exercise. Ten randomly selected subjects first recovered after DST without massaging the legs, while the other 10 subjects recovered by massage. A week later; the subjects recovered without massage were recovered by massage, while the subjects who were massaged were recovered without massage. The resting heart rate (HR) values of the athletes were taken before DST, and then subjected to the DST test. Recovery of the subjects was followed up for 15 minutes after the test. HR measurements were recorded every minute of recovery. Shapiro Wilk test was used to check whether the data showed normal distribution and parametric statistical analysis was used because data sets are normally distributed. Paired t test was used for the pairwise comparison.

HR values at 1st and 2nd minutes of massage recovery after anaerobic exercise were lower than non-massage recovery HR values (p<0.05). Recovery by massaging reduced HR faster and accelerated recovery. Massage recovery values up to 5 minutes of recovery are lower, although not statistically significant. Between the 2nd and the 15th minutes of the recovery, HR values did not differ statistically (p>0.05).

As a conclusion, when massage is performed, recovery occurs faster in the first 5 minutes after exercise. This result shows that starting massage immediately after exercise accelerates recovery.

Keywords: Heart rate, anaerobic exercise, massage.

ÖZET

Yüksek yoğunluklu egzersiz sonrası yapılan masajın toparlanmaya etkisini araştırmak amacıyla bu çlışma yapılmıştır. Çalışmaya Spor Bilimleri Fakültesinde öğrenim gören 20 erkek gönüllü öğrenci (yaş 23.00±2.99 yıl) katıldı. Deneklere anaerobik egzersiz olarak iki kez bir hafta arayla 30 sn tekrarlı dikey sıçrama testi (DST) uygulandı. Rastgele seçilmiş 10 deneğin ilk olarak DST sonrası bacaklara masaj yapılmadan toparlanması takip edilirken, diğer 10 deneğin ise masaj yapılarak toparlanmaları takip edildi. Bir hafta sonra ise; masaj yapılmadan toparlanan deneklere masaj yapılarak, masaj yapılarak toparlananlara ise masaj yapılmadan toparlanmaları takip edildi. Sporcuların DST öncesinde dinlenik Kalp Atım Hızı (KAH) değerleri alındı, daha sonra DST testine tabii tutuldu. Deneklerin toparlanmaları testten sonra 15 dk boyunca takip edildi. Toparlanmanın her dakikasında KAH ölçümleri kaydedildi. Veriler normal dağılım gösterdiğinden parametrik test kullanıldı. Ön test ve son test karşılaştırması yapman için paired t test kullanıldı. Verilerin normal dağılım gösterip göstermediğini kontrol etmek için Shapiro Wilk testi kullanıldı ve veriler normal dağılım gösterdiğinden parametrik istatistiksel analiz kullanıldı. İki deneme arasında fark olup olmadığına bakmak amacıyla paired t testi kullanıldı.

Anaerobik egzersiz sonrası masajlı toparlanmanın 1. ve 2.dk'sındaki KAH değerleri, masajsız toparlanma KAH değerlerinden daha düşük bulundu (p<0.05). Masaj yaparak toparlanma daha hızlı bir şekilde KAH'nı düşürdü ve toparlanmayı hızlandırdı. Toparlanmanın 5.dk'sına kadar masajlı toparlanma KAH değerleri istatistiksel olarak anlamlı olmasa da daha düşüktür. Toparlanmanın 2.dk'sından 15.dk'sına kadar ise KAH değerleri istatistiksel olarak farklılık göstermedi (p>0.05).

Sonuç olarak, masaj yapıldığında özellikle egzersizden sonra ilk 5 dk toparlanma daha hızlı gerçekleşmektedir. Bu sonuç özellikle egzersiz sonrası hemen masaja başlamanın toparlanmayı hızlandırdığını göstermektedir.

Anahtar Kelimeler: Toparlanma, anaerobik egzersiz, masaj

INTRODUCTION

When evaluating the performance in sports activities, it is primarily investigated how fast the energy resources and systems undergo recovery (Günay et al. 2017). Human beings have been using complementary therapies since their existence. However, since the middle of the twentieth century, parallel to the rapid developments observed in the diagnosis, care and treatment of diseases, there has been an increase in the use of complementary therapies {Muslu and Öztürk 2008] One of the complementary therapies is massage. Massage can be defined as the tendency to create physiological and psychological effects in the organism with systematic manipulations by mechanically stimulating the soft tissues. Classical massage manipulations consist of five parts. Effleurage, Petrissage, Friction, Tapotement and Vibration (Kambir, 2005). Sports massage is applied for athletes. It is widely preferred by athletes to prevent injuries, relax, recover muscles and increase performance (Günay et al.2017).

Sports massage is a form of bodywork for athletes. It is used to prevent injuries, to prepare and maintain the body for athletic activities, and to help save athletes from training fatigue and injuries. There are three basic forms of sports massage: pre-activity massage, during activity massage and post-activity massage (alternatifterapi.com). The purpose of recovery after exercise is to rest the whole body and muscles and return them to pre-exercise conditions (Günay & Cicioğlu, 2001).

A good recovery is a process that allows the athlete to recover from the fatigue caused by training or competition and to replenish their energy reserves. In the event that a complete recovery does not occur, in the athlete; chronic fatigue and muscle injury can be seen. In these, it can cause the athlete to stay away from sports for a certain period of time or even quit sports (Gümüşdağ et al., 2015; Bishop et al., 2008). This study was carried out to examine the effect of massage after 30 seconds repetetive jump test on recovery.

METHOD

This study was conducted with 20 male students (age 23.00 ± 2.99 years, height 175.65 ± 4.89 cm, VA 74.85 ± 7.06 kg) from Ondokuz Mayıs University, Yaşar Doğu Faculty of Sport Sciences, Department of Coaching Education.

Polar watches were worn on the subjects. The subjects were rested for 2 minutes to decrease their pulse rate. Resting heart rate (HR) was obtained. Then, 30 seconds of repeated vertical jump test was performed and HR at the end of 30 seconds was measured. After the repetitive jump test, massage was performed for 15 minutes and recovery HR was recorded every 1 minute for 15 minutes. Recovery HR was followed by passive rest [sitting] or massage (leg massage). Both methods were used to recover all subjects on separate days.

Techniques used in massage:
Effleurage; The starting and ending maneuvers were performed by stroking the inner part of the hands and fingers from the sides of the body towards the center.
Friction; Circular scrubbing, rubbing and rubbing movements were performed with the inside of the hands, palm, thumb and other fingers.
Petrissage; The kneading maneuver was performed by holding the soft tissues with fingers and hands and rolling, pulling and rotating them in various ways.
Vibration; Vibration movements were made with the hands or fingertips.
Statistics: Paired t test was used to calculate the arithmetic mean and standard deviation of the data obtained in the study and to determine whether there was a difference between the two trials. Statistical significance was accepted as $p < 0.05$. Statistical analysis of the data obtained in the study was performed in SPSS version 21.0.

RESULTS

Table 1: Recovery HR Values of the Subjects with and without Massaging

(beats/min)	RECOVERY	N	Mean	Standart Deviation	Min	Max	p
Resting HR	With massage	20	68,05	9,12	60,21	77,61	0.966
	Without massage	20	68,10	7,71	61,42	75,32	
Immediately after exercise	With massage	20	142,75	17,77	125,35	159,26	0.532
	Without massage	20	144,70	12,41	132,56	156,23	
1 min after exercise	With massage	20	117,25	14,03	103,69	131,84	0.048*
	Without massage	20	124,90	12,72	112,52	136,68	
2 min after exercise	With massage	20	103,55	11,25	92,63	114,32	0.020*
	Without massage	20	111,80	10,80	101,56	122,00	
3 min after exercise	With massage	20	97,20	9,93	87,36	106,58	0.094
	Without massage	20	102,30	8,59	93,27	111,34	
4 min after exercise	With massage	20	94,20	8,46	85,47	102,65	0.170
	Without massage	20	97,35	4,86	92,35	101,23	
5 min after exercise	With massage	20	91,90	6,23	85,45	97,46	0.297
	Without massage	20	93,85	4,54	89,36	99,35	
6 min after exercise	With massage	20	91,25	6,38	85,78	97,41	0.774
	Without massage	20	91,80	4,39	87,69	95,67	
7 min after exercise	With massage	20	87,95	6,88	81,34	93,69	0.344
	Without massage	20	89,80	4,34	85,37	93,58	
8 min after exercise	With massage	20	87,15	5,62	82,36	93,25	0.683
	Without massage	20	87,90	5,23	81,64	93,27	
9 min after exercise	With massage	20	85,60	5,80	79,79	91,30	0.905
	Without massage	20	85,80	4,27	79,36	92,64	
10 min after exercise	With massage	20	82,70	6,70	76,39	88,45	0.439
	Without massage	20	84,15	4,47	80,94	88,64	
11 min after exercise	With massage	20	81,35	5,40	78,12	86,34	0.386
	Without massage	20	82,85	4,22	78,26	86,21	
12 min after exercise	With massage	20	81,35	6,14	74,01	87,79	0.799
	Without massage	20	80,85	4,62	75,31	85,03	
13 min after exercise	With massage	20	79,10	6,47	73,09	85,91	0.797
	Without massage	20	79,65	4,40	74,06	83,42	
14 min after exercise	With massage	20	78,45	5,61	72,38	83,13	0.788
	Without massage	20	77,95	4,13	73,35	72,98	
15 min after exercise	With massage	20	76,75	5,36	70,06	83,42	0.492
	Without massage	20	75,50	4,90	69,08	77,38	

*$p<0.05$

Resting HR and HR values immediately after exercise do not differ statistically before recovery with or without massage ($p> 0.05$).

The HR values for recovery by massaging and without massage after exercise are given in table 1. HR values at the 1st and 2nd minutes of recovery with massage were found to be statistically lower than non-massage recovery HR values ($p <0.05$).

HR values did not differ statistically from the 2nd minute to the 15th minute of recovery ($p>0.05$).

DISCUSSION
In our study, recovery HR values were examined by massage and without massage after exercise. HR values at rest and immediately after exercise were similar between massage and non-massage recovery. This result shows that the fatigue of the athletes before both applications was similar.

The HR values at the 1st and 2nd minutes of massage recovery after exercise were found to be lower than the non-massage recovery HR values. Recovery by massage decreased HR more quickly and accelerated recovery. Massage recovery HR values up to the 5th minute of recovery are lower, although not statistically significant. In other words, when massaged, recovery occurs faster, especially in the first 5 minutes after exercise. This result shows that starting to massage immediately after exercise accelerates recovery.

In a study conducted to determine the effect of locally applied classical massage on recovery after exercise, it was observed that passive rest caused a statistically significant difference in systolic blood pressure, and post-exercise massage and passive rest caused a statistically significant difference in lactic acid value and heart rate. The blood lactate level decreased significantly in both the massaged group and the control group. Percentage change was found to be -51.60% in the massage group and -24.63% in the control group. As a result, it was stated that total classical body massage has an effect on removing the blood lactic acid level (Baydil et al 2017). In the study of Baydil et al. (2017), it was determined that massage applied for recovery after strenuous exercises is a more effective method in removing lactic acid than passive rest.

When the studies examining the effects of massage applications on recovery are evaluated, it is seen that there are different opinions. It is argued that massage affects various parameters in recovery. It is thought that the main mechanism of massage affecting the recovery parameters is that it increases blood and lymph circulation. It is also advocated to achieve indirect effects such as removing lactate and reducing pain and fatigue by increasing blood circulation (Kara and Ünver 2019).

In the study of Sarı et al. (2016), it was determined that there was no significant difference between them in terms of reducing the number of heartbeats with the removal of blood lactic acid in resting practices performed with active and massage method. However, rest with massage application is thought to be more effective than active resting method in reducing the number of heartbeats by removing the blood lactic acid. This is thought to be due to the fact that the massage application provides rapid removal of blood lactate by increasing the blood circulation passively (Sarı et al., 2016). Sharma et al (2017) demonstrated the benefits of massage in recovery, accelerating blood flow and venous return, helping lactic acid excretion, and increasing the feeling of well-being while reducing pain. They stated that it is a more effective method than passive rest. Wiltshire et al. (2010) stated that massage and active recovery have similar effects and are more effective than passive recovery.

As a result, when massaged, recovery occurs faster, especially in the first 5 minutes after exercise. This result shows that starting to massage immediately after exercise accelerates recovery.

REFERENCES
Baydil, B., Gürses, V., & Koç, C. (2017). Masajın bazı toparlanma parametrelerine etkisi. *Sportif Bakış: Sor ve Eğitim Bilimleri Dergisi S(I)*, *1*, 63-69.
Bishop, P. A., Jones, E., & Woods, A. K. (2008). Recovery from training: a brief review: brief review. *The Journal of Strength & Conditioning Research*, *22*(3), 1015-1024.
Gümüşdağ, H., Egesoy, H., & Cerit, E. (2015). Sporda toparlanma stratejileri. Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 8(1): 53-69.
Günay, M., & Cicioğlu, İ. (2001). Spor Fizyolojisi, Gazi Kitabevi, Baran Ofset, 1. *Baskı, Ankara*.
Günay, M., Şıktar, E., Şıktar, E. (2017). Antrenman Bilimi, Batman Belediyespor Kültür Eğitim ve Spor Yayınları
Günay, M., Tamer, K., & Cicioğlu, İ. (2010). Spor Fizyolojisi ve Performans Ölçümü. Gazi Kitabevi.
https://www.alternatifterapi.com/icerik/spor/masajı-nedir Erişim tarihi:1 Haziran 2020.
Kambir, O. (2005). Klasik Masaj Dinlendirme, Tedavi, Spor Masajı, 2. *Baskı, Ekin Basım Yayın Dağıtım, Bursa*.
Kara E, Ünver G. (2019). Masaj ve toparlanmaya etkileri. *Gaziantep Üniversitesi Spor Bilimleri Dergisi*, *4*(1), 28-49.
Muslu, G. K., & Öztürk, C. (2008). Tamamlayıcı ve alternatif tedaviler ve çocuklarda kullanımı. *Çocuk Sağlığı ve Hastalıkları Dergisi*, *51*(1), 62-7.
Sarı, R., Demirkan, E., & Kaya, M. (2016). Farklı toparlanma uygulamalarının yüzücülerde laktik asit düzeyine etkisinin incelenmesi. *Çağdaş Tıp Dergisi*, *6*(4), 327-333.

Sharma, L., Hussain, M. E., & Verma, S. (2017). Effect of recovery modalities on blood lactate clearance. Saudi Journal of Sports Medicine, 17(2), 65.

Wiltshire, E. V., Poitras, V., Pak, M., Hong, T., Rayner, J., & Tschakovsky, M. E. (2010). Massage impairs postexercise muscle blood flow and" lactic acid" removal. Medicine & Science in Sports & Exercise, 42(6), 1062-1071.