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Compression of effects of three recovery protocols on muscle performance indexes of young soccer players

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Introduction

Nowadays several methods are used to deal with injuries and muscular tension caused by training sessions or competitions such as stretching exercises, massage, immersion in cold water (CWI), antiseptic bath (immersion in cold and hot water), vibration, anti-inflammatory drugs such as ibuprofen, vitamin C, E (2).
It has been shown that massaging following intense practice or training can be used to improve the performance of athletes (4). Massage therapy has been used for centuries to prevent and treat injuries. The use of massage is considered to muscle relaxation, improve muscle strain and pain and thus to enhance the performance. Also, there is the idea that massage provides a relaxing sensation, housing, and strength, and can give the athlete confidence by positive reactions that occur in the body (1-2).
Massage through the recovery and reconstruction of muscle fibers can be an effective way to prevent problems caused by damage or destruction of tissue (3).
On the other hand, CWI has emerged as a popular way among various athletes. Hence, many athletes use CWI in order to recovery from exercises and competitions (5).
In this regard, according to the results of previous studies, CWI accelerates the recovery and athletic performance of sports (2).
However, due to restrictions of CWI, such as the availability of a pool at a training site or in competition, have led coaches and athletes to use other methods such as massage for recovery for athletes (6).
Regarding the contradictory results on the effect of different recovery methods on athletes' performance, the purpose of this study was to compare the effects of three methods of CWI, PR and MR recovery on muscle performance indexes of young soccer players.

Methodology

Subjects
30 soccer men were selected from among the candidates who had inclusion criteria and randomly divided into three groups: CWI (10 people), MR (10 people) and PR (10 people).
Estimated Maximum Oxygen Consumption (VO2max):
Shuttle running test was used to measure the VO2max.
In brief, in this test after the start command, the athlete must take 3 times the distance of 20 meters at maximum speed and then take an active resting range of 5 meters.
After two round trips in the 5-meter range, the subject must again have three speeds of 20 m at maximum speed.
All these steps must be completed within 45 seconds. VO2max was calculated using the following formula (14).
24.4 (maximum speed per hour / km × 6) = (ml / kg / min) VO2max
Exhaustive exercise protocol:
exhaustive exercise in this study was a soccer simulation that includes Illinois agility test with balls, walking, jogging and running fast. The simulated soccer test included the following steps: Warming included running (5 minutes), joint mobility (2 minutes), neuromuscular exercise (forward jump and 10 m running speed) (2 minutes), Jump training (3 jumps sequentially and 10 m running speed) and then passive rest (2 minutes) (6). After warming, in order to measure the soccer agility test, the subjects performed the Illinois agility test with balls.
Subjects then performed a test (LIST) consisting of five sets of 15 minutes, the first three sets being separated by three minutes of rest from the next two sets.
Exhaustive exercise lasted on average 90 minutes.
Recovery Protocols:
1- MR: In the recovery group with massage, the subjects received massage for six minutes after completing the exhausting test. Initially, the hamstring muscles (2 minutes) and the gastrocnemius muscle (2 minutes) and then the quadriceps (4 minutes) were massaged (8).
2- CWI: In the cold-water immersion recovery group, immediately after the exhaustive activity, the subjects were asked to sit up to the height of the breasts in the pool water at 11 to 15 ° C for 10 minutes (6).
PR-3: In the passive recovery group, subjects performed static stretching exercise on hamstring, gastrocnemius and quadriceps muscle groups for 10 minutes in sitting position.
Statistical methods
The collected data were analyzed with SPSS software version 16.
Normal distribution of data was done using Shapiro–Wilk test and homogeneity of variances was performed by Leven's test. Student t-test was used to compare the mean of intra-group and ANCOVA was used to compare the means between groups.
To test the results, a significant level of P <0.05 was considered.

Results

The anthropometric characteristics of the subjects are shown in Table 1.
The results of Table 2 in relation to 20-meter sprint showed that in the CWI and MR groups, the performance of subjects was not significantly decreased compared to the pre-test, while the performance of the PR group significantly decreased compared to the pre-test.
In 40-meter sprint, the results showed that, compared to the pre-test, the performance of the CWI group significantly decreased, while there was no significant change in the performance of PR and MR groups.
Based on the results of Table 2, the CWI recovery method improved agility, while massage significantly decreased the agility test record.
In relation to vertical jump scores, the results showed that CWI had a significant increase in test results, while MR and PR had no effect on vertical jump.
Also, the results of Table 2 show that both the MR and PR techniques compared to the pre-test scores led to a significant decrease in the record of the ability to repeat sprints, while there was no significant difference for the CWI group.

Tables & Graphs

P	T value	Per- test mean±sd Post- test mean±sd	Groups	Tests
0/83	0/215	3/31±0/15 3/29±0/15	CWI	20m spring
0/425	0/835	3/36±0/13 3/46±0/27	massage	
*0/037	2/09	3/31±0/17 3/53±0/20	Passive recovery	
*0/000	7/38	5/52±0/22 5/84±0/21	CWI	40m springs
0/500	0/702	5/68±0/20 5/77±0/38	massage	
0/202	1/27	5/91±/052 6/08±/026	Passive recovery	
*0/007	3/51	22/33±1/28 21/32±1/59	CWI	Agility
*0/011	3/21	22/36±1/66 23/43±2/07	massage	
0/383	0/917	21/64±1/56 22/13±2/48	Passive recovery	
*0/070	2/05	45/80±5/73 49±6/18	CWI	High jump test
0/775	0/294	44/40±4/88 44/20±4/80	massage	
0/783	0/283	50±6/58 4/30±4/54	Passive recovery	
0/623	0/509	8/43±2/82 7/75±2/45	CWI	Test of ability to repeat sprints
*0/028	2/91	10/38±5/41 15/32±7/68	massage	
*0/012	3/15	9/34±4/28 9/74±4/41	Passive recovery	

Schematic representation of the whole research plan
R: Recovery –SH: Exhaustive Test – ST: Shuttle Run Test to Measure Maximum Oxygen Manger - Familiarity

Discussion & Conclusion

These results are consistent with the findings of Teimuri et al. (2012) and Monkil et al. (2006) (19-20), but not consistent with the findings of Mustafa Leh et al. (2012) (21).
Mustafa lo et al (2012) studied acute effects of two type of massage () on lower limb of soccer players and concluded which significant increase showed in flexibility levels but no effect on results of power, agility, surgent jump 4*9 shuttle run (21).
According to previous studies, it appears that massage reduces muscle-tendon adhesions and increase the readiness of units. Meanwhile, the mechanical stresses of the massage cause parasympathetic stimulation, thereby reducing heart rate, lowering blood pressure (22), increasing relaxation hormones such as endorphins and serotonin (23), and decreasing cortisol levels.
Also, when massage is carried out at speed and with stimulating methods, it can lead to increased mental clarity through sensory stimulation and increased brain circulation.
In this regard, the results of the research show that 10 to 15-minute sessions of rapid rhythm massage with stimulating methods such as knocking and joint stimulation can lead to increased athlete's level of consciousness (24).
Massage can also increase the amount of fluid in the lymph and vein, eliminate harmful metabolic products, enhance deep tissue tension, and facilitate the elasticity of muscle fibers and cause more tissue movement (25).
In connection with the recovery in the form of CWI, the mechanism of effect is not clear (5).
Possible mechanisms for this method can be to reduce the flow of blood tissue that prevents inflammation and thus fatigue and pain (26).
In this regard, the effect of CWI has been shown on muscle injury indices. The researchers also concluded that CWI accelerated recovery and exercise performance (27).
Conclusion
In general, it can be said that among the three recovery methods mentioned above, the CWI is more effective than the massage and passive recovery, and therefore, sports therapists can use this method to reduce fatigue and also increase muscle function after the tournament and intense exercises in young soccer players.

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