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Effect of recovery mode on repeated sprint ability in young basketball players

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Abstract

The purpose of the study was to see the effect of two different recovery modes, i.e., passive and active recovery mode on the repeated sprinting ability of regular school going basketball players. 20 students (boys) on the basis of purposive sampling technique of age 17 ± 2 years were selected as a subject from the basketball team of The Cathedral Vidya School, Lonavala. They were divided into two groups of 10 each. The first group had to use passive recovery as their recovery method, and the other had to use active recovery. The subjects were explained about their importance and how the experiment would be conducted. All the subjects performed six repeated sprints (shuttle running 3x10m) with definite and equal recovery periods but with different recovery method. Performed in unplanned order on two separate occasions two repeated sprint ability protocols consisting of 10 x 30-m shuttle run sprints with 30 seconds of passive or active recovery. Independent T-test was administrated to find the effects of different recovery modes (Active & Passive) on the repeated sprinting ability of school going basketball players and found insignificant effects of different recovery modes (Active & Passive) on the repeated sprinting ability. The level of significance was set to 0.05.

Keywords: Active recovery, passive recovery, repeated sprinting ability

Introduction

Sports science is the utilization of scientific principles in exercise and sports. It's a rapidly growing area, and it opens its doors to a range of tasks in the pharmaceutical, healthcare, fitness and leisure industries^[1].

Sports science is a branch of science that deals with the science behind the vast and massive world of sports. The study of sports science has helped us in many ways in understanding, researching in the field of sports. There are many areas that have been found and understood by the help of sports science like the Bio-mechanics of the body, physiological and the psychological changes that go on in the athlete's mind and body^[2].

Each country striving to get better and better results in major sports events like the Olympics and The Commonwealth Games have made a sudden increase in the demand of sports scientist in the world and also because of the ever-increasing focus of the world of sports to achieve the best results, by studying science and sport together, researchers have established a better understanding of how the human body responds to exercise in different conditions and how the human body alters to various stimuli. The study of different recovery methods falls under the exercise physiology section of sports science. Exercise physiology is the study of how a person reacts to exercise and what effect does a specific exercise have on him^[3].

It is essential to know exercise models similar as fitness, fatigue & endurance: from the cellular and molecular level to the musculoskeletal and cardiovascular systems. Sports Science and Physiology deals with various developments of the body all along physical movement, through the fundamental disciplines of exercise physiology, motor control, bio-mechanics, sport, and exercise psychology.

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¹N.p., n.d. Web. 23 Oct. 2017. "Sports Science" Bright Knowledge, <<https://www.brightknowledge.org/sport-leisure/sports-science>>

² N.p., n.d. Web. 24 Oct. 2017. Sydney Sports & Exercise Physiology | What Is Sport Science, www.ssep.com.au/what-is-sport-science.html

³ N.p., n.d. Web. 23 Oct. 2017. "Sports Scientist." Sports Scientist | Smart Futures, www.smartfutures.ie/sports-scientist

Looking at the psychological aspect of sports we can even see how an individual's personality plays an important role. Personality has been defined as "those relatively stable and enduring aspects of an individual which distinguish them from other people, making them unique but at the same time permit a comparison between individuals" (Gross 1992). ^[4] The attitude of the players towards the recovery practice is also a determining factor.

Recovery is significant component in sports it is vital for a player to get ample of rest and recover so that he can perform at his best. Whenever a drill is planned recovery time is being given between two stations/exercises so that the players can give their best or at least optimum performance at every workout. ^[5]

There are two types of recovery methods that are used by every coach around the globe. The two types of recovery are 1) Active Recovery & 2) Passive Recovery.

1. Active Recovery: It means purposely exercising at low intensity to give our body ample time to recover after a high-intensity bout. E.g., walking or slow jogging for a small distance after a 100mtrs sprint or a 400mtrs race.
2. Passive Recovery: It means getting the body to complete rest or stillness and allowing recovering after a high-intensity exercise. E.g., stopping and stretching after a 100mtrs sprint or a 400mtrs race.

Actively cooling down/recovering by walking or jogging instantaneously after a strenuous exercise prevents venous pooling and recurring exercise cause an upsurge in the blood flow through the heart and veins throughout recovery, speeding up lactate removal from the blood. Passive recovery involving coming to complete rest decreases blood lactate faster than doing light-to-moderate activity like in Active recovery. Movement through recovery also upholds circulation to the heart, liver, and inactive muscles which doesn't give the major muscles time to rest and recover fully. ^[6]

RSA test varies according to a mode of recovery, number of sprints, distance of sprints and duration. The most used and convenient RSA test protocol is $10 \times (2 \times 15\text{-m})$ with a 30s break of passive or active recovery. Test which is conducted and has a distance of more 30mtrs is not advisable as the basketball court is only 28mtrs long. RSA test is widely used in variations to determine/measure the degree of fatigue, performance, etc. 'This test can be used to estimate the ability of an individual to repeatedly sprint forwards and backward, thus imitating specific game situations that usually occur during a basketball match such as the immediate movements from defence to offense and vice versa' ^[7].

Methodology

This study investigated the effect of two different recovery modes, i.e., passive and active recovery mode on the repeated sprinting ability of regular school going basketball players. The study followed a cross-over design protocol. 20 school

going basketball players on the basis of purposive sampling were taken for this study. They were divided into two groups of 10 each. The first group had to use passive recovery as their recovery method, and the other had to use active recovery. The subjects were explained about their importance and how the experiment would be conducted. All the subjects performed six repeated sprints (shuttle running $3 \times 10\text{m}$) with definite and equal recovery periods but with different recovery method. Performed in unplanned order on two separate occasions two repeated sprint ability protocols consisting of $10 \times 30\text{-m}$ shuttle run sprints with 30 seconds of passive or active recovery. For the purpose data collection, the researchers followed the method of Barbero-Alvarez and Spencer.

Selection of Subjects

20 male athletes on the basis of purposive sampling were taken as subjects for the current study. Since all the subjects were basketball players, their RSA is somewhat developed because they have been playing the game for years. The objective of this study was explained to all the subjects before starting the test.

Variables

- Independent Variable- Recovery Mode (Active & Passive);
- Dependant Variable- FI (Fatigue Index)

Criterion Measures

1. Performance of the RSA test was used to measure the repeated sprinting ability of the young basketball players.

Delimitations

- The study was delimited to the students of this school.
- The study was bound to 20 male basketball players.
- The study was delimited to passive and active recovery methods.

Apparatus

- Marker Cones
- Stopwatch
- Measuring Tape

This table was used to determine the ratings

Rating	Fatigue Index
Excellent	> 89%
Good	85-89 %
Average	80-84%
Poor	< 80% ⁸

Statistical Procedure

To find out the effect of different recovery mode and to understand which recovery mode is better, Independent T-test was employed with the help of Statistical Package for Social Science (SPSS) (Version 20). The level significance was set at 0.05 levels for testing the hypothesis.

Level of Significance

The level of significance was set to 0.05 in order to if there is any significant difference between the two variables.

⁴ "The Athlete Personality?" *The UK's Leading Sports Psychology Website* N.p., 31 Mar. 2015. Web. 27 Sept. 2017.

⁵ Castagna, Carlo, and Giuseppe Annino. N.p., May 2008. Web. 23 Sept. 2017. <http://journals.lww.com/nsca-jscr/Abstract/2008/05000/Effect_of_Recovery_Mode_on_Repeated_Sprint_Ability_39.aspx>.

⁶ "The Recovery Principle for Sports Training." Sports Training Adviser: Practical Training Tips Based on Sport Science. N.p., n.d. Web. 23 Oct. 2017

⁷ Bragazzi, Nicola L., et al. "Repeated Sprint Ability in Young Basketball Players: Multi-Direction vs. One-Change of Direction (Part 1)." *Frontiers in Physiology*, Frontiers Media S.A., 2016,

⁸ *Sprint Fatigue Test*. N.p., n.d. Web. 23 Oct. 2017.

Findings

To observe the significant difference between the active recovery and passive recovery group T-test was administrated

to see the difference between two recovery modes (Active & Passive).

Table 1: Descriptive Statistics

Group Statistics					
Recovery mode		N	Mean	Std. Deviation	Std. Error Mean
Fatigue index	passive recovery	10	7.8780	4.82818	1.52680
	active recovery	10	8.9330	5.30506	1.67761
Anaerobic capacity	passive recovery	10	2980.1550	650.57573	205.73011
	active recovery	10	3081.9390	634.11249	200.52398

Table 1 shows the mean and standard deviation of the fatigue index and anaerobic capacity of different recovery groups (Active & Passive).

Table 2: T-table

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Fatigue index	Equal variances assumed	.070	.795	-.465	18	.647	-1.05500	2.26837	-5.82067	3.71067
	Equal variances not assumed			-.465	17.843	.647	-1.05500	2.26837	-5.82368	3.71368
Anaerobic capacity	Equal variances assumed	.429	.521	-.354	18	.727	-101.78400	287.28860	-705.35496	501.78696
	Equal variances not assumed			-.354	17.988	.727	-101.78400	287.28860	-705.38337	501.81537

Table 2 shows that there is an insignificant difference in fatigue index and anaerobic capacity as both the p-values is more than the level of significance that is 0.05

Graphical Representation

Fatigue Index

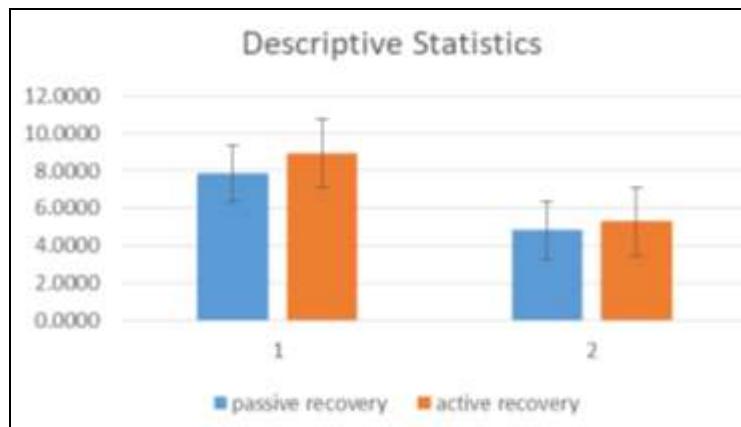


Fig 1: Shows the mean and the Std. Deviation of fatigue index.

Anaerobic Capacity

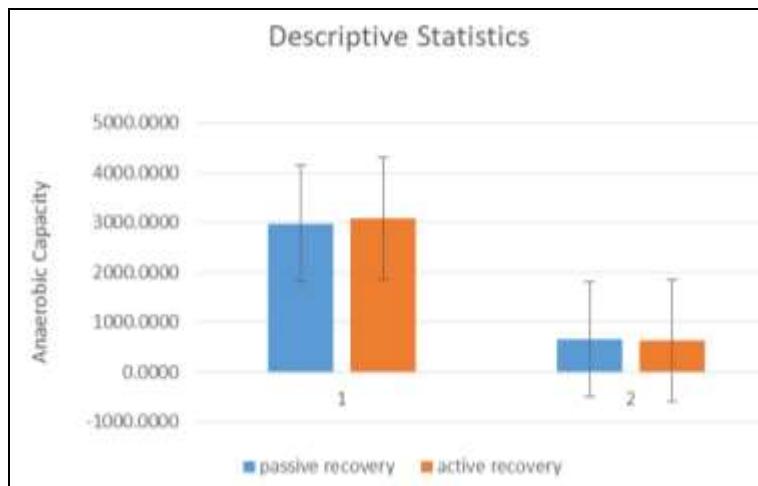


Fig 2: Shows the mean and the Std. Deviation of anaerobic capacity.

Discussion of Findings

Independent T-test was administrated to find the effects of different recovery modes (Active & Passive) on the repeated sprinting ability of school going basketball players.

After conducting the RAST (Repeated Sprinting Ability Test), the collected data was observed and an insignificant difference between the two recovery groups.

In basketball a game which gives a little recovery time, recovery mode is an important determining factor how you perform in the randomly occurring high-intensity exercise.

Elvira Padua (2008)

Anaerobic Capacity is the energy that can be gained from ATP in a single continuous bout. An excellent anaerobic capacity helps the athlete to perform better. The main discovery of this investigation was that accepting passive recovery in between repeated sprints gave the outcome which showed a lower fatigue index, lower total sprint time and better performance across six bouts of maximal sprints.

After the data collection was done and the T-test was administrated it was observed that there is no powerful correlation between the two recovery groups. The reason no strong difference is seen among the two recovery group may be because the athletes aren't professional athletes but regular school going athletes who play just for recreation.

As seen in table 1 both recovery methods have their significance value above the level of level significance set that 0.05. But there is still a visible difference between the two recovery methods.

The fatigue index mean of passive recovery is lower compared to that of active recovery and so is the anaerobic capacity.

As seen in figure 1 fatigue index in active recovery is relatively higher than compared to the fatigue index of passive recovery athletes. Carlo Castagna (2008) did a similar study in which the data collected showed that passive recovery is better to be used than active recovery in strenuous activities.

In figure 2 shows the difference in the anaerobic capacity of the athletes who used active and passive recovery. It was seen that active recovery had a higher anaerobic energy output than compared to that of passive recovery athletes.

A study by Carlo Castagnaro et al. (2008) showed that during repeated sprinting, passive recovery assisted better performance, decreasing fatigue. Thus, the use of passive recovery is suitable during a competition in order to limit fatigue as a result of repeated high intensity exercise.

Conclusion

The anaerobic capacity and fatigue index show insignificant difference between the two but there is still a notable between them that show the out-come of active recovery and passive recovery method on an individual athlete's performance. This shows that players give a better performance if they are allowed to remain inactive for some time and recover in passive method during different given instances. This could prove really helpful for athletes taking part in different team games like football, soccer, rugby and cricket. Cricket could be the best example of how passive recovery help in producing same performance again and again at any given time of the day.

Further scope of this study: This study could be done on a different gender or a different age group. This research could also be done by taking more number of subjects or even by taking professional athletes in to take part and get much better and significant results to prove which recovery mode is better.

Improvements: This study was conducted to see which recovery method is better to be used for school going basketball players. This study could be conducted with elite players of top leagues in different sports to get better results. Variations can also be used by the researchers to get even better results out of this study. The effect of different recovery modes can also be seen on different times of the day just to see which recovery mode would be better at given point of time.

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