



## Full Length Research Article

### IMPACT OF PHYSICAL EXERCISE ON PERIPHERAL PLATELET COUNT

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#### ARTICLE INFO

##### Article History:

Received 17<sup>th</sup> January, 2017

Received in revised form

27<sup>th</sup> February, 2017

Accepted 06<sup>th</sup> March, 2017

Published online 20<sup>th</sup> April, 2017

##### Key Words:

Physical Exercise,  
Peripheral Platelet Count

#### ABSTRACT

**Background:** The beneficial effect of regular exercise on physical fitness is well documented. There is also evidence that acute and chronic exercise affect platelet activation in different ways. Few studies are available on effect of exercise on platelets function. Therefore, present work has been undertaken to study the effect of exercise on platelets.

**Objective:** Effect of exercise on peripheral platelet count.

**Materials and Methods:** The study was conducted on 40 healthy female subjects in the age group of 22-29. Samples for platelet counts were obtained prior to training and after 12 wk. Data obtained was compiled using computer software MS Excel for Windows. Statistically significant differences among quantitative variables were evaluated by Independent t-test and with the help of SPSS software (version 20). A p-value less than 0.05 was considered as statistically significant.

**Conclusion:** According to results of present study platelet count was found to be increased after exercise.

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#### INTRODUCTION

Most organs and tissues are affected by physical activity and adapt to regular exercise. Physical activity refers to all bodily movements that result from the contraction of the skeletal muscles and results in increased energy expenditure. Physical activity can be carried out at different levels of intensity. The more intense, the greater the immediate impact on various bodily functions. The length of the period of exercise training also plays a major role. Although some effects exercise can be seen after short time of one to a few weeks, other important factors are frequency (how often the person exercises), duration (how long a session is) and intensity. Physical activity has various effects on various systems of the body including blood parameters. An exercise session leads to a significant increase in the number of platelets in the blood, but due to release of blood platelets from various organs, such as the spleen, bone marrow and from lungs (Jan Henriksson and Carl Johan 2010). Activation of platelets is closely related to the liberation of growth factors and inflammatory mediators.

This is of special interest as the inflammatory and immunomodulatory consequences of platelet activation are increasingly recognised and platelets seem to be of central importance not only to final stage of cardiovascular disease but also to the development of these diseases. As blood platelets are of central importance to the process of primary haemostasis and coagulation, any abnormalities in platelet function result in severe and potentially lethal consequences. Activation of platelets results in platelet aggregation and subsequent thrombus formation (Stefan and Ivo 2015).

#### MATERIALS AND METHODS

The study was conducted on 40 healthy female subjects in the age group of 22-29. All participants gave written informed consent. Subjects have been selected among people who do not use drugs and do not drink addictive beverages. Subjects with history of haematological disease, and heart disease were excluded from study. The subjects (participated in supervised program of treadmill exercise. Subjects exercised for 20 min, three times weekly, for 12 wk. Blood samples taken from the volunteers from their forearm antecubital area in line with hygiene rules were analyzed in the central laboratory by means of an auto-analyzer for hematological levels such as platelets

Samples for platelet counts, were obtained prior to training and after 12 wk.

### Statistical Analysis

Data obtained was compiled using computer software MS Excel for Windows. Statistically significant differences among quantitative variables were evaluated by Independent t-test and with the help of SPSS software (version 20). A p-value less than 0.05 was considered as statistically significant.

## RESULTS

Before exercise absolute platelet count ranged from 1.56 to 2.56 with a mean  $\pm$  standard deviation of  $1.84 \pm 0.30$  lacks. After exercise absolute platelet count ranged from 1.72 to 4.85 with a mean  $\pm$  standard deviation of  $2.98 \pm 0.90$  lacks /mm<sup>3</sup>.

Mean platelet count before and after exercise

Platelet count	Range (lakhs/mm <sup>3</sup> )	Mean $\pm$ Standard deviation (lakhs/mm <sup>3</sup> )	
Before exercise	1.56 to 2.56	$1.84 \pm 0.30$	p<0.0001
After exercise	1.72 to 4.85	$2.98 \pm 0.90$	p=0.004

## DISCUSSION

It is being reported that exercise exerts physiological stress on the body and results number of chemical (hormonal) and cellular changes. This depends on number of factors such as type and duration of exercise (Rashida and Din *et al* 2007). The results of present study showed that exercise increases platelet count. Several studies show that acute exercise results transient increase in platelet count. This increase is caused by hem concentration and by platelet release from liver, lungs and spleen.(K.G Chamberlain *et al.*1990) (K. G. Schmidt and J. W. Rasmussen *et al* 1984 ).Our results are also in agreement with the study conducted by( Davis *et al.* 1990) who studied the effects of exercise and exercise conditioning on blood platelet function. Platelet functions were investigated in six healthy individuals who had not engaged in regular exercise for at least 1 yr prior to the study. It was found that Platelet counts increased after exercise.

Our findings are in agreement with the study conducted by (Ghanbari *et al* 2005) who observed that physical activity improves platelet count which may be associated with release of fresh platelet from vascular bed of the spleen, bone marrow and other platelet reservoir. Arazi *et al* 2005 observed that epinephrine causes a strong contraction of the spleen (where 1/3 of body platelets are stored); as epinephrine levels rise in physical activity this may account for elevated level of platelets after exercise. Ahmadabad S and El-Sayed (2003) also observed increased platelet count after exercise. Özdengül (1998) also support our findings that platelet count increases after exercise. Drygas and WK (1988) observed increased platelet count after exercise. Ribeiro and Almeida 2007 also supports our study. Results of present study are consistent with the work of Odland PD *et al.* (1994), who reported increased platelet count after exercise. Similarly, Rock *et al.* (1997) reported increased platelet count after exercise. Salimeh Mahmoodinezhadet *et al* 2016 conducted a study on 30 female athletes and observed that physical exercise increases platelet count. An activation of blood platelets has also been observed during acute exercise.

Such an activation is due to increased occurrence of the protein, P-selectin, on the platelets,' surface, with greater aggregation tendency of platelets and greater formation of thrombin and fibrin leading to a shortened coagulation time (Fotios 2012). Patlar and Keski 2007 also observed increased platelet count after exercise. Our findings are also supported by Bourey and Santoro (1988), who measured the effects of exercise and training on coagulation, platelet function and fibrinolysis in normal human subjects. They reported that platelet count, Factor VIII activity and fibrinolytic potential increased after exercise.

### Conclusion

We conclude that platelet count increases after physical exercise.

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