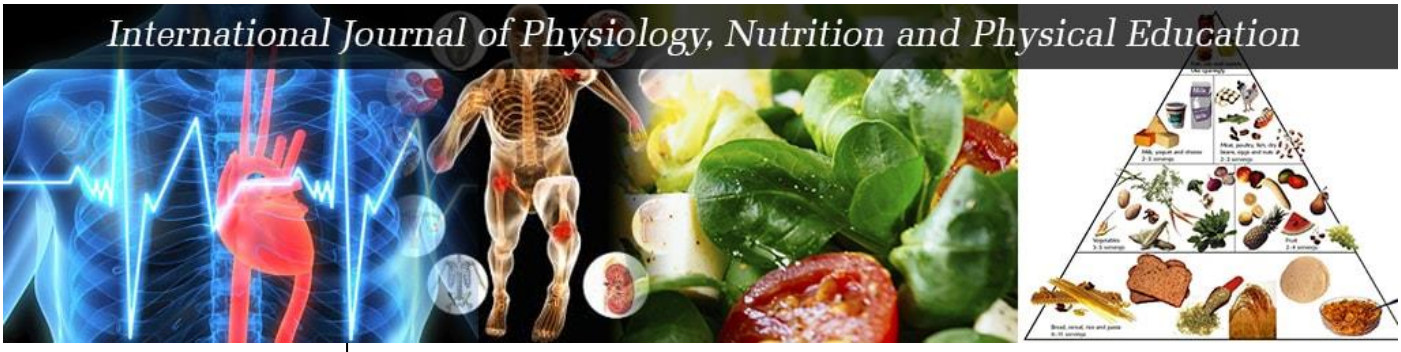

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Effect of twelve minutes run and walk on platelet variables

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Abstract
Background: Platelets are small, anucleated blood elements and under normal conditions constitute a small fraction of the circulating cells. A growing body of recent research reports indicates that platelet functions in the human body are influence by physical training and regular exercise habit.
Objective: The objective of the present study was to investigate the effect of twelve minutes run and walk on platelet variables.
Method: Present Study was conducted in the Visva Bharati University campus, west Bengal, India. To meet the purpose of this pilot study two male healthy physical education students, aged between 20-22 years, non-smoker were acted as subject of the study. Platelet Aggregation profile i.e., collagen aggregation, epinephrine aggregation, ADP aggregation and arachidonate aggregation, Bleeding time and clotting time was measured before and immediately after the completion of twelve minute run and walk test. In this study mean and SD was calculated to observe the changes after exercise.
Results: Mean value of collagen aggregation (pretest 79.5 ± 0.70% to posttest 81.5 ± 0.70%), epinephrine aggregation (pretest 71.5 ± 0.70% to posttest 73.0 ± 0%); ADP aggregation (pretest 77 ± 2.82% to posttest 77.5 ± 4.94%) Ristocetin aggregation (pretest 89.5 ± 0.70% to posttest 91.5 ± 0.70%), bleeding time (pretest 155 ± 35.35sec to posttest 165 ± 35.35sec) and clotting time (240 ± 7.07se to posttest 254 ± 8.48sec) were increase from the pre exercise value to completion of exercise, where as Arachidonate aggregation was decreased from 83.0 ± 0% to 82.5 ± 3.53% respectively.
Conclusion: Platelet aggregation induced by Collagen, Epniephrine, Ristocetin and ADP was increase may be due to release of fresh platelet from the spleen, bone marrow, or other reservoirs in the body. Bleeding and clotting time shows that, after doing exercise it was gradually increase due to elevation of neither the circulating nor epinephrine during exercises.

Keywords: Platelet aggregation, bleeding time, clotting time, run and walk

Introduction
Platelets are small, disk shaped blood cell with 2- 3 µm in diameter, exhibit many granules but no nucleus. Growing body of scientific evidence indicates that both acute exercise and habitual physical activity affect platelet function. The platelet plays a critical role in arrest of haemorrhage. The most important function of the platelets is temporary haemostasis by platelet plug formation.
Pathological and clinical studies have suggested that platelets play an important role in the pathogenesis and progression of cardiovascular diseases [1-3]. It has also been postulated that regular exercise may reduce the risk of major vascular thrombotic events and protect us against cardiovascular diseases [4-7]. However, Siscovick and coworkers [8] reported that the risk of primary cardiac arrest was transiently increased during exercise. Therefore, physical exercise seems to be able to protect us against cardiovascular disease on the one hand and to provoke sudden cardiac death on the other hand. Various studies, including our previous study, found an increase in platelet counts ranging from 18% to 80% immediately after treadmill or bicycle exercise. Despite the increase in platelet number, most studies regarding the effects of exercise on platelet functional behavior, mainly aggregation and secretion, have been either controversial or incomplete [9-10]. These discrepancies may be caused by different methodological determinations, including exercise protocol and the methods of measuring platelet function, in various studies.

The bleeding time test is a useful for testing platelet plug formation in the capillaries. It is generally used in conjunction with other coagulation tests such as the prothrombin time, activated partial thromboplastin time, platelet count, fibrinogen and fibrin degradation products (FDP) to aid in the diagnosis of patients suspected of having a bleeding disorder. Coagulopathies (problems in hemostasis) such as thrombocytopenia, qualitative platelet defects, vascular abnormalities, and von Willebrand's disease may be diagnosed with coagulation tests [11].

Method

Study Area: The Study was conducted in the Visva Bharati University campus, west Bengal, India.

Subjects: The present study was conducted on two normal, healthy, non-smoker male volunteer of age between 20-22 years who had no evidence of any disease. Subjects suffering from bleeding disorders and subjects taking any drugs were excluded from the study.

Criterion measures: For this study Platelet Aggregation profile i.e., collagen aggregation, epinephrine aggregation, ADP aggregation and arachidonate aggregation, bleeding time and clotting time was measured.

Protocol: After the subject had arrived at the laboratory and rested for 30 minutes. Subjects were instructed on previous day, they were asked to have light breakfast one hour before exercise. Before the actual study subjects were familiarized with 12 minutes run and walk test (Cooper test) to eliminate the novel effect of new experience.

Design: Before the exercise blood sample were drown from a forearm vein. Blood was added to anti-coagulant. After that the subjects were instructed to perform 12 minutes run and walk. Immediately after the exercise session, another blood sample was drawn from the fore-arm vein and added with anti-coagulant.

Statistics: For this study mean and SD was calculated to observe the changes after exercise.

Results

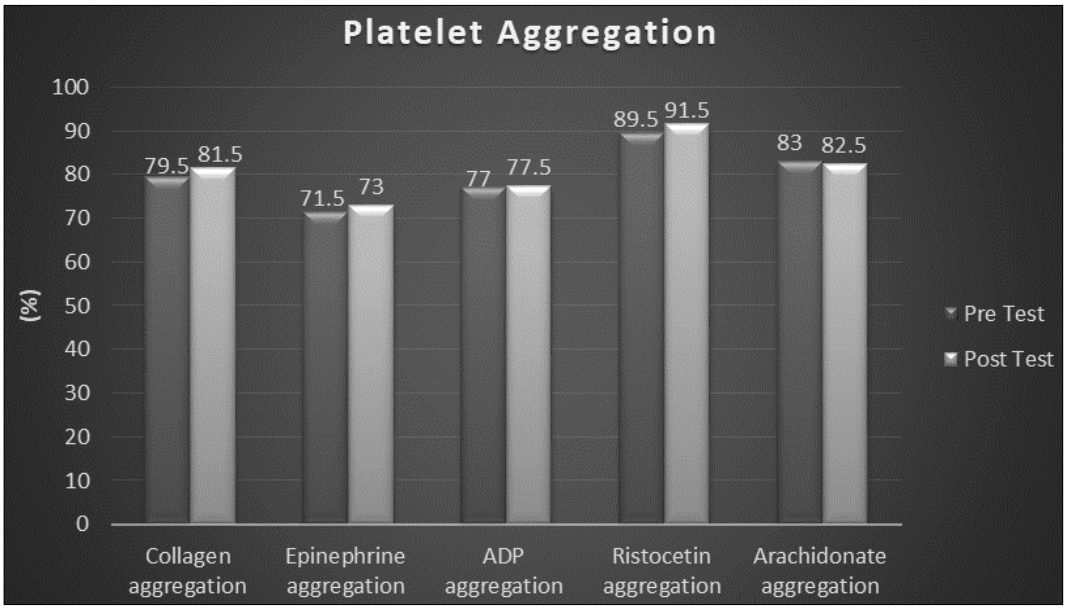
Mean value of collagen aggregation (pretest 79.5 ± 0.70% to posttest 81.5 ± 0.70%), epinephrine aggregation (pretest 71.5 ± 0.70% to posttest 73.0 ± 0%); ADP aggregation (pretest 77 ± 2.82% to posttest 77.5 ± 4.94%) Ristocetin aggregation (pretest 89.5 ± 0.70% to posttest 91.5 ± 0.70%), bleeding time (pretest 155 ± 35.35sec to posttest 165 ± 35.35sec) and clotting time (240 ± 7.07se to posttest 254 ± 8.48sec) were increase from the pre exercise value to completion of exercise, where as arachidonate aggregation was decreased from 83.0 ± 0% to 82.5 ± 3.53% respectively.

Table 1: Effect of Twelve Minutes Run and Walk On Platelet Aggregation

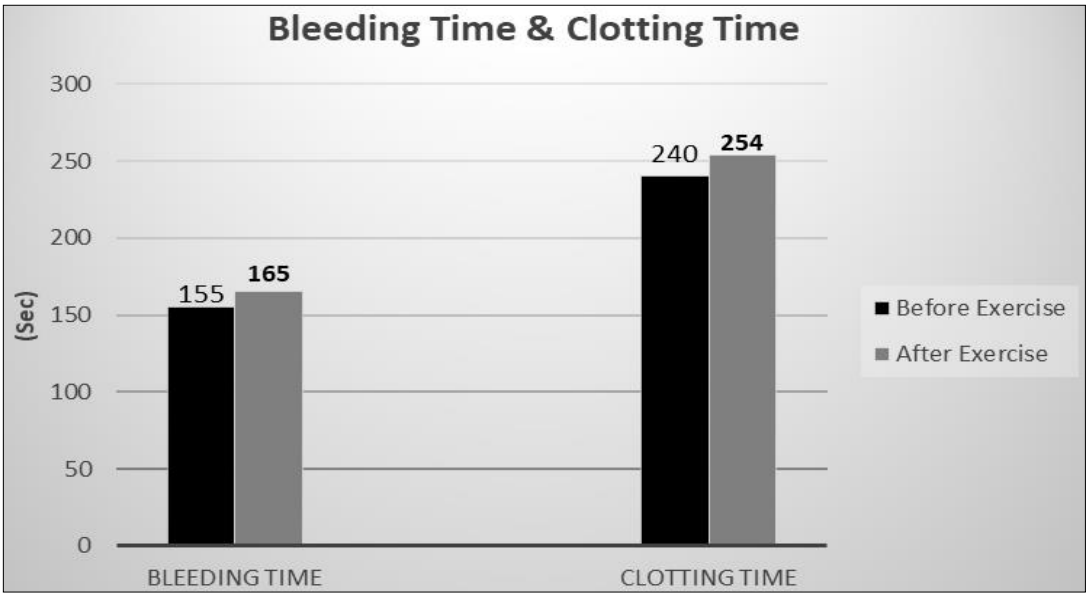
Parameter (%)	Pre Test Mean ± SD	Post Test Mean ± SD	Reference Range
Collagen Aggregation	79.5±0.70	81.5±0.70	75-93
Epinephrine Aggregation	71.5±0.70	73.0±0	67-88
ADP Aggregation	77±2.82	77.5±4.94	67-97
Arachidonate Aggregation	83.0±0	82.5±3.53	72-94
Ristocetin Aggregation	89.5±0.70	91.5±0.70	73-104

Table 2: Effect of Twelve Minutes Run and Walk On Bleeding & Clotting Time

Parameter (Sec)	Pre Test Mean ± SD	Post Test Mean ± SD	Reference Range
Bleeding Time	155±35.35	165±35.35	60-540
Clotting Time	240±7.07	254±8.48	180-660



Graph 1: Graphical presentation of twelve minutes run and walk on platelet aggregation



Graph 1: Graphical presentation of twelve minutes run and walk on bleeding & clotting time

Conclusion

Platelet aggregation induced by Collagen, Epniephrine, Ristocetin and ADP was increase may be due to release of fresh platelet from the spleen, bone marrow, or other reservoirs in the body. Bleeding and clotting time shows that, after doing exercise it was gradually increase due to elevation of neither the circulating nor epinephrine during exercises.

We recognize that we should estimate our results carefully because of some limitations. First, we estimated only platelet aggregability, bleeding time and clotting time. We could not assess the extent of sympathetic activation after particular type of exercise schedule. Second, the population was taken small. In addition all subjects were healthy volunteers so whether different disease conditions show variable response to the effect of exercise on platelet aggregability could not be assessed. The type of exercise given was also of single type. So the effects of different types of exercise could not be assessed. Considering these issues, a long term prospective study with a larger population, different types of exercises and parameters to assess sympathetic activity is expected to have elaborated justification for our findings.

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