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Explosive Muscular Power Correlation with Reaction Time of D2 Collegiate Runners and the Effects of Reaction Time Intervention

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Abstract and Introduction

The skill of running involves much more than meets the eye. Running requires explosive muscular power and proper reaction time. This research will discuss the explosive power and reaction time of D2 collegiate runners and document the development of the intervention program. This study spans for approximately 4 weeks, with the volunteer population split into two groups: a control and an intervention group. The intervention group is expected to see improvements in both explosive power and reaction time due to the intervention program. Data will be collected from both groups via Force Plates and Blaze Pods technology pre and post intervention program.

Methods

Data was collected from a total of 20 volunteers, 13 females and 7 males. Requirements to qualify for study include being a Division II Cross Country and/or Track collegiate athlete, currently practicing, and at least 18 years in age. Volunteers were excluded from the study if they currently or have had a lower extremity injury. Participants were divided into even groups of 10; the first 10 that arrived at pre-test were put into the control group, whereas the remaining 10 were put in the intervention group. Data values were collected via technology equipment Blaze Pods and Force Delta Plates. Blaze Pods collect the reaction time of the volunteers. Force Delta Plates collected the peak force and velocity of each volunteer's countermovement squat jump. Intervention consisted of a four-week program of three exercises: scissor line jumps, horizontal line jumps, and vertical line jumps. Each of these exercises were to be done on their own 3 times a week for 30 seconds each.

Results

The p-value for reaction time difference between the control and intervention group was 0.4563, at significance level of 0.05. This value indicates there is no significance found between the two groups pre and post-tests. On average, all volunteers lowered their reaction time by 22.4 ms. We must accept the null hypothesis that there is not a significant difference between the control and intervention groups. The volunteers also created lower peak force numbers in the post test. The correlation coefficient of the volunteer's pre-test data was -0.2999. The correlation coefficient of the volunteer's post-test data was -0.1573. The correlation between reaction time and explosive muscular power is negative based on these values. After the 4-week allotted time, these two coefficients became more closely related. This leads to the conclusion there is a correlation between reaction time and explosive muscular force.

Average Initial Measurements		
	Avg. Initial Force	Avg. Initial Reaction Time
Control	2.338 kg	703.1 ms
Experimental	2.306 kg	734.2 ms

Figure 1

Average Final Measurements		
	Avg. Final Force	Avg. Final Reaction Time
Control	2.208 kg	680.5 ms
Experimental	2.170 kg	734.0 ms

Figure 2

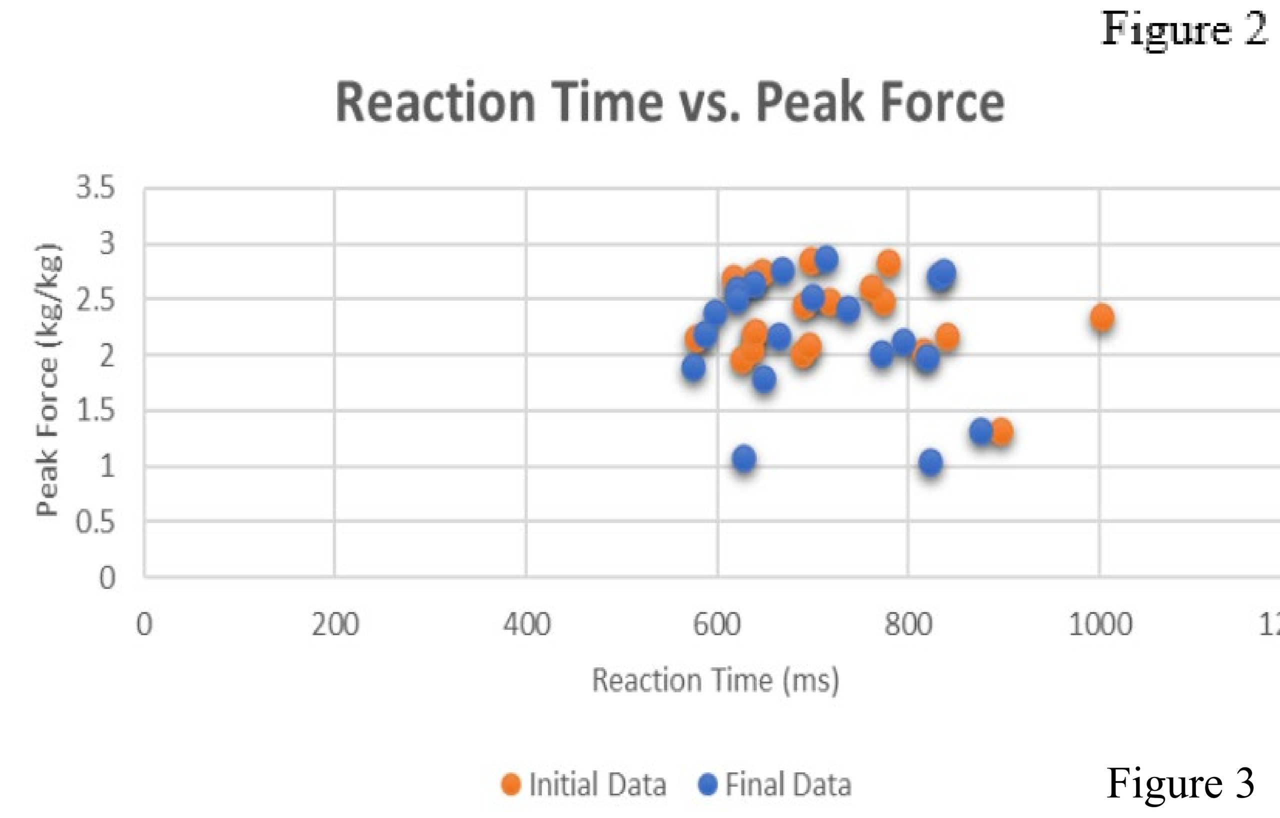

Figure 3

Conclusion

This study did not result in significant improvement in reaction time for the intervention group. Both the control and experimental groups decreased their reaction time, but the decrease cannot be attributed to this study. The decrease could have been caused by other factors such as training for meets. A conclusion that can be made is that peak force and reaction time have a correlation. This study found there is a negative correlation between the two; as reaction time decreases, their peak force decreased. This was formed from the correlation coefficients calculated for peak force and reaction time. This study needs further testing over a longer intervention period, larger sample and different groups of volunteers to form conclusions on what factors affect reaction time and explosive muscular power, as well as their correlation.

References

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