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Blood Glucose Levels and High Intensity Exercise with Respect to Meal Timing

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ABSTRACT

The research conducted was about monitoring blood glucose levels with exercise with respect to meal timing. It has been hypothesized that with short bouts of high intensity exercise, one can raise their blood glucose levels because in acute response to high intensity exercise. Previous research has shown that with long bouts of exercise while fasting you can lower blood glucose levels. This study is testing the meal timing from fasting to right before the exercise and also eating one and two hours before combined with a 50 minute moderate to high intensity workout, keeping the heart rate in zones 3-5, which is around 70%-100% Of their VO2 Max, which was tested by using An H7 sensor. The research population ranged from male to female, and ages from 19-39 year old college students. The test is administered before the workout and after the workout. There is hope that with enough data we can support that an individual can increase glycogen levels when eating at the perfect time for increased muscle capacity, but also how you can lower blood glucose levels with different types of exercise when fasting. This info will be very beneficial to people who suffer from diabetes, or even athletes who was to optimize performance.

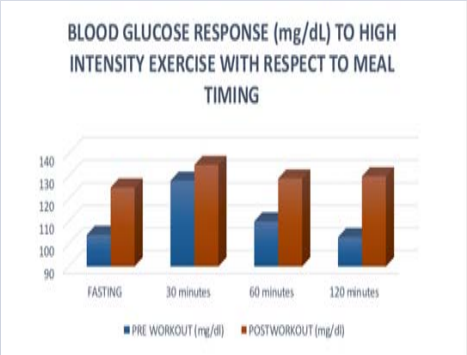
OBJECTIVES

- Support the hypothesis
- Raise awareness on blood glucose health
- Understanding the effects of meal timing on blood glucose
- Determine optimal blood glucose ranges before and after exercise

METHODS

Participants	Fasting (Before/ After exercise blood glucose levels)	30 minutes before (Before/After exercise blood glucose levels)	Eating 1 hour before exercise (Before/After exercise blood glucose levels)	Eating 2 hours before exercise (Before/After exercise blood glucose levels
Female Age 27	94/102	120/117	112/134	98/110
Male Age 29	98/106	103/118	96/104	103/117
Male Age 19	116/162	191/176	116/147	98/159
Male Age 39	108/131	114/132	117/128	112/134

Four students who were enrolled in KIN 288 participated in a 12 week blood glucose study where they had a meal of 50-60g of carbohydrates, eating at four different times; fasting, 30 minutes before, 1 hour before, and 2 hours before a 50 minute high intensity workout. This study was broken up into a 3 month span where the participants measured their blood glucose levels any day of their choosing at 8am. Students who participated in the high intensity agility workouts did so in Parklands Fitness Center. The target ranges of fasting blood glucose are 100-126mg/dl and the resting blood glucose ranges are 140-200mg/dl. Shown below is the data collected from the 12 week study.



RESULTS

Four out of five students from Kinesiology 288 that partook in the study, successfully completed the experiment. (Due to technical difficulties involving one of the blood glucose monitors, one of the subjects was unable to complete the experiment.) Using four different meal times prior to exercise to determine how these levels changed from before to after exercise—we were able to determine, which times before exercise would raise blood glucose levels most significantly following a fifty minute duration of high intensity exercise.

Our results revealed that blood glucose levels increased using all four meal timing schemes prior to exercise, but increased most significantly when eating 120 minutes before exercise and when fasting.

In improving this study for the future, students should ensure that all blood glucose monitors function properly before the experiment begins. Instructions on usage of these monitors should be clearly defined as well. Also, several monitors could be used on one person (for one given measurement) to determine the accuracy of the monitors to prevent the data from being skewed by any incorrect values reported by faulty equipment.

	Blood Glucose (ml/dl) response pre and post workout			
	FASTING	30 minutes	60 minutes	120 minutes
PRE WORKOUT (mg/dl)	104	128	110	103
POSTWORKOUT (mg/dl)	125	135	129	130
Difference (mg/dl)	21	7	19	27

CONCLUSIONS

With proper meal time, prior to high intensity cardiovascular exercise the desired increase in blood glucose levels can be achieved. Though it may be difficult to discern this change in blood glucose levels based off of different foods consumed, we were still able to conclude that when consuming roughly fifty carbohydrates at specific times prior to cardiovascular exercise that eating either two hours before the exercise session, or when fasting the largest increases in blood glucose would occur. Using our experiment we were able to identify a specific meal's effect on pre and post- exercise blood glucose levels. Similar experiments to this one are easy to administer and require only a few days to complete , given that all the data from the blood glucose monitors reads accurately.

Through the inclusion of eating at different times before exercise and by eating different amounts of carbohydrates following these bouts of exercise, a clear effect of food and exercises effects of blood glucose levels can be measured. Previous data concluded that with 2 bouts of low to moderate intensity yielded a lowering of blood glucose while fasting (1), and with higher intensity, the blood glucose raised significantly (2). Going forward, future studies could use similar meal times and similar carbohydrates intakes to measure the change to blood glucose levels before and after resistance training, opposed to cardiovascular training. By studying the effect that cardiovascular training has on blood glucose levels the ground work has been laid for future studies to look into the way that blood glucose levels are effected by other training modalities.

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