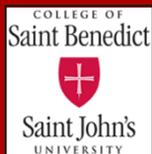


Carbohydrate-protein Drink Fails to Reduce Muscle Damage in Division III Racing CC Skiers



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Introduction

- Sport drinks that contain protein appear to reduce the muscle damage caused by exercise under experimental conditions; however, the effectiveness under actual race conditions is not known.
- **Purpose:** to determine whether a sport drink containing protein [Accelerade] consumed before/after a ski race reduces muscle soreness and/or damage as indicated by serum creatine kinase (CK) levels.



Methods

- Subjects were recruited from the men's and women's cross country ski teams. NCAA races [mostly 10 Ks] were scheduled over two weekends; there were 16 participants (M=9, F=7) the first weekend and 14 (M=9, F=5) the second weekend.
- Subjects engaged in their normal routine surrounding races; no attempt was made to intervene regarding the beverages selected before or after the races.
- Researchers analyzed dietary intakes for 4 hrs pre and post race using mypyramid.gov and recorded Accelerade consumption.
- CK was measured the day before each race weekend and 24-48 hrs post race to assess muscle damage. CK levels were measured using a colorimetric enzymatic assay [Bios Scientific]
- Surveys were completed after each race to evaluate GI distress, hunger, thirst, and soreness. Another survey was given 24 hours after each race weekend to assess delayed onset muscle soreness.

Acknowledgments

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Mean Serum Creatine Kinase Levels Pre and Post Race

	Mean Serum CK Pre-Race	Mean Serum CK Post-Race	Mean Change in Serum CK
No Accelerade N= 4	37.4 ± 10.8	109.8 ± 66.5	72.4 ± 56.5
Accelerade After Race N= 7	40.8 ± 22.5	93.7 ± 31.9	52.9 ± 31.9
Accelerade Before & After Race N= 16	45.5 ± 27.7	97.3 ± 57.5	51.8 ± 47.2

Survey Results

1 = no symptoms 5 = severe symptoms	Stomach	Hungry	Thirsty	RPE	Post Race Soreness	Delayed Soreness
No Accelerade	1.8 ± 1.3	3.2 ± 0.84	3.8 ± 0.45	4.4 ± 0.55	3.4 ± 0.89	3.0 ± 0.82
Accelerade After Race	2.0 ± 0.82	3.1 ± 0.90	4.0 ± 0.82	4.7 ± 0.49	3.9 ± 0.90	3.8 ± 0.98
Accelerade Before & After Race	2.5 ± 1.2	2.5 ± 1.36	3.3 ± 1.39	4.3 ± 0.86	3.7 ± 0.98	3.8 ± 0.75

Nutrition Summary of Participants Pre and Post Race

	Calories	Carbohydrate (g)	Protein (g)	Fat (g)	Fluid (oz)
Pre-Race	716 [310-1741]	124 [40-306]	23 [7-76]	14 [3- 29]	27 [4-41]
Post-Race	796 [250-1492]	121 [32-205]	28 [8-63]	19 [1-59]	31 [8-71]

Results

- Creatine kinase levels increased significantly for all skiers (pre to post) after both race weekends (p=0.009 and p=0.0001 respectively).
- However, there were no differences in CK levels [means or CK change (post-pre values)] between the Accelerade groups and the control (p= 0.46).
- There was no differences in gastro-intestinal distress, perceived exertion, post-race soreness, and 24-48 hr soreness between the groups.

Discussion

- Accelerade did not reduce muscle damage in this study.
- Participants were in actual race conditions and allowed to eat and drink ad lib.
- Participants ate before and after the races; protein foods may have prevented muscle damage in a similar to Accelerade.
- The time to complete a 10k race may not be sufficient to induce significant muscle damage as our post race CK values are fairly low.

Limitations

- The study was not double blind & subjects were free to choose beverages.
- Participants who were expected to be in the control group ultimately chose to drink Accelerade; consequently the control group became very small, n = 4.

Conclusions

- Accelerade did not appear to confer any advantages or disadvantages under actual race conditions of ~10 K distances in this study.
- Consuming sufficient amounts of dietary protein before and after exercise appears to minimize muscle damage.