

Short Commentry

Can an Intake of 120g of CHO/h Reduce Neuromuscular Fatigue and Improve Long-Term Recovery in Ultra-Resistance Events?

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Justification

The development of a trail marathon race involves facing multiple obstacles, some of which are: physiological-depletion of muscle glycogen, dehydration-, motivational, others such as climatic and topographical conditions. All these factors make it essential that a nutritional strategy should be considered according to the event and the level of training and/or experience. Also one of the aspects that should be considered in the strategy is the possibility of mitigating the effect of a mountain marathon on neuromuscular fatigue. Several authors have demonstrated the relevance of carbohydrate (CHO) consumption in endurance sports [1,2]. In the case of neuromuscular function it has been shown that its consumption delays neuromuscular fatigue and consequently improves working capacity, recovery times [1,3]. Research has shown the relevance of adequate CHO consumption and as this has a favorable impact on recovery times, resulting in early incorporation into workouts due to decreased fatigue and reduced muscle damage.

Objective

The authors sought to determine whether CHO's 120g/h intake could reduce neuromuscular fatigue through the assessment of the internal burden of exercise, neuromuscular function was through Abalakov jumps, aerobic power testing and endurance tests. Such CHO consumption would be an improvement in long-term recovery. The study compared CHO consumption during a trail marathon race

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events (MED-90g/h), and regular intake of CHO by athletes during these races (LOW 60g/h).

Participants and experimental protocol

The study involved 26 male athletes with 5 years in ultramarathon (2 world champions). These athletes were randomly distributed in all three groups (HIGHER-9; MED-9; LOW 8). The methodology selected to evaluate neuromuscular function was by means of Abalakov jumps and aerobic power test resistance tests. This compared the pre- and post-race times for the three experimental groups. The mountain marathon was held in Oiartzun (Guipúzcoa-Spain) (10°C, 60% humidity).

Results

The most outstanding results that answer the question of the relevance of an intake of 120g CHO/h in the internal load of the exercise after the completion of a mountain marathon. On the one hand, a higher internal exercise load was recorded in groups with a LOW and MED intake compared to the HIGH group. Similarly, some variables such as Abalakov jump time (ABK_{JT}), Abalakov jump height (ABK_H), half-squat test 1 repetition maximum (HST_{IRM}) between prior to the trail marathon race (T1) and before (T2) showed a significant difference in the LOW and MED groups but not in the HIGH group. Also in the tests of in ABK_{JT} ($p = 0.038$), ABK_H ($p = 0.038$) HST_{IRM} ($p = 0.041$), internal exercise load using individualized training impulse (TRIMP) and lactate ($p = 0.012$) within the aerobic power-capacity test had greater differences in LOW and MED, compared to the HIGH.

Discussion

The objective of the study was to analyze the impact of an intake of 120g CHO/h during amountain marathon and determine how it influences neuromuscular fatigue. In the discussion the authors raised the relevance of neuromuscular fatigue in the development and subsequent recovery of a long-lasting endurance event. While the study was conducted on elite athletes it is known that neuromuscular fatigue is this central or peripheral is common denominator in sport, hence the relevance of the application of an intake protocol of 120g/h. The causes of fatigue are multifactorial [4], while it can be central or peripheral. One of the main consequences in athletes is that it decreases performance and/or hinders the recovery process [5,6].

These cases include a negative energy balance, dehydration, decreased blood levels, muscle and liver glycogen depletion, as well as over-training. Keep in mind that these events take place on terrains that require greater physiological demand, particularly decreases where there is greater participation of eccentric force [7].

The highlights of the study are innovation for including an intake of 120g of CHO/h during a mountain marathon, as well as for developing it in elite athletes. Most studies do not incorporate athletes with professional experience, except for case studies. According to

the author's knowledge, no other studies have been recorded that have used a higher amount of CHO than the recommendations, at least in trail marathon runners.

Efforts should be made to replicate the study in less experienced athletes taking into account some points for this: Prior intestinal training and ensuring the correct execution of the Abalakov jumps to be performed by athletes.

Conclusion

An intake of 120g of CHO/h helps limit neuromuscular fatigue, as well as shortens post-exercise recovery after a 42km mountain marathon. It should be noted that the high intake of CHO has been well tolerated due to the intestinal training developed by athletes. The results can help with understanding the neuromuscular fatigue mechanism by ingesting 120g of CHO/h and determining its effects on decreased neuromuscular fatigue.

Importance of results

The importance of this study lies in the possibility of decreasing recovery times at the end of a long-lasting, high-intensity endurance exercise. In this way it is possible to perform numerous training sessions or compete with a shorter time between events.

One of the highlights of the study is the originality of the study, since according to the knowledge of the authors there are no studies that include 3 experimental groups, one of them consuming 120g CHO/h in a mountain marathon. Despite the limited number of runners, it should be noted that few studies have the possibility of including champions and/or professional athletes. International recommendations are usually made for elite athletes or with a high level of training, which is why being able to include these athletes in the study allows to establish intake comparisons with references made for the same target of athletes. One could only ask whether these findings can be applied to other areas not only at the sporting level but in pathologies that involve a decrease in neuromuscular function.

The study question is answered?

When asked: If it is possible that an intake of 120g CHO/h can reduce neuromuscular fatigue and consequently improve recovery in ultra-resistance events. The evidence presented by the article leaves no doubt, if feasible. This finding allows you to adjust training and nutritional plans without decreasing the intensity or number of weekly sessions. It also reduces the ailments associated with EIDM and thereby loss of performance in some cases reaching 65% [8].

The authors establish as one of the keys to success in implementing an intake greater than 90g CHO/h established as international recommendations for endurance exercises [9,10], is to perform an intestinal training consisting of an intake of more than 90g CHO/h twice a week for at least 4 weeks [11].

It only remains to replicate the results in other competitions and/or with amateur athletes to be able to claim that this intake offers benefits to athletes with previous intestinal training. The authors describe as a limiting the number of runners anyway it should be noted that among them we will find athletes with a prominent level of sports, with championship winners.

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