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Letter to the Editor

Comment on: "CrossFit and rhabdomyolysis: A case series of 11 patients presenting at a single academic institution"

We would like to congratulate Hopkins et al.[1] on their study, *CrossFit and rhabdomyolysis: A case series of 11 patients presenting at a single academic institution*. This is an extremely relevant research topic since participation in CrossFit has shown major growth worldwide. The findings are relevant to the field and will prompt further research on rhabdomyolysis related to exercise in which high volume and intensity predominate.

CrossFit® training has been shown to be effective for improvement of several physical fitness parameters and offers numerous health benefits, including enhanced cardiovascular/respiratory endurance, stamina, strength, flexibility, power and balance.[2,3] Due to its challenging and motivational nature, participation in CrossFit training has shown significant growth in both healthy and obese individuals, and is popular among the military and athletes.[4] The increase in participation has been accompanied by increased concern about injuries,[3] including rhabdomyolysis. However, we feel that the data presented by Hopkins et al. should be interpreted with caution.

Although the authors stated that further study on the subject is needed, they concluded that CrossFit participation poses significant risks to participants including exercise-induced rhabdomyolysis. However, they do not present a statistical basis for such a conclusion. The analysis was too limited to enable a conclusion about the risk of developing rhabdomyolysis due to CrossFit training. Furthermore, it is important to note that rhabdomyolysis induced by exercise is called exertional rhabdomyolysis.[5,6]

The authors do not report the number of patients with rhabdomyolysis unrelated to CrossFit training seen at their institution. Such data would allow calculation of the odds ratio for estimation of the risk of exertional rhabdomyolysis.[7]

As described by the authors,[1] exertional rhabdomyolysis is associated with factors other than high-intensity training alone, such as limited exercise experience, eccentric muscle contraction, hot environments, electrolyte imbalance, male sex, low protein diets, statin use, alcohol ingestion, and creatine supplementation. Evidence also suggests an association between the use of antidepressants and rhabdomyolysis.[8] In the Methods section, it is unclear whether patients who have used antidepressants or creatine supplements, for example, were excluded. This is an important question, since both can contribute to exertional rhabdomyolysis.[9,10]

The authors only report general injury percentages, and consider a 2.1% (11 of 523 patients) rate for exertional rhabdomyolysis due to CrossFit training to be significant and worrying. This value, as presented in Table 1, represents an uncommon injury in CrossFit practitioners. Although rhabdomyolysis is more serious than other injuries due to the possibility of life-threatening complications, we do not feel that the incidence is concerning. The incidence of exertional rhabdomyolysis in active populations and athletes is around 22.2 and 29.9 per 100,000 patients, respectively.[11,12] This study could also provide incidence rates, since it was performed for a defined period of time (from June 2010 to June 2016).

High-intensity functional training sessions (HIFT) characterized by high volume and intensity, such as CrossFit, may precipitate exertional rhabdomyolysis; however, this will depend on the training protocol (duration, intensity, type of exercise performed) and level of individual conditioning.[5]

Hopkins et al. also express concern about an increase in the incidence of injuries caused by the growth of CrossFit participation; however, most of the literature indicates that the prevalence and incidence of injuries in CrossFit practitioners are similar to those associated with several other sports and exercise modalities.[3,5,13–15] Moreover, the authors presented an average injury rate of about 19%, based on data from a reference that is no longer available (News.com.au. What CrossFit doesn't want you to know, 2013); these data relativizes the authors' conclusion regarding injuries in general. In our systematic review[14] (search performed in May 2017) on CrossFit training injuries, we analyzed 10 studies; however, we are now aware of at least 8 more studies on this topic, including that by Hopkins et al.

Although we questioned some aspects of the study by Hopkins et al., the authors' work was very important, and we acknowledge the contribution to the field. This work has merit because only case reports regarding exertional rhabdomyolysis have been published to date; this was the first documented case series on the subject. We hope to contribute to further understanding of this subject, through further research.

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