

Prevalence and Incidence Rates Are Not the Same: Response

Authors' Response:

In our recent paper titled "Injury Rate and Patterns Among CrossFit Athletes," the use of the term *injury rate* was questioned. Specifically, the reader queried whether our use of the term referred to incidence or prevalence. We appreciate the reader's thoughtful comments and agree that this point deserves further clarification.

In our study, we described *injury rate* as a measure of prevalence, not incidence, since we did not report exposure hours. The ratio we reported was that of subjects with a new injury divided by the total number of subjects over a specified period of calendar time (6 months). As pointed out, this is not an incidence rate, but rather a prevalence rate. To be considered an incidence rate, the numerator would be the total number of injuries and the denominator would be total exposure time of CrossFit. Although this is not the typical means of reporting injury rate in sports, it is clear in our paper how we define injury rate, and it has been reported similarly in other sports studies.⁶

We initially decided to not report injury rate in terms of exposure hours for several reasons. Because our survey collected data at a single point in time, we were unclear whether the participant was reporting time before or after the injury, which could lead to either an underestimate or overestimate of training time. Secondly, the variables we collected to calculate exposure were recorded in categories (time per session and number of sessions per week) and therefore are naturally imprecise. Lastly, these represented averages over time and were therefore subject to recall bias. While recalling whether the participant sustained an injury is also subject to recall bias, studies have shown that athletes are quite accurate when recalling whether they sustained an injury over a 12-month time period.² Therefore, if we were to report our injury statistics in terms of injuries per exposure it would be subject to greater recall bias, and we would be less certain of its accuracy. Despite these limitations however, we believe that Dr Feito brings up a legitimate point. We would like to provide future readers with the ability to compare CrossFit to other sports both in terms of prevalence and incidence rates. In order to address this issue further, we decided to report the injury rate we discovered in this study in terms of exposure hours below. This will hopefully help to provide a clearer and more effective means of comparing injury rate in CrossFit to other sports.

For the 386 participants that we included in the study, we found that average (\pm SD) participation over the 6-month

period was 5.5 ± 1.2 months, average training time was 4.0 ± 1.1 days, and average length of training session was 59.0 ± 14.2 minutes. When all of the individual exposure hours were added together, it yielded an exposure time of 36,928.7 hours. With a total of 89 injuries, this resulted in 2.4 injuries per 1000 hours of CrossFit. This figure is slightly less than what other studies have reported on CrossFit of 3.1 per 1000 hours.³ In comparison, it is higher than less metabolically stressful activities such as walking, cycling to work, gardening, home repair, hunting and fishing, golf, dancing, swimming, walking, and rowing, which have reported injury rates of 0.19 to 1.5 per 1000 hours. However it is lower than the exposure times for contact or team sports such as squash, judo, wrestling, karate, basketball, soccer, ice hockey, and volleyball, which have reported injury rates of 6.6 to 18.3 per 1000 hours.⁵ To compare our results to running, one study showed an injury rate of 2.4 per 1000 hours in long-distance/marathon runners and about double that in sprinters and middle-distance runners (5.6 to 5.8 per 1000 hours), although the numbers on these specific sports can vary greatly depending on the study (2.5-12.1 per 1000 hours).^{4,7} The injury rate in CrossFit is equivalent to that seen during training periods of triathletes, which reported an average injury rate of 2.5 per 1000 hours.¹ We can establish 3 conclusions from these comparisons, although these are limited considering the different methodologies and populations of each separate study. Participating in CrossFit puts individuals at a higher risk of injury than they would be if they never began exercising or participated in only low-impact exercises. It seems to be less than or relatively equivalent, depending upon the source, to running or triathlon training, which are two commonly pursued recreational activities. Finally, it is significantly less than what is observed in contact or team sports.

The primary goal of our study was to identify and accurately record if injuries occur in CrossFit, and we believe these additional data support that point. It is logical that participants will be at a higher risk of injury given that increased activity inherently will put an individual at increased risk of injury. Although this seems to be less than what is observed in other commonly pursued recreational sports, it does not imply that there is no room for improvement of the program. Therefore, we focused on identifying risk factors and their relationships with specific injury patterns. Once identified, associations could then be further scrutinized and injury prevention strategies could be implemented and subsequently studied.

Again, we would like to thank the reader for their inquiry and allowing us to clarify this issue. We agree that in the paper we report injury prevalence rate, not incidence rates. We hope that by reporting incidence rates in this response we enable future readers to better interpret our results.

Brian Giordano, MD
Benjamin Weisenthal, BA
Rochester, New York, USA

Address correspondence to Brian Giordano, MD (e-mail: brian_giordano@urmc.rochester.edu).

The authors declared that they have no conflicts of interest in the authorship and publication of this contribution.

REFERENCES

1. Burns J, Keenan A, Redmond A. Factors associated with triathlon-related overuse injuries. *J Orthop Sports Phys Ther.* 2003;4(33):174-184.
2. Gabbe BJ, Finch CF, Bennel KL, et al. How valid is a self reported 12 month sports injury history?. *Br J Sports Med.* 2003;37:545-547.
3. Hak PT, Hodzovic E, Hickey B. The nature and prevalence of injury during CrossFit training [published online November 22, 2013]. *J Strength Cond Res.* doi:10.1519/JSC.0000000000000318.
4. Lysholm J, Wiklander J. Injuries in runners. *Am J Sports Med.* 1987;15:168-171.
5. Parkkari J, Kannus P, Natri A, et al. Active living and injury risk. *Int J Sports Med.* 2004;25:209-216.
6. Taunton JE, Ryan MB, Clement DB, et al. A prospective study of running injuries: the Vancouver Sun Run "In Training" clinics. *Br J Sports Med.* 2003;37:239-244.
7. van Mechelen W. Running injuries. A review of the epidemiological literature. *Sports Med.* 1992;14:320-335.