The effectiveness of crossfit and hift practices

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High intensity functional training uses functional exercises often combined with aerobic exercises to create a high-intensity, whole-body training session that challenges multiple systems in the body at once.

One study to date has assessed the oxidative stress that is generated by a popular session of HIFT, derived from CrossFit, by comparing 20 minutes of high intensity running at 90% of maximum heart rate with the WOD known as “ Cindy” (as many rounds as possible of 5 pull-ups, 10 push ups, and 15 body weight squats in 20 minutes). By examining blood markers of oxidative stress, and the heart rate and lactate responses to the HIFT session, the authors concluded that both sessions provided a similar and very high level of metabolic stress. These findings corroborate other research studies regarding the high aerobic demand placed on individuals performing CrossFit workouts and collectively suggest that CrossFit training may produce a training stress similar in nature to a bout of endurance training. What is surprising about the study of Klisczewicz and colleagues (2015), is that even though such activities are commonly employed in many HIFT sessions, the workout used by the authors consisted of only bodyweight exercises. It is possible then, that sessions that utilize short, intense aerobic intervals or explosive exercises can have an even greater impact on the athlete’s aerobic performance. Previous studies have demonstrated that high intensity interval training and heavy resistance training significantly enhance endurance performance, by improving power, running economy, and even VO2max.

Considering the results in these studies, and the fact that HIFT has the potential to elicit a similar stress even when no traditional aerobic exercise is

performed, it is possible that improvements in endurance markers, such as VO2max, maximum power, anaerobic threshold and economy can occur with HIFT. Just as important, Crawford et al (2018) noted that CrossFit training sessions in healthy, untrained individuals led to significant improvements in aerobic capacity, anaerobic capacity, maximal strength, and work capacity, measured as the required time to complete a pre-determined workout. As noted by the authors, improvements in work capacity are likely the largest changes that can occur with HIFT sessions. The functional tasks performed during the sessions challenge the integration and efficiency of different body systems and these combined stimuli may force a more efficient system integration to perform work, leading to what the authors called “ economy of effort”. Such improvements would probably involve a change of energy utilization in the body, with a shift towards greater reliance on aerobic metabolism during tasks that would be predominantly anaerobic in nature. While further studies are required to prove this hypothesis, HIFT has the potential to increase general athletic ability through an improvement in multiple fitness domains.

In addition to the positive effects on aerobic fitness and work capacity, the intense nature of weightlifting exercises performed as part of a HIFT session can also lead to improvements in strength and power. De Sousa et al (2016) have examined the differences in fitness between recreational CrossFit participants and resistance-trained individuals, who were required to have at least 1 year of training experience and a current training frequency of at least 2 – 3 sessions per week. No differences were found for body mass or body composition, and as would be expected, the CrossFit participants

obtained higher scores in the tests associated with aerobic performance, having a greater final speed on the shuttle run test (13. 31 vs 12. 08) and a higher VO2max (52. 54 vs 45. 98 ml. kg. min-1). Both groups outperformed the average results for male individuals of similar age in the pull-up test, with no differences between them found for the maximum number of repetitions performed and achieved counter-movement jump scores that resembled that of soccer players, with the results slightly favoring the CrossFit group.

Although the authors recommend caution when interpreting these results, given the cross-sectional design of the study, it is suggested that CrossFit training could be as effective as traditional resistance training in improving strength, power, and muscular endurance in this population, while still having a significant effect of aerobic fitness. While much controversy still exists as to the role of an interference effect when strength and endurance training are performed concomitantly in the same training program, these results support the hypothesis that such interference effect might not occur, particularly when training frequency is low (2 to 3 sessions per week). These results provide further support for the argument that HIFT could provide a time-efficient strategy to concomitantly develop muscular and metabolic adaptations that could lead to improved performance.

Another positive of HIFT is that sessions can be manipulated in multiple ways to develop specific fitness components, with characteristics such as resistance training experience and athletes’ fitness level playing a role in the adaptations that will be elicited by the session. When comparing the

relationship between aerobic capacity, anaerobic peak power and experience to two different CrossFit sessions in naïve and experienced CrossFit participants, Bellar et al (2015) found significant differences between the two groups. The WODs consisted of either an AMRAP (as many rounds as possible in 12 minutes of medicine ball throws, kettlebell swings, and burpee pull-ups), or three exercises – sumo deadlift high pull, box jumps, and farmers walk (21-15-9 reps, with all repetitions of each exercise being performed before participants could move on the next). The AMRAP session had a higher association with VO2max for both groups, which could mean that sessions programmed in such way are more likely to lead to aerobic improvements. The second WOD, however, only had a significant relation with VO2max for the experienced participants. The authors hypothesized that the presence of more technically demanding exercises may prove to be a limiting factor when the goal is a high level of metabolic stress, particularly for naïve participants. Therefore, similar to traditional resistance training programs, coaches and practitioners can build their training sessions in ways that would stimulate the precise adaptations that are desired at each specific phase of the training periodization. In doing so, it is important that coaches consider the amount of fatigue that will be generated by each workout so that they can ensure adequate recovery between training sessions.

When investigating the effect of three distinct CrossFit sessions, Mate-Munoz et al (2017) had sessions designed according to the three WOD profiles seen in CrossFit: a metabolic (M), a gymnastics (G), and a weightlifting (W) session, and found that gymnastics and weightlifting sessions had a greater

impact on muscular fatigue. The three sessions had a post exercise blood lactate concentration of 11. 79, 10. 15, and 11. 24 mmol, respectively, confirming the high level of metabolic stress experienced in each. However, impairments in neuromuscular performance were greater for the G and W sessions only. It is possible that the lack of observed muscle fatigue at the end of the metabolic conditioning session was due to the nature of the WOD, which consisted of a round of a Tabata interval (4 minutes of total work, performed as 8 sets of 20-second intervals with 10 seconds of recovery between each), using a jump rope to perform what is called “ double-unders”.

Still, it appears that the type of session can influence not only the adaptations that will be triggered, but also the quality of training on the subsequent days as well, as a large amount of fatigue can be seen after different types of HIFT sessions.