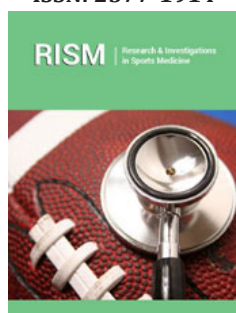


# Further Defining High-Intensity, Multimodal Exercises, and Functional Training as Part of the Working Definition for High-Intensity Functional Training

ISSN: 2577-1914



**\*1Corresponding author:** Joshua Dexheimer D, Department of Kinesiology, Azusa, CA 91702, USA

**Submission:**  July 22, 2019

**Published:**  August 13, 2019

Volume 5 - Issue 1

**How to cite this article:** Joshua D. Dexheimer, Further Defining High-Intensity, Multimodal Exercises, and Functional Training as Part of the Working Definition for High-Intensity Functional Training, *Res Inves Sports Med.* 5(1). RISM.000605.2019.  
DOI: [10.31031/RISM.2019.05.000605](https://doi.org/10.31031/RISM.2019.05.000605)

**Copyright@** Joshua Dexheimer D, This article is distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use and redistribution provided that the original author and source are credited.

**Joshua D. Dexheimer\***

Department of Kinesiology, Azusa Pacific University, USA

---

## Introduction

A working definition of High-Intensity Functional Training (HIFT) has been provided stating that, “[HIFT] is a training style (or program) that incorporates functional, multimodal movements, performed at a relatively high intensity, and designed to improve parameters of general physical fitness and performance” [1]. This working definition has initiated a starting point to more clearly describe this new exercise training program and has provided a platform for those in the field to build upon. However, this definition leaves much room for questions and interpretation. For instance, what is “relatively high-intensity”? Multimodal has been used in the description of aerobic training as well as improving golf performance and requires further clarification as it relates to HIFT [2,3]. Lastly, functional training and functional exercise or movements have been used within the literature with no clear definition or distinction between functional training and functional exercises [4,5]. Therefore, it is important to further support the working definition by quantifying HIFT intensity as well as provide perspectives on the use of the terms multimodal and functional as they relate to training and exercise.

## Quantifying High-Intensity Functional Training

Exercise intensities have previously been quantified for both cardiorespiratory endurance exercise and resistance training [6]. Though, no quantification of high-intensity has been provided for HIFT. HIFT has been described as taking an autonomous approach placed on the athlete or coach to make the movements or combination of movements intense by pace, load, reps or some combination [1,7,8]. However, in order to be considered high-intensity training, workouts must meet already accepted high or vigorous intensities [6]. Previous studies have quantified physiological responses to various HIFT workouts (displayed in Table 1) and may provide quantifiable support for HIFT being high-intensity exercise. Cardiovascular and metabolic variables, as well as subjective perceived exertion displayed in Table 1, quantitatively define HIFT as high-intensity as performance across multiple workouts yielded values within the classification of vigorous intensity [6]. This evidence supports that HIFT may provide an environment in which people autonomously exercise at a high-intensity.

**Table 1:** Intensity of HIFT workouts.

	HRav (bpm)	VO <sub>2</sub> av (ml/kg/min)	%HRmax	%VO <sub>2</sub> max	RPE	METs
Fran [9]	179.0 ± 8.4	29.1 ± 1.1	95.4 ± 3.0	56.7 ± 6.2	X	~8.31
Fran [10]	159 ± 10.62	44.5 ± 8.3	88.0 ± 6.45	79.5 ± 12.1	~15**	~10.9
Fran [11]	176 ± 6	X	91 ± 4%	X	~9*	X
Cindy [9]	182.2 ± 6.6	34.4 ± 3.5	97.4 ± 2.4	66.2 ± 4.8	X	~9.83
Cindy [12]	170.8 ± 13.5	33.5 ± 5.5	91 ± 4.2%	63.8 ± 12.3	X	~9.5
Cindy [13]	174.1 ± 2.6	X	~90.4%	X	~6*	X
Donkey Kong [10]	164.5 ± 10.03	34.5 ± 7.23	91.0 ± 4.55	84.5 ± 5.35	~17**	~11.6
Fight Gone Bad [11]	174 ± 3	X	90 ± 3%	X	~10*	X
Modified Rahoï [14]	X	37.0 ± 4.8	X	X	X	~10.6

Abbreviations: HRav: Average Heart Rate; VO<sub>2</sub>av: Average Oxygen Consumption; %HRmax: Percentage of Maximum Heart Rate, %VO<sub>2</sub>max: Percentage of Maximal Oxygen Consumption; RPE: Rate of Perceived Exertion; METs: Metabolic Equivalent

\*Note: Rate of Perceived Exertion Scale 0-10

\*\*Note: Rate of Perceived Exertion Scale 6-20

### Multimodal Exercises

As previously described, HIFT is a modality of training consisting of multimodal movements or exercises [1]. Mode is the way, manner, fashion, method, form, style, technique, approach, or procedure of something. Essentially, mode describes a type of treatment, training program, or exercise [15-17]. Multimodal exercise describes multiple types of exercise. Though, aerobic training also utilizes multimodal exercises consisting of rowing, running, and cycling; what differentiates HIFT multimodal exercises from others, like HIIT, is the multicomponent nature of HIFT [2].

HIFT aims to improve parameters of general physical fitness and performance [1]. General physical fitness is defined as, “a state of ability to perform sustained physical work characterized by an effective integration of cardiorespiratory endurance, strength, flexibility, coordination, and body composition” [18]. There are five health-related components of physical fitness: body composition, muscular strength, muscular endurance, flexibility, and cardiorespiratory fitness [19]. Unlike training programs, such as HIIT, which may only challenge a single component of physical fitness, HIFT challenges multiple components of physical fitness. This supports the definition that HIFT consists of multimodal movements/exercises which challenge multiple components of physical fitness to improve general physical fitness and performance.

### Functional Exercise and Training

No distinctly supported definition exists as to what comprises functional training and/or functional exercise within a healthy

population. Functional exercise is common within dependent populations in which functional capacity has been lost as functional incapacity refers to the inability to perform normal activities of living [5,20,21]. This indicates there must be a loss of function before there is functional exercise. However, this is not relevant to a healthy population participating in HIFT.

Functional exercises within HIFT are those that, “involve whole body, universal motor recruitment patterns in multiple planes of movement such as squats, deadlifts, cleans, snatches, pull-ups, vertical jumps, and more” [1,8,22,23]. This may provide a starting point in describing functional exercises, though, classifying some exercises as functional would imply others are non-functional. Also, the list of movements (and workouts in Table 1) lack multiplanar movements as they all occur along the sagittal plane lacking multiplanar movement. Lastly, it may be argued that some single joint exercises assist to maintain or improve human body function as well [24,25]. It may not be appropriate to classify exercises as functional as all exercise aims to improve or maintain human body function.

Though exercise may not be classified as functional, we may be able to distinguish training as “functional training” like aerobic and resistance training. While training and exercise are commonly used interchangeably, training is distinct from exercise in that training consists of undertaking a course of exercise and exercise is a subset of physical activity [26]. It may be postulated that what distinguishes functional training as “functional” is that it challenges multiple components of physical fitness. Functional training focuses on improving strength, flexibility,

coordination, spinal stability, and balance to improve functional capacity [5,27-29]. Superior levels in all components of physical fitness may provide optimal human body function. Given that HIFT utilizes multiple modes of exercise to improve general physical fitness (which consists of multiple components) it may be classified as functional training.

## Conclusion

In conclusion, evidence further substantiates as well clarifies the working definition for HIFT. Cardiovascular, metabolic, and perceived exertion values quantitatively corroborate the classification of HIFT as high-intensity. Upon further examination of the literature, a clearer description of the term multimodal has been provided and these multimodal exercises challenge multiple components of physical fitness. Lastly, upon further exploration of the term functional (as used in conjunction with training and exercise), it may not be appropriate to classify exercises as functional as we would then assume other exercises as non-functional. Though, it was substantiated that HIFT is functional training in that it focuses on multiple components of fitness. HIFT may be further described as a functional training program, consisting of multimodal exercises performed at a high-intensity, designed to challenge and improve multiple components of general physical fitness and performance.

## References

- Feito Y, Heinrich KM, Butcher SJ, Poston WSC (2018) High-intensity functional training (HIFT): Definition and research implications for improved fitness. *Sports* 6(3): 76.
- Gibson AL, Wagner D, Heyward V (2018) Advanced fitness assessment and exercise prescription. (8<sup>th</sup> edn), Human Kinetics pp. 1-560.
- Thompson CJ, Osness WH (2004) Effects of an 8-week multimodal exercise program on strength, flexibility, and golf performance in 55- to 79-year-old men. *Journal of aging and physical activity* 12(2): 144-156.
- Walker T, Lennemann LM, Anderson V, Lyons W, Zupan MF (2011) Adaptations to a new physical training program in the combat controller training pipeline. *Journal of Special Operations Medicine* 11(2): 37-44.
- Rosendahl E, Lindelöf N, Littbrand H, Yifter-Lindgren E, Lundin-Olsson L, et al. (2006) High-intensity functional exercise program and protein-enriched energy supplement for older persons dependent in activities of daily living: A randomised controlled trial. *Aust J Physiother* 52(2): 105-113.
- Garber C, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, et al. (2011) ACSM position stand. Cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc* 43(7): 1334-1359.
- Glassman G (2003) A theoretical template for crossfit's programming. *The Crossfit Journal* pp. 1-5.
- Heinrich KM, Patel PM, O'Neal JL, Heinrich BS (2014) High-intensity compared to moderate-intensity training for exercise initiation, enjoyment, adherence, and intentions: an intervention study. *BMC Public Health* 14(1): 789.
- Fernández JF, Solana RS, Moya D, Marin JMS, Ramón MM (2015) Acute Physiological responses during crossfit® workouts. *European Journal of Human Movement* 35: 114-124.
- Babiash PE (2013) Determining the energy expenditure and relative intensity of two crossfit workouts, University of Wisconsin, Madison, Wisconsin, USA.
- Tibana R, Nuno Manuel Frade De Sousa, Jonato Prestes, Fabrício Azevedo Voltarelli (2018) Lactate, heart rate and rating of perceived exertion responses to shorter and longer duration crossfit® training sessions. *Journal of Functional Morphology and Kinesiology* 3(4): 60.
- Kliszczewicz B, Snarr R, Esco M (2014) Metabolic and cardiovascular response to the crossfit workout "cindy": a pilot study. *Journal of Sport and Human Performance* 2(2): 1-9.
- Brupbacher G, Harder J, Faude O, Zahner L, Donath L, et al. (2014) Music in crossfit®-influence on performance, physiological, and psychological parameters. *Sports* 2(1): 14-23.
- Escobar KA, Morales J, Vandusseldorp TA (2017) Metabolic profile of a crossfit training bout. *Journal of Human Sport and Exercise* 12(4): 1248-1255.
- Sculthorpe NF, Herbert P, Grace F (2017) One session of high-intensity interval training (HIIT) every 5 days, improves muscle power but not static balance in lifelong sedentary ageing men: a randomized controlled trial. *Medicine* 96(6): e6040.
- Schuch FB, Morres ID, Ekkekakis P, Rosenbaum S, Stubbs B, et al. (2017) A critical review of exercise as a treatment for clinically depressed adults: time to get pragmatic. *Acta Neuropsychiatrica* 29(2): 65-71.
- Snoza CT, Berg KE, Slivka DR (2016) Comparison of  $VO_{2peak}$  and achievement of  $VO_{2peak}$  criteria in three modes of exercise in female triathletes. *Journal of Strength and Conditioning Research* 30(10): 2816-2822.
- Miller A, Grais IM, Winslow E, Kaminsky LA (1991) The definition of physical fitness. a definition to make it understandable to the laity. *The Journal of Sports Medicine and Physical Fitness* 31(4): 639.
- Medicine ACoS (2013) ACSM's health-related physical fitness assessment manual. Lippincott Williams & Wilkins, Philadelphia, Pennsylvania, USA.
- Toots A, Littbrand H, Lindelöf N, Wiklund R, Holmberg H, et al. (2016) Effects of a high-intensity functional exercise program on dependence in activities of daily living and balance in older adults with dementia. *Journal of the American Geriatrics Society* 64(1): 55-64.
- de Souza Santos CA, Dantas EEM, Moreira MHR (2011) Correlation of physical aptitude; functional capacity, corporal balance and quality of life (QOL) among elderly women submitted to a post-menopausal physical activities program. *Archives of Gerontology and Geriatrics* 53(3): 344-349.
- Heinrich KM, Spencer V, Fehl N, Poston WS (2012) Mission essential fitness: comparison of functional circuit training to traditional army physical training for active duty military. *Military medicine* 177(10): 1125-1130.
- Poston WS, Haddock CK, Heinrich KM, Jahnke SA, Jitnarin N, et al. (2016) Is high-intensity functional training (HIFT)/crossfit safe for military fitness training? *Military Medicine* 181(7): 627-637.
- Schenkman M, Hughes MA, Samsa G, Studenski S (1996) The relative importance of strength and balance in chair rise by functionally impaired older individuals. *Journal of the American Geriatrics Society* 44(12): 1441-1446.
- Carmeli E, Imam B, Merrick J (2012) The relationship of pre-sarcopenia (low muscle mass) and sarcopenia (loss of muscle strength) with functional decline in individuals with intellectual disability (ID). *Archives of Gerontology and Geriatrics* 55(1): p. 181-185.
- Caspersen CJ, Powell KE, Christenson GM (1985) Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep* 100(2): 126-131.
- Jørgensen MB, Andersen LL, Kirk N, Pedersen MT, Sjøgaard K, et al. (2010) Muscle activity during functional coordination training: implications for strength gain and rehabilitation. *The Journal of Strength & Conditioning Research* 24(7): 1732-1739.

28. Pacheco MM, Teixeira LA, Franchini E, Takito MY (2013) Functional vs. strength training in adults: specific needs define the best intervention. *International Journal of Sports Physical Therapy* 8(1): 34.
29. Thompson CJ, Cobb KM, Blackwell J (2007) Functional training improves club head speed and functional fitness in older golfers. *The Journal of Strength & Conditioning Research* 21(1): 131-137.

For possible submissions Click below:

[Submit Article](#)