

INVITED EDITORIAL

DO NON-RESPONDERS TO RESISTANCE TRAINING EXIST IN PROFESSIONAL SPORT?

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ABSTRACT

Resistance training (RT) is the most popular form of exercise that exerts several benefits (muscle hypertrophy and strength). Furthermore, we are witnessing several athletes competing at the highest level of their respective sport have undergone an enormous physical transformation. Nonetheless, lack of RT training, especially after a long detraining period, causes loss of muscle mass, and consequently, a decreased muscle strength, power, and lower muscle activation, and consequently, performance deterioration. In light of these facts, several authors recently have arisen the existence of responders and non-responders to RT. In order to improve athletic performance, the scientific community has tried to define the right RT method to be applied with athletes. In this regard, complex training compared to traditional training methods is reported to be a useful method providing superior benefits for improving athletic performance. With this editorial we encourage the research community to investigate this very interesting and complex matter, making the picture clearer and giving the opportunity to the athletic community to adjust RT programs based on the individual needs in order to maximize the outcome.

Keywords: Resistance training, performance hypertrophy, strength, exercise science.

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Resistance training (RT) is the most popular form of exercise that exerts several benefits (muscle hypertrophy and strength)⁽¹⁻⁴⁾. Furthermore, we are witnessing several athletes competing at the highest level of their respective sport have undergone an enormous physical transformation (increased muscle mass) (e.g., Bayern München soccer players). On the other hand, among the professional athletic community, some elite athletes demonstrate that the resistance training adaptations have not taken place properly (lack of muscle mass). Nonetheless, lack of RT training, especially after a long detraining period, causes loss of muscle mass, and consequently,

a decreased muscle strength, power, and lower muscle activation⁽⁵⁾, and consequently, performance deterioration. In fact, Stapley et al., (2020) reported that individuals adapt differently to RT, revealing individual differences in the magnitude of strength and muscle mass improvements. In light of these facts, the existence of responders and non-responders to RT has arisen^(4, 6).

In order to improve athletic performance, the scientific community has tried to define the right RT method to be applied with athletes. In this regard, complex training compared to traditional training methods is reported to be a useful method providing superior benefits for improving athletic performance. Indeed, studies have reported that complex

resistance training method improved jump, strength and sprint performance in athletes^(7,8).

Yet, it is up to science to bring into light the causing factors these individual RT adaptation differences. In this regard, the modification of RT programs has been already tested by adding single-joint exercises to multiple joint RT programs reporting some positive effect on skinfold reduction and arm circumference increment^(8,9). Additionally, based on the theory that different attentional foci could modify muscle activation, Paoli and his colleagues discovered that verbal instructions “to isolate a specific muscle” resulted in increased muscle activity⁽⁹⁾.

Moreover, with the increased use of technology in sport, velocity-based strength training is another method that has attracted interest from researchers and strength and conditioning professionals. Indeed, the use of velocity-based strength training, more specifically velocity zones, is reported to provide similar or greater RT adaptations and is suggested to be used as a training method instead of the traditional one repetition maximum percentage (%1RM) method to determine training loads⁽¹⁰⁾. Additionally, another factor that could hinder the RT adaptations is the failure to consume the right amount of macro and micronutrients, which roughly depends on the purpose that the athlete has set to achieve and the training phase⁽¹¹⁾. For example, according to Gentil et al. (2017) the amount of protein and carbohydrates that bodybuilders ingest varies between the bulking and cutting phase, highlighting the importance of the right nutrition strategy to achieving the highest results⁽¹²⁾.

In light of the abovementioned facts, the following concerns could be addressed: Do so-called non-responders train correctly using the right combination of RT methods; Do they manipulate the RT variables in the right manner; Do they lack proper nutrition and/or the right genetic makeup?

Finally, we encourage the research community to investigate this very interesting and complex matter, making the picture clearer and giving the opportunity to the athletic community to adjust RT programs based on the individual needs in order to maximize the outcome.

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