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Opinion

Recommendations for Measurement of Bodybuilding Internal Training Load by eTRIMP Method

Haniel Fernandes*

Nutrition Department, Estácio de Sá College, Fortaleza, Ceará, Brazil

Abstract

Currently, analysis of training data metrics has become increasingly important in characterizing high throughput. In fact, in bodybuilding, the RPE (rate of perceived exertion) assessment is the metric commonly used to calculate training volume. Therefore, this study demonstrates another way for bodybuilding athletes to evaluate their training through heart rate using the TRIMP (training impulse) method proposed by Edwards to analyze the intensity of a given training model. For this athlete, it is important to stay most of the time outside heart rate zone 1, not have more than 10% of total training time in zone 5 and contain the largest proportion of total training time in zones 2, 3 and 4.

More Information

***Address for correspondence:**
Haniel Fernandes, Nutrition Department, Estácio de Sá College, Fortaleza, Ceará, Brazil,
Email: Haniel_fernandes@hotmail.com

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Introduction

The amount of weight used in training, the number of repetitions of the sets performed, and the evaluation of the session's perceived effort rate (session RPE) using Borg's CR-10 subjective scale, are already commonly used among endurance athletes to measure external and internal load, respectively [1]. It is interesting to know another method capable of quantifying the internal load of bodybuilding training through heart rate zones. Therefore, pulse monitors have been considered common to the public and scientifically validated as having good heart rate accuracy [2].

From that, the methods that use the training heart rate zone to evaluate internal load are called training impulses (TRIMP). Edward proposed eTRIMP method which the ITL (internal training load) result is determines by measuring a product of the accumulated training duration in minutes of 5 HR (heart rate) zones by a coefficient related to each zone (50% to 60% of HRmax x 1; 60% to 70% of HRmax x 2; 70% to 80% of HRmax x 3; 80% to 90% of HRmax x 4; and 90% - 100% of HRmax x 5), a model which has a relationship moderate to large between measures of training load [3].

The result is obtained in arbitrary units (AU), the unit that determines the total quantification of the internal load by this method. It is interesting to comment that bodybuilding uses periodization of training using muscle groups, often distinct, and the interaction of internal training load assessed by heart rate and session-RPE tends to be linear [4].

However, good communication is crucial for all stakeholders to attain a common understanding of the data and can optimize the evaluation and prescription of training. Thus, how internal and planned external measures of intensity cannot be used interchangeably to monitor training [5], a recommendation to evaluate the magnitudes of internal training loads inherent to bodybuilding is important to help athletes, non-athletes, and coaches, to understand whether training may result in internal loads highs based on measurement by eTRIMP method.

Discussion

Strong correlations have been detected, especially between parameters of total activity volume and internal load parameters HR-indices and RPE or session-RPE [5], in endurance and resistance athletes, showing that changes in HR registered during intermittent or gradually increasing load conditions could be evaluated using the TRIMP method for both types of activities based on the total training time, obtaining the time in each heart rate zone.

This way, a recent article brought a discussion on training zones in internal load analysis in athletes, where a significant interaction was observed in the relationship between training load and training intensity distribution for the eTRIMP model [6]. Therefore, in a mathematical way, the time in each zone as proposed by the eTRIMP method can determine the total ITL (internal training load) in AU (arbitrary units) of the training.

Table 1: Recommendations for understanding the optimal measurement of bodybuilding internal training load by eTRIMP method for athletes, non-athletes and coaches.

Zone 1	Zone 2, 3 and 4	Zone 5
Must contain a lower rate of training time (< 50% of total time).	They must comprise the remaining portion of the time (40% of the time).	Must contain less than 10% of the total training time.
Training above 50% may not be effective in increasing performance or muscle hypertrophy.	For greater internal loads, a greater rate of time in zones 3 and 4.	Training above 10% can lead to a risk of injury, increased fatigue, and overtraining.
Increased by high rest time between sets, few loads, and/or repetitions.	Interesting time range for adequate intensities and optimization of muscle hypertrophy.	Hardly achieved in bodybuilding training.

From this number it can be assessed: i) whether the load of this training was low, moderate, or high; ii) if the load of this training was greater or lesser than the load of the last training.

Practically speaking, if a bodybuilding athlete performs biceps and triceps training in 60 minutes, with 40 minutes in zone 1 and 20 minutes in zone 2, there is a load of 80 UA by the eTRIMP method (40x1 + 20x2). However, if this same individual performs the same model training in the next week but their result is 50 minutes in zone 1 and 10 minutes in zone 2, there is a load of 70 UA (50x1 + 10x2), the training had less internal load by eTRIMP method. Although a longer time in larger HR zones can be decisive for increasing the total internal training load, training more than 10% above 90% maximum HR can lead to a risk of injury, increased fatigue, and overtraining [7].

These findings may make the individual make greater efforts to adjust rest time and the volume of training sets and repetitions, besides avoiding passing more time in the highest zones (> 90% maximum HR) to evite harm recovery from training. On the other hand, longer time rates in low-intensity zones (< 50% maximum HR) may demonstrate a low internal training load.

Conclusion

In summary, the assessment of bodybuilding internal training load (ITL) using the eTRIMP method can be commonly and easily used by athletes, non-athletes, and coaches, to assess training loads based on comparison to past and future training loads. In Table 1, recommendations are provided for athletes, non-athletes, and coaches, on how to understand the optimal measurement of bodybuilding internal training load by the eTRIMP method.

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