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Paulo Gentil, James Steele, James Fisher

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Why intensity is not a bad word - benefits and practical aspects of high effort resistance training to the older

Paulo Gentil[1], James Steele[2], James Fisher[2]

1 – College of Physical Education and Dance, Federal University of Goias, Goiânia, GO, Brazil.

2 – School of Sport, Health, and Social Sciences, Southampton Solent University, United Kingdom.

Corresponding author:

Paulo Gentil

FEFD - Faculdade de Educação Física e Dança

Universidade Federal de Goiás - UFG

Campus Samambaia

Avenida Esperança s/n, Campus Samambaia- CEP: 74.690-900

Goiânia - Goiás - Brasil

Phone/Fax: +55 062 3521-1105

Email: paulogentil@hotmail.com

Dear Editor,

We would like to congratulate Hunter et al. [1] for their excellent work. If we may, we would like to further this discussion in order to clarify issues regarding practical aspects of high effort[1] resistance training (RT) for older people.

Ageing is associated with a decrease in protein synthesis, specially type II fibers [2]; however, although the fractional rate of muscle protein synthesis is lower in the elderly than in the young, it increases to a comparable rate in both age groups in response to high effort RT [3]. Therefore, muscle mass and functional performance do not seem to be an inevitable effect of ageing, but rather a consequence of refraining from high effort physical activities. In agreement with this, Candow et al. [4] reported that 22 weeks of high effort RT eliminates age-related deficits in muscle mass and strength in older (60-71 years) when compared to young males (18-31 years). Other studies showed that when older and younger people are submitted to the same RT program, they show similar increases in muscle size [5] and that load progression and strength increases are similar among young and older men and women [6, 7]. The article by Hunter et al. supports this evidences and makes us question if the limited response by the elderly to RT seen in many cases may originate from over precaution in prescription of intensity of effort and the underestimation of their adaptive capacity, reinforced by physical activity guidelines for this population. For example, where RT has been implemented using a low effort prescription no significant improvements in any outcome measures occurred compared with a non-training control group [8]. Contrastingly, we have recently reported significant improvements in strength and body composition over a 6 months supervised RT intervention employing progressive introduction of higher efforts [9]

The importance of effort is not limited to muscle strength and hypertrophy. For example, Izumiya et al. showed that the activation of Akt partially reversed the negative effects of overfeeding in rats, including reductions in liver fat, adipocyte atrophy and improved glycemic control [10]. Considering that the activation of the mTOR axis may be related to type II fiber activation, and thus based upon Henneman's size principle high motor efforts, it seems there are three important practical methods to achieve this:

[1] We note that the term 'effort' is favoured here in place of 'intensity' to avoid the confusion that this can cause particularly with respect to resistance training (Steele, 2014)
Steele J. *Intensity*; in-ten-si-ty; *noun*. 1. Often used ambiguously within resistance training. 2. Is it time to drop the term altogether? Br J Sports Med. 2014;48(22):1586-1588

using heavy relative loads, performing exercises at high velocity, and training to momentary failure. Interestingly, Ibanez et al. [11] reported reductions in body fat and increases in insulin sensitivity in older people with type 2 diabetes performing high effort RT, even with an increase in caloric intake. Moreover, previous studies from Paoli et al. [12, 13] showed concomitant reductions in body fat, increases in muscle mass and improvements in health parameters in response to high effort RT in older participants, without alterations in dietary habits.

Therefore, it is our opinion that the article by Hunter et al. [1] presents an important message that should be considered by practitioners in order to help older people to improve their health through high effort RT. Whilst adherence and engagement present a challenge, we have demonstrated that it is possible to successfully apply progressive introduction of higher effort RT in this population [9]. Possibly the greater challenge though would be to combine efficiency and safety, especially because ageing is associated with joint instability and a greater incidence of cardiovascular problems such as arterial hypertension. In this regard, it might be wise to avoid the performance of multiple sets and a high number of repetitions, since both seem to be associated with higher cardiovascular stress [14-17]. Here, again, 'intensity' of effort may not be a bad word, but volume may be.

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