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LETTER TO THE EDITOR

Comment on "Influence of Resistance Training Proximity-to-Failure on Skeletal Muscle Hypertrophy: A Systematic Review with Meta-analysis"

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Dear Editor,

We read the recent article by Refalo et al. [1] and congratulate the authors on their discussion about the influence of resistance training (RT) performed to set failure versus non-failure on muscle hypertrophy. This discussion is relevant to coaches, athletes, and the general population aiming at improving neuromuscular function, health, and aesthetics. However, we would like to raise issues about the sample size, volume load (VL) reported, studies included, and the generalized recommendations of the findings.

Regarding studies included, as stated in Sect. 2.4 of their article [1], it was required that "(…) participants were randomized to experimental groups." Methodological quality assessment was assessed by the TESTEX scale, which awards one point in randomization criteria for "studies that stipulate the method of randomization" [2]. However, some studies included in the analysis [3–6] did not clearly describe the methods used to determine the allocation process. Additionally, five studies included in their review [1] were not randomized in a classical fashion, using instead intra-individual randomization designs—where each participant's leg was allocated to a different intervention group [3–5, 7, 8]. Allocating both legs of a subject is characterized as a form of clustering, implying dependence between the analyzed groups that can affect meta-analysis results if not treated accordingly [9]. This treatment was done by the authors in an elegant fashion, but we felt a lack of transparency regarding the design of the papers included in the review. Specifically, the only way to find out which studies had intra- or inter-group designs was to read them one by one, since this particularity was not clearly stated by the authors anywhere in the results description, as would be recommended [10].

In Table 2 of their article [1], the authors reported the sample size of the studies. Unfortunately, there is an error when describing two studies [4, 11]. Due to dropouts, the final sample sizes were 38 [11] and 27 [4], not 41 and 32 individuals, respectively. If these wrong sample sizes were used for the effect size calculations, this error may have influenced the results of the meta-analysis.

The sub-analysis of the possible impact of the VL was conducted on the basis of the VL reported in the articles (see Table 3 of their article [1]). Therefore, contrary to the author's claim, three [5, 12, 13] of the nine studies included did not report the metric (i.e., VL), but the number of sets and repetitions only. The inclusion of these studies may have impacted on the sub-analysis of VL moderator effect.

In Sect. 4.1.1 of their article [1], the authors claim that the equalization of VL would be unnecessary, and that set volume would have a more potent effect on muscle hypertrophy. Unfortunately, the cited study does not support this general conclusion, since it is a systematic review conducted with young trained individuals only [14]. Otherwise, seven [4–6, 8, 11, 13, 15] of the nine studies included in the sub-analysis of VL moderator effect [1] were conducted with untrained individuals, with one study investigating older individuals [11]. Additionally, due to the set volume prescribed being lower than those achieved with practice, the authors state that the effect of VL as moderator variable would be limited.

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However, the cited study [16] to support this statement was conducted with professional bodybuilders, a population that may be performing a greater VL than untrained individuals. Similarly, the authors also recommended that future research should employ set volumes that reflect current scientific guidelines for best practice [17]; however, the cited study investigated young trained participants only.

Due to the expected differences in muscle hypertrophy responses observed between trained, untrained [18], and also young and older participants [19], we believe that some of the references cited by Refalo et al. [1] do not support the overall statements and conclusions. Therefore, we recommend caution concerning the findings and recommendations of their meta-analysis to generalized populations (e.g., trained, untrained, young, or older individuals). We hope that the authors receive our comments and suggestions from a constructive point of view. They were presented to improve discussions around the theme.

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Declarations

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Conflict of Interest Pedro A. B. Fonseca, Bernardo N. Ide, Eric Pascher, and Gustavo R. Mota have no potential conflicts of interest in relation to the content of this letter.

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