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## Correspondence

### Reply to “Muscular static strength test performance and health: absolute or relative values?”

### Resposta a “Desempenho do teste de força muscular estática e saúde: valores relativos ou absolutos?”

Dear Editor,

We carefully analyzed Prestes & Tibana's comments in the correspondence entitled “Muscular static strength test performance and health: absolute or relative values?”, and we appreciate the interest in our work, as well as the possibility of engaging in academic dialogue.

Initially, Prestes & Tibana stated the objective and part of the results of our article. They describe the significant differences between hypertensive and normotensive patients, the main theme of the publication. Hypertensive patients presented higher average values compared to normotensive patients for the following variables: body mass (BM); body mass index (BMI); waist circumference; age; and systolic, diastolic, and average blood pressure. However, the same comparison did not present a statistically significant difference in performances in static, right-hand and left-hand grip, lumbar, and scapular strength tests.<sup>1</sup>

Prestes & Tibana indicate the importance of adjusting the static muscle strength, dividing its (absolute) result by BM, relating the muscular strength results to BM (relative static muscular strength [RSMS]). Conversely, this adjustment in our article curiously favors normotensive patients, as, because they show lower BM, they present more relative static muscular strength.

The following discussions were based on the studies referred to by Prestes & Tibana. Each of them has its brief description presented separately, using the points deemed most important.

The objective of the article “Avaliação da pressão arterial em mulheres sedentárias e sua relação com a força muscular” [Evaluation of sedentary women's blood pressure and its relation to muscle strength]<sup>2</sup> is similar to that of the article under discussion. However, the authors used RSMS. Patients

were divided in tertiles according to RSMS: tertile-1 presented the highest RSMS, and tertile-3 presented the lowest RSMS. Not surprisingly, the tertile-1 group presented the lowest BM, and the tertile-3 group presented the highest BM. A significant difference was observed for RSMS in the three groups, but for BM only between the tertile-1 and tertile-3 groups.

This evidence was also observed in the article “Relação da circunferência do pescoço com a força muscular relativa e os fatores de risco cardiovascular em mulheres sedentárias” [Relation of neck circumference with relative muscle strength and cardiovascular risk factors in sedentary women],<sup>3</sup> published by the same research group. In this case, the objective was to compare the values of relative muscle strength and cardiovascular risk factors in sedentary Brazilian women with different values of neck circumference (NC). The authors chose 35 cm as the NC cutoff point (with no further theoretical/statistical basis); comparing the groups, a difference in BM could again be observed and, subsequently, a difference in RSMS.

In the third study, “Comparação da força muscular entre mulheres brasileiras com e sem síndrome metabólica” [Comparison of muscle strength between Brazilian women with and without metabolic syndrome],<sup>4</sup> the authors compared women with and without metabolic syndrome. The results presented a statistically significant difference in the BM, which was higher in women with metabolic syndrome. Subsequently, when comparing RSMS, healthy women presented a higher result.

Apparently, there appears to be a mistake in the interpretation of the findings of the aforementioned studies, which is caused by the adjustment of muscle strength estimates by BM. The linear relation of BM and other involved variables appears to strongly affect the findings. This aspect appears to be more evident when lower muscle strength is observed

in women with metabolic syndrome, as there is no direct relation between muscle strength and all the components of such syndrome. The adjustment by fat-free mass also needs to be considered carefully, as the total amount of muscle mass (whole body) does not necessarily affect the strength in a hand-grip test.

The size of the samples and the methodological design of the studies referred to by Prestes & Tibana do not allow the suggestion that the use of RSMS produces results that allow for a better comprehension of the relation between muscle strength and general health parameters. We believe that the use of a multivariate model, as is the case of linear regression, could help to clarify the interrelations among the involved variables. In our research, the non-parametric distribution observed prevented the use of these statistical adjustments in order to control potential confounding factors. Thus, the foregoing indicate that the use of muscle strength related to BM as a health risk indicator needs to be better explored in the attempt to elucidate whether it is indeed the best methodological option.

#### REFERENCES

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Timothy Gustavo Cavazzotto<sup>a,\*</sup>, Luriam Tratis<sup>a</sup>,  
Sandra Aires Ferreira<sup>b</sup>, Rômulo Araújo Fernandes<sup>c</sup>,  
Marcos Roberto Queiroga<sup>b</sup>

<sup>a</sup>Laboratory of Experimental Physiology and Physiology Applied to Physical Activities, Universidade Estadual do Centro Oeste (UNICENTRO), Guarapuava, PR, Brazil

<sup>b</sup>Department of Physical Education, UNICENTRO, Guarapuava, PR, Brazil

<sup>c</sup>Department of Physical Education, Universidade Estadual Paulista, Presidente Prudente, SP, Brazil

\*Corresponding author.

E-mail: tcavazzotto@yahoo.com.br (T.G. Cavazzotto).