



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

June 17, 2022

International Journal of Exercise Science

Dear Editor,

As the corresponding author, and on behalf of our research groups, please consider our revised manuscript titled “Effects of Training with Blood Flow Restriction on Muscular Strength: A Systematic Review and Meta-Analysis” to be evaluated for publication in the International Journal of Exercise Science. This manuscript has been read and approved by the listed authors. All listed authors meet the criteria for authorship. The study was approved by the Institutional Review Board (IRB) at California State University, Stanislaus.

Response

MS #3270: Effects of Training with Blood Flow Restriction on Muscular Strength: A Systematic Review and Meta-Analysis

We appreciate valuable comments and suggestions. We are successfully able to address and revised the manuscript based on reviewer’s comments. We believe that these changes and additions have significantly improved the manuscript and its readability. Again, thank you for your valuable comments.

All changes were highlighted in both the reviewer responses and revised manuscript.

Review by: Reviewer #7

The review:

Overall I would like to applaud the authors on this systematic review and meta-analysis investigating the effects of BFR training on muscular strength. I especially was impressed by the investigation into the different characteristics (e.g., gender, BFR pressure, cuff type, limbs, etc.).



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

→ Thank you for your kind words.

After reviewing the manuscript I have the following suggestions:

ABSTRACT

- The running head is different on the entire document compared to the title page. Please revise the running head so that it is consistent throughout the entire document.

→ Thank you for the comment. The running head is revised (Blood Flow Restriction on Muscular Strength) and placed consistently throughout the entire document.

INTRODUCTION

- Paragraph 1 - Please do not use brand names when describing the different types of BFR cuff systems.

→ Thank you for the comment. It was not an essential part of the introduction. So the entire sentence with brand names has been removed from the introduction.

Devices used for BFR training include Fit Cuffs, the Edge BFR system, and multiple KAATSU devices that can be used for personal or clinical use depending on the device.

- Paragraph 1 - From a philosophical standpoint, can we ever truly "perfect" a training technique? Please consider if revising these statements to be less absolute (e.g., "improving a training technique").



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

→ Revised based on the suggestion. Improving training technique...

- Paragraph 1 - Please consider including a reference(s) for the reader regarding the "pathways of muscle protein synthesis" statement.

→ The references were added.

16. Hill EC, Housh TJ, Keller JL, Smith CM, Schmidt RJ, Johnson GO. Early phase adaptations in muscle strength and hypertrophy as a result of low-intensity blood flow restriction resistance training. *European Journal of Applied Physiology*. 2018;118(9):1831-1843.

37. Nyakayiru J, Fuchs CJ, Trommelen J, et al. Blood Flow Restriction Only Increases Myofibrillar Protein Synthesis with Exercise. *Med Sci Sports Exerc*. 2019;51(6):1137-1145. doi:10.1249/MSS.0000000000001899.

- Paragraph 2 - The first sentence of paragraph 2 seems very vague. Please consider revising this sentence to add more specifics to improve the reader's ability to follow along with your thought process.

→ Revised based on the suggestion.

- Paragraph 2 - Please consider adding examples for the "opportunities and advantages" you are referring to.

→ Revised based on the suggestion.



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

- Paragraph 2 - Please consider briefly speaking to some of the proposed mechanisms that are "behind favorable adaptations to BFR training" and provide adequate references.

→ The proposed mechanisms are addressed with reference.

METHODS

- Paragraph 2 - Please omit the "*" from the second line.

→ Revised based on the suggestion.

- Paragraph 5 (Data Extraction and Coding) - The phrase "Assessment of Methodological Quality" is at the end of this paragraph. I am assuming this was meant to be a subheading for the next paragraph. If so, please revise the phrase so that it is not at the end of a paragraph.

→ Thanks. Yes, it is. Revised based on the suggestion.

Assessment of Methodological Quality

- Table 1 Heading - Please make sure that the heading and the table are included on the same page.



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

- Table 1 - Is there a way to present this information more concisely instead of across 3.5 pages? Could the table be separated into multiple tables/sections by a characteristics? For example, Table 1A studies investigating both genders, Table 1B studies investigating females only, and Table 1C studies investigating males only. If the authors choose to include all the information into one table that fits across multiple pages, please consider making sure that the headings (row 1 of the table) are repeated as the first row of each page so that it helps the reader follow along. Lastly, please make sure that all table column widths are wide enough to fit the appropriate heading title (e.g., Workload).

→ Revised based on the suggestion.

RESULTS

- Publication Bias Paragraph - Please use the term "Comprehensive Meta-Analysis" instead of "CMA" since the abbreviation was never formally introduced to the reader.

→ Revised based on the suggestion.

- Figure 2 - Please consider revising the x-axis to "Standard Difference in Means" instead of "Std diff in means".

→ Revised based on the suggestion.



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

- Overall Effect Size Paragraph - Please consider adding "articles" or "studies" after "three BFR training" and "had large effects...".

→ Revised based on the suggestion.

- Overall Effect Size Paragraph - Could the three data points be in Figure 2 be colored or a different symbol to better show the reader what three points the authors are referring to?

→ Revised based on the suggestion (colored in blue).

- Figure 3 - Please revising the heading to "Standard Differences in Means" instead of "Std diff in means".

→ Revised based on the suggestion.

- Table 2 - Could the moderator variable codes (1, 2, & 3) some how be coded differently to allow the reader easier interpretation of the results? For example, for Gender could 1 = Male, 2 = Female, & 3 = Combined. If abbreviations are needed the authors could include the abbreviation legend as a footnote for Table 2.

→ Revised based on the suggestion.



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

DISCUSSION

- Publication Bias Paragraph - Please omit the second "that" in the following sentence: "... larger populations that that contain higher power...".

→ Revised based on the suggestion.

- Effect Size Paragraph - Instead of reference #29 in the second to last sentence of this paragraph did the authors mean to include reference #10?

Thanks. Yes, it should be "10". Corrected.

- Cuff Pressure Paragraph - Could you please include references for the "other studies" that the authors were referring to in the following sentence: "These results are consistent with other studies that have found...".

→ The references were included.

28. Loenneke, J, Thiebaud, R, Abe, T, Bembem, M. (2014). Blood Flow Restriction Pressure Recommendations: The Hormesis Hypothesis. *Medical Hypotheses*. 82. 10.1016/j.mehy.2014.02.023.

43. Suga T, Okita K, Morita N, Yokota T, Hirabayashi K, Horiuchi M, Takada S, Omokawa M, Kinugawa S, Tsutsui H. Dose effect on intramuscular metabolic stress during low-intensity resistance exercise with



TEXAS A&M UNIVERSITY - SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

blood flow restriction. J Appl Physiol (1985). 2010 Jun;108(6):1563-7. doi:
10.1152/jappphysiol.00504.2009.

CONCLUSION

- I think the authors meant to put "inclusion criteria" instead of
"conclusion criteria".

→ Thanks. Yes, it should be "inclusion criteria". Corrected.

Review by: Reviewer #2

Page 3 - ...that emphasizes on activity in the sympathetic...Delete "on"

→ Revised based on the suggestion.

Page 3 - In the last 40 years alone blood flow restriction has seen a breakthrough in both practice and equipment used, which has turned it into the trending method of recovery it is today

This last sentence is not congruent with the purpose of the study. The purpose is to ascertain BFR as a training modality, NOT a recovery modality.

→ Revised based on the suggestion. trending method of training it is today.

Page 4 - As research into BFR training is growing, so is the number of practitioners

"are" instead of "is"

→ Revised based on the suggestion.

As research into BFR training is growing, so are the number of practitioners utilizing this training method



TEXAS A&M UNIVERSITY-SAN ANTONIO

College of Education &
Human Development

College of Education & Human Development

Sen. Frank L. Madla Building, Suite 212
One University Way, San Antonio, Texas 78224

Page 11 - The overall effect size (ES) of the effect of blood flow restriction on skeletal muscle

Effect size equations need to be referenced. What calculations were used in establishing effect size?

→ Equation of calculation is inserted in the method section.

$$\text{Cohen's } d (ES_{sm}) = \frac{\bar{X}_{G1} - \bar{X}_{G2}}{S_p} \text{ where } S_p = \sqrt{\frac{(N_{G1}-1)S^2_{G1} + (N_{G2}-1)S^2_{G2}}{(N_{G1}-1) + (N_{G2}-1)}}$$

We would like to thank you in advance for your time and consideration of our manuscript for publication in your journal. This manuscript is original and not previously published, nor is it being considered elsewhere. The authors do not declare any conflicts of interest.

Sincerely,

Sukho Lee, Ph.D., FACN, CPT

Professor of Kinesiology
Department of Counseling, Health, and Kinesiology
Texas A&M University-San Antonio
One University Way, San Antonio Texas 78224
Office: STEM 142A
Phone: (210) 784-2537