LETTER TO THE EDITOR

Nr 2025;15 (4):478-479

Ref: Effects of Strength Training with and Without Blood Flow Restriction on Pain Reduction in Individuals with Knee Osteoarthritis: A Systematic Review with Meta-Analysis of Randomized Clinical Trials (doi: 10.32098/mltj.02.2025.04)

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DOI:
10.32098/mltj.04.2025.13

LEVEL OF EVIDENCE: N/A

KEY WORDS
BFR; Kaatsu; exercise; osteoarthritis; pain.

To the Editor,

I read with great interest the article by Linhares *et al.* (1), which presents a systematic review and meta-analysis on the effects of blood flow restriction strength training (BFRST) compared with conventional strength training (CST) on pain in individuals with knee osteoarthritis. I would like to commend the authors for their rigorous methodological approach, including prospective registration in PROSPERO, adherence to PRISMA guidelines, and the appropriate use of RoB 2.0, TESTEX, and GRADE. These choices add transparency and reliability to the synthesis process, while addressing a clinically relevant and timely topic.

At the same time, it is important to acknowledge that the available evidence still presents limitations that constrain the certainty of the findings. The small number of included randomized trials and the restricted sample sizes within them inherently increase the risk of type II error and reduce the precision of pooled estimates (1). Furthermore, the clinical heterogeneity across BFR protocols - including substantial variations in cuff pressure, relative training intensity, exercise selection, and intervention duration - complicates the interpretation of aggregate data. For instance, studies employing practical BFR methods with elastic wraps have demonstrated hypertrophy and functional gains comparable to traditional high-intensity training (2), yet these protocols differ markedly from the pneumatic cuff models frequently applied in clinical contexts (3). This methodological diversity, although reflective of real-world practice, makes it difficult to draw firm conclusions about the superiority or equivalence of BFR when compared with conventional strength training in knee osteoarthritis. Added to this, the use of different pain assessment instruments across trials (e.g., WOMAC, KOOS, or NPRS) limits comparability and precludes consistent translation of standardized mean differences into clinically meaning-

ful terms, such as the minimal clinically important difference (MCID) (4). Without harmonization of protocols and outcome measures, the field remains vulnerable to fragmented evidence, which undermines both the external validity and the practical implementation of BFR interventions in clinical rehabilitation settings.

In this context, future research could strengthen the evidence base by focusing on:

1. Standardization of BFR protocols, with clear parameters for occlusion pressure, training intensity, and intervention duration (3).
2. Use of consistent pain assessment tools, such as validated WOMAC subscales, enabling more direct comparisons and interpretation relative to the minimal clinically important difference (MCID) (4).
3. Larger, multicenter randomized controlled trials, capable of providing greater statistical power and generalizability (5).
4. Longer follow-up periods, to determine the sustainability of analgesic effects in the context of chronic disease (6).
5. Systematic reporting of adherence and adverse events, to ensure a balanced evaluation of risks and benefits (3).

In summary, the work of Linhares *et al.* (1) represents a valuable contribution by consolidating the current literature and providing a clear, cautious interpretation of the available evidence. Their acknowledgment that no superiority of BFRST over CST could be statistically confirmed reflects scientific integrity and highlights the need for more robust future trials to clarify this clinically relevant question.

FUNDINGS

None.

DATA AVAILABILITY

N/A.

CONTRIBUTIONS

MM contributed entirely to this work.

CONFLICT OF INTERESTS

The author declares that he has no conflict of interests.

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Reply to "Ref: Linhares DG *et al.* Effects of Strength Training with and Without Blood Flow Restriction on Pain Reduction in Individuals with Knee Osteoarthritis: A Systematic Review with Meta-Analysis of Randomized Clinical Trials"

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We greatly appreciate your interest in reading this study. We agree that the number of included studies is low, due to the scarcity of randomized clinical trials addressing this topic. However, we understand that it meets the guidelines for conducting a meta-analysis. Cochrane (1) determines that this method can be used with two or more studies.

Regarding high heterogeneity and different assessment tools, this is very common in meta-analyses involving studies with human subjects. After all, there is clinical diversity (population and treatment) and methodological diversity (allocation, outcomes, and instruments). However, it is worth noting that this study used scientific rigor in its statistical analysis, adjusting and ensuring the reliability of the results.

We appreciate your contributions. It is always great to be able to discuss science, and we will certainly continue to investigate future studies with the same dedication.

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