

# Response to the Comment on our Article: “Explosive is not a Term Defined in the International System of Units and Should not be Used to Describe Neuromuscular Performance”

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Dear Editor,

We thank Schumann et al. (Schumann, Feuerbacher et al. 2024) for their engagement and thoughtful comments on our article (Ide, Silvatti et al. 2023), and the overarching use of terminology in sports science. Academic debate is critical for advancing our field, and we welcome the opportunity to clarify and expand on our arguments. While their comment offers a perspective on practical terminology use, we maintain that the application of “explosive” in scientific literature may be both unnecessary and potentially misleading.

Schumann et al. 2024 argue that our definition of muscle strength as the force developed by muscles disregards the roles of the central and peripheral nervous systems, along with tendon properties. We respectfully disagree. This definition does not inherently exclude these components, which are inseparable from force production in human

movement. Furthermore, the influence of motor unit firing rates on muscle strength was explicitly addressed in the third paragraph of our introduction: “Muscular strength may be influenced by factors as muscle fibre area and motor unit firing rate...” Their claim overlooks this clearly outlined point, where we detail the neural contributions to force production. We maintain that our definition remains accurate and appropriately inclusive. Additionally, the authors claim that we used the term “ballistic contraction” in our article. This is incorrect; the term does not appear in our work. This misattribution highlights a potential misunderstanding of our arguments.

The authors propose that “explosive strength” represents a distinct domain of neuromuscular performance, which can be quantified through metrics like the rate of force development or jump height. However, they also argue that it should not replace Newtonian-based metrics. These positions appear contradictory, and the ambiguity they

introduce further complicates the term's conceptual clarity. Our argument that "explosive" lacks precision remains consistent with this critique, as these metrics can be accurately described using established terminology (e.g., impulse, velocity, power and rate of force development) without invoking ambiguous terms.

Schumann et al. 2024 suggest that the term "explosive" enhances clarity for both practitioners and scientists. While we acknowledge its utility in informal coaching contexts—as noted in our article—scientific communication requires precision and universal understanding. This distinction is vital, particularly in interdisciplinary discussions, as evidenced by our experiences with physics and engineering colleagues questioning the mechanical meaning of "explosive strength."

The authors also argue that instructions to contract muscles "explosively" facilitate neuromuscular adaptations for fast movements, justifying the term "explosive strength training". We question how this differs from instructing individuals to contract (for example) "as fast and forcefully as possible". The term "explosive" adds unnecessary ambiguity rather than enhancing clarity or specificity in instructional or scientific contexts.

The authors emphasize the term's historical prevalence in literature. While historical context is valuable, scientific terminology must evolve to reflect advancements in understanding and methodology. Historical usage alone does not justify the perpetuation of terms that lack precision or alignment with International System of Units (SI) principles. As science progresses, it is our responsibility to ensure that our language is accurate and meaningful.

Finally, the inconsistencies in the use of the term explosive in scientific literature had already been highlighted in previous studies published in 2009 and 2016 by Knudson (Knudson 2009) and Winter (Winter, Abt et al. 2016), respectively. Knudson (Knudson 2009) succinctly highlighted this issue, stating, "Colloquial jargon like 'power' and 'explosive strength' may be useful coaching cues, but they have little place in strength and conditioning research and professional literature." Winter et al. (Winter, Abt et al. 2016) similarly wrote, "This is not a physics term and of course nothing actually 'explodes' in the human. We recommend that the term 'explosive' no longer be used to describe human movement." These earlier works

have already advised against using specific terms (e.g., 'explosive'); however, despite their valid observations regarding inconsistencies, they did not elicit any comments.

We acknowledge the points raised by Schumann et al. 2024; however, we find their arguments insufficient to mechanically justify the continued use of the term "explosive" in the sport and exercise science literature. While science discourages is inherently dynamic, and the term persists in recent publication, its continued usage does not validate its mechanical appropriateness. If researchers opt to employ this terminology, we encourage them to provide precise and clear mechanical explanations to support its application. Nevertheless, we maintain our recommendation to avoid the term in sports and exercise science contexts, as it remains mechanically inaccurate and imprecise.

Finally, establishing proper terminology is essential for ensuring that scientists from other fields can accurately interpret and apply findings from sports and exercise science, avoiding misunderstandings caused by field-specific jargon. We hope this discussion inspires further scrutiny and refinement of terminology in our field.

## CONFLICTS OF INTEREST

There are no conflicting relationships or activities.

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## CORRESPONDING ARTICLES

Original Article - <https://journal.iusca.org/index.php/>

Journal/article/view/210

Commentary - <https://journal.iusca.org/index.php/>

Journal/article/view/367

## REFERENCES

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