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Response to the comment on "A New Taxonomy for Post-activation Potentiation in Sport"

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1 **Title: Response to the comment on “A New Taxonomy for Post-activation**
2 **Potential in Sport”**

3 **Running head:** Response
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31 We thank Dr. Smith and Professor MacIntosh for the opportunity to further
32 discuss the implications of the new proposed taxonomy. In their letter,¹ they claim that
33 the definition they propose is in contrast with that cited in our article,² and argue that
34 while their definition does not stipulate a mechanism, our definition does so. Honestly,
35 we find it challenging to distinguish between the two definitions.^{1,2} When comparing
36 the terminology, we see quite similar nomenclature and no mechanisms proposed.
37 Furthermore, our definition does not differ substantially from prior classical
38 definitions.³

39
40 Smith and MacIntosh state: “This is an important point because Boulosa and
41 colleagues justify their commentary based on assumed mechanisms.”¹ However, it is
42 ubiquitously agreed since the pioneering works in the 80’s that the mechanisms for PAP
43 are well established. In fact, Professor MacIntosh’s own impressive work has helped to
44 define these mechanisms.^{4,5} Hence, the literature consistently agrees upon the
45 mechanisms of PAP over the last 30 years.

46
47 On another point, Smith and MacIntosh state: “Twitch potentiation dissipates
48 over the ~6 min period immediately after a conditioning contraction.⁵ For this reason,
49 any enhancement of performance or contractile response outside of this time cannot be
50 attributed to PAP.”¹ However, the time course of PAP is not as static as Smith and
51 MacIntosh propose, with examples in literature of PAP recorded >6 min after the
52 conditioning activity.^{2,6}

53
54 Smith and MacIntosh continue: “However, it is important to realize that PAP is
55 not limited to isometric twitch contractions and that PAP of other contraction types
56 could theoretically contribute to PAPE if the effects coincide temporally.”¹ In our article
57 we agreed with this statement.² Our contention was that voluntary contractions have a
58 lower signal-to-noise ratio, making it more difficult to detect voluntary changes
59 associated with PAP.

60
61 It is interesting that Smith and MacIntosh indicate that there should only be two
62 descriptors (PAP and PAPE) and there is no possibility for alternative terminologies.
63 The proposed taxonomy highlights the conditioning activity, testing activity and
64 population, factors causally related to the onset and magnitude of potentiation effects.
65 For instance, the rationale for a lack of increased voluntary performance would be more
66 apparent in the case of the following descriptor: “Post low intensity squats jump
67 potentiation in sedentary males.” In this case, the conditioning activity and population
68 are less likely to induce and experience potentiation, respectively. There is no reason
69 that more general descriptors such as PAP and PAPE cannot co-exist with our proposed
70 taxonomy, as we clearly stated in our article.²

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72

73 **References**

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75 1. Smith IC, MacIntosh BR. A Comment on “A New Taxonomy for Post-
76 Activation Potentiation in Sport”. *Int J Sports Physiol Perform.* 2020; In press.

77 2. Boulosa D, Beato M, Dello Iacono A, Cuenca-Fernández F, Doma K,
78 Schumann M, Zagatto A, Loturco I, Behm DG. A New Taxonomy for Post-
79 Activation Potentiation in Sport”. *Int J Sports Physiol. Perform.* 2020; In press.

80 3. Sale DG. Postactivation potentiation: role in human performance. *Exerc Sport*
81 *Sci Rev.* 2002; 30(3): 138-143.

82 4. Rassier DE, MacIntosh BR. Coexistence of potentiation and fatigue in skeletal
83 muscle. *Braz J Med Biol Res.* 2000;33: 499-508.

84 5. MacIntosh BR, Robillard ME, Tomaras EK. Should postactivation potentiation
85 be the goal of your warm-up? *Appl Physiol Nutr Metab.* 2012;37: 546–550.
86 doi:10.1139/H2012-016

87 6. Vandervoort,AA, Quinlin, J, McComas AJ. Twitch potentiation after voluntary
88 contraction. *Exp Neurol.* 1983;81: 141-152.

89