Review of: "Sustained Muscle EMG Activity to Contractile Failure During Incremental Exercise and Intense Constant Load Cycling: No Evidence of a Central Governor"

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Potential competing interests: No potential competing interests to declare.

Abstract:

- **Bout duration:** Move information on bout durations to the Methods section. In the Abstract, mention participants reached volitional exhaustion within each bout.
- **sEMG processing:** This information is more suited for the Methods section. Remove it from the Abstract.
- **Two-way ANOVA factors:** Clearly state the factors as "intensity" (different workloads) and "time" (segments within each bout).
- **VO2max definition:** Define VO2max in the Methods section before referencing it here.
- **Reformulating sEMG results:** Rephrase as: "Segment 2 of the VO2max trial displayed significantly higher sEMG activity compared to segment 1 (F=6.741, p=0.023). This suggests increased muscle activation throughout the exercise bout."
- **High muscle activation and CGM:** Clarify: "The observed sustained increases in sEMG activity during high-intensity exercise contradict CGM predictions of reduced central motor drive at exhaustion. The CGM proposes a protective mechanism that inhibits muscle activation to prevent excessive physiological strain."

Introduction:

- **Noakes' argument and VO2 plateau:** Briefly acknowledge criticisms and explain that a plateau doesn't necessarily indicate immediate exercise termination.
- **Reformulating core issue:** Rephrase as: "A key tenet of the CGM is that the central nervous system (CNS) regulates exercise intensity to maintain homeostasis across bodily systems."
- **CNS speculation:** Support the statement with references demonstrating CNS regulation of motor unit recruitment during exercise (e.g., [citation on CNS regulation of motor unit recruitment]).
- **sEMG section:** Decide if this section is directly relevant. If not, remove it. If relevant, move it to the Methods section to define EMG.
- **Fatigue mechanisms:** Specify the type of fatigue investigated (central vs. peripheral) and the type of exercise used to induce it (e.g., high-intensity cycling).

Methods:

- **Age range:** Briefly explain the rationale behind the chosen age range (e.g., focus on healthy, young adults for initial investigation).
- **Sample size:** Combine with the previous paragraph about age range.
- **Number of trials:** Clarify: participants performed five trials spread across four days (one trial per day).
- **VO2max test:** Specify the exercise protocol used to assess VO2max (e.g., incremental cycling protocol).
- **Data merging:** Combine "Recruitment," "Sample Size," and "Informed Consent" into one section, removing redundant sentences. Change "weight (kg)" to "mass (kg)" and "Demographics" to "Anthropometric characteristics."
- **Ramp protocol reference:** Cite the reference for the ramp-based exercise protocol used.
- **CP definition:** Define "CP" (critical power) at its first appearance.
- **Critical power reference:** Provide a reference for the method used to determine critical power and power output relationship.
- **Muscle electromyography section:** Briefly describe the sEMG recording setup and processing methods. Cite the reference for the used protocol.
- **Ventilation threshold definition:** Remove the redundant definition, referring back to the previous explanation.
- **RER, peakVI, peakFbr, peakVt:** If already defined earlier, avoid repetition.
- **Missing data and statistical approach:** Acknowledge the data quality issue. Briefly discuss alternative options like data imputation or transformation techniques before resorting to excluding participants if possible.
- **Table abbreviations:** Define all abbreviations used in the footnotes of both tables.

Discussion:

- **Combine first two paragraphs:** Briefly summarize key findings and limitations of sEMG for motor unit recruitment analysis in the first paragraph.
- **Cardio-pulmonary data section:** Focus on how VO2max and RER data confirm high exercise intensity during each bout.
- **sEMG results and CGM section:** Add a transition sentence linking this section to the previous one.
- **Limitations section:** Consider mentioning alternative methods for motor unit recruitment analysis (e.g., decomposition techniques).
- **Conclusions:** Briefly restate the key finding on sustained sEMG increases. Mention limitations of sEMG and its implications for CGM interpretation. Briefly discuss the proposed explanation for contractile failure based on motor unit recruitment profiles.