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Repeated-Sprint Cycling Does Not Induce Respiratory Muscle Fatigue in Active Adults: Measurements from The Powerbreathe® Inspiratory Muscle Trainer

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ABSTRACT

This study examined respiratory muscle strength using the POWERbreathe® inspiratory muscle trainer (i.e., 'S-Index') before and after repeated-sprint cycling for comparison with maximal inspiratory pressure (MIP) values obtained during a Mueller maneuver. The S-Index was measured during six trials across two sessions using the POWERbreathe® and MIP was measured during three trials in a single session using a custom-made manometer in seven recreationally active adults. Global respiratory muscle strength was measured using both devices before and after the performance of sixteen, 6-s sprints on a cycle ergometer. Intraclass correlation coefficients for the POWERbreathe® S-index indicated excellent ($p < 0.05$) trial-to-trial ($r = 0.87$) and day-to-day ($r = 0.90$) reliability yet there was no significant correlation ($r = -0.35$, $p = 0.43$) between the S-Index measured using the POWERbreathe® and MIP measured during a Mueller maneuver. Repeated-sprint cycling had no effect on respiratory muscle strength as measured by the POWERbreathe® ($p > 0.99$) and during the Mueller maneuver ($p > 0.99$). The POWERbreathe® S-Index is a moderately reliable, but not equivalent, measure of MIP determined during a Mueller maneuver. Furthermore, repeated-sprint cycling does not induce globalized respiratory muscle fatigue in recreationally-active adults.

Key words: Maximal inspiratory pressure, respiratory muscle fatigue, repeated-sprint ability, mouth pressure, manometer

Key Points

- The S-Index as measured by the POWERbreathe® is a reliable measure of respiratory muscle strength
- The S-Index does not accurately reflect maximal inspiratory pressure obtained from a Mueller maneuver

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