Upper body exercise involves substantial recruitment of arm and shoulder musculature. Recent evidence suggests that muscles in the trunk and lower body are important when performing upper body tasks such as hand cycling, standing arm cycling (“grinding”), and cross country skiing.

PURPOSE: Our purpose was to determine the relative contributions of arm, trunk, and leg musculature to submaximal and maximal arm cycling performance. Specifically, we determined the extent to which restriction of the trunk and legs influenced 1) metabolic and cardiorespiratory responses during submaximal arm cycling and 2) maximum neuromuscular power during maximal arm cycling.

METHODS: Healthy male participants performed arm cycling trials under three experimental conditions: normal, restricted legs, and restricted legs and trunk, all of which were presented randomly. During normal conditions, participants cycled using their arms and trunk while using legs for stabilization. For restricted leg conditions the contribution of the legs was reduced by removing the floor and strapping the legs together. Similarly, restricting the legs and trunk was done by removing the floor, strapping the legs together and utilizing a four-point seat belt harness to minimize torso movement. During submaximal arm cycling participants cycled for 5 min at 40, 80, and 100 W (70rpm) while oxygen consumption, ventilation, heart rate, blood lactate, and rating of perceived exertion were recorded. During maximal arm cycling trials participants cycled at maximal effort and power was assessed using the inertial-load method.

RESULTS: Results indicated that when the legs and/or trunk were restricted metabolic and cardiorespiratory responses tended to increase during submaximal arm cycling (n = 3). When the legs were restricted during maximal arm cycling (n = 5) maximum power decreased by 25 ± 4% (P < 0.01) compared to normal. Similarly, when legs and trunk were both restricted maximum power was reduced by 33 ± 3% (P < 0.01) compared to normal.

CONCLUSION: These results help verify the importance of trunk and lower body musculature to upper body exercise performance. Finally, these findings may have implications for researchers and clinicians who use arm cycling as a modality to exercise muscles in the upper body.