

Skeletal muscle size is a predominant factor for Racerunning performance in individuals with cerebral palsy

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Conclusion

- Skeletal muscle mass is an important factor for Racerunning performance.
- Our findings highlight the need for optimization of physical exercise regimes for individuals with CP in order to stimulate maintenance of skeletal muscle mass and function.

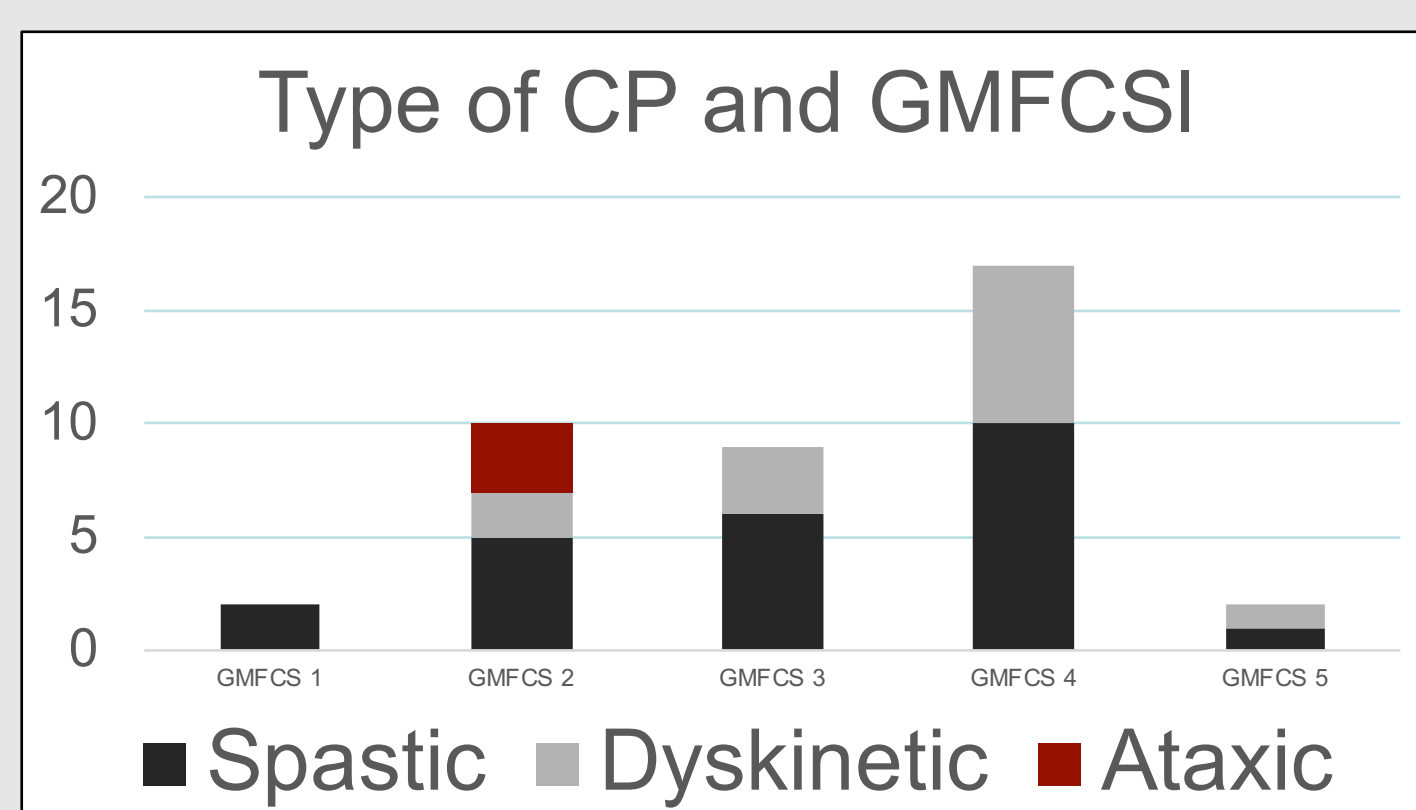


Introduction

Racerunning is a parasport and form of exercise using a three-wheeled running bike. The activity enables enough intensity to promote training adaptations for partly or non-walking individuals with cerebral palsy (CP). The influence of physiological parameters on Racerunning performance is currently not well understood.

Participants

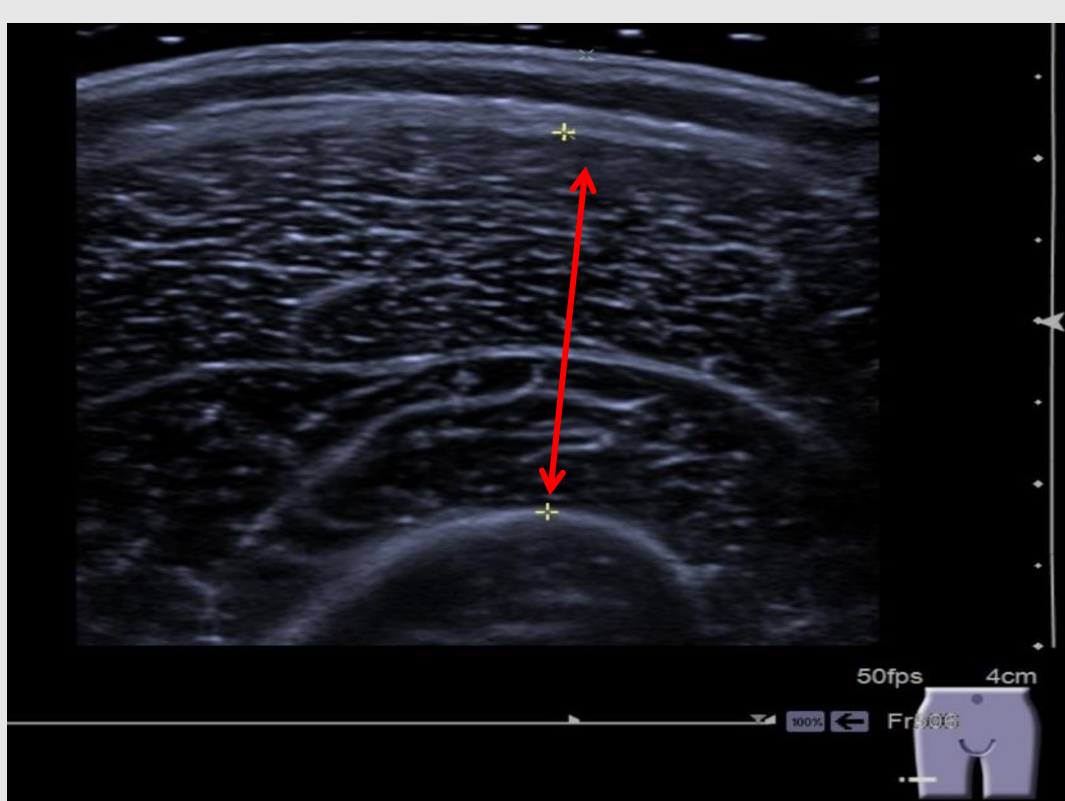
Forty individuals (mean age 21, range 9-43, 19 males/21 females) with CP were recruited during RaceRunning Camp and Cup 2018.



Type of CP;
Spastic; n=24,
Dyskinetic; n=13,
Ataxic n=3
GMFCS I-V;
n=2-10-9-17-2

Methods

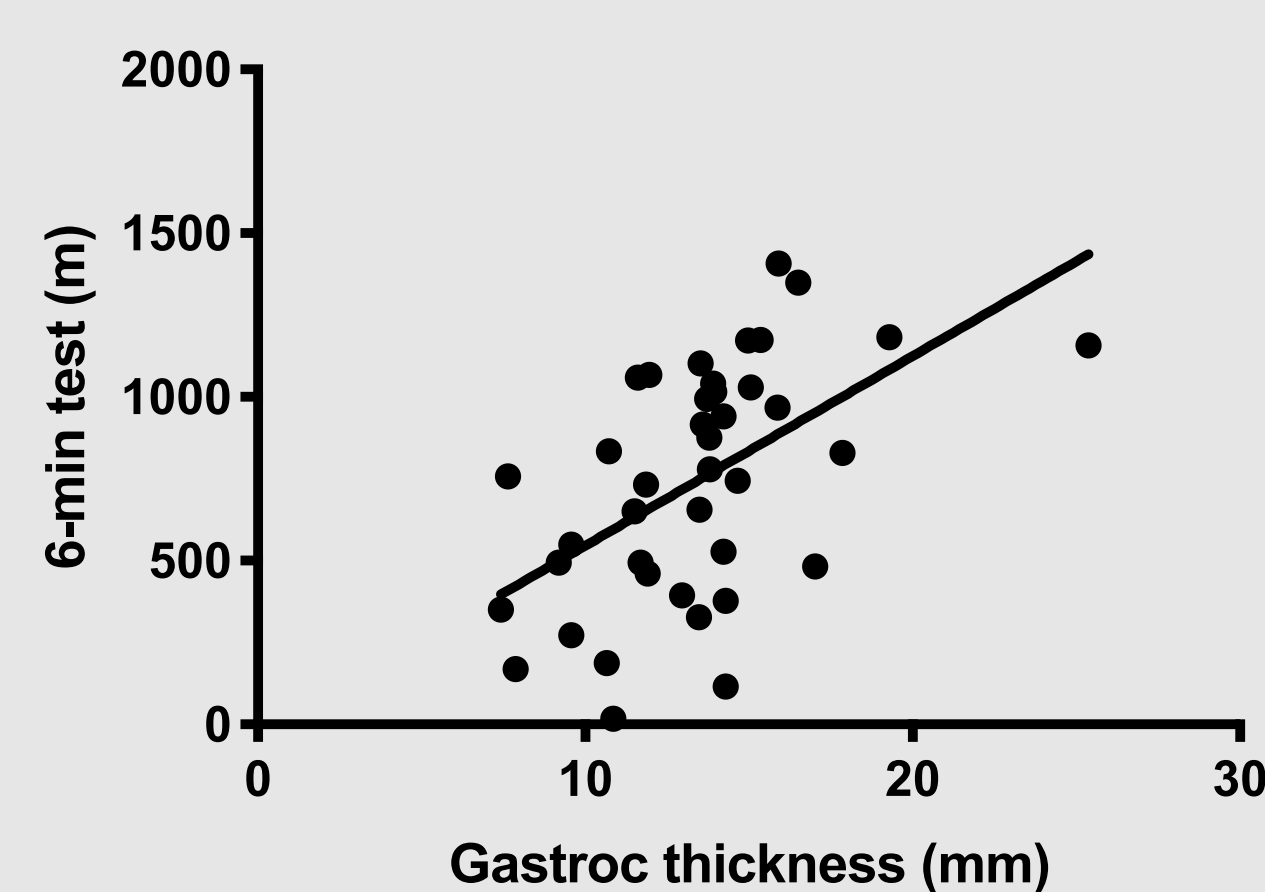
The Racerunning-athletes completed a 6-min Racerunning Test (6-min RT). Heart rate was monitored throughout the test. Spasticity with modified Ashworth scale, selective control in the dorsiflexors of the ankle with Selective Control Scale (SMC) and pROM of hip, knee and ankle, and thickness of thigh and calf muscles (ultrasound) before the test.



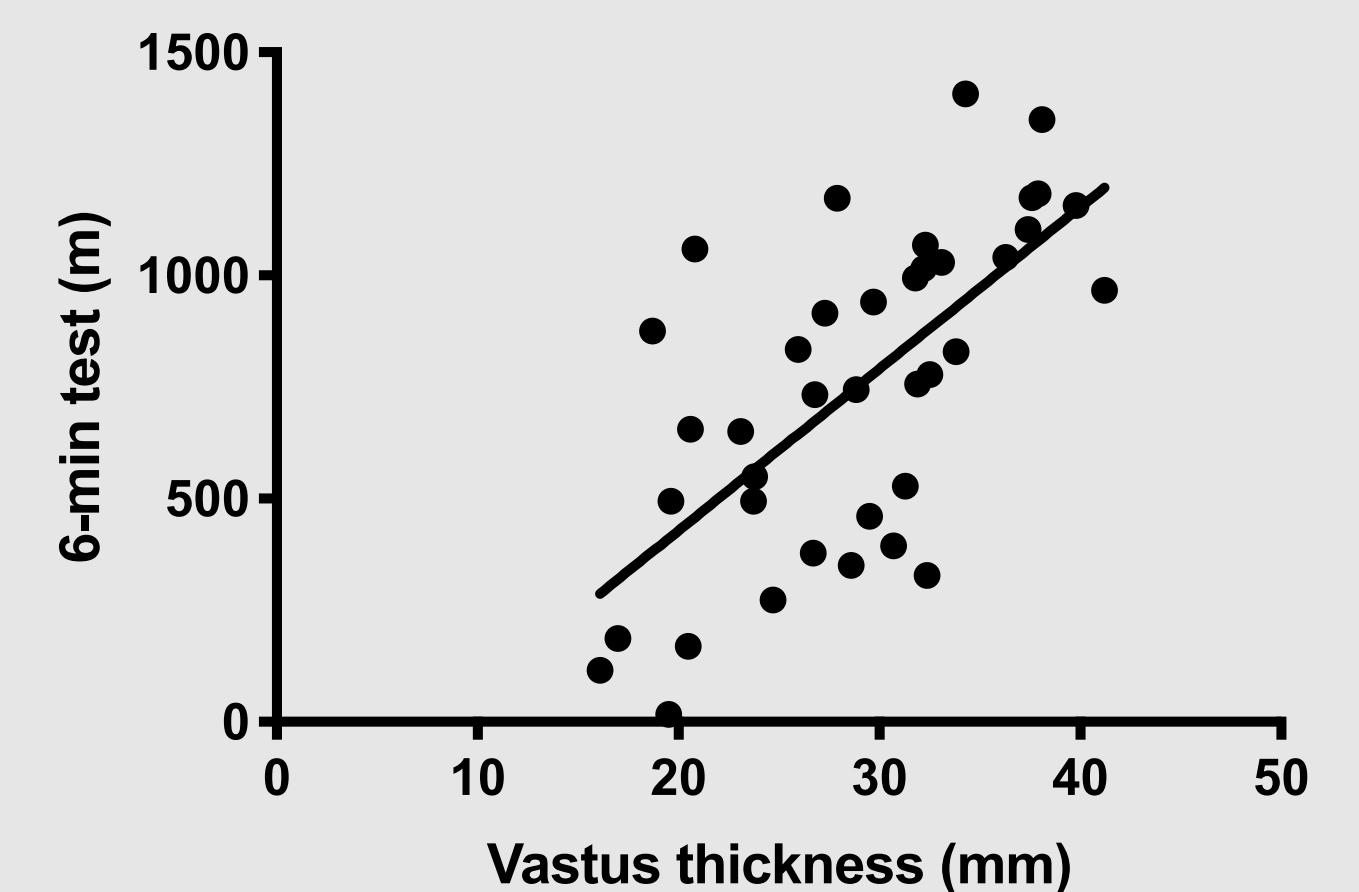
Ultra sound image of the thigh (vastus lateralis + intermedius), red marker indicating measured thickness.

Results

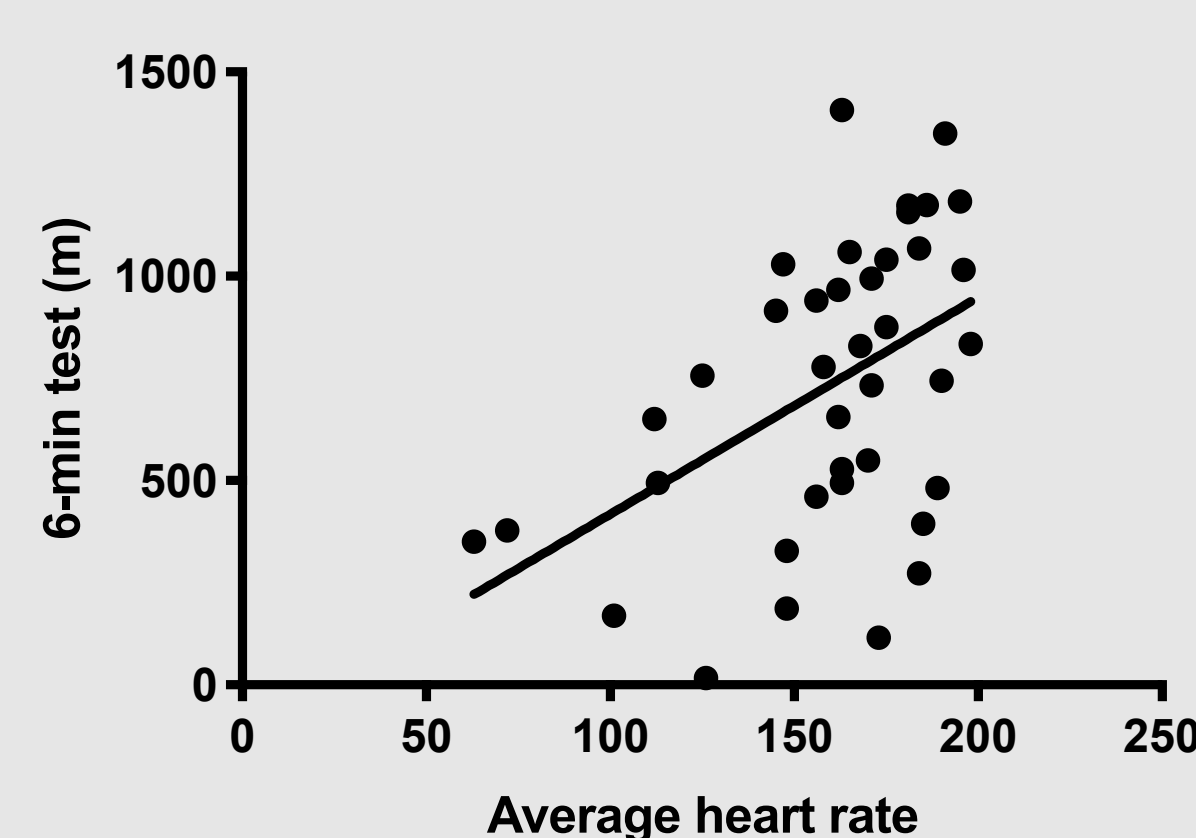
Performance on the 6-min Racerunning was influenced by GMFCS ($R^2=0.6$, $p<0.01$) but was independent of age. Skeletal muscle thickness was a predominant factor for performance, more so the thigh as compared to the calf muscles.



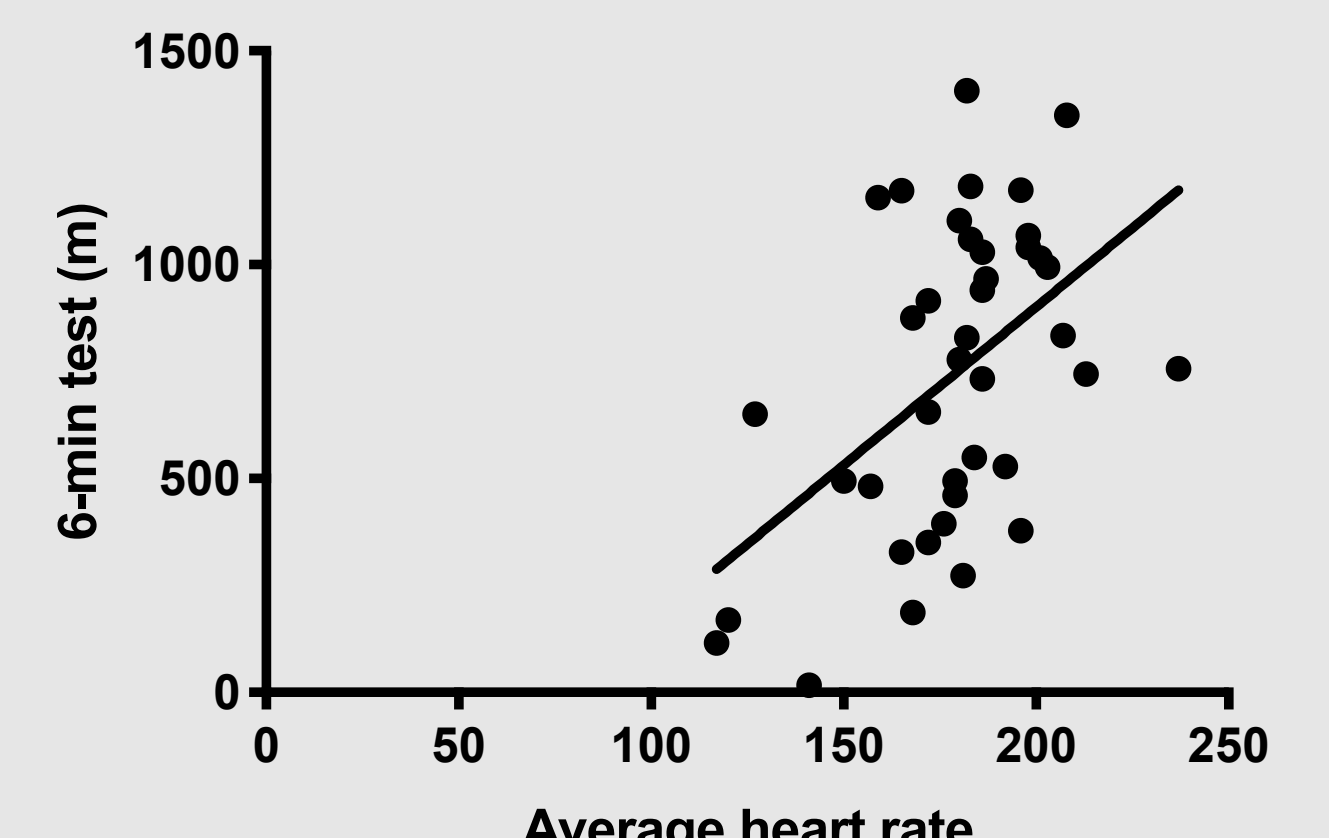
Average thickness of Gastrocnemius vs 6 min RT, ($R^2=0.53$, $p<0.01$).



Average thickness of thigh muscles vs 6 min RT, ($R^2=0.67$, $p<0.01$).



Average heart rate vs 6 min RT, ($R^2=0.46$, $p<0.01$).



Maximum heart rate vs 6 min RT, ($R^2=0.5$, $p<0.01$).

Both average and maximum heart rate correlated positively to performance on the 6-min Racerunning test. pROM of the hip ($R^2=0.56$, $p<0.01$) and knee ($R^2=0.45$, $p<0.01$) joint was associated with performance on the 6-min Racerunning test. No such relationship was observed for the ankle joint.

Future plans

- Increase sample number to allow for subgroup analysis
- Measurements of fatigue during Racerunning
- Cytokine and exosome release post exercise.

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