

Racerunning training for 12 weeks improves aerobic capacity and promotes skeletal muscle hypertrophy in adolescents and young adults with cerebral palsy

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Our conclusions are:

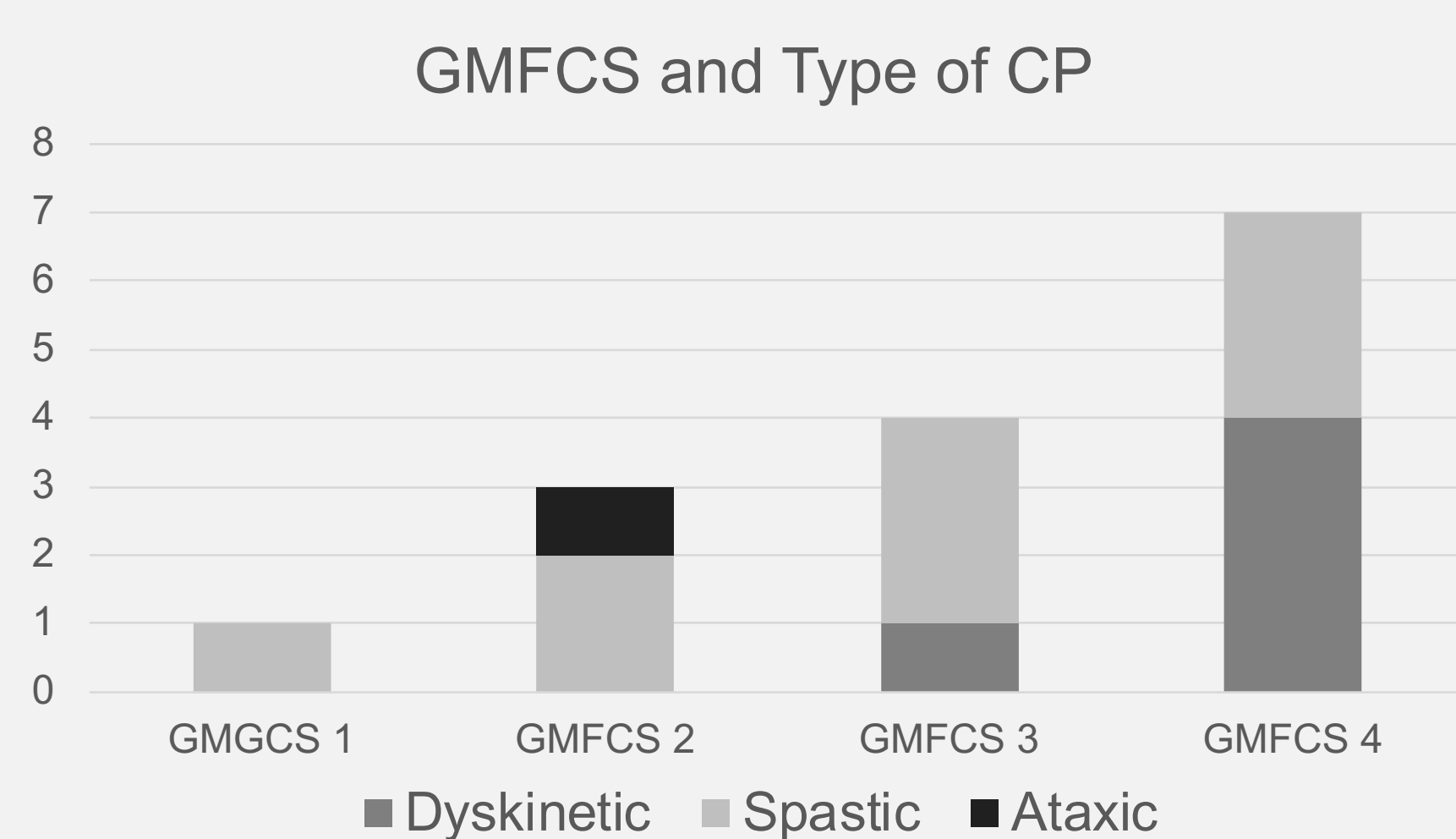
- Racerunning training improves aerobic capacity (6-min test).
- Racerunning training promotes skeletal muscle hypertrophy.
- Racerunning is a powerful and effective training modality in individuals with CP promoting both central and peripheral adaptations.

Introduction and aim

A Racerunner is tricycle, with a saddle and a breastplate for support but propelled forward by running on the ground. It enables cardiovascular fitness-training for partly or non-walking individuals Cerebral Palsy.

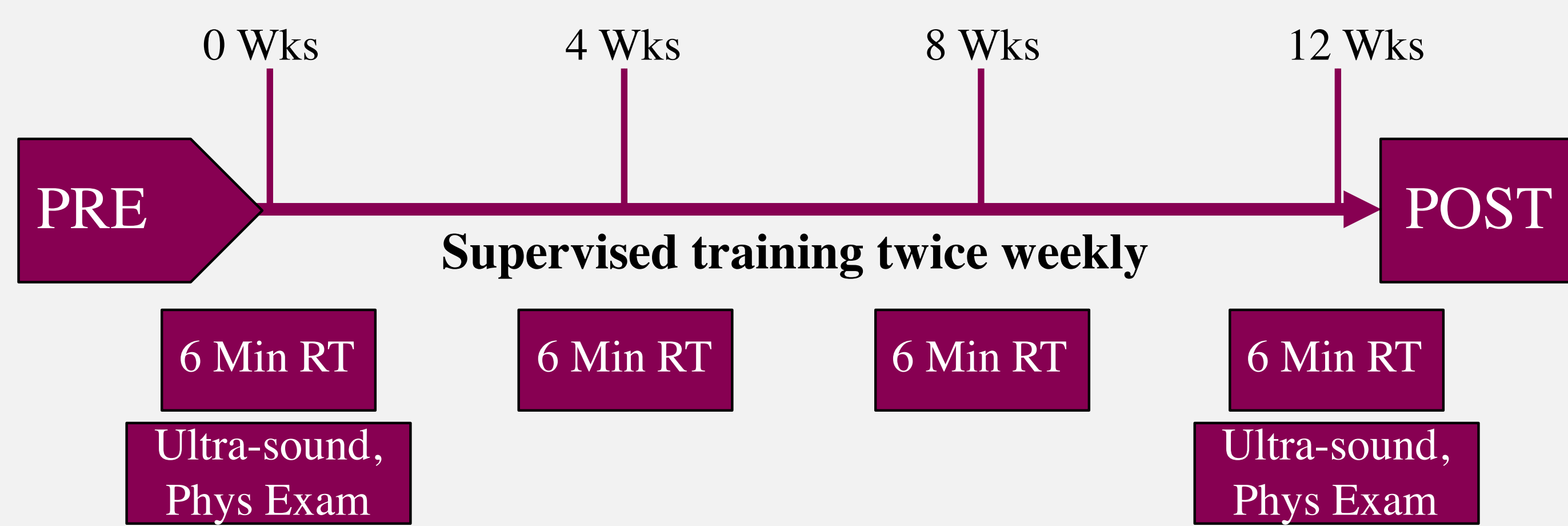
Participants

Fifteen partly or non-walking participants (mean age 16, range 9-29, 8 males / 7 females).



Description of type of CP; Spastic, Dyskinetic and Ataxic; 9-5-1 and Gross Motor Function Classification System, GMFCS I-IV; 1-3-4-7.

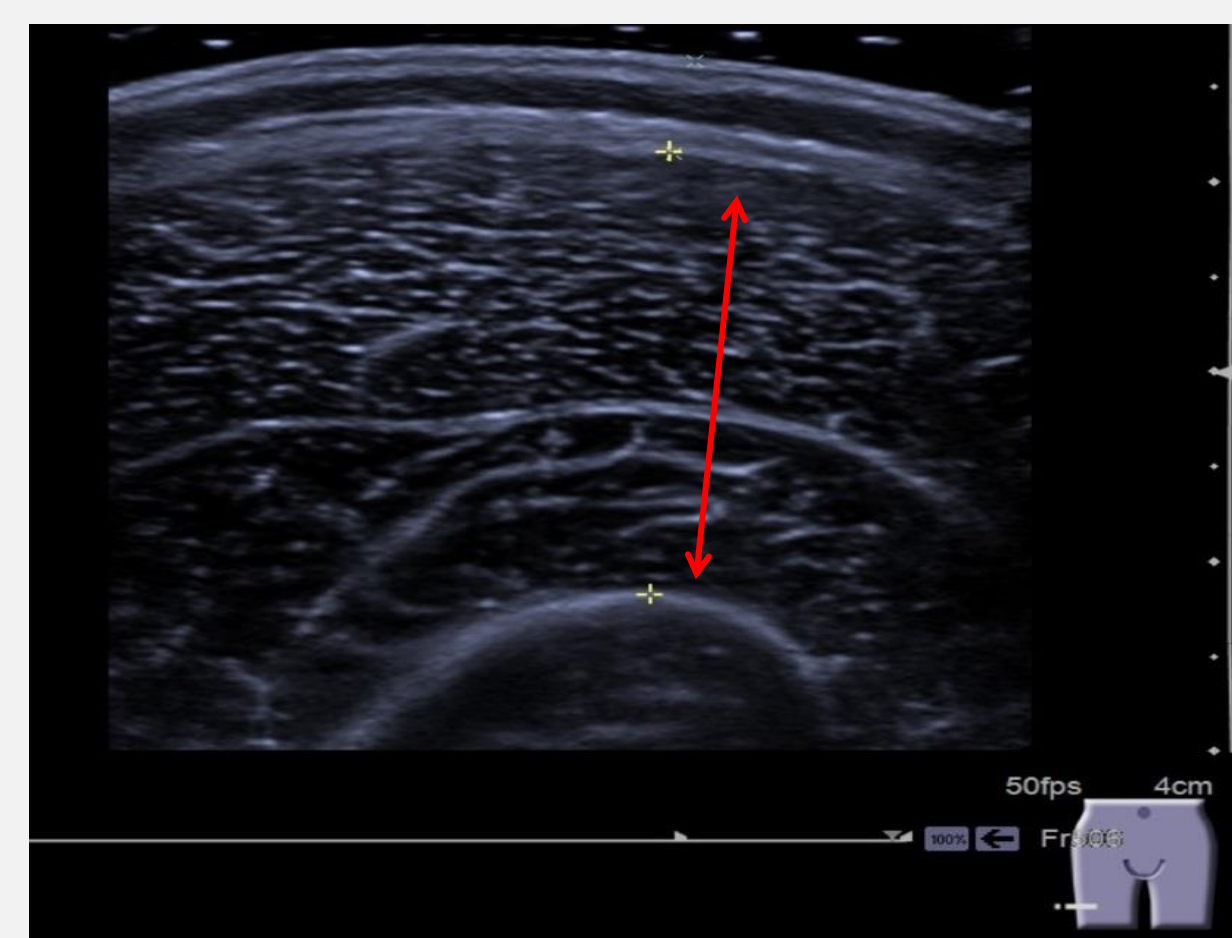
Training



Racerunning training: 12 weeks, 2 times per week.
Evaluations: Pre and Post ultrasound and physical examination. 6 min racerunning test pre, post and every 4 weeks.

Evaluations

Measurements of aerobic capacity (6-min Racerunning test, average and maximum heart rate), spasticity and passive range of motion (pROM) of hip, knee and ankle joints and skeletal muscle thickness in the thigh and lower leg were collected before and after the training period.

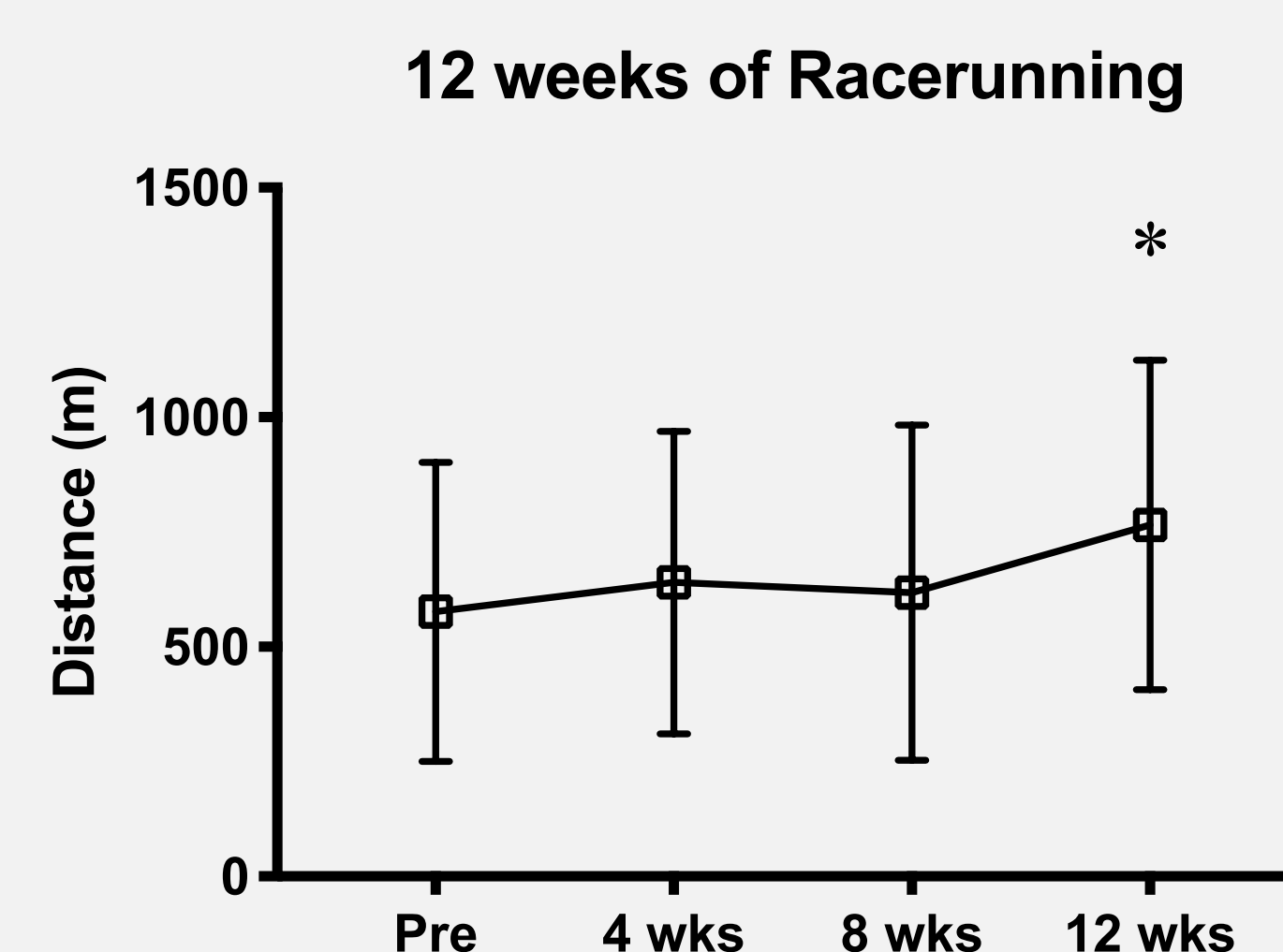


Example of ultra sound image of the thigh (vastus lateralis + intermedius), red marker indicating measured thickness.

Results

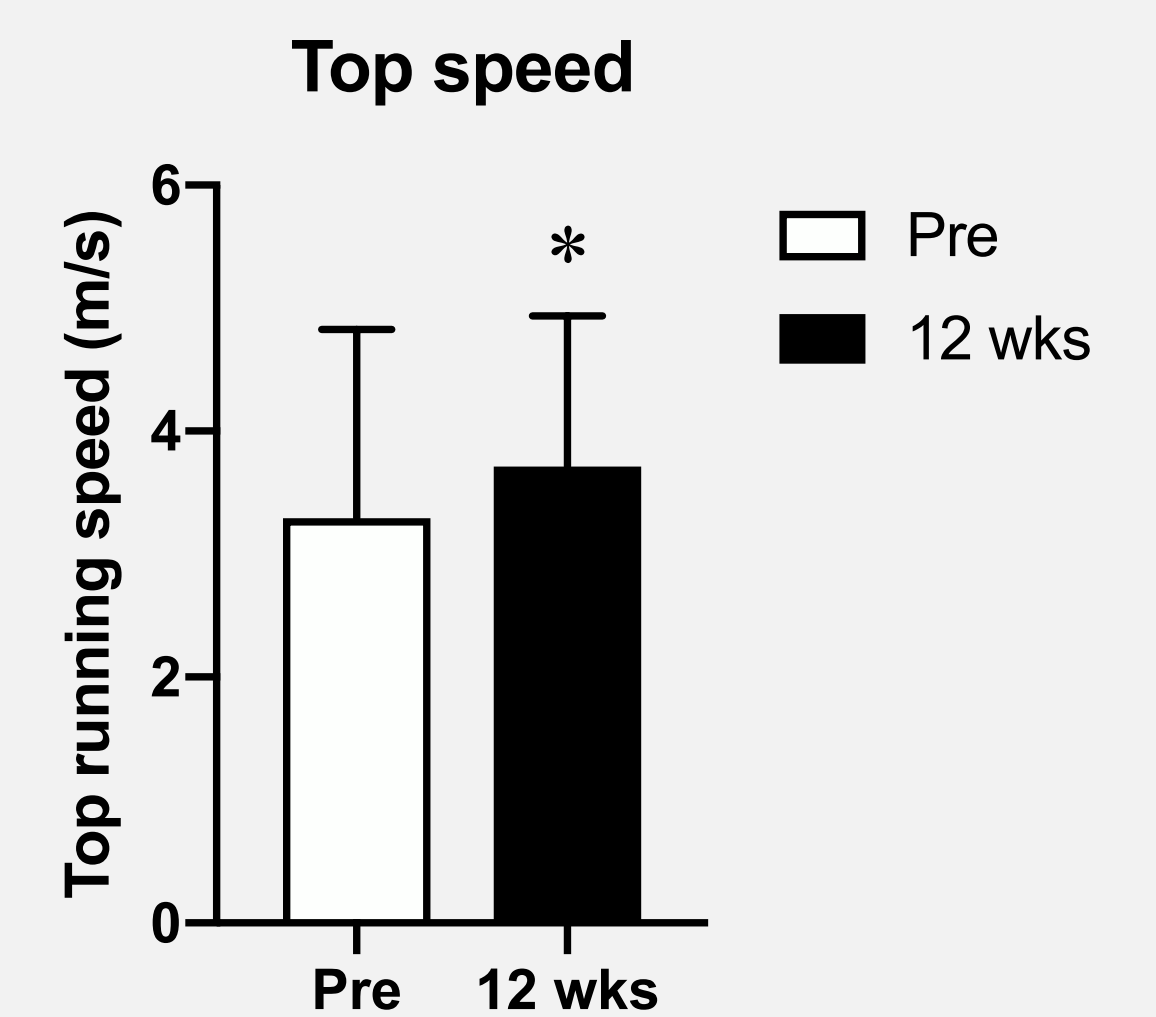
Aerobic capacity increased on average 36% (6-min Racerunning test distance; pre 576 ± 325 m vs. post 765 ± 428 m, $p < 0.001$). Average and maximum heart rate during the 6-min Racerunning test was not different pre vs. post training. Mean top speed increased from 3.3 m/s to 3.7 m/s ($p < 0.05$). Individual top speed improved on average 21% over 12 weeks of training. Muscle thickness of m. gastrocnemius increased in response to training ($p < 0.05$) on the more affected side. Neither pROM (hip, knee and ankle) nor spasticity were affected by 12 weeks of Racerunning training.

A



6-minute test pre vs post training, * denotes $p < 0.05$

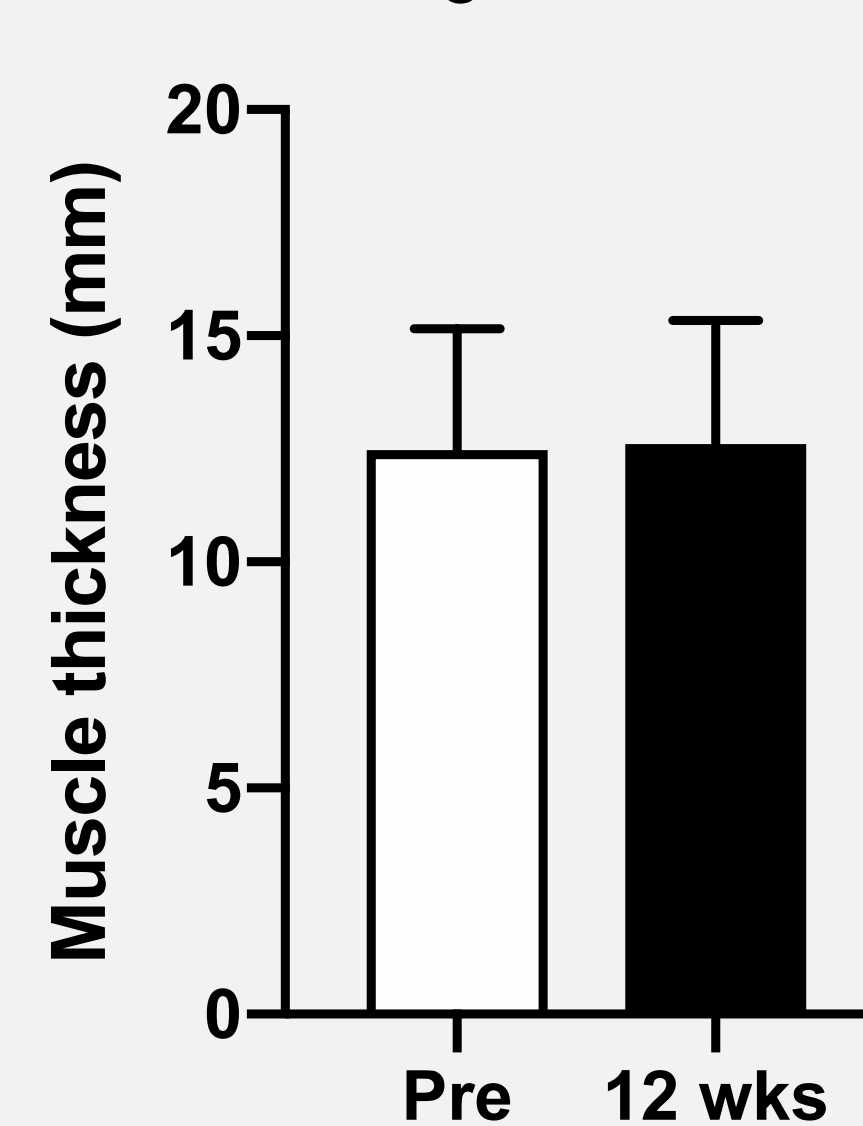
B



Top speed measured with trip-computer pre vs post training,

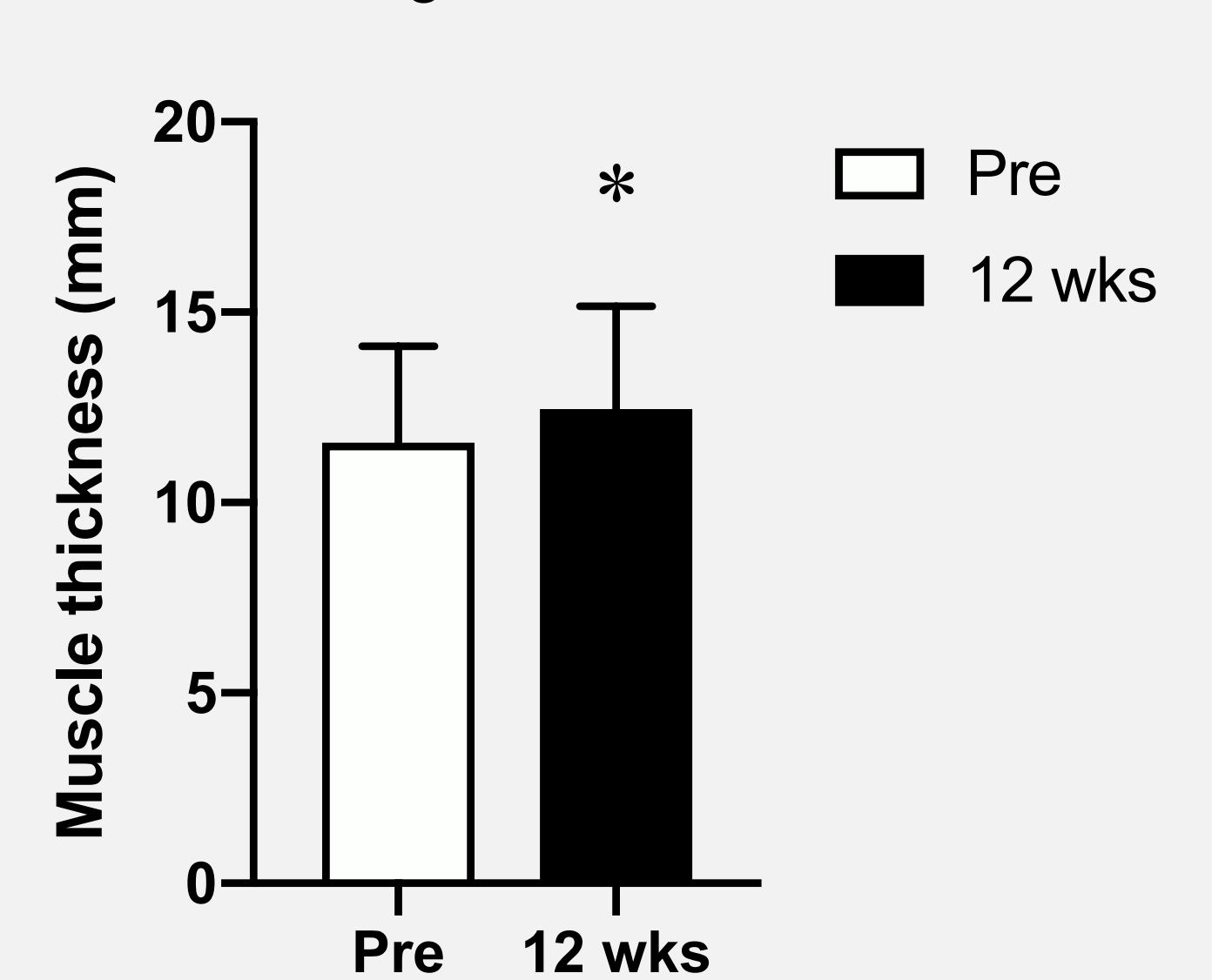
A

Less affected gastrocnemius muscle



B

More affected gastrocnemius muscle



Muscle thickness of the gastrocnemius muscle of A) the less affected side and B) more affected side pre vs post training.

Other plans

Ongoing research aims at investigating the effects of Racerunning training on health related quality of life and physical self perception. We are also aiming to define physiological parameters of importance for Racerunning capacity.

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