



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ



EXECCP-seminaari

**Näyttöön perustuvaa liikunnallista
kuntoutusta henkilöille, joilla on
cp-vamma**

Ohjelma



11.00: Tilaisuuden avaus, professori **Taija Juutinen**, Jyväskylän yliopisto

11.10: CP-vamman etiologia, diagnostiikka ja kuntoutusmahdollisuudet eri ikäisillä lapsilla ja nuorilla, lastenneurologian erikoislääkäri **Silva Löö**, HUS Neurokeskus

11.50: Liikunnallisesti aktiivinen elämäntapa terveyden ja toimintakyvyn tukena, tutkijatohtori **Tiina Savikangas**, Jyväskylän yliopisto

12.10: Proprioseptiikka ja CP-vamma – liikeaistin merkitys liikkumiskyvylle, professori **Harri Piitulainen**, Jyväskylän yliopisto

12.30: Lounas (omakustanteinen)

13.15: Liikunnallisella kuntoutuksella parempaa toimintakykyä in **ENGLISH**

13.15: Increasing motor function in spastic CP, Postdoctoral Researcher **Pedro Valadão**,

13.45: The EXECCP exercises and their modifications for individual needs, Postdoctoral Researcher **Pedro Valadão**, University of Jyväskylä

14.30–15.00: Discussion

15.00: Yhteenveto Yliopistonlehtori **Eero Haapala**, Jyväskylän yliopisto

Siirtyminen Liikunta-rakennuksen kuntosalille

15.45–17.00: Käytännön harjoitukset kuntosalilla (valinnainen osuus)



osf.io/4kbjh/

EXercise for Cerebral Palsy

Research group: **Taija Finni, Pedro Valadao, Harri Piitulainen, Janne Avela, Eero Haapala, Francesco Cenni, Tiina Parviainen, Tiina Savikangas, Alfredo Ruiz, Maija Piiparinen**

Funding: Ministry of Education and Culture, Finland, Research Council of Finland, Cerebral Palsy Alliance Research Foundation, Finnish Cultural Foundation, Olvi säätiö, Jane ja Aatos Erkon säätiö

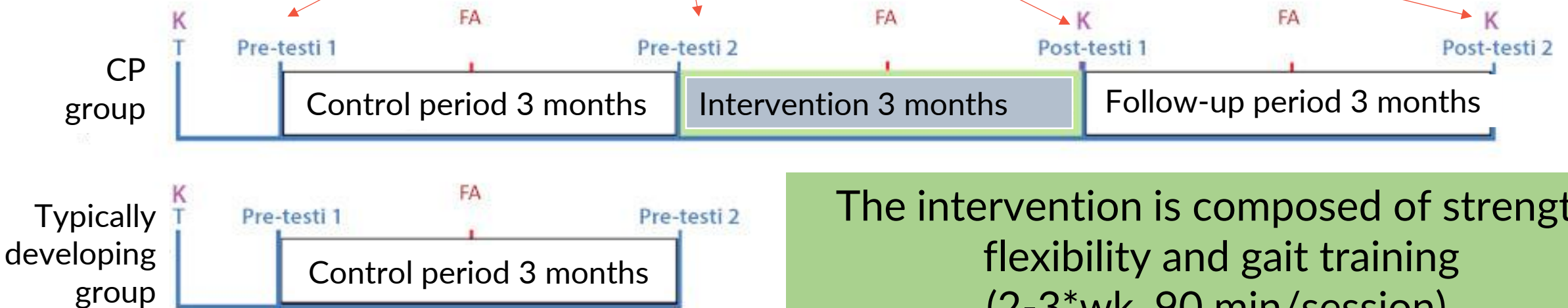




Valadao et al. 2021: <https://pubmed.ncbi.nlm.nih.gov/33637124/>

Three visits to laboratory:

- 1: Strength, flexibility, spinal reflexes, tonic stretch reflex threshold
- 2: Blood sample, arterial stiffness, body composition, 3D gait, 6minwt
- 3: MEG for cortical proprioception processing, cortico-muscular coherence



The intervention is composed of strength, flexibility and gait training (2-3*wk, 90 min/session).



Strength and stretching exercises

<https://www.youtube.com/@EXECP-kv4io>



around here less than 40° is considered short hamstring muscles. So if from



The knee flexion exercise. The main things to focus on are first of



For this squat exercise the main preoccupation is to avoid hip adduction during the movement.





Gait training

Valadão et al. (2024) https://journals.lww.com/acsm-msse/fulltext/2024/01000/effects_of_the_exe cp_intervention_on_motor.1.aspx#



Mechanical treadmill with adjustable inclination
(Vida XL, Venlo, Netherlands)

Total training volume:

29 ± 4 (range 24–36) training sessions:

- 360–1984 min (683 ± 352 min) of gait
- 32–96 min (67 ± 16 min) of stretching

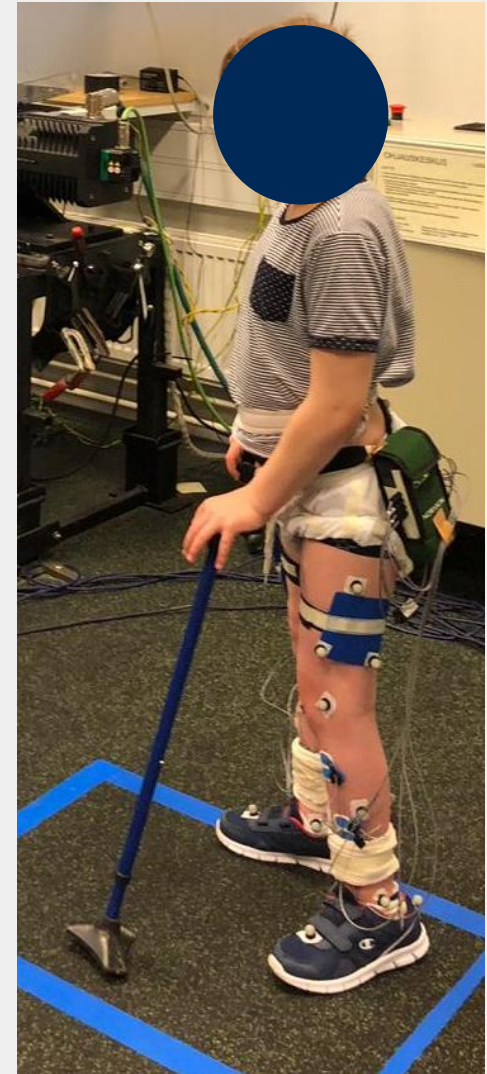
In a total of 529 training sessions:

- 12 complaints of acute knee pain (2%) by four participants, which subsided in the same day
- 3 complaints about muscle soreness
- 1 knee pain complaint subsided after further gait training instruction



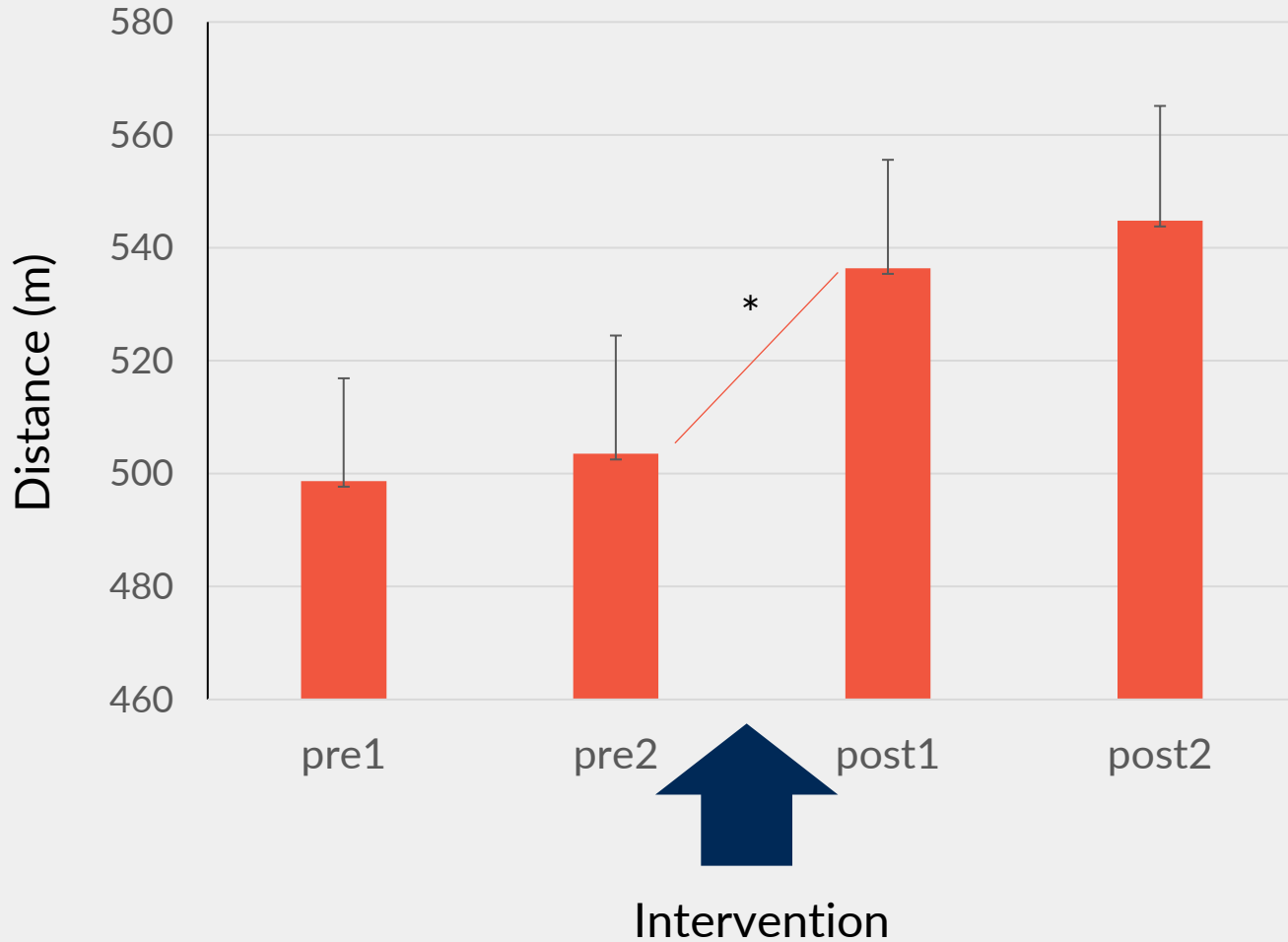
After the intervention

- Walking ability ↑
- Motor Function ↑
- Muscle Strength (thigh and trunk muscles) ↑
- Flexibility (hip and knee joints) ↑
- No changes in strength for shank muscles =
- No changes in cardiometabolic risk factors =
(blood pressure, BW, fat %, pulse wave vel)
- No side-effects 😊



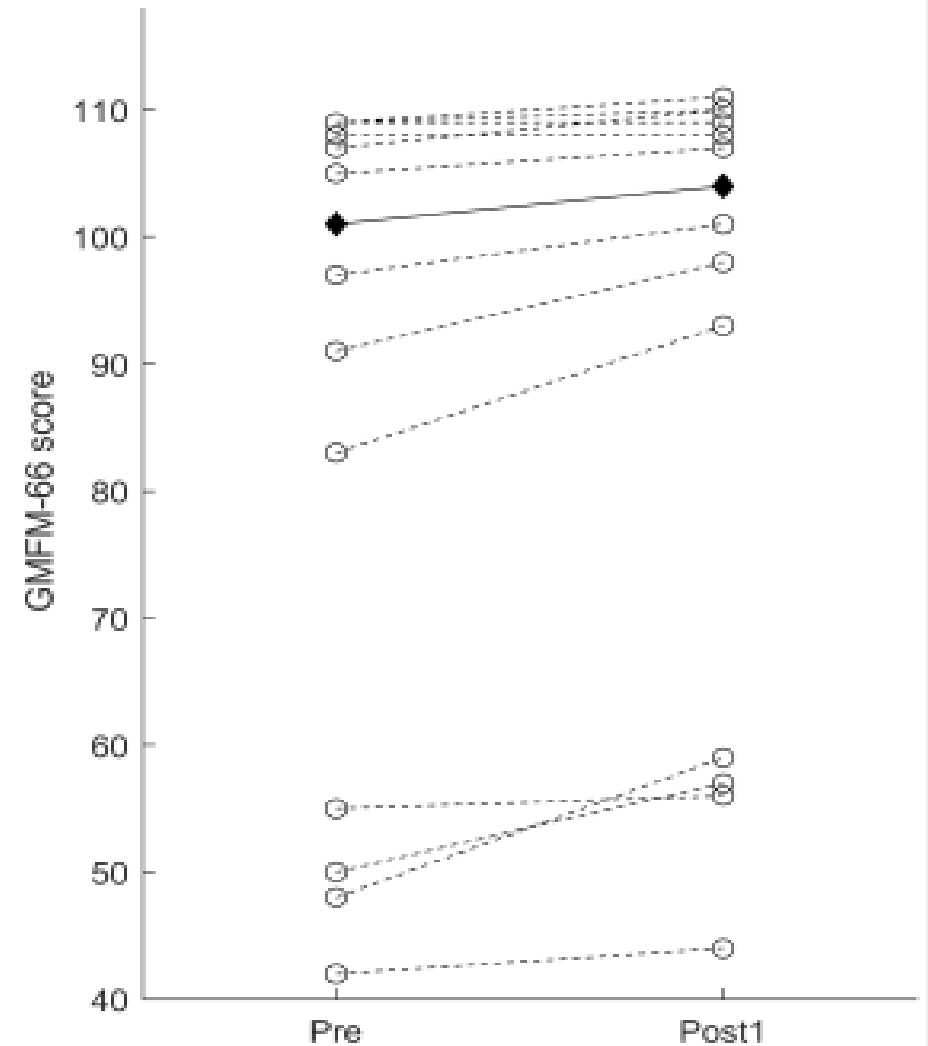


6 minute walking test



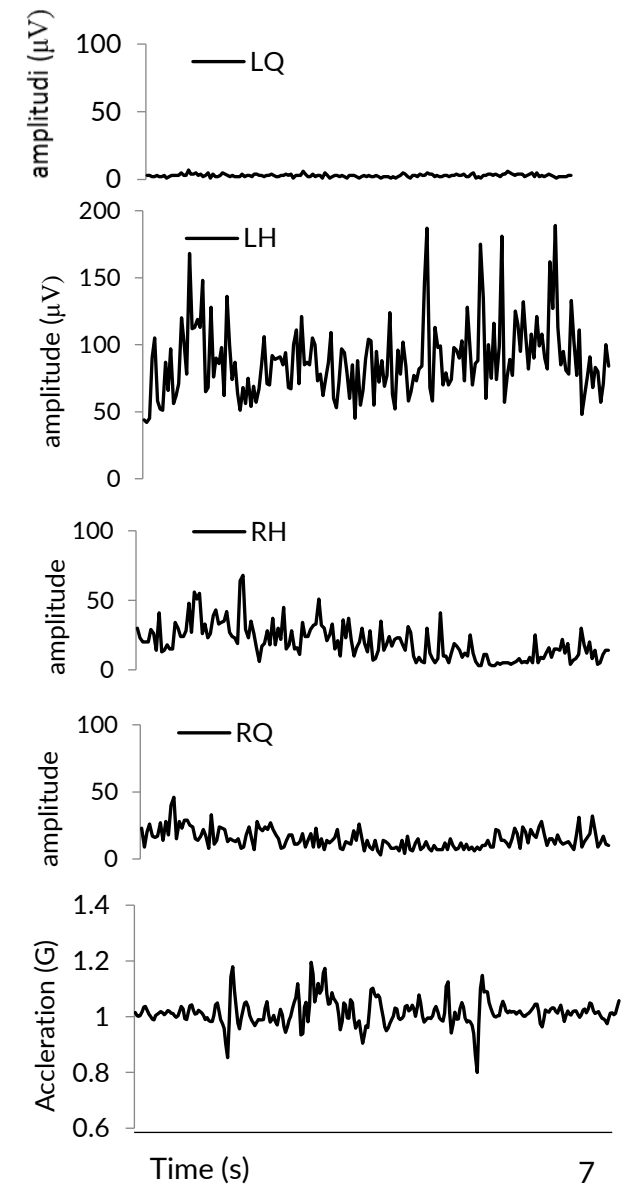
Improvements in Function

GMFM dimensions D (standing) and E (walking, running and jumping).





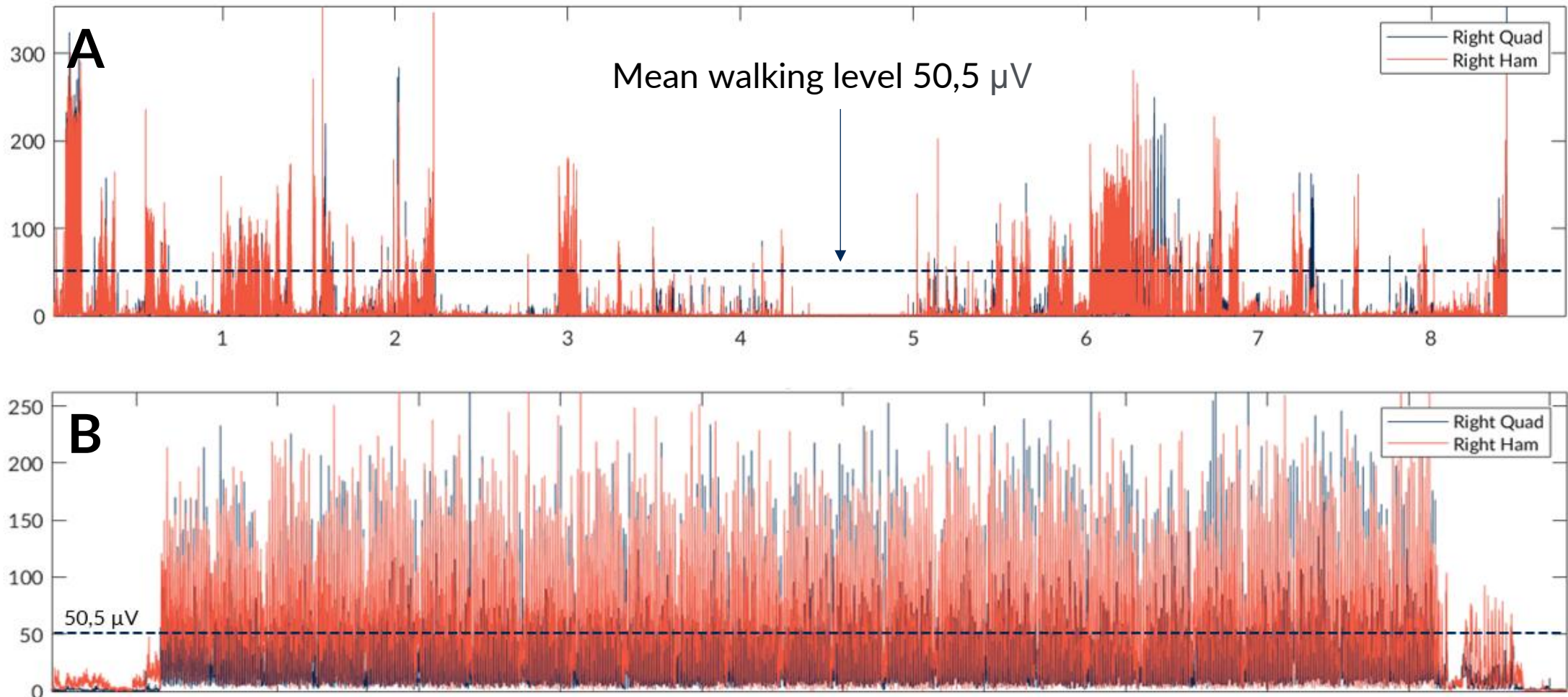
Thigh muscle EMG





Daily thigh muscle activity

Piiparinen et al. manuscript



Example EMG data. Data was normalized to a 2 min period from the average of 6-minute walking test. A: EMG activity during the entire day. B: EMG during 6-minute walking test.



Take home messages

EXECp-training was effective and safe.

Training should be frequent, otherwise gains will regress

The intervention was not able to attenuate cardiometabolic risk factors. Aerobic exercise is required!