

Effect of Whole-Body Vibration on Voluntary Muscle Activation and Spasticity in Children with Cerebral Palsy: A Randomized Cross-Over Pilot Study.

A. Thijs¹, H. Baur²

¹Center of Development Advancement and pediatric Neurorehabilitation of the Wildermeth Foundation, Biel/Bienne, Switzerland, ²University of Applied Science, Department Health

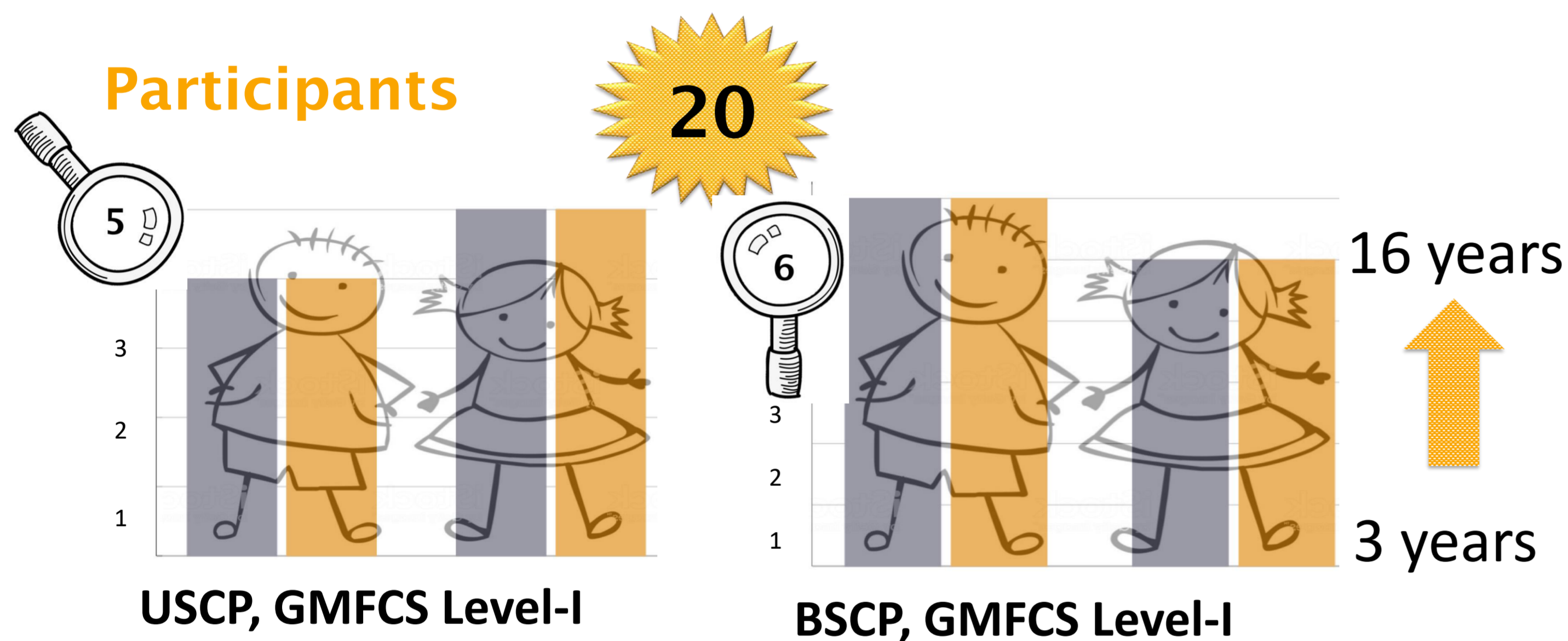
Purpose

This study examined the effect of a 3-minute whole-body vibration on voluntary muscle activation and spasticity for ensuing physiotherapeutic treatment in children with cerebral palsy (CP).

Background

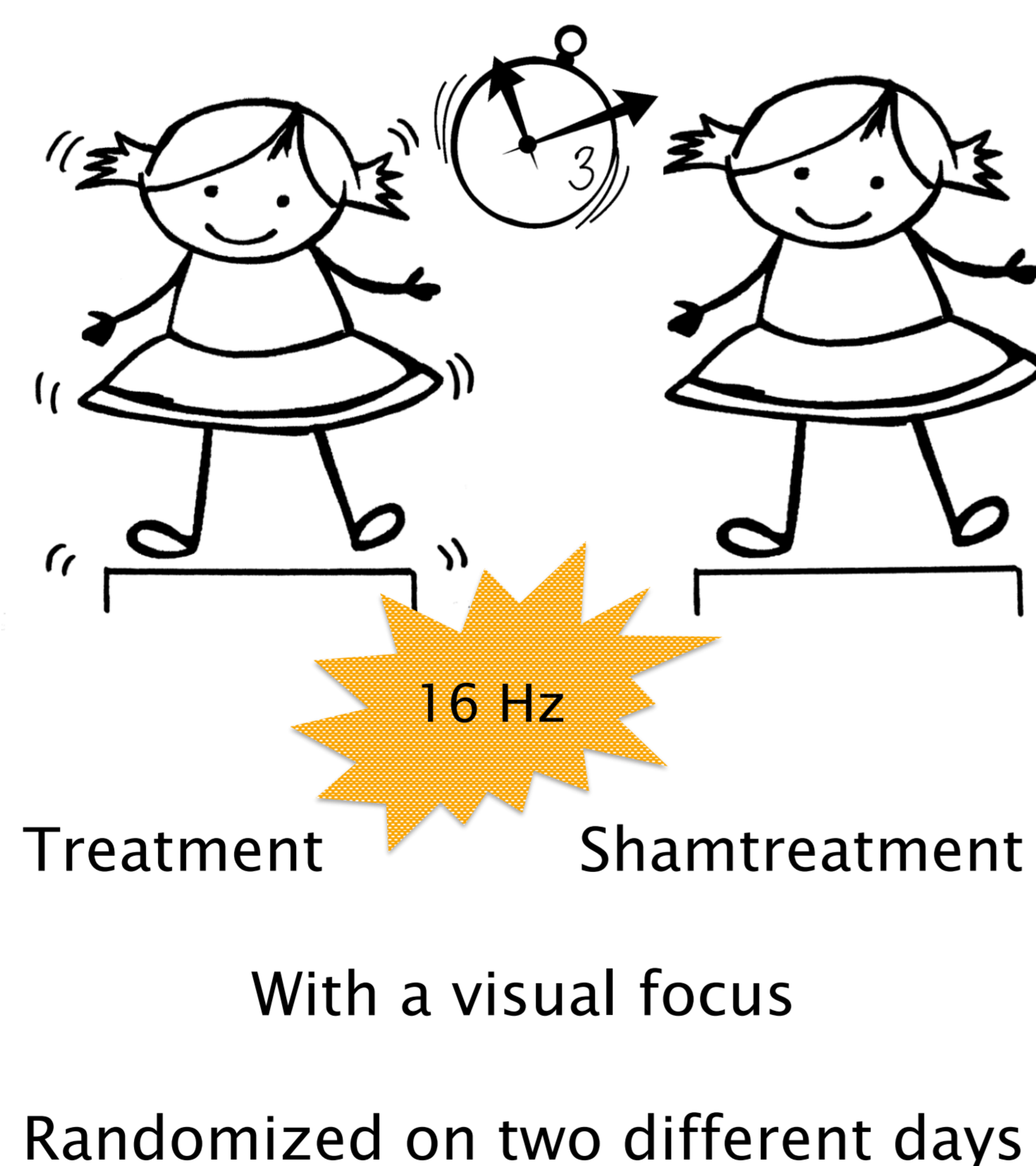
- Cerebral Palsy is one of the most common causes of motor deficiency in young children and can be characterized by spasticity.¹
- Spasticity can lead to structural changes of the muscle and shortening of the hypertonic muscle and restriction of movement.
- Whole-Body vibration should increase spinal excitability and induces I-a afferent reflex activation in a healthy population.

Participants



Methods

- Order of measurements:
 - M1 = pretest
 - M2 = posttest 5 minutes
 - 25 minutes physiotherapy
 - M3 = posttest 30 minutes
- EMG of maximal voluntary muscle activation (VA) of m. gastrocnemius, m. soleus, m. tibialis anterior.



Results

- Pre- to post VA-enhancements (M1 - M2 & M1 - M3) for all muscles, as well for treatment as for sham-treatment (a-asymptotic Wilcoxon test, $z = -3.92$, $p < 0.001$, $r = 0.62$).
- Between subject effects not significant for VA.

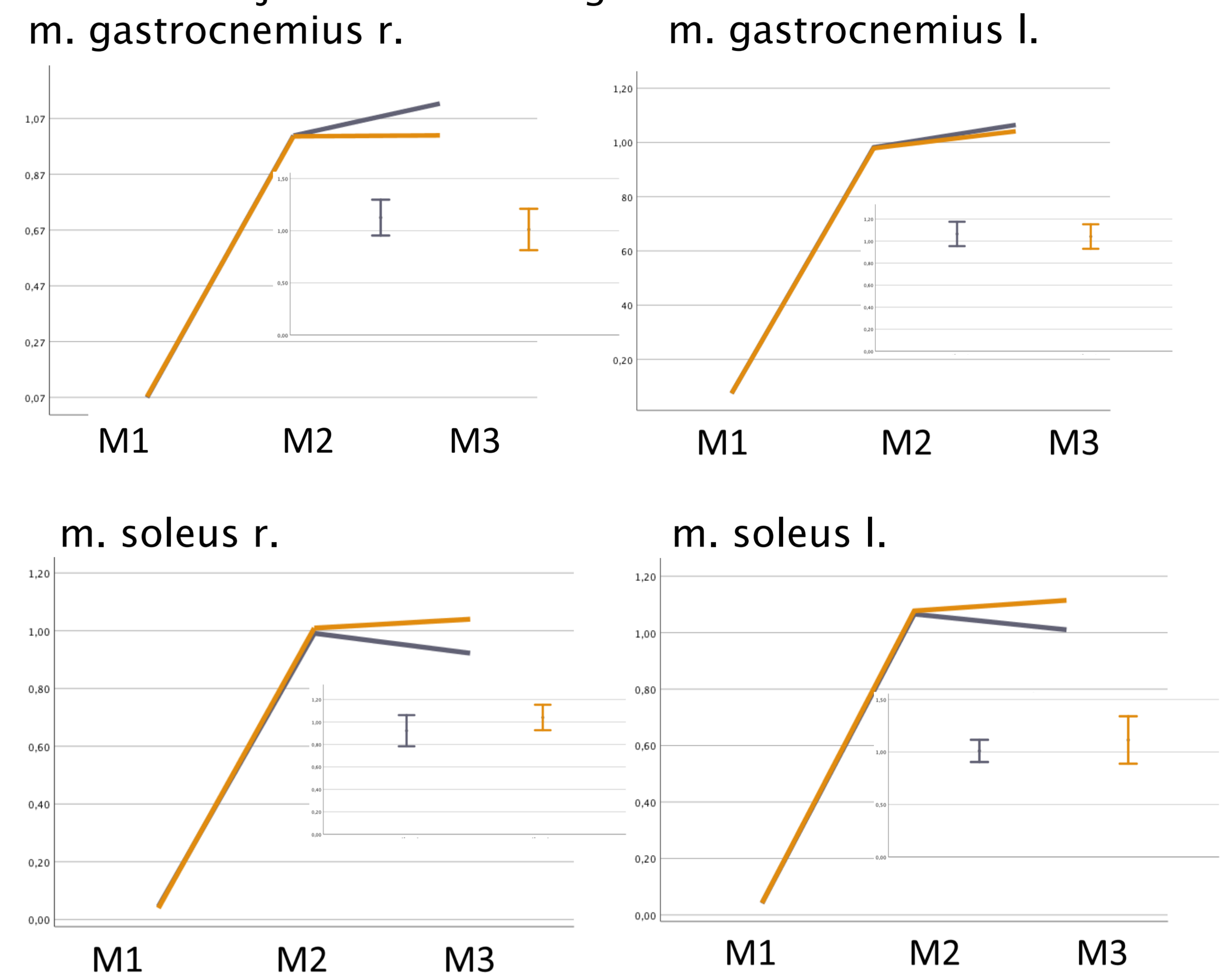
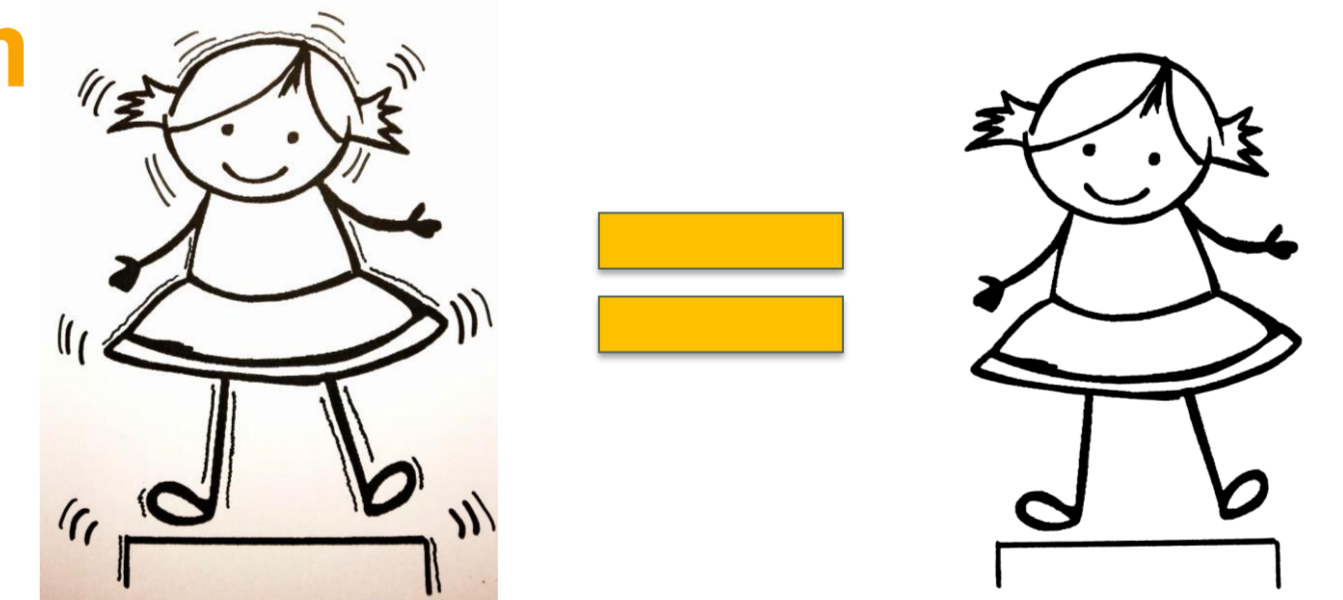


Figure 1 Mean Values of the VA, measurement time M1 - M3, with their CI at measurement time M3. Two-way ANOVA for repeated measures in one factor (time).

Discussion & Conclusion



- No significant differences were found between the intervention vibration and the intervention no-vibration.
- This study is the first to investigate a homogenous group of children with cerebral palsy at GMFCS level-I concerning whole-body vibration.
- GMFCS Level-I might be too high and the impact of the spasticity too small for the low frequency and low amplitude level presented in this study.
- Further Investigation on balance training with a visual focus should be considered.

References

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Keywords

cerebral palsy, whole-body vibration, spasticity, voluntary muscle activation

Ethics approval

The Cantonal Ethics Committee approved the study for research in Bern (KEK 2018 -00750, study registration at the German Register for Clinical Studies: DRKS00016036).

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