

Effect of Continuous Audio Biofeedback in Elderly on the Respect of a Partial Weight-Bearing in an Acute Context - A Randomised Pilot Trial

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Introduction

- Partial weight-bearing (PWB) prescription after lower limb surgery: gold standard treatment (American Academy of Orthopedic Surgeons guidelines)¹
- Adherence to PWB: challenging for the elderly
- Teaching PWB using a bathroom scale: low reliability²
- Use of audio biofeedback (AB): valid for PWB instruction and improving compliance^{3,4,5}

Aims

- **Efficacy** of a continuous AB during functional activities on PWB compliance in persons over 60 years using OpenGo insoles compared to AB only during training
- **Feasibility** of OpenGo insoles use to assess PWB loading
- **Influence** of cognitive impairment and age on PWB compliance

Methods



Twenty volunteers over 60 years after a lower limb surgery and with a PWB



Intervention group (IC) → AB during initial PWB training and measurement (n=10)
Control group (CG) → AB only during training. (n=10)

Outcomes



Individual deviation from the PWB recommendation measured by the PWB loading (ground reaction force)
 Influence of the participant's cognitive level and age



Measured Activities

Walking, walking with a 5kg backpack, sit-stand-sit and standing using the validated tool OpenGo insole⁶



Statistical analyses

Two sample t-test with significance at a p-value < 0.05
 Linear regression (Influence of the participant's cognitive level and age)



OpenGo system through the participant's experience during the trial

References

- ¹ Kammerlander et al. Journal of Bone and Joint Surgery. 2018
² Raaben et al. Trials. 2018
³ Jagtenberg et al. Journal of Rehabilitation Medicine. 2020
⁴ Braun et al. International Orthopaedics. 2017
⁵ Cramer et al. Sensors. 2022
⁶ Moticon ReGo AG. 2020

Results



None of the participants respected their PWB for 4/4 activities

Better PWB management for IC for 3/4 activities

No statistical significance between the means relative deviations



No influence of advanced age or low MoCA

Good satisfaction with OpenGo insoles concerning handling an comfort



Activities	IC n=10*	CG n=10*	CI 95%	p-value
Walking 3 minutes	127.7±121.9	116.0±133.0	[-143.5;120.1]	0.85
Walking with a 5kg backpack	104.4±144.2	164.5±164.5	[-89.4;209.5]	0.41
Standing	8.0±102.3	38.8±131.7	[-80.6;142.0]	0.57
Sit-stand-sit	57.6±107.2	86.8±122.4	[-79.0;137.5]	0.58

Legend: data expressed as: relative deviation in % from PWB recommendation ± SD (standard deviation)
 * non-usable data are not included in the analysis

Discussion and Conclusion

- ✓ Compliance with PWB after an initial training session is low despite the use of continuous AB.
- ✓ Use of AB system via insole → advantageous tool to measure postoperative PWB but probably more training session needed to comply with PWB specifications.
- ✓ In this trial: high MoCA scores not indicative for cognitive impairment and therefore no potential influence on PWB compliance could be observed.



Take Home Message

The instruction of a PWB with continuous AB has potential for daily practice - further research on the continuous use of audiofeedback is warranted

