

# The FLOAT: Interactive BWS training of everyday walking challenges in 4 dimensions

M. Bannwart<sup>1</sup>; G. Rauter<sup>1,2,\*</sup>; A. Curt<sup>1</sup>; M. Bolliger<sup>1</sup>

## Background

Extensive **locomotor training** is essential <sup>[1]</sup> to relearn walking

- provides functional input
- promotes plasticity

**Robotic gait therapy** is well established <sup>[2]</sup> but

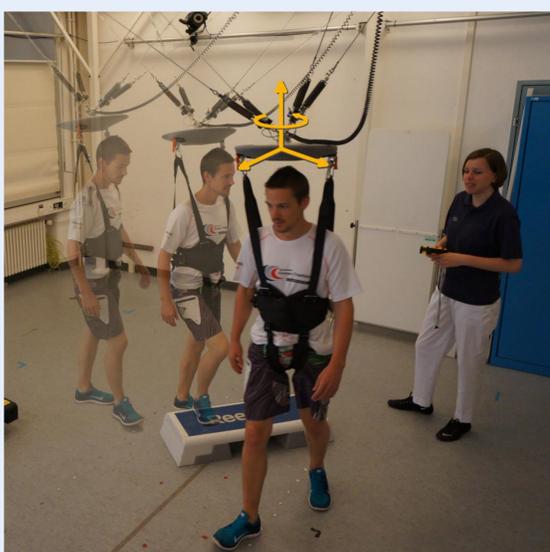
- few and spatially limited tasks <sup>[3]</sup>
- precludes active participation <sup>[4]</sup>
- limits training of daily activities

## Project Goals

**Enhance gait therapy** by

- improving usability for therapists
- providing task-specific support
- developing training modes in 4D for everyday walking tasks
- creating motivating virtual reality scenarios

## Providing Task-Specific Support through the FLOAT



4D gait training in the FLOAT

Multidirectional overhead body-weight support (BWS) system **The FLOAT<sup>5</sup>**

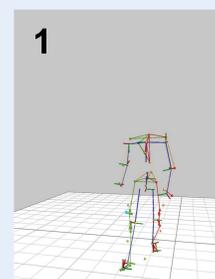
- enables unrestricted over-ground walking
- supplies BWS during training in 4D
- fall prevention



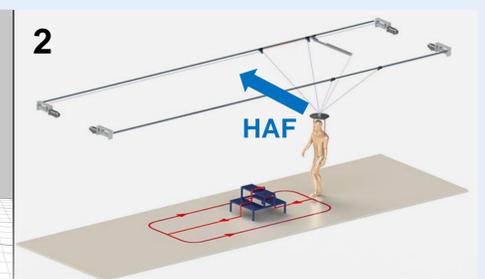
*training of everyday walking tasks*

**Controllers** are required that

- are based on results and knowledge from gait analysis
- enable haptic assistive forces (HAF) in a safe way, e.g. through potential fields



Gait analysis

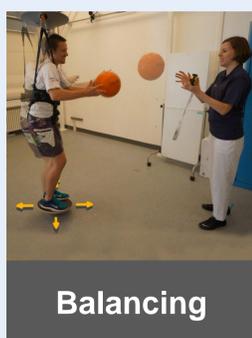


Haptic assistive forces

## Training of Everyday Challenges



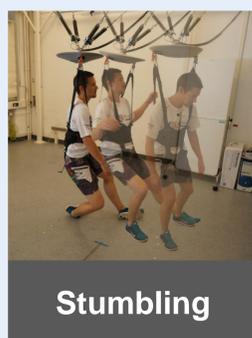
Sit and stand



Balancing



Climbing stairs



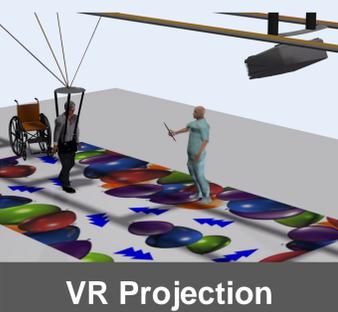
Stumbling



Arbitrary path walking

- maximized challenge in a safe environment
- adapted body-weight support and training tasks according to needs
- support/resistance in movement direction
- increased walking confidence

## Virtual Reality Scenarios



VR Projection

- increased motivation
- adaptable task difficulty
- increased immersion during training of activities of daily living
- simple presentation of instructions and feedback



Creek crossing



Discovery / Follow

## References

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