C-MILL THERAPY IMPROVES GAIT ADAPTABILITY IN THE CHRONIC PHASE AFTER STROKE
Heeren J1,2, van Ooijen M1, Janssen T4,5, Beek P4, Geurts A1,2,3, Roerdink M4, Weerdesteyn V1,2,3

1Radboud University Nijmegen Medical Centre, Nijmegen Centre for Evidence Based Practice, Department of Rehabilitation, the Netherlands
2Sint Maartenskliniek, Centre for Rehabilitation, Nijmegen, the Netherlands
3Sint Maartenskliniek Research, Development & Education, Nijmegen, the Netherlands
4Research Institute MOVE, Faculty of Human Movement Sciences, VU University, Amsterdam, the Netherlands
5Amsterdam Rehabilitation Research Institute, Reade, Amsterdam, the Netherlands

Background and aim: People with stroke are at increased risk of falling, which may be related to their reduced ability to make step adaptations during standing and walking1. The C-Mill is a novel instrumented treadmill with visual context presented via a projector (i.e. targets, obstacles), designed to train gait adaptability in a safe environment. C-Mill therapy is task-specific, repetitive, intensive and provides feedback on performance, thereby adhering to evidence-based guidelines for effective gait rehabilitation2. In this proof of concept study we aimed to identify whether and by which mechanisms step adaptations improve after C-Mill therapy.

Methods: A total of 14 community-dwelling persons in the chronic phase after stroke (age 38-61 yrs, FAC 4-5, BBS 48-56) were referred by their physiatrist for C-Mill therapy. Participants received 10 C-Mill therapy sessions (1 hour each, 5 weeks). Pre- and post-intervention tests included the Berg Balance Scale [BBS], Timed Up-and-Go [TUG], 10meter walking test [10MWT] and Trunk Impairment Scale [TIS]. In addition, we conducted instrumented assessments of obstacle avoidance ability during walking and step adaptability during stance in response to a displacing stepping target.

Results: After C-Mill therapy BBS, TUG and 10MWT improved significantly (all p<0.05), while the TIS did not (p=0.584). The ability to avoid sudden obstacles during walking also improved significantly (success rates mean ± sd; 59±16% vs 83±14%, p<0.001). The steps towards the displacing target showed a non-significant decrease in foot placement error (mean±sd; 50±32mm vs 44±27mm, p=0.24).

Conclusion: These first results suggest that C-Mill therapy is a promising therapeutic tool to improve gait adaptability in people with stroke. It is for future research to investigate its potential benefits on the risk of falling in daily life.

1. Nonnekes JH et al. NNR, 24(4):2010:393-400

Word count: 291

Acknowledgement: This project was funded by the Dutch Brain Society