Reviewer’s report


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Reviewer: Rob den Otter

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Minor Essential Revisions

Introduction: Visual cue training will take place on the treadmill and overground. The difference between these two condition may be stressed more. For instance, visual cue training on the treadmill is likely to add an element of time criticality to the stepping task, which may (or may not?) be exploited during training.

Introduction: Although gait asymmetry after stroke has been shown to be correlated with gait speed and functional measures, the idea that functional gait/balance training should involve normalization of symmetry measures is controversial (see e.g. Griffin et al 1995, Gait & Posture; Latash & Anson for a more general point of view on the topic). The authors may want to more elaborately explain why they think that symmetry is important (e.g. by providing a few more references).

Discretionary Revisions

Abstract/outcome measures: it is not clear what the ‘novel assessment of step length adaptability’ refers to (I suppose this refers to the success rate in target stepping?). Please specify.

Abstract/ Design: (…) remained blind to allocation’(…) [spelling]

Introduction: Perhaps the authors may spend a few more words on why they think the suggested intervention has potential to improve ‘adaptability’ and speed, and why it may help to reduce proneness to falling. E.g. with respect to the latter: the modification of step width or length changes the relation between the base of support and the center of mass, the regulation of which is crucial for dynamic balance control.

Introduction: Since (both overground and on the treadmill) the visual cues as they are described in the paper can be observed a few steps ahead, the adaptive stepping that is induced/trained will primarily address the pro-active and to a lesser extent the reactive aspects of stepping adaptability. Note that in many falling accidents the reactive component may be more important (as in slips, pushes etc.). The authors may wish to address this issue, e.g. somewhere in the Introduction.

Introduction 3rd paragraph: The authors may want to more specifically define
what the term ‘coordination’ refers to in this context: does it reflect spatial/temporal step asymmetry, limb phasing, etc. or all of these?

Introduction 3rd paragraph: reference to [8] refers to the use of implicit learning only, can the authors also provide references to support the other assumptions (task specificity, intensity etc. See e.g. work by Kwakkel et al.).

Introduction 5th paragraph: the authors may want to be more specific about what aspects of gait recovery and adaptability the expect the intervention to be effective. Do they expect recovery at the level of function (e.g. strength) or at the functional/coordinative level ? I suspect the latter is the case, but please specify. Similarly, which aspects of adaptability are targeted specifically by the treatment?

Methods: I suppose that stratification of patients will be done on the basis over overground rather than treadmill speed? The authors may want to clarify this under ‘design’ of the Methods section.

Methods/Randomization (header/ first sentence): Use either randomization or randomization, consistently [spelling].

Methods, Randomization: given the presented procedure, there is a possibility that somewhere along the line patients in one of the groups will not be needed for inclusion. How will the authors solve this problem without affecting the randomization?

Methods/Interventions: ‘(…) mechanically aided rehabilitation approaches are favored from motor learning and motor control perspectives (..)’. I am not convinced: the clinical evidence for the efficacy of mech. aided gait training has been quite inconclusive so far, and the usefulness of e.g. movement guidance in robotic gait trainers is still quite controversial. In addition, reference [24] primarily deals with robotic training, and it is not evident how this justifies the investigation of the ‘potential efficacy, feasibility etc.’ of visual cue training.

Methods/Intervention: ‘All treatments will share the same frequency, duration and intensity’. The authors may want to specify this in more detail, because it is unlikely that during overground training the same number of steps can be produced than on the treadmill within the same amount of time. Do the authors wish to maintain e.g. equal session durations for all 3 treatments?

VCT interventions/i. Training of speed and symmetry: I am not sure what ‘the height’ (I assume the targets are flat?) and ‘the length’ (inter-target distance?) of the targets (line 6 and 8) refers to exactly.

VCT interventions/i. With regard to overground training, will any instructions on gait speed be given? This may be relevant since step length are known to depend on gait speed.

VCT interventions/i. Training of speed and symmetry: Since the relation between spatial/temporal step symmetry, and gait ability/gait speed are quite complex (see e.g. Patterson et al. 2008, Gait & Posture), the authors may want to spend a
few words (in the interventions section or the Introduction?) on why they think this is an aspect of hemiparetic gait that should be targeted (see also earlier comment on Introduction).

VCT interventions/i.: Treatment will progress in phases (as shown in Table 1) and the phases are linked to defined treatment goals. How will training/treatment continue if a patient does not meet a particular sub-goal (will the phase be extended or..)?

Primary measures of walking ability: Can the authors specify how they intend to obtain quantitative information on ‘stepping strategies’ from the GaitRite data?

Primary measures of walking ability: ‘A target is classified as missed if the participant is unable to place (the?) foot accurately on the target’. How is accuracy assessed? Is this done by visual assessment?

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

'I declare that I have no competing interests'