Reviewer’s report

Title: Pilot study of locomotor training using Hybrid Assistive Limb in chronic stroke patients

Version: 1 Date: 22 May 2013

Reviewer: Marco Iosa

Reviewer’s report:

This study aims to investigate the effects on gait recovery of patients with chronic stroke using an ambulatory exoskeleton (HAL) during rehabilitation.

The main problem of this study is the absence of a control group of patients performing conventional therapy for the same amount of time of the experimental group. I would suggest to the authors to include a control group, train it with conventional therapy focused on walking recovery for 8 weeks, 2 days at week, and then re-submit the study. Due to the high heterogeneity of experimental group (ischemia, haemorragia, moyamoya…), control group should at least roughly match the features of experimental one. There are problems also with statistics and the application of the protocol (8 weeks?) is unclear. So, despite I judge positive the work using HAL, there are many issues that should be faced:

1) ADD CONTROLS
2) CHANGE STATISTICS USING NON PARAMETRIC TESTS
3) EXPLAIN INCONGRUENCES BETWEEN METHODS AND RESULTS

SPECIFIC COMMENTS

1. This sentence “Patients with impaired walking ability caused by lower-limb paralysis often become dependent on a wheelchair or may even be bedridden.” needs a reference. For example Paolucci et al. 2008.

2. In the Introduction, authors differentiated between exoskeleton and end-effector and between treadmill needing the assistance of 1-2 therapists vs. robots needing less assistance. However, in my opinion, it is important also to introduce the differentiation between ambulatory vs. non ambulatory robots. HAL system is an ambulatory robots allowing patients to walk overground or in more natural environment than devices such as Lokomat or Gait Trainer that performed a simulated walking on a treadmill and in place (not moving around). In this, HAL seems to be closer to physiological gait, and authors should highlight it.

3. Being the scores of clinical scales ordinal and not continuous, non-parametric statistics should be used (also for the small sample size). So Wilcoxon’s test should be used instead of Student’s t-test.

4. It is unclear the sentence “The mean duration of the intervention period was 10.6 ± 4.3 weeks in all patients” when in Methods section it has been declared
that the protocol lasted 8 weeks. In general it seems from Results that each rehabilitative pathway has been tailored also in length on patient’s needs and not planned before.

5. In discussion authors introduced the problem of passive vs. active robotic rehabilitation, relating it to motor learning. Discussion would benefit from introducing the concept of buttom up vs. top down rehabilitative approaches.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I have no competing interests in reviewing this paper