Llorens Rodríguez, R.; Noé Sebastián, E.; Colomer, C.; Alcañiz Raya, ML. (2015). Effectiveness, usability, and cost-benefit of a virtual reality-based telerehabilitation program for balance recovery after stroke: a randomized controlled trial - The authors respond. Archives of Physical Medicine and Rehabilitation. 96(8):1544-1547. doi:10.1016/j.apmr.2015.04.006.

The authors respond

We thank our colleague for the interest in our article[1] and the editors for the chance to clarify the text.

First, we agree that the limitation in the length of the article could have derived in insufficient report of visual feedback. In essence, the virtual environment (VE) consisted of a checkered floor, whose center was indicated by a darkened circle, and jelly items that rose from the ground around the circle (Figure 1). The VE was represented from an overhead and slightly backward one-point perspective to allow users to perceive their peripersonal space in all directions. The user was represented with a third person view by a simplified avatar consisting of two feet. As stated, the goal of the exercise was to reach the items with the nearest feet while maintaining the supporting foot within the circle. After reaching the item, the extended extremity had to be recruited to the body within the boundaries of the circle (some arrows indicated this requirement in the VE). Otherwise the exercise did not allow new items to be reached (the feet turned red).

Visual feedback is a well-known key aspect for motor learning, more importantly after stroke.[2] However, the article referred by our colleagues does not determine that "some designs promote change better than others" but how feedback affects postural control. Better conclusions about the effects of force platform feedback on balance training after stroke can be derived from a Cochrane review.[3] In addition, the referred paper studies the role of visual feedback on the use of the ankle and hip strategies in young healthy population. In contrast, our study focused on the use of the stepping strategy (which goes beyond unilateral balance training) to improve balance in stroke population,[1] preventing extrapolation of the results. We kindly refer our colleagues to a previous study of our group, where a force platform VR-based system

was used to improve balance in a stroke group through the training of the ankle and hip strategies with promising results.[4]

Second, as stated in the text all the participants trained skills not related to balance twice a week to complement the VR-based balance training. Specifically, these sessions mostly focused on upper-limb training, including active and assisted movements, joint mobilization, muscle toning, strengthening, sensory retraining (based on Perfetti's method), and manual fine dexterity exercises. Hence, participants did not train balance-related skills during the complementary sessions, assuring that improvements in balance were promoted by the VR-based intervention.

Finally, a controlled trial is just a study where all the participants are treated the same regardless their group except for a factor that is unique to that group, which is usually the intervention. However, it does not imply that a group undergoes a traditional/conventional (or placebo) intervention. It is determined by the objectives of the study. In our particular case, the effectiveness of the VR-based intervention in comparison with a conventional physical therapy program had been already determined.[5]

References

1. Llorens R, Noe E, Colomer C, Alcaniz M. Effectiveness, usability, and cost-benefit of a virtual reality-based telerehabilitation program for balance recovery after stroke: a randomized controlled trial. Archives of physical medicine and rehabilitation. Mar 2015;96(3):418-425 e412.

2. Navalon N, Verdecho I, Llorens R, et al. Progression of posturographic findings after acquired brain injury. Brain injury. 2014;28(11):1417-1424.

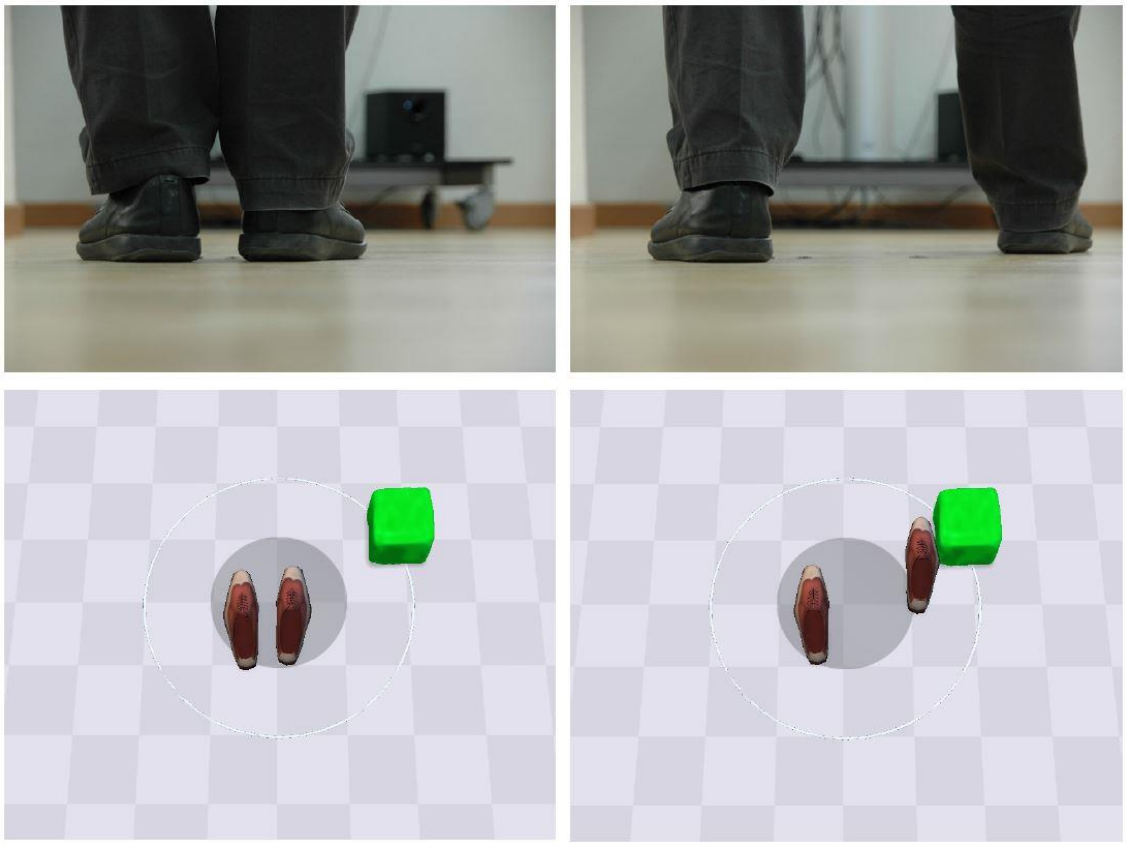
3. Barclay-Goddard R, Stevenson T, Poluha W, Moffatt ME, Taback SP. Force platform feedback for standing balance training after stroke. The Cochrane database of systematic reviews. 2004(4):CD004129.

4. Gil-Gomez JA, Llorens R, Alcaniz M, Colomer C. Effectiveness of a Wii balance board-based system (eBaViR) for balance rehabilitation: a pilot randomized clinical trial in patients with acquired brain injury. Journal of neuroengineering and rehabilitation. 2011;8:30.

5. Llorens R, Gil-Gomez JA, Alcaniz M, Colomer C, Noe E. Improvement in balance using a virtual reality-based stepping exercise: a randomized controlled trial involving individuals with chronic stroke. Clinical rehabilitation. Mar 2015;29(3):261-268.

Figure Legends

Figure 1. Virtual environment of the stepping exercise



The figure shows an example of an stepping movement (bottom row) and the feedback provided by the VR-based system (top row).