

Effectiveness of virtual reality on balance rehabilitation in patients with hemophilia: a case report

Glenda Feldberg, Janaína B Ricciardi, Márcia A P Matta, Samuel S Medina, Margareth C Ozelo
Unit of Hemophilia "IHTC- Cláudio L. P. Corrêa" - INCT do Sangue Hemocentro Unicamp

INTRODUCTION AND OBJECTIVE

One of the main complications of hemophilia is musculoskeletal (MSK) disorder and when associated with muscle weakness, decreased flexibility and chronic pain, this complication contributes to balance deficit of patients. The objective of this study was to evaluate the effectiveness of training using the virtual reality Xbox Kinect™ system to stimulate musculoskeletal capacity and gain of balance in hemophilia patient.

METHODS

A 38 years-old severe hemophilia B female patient participated in this study. She had considerable balance problems due to advanced left hip and right knee arthropathy. We developed a protocol with 16 sessions with 60'each, aimed to balance gain, using exercises of the "In Shape" software from the Xbox Kinect™ system (Microsoft Inc) (Figure 1). The patient was evaluated before and after therapy, using the outcome measurements: Functional Independence Score (FISH), Hemophilia Joint Health Score (HJHS), and to measure the balance deficit degree the Berg Balance Scale, Tinetti Test, Timed Testing "Up and Go" and On Leg Stance test.

RESULTS

We observed a considerable gain in all measurements comparing the baseline and after 16-sessions protocol. In the FISH she obtained score 19 pre-training and 22 post-training, with enhancement in "ability to run". In the HJHS she scored 29 pre-training and 28 post-training, with improvement in the right knee assessment. In Berg Balance Scale the initial score was 47 / 56 and at the end 50 / 56. In Tinetti Test the scores obtained were 14 / 28 pre-training, and 23 / 28 post-training. In One Leg Test (normal = 0), the pre-training results were 12 (right leg)-12 (left leg), and post-training results were 3 (right leg)-5 (left leg). In the Timed Up and Go, the time scale route in 3 meters presented pre-training was 11"40ms and post-treatment was 06"45ms (Table 1).

Table 1. Evaluation pre and post 16 sessions using "In Shape" program for Xbox Kinect™

FISH	HJHS	BERG Balance Scale	TINETTI Test	On leg Test	Timed up and GO
Pre-training					
19	29	47 / 56	14/28	12 (R leg) – 12 (L leg)	11" 40ms
Post-training					
22	28	50 / 56	23/28	3 (R leg) – 5 (L leg)	06" 45ms

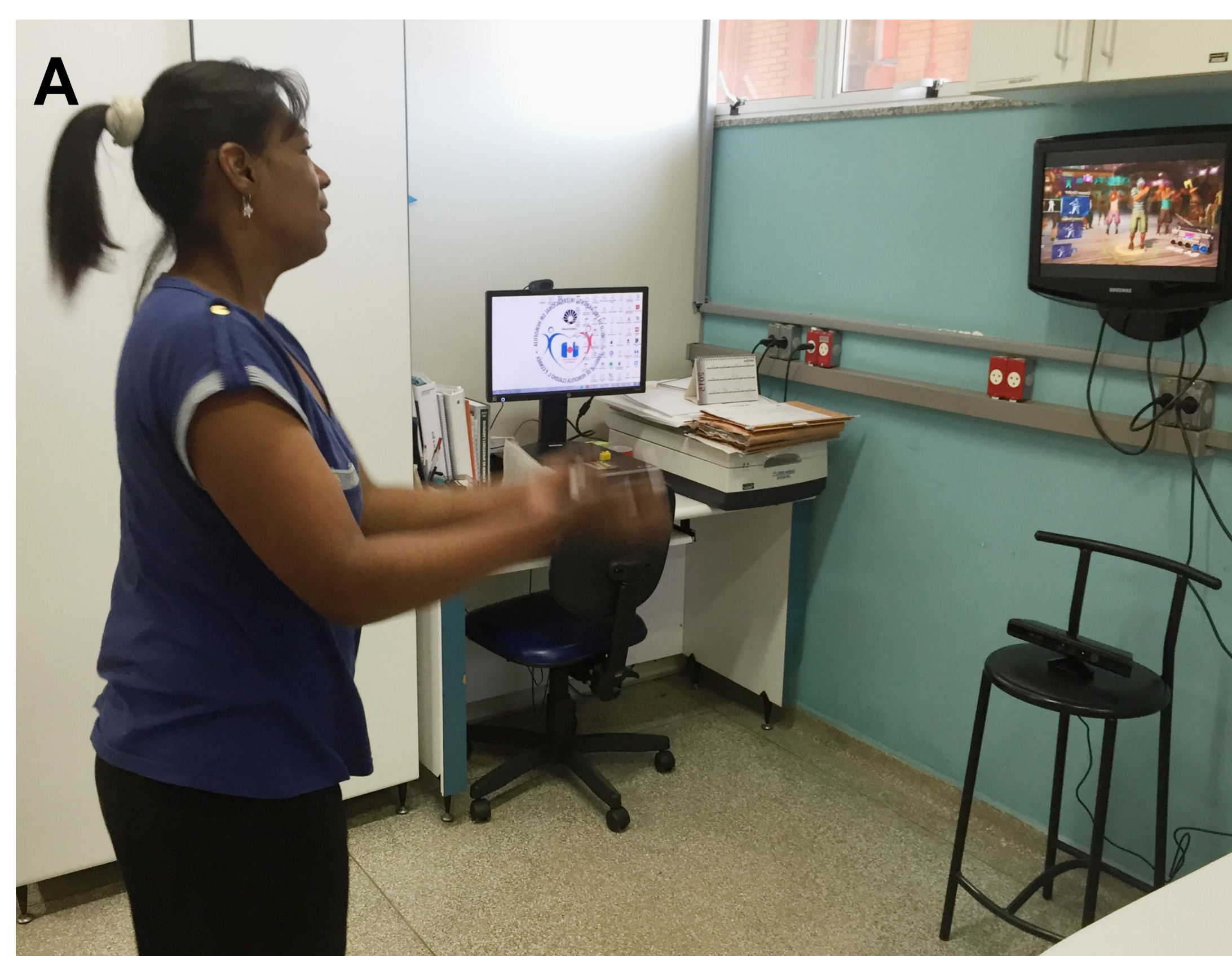


Figure 1. Training with Xbox Kinect™ "In Shape" program

CONCLUSION

In this study we observed that the training with the virtual reality Xbox Kinect™ system was able to restore balance in a patient with severe arthropathy affecting both lower limbs. We believe protocols using virtual reality can be an important strategy for hemophilia rehabilitation.

REFERENCES

- HILL, K. et al. Eftetiveness of a balance training home exercise programme for adults with haemophilia: a pilot study. *BioMed. Central. Haemophilia* 2010 Jan;16(1):162-9
- P. E. LONGMUIR et al. Childhood physical activity body contact risk: feasibility of a novel technique for objective measurements of impact speed, frequency, and intentionality. *Haemophilia* 2016 Jan; 22(1):126-33
- SEAMON B. et al. Use of the Xbox Kinect virtual gaming system to improve gait, postural control and cognitive awareness in an individual with Progressive Supranuclear Palsy. *Disabil Rehabil.* 2016 Mar 23:1-6

