Experience of a hip passive assistive device in the treatment of MS patients

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Introduction

Multiple sclerosis (MS) patients display a reduction in independence and quality of life caused by gait alterations associated with the disease[1].

For this reason, it is evident that the rehabilitation processes can play an important role to improve gait in patients affected by MS. In the present study, we aimed to investigate the effect of a passive orthosis (ExoBand) assisting hip flexion in the treatment of MS patients[3].

Materials and methods

- We applied three different methods of evaluation of the passive orthosis: acute effect, training in hospital and training effect at home.
- 1) Two patients with MS (2F age: 49,5 ± 4,9 yo; weight 58,5 ± 2,1 kg) underwent 3D gait analysis, walking with and without the orthosis (acute effect);
- 2) Two groups of patients (3F, 1M for each group) underwent a rehabilitation protocol of 10 sessions, including 40 mins of physiotherapists' manipulation, 40 mins of exercises and 20 mins of walking. One group conducted the walking part using the orthosis (age: 45,0 ± 8,2 yo; height 169,5 ± 8,3 cm; weight 69,8 ± 15,9 kg) and the second one without (age: 50,3 ± 6,4 yo; height 165,5 ± 8,3 cm; weight 59,5 ± 3,1 kg) (training effect in hospital);
- 3) Two patients with primary progressive MS (1M, 1F age: 48,5 ± 17,7 yo; height 170,0 ± 7,1 cm; weight 83,0 ± 4,2 kg) underwent a 4-week customized remote training program (training effect at home). The training had a duration of ~30 mins and was executed via remote telemonitoring, it involved dynamic exercises and walking wearing the assistive device[2].

(a)

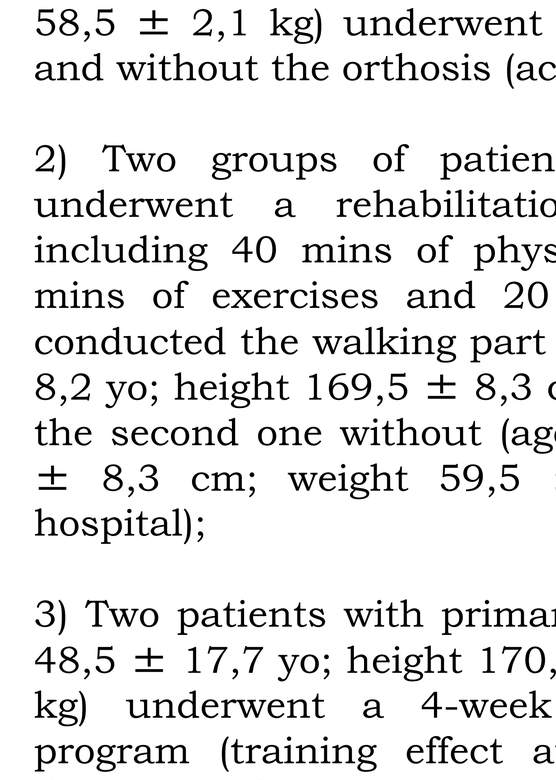


Fig. 1 (a) telerehabilitation with physiotherapist .

(b)

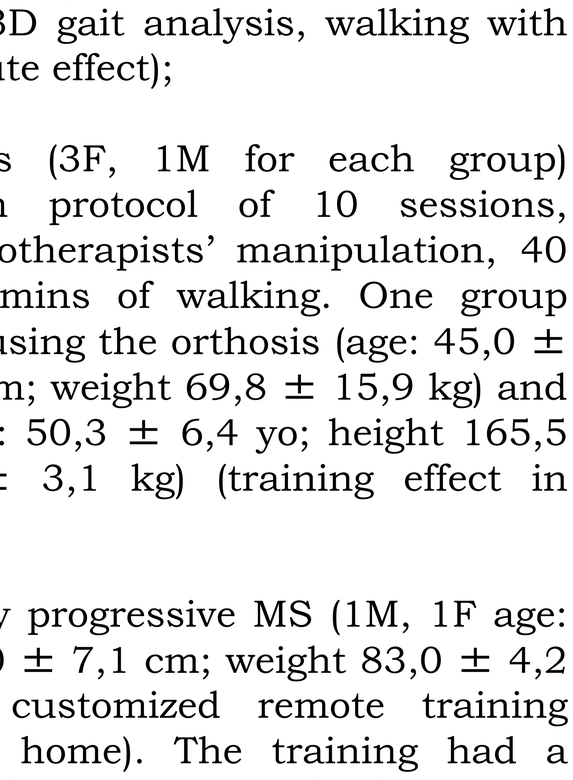


Fig. 1 (b) Setup rehabilitation session

(c)

Fig. 1 (c) Motion capture camera by BTS Bioengineering.

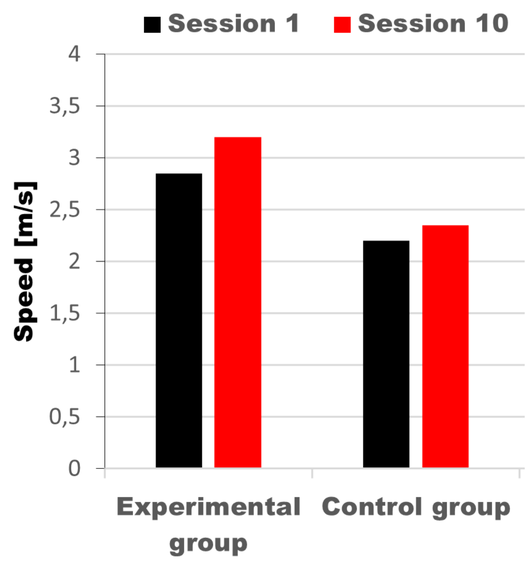
(d)

Fig. 1 (d) ExoBand by Moveo.

Results

Acute effect: patients evaluated with gait analysis displayed an average increase in speed (+13,4%) and cadence (+7,4%) while walking with the orthosis with respect to not using it.

Training effect in the hospital: patients undergoing the traditional rehabilitation protocol improved their baseline walking speed by +6,8% at session 10 with respect to session 1, and those who used the assistive device by 12,3%.



Training effect at home: patients who underwent remote training program showed an increase in distance covered by 15,3% (10 MWT) and of 11,0% in stability (BBS) comparing their performance before starting the training protocol.

Conclusions

Results highlited the fact that the hip orthosis has an effect on several gait parameters.
Its semplicity of use is a striking point for a rehabilition protocol, that can be conducted at home or in a clinical setting. Although very promising, these results need to be strengthen by future work conducted on a larger cohort of patients.

Refernces

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