

Changes in posture, équilibre and strength parameters following training with HUBER® device in healthy subjects

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Purpose

The aim of this study was to analyse, on healthy subjects, the effects of a training program with a new rehabilitation device, HUBER® designed by LPG Systems and devoted to improve posture, equilibrium and muscular function by involving the whole locomotor apparatus.

Material and Methods

Twelve healthy adults took part in a two-month training program, three times a week on HUBER® System. Instrumental assessment of posture (Spinal Mouse®), equilibrium (Satel platform®) and muscular function (Cybex Norm®) was performed before and after training. The Bouchard activity questionnaire allowed us to split the population into a "sedentary" and "active" groups.

Results

The findings showed:

- For posture: a shortening of the spine length ($p < 0.05$), particularly for the sedentary group; no change was observed in thoracic and lumbar curvatures;
- For equilibrium: a more forward Centre of Foot Pressure (CP) position for the maximal backward inclination condition ($p < 0.01$), a diminution of the length of the (CP) displacement in eyes closed on foam condition and in the maximal forward inclination condition. In this latter condition a diminished surface of the CP displacement was also notable ($p < 0.01$);
- For the muscular function: an improved Maximal Voluntary Isometric Contraction (MVIC) for knee extension in the sedentary group ($p < 0.05$) and a functional improvement of muscle fatigability for all the subjects.

Conclusions

These results suggested that postural and equilibrium were sensitive to training on such a rehabilitation device. However, equilibrium was only modified in some experimental conditions: when it was modified, it was characterised by a forward body weight transfer and enhanced stability. Muscular force was also only improved in the sedentary group. It seems likely that training on this device would better suit a population with an initial low physical activity level. This suggestion is confirmed by the fact that the subjects who were initially less stable in the maximal backward inclination condition and eyes closed on foam condition obtained the greatest benefit from the training. This training could be applied to elderly or disabled people, especially those with sensory disabilities. Moreover, for healthy active or trained subjects, greater effects could be obtained by increasing exercises' intensity. Lastly, the flexibility in the use of HUBER system affords multiple solutions of exercises according to the objectives of the users.