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CHANGES IN BALANCE AND STRENGTH PARAMETERS FOLLOWING TRAINING WITH SPINEFORCE® OR HUBER® DEVICE IN HEALTHY SUBJECTS.

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PURPOSE: The aim of this study was to analyse the effects of training performed on a SpineForce® (Huber®) device design by LPG Systems (France).

RELEVANCE: This device designed to improve balance and muscular function has not yet been assessed during a training programme that could be proposed to patients with altered motor function by physical therapists.

PARTICIPANTS: Twelve healthy adults took part in the training programme. This study was approved by the Ethics Review Committee of Pitié-Salpêtrière Hospital in Paris and informed consent was obtained from each subject prior to participation.

METHODS: The training programme lasted two months, three times a week on a rehabilitation device involving the whole body. Instrumental assessment of postural control (Satel® force platform) and muscular function (Cybex Norm®) was performed before and after training. Postural control was measured in different experimental conditions by a parameter of position (mean anteroposterior position of center of foot pressure (CP)) and by two parameters of stability (length and surface of the displacement of CP). The assessment of the muscular function was performed during knee and spine extension and included maximal voluntary isometric contraction (MVIC), as well as a measure of muscle fatigability. The Bouchard questionnaire allowed us to split the population into sedentary and active groups.

ANALYSIS: A Wilcoxon test was used to examine the training effect for each group and pooled subjects. A Mann-Whitney test was used to compared groups. Regression analyses were performed using Spearman coefficient correlation.

RESULTS: For static postural control, a more forward CP position for the maximal backward inclination condition ($p < 0.01$), a diminution of the length of CP displacement in eyes closed on foam condition and in the maximal forward inclination condition were observed. In this latter condition a diminished surface of the CP displacement was also notable ($p < 0.01$). For the muscular function, an improved MVIC for knee extension was only observed in the sedentary group ($p < 0.05$), a functional improvement of muscle fatigability for all the subjects.

CONCLUSIONS: These results suggested that postural control and muscular function were sensitive to training on such a rehabilitation device.

IMPLICATIONS: It seems likely that training on this device would better suit a population with an initial low physical activity level and 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 and specificity.

KEYWORDS: motor function, rehabilitation device, training.

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ETHICS COMMITTEE: This study was approved by the Ethics Committee of Pitié-Salpêtrière Hospital in Paris, France.