The Effect of Whole Body Vibration Exercise on Muscle Activity Change in Healthy Young Women


Abstract—The aim of this study was to investigate the effect of whole body vibration (WBV) on muscle activity alteration. Ten healthy young women subjects (age 21 ± 1.3 years, height 160 ± 2.1 cm and weight 52 ± 4.6 kg) were selected. Subjects performed four different squat position exercises on a vibration platform (VM-10, Sonicworld). A vibration stimulus is 25Hz and intensity is 40. EMG signals measured by (Rectus Femoris, Vastus Lateralis, Vastus Intermedius, Vastus Medius) leg muscles were analyzed. The exercise was performed both with 10 seconds WBV and without 10 seconds WBV. In the result, EMG signals related to WBV were significantly higher compared with non-vibration stimulus in all leg muscles and squat position exercises (on average HS +24.8%, LS +23.1%, OS +20.1%, HU&HS +17.9%). In conclusion, WBV would have an effect on increasing activation of the thigh muscle.

I. INTRODUCTION

The acute increase in 1RM when Whole body vibration (WBV) is added to the exercise seems to be the result of greater muscle activation compared with that in the no-WBV condition, as seen by increased electromyography (EMG) activity[1]. And WBV training has been observed to acutely increase the 1 repetition maximum (1RM) in the coordinative demandingsquat exercise[2]. Thus, the purpose of this study was to investigate the effect of whole body vibration on muscle activation changes in healthy young women.

II. METHODS AND RESULTS

Ten healthy female (age 21 ± 1.3 yr, height 160 ± 2.1 cm, weight 52 ± 4.6 kg) volunteered to participate in this study. To conform to the Declaration of Helsinki (1964), written informed consent was obtained from all subjects. All subjects are never experienced WBV exercise before. The surface EMG signals (Delsys bagnoli-8, NY, USA) from the rectus femor, vastus lateralis, vastus intermedius, vastus medius muscle of the dominant leg were taken and analyzed.

As shown in Figure 1, subjects performed four different squat exercise on a vibration platform (VM-10, Sonicworld Co., Ltd, Korea) such as High Squat (HS), Low Squat (LS), Heel Up & High Squat (HU&HS), One Leg Squat (OS). The exercises were performed both with 10 seconds WBV and 10 seconds no-WBV. A vibration stimulus is 25Hz and intensity is 40. Muscle activities during WBV were compared with no-WBV.

In the result, EMG signals related to WBV were significantly higher compared to no-WBV in all thigh muscles and squat exercise (on average HS +24.8%, LS +23.1%, OS +20.1%, HU&HS +17.9%). In conclusion, WBV would have an effect on increasing activation of the thigh muscles.

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