

WHOLE-BODY VIBRATION: IS GRAVITATIONAL FORCE A VALID
MEASUREMENT OF EXERCISE INTENSITY?

A DISSERTATION

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BY

CHRISTOPHER J. GOODE (ROBINSON) A.S., B.A., B.S., M.A., M.B.A., M.S.

DENTON TEXAS

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ABSTRACT

CHRISTOPHER J. GOODE

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The primary aim of this study was to determine if g-force is a valid measurement of vibration exercise intensity (VEI). For this purpose, twelve healthy lean adults (male, 7; female 5; age, 29.4 ± 6.4 years; height 171.4 ± 4.9 cm; weight, 67.4 ± 10.4 kg, BMI, $22.9 \pm 2/6$ kg/m²) voluntarily participated in the study. A 3-way (muscle group x frequency x amplitude) repeated measures design analyzed electromyography (EMG) muscle activity in the vastus lateralis (VL), vastus medialis (VM), gastrocnemius lateralis (GL) and gastrocnemius medialis (GM) muscles during WBV (Power Plate Pro5tm) exercise while participants performed a standard unloaded isometric high-squat (knee angle 30 degrees, hip angle 30 degrees, feet 30 cm apart) stance at 8 different levels of g-force. The g-force levels were derived from 4 different pre-set frequency settings (30, 35, 40 and 50 Hz) measured at both the low ($\cong 3$ mm) and high ($\cong 7$ mm) pre-set amplitude settings. Each trial consisted of a pre-vibration control phase (no vibration) followed by one of the amplitudes and all four pre-set frequencies. The VEI was defined as the WBV-induced percentage increased in EMGrms compared with the control. Control data was expressed as a percentage of maximal voluntary contraction (MVC); thus, allowing for inter-subject comparisons. The mean and standard deviation values for VEI were determined for each level of g-force. Statistical analysis revealed that amplitude increased VEI while frequency decreased VEI. The researchers concluded that g-force is not a valid measurement of VEI and that the degree to which vibration is transmitted to the body depends on vibration frequency.

DEDICATION

To the Pfizer Gods and Anheuser Busch, thank you for always being a solid, and a liquid, friend.

To Larry Tesler, the inventor of Copy & Paste, pure genius!

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To one of the shortest but sweetest palindromes in the world, 'Mom,' your endless support throughout this scholastic saga will never be forgotten. Love CJ=)