

Whole body vibration training - good vibrations? Measurements of acceleration levels

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1. Introduction

Whole Body Vibration Training (WBVT) is an exercise and rehabilitation method that is performed on an electric vibration platform. The method is thought to enhance the training effect as the vibration will stimulate the muscles stretch reflex. It is also considered that WBVT could increase bone density, and the circulation in the muscles.

Exposure to high levels of whole body vibration is reported to cause adverse health effects such as lower back pain. An EU directive (EU 2002/44/EG) sets standards for regulations of workers exposure to vibrations. The directive introduces an exposure limit value which must not be exceeded over a workday. Measures must be taken at the half of the limit value.

The aim of this work was to investigate if the acceleration levels from the WBVT devices could be at such intensities that there is a risk of exceeding the limit value.

2. Methods

Whole body vibrations were measured and evaluated in accordance with International standard ISO 2631-1. An accelerometer was placed between the feet and the vibrating surface. Measurements were performed on WBVT devices used in fitness centers as well as for rehabilitation purposes and for different amplitudes and frequency settings. The measurement results were then compared to the occupational exposure limit value and the exposure time to reach the limit value was calculated.

3. Results

The result shows that the occupational limit value for whole body vibration is exceeded even after a short exposure time (table 1). When vibrating on one of the models at 50 Hz frequency and with the amplitude set to high, it takes only just over 1 minute before the exposure is over the occupational limit.

Table 8. Results from measurements on two models of vibration plates.

Frequency [Hz]	Amplitude	Model	Vibration level [m/s ²]	Limit value is exceeded in [min]
30	Low	New	7.1	13
30	Low	Old	9.6	7
40	Low	New	7.5	11
40	Low	Old	11	5
50	Low	Old	10	6
30	High	New	14	3
30	High	Old	18	2
40	High	New	15	3
40	High	Old	21	2
50	High	New	18	2
50	High	Old	24	1

Even if the vibration directive and the limit value is intended for occupational exposure, caution should still be taken when practicing WBVT because of the exposure to high levels of vibrations.