Paper No. 22

TRANSMISSION OF WHOLE BODY VIBRATION TO LOWER EXTREMITY IN DYNAMIC AND STATIC CONDITIONS (HALF SQUAT)

Munera M., Duc S. , Bertucci W. and Chiementin X.

GRESPI, Groupe de Recherche En Sciences Pour l'Ingénieur, Université de Reims Champagne-Ardenne, 51687 Reims Cedex 2
France
marcela.munerar@gmail.com, sebastien.duc@univ-reims.fr, william.bertucci@ univ-reims.fr, xavier.chiementin@univ-reims.fr

ABSTRACT

Vibration is used like a method of training for the muscle strengthening by using vibratory plates during exercise. Those vibrations experienced by the human body can be beneficial or harmful depending on different characteristics of the source of exposure (frequency, amplitude) and characteristics of the subject under vibration (anthropometry, position). However, the risk of this training is not clear yet. The aim of this work is to assess the risk of vibrations by calculating the transmissibility values in three joints of the lower limb: ankle, knee and hip; under dynamic and static conditions. In this study, the acceleration at each joint was measured for fifteen healthy male performed at four different conditions: (1) a dynamic half squat exercise, (2) relaxed standing, (3) half squat with 90° extension knee angle and (4) half squat with 120° extension knee angle. This acceleration was measured at different frequencies of vibration exposure between 20-60Hz. The results show some differences between the different studied conditions. The frequencies and positions where the transmissibility is higher for each joint are found, this gives us some information about the conditions in the vibrations training where the risk is more important. In the dynamic condition a significant difference in the transmissibility values in the two phases of movement: flexion and extension, was found. The comparison between the values in static and dynamic conditions shows an influence of the presence of movement.