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Title: Effects of whole body vibration in Japanese patients with chronic obstructive pulmonary disease. A randomized controlled trial

Mr. Mitsunobu 3866 Ito takefumisaito_0212@yahoo.co.jp¹, Mr. Masao 3867 Yamada masao-y@kiu.biglobe.ne.jp¹, Shinji 3868 Inamura inamurashinji@yahoo.co.jp¹, Dr. Yoshiya 3869 Tsunoda chabo448@yahoo.co.jp MD¹, Dr. Kenji 3870 Hayashihara dora@nms.ac.jp MD¹, Prof. Dr Takefumi 3871 Saito takefumisaito@yahoo.co.jp MD¹ and Dr. Shimao 3872 Fukai fukai.shimao@plum.plala.or.jp MD¹.¹ Respiratory Medicine, Ibarakihigashi National Hospital, Tokai-mura, Naka-gun, Japan, 319-1113 .

Body: Background: Chronic obstructive pulmonary disease (COPD) is a respiratory condition symptomatically characterised by dyspnea. Exercise tolerance, functionally, is low in patients with COPD, leading to dyspnea and lower limb skeletal muscle dysfunction. Endurance and strength training are established in patients with COPD. There, however, is an unmet need for further research in new and complementary exercise modalities. Whole-body vibration (WBV) is a mode of physical activity known to improve muscular function of the lower limbs, though such a new approach has not yet been investigated in Japanese patients with COPD. Methods: Ten male patients (74.4 ± 4.6 yrs, FEV(1) pred. 67.8 ± 27.2%) with COPD in GOLD stage I to IV assessed for a 12-week outpatient multidisciplinary rehabilitation program were on top randomly assigned to one of two intervention groups: (1) 2 × 3 min of bilateral dynamic squat exercises on a side-alternating vibration platform at 12-24 Hz twice per week (WBV) and (2) a control group (CON) with the same amount of exercise time without WBV. Results: All the patients completed the study in each group. The improvement in 6-min walking distance was significantly higher in the WBV-group when compared to the CON-group (WBV: 69.0 ± 28.2 m, CON: 31.0 ± 20.7 m with a between-group difference of 38 m (p <0.05). Significant improvements in symptoms, activity and impact of the St. George's Respiratory Questionnaire were shown in the WBV-group, compared to the CON-group. Conclusions: WBV training seems to be a promising new exercise modality for Japanese outpatients with COPD.