Acute whole-body vibration exercise promotes favorable handgrip neuromuscular modifications in rheumatoid Arthritis: A Cross-Over Randomized Clinical

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Objective. Rheumatoid arthritis (RA) causes progressive changes in the musculoskeletal system compromising neuromuscular control especially in the hands. Whole-body vibration (WBV) could be an alternative for the rehabilitation in this population. This study investigated the immediate effect of WBV while in the modified push-up position on neural ratio (NR) in a single session during handgrip strength (HS) in women with stable RA. Methods. Twenty-one women with RA (diagnosis of disease: ±8 years, erythrocyte sedimentation rate: ±24.8, age: 54±11 years, BMI: 28±4 $kg \cdot m^{-2}$) received three experimental interventions for five minutes in a randomized and balanced cross-over order: (1) control—seated with hands at rest, (2) sham-push-up position with hands on the vibration platform that remained disconnected, and (3) vibration-push-up position with hands on the vibration platform turned on (45 Hz, 2 mm, 159.73$m \cdot s^{-2}$). At the baseline and immediately after the three experimental interventions, the HS, the electromyographic records (EMGrms), and range of motion (ROM) of the dominant hand were measured. The NR, i.e., the ratio between EMGrms of the flexor digitorum superficialis (FDS) muscle and HS, was also determined. The lower NR represented the greater neuromuscular efficiency (NE). Results. The NR was similar at baseline in the three experimental interventions. Despite the nonsignificance of within-interventions (p=0:0611) and interaction effect (p=0:1907), WBV exercise reduced the NR compared with the sham and control (p=0:0003, F=8:86, η2=0:85, power=1:00). Conclusion. Acute WBV exercise under the hands promotes neuromuscular modifications during the handgrip of women with stable RA. Thus, acute WBV exercise may be used as a preparatory exercise for the rehabilitation of the hands in this population. This trial is registered with trial registration 2.544.850 (ReBEC-RBR-2n932c).