

Effect of whole body vibration training on proprioception : a meta-analysis

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ADMINISTRATIVE INFORMATION**Support** - Military health care class project and Qingdao medical health research guidance project project funding.**Review Stage at time of this submission** - Data extraction.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202420121**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 29 February 2024 and was last updated on 29 February 2024.**INTRODUCTION**

Review question / Objective This paper will conduct a meta-analysis of the influence of whole body vibration training on proprioceptive function, try to analyze the effect of whole body vibration training and discuss the parameter setting, in order to provide references for this technology to promote proprioceptive recovery in clinical practice.

Condition being studied Proprioception plays an important role in motor control. It transmits motion information to the nervous system through proprioception in muscles, tendons and joints and integrates with other sensory information to perceive the relative position, movement direction, movement intensity and joint Angle of each part of the body and make corresponding control behaviors. If proprioception is absent, the human

motor control ability is lost, resulting in decreased balance, postural control and joint stability, increasing the risk of sports injury. whole-body vibration training (WBVT) is a form of training in which the subject stands on a platform that produces vertical sinusoidal oscillations and receives mechanical vibrations transmitted from the bottom up to promote the stability of neuromuscular control. Studies have shown that WBVT can improve muscle strength, proprioception, and neuromuscular control.

METHODS

Search strategy Using the combination of subject words and keywords, according to the characteristics of different databases to formulate corresponding search strategies. Take pubmed, for example,
#1 whole body vibration[Title/Abstract]

#2 whole-body vibration[Title/Abstract] OR vibration training[Title/Abstract] OR vibration exercise[Title/Abstract]
 #3 #1 AND#2
 #4 Proprioception[Mesh]
 #5 Proprioceptive Sense[Title/Abstract]OR Vestibular Sense[Title/Abstract]OR Equilibrium Sense[Title/Abstract]OR Labyrinthine Sense[Title/Abstract]OR Position Sense[Title/Abstract]
 #6 #4 AND #5
 #7 #3 AND #6.

Participant or population Patients treated with WBVT were selected and proprioceptive function was evaluated before and after treatment. Evaluation indicators include angle recurrence value, average trajectory error, and passive positioning reset value. Including but not limited to healthy people, sports injuries, chronic musculoskeletal diseases, nervous system injuries and other patients.

Intervention The intervention group received WBVT training or added WBVT training on the basis of the control group.

Comparator The control group received blank control, placebo control, routine rehabilitation training or other training.

Study designs to be included Randomized controlled trial.

Eligibility criteria Inclusion criteria: ① Study type: randomized controlled trial; ② Subjects: healthy people, patients with sports injuries, chronic musculoskeletal diseases, nervous system injuries, etc. ③ Intervention measures: The control group used blank control, placebo control, routine rehabilitation training or other training; The intervention group received WBVT training or added WBVT training on the basis of the control group; ④ Outcome indicators: active angel repositioning, active angel repositioning, AAR), average trace error (ATE), passive reproduction of passive positioning (PRPP)Exclusion criteria: ① repeated publications; Reviews, conference papers and meta-analyses; ③ Articles with incomplete data; (4) Non-Chinese and English literature; ⑤ Articles on mixed diseases of the object of study.

Information sources Search English databases including Pubmed, Web of Science, Embase and The Cochrane Library; Chinese databases include China National Knowledge Network (CNKI), Wanfang Data Knowledge Service Platform (Wanfang), VIP Chinese Journal Full-Text Database

(VIP) and China Biomedical Literature (SinoMed) database.

Main outcome(s) Active angel repositioning, active angel repositioning, AAR), average trace error (ATE), passive reproduction of passive positioning (PRPP) before and after treatment using whole body vibration training.

Data management Two researchers independently screened, extracted and cross-checked the data. In the literature selection process, first read the title and abstract of the article, remove the irrelevant content, review and conference literature, and then further read the full text according to the inclusion and exclusion criteria for final screening to determine the included literature. When there is a disagreement, a third researcher intervenes.

Quality assessment / Risk of bias analysis The Cochrane bias risk assessment tool was used to evaluate the methodological quality of the included literature. It includes the following six aspects: random sequence generation, assignment hiding, participant and investigator blindness, outcome data integrity, selective reporting, and other aspects of bias. According to the standard, "low risk, high risk, unclear" is the evaluation result.

Strategy of data synthesis Continuous variables were represented by weighted mean difference (WMD) or standard mean difference (SMD), and the size of each combined effect size and its 95% confidence interval were calculated. The I² test was used for heterogeneity analysis. When I² > 50% and P < 0.1 between studies, it indicated that there was a large heterogeneity. The random effects model was used for analysis, and the fixed effects model was used for analysis.

Subgroup analysis Subgroup analysis was performed for different subjects, test joints, vibration frequency, vibration amplitude, dynamic and static training, and intervention duration of the original study.

Sensitivity analysis Sensitivity analysis was performed in Revman 5.3 using the single article exclusion method to assess the impact of each study on the overall pooled estimate.

Language restriction English and Chinese.

Country(ies) involved China.

Keywords whole body vibration training; proprioception; active angel repositioning; average

trace error; passive reproduction of passive positioning; meta-analysis.

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