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EFFECT OF WHOLE BODY VIBRATION TRAINING ON QUADRICEPS MUSCLE STRENGTH IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction

- Recently, the use of whole body vibration (WBV) for improving muscle strength in individuals with knee OA has been recommended as an efficient and alternative method to resistance training.
- Wang et al. published a systematic review and meta-analysis to investigate the effects of WBV on pain, stiffness and physical function in individuals with knee OA.
- To date, no systematic reviews or meta-analyses have been published regarding the effect of whole body vibration therapy on quadriceps muscle strength in individuals with knee OA.
- Therefore, the objective of this review was to investigate evidence regarding the effect of WBV training on quadriceps muscle strength in individuals with knee OA.

Purpose of the study

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Methods

Data sources

- The search was conducted in PubMed, Embase, Scopus, PEDro and the Science Citation Index, using the keywords whole body vibration, vibration therapy, strength, and vibratory exercise with 'Osteoarthritis knee', and the Medical Subject Heading 'osteoarthritis, knee' in combination with 'whole body vibration' or 'vibration'.

Inclusion and exclusion criteria

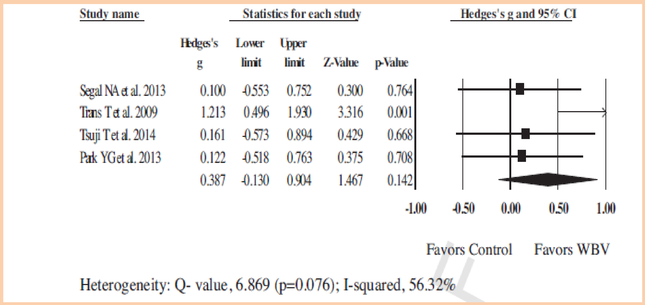
- Trials were required to compare exercise with and with out WBV, or exercise with WBV and control.
- Studies that did not include WBV in their interventions were excluded.
- The outcome measure of interest was isokinetic quadriceps muscle strength in individuals with knee OA.

Assessment of methodological quality

- The quality of the included studies was evaluated by two independent evaluators (SA and HZ) using the PEDro scale.
- The domain-based evaluation of risk of bias was assessed using the Cochrane collaboration's tool for assessing risk of bias.
- In addition, the International Society of Musculoskeletal and Neuronal Interactions (ISMNI) for reporting WBV intervention studies was used.

Results

- A total of 18 studies were assessed for eligibility. Fourteen studies were excluded because they did not fulfill the inclusion criteria. The final selection of four studies in the quality assessment phase was made by consensus.
- Meta-analysis of the four trials showed that most studies displayed insignificant effect size point estimate to favor WBV compared to control ($P > 0.05$), with an overall small effect size point estimate of 0.39 (95% CI, −0.130 to 0.904) based on a random-effects model (as shown in Figure). A non-significant heterogeneity was found between these studies (I^2 56%, $P > 0.05$).
- The four included studies reached an average PEDro score of **5.25/10.**
- The risk of bias was high in two studies [9,10], and unclear in the other two.
- The quality score by the ISMNI recommendation was 7±1.4 (range: 6–9) of 13 points.



Discussion

- The present review is the first systematic review of the literature and meta-analysis investigating the effect of WBV on quadriceps muscle strength in individuals with knee OA.
- The present review evaluated four RCTs including a total of 162 participants to examine evidence regarding the effect of WBV on quadriceps muscle strength in individuals with knee OA.
- Among the four studies evaluated using the PEDro scale, three were considered of high methodological quality.

Conclusions

- According to the present review, WBV provide no extra benefits on quadriceps muscle strength when compared to a control group performing the same exercises as the WBV groups in individuals with knee OA.
- In the present review, there is lack of uniformity in the vibration protocol, training dose and reported results.
- Hence, more studies are required for conclusive evidence of the effect on quadriceps muscle strength of WBV training in individuals with knee OA.

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