

The effects of a whole-body vibration program on muscle performance and flexibility in female athletes.

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OBJECTIVE: This randomized controlled study was designed to investigate the short-term effects of an 8-wk whole-body vibration protocol on muscle performance and flexibility in female competitive athletes. **DESIGN:** Twenty-six young volunteer female athletes (ages 21-27 yrs) were randomized to either the vibration group or control group. The vibration intervention consisted of an 8-wk whole-body vibration 3 times a week employed by standing on a vertical vibration platform. As outcome measures, three performance tests (counter-movement jump, extension strength of lower extremities with an isokinetic horizontal leg press, and a sit-and-reach test for flexibility) were performed initially and after 8 wks. **RESULTS:** A total of 24 athletes completed the study properly. In the vibration group (n = 13) whole-body vibration induced significant improvement of bilateral knee extensor strength ($P < 0.001$), counter-movements jump ($P < 0.001$), and flexibility ($P < 0.001$) after 8 wks of training. No significant changes were

found for all the outcome measures for the control group (n = 11). CONCLUSIONS: Whole-body vibration is a suitable training method to improve knee extension maximal strength, counter-movement jump, and flexibility in a young female athlete if it is properly designed. Not only do the optimal frequency, amplitude, and g-forces need to be identified but also the level of muscle activation that would benefit more from vibration stimulation. The improvement of flexibility is important not only for performance but also for the prevention of muscle-tendon injury.

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