WHOLE BODY VIBRATION IN SPORT

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Fred Kudu training group in Kääriku (1982)
Nazarov vibration device


Power Plate vibration platform
Whole body vibration exercises (static)

Whole body vibration exercises (dynamic)
Potential mechanisms of how whole body vibration may exert its beneficial effects on athletic performance

• Acute force enhancement through the vibration-induced rapid stretch-shortening cycle
• Facilitation of muscle function through the tonic vibration reflex
• Enhancement of muscle energy metabolism through vibration-generated muscle contraction


• Increases in muscle perfusion rates
• Rise in muscle temperature
• Favorable changes in growth hormone, testosterone, and catecholamine levels

Does this method work in high level sport?

• Would any of these potential WBV mechanisms be robust enough to add additional stimulus to the main effects provided by the primary training stimulus?

• Several experiments have showed positive effects of WBV in elderly people and patients with various health problems.

Fred Kudu training group in Kääriku (1982)
Review articles about this topic


Review articles


• The authors selected 21 eligible studies from an original search yield of 252 studies
• The subjects were 373 (173 male, 200 female) athletes, age 22.1 years (range 17.0–27.0), representing 16 sports
Whole body vibration characteristics

• Frequency - 33.0 (range 25–45) Hz
• Amplitude - 3.8 (range 0.8–8.0) mm
• Acceleration - 157 (range 52–386) m/s²
• Exercises - static or dynamic

• Duration of exposure to vibration – acute studies 145s (range 20 – 300), training studies – 107min(range 30-189)
• Typical acute WBV training sessioon – 1x30s; 5x30s; 6x45s with 30s or 60s rest between bouts;
• Training studies – 4-14 weeks, 2-4 WBV sessions per week
Results of Hortobágyi et al. (2015) review

Whole body vibration combined with exercise had an overall **0.3 % acute** effect on
• maximal voluntary force (−6.4 %, effect size = −0.43, 1 study),
• leg power (4.7 %, weighted mean effect size = 0.30, 6 studies),
• flexibility (4.6 %, effect size = −0.12 to 0.22, 2 studies),

Combined data from the meta-analyses - whole body vibration had an overall small acute effect on athletic performance (the effect size: 0.28).

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Results of Hortobágyi et al. (2015) review

Whole body vibration combined with exercise had an overall **10.2 % chronic** effect on
• maximal voluntary force (14.6 %, weighted mean effect size = 0.44, 5 studies),
• leg power (10.7 %, weighted mean effect size = 0.42, 9 studies),
• flexibility (16.5 %, effect size = 0.57 to 0.61, 2 studies),

Combined data from the meta-analyses - whole body vibration had an overall small chronic effect on athletic performance (the effect size: 0.44).
Possible explanations of WBV small effect on athletic performance

• WBV stimulus has low or no specificity to the structure of the motor skills involved in a given sport.

• The magnitude of stimulus provided by whole body vibration in relation to the magnitude of stimulus generated by physical conditioning and skill training is very small.

Conclusion

Whole body vibration has small and inconsistent acute and chronic effects on athletic performance in competitive and/or elite athletes.
And still, two latest articles in WBV topic showed positive effect on athletic performance

- Sébastien, D, Rønnestad BR, Bertucci W. Adding whole body vibration to preconditioning squat exercise increases cycling sprint performance. *Journal of Strength and Conditioning Research*, sept, 2017 (Epub ahead of print)

- The proposed mechanism is postactivation potentiation - PAP (a transient increase in muscle contractile performance force after a previous contractile activity).

There have been 40 years of WBV research and we still need a lot of future studies.
Thank you!