

THE EFFECTS ON STRENGTH, POWER, AND GENU VALGUM FOLLOWING A FIVE WEEK TRAINING PROGRAM WITH WHOLE-BODY VIBRATION

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INTRODUCTION: Human movements are controlled by the motor and sensory command centers of the body, and evidence indicates that voluntary activation of muscles is limited in force, power, and strength production (Rønnestad, 2004). The increase of motor unit activation through whole-body vibration (WBV) allows the muscles to contract and relax at a higher rate utilizing more muscle fibers to enhance athletic performance. The purpose is to examine the effects on strength, power, and genu valgum angle following a five week resistance training program either with or without whole-body vibration.

METHODS: There are two groups, resistance training (RT) and resistance training with WBV (RT-V). Both groups performed the same training program. Dumbbells were used for all exercises, except push-ups, with increasing weight by 2-5kg each week. The RT group trained on the gym floor, whereas the RT-V group performed all exercises on a vibration platform beginning at 30 hertz and increasing by five hertz every week. Pre- and post-test evaluation included maximum countermovement vertical jump (cm), standing long jump (cm), medicine ball toss (cm), 1RM (kg) of both chest press and leg press, and genu valgum measured at maximum genu valgum angle (degrees) at knee bend following a land and load maneuver.

RESULTS/DISCUSSION: The results of this study indicated greater improvement in both the countermovement vertical jump and leg press following the vibration training; however, the RT group displayed greater improvement in standing long jump, medicine ball toss, and chest press. One subject in the RT group and two subjects in the RT-V group exhibited genu valgum in one of their legs; all three subjects improved at the post-test.

CONCLUSION: Although this study showed improvement in only two areas following WBV, Bosco et al. (1999) found significant improvement of force-velocity, force-power, and vertical jump performance following ten, 60 second WBV treatments. Therefore, future research is needed to determine the appropriate frequency and training program for maximal performance.

REFERENCES:

Bosco, C., Colli, R., Introni, E., Cardinale, M., Tsarpela, O., Madella, et al. (1999). Adaptive responses of human skeletal muscle to vibration exposure. *Clinical Physiology*, 19, 183-187.

Rønnestad, B. R. (2004). Comparing the performance-enhancing effects of squats on a vibration platform with conventional squats in recreationally resistance-trained men. *Journal of Strength and Conditioning Research*, 18, 839-845.

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