Acute Effect of Plyometric Training Combined with Whole Body Vibration on Lower Limb Power Performance

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SUMMARY
The objective of this study was to investigate the acute effect of plyometric training combined with whole body vibration on the countermovement jump (CMJ) height and hip, knee and ankle joints moment and power. 11 male college players of Division I volleyball and basketball teams voluntarily participated in the study. The motion system and force platforms were used to collect and analyze the data. Subjects performed 3 CMJs as pre-tests with 1-min rest between trials. Then 5 training sessions, (1) whole body vibration: 30Hz/4mm/10 seconds × 3 sets with 1-min rest between sets, (2) plyometric training: 5 times of drop jump from an individualized drop height × 1 set, (3) resistance training: 5RM squats, (4) combination of resistance training and plyometric training sessions with 4-min rest between sessions and (5) combination of whole body vibration (TVR4900, Taiwan) and plyometric training sessions with 4-min rest between sessions were completed on separate days. Before the commencement of the experimental trials, a general warm-up protocol consisted of cycling on a stationary cycle (Magtonic, MAG-5100, Tonic Fitness Technology, Taiwan) at a self-selected pace for 5 minutes. Then the subject performed 3 CMJs as the baseline measurement (pretest) with a 20-second rest between jumps. After the pretest, the subjects were allowed a 1-minute static recovery and then randomly assigned to one of the 5 training session. After the training session, the subjects performed 3 CMJs (post-test) at the recovery times of 4 minutes.

RESULTS AND DISCUSSION
All dependent variable were recorded using 11 Eagle cameras (Motion Analysis Corporation, Santa Rosa, CA, USA) at a 200-Hz sampling rate and 2 force platforms (AMTI Inc., Watertown, MA, USA) at a 2000-Hz sampling rate. The cameras were synchronized to 2 force platforms. All dependent variable were transformed and analyzed using Motion Monitor software (Innovative Sports Training, Inc., Chicago, IL, USA).

Repeated-measure 2-way (5 training session × 2 times) ANOVA was used to compare the differences between 5 training session and times (pretest and posttest) for each dependent variable from CMJ performance.

CONCLUSIONS
These findings indicated that plyometric training, whole body vibration, resistance training, and combination of whole body vibration and plyometric training provide positive acute effect in 4 minutes on CMJs and specifically contribute to knee and ankle joints.

ACKNOWLEDGEMENTS
Thanks for Chinese Culture University volleyball and basketball teams.
REFERENCES