# Effects of Plyometric Training on Lower Limb Explosive Power in Male College Basketball Players: Postprint

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## Abstract

Objective To investigate the effects of plyometric training on lower limb biomechanics and explosive power in male college basketball players, providing a theoretical basis for optimizing basketball-specific training.

Methods Eighteen male college basketball players were selected and randomly divided into an experimental group (receiving plyometric training) and a control group (receiving traditional resistance training), with 9 participants in each group. Before and after training, kinetic indicators of lower limb explosive power (including muscle RMS (root mean square) values, contribution rates, joint torque, and stiffness), kinematic indicators (movement angles and angular velocities of the ankle, knee, and hip joints), and training performance indicators (jumping performance and movement performance) were tested and analyzed for both groups.

Results After plyometric training, regarding lower limb muscle activation, the experimental group showed very significant differences ($P<0.01$) in RMS values of the rectus femoris, medial head of gastrocnemius, and lateral head of gastrocnemius compared to traditional resistance training; the RMS value of the long head of biceps femoris was significantly lower than that of the control group ($P<0.05$), with the contribution rate decreasing by approximately 3.72%. At the joint stiffness level, lower limb stiffness in the experimental group increased significantly ($P<0.05$), with an increment of 6.4 BW/m; the maximum angle and maximum angular velocity of the ankle joint during the support phase also increased significantly ($P<0.05$). The experimental group demonstrated outstanding explosive power performance, with significant improvements ($P<0.05$) in standing long jump, stationary double-leg vertical jump, and running single-leg vertical jump compared to the control group; in terms of movement performance, T-test and V-cut dribble layup drill times improved by 1.09 s and

2.68 s respectively, both reaching significant differences (P<0.05); there was no significant difference in 10-yard sprint between groups (P>0.05).

Conclusion This study demonstrates that plyometric training is more effective than traditional resistance training in improving lower limb explosive power in male college basketball players and is worthy of widespread promotion in basketball-specific training.

## Full Text

## Preamble

The original text in this section is extensively corrupted and contains no readable Chinese content for translation. Only the section heading could be reliably identified.

All mathematical placeholders and technical notation appear to be embedded within irrecoverable OCR artifacts and encoding errors. The corrupted expressions—including `$5 "%! ! # 5759 $` and `$H!9( <3 >&<31)1) " 4,„& V' "DEFGGH!5755!!F(5) "55$`—are not recoverable. Consequently, no meaningful translation of the technical content can be provided for this section.

*Note: Figure translations are in progress. See original paper for figures.*