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Training Load-Mediated Speed and Agility Gains in Wing Players: A Comparative Study of Circuit and Velocity-Based Resistance Protocols in Collegiate Handball

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The present study evaluated the effects of Velocity-Based Training (VBT) and Circuit Training (CT) on sprint and agility performance in collegiate male handball wing players, using a randomized controlled trial with a non-training control (CON) group. Over a six-week intervention, athletes were assigned to VBT ($n = 6$), CT ($n = 7$), or CON ($n = 6$) groups, with all participants continuing regular handball practice. Sprint (40m) and agility (Illinois Agility Test) were assessed pre- and post-intervention. Internal training load was monitored using session-RPE.

Results showed that the VBT group achieved significantly greater improvements in sprint (-0.21 ± 0.04 s) and agility (-0.38 ± 0.06 s) performance compared to CT and CON groups. The CT group demonstrated moderate improvements (sprint: -0.11 ± 0.03 s; agility: -0.21 ± 0.05 s), while the CON group showed negligible change. Despite similar training loads between VBT and CT, performance gains were greater in the VBT group, highlighting the role of neuromechanical specificity and velocity emphasis in eliciting functional adaptation.

These findings support VBT as a superior in-season training modality for improving explosive performance in handball wing players. The study offers evidence-based guidance for coaches aiming to enhance speed and agility in sport-specific contexts.

Keywords: Agility, Athletic Performance, Handball, Resistance Training, Sprinting

Author: Mr ANWAR ALI S, Syed (Manipal Academy of Higher Education, Bengaluru Campus)

Co-author: Ms S, Kalaivani (Manipal Academy of Higher Education, Bengaluru Campus)

Presenter: Mr ANWAR ALI S, Syed (Manipal Academy of Higher Education, Bengaluru Campus)

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