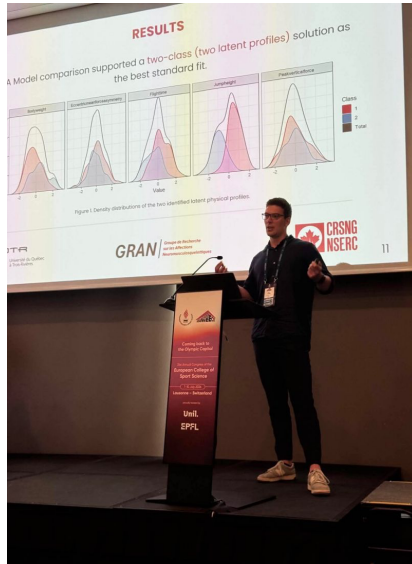




Physical Profiling in Highly Trained Adolescent Male Baseball Players: A Latent Profile Analysis Approach



We wanted to know:

What distinct physical performance profiles can be identified among highly trained male baseball players?

What is the problem?

Athletes differ in how their physical characteristics and capacities combine to support performance. However, most research examines these measures separately, such as body weight, strength, or jump performance. This approach may overlook meaningful combinations of characteristics and capacities that distinguish different types of athletes. We therefore wanted to determine whether highly trained male adolescent baseball players could be grouped into distinct physical profiles based on several physical assessments.

How did the team study the question?

We analyzed baseline physical assessment data from 96 highly trained adolescent male baseball players from the *Académie de Baseball du Canada*, Québec's male high-performance provincial baseball program, collected between 2021 and 2024. We examined five measures related to body size, explosive performance, and lower-body force production: body weight, jump height, jump efficiency, force asymmetry between the legs, and maximal strength during a mid-thigh pull. We then used a statistical approach called latent profile analysis to identify groups of players with similar combinations of physical characteristics. We tested solutions ranging from one to six profiles and identified two distinct physical profiles as the best fit for the data.

What did you find?

We identified two distinct physical profiles among the players. Profile 1 (60% of players) consisted of lighter athletes who jumped higher and demonstrated greater jump efficiency, indicating more effective use of their lower-body neuromuscular capabilities during explosive movement. Profile 2 (40% of players) consisted of heavier athletes who jumped lower, despite showing similar maximal force production and differences in force between the legs. The two profiles differed significantly in body weight, jump height, and jump efficiency, but not in maximal force or force asymmetry. These findings suggest that body weight and explosive jump performance may distinguish physical profiles more clearly than maximal strength alone in this group of highly trained adolescent baseball players.

How can this research be used?

Understanding different combinations of physical characteristics may help coaches, strength and conditioning professionals, and rehabilitation practitioners better describe individual athletes and monitor changes over time. Rather than evaluating a single physical measure in isolation, considering several characteristics together may provide a more complete picture of an athlete's physical profile. This approach could eventually support individualized training, rehabilitation, and return-to-sport monitoring, although these potential applications require further research.

Cautions

This study included a relatively small sample of highly trained adolescent male players from a single provincial program, which may limit how broadly the findings can be applied. The analysis was based on baseline assessments and included a limited number of physical measures. The profiles therefore need to be validated in other athlete populations and followed over time.

Reference: Tremblay, M. Prunault, C. Dupebe, W. Abboud, J. Descarraux, M. (2026). Physical Profiling in Highly Trained Adolescent Male Baseball Players: A Latent Profile Analysis Approach. *31st European College of Sport Science Congress 2026*, Lausanne, Switzerland.

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