

## **Association Between Efficiency of Movement Patterns and Basketball Performance: An Exploratory Study**

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### **ABSTRACT**

Basketball is a sport that requires players to execute a variety of multidirectional movements that have technically-skilled components of both offense and defense. While research has explored the relationships between a) strength and conditioning measures and basketball performance and b) strength and conditioning measures and measurements of movement efficiency, at this time we are unaware of any research that has investigated if movement efficiency and basketball performance are inter-related.

**PURPOSE:** To explore the association between efficiency of movement and basketball performance.

**METHODS:** Pre-season, participants (n=17) were recruited from a men's and women's NCAA Division 1 basketball team. Spatio-temporal movement parameters and their inefficiencies were analyzed using the OptoGait. After a controlled warm-up, participants were asked to complete a 30-second treadmill walk and run, sprint 5 meters, and perform a single and double leg vertical and broad jump. Movement pattern efficiency for gait-based parameters was operationally defined as variance in lower limb movement (e.g., variance in gait speed, single leg support time), with greater variance being considered as inefficient. For jumping movements, inefficiency of movement was defined as larger landing areas and jump points.

Basketball statistics were downloaded post-season and each player's basketball statistics were normalized to 30 minutes. Zero-order correlations were used to identify the relationship between basketball statistics and movement inefficiencies. **RESULTS:** While there were many (178) significant relationships present, the direction of the relationships was as expected with larger inefficiencies in movement being associated with worse basketball performance. Variances in sprint acceleration were negatively associated with most basketball statistics, with some of the largest relationships being field goal percent (-0.647), free throw attempt (-0.912), and total rebounds (-0.844). **CONCLUSION:** Taken together, the findings suggest that players who move inefficiently during running and while jumping tend to perform worse when they are playing basketball. Although this study did not identify how these inefficiencies impacted player performance, the results from this exploratory study suggest that investigation into this area is warranted. Our findings provide evidence that strength and conditioning researchers should also seek to understand whether movement efficiencies influence performance in other sports and also further investigate these relationships in basketball players with larger sample sizes.