

Oxygen Cost and Heart Rate Response of Manipulating a Foam Cube Using Soccer-style Movements in Comparison to Treadmill Exercise

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Introduction: This investigation aimed to determine the oxygen cost (VO₂) of manipulating a foam cube using soccer-style movements. In addition, the average VO₂ measured was used to estimate a comparable treadmill exercise work rate.

Background: The SAID principle of training suggests that the body will make Specific Adaptations to the Imposed Demands associated with training. For this reason, it makes sense for soccer players and coaches to use traditional soccer balls as the primary training tool during training sessions. There are, however, a variety of circumstances in which an athlete or coach may benefit from the use of an alternative training modality such as a foam cube. These circumstances include, NCAA seasonal time-on-ball rules, no soccer ball-on-side line during match rules, and injury rehabilitation applications. To date, very little is known about the oxygen cost or energy demands of using foam training cubes. Because of this, it is not clear what degree of training stimulus the foam cube provides, nor how this compares to traditional physical activities like treadmill exercise.

Methods: Twenty (9 men and 11 women), experienced, recreational and competitive (college or club) soccer players manipulated a foam cube, using a lateral, back-and-forth, rolling motion, for two minutes at both 50 and 70 rolls/min. Rolling cadence was kept using a metronome. The foam cubes measured 12 inches across and were approximately the same height as a traditional size 5 (official sized) soccer ball. VO₂ and heart rate (HR) were measured using a ParvoMedic True One 2400 metabolic measurement system and a Polar HR monitor. Comparable treadmill work rates (treadmill speed and grade) were estimated using the American College of Sports Medicine Metabolic Calculations.

Results: Analysis of the data revealed the VO₂ was 12.9 ml/kg/min and 17.4 ml/kg/min for 50 and 70 rolls/min, respectively. HR was 109.8 and 125.5 beats/min for 50 and 70 rolls/min, respectively. The VO₂ for 50 and 70 rolls/min would be equivalent to treadmill walking exercise at 3 mph with 0% grade, and 4.4 mph with 1% grade, respectively. Conclusion: These results suggest a soccer player who uses a foam cube could experience a VO₂ and HR response to be of benefit when the use of a soccer ball is not possible nor advised.