Analyzing the Factors of Performance: Is There a More Precise Way for Trainers to Score an Individual's Form During Exercises?

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Analyzing the Factors of Performance: Is There a More Accurate Way For Trainers to Score Form During Exercises.

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Objective: Determine if form scores are depictive of the individual’s true form and analyze if there are any unseen irregularities.

Methods:
- An Xsens Awinda 17 IMU sensor suit for camera-less motion capture
- 3 Trials of the Lock and Load, an Exercise designed by ProTERF trainer Ed Downs
- The Lock and Load is performed on both the left and right hand

![Figure 1: Xsens Awinda Suit](image)

![Figure 2: The Lock and Load](image)

Theory: Center of Mass in the Anterior-Posterior and Medial-Lateral direction give us the sway range for analyzing control and balance throughout the drill. Maximum Acceleration was used for determining the concurrent movements of the active limbs.

![Figure 3: AP Sway Left Hand](image)

![Figure 4: AP Sway Right Hand](image)

![Figure 5: ML Sway Left Hand](image)

![Figure 6: ML Sway Right Hand](image)

Results:
- Trends show that not all above average performers fall below the average sway range for both front to back and side to side control

![Figure 7: Max Accelerations of Left Hand and Right Foot](image)

![Figure 8: Max Accelerations of Right Hand and Left Foot](image)

Key:
- **= Above Average Performers
- **= Below Average Performers

Conclusion:
- Not all above average performers had low sway ranges which correlates to more control and vice versa
  - No clear correlations
- The active limbs did not appear to have the same accelerations
  - May not be in sync on the way up
  - May not be in sync on the way down
  - Put down a hand/foot during the drill for stabilization
- More biomechanical markers are needed for further analysis of the form
  - Coordination plots
  - Pelvis rotation and tilting
  - Jerk analysis
  - Other sensor based outcomes

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References:
1. [https://www.xsens.com/](https://www.xsens.com/)