IRISH STRENGTH & CONDITIONING NETWORK
Research Review

Title

The Reliability, Bias, Differences, and Agreement Between Velocity Measurement Devices During the Hang Clean Pull

Source

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Purpose of Study

To examine the reliability, bias, differences, and agreement between the GymAware PowerTool (GA) and Tendo Power Analyzer (TENDO) during the hang clean pull (HCP) across a range of loads.

Key Findings

1. **Reliability**:
   - **GymAware PowerTool (GA)**: Displayed excellent reliability for all mean barbell velocity (MBV) and peak barbell velocity (PBV) measurements.
   - **Tendo Power Analyzer (TENDO)**: Showed excellent reliability for MBV across all loads, but only moderate to good reliability for PBV at loads greater than 80% 1RM.
2. **Bias**:
   - **Proportional Bias**: TENDO displayed proportional bias for both MBV and PBV.
   - **Fixed Bias**: TENDO showed fixed bias for PBV at 140% 1RM compared to GA.
3. **Differences**:
   - Small differences in MBV (Hedge's g = 0.35–0.57) and PBV (Hedge's g = 0.23–0.54) between GA and TENDO, but none were practically meaningful.
4. **Agreement**:
   - Despite small effect sizes, the TENDO consistently overestimated MBV and PBV by 3.7–6.8% and 1.8–2.9%, respectively, compared to GA.

Practical Applications

- **Device Selection**: Both GA and TENDO can reliably measure MBV and PBV during the HCP, but practitioners should be aware of the potential overestimation by TENDO, especially at higher loads.
- **Consistency**: Use the same device consistently within training to account for any biases.
- **Monitoring**: Be cautious when comparing data from different devices, particularly at heavier loads.

Research Methods

The study involved 14 resistance-trained men performing HCP repetitions with 20, 40, 60, 80, 100, 120, and 140% of their 1RM HPC. Data were collected using GA and TENDO devices, and analyzed for reliability, bias, and differences.

Strengths and Limitations

Strengths:

- Comprehensive analysis of two popular velocity measurement devices across a wide range of loads.
- Provides practical insights for strength and conditioning practitioners.

Limitations:

- The study focused on resistance-trained men, which may affect the generalizability of the findings.
- Lack of 3D high-speed motion capture as a criterion measurement.

Takeaway Message

Both the GymAware PowerTool and Tendo Power Analyzer are reliable for measuring barbell velocity during the hang clean pull, but practitioners should be aware of the potential overestimation by TENDO, especially at higher loads. Consistent use of the same device is recommended to ensure accurate monitoring and assessment.
