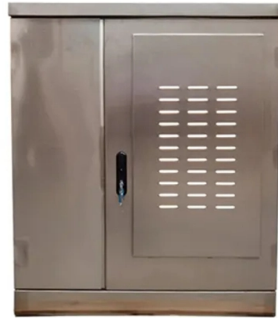


Comparison of high precision and more reliable performance of invisible jumpers



Article Overview

Invisible jumpers, such as IMU-based systems, can achieve high precision in measuring countermovement jump performance, closely matching force plate data for key metrics like jump height, contraction time, and RSImod.

Accuracy and Precision

Inertial Measurement Units (IMUs) placed on the lumbar spine (L5) have been shown to provide highly accurate measurements of CMJ parameters when compared to force plates, the gold standard. Metrics such as contraction time ($r = 0.902$), negative impulse phase time ($r = 0.773$), flight time ($r = 0.737$), jump time ($r = 0.708$), RSImod ($r = 0.725$), and minimum force ($r = 0.758$) demonstrated strong correlations with force plate data, indicating that IMUs can reliably capture the temporal and force characteristics of jumps. However, positive impulse phase measurements may be less precise depending on device placement and calibration. Low-sampling rate IMUs using Numerical Double Integration methods also showed excellent reliability (0.88) and low bias (2.5 cm) in estimating jump height, making them a portable and practical alternative for field-based assessments. Other computational methods like Take-Off Velocity and Flight Time performed well for bilateral jumps but were less accurate for unilateral jumps.

Performance Metrics

CMJ performance is typically evaluated using jump height, peak power, and RSImod...

Article Content

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arXiv:2009.00508v1 [cs.CV] 1 Sep 2020

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To mitigate these limitations, an emerging concept termed invisible monitoring was " " proposed and is gaining popularity.⁴ Initially,

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