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Conference report

Inter-Session Reliability of Load-Velocity Profile and Dynamic Strength Index (DSI) in Chinese Elite Judokas

Eduardo Carballeira[1,*], Felipe Sánchez-Llanes[2], Shengtao Yang[3,4], Maria-Alejandra Camacho-Villa[1], Sonia Rivera-Mejía[1], Marta Sevilla-Sanchez[1]

[1] Performance and Health Group, Department of Physical Education and Sport, University of A Coruña, A Coruña, Spain; eduardo.carballeira@udc.es; marta.sevilla@udc.es; m.camacho@udc.es; sonia.riveram@udc.es
[2] Shanghai Elite Sport Training Center, Beiyan Rd 300, Chongming Island, Shanghai, China; felipellanes@gmail.com
[3] School of Physical Education and Training, Shanghai University of Sport, Shanghai, China; totti_yang57@163.com
[4] Professional Sports Research Center, Shanghai Research Institute of Sports Science, Shanghai, China.

* Correspondence: eduardo.carballeira@udc.es; Tel.: +34 634 476 577

Abstract: Monitoring neuromuscular responses and recovery processes in elite athletes is a significant challenge, as tests must be non-disruptive to training schedules while remaining reliable. To address this, we propose studying the Dynamic Strength Index (DSI), which involves calculating the ratio between the peak force of a countermovement jump (CMJ) and the peak force of an isometric mid-thigh pull (IMTP) (1). This method is less time-consuming than the load-velocity curve and does not require weight adjustments between athletes, making it ideal for frequent evaluations of large groups. This study aimed to compare the inter-session reliability of the DSI with the load-velocity curve in elite Chinese judokas.

Sixteen judokas (10 males and 6 females, ages: 18.5 ± 2.6 years, weight: 72.7 ± 12 kg, body fat: 13.8 ± 4 kg, muscle mass: 47.5 ± 2.4 kg) participated. Testing took place over five days: three for familiarization and two for actual testing. Each session was separated by 48 hours and conducted at the same time of day to ensure inter-day reliability. Athletes abstained from training for 48 hours prior to testing and maintained consistent fluid and dietary intake. The two tests were performed on the same day, separated by one hour. The order of the tests was randomized by blocks, with pairs sorted by maximum strength level in IMTP.

For the load-velocity multiple-point method, high reliability was found for L_0 (CV= 3.48%; $ICC_{3.1}$ = 0.97), V_0 (CV= 3.53%; $ICC_{3.1}$ = 0.92), $S_{L\text{-}V}$ (CV= 6.46%; $ICC_{3.1}$ = 0.90), and A_{line} (CV= 5.21%; $ICC_{3.1}$ = 0.96). For the load-velocity two-point method, high reliability was obtained for L_0 (CV= 9.44%; $ICC_{3.1}$ = 0.78), V_0 (CV= 4.95%; $ICC_{3.1}$ = 0.88), and A_{line} (CV= 6.09%; $ICC_{3.1}$ = 0.95), but unacceptable reliability for $S_{L\text{-}V}$ (CV= 14.29%; $ICC_{3.1}$ = 0.62). The IMTP (CV= 7.91%; $ICC_{3.1}$ = 0.85) and CMJ (CV= 7.47%; $ICC_{3.1}$ = 0.90) showed high reliability, but the DSI variable had unacceptable reliability (CV= 11.11%; $ICC_{3.1}$ = 0.74), although it performed better than a similar test previously reported (2).

The most replicable test for monitoring strength performance in elite judokas was those related with the load-velocity curve. The two-point method yielded results comparable to the multi-point curve but is more efficient, requiring less time and effort. The reproducibility of the DSI was near the CV and ICC cut-off thresholds, indicating the need for further studies with larger sample sizes to clarify its utility for neuromuscular monitoring.

Keywords: neuromuscular monitoring; isometric mid-thigh pull; squat.

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