

LONGITUDINAL DYNAMIC STRENGTH INDEX PROFILING IN COLLEGIATE OLYMPIC WEIGHTLIFTERS PREPARING FOR NATIONAL COMPETITION

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Introduction

- Dynamic Strength Index (DSI) is an indicator showing the relationship of an athlete's strength and power production capacity; is an indicator of how much of their maximal strength can be use dynamically. It can also be looked as the athletes "strength and power potential".
- To obtain DSI the athlete must complete two movements, these being a countermovement vertical jump (CMJ) as well as an isometric mid-thigh pull (IMTP). DSI is gained by dividing the peak propulsive force of the CMVJ by the isometric peak force of the IMTP.
- $DSI = \text{Peak Propulsive Force} / \text{Isometric Peak Force}$.
- Research literature suggest that general DSI scores for athletes should range between 0.6 to 0.8, This being a percentage value of how much of their maximal strength can be use dynamically.
- Olympic weightlifting is a sport characterized by great demands of strength and power. So far, there is limited DSI data and research within this population.

Purpose

To distinguish and assess longitudinal changes in DSI and its constituent variables in collegiate Olympic weightlifters.

Methods

- 22 collegiate Olympic weightlifters from Lindenwood University participated in this study

| | Males (n = 10) | Females (n = 12) |
|----------------|-------------------|---------------------|
| Age (y) | 20.5 ± 1.9 | 19.8 ± 0.6 |
| Height (cm) | 172.1 ± 5.0 | 163.9 ± 5.1 |
| Body Mass (kg) | 83.1 ± 17.1 | 75.7 ± 13.9 |
| Body Fat % | 20.3 ± 5.1 | 32.4 ± 5.7 |

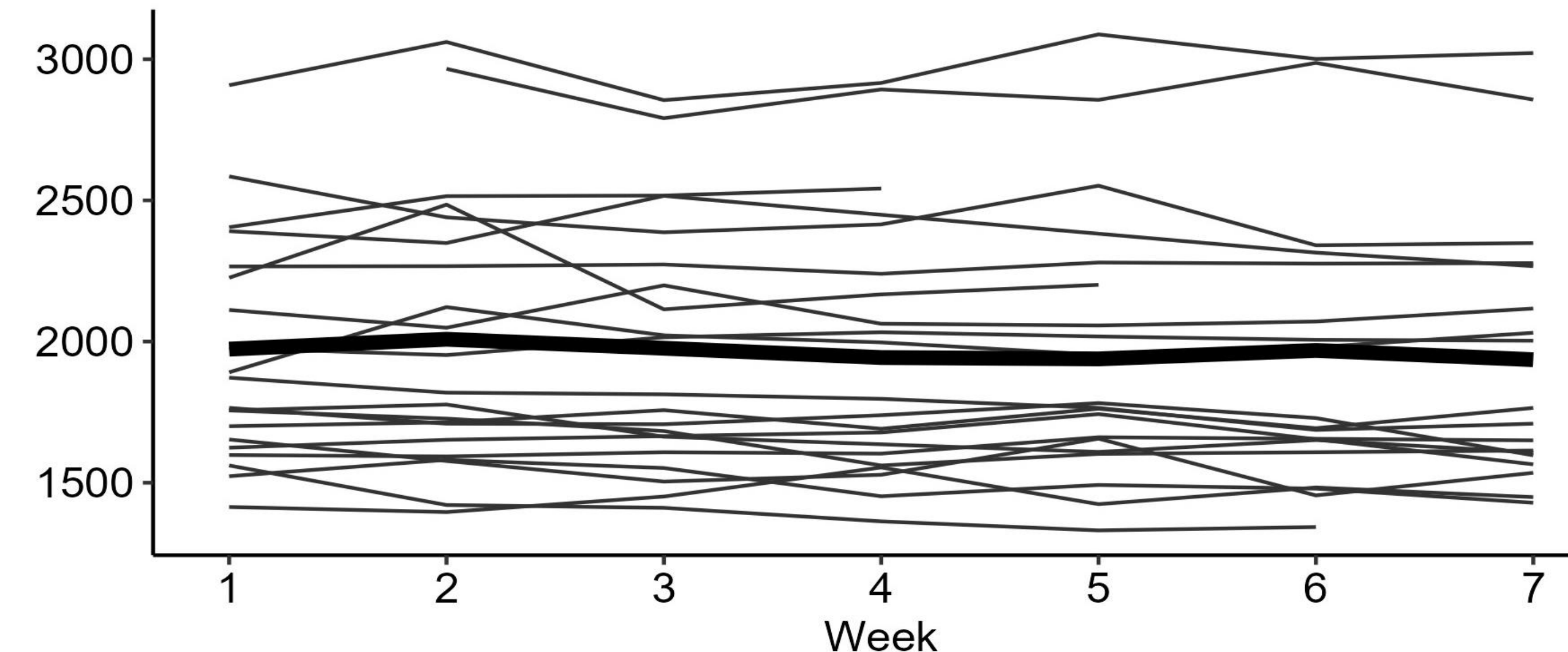
- Each athlete performed three trials of CMJ and IMTP during the first seven weeks of the final eight-week peaking period prior to a major national competition.
- All tests occurred following a 12h abstention from exercise and standardized warm up.

Statistical Analysis

- For statistical analysis, mixed effect models with random intercept for subject ID were computed to identify week-to-week differences in DSI, CMJ, and IMTP performance ($\alpha = 0.05$).
- Cohen's d effect sizes were calculated comparing each week and baseline.

Results

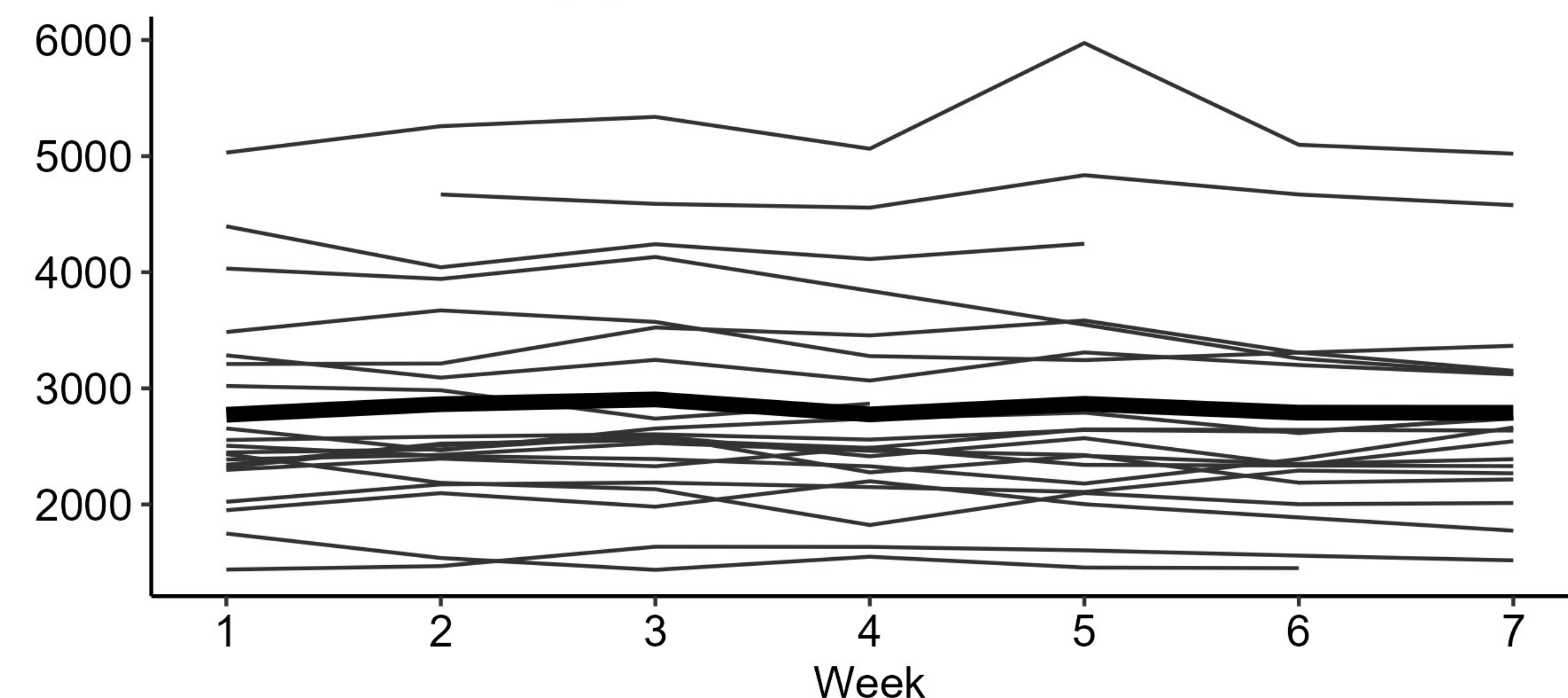
CMJ Peak Force (N)



CMJ

- No significant changes were detected in throughout the testing period for CMJ ($p = 0.057$).
- Effect sizes showing the magnitude of change in CMJ compared to Week 1 were negligible ($d < 0.10$).

IMTP Peak Force (N)



IMTP

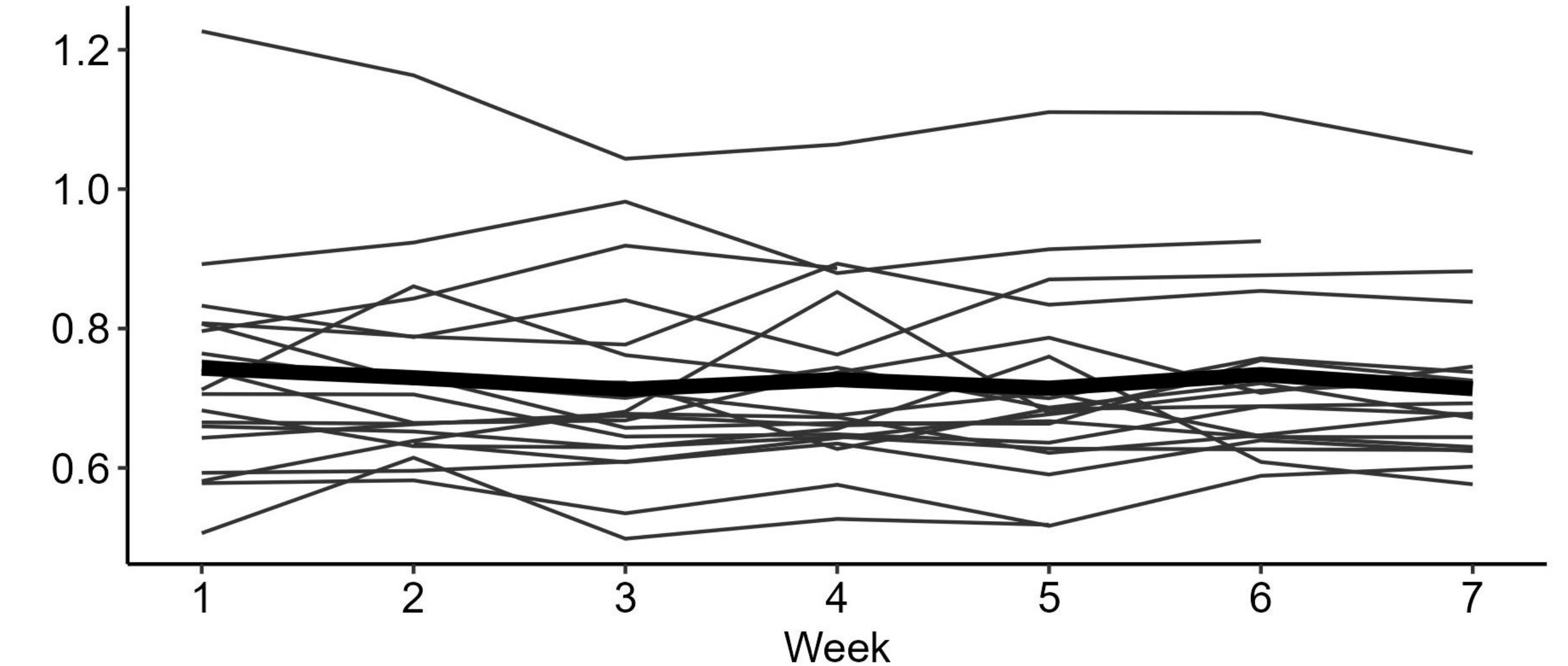
- No significant changes were detected in throughout the testing period for IMTP ($p = 0.066$).
- Effect sizes showing the magnitude of change in IMTP compared to Week 1 were negligible ($d < 0.10$).

Results Cont.

DSI

- Mean DSI was 0.73 ± 0.13
- No significant changes were detected in DSI throughout the testing period ($p = 0.855$).
- DSI scores decreased from baseline in Weeks 3 ($d = 0.21$), 5 ($d = 0.19$), and 7 ($d = 0.22$).

DSI



Conclusions

- Average DSI fell within the "balanced" range (0.6 - 0.8).
- There were no significant changes in DSI or its components across the testing period.
- Results suggest that practitioners can perform DSI testing with less frequency while still obtaining useful strength and power profiles from their athletes.

Acknowledgements

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