RELATIONSHIPS BETWEEN SPORT POSITION, PATELLAR TENDON ADAPTATIONS, AND SELF-REPORTED MEASURES IN COLLEGIATE WOMEN VOLLEYBALL ATHLETES

Lauren N. Distad, Erica L. King, Noelle D. Saine, Morgan A. Lamarre, Angela Miller, Parag V. Chitnis, Margaret T. Jones

PRESENTER:
Lauren Distad

BACKGROUND

- Patellar tendinopathy is prevalent among women in high-impact sports.
- Ultrasound (US) imaging of patellar tendon thickness (PTT) provides insight into structural adaptations in response to external load.
- Athlete self-reported wellness metrics (SRWM) is a way to monitor internal load, the physiological response to imposed external load.
- Utilizing US PTT measurements and athlete SRWM in concert allows a connection to be made between external and internal load and the effect on tendon health.

PURPOSE

- To monitor SRWM and PTT across a volleyball season in collegiate women athletes.

METHODS

- NCAA Division I women volleyball athletes (n=16; mean ± SD; age: 19.59 ± 1.50, height: 176.73 ± 7.37 cm, weight: 75.35 ± 9.40 kg, %bodyfat: 28.75 ± 3.59) were monitored across a 12-week competitive sport season.
- Sport positions: Libero (L) = 4, Middle Blocker (MB) = 4, Outside Hitters (OH) = 3, Right Side Hitter (RSH) = 2, Setters (S) = 3.
- Athletes completed weekly SRWM surveys of perceived recovery status (PRSS), overall soreness scale (OSS), and overall fatigue scale (OFS).
- Weekly US measures of PTT on dominant (D) and non-dominant (ND) legs included manually measured proximal (PPTT), medial (MPTT), and distal (DPTT) (Figure 1).

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KEY FINDINGS

Self-reported wellness measures are significantly correlated with patellar tendon thickness in collegiate women volleyball athletes.

Ultrasound Image of the Patellar Tendon

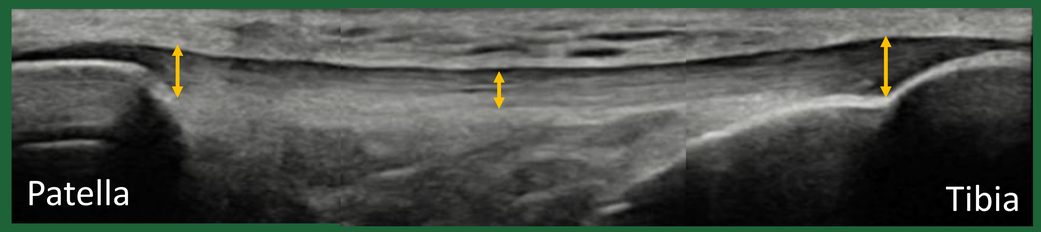


Figure 1. Ultrasound Patellar Tendon Measurements

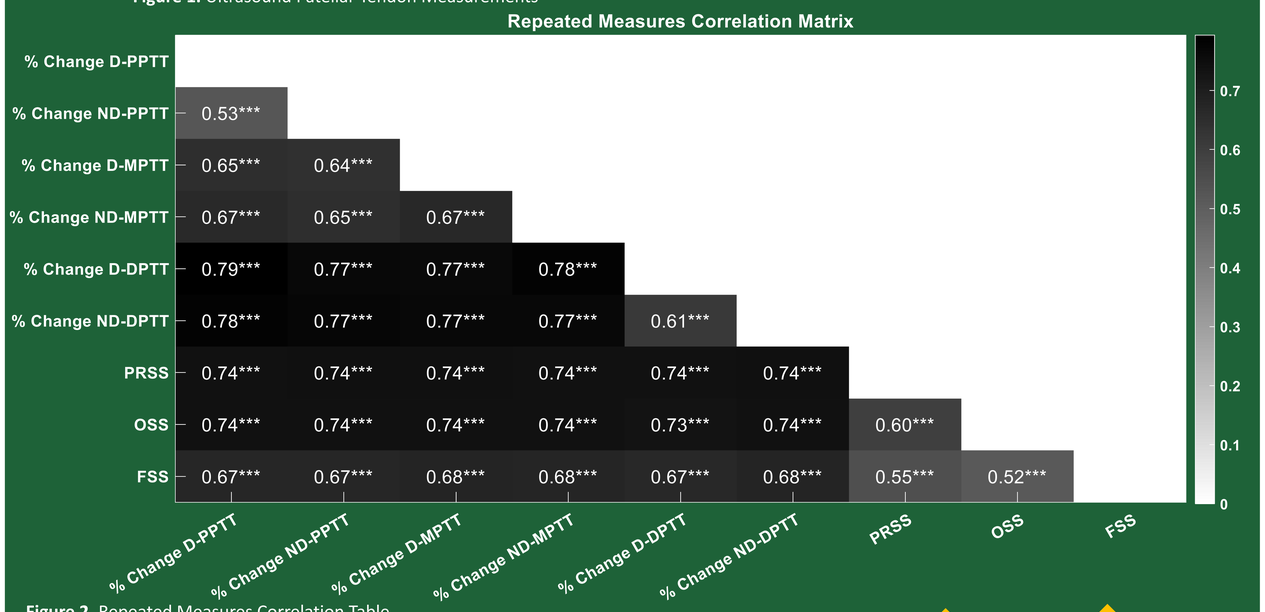


Figure 2. Repeated Measures Correlation Table

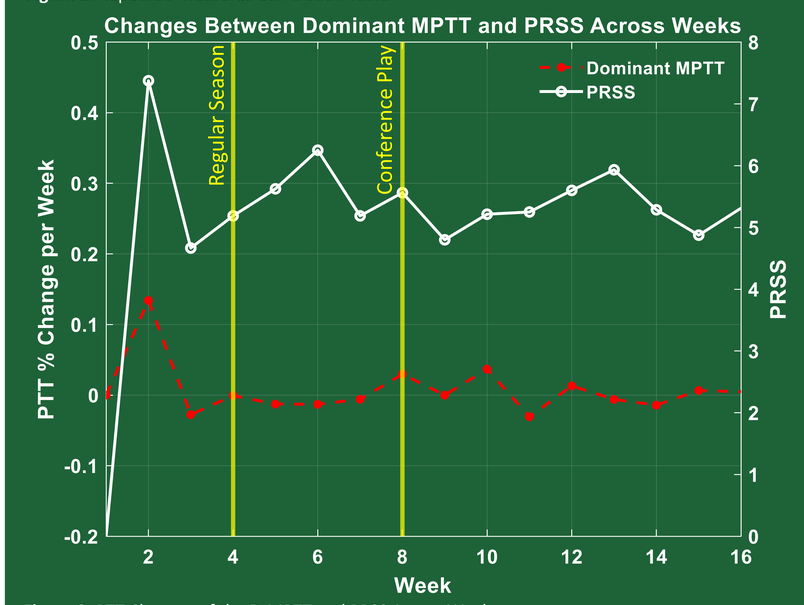
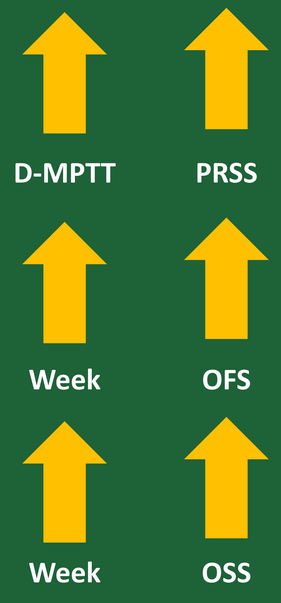


Figure 3. PTT Changes of the D-MPTT and PRSS Across Weeks



*p < 0.05, **p<0.01, ***p<0.001

STATISTICAL ANALYSIS

- Repeated measures correlation (RMCORR) measured relationships between PTT, SRWM, and VB position.
- Hierarchical linear modeling (HLM) examined SRWM and PTT while accounting for dependencies within individual athletes.
- Statistical significance was set to p> 0.05.

RESULTS

- *Figure 2:* RMCORR showed that SRWM were correlated to all PTT values (p<0.05)
- *Figure 3*: HLM showed that over the course of a competitive season, SRWM – PRSS was related to DMPTT (p=0.02)
- HLM showed SRWM – OSS was related to time (p<0.001)
- HLM showed SRWM – OSS was related to time for only the RS position (p=0.04)
- HLM showed SRWM – OFS was related to time for RS (p=0.02)
- HLM showed SRWM – OSS was related to time (p<0.01)

CONCLUSIONS and PRACTICAL APPLICATIONS

- SRWM were significantly correlated with PTT values, highlighting the relationship of subjective wellness and objective tendon health metrics.
- These findings contribute to the limited data in court jumping sports connecting subjective wellness and patellar tendon adaptations, measured by US imaging.
- By utilizing SRWM and PTT values, practitioners can monitor tendon health and identify early signs of potential overuse injuries, which can inform individualized approaches for athlete load management.

GEORGE MASON PERFORMANCE

College of Engineering and Computing
BIOENGINEERING
George Mason University