DYNAMIC STRENGTH INDEX WITHIN POSITIONAL GROUPS IN NCAA FEMALE LACROSSE ATHLETES

Paige J. Sutton, Lindsey A. Smith, Harry P. Cintineo, Kyle L. Sunderland
Exercise and Performance Nutrition Laboratory, Lindenwood University, St. Charles, MO 63301

Introduction

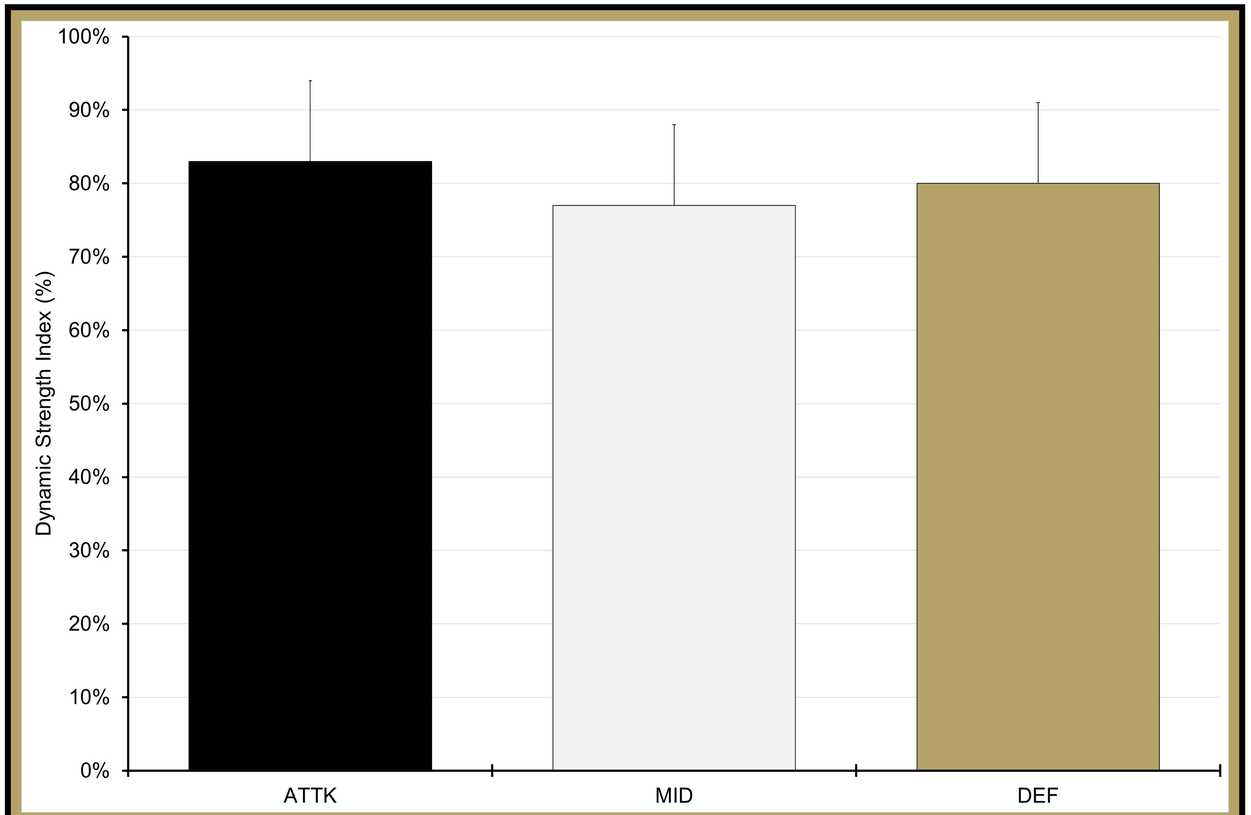
- Dynamic strength index (DSI) is the ratio between dynamic peak force production, assessed via countermovement jump peak propulsive force (CMJ), and isometric peak force production, assessed via isometric mid-thigh pull peak isometric force (IMTP).
- This measurement is commonly used to assess an athlete's capacity to effectively use maximum strength during dynamic tasks.
- To our knowledge only two studies have assessed DSI ratio in collegiate female lacrosse players and neither examined positional differences.

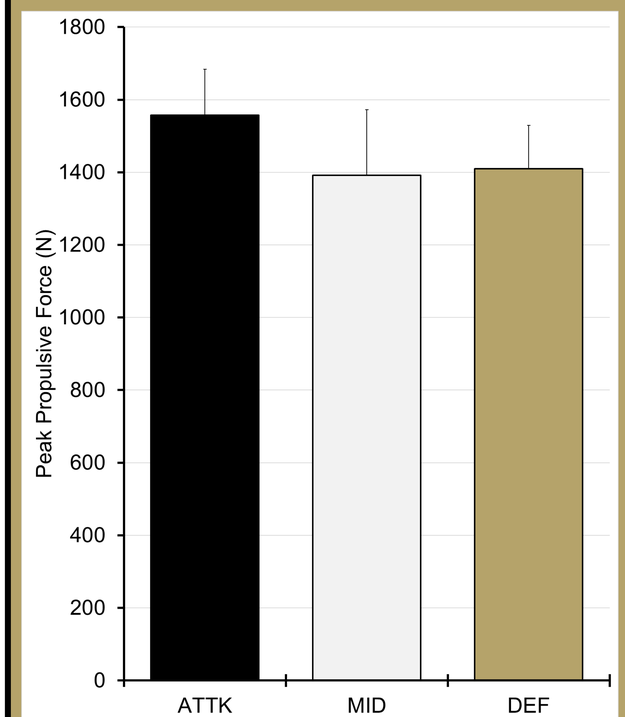
Purpose

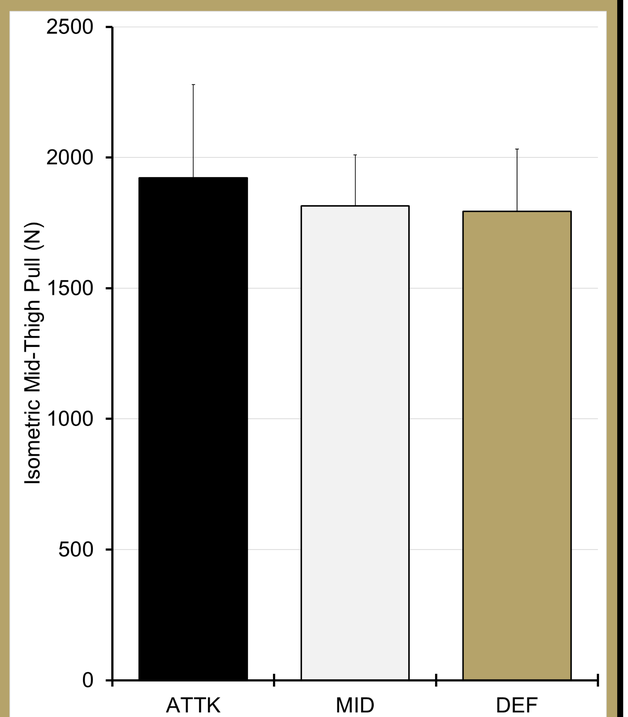
- To assess the differences in CMJ, IMTP, and the resultant DSI ratio between positional groups in college female lacrosse athletes.

Methods

- Nineteen National Collegiate Athletics Association Division I women's lacrosse athletes (21.5±1.5 years, 168.0±6.2 cm, 65.5±7.0 kg) participated in this study in the preseason training phase.
- Following an off day, participants completed a standardized warm up, three maximal effort CMJs were completed on dual force platforms (Hawkin Dynamics, Westbrook, ME) with at least 30 seconds rest between efforts.
- Following at least three minutes of rest, participants then completed three maximal effort IMTPs on dual force platforms (PASCO Scientific, Roseville, CA) with at least 60 seconds rest between efforts.
- Both sets of dual force platforms measured at a frequency of 1000Hz.
- DSI ratio was calculated by dividing the peak propulsive force of CMJ by the peak force production of IMTP.
- One-way ANOVAs were used to determine differences between attackers (ATTK), midfielders (MID), and defenders (DEF) for peak propulsive force during CMJ and IMTP, and the resultant DSI ratio.







Results

- No significant differences between positions were found for CMJ (ATTK: 1556.9±126.9 N, MID: 1392.2±180.5 N, DEF: 1409.8±119.6 N; p=0.104), IMTP (ATTK: 1922.2±357.4 N, MID: 1814.4±196.3 N, DEF: 1794.1±238.7 N; p=0.675), or DSI ratio (ATTK: 0.83±0.11, MID: 0.77±0.11, DEF: 0.80±0.11; p=0.681).

Conclusions

- To our knowledge, this is the first study to look at positional differences in CMJ, IMTP, and DSI ratio.
- While we observed no significant differences between position groups, previous research has found positional differences between on-field workloads in female lacrosse athletes.
- This leads us to believe off field training stimulus does not mimic on field training impulse.

Practical Applications

- Strength and conditioning coaches could use the DSI ratio to individualize training stimulus (strength/power) based on positional groups in order to optimize training and performance outcomes.
- Based on positional demands, an individualized training program could be created to be power-oriented for ATTK and strength-focused for DEF, while a combination program could be used for MID to optimize both aspects.
- Since previous research has shown that on-field workload demands differ based on positional group, off-field strength and conditioning programs should mimic on-field positional differences to optimize performance on the field.

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