The changes in stroke production in the modern game of tennis have increased the demands in trunk rotation in the elite tennis players. However, no study to date has objectively quantified side to side rotational trunk strength in these players.

Ninety-four elite tennis players were tested using a Cybex isokinetic torso rotation unit at a 60 and 120 degrees per second to measure left and right rotational strength. A subset of 28 subjects performed a functional series of medicine ball tosses using forehand and backhand movement patterns with a 6 pound ball.

A repeated measures ANOVA was used to determine side to side rotational differences and a Pearson correlation was used to test the relationship between the functional medicine ball toss and the isolated isokinetic torso rotation test results.

No significant differences in forehand and backhand trunk rotational strength were found in the elite male tennis players. In females, slightly greater backhand rotation strength was found at both testing speeds. Significant correlations were also found between the functional medicine ball toss and both forehand and backhand isokinetic strength variables.

These findings suggest that conditioning programs for elite tennis players should include exercises to develop bilateral trunk rotation to provide vital core stability to the spine and torso to meet the rotational demands encountered during tennis play.

Muscloskeletal demands placed upon the human body during tennis play have resulted in a characteristic pattern of upper extremity injuries in tennis players. Injuries to the lower back can be included in among the characteristic injuries in elite tennis players. Rotation of the trunk during the tennis serve and groundstrokes is an integral part of the development of power and transfer of energy up the kinetic chain from the lower to upper extremities (Roetert & Gruppel, Ellenbecker & Davies). The integral role that trunk rotation plays in tennis performance has led to a greater awareness and utilization of conditioning programs to improve core stability to enhance performance and prevent injury. However, little research is available to guide clinicians in the proper design of these stabilization programs nor is there an established method to identify players who are deficient in core strength and may require these programs.

The purpose of this study was to isokinetically measure bilateral trunk rotation strength in elite tennis players and to determine if differences exist in side-to-side rotational strength. Additionally, the study sought to determine the degree of correlation between isokinetically measured trunk rotation strength and a functional medicine ball toss that uses trunk rotation.

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**RESULTS**

- No significant strength differences were found in the male subjects between forehand and backhand rotational strength.
- Females demonstrated a significant (p < .001) side-to-side strength difference. Female subjects had significantly greater (p < .001) backhand rotation peak torque and single repetition work values at both 60 and 120 degrees per second compared to forehand rotation.
- Significant (p < .001) correlations were found between the peak isokinetic rotational strength and both forehand and backhand functional medicine ball tosses (r = .80).

**IMPLICATIONS AND APPLICATIONS**

- Elite level players have very high levels of trunk rotation strength.
- Training methods should promote symmetrical strength development in forehand and backhand rotation.
- Players with side-to-side strength differences of more than 5-10% should perform exercises to balance trunk rotational strength.
- A medicine ball toss can be used as an effective field exercise to estimate trunk rotational strength.

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