`Research article`

Relationship between Sprint, Change of Direction, Jump, and Hexagon Test Performance in Young Tennis Players

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Abstract

The hexagon agility test is widely used in tennis players' fitness evaluation, although its validity has not been fully stablished. This study aimed to assess the relationships between sprinting, jumping, and change of direction (COD) ability and hexagon test performance. Thirty-five under-16 tennis players completed a testing battery including the hexagon test, 20-m linear sprint, bilateral and unilateral countermovement jumps (CMJ), triple leg-hop for distance, T-Test, 5-0-5 and Pro-Agility test on two different sessions, separated by one week. The intraclass correlation coefficient (ICC) and the standard error of measurement (SEM) were used to assess the reliability of the test. Pearson's product correlations (r) were used to analyze the relationships between the hexagon test and the other fitness tests. Statistical significance was set at $p < 0.05$. The hexagon test showed high relative reliability (ICC = 0.88) and low SEM values (0.17 s). Significant small to large correlations were found between the hexagon test time and linear sprint time ($r = 0.40$ to 0.60), COD tests ($r = 0.53$ to 0.79), and jumping performance ($r = -0.40$ to -0.68). The hexagon test is a simple, quick, easy-to-implement and reliable test, which allow it to be included in tennis players' testing batteries. The test is related to measures of speed, power and agility, although the magnitude of these relationships does not allow for the replacement of the more traditional assessments (e.g., CMJ, 20-m sprint, T-Test) within tennis players' testing batteries.

Key words: Validity, testing, agility, tennis.

Introduction

Tennis is a complex sport which involves sport-specific technical skills together with a high level of numerous physical components (Fernández-Fernández et al., 2009). In this regard, the concomitant development of strength, power, speed, and agility has been proposed as a prerequisite for success in tennis (Fernández-Fernández et al., 2014). To optimize training strategies and monitor training loads, it is essential to regularly assess tennis players using valid and reliable measurements and instruments (Ferrauti et al., 2018; Reilly et al., 2009). Consistent evaluations will provide coaches with important information regarding tennis players (e.g., weakness or necessities), which aid in training prescription when looking for the optimal long-term athlete development (Fernández-Fernández et al., 2014). After implementing

individualized training programs, testing should be frequently repeated to detect changes in physical performance and adjust subsequent training programs (Ferrauti et al., 2018).

Among a series of testing procedures, field-based tests present some advantages, as they seem more appropriate to mimic the specific demands of complex sports such as tennis (Ferrauti et al., 2018). Further, field-based tests are easy-to-implement, ecologically valid, and time-efficient, as they allow for the simultaneous recording of several players and generally require inexpensive equipment (Reilly et al., 2009). As a result, field-based tests such as 20 m linear sprint, change of direction (COD) tests (e.g., T-Test, 5-0-5), and jumping ability tests (e.g., countermovement jump [CMJ]) are commonly used with tennis players (Cooke et al. 2011; Fernández-Fernández et al., 2014; Ferrauti et al., 2018; Myburgh et al., 2016). Although without a high scientific justification, the hexagon test has been implemented as a measure of agility performance (Beekhuizen et al. 2009), being included in the fitness testing battery proposed by the United States Tennis Association (USTA; www.ushsta.org) and the International Tennis Federation (ITF; www.itftennis.com) (Kovacs et al., 2016). Consequently, some studies have used the hexagon test as a measure of agility in tennis players (Beekhuizen et al., 2009; Myburgh et al., 2016).

The term agility has been previously defined as the ability to explosively brake, change of direction, and (re) accelerate (Plisk, 2008). However, more recent research have defined agility as the skill required to rapidly change direction, velocity, or mode, in response to a stimulus (Jones and Nimphius 2019; Nimphius et al., 2018). Although named as "hexagon agility test", this measurement does not present any response to a stimulus or a decision-making process, which places the test in an ambiguous position. Thus, despite a previous research reported excellent reliability scores for the hexagon test (Beekhuizen et al., 2009), the validity of the test has not been established. Actually, Farlinger et al. (2007) detected no significant correlations between hexagon test time and several physical performance tests (e.g., Wingate, vertical jump, specific on-ice sprint) in competitive hockey players. Similarly, Myburgh et al. (2016) reported non-significant correlations between hexagon test performance and other functional measurements in youth tennis players. In

contrast, Pauole et al. (2000) observed significant relationships between hexagon test time and both linear and COD (e.g., T-Test) speed in athletes from different sports. As such, there is a lack of consistency and agreement concerning the actual contributions and relationships of different physical components in hexagon test performance.

This study aimed at assessing the validity of the hexagon agility test as a measure of speed-power-related abilities in youth tennis players by examining its correlations with valid tests of linear speed, jump, and COD performances. Based on a previous study on this topic in young tennis players (Myburgh et al., 2016), we hypothesized that the hexagon agility test is not related to jumping, COD, and sprinting ability.

Methods

Design
This is an observational descriptive study examining the validity of the hexagon agility test as a measure of speed, power, and COD ability in youth tennis players. Testing protocols were conducted over a 2-week period beginning at the end of July 2020. Test sessions were undertaken between 12:00 and 14:00 hours, and the players were tested at their respective tennis clubs. All tests were performed in the same order, using the same testing devices, measurement protocols, and experienced evaluators. The testing took place in an outdoor synthetic court (Rebound Ace surface; temperature, 24.6-26°C; relative humidity, 54.4–61.0%; Kestrel 4000 Pocket Weather Tracker, Nielsen Kellerman, Boothwyn, PA). Subjects were instructed to withdraw all sources of caffeine for 24 h before testing and to have their habitual breakfast at least 3 h before the onset of the measurements.

Subjects
Thirty-five junior tennis players (i.e., (21 boys and 14 girls; age 14.3 ± 1.6 years, body mass 54.3 ± 9.9 kg, height 166.1 ± 9.8 cm, estimated age at peak height velocity (PHV) 12.7 ± 0.8 years) took part in this study. The sample comprised competitive players from two tennis clubs, selected by the coaching staff based on their technical abilities and competitive performance. All players completed, on average, 15-20 hours of combined tennis and physical training per week and had a training background of 6.2 ± 2.5 years. None of the players reported any history of chronic medical conditions during the previous 12 months. Before taking part in the study, subjects and their parents/guardians were fully informed about the study protocol and provided their written informed consent. The Spanish Tennis Federation Ethics committee approved the procedures (RFET.EC_19.3) in accordance with the latest version of the Declaration of Helsinki.

Procedures
Maturity status
Body height was measured using a fixed stadiometer (± 0.1 cm; Holtain Ltd., Crosswell, UK), sitting height with a purpose-built table (± 0.1 cm; Holtain Ltd., Crosswell,

UK), and body mass with a digital balance (± 0.1 kg; ADE Electronic Column Scales, Hamburg, Germany). Pubertal timing was estimated according to the biological maturation of each individual using the predictive equation described by Mirwald et al. (2002). The age of peak linear growth (age at peak height velocity) is an indicator of somatic maturity representing the time of maximum growth in stature during adolescence. Calculating the biological maturation of each player (years) was achieved by subtracting the chronological age at the time of measurement from the chronological peak-velocity age (Sherar et al., 2005).

Sprint test
Time during a 20-m sprint (with 5 and 10 m split times) in a straight line was measured using photocell gates placed 1 m above the ground level (Witty System, Microgate, Bolzano, Italy). Each sprint was initiated 0.5 m behind the photocell gate, which then started a digital timer. Players started the sprint test in a standing position, with their preferred foot behind the starting line, followed by accelerating forward at maximal effort until they have passed the last photocell gate placed at 20 m. Each player performed two maximal 20-m sprints with at least 2 min of passive recovery in between the two trials (Fernández-Ferández et al., 2018). The fastest time was retained for statistical analysis.

Modified 505 change of direction test
The ability of athletes to perform a single and rapid 180° change of direction over 5 m was evaluated using a modified version (stationary start) of the 505 test (Gallo-Salazar et al., 2017). Players started in a standing position with their preferred foot behind the starting line, followed by accelerating forward at maximal effort until reaching a line placed at 5 m. Two trials pivoting on both left and right feet were completed and the fastest time recorded to the nearest 0.01 s (Witty System, Microgate, Bolzano, Italy) was used for analysis. Two minutes of rest were allowed between trials. The COD deficit for the modified 505 test was calculated by the formula: modified 505 time – 10-m time (Nimphius et al., 2016).

Pro-Agility test
The Pro-Agility test was set up and administered using the protocol outlined by previous research (Paul et al., 2016). Subjects started in a neutral stance and were instructed to turn and sprint to the dominant or non-dominant side (5 m), touching a cone with the hand. They then turned to the opposite side and ran 10 m to the far cone. The subjects touched this cone with the hand and then sprinted 5 m to the finish. Time was recorded using photocell gates (Witty System, Microgate, Bolzano, Italy). Subjects performed two trials to both, dominant and non-dominant sides, and the fastest trials were used for analysis. The Pro-Agility deficit was calculated by the formula: Pro-Agility time – 20-m time.

T-Test
A modified version of the T-Test was performed (Kadlubowski et al., 2019). A single cone was set up at 10

m from the timing gates, and then two more cones either side of the first cone at 5 m. On command, subjects sprinted forward, through the photocell gates (Witty System, Microgate, Bolzano, Italy), and touched the middle cone with their right hand. Subjects then side shuffled 5 m to their left (touching the cone with their left hand) and then proceeded to side shuffle 10 m to the far-right cone (this time touching down with their right hand). A side shuffle of 5 m left was then performed back to the centre cone before turn 180º and sprinting forwards 10 m through the timing gates to complete the test. Each subject performed three trials interspersed with a 2 min passive rest, and the fastest time was used for statistical analysis.

Countermovement Jump (CMJ) test

A bilateral and unilateral (e.g., dominant and non-dominant side) CMJ were performed on an infrared plate Optojump (Microgate, Bolzano, Italy), according to procedures previously described (Glatthorn et al., 2011). Briefly, subjects performed the jumps starting in a standing position with their hands on their hips; then, they flexed their knees using a self-selected depth and jumped as high as possible. Each player performed three maximal CMJs interspersed with 45 s of passive recovery. The highest jump was recorded for each athlete and used for further analysis.

Triple leg-hop for distance

The triple hop test requires the subjects to perform 3 consecutive hops on the same leg aiming for maximum distance (Williams et al., 2017). Subjects' toes were immediately behind the zero line, marked with a measuring tape. The distance covered was defined as the distance from the zero line to the point their heels touched the ground following the third hop (in m). Each player performed two attempts with each leg, interspersed with 45 s of passive recovery. The larger distance was retained for analysis.

Hexagon test

A modified version of the original hexagon test (Beekhuizen et al., 2009) (e.g., including two sequences instead of three) was used in the present study. The test requires the player to stand facing forwards, in the middle of a hexagon measuring 60 cm per side and with 120-degree angles. With feet together and hips facing forward throughout the test sequence, subjects hopped forwards and backwards in a clockwise manner, over each of the six sides of the hexagon. Each repetition was recorded using a mobile phone (iPhone XS; Apple Inc., Cupertino, CA, USA) running iOS 13.7 was secured to a small tripod with a mount (GripTight Mount Pro, Joby, USA) and positioned 1 m from the hexagon. All trials were recorded at 240 Hz and the time to complete two rotations was later analyzed with a video analyses software (Kinovea version 0.8.15, available for download at: http://www.kinovea.org). A penalty of 0.5 s was given each time the player touched a line, and a 1.0 s penalty was given if the player failed to follow the correct sequence. A practice attempt was given prior to the two attempts used for analyses, with a 45 s rest between them. The fastest time for the two attempts was used for analysis.

Statistical analysis

Descriptive statistics are presented as mean values and SDs. The dependent variables demonstrated a normal distribution using the Kolmogorov-Smirnov test. To assess relative reliability, Intraclass correlation coefficients (ICCs) were calculated with the corresponding 95% confidence intervals (95% CIs). The ICC values were interpreted as follows: excellent (> 0.90), high (0.70-0.90), moderate (0.50-0.69) and low (< 0.50). Absolute reliability was calculated using the standard error of measurements (SEM), which was calculated as $SD \times \sqrt{1 - ICC}$, where SD is the SD of all scores from the subjects (Weir, 2005). The SEM was used for calculating the minimal detectable change (MDC) and was calculated as $SEM \times 1.96 \times \sqrt{2}$ to construct a 95% CI (27). A paired t-test was used to assess the potential differences between dominant and non-dominant tests performance. Pearson' product correlation (r) was computed between the hexagon test and all the other tests. The strength of the correlation was interpreted as trivial (< 0.30), small (0.30-0.49), moderate (0.50-0.70) and large (> 0.70). Statistical significance was set at $p < 0.05$. Data were analyzed using the SPSS statistical package version 25.

Results

Table 1 shows the performance test results. The statistical analyses showed significant differences ($P < 0.05$) between dominant and non-dominant legs in the triple leg hop for distance.

Table 1. Test performance results (mean ± SD).

Variables		Dominant side	Non-dominant side
Sprints	5m (s)	1.14 ± 0.1	
	10m (s)	1.98 ± 0.1	
	20m (s)	3.54 ± 0.3	
Jumps	CMJ Bilateral (cm)	25.46 ± 5.0	
	CMJ Unilateral (cm)	11.84 ± 3.4	11.91 ± 3.3
	Triple hop (m)	5.00 ± 0.9*	4.84 ± 0.9
Change of direction	505 Test (s)	2.94 ± 0.2	2.95 ± 0.2
	T-test (s)	10.68 ± 0.8	
	Pro-agility (s)	5.66 ± 0.4	5.69 ± 0.3
	Hexagon (s)	8.10 ± 1.1	

* Significant differences between sides ($p < 0.05$); cm: centimetres; CMJ: Countermovement jump; m: metres; s: seconds.

The reliability data of the tests conducted in the present study is shown in Table 2. The hexagon test, the 5 m sprint test, and the Pro-Agility Test with the non-dominant leg showed high ICC values (> 0.80), with the other tests showing excellent reliability scores (ICC > 0.90).

The relationships between times in COD tests and jumping performance are depicted in Table 3. The hexagon test showed significant negative correlations (r ranging from -0.40 to -0.68) with all jumping tests. More specifically, the relationships were moderate with the triple hop and bilateral CMJ tests, and small with unilateral CMJ performance. Regarding the other COD tests, relationships with jumping performance were similar for the T-test (r from -0.41 to -0.75) and the 5-0-5 (r from -0.38 to -0.66), and higher for the Pro-Agility test (r from - 0.56 to -0.85).

The hexagon test showed significant positive correlations with sprinting time. The association was small for the 5-m time ($r = 0.40$), but moderate for both 10- ($r = 0.57$) and 20-m ($r = 0.60$) sprint time. Regarding the other COD tests, relationships with sprinting performance were similar for the T-Test ($r = 0.41$-0.63), and slightly higher for the 5-0-5 ($r = 0.55$-0.65) and the Pro-Agility test ($r = 0.52$-0.78). Interestingly, both, 5-0-5 and Pro-Agility deficits, were negatively associated with sprinting performance (Table 4).

Table 5 shows the relationships between the different COD tests analyzed in the study. The hexagon test showed significant positive correlations with the 5-0-5 test ($r = 0.53$-0.79), and large correlations with the T-Test ($r = 0.76$) and the Pro-Agility test ($r = 0.78$-0.79). The associations among the other COD tests were generally stronger

(r ranging from 0.71 to 0.89). Deficits showed in both 5-0-5 and Pro-Agility tests were largely significantly correlated ($r = 0.78$).

Table 4. Relationship between COD tests and linear sprint performance.

Tests	Time 5-m	Time 10-m	Time 20-m
5-0-5 D	0.57*	0.69*	0.72*
5-0-5 ND	0.49*	0.52*	0.54*
5-0-5 best	0.55*	0.62*	0.65*
5-0-5 deficit	-0.38*	-0.39*	-0.32
T-Test	0.41*	0.54*	0.63*
ProAgility D	0.50*	0.68*	0.76*
ProAgility ND	0.49*	0.68*	0.77*
ProAgility best	0.52*	0.70*	0.78*
ProAgility deficit	-0.58*	-0.57*	-0.53*
Hexagon	0.40*	0.57*	0.60*

D: dominant; ND: non-dominant; *: $p < 0.05$.

Table 2. Reliability data for the different tests.

Tests	ICC	95% CI Upper bound	95% CI Lower bound	SEM	MDC
5m	0.82	0.50	0.94	0.03	0.07
10m	0.90	0.70	0.97	0.04	0.10
20m	0.91	0.73	0.97	0.07	0.21
5-0-5-D	0.95	0.84	0.98	0.04	0.11
5-0-5-ND	0.87	0.63	0.96	0.08	0.21
ProAgility-D	0.93	0.77	0.98	0.07	0.21
ProAgility-ND	0.88	0.63	0.96	0.10	0.26
T-Test	0.92	0.76	0.98	0.14	0.39
Hexagon	0.88	0.69	0.96	0.17	0.46
CMJ	0.98	0.95	0.99	0.76	2.11
CMJ-D	0.95	0.88	0.98	0.78	2.15
CMJ-ND	0.94	0.85	0.98	0.79	2.20
3LH-D	0.92	0.78	0.97	0.23	0.64
3LH-ND	0.96	0.89	0.98	0.17	0.47

ICC = intraclass correlation coefficient; CI = confident interval; SEM = standard error of measurement; MDC = minimal detectable change; CMJ: Countermovement jump; 3LH: triple leg hop for distance; D: Dominant side; ND: Non-dominant side.

Table 3. Relationships between times in COD tests and jump performance.

Tests	CMJ	CMJ-D	CMJ-ND	CMJ best	3LH-D	3LH-ND	3LH-best
5-0-5 D	-0.60*	-0.47*	-0.47*	-0.46*	-0.67*	-0.73*	-0.74*
5-0-5 ND	-0.37*	-0.22	-0.21	-0.18	-0.51*	-0.55*	-0.59*
5-0-5 best	-0.51*	-0.40*	-0.39*	-0.38*	-0.58*	-0.64*	-0.66*
5-0-5 deficit	-0.06	-0.03	-0.04	0.01	0.17	0.04	0.05
T-Test	-0.56*	-0.41*	-0.58*	-0.49*	-0.62*	-0.75*	-0.72*
ProAgility D	-0.69*	-0.56*	-0.66*	-0.62*	-0.73*	-0.82*	-0.83*
ProAgility ND	-0.66*	-0.51*	-0.64*	-0.60*	-0.76*	-0.84*	-0.85*
ProAgility best	-0.67*	-0.56*	-0.68*	-0.64*	-0.75*	-0.84*	-0.85*
ProAgility deficit	0.07	0.02	0.01	0.06	0.26	0.10	0.13
Hexagon	-0.60*	-0.40*	-0.51*	-0.48*	-0.63*	-0.68*	-0.68*

CMJ: Countermovement jump; 3LH: triple leg hop for distance; D: Dominant side; ND: Non-dominant side; *: $p < 0.05$.

Table 5. Relationships between the different variables obtained in the COD tests.

	5-0-5 ND	5-0-5 best	5-0-5 deficit	T-Test	ProAgility D	ProAgility ND	ProAgility best	ProAgility deficit	Hexagon
5-0-5 D	0.80*	0.95*	0.35	0.86*	0.89*	0.83*	0.88*	0.12	0.79*
5-0-5 ND		0.91*	0.48*	0.80*	0.79*	0.71*	0.77*	0.22	0.53*
5-0-5 best			0.47*	0.84*	0.85*	0.78*	0.85*	0.17	0.71*
5-0-5 deficit				0.35	0.17	0.14	0.18	0.78*	0.20
T-Test					0.84*	0.84*	0.87*	0.18	0.76*
ProAgility D						0.93*	0.98*	0.11	0.78*
ProAgility ND							0.97*	0.09	0.79*
ProAgility best								0.11	0.79*
ProAgility deficit									0.05

COD : change of direction ; D: dominant; ND: non-dominant; *: $p < 0.05$.

Discussion

The aim of the present study was to assess the validity of the hexagon agility test as a measure of speed, power, and COD ability in youth tennis players. Present results rejected the authors' hypothesis, as the hexagon agility test performance is significantly related to some specific measures of jump performance (i.e., CMJ height and triple hop for distance), as well as with linear speed over different distances (5, 10, and 20 m) and COD ability (T-Test, 5-0-5 and Pro-Agility).

Due to the practical impact of fitness testing (e.g., changes in performance, training prescription, return-to-sport after an injury, etc.), it is crucial that the tests used for evaluation demonstrate high levels of reliability. In the present study, all tests showed high-to-excellent ICC values, supporting their suitability as reliable measurements to evaluate the physical performance of young tennis players. More specifically, the hexagon test presented a high ICC (i.e., 0.88), which is in line with the results provided by Beekhuizen et al. (2009) (ICC = 0.94), highlighting the high reliability of this test.

The hexagon test has been previously defined as a practical measure of agility and foot quickness involving balance and coordination (Kovacs et al., 2016). To date, the validity of the hexagon test as a measure of speed, lower-body power, and COD performance has been shown to be weak. In this regard, previous studies have reported no relationships between the hexagon test performance and jumping ability (Farlinger et al., 2007; Myburgh et al., 2016) and linear sprint times (Myburgh et al., 2016). Only a previous study found significant trivial-to-small ($r = 0.22$-0.40) correlations between the hexagon test, vertical jump height, and linear sprint speed in college-aged females (Pauole et al., 2000). Present results differ from previous research, as moderate correlations were found between the hexagon test, CMJ height ($r = 0.60$), and triple leg-hop distance ($r = 0.63$-68). Although also significant, the relationship between the hexagon test and unilateral CMJ was lower ($r = 0.40$-0.51). The contralateral balance required in both, the hexagon and the triple leg-hop test may, to some extent, explain these moderate relationships. Although not measured, we can speculate that performance in the hexagon test is more related to muscle-tendon unit stiffness, which has been previously associated with reduced ground contact time during jump tasks (Abdelsattar et al., 2018) and significant improvements in drop jump performance (Kubo et al., 2007).

Contrary to the authors' hypothesis, performance in the hexagon test was significantly correlated with linear sprint and COD performance. Specifically, for the sprint test, this relationship ranged from small ($r = 0.40$; at 5 m split time) to moderate ($r = 0.60$; at 20 m). Therefore, tennis players who performed worse in the hexagon test also showed slower sprinting times. Although again speculative, this association could be explained by the positive influence of muscle-tendon stiffness on both the hexagon test and sprinting performance (Butler et al., 2003). These results are not in agreement with the study of Farlinger et al. (2007), who detected a non-significant relationship between hexagon test performance and 30-m sprint time in

ice-hockey players. These discrepancies may be related to some differences in the samples, as they used male athletes of 16.3 ± 1.7 years of age, while the sample in the present study was composed of younger male and female tennis players (i.e., 13.0 ± 2.7 years). Therefore, differences in sport, sex, maturation status (and hence anthropometric and physiological traits) cannot be discarded as explanations for these respective differences.

The greatest magnitude of relationships was found between the hexagon test and the other COD tests. The hexagon test requires multilateral jumps to six different positions, which inherently involves a COD task. It can be inferred that some specific mechanisms important for COD performance such as shorter ground contact times and greater horizontal braking and propulsive forces (Dos'Santos et al., 2017) are also key mechanical factors for successful performance in the hexagon test. Other variables which may potentially influence performance in either hexagon and COD tests are dynamic core stability and lower limb muscle activity (Dos'Santos et al., 2018; 2019).

This research presents several limitations which makes it impossible to draw any causal conclusions from the current results. The study is limited by the small sample of national level male and female tennis players; hence, our results cannot be extrapolated to more specialized populations (e.g., senior tennis players). Moreover, training volume, experience and maturation levels were not completely matched; as a consequence, a certain level of heterogeneity may have influenced our outcomes. Further investigations considering these aspects are needed to draw more firm conclusions on these relationships.

Conclusion

The findings reported here may have important implications for both youth talent identification and training purposes. Coaches should evaluate tennis players using practical and consistent tests, which measure the specific requirements of the sport. Our results confirm the high reliability of the hexagon agility test. This field-based measurement requires simple and inexpensive material and is easy to implement, which places it in a good position to be included in tennis players' testing batteries. In addition, the performance in the hexagon test was significantly related to the performance obtained in different physical performance measurements (COD, jump, and linear sprint tests), with correlations ranging from small to large ($r = 0.40$-0.79). Therefore, the hexagon test could be implemented and used as a monitoring tool in the regular testing batteries of tennis players, especially during time-restricted sessions, as for example during the in-season period. However, the hexagon agility test should not be used to substitute the more traditional speed-power related tests (e.g., linear sprint, CMJ, COD).

during the current study are not publicly available but are available from the corresponding author who was an organizer of the study.

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Key points

- The Hexagon test is a simple and user-friendly test, which has shown high reliability in young tennis players.
- Performance in the Hexagon test is significantly related to different measures of speed, jump, and change of direction ability.
- The present data suggest that the Hexagon test is appropriate to be included in tennis players' testing batteries.
- Since the Hexagon test is only moderately correlated with more traditional speed-power tests, this measurement should not be used to replace more standard performance tests (e.g., CMJ, 20-m sprint, 5-0-5).

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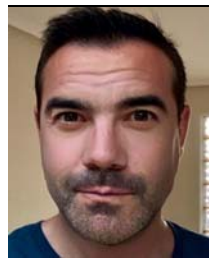
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