Lexington Clinic
Shoulder Center of Kentucky

ASK THE DOC: JANUARY 2023

TOPIC: OBSERVATIONAL TENNIS SERVE ANALYSIS

The Observational Tennis Serve Analysis (OTSA) was developed as a collaborative effort between the Women's Tennis Association (WTA) and Lexington Clinic's Shoulder Center of KY to create a tool for effective analysis of the serve motion that could be used easily on court and would suggest interventions that could improve serve mechanics and modify risk of injury. It is based on current knowledge of the mechanics of optimum force production that has been produced through basic science investigation. It has been used extensively for evaluation of professional tennis players and has also been used for evaluation of active and competitive nonprofessional players.

The OTSA is designed to be used as part of an overall plan for improvement of the skills for an individual player at all skill levels. The aims of the OTSA are to produce a rating score that provides an overall view of the entire serve motion, to highlight certain areas of the serve motion that are performed well or may be deficient and to suggest areas that can be highlighted for improvement, either by improving strength or flexibility or by improving the serve technique. The analysis report also includes some suggested exercises and technique adjustments that can be used to optimize performance.

The framework of OTSA is based on evaluation of the player's ability to achieve certain body positions and motions (called nodes) and found to be basic for efficient performance of the entire serve motion. Results are captured in an analysis report that includes some suggested exercises and technique adjustments that can be used to optimize performance at each node. Nine components are identified as:

• Eight specific body positions and motions -- foot position, knee motion, hip rotation, hip tilt and hip lean, trunk/shoulder angle (the x- angle), trunk rotation and arm/shoulder blade angle -- have been found to be the most basic and key components. Each of these nodes are assessed separately and evaluated by direct observation or by video during maximum knee bend and represent different areas of the body during the serve motion.

• The final node is overall body motion – the push through (using the legs to push the body and arm through ball impact) and pull through (using the trunk to pull the body into ball impact) while delivering the serve. Node 9 is evaluated during the entire service motion.

OSTA ANALYSIS AND SCORING

The analysis uses direct observation or video evaluation of the serve from a specific position behind and to the side of the players as they hit a series of 4-8 serves. The analysis form is then used by the evaluator to check each of the nine nodes, to see if they were achieved and performed according to the operational definition for both good and bad mechanics (see table). Correct performance of the node generates one point; incorrect performance generates a score of zero. The scores for each node are then added to get the overall score. Comments can be made for each node that allow for suggestions for interventions. Scores of 5-9 have been correlated with best performance of the serve such as professional ranking, high NTRP rating, highest percentage of aces and lowest percentage of double faults.

OBSERVATIONAL
TENNIS SERVE ANALYSIS

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THE NINE NODES OF EVALUATION

	"Good"	"Bad"
Node 1: Foot Position	Rear foot stays behind or equal to front foot	Rear foot stays in front of front foot
Node 2: Knee Position	Substantial knee bend (Both knees bend >15°)	None to minimal knee bend (Both knees bend ≤15°)
Node 3: Counter Hip Rotation	Back side hip rotates away from the net	Back side hip does not rotate away from the net
Node 4: Posterior Hip Tilt	Back side hip drops towards the ground, back leg is loaded	Back side does not drop towards the ground, back leg is not loaded
Node 5: Absence of Front Hip Lean	Front side- no lean towards the net	Front side leans towards the net
Node 6: X-angle	X-angle approx 30°	X-angle greater, less than 30°
Node 7: Trunk Position	Trunk rotation around vertical axis	No trunk rotation
Node 8: Arm Position	Shoulder in line with scapular plane	Cocking – Arm behind (hyper), in front of (hypo), scapular plane
Node 9: Composite motion of the Kinetic Chain	Back leg drive to push the body upward from cocking into ball impact	Use trunk muscles to pull the trunk and arm from cocking into ball impact

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The Shoulder Center of KY, a certified Center of Excellence through the Society for Tennis Medicine and Science, can offer this analysis to all tennis players as part of their comprehensive package of services, including education, stroke analysis, injury risk assessment, conditioning for tennis and tennis injury treatment, to enable the tennis player to achieve their best level of enjoyment and participation.

If you are interested in participating in a Lexington Clinic Serve Analysis, please contact Michael Smith, at 859.327.0968 or micsm@lexclin. com. The team at Lexington Clinic Orthopedics-Sports Medicine Center can provide this Serve Analysis for individuals and small or large groups.

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If you are experiencing pain and would like to receive one-on-one evaluation, we recommend calling Lexington Clinic Orthopedics at 859.258.8575 to schedule an appointment with one of our Orthopedic physicians or Physical Therapists *(doctor referral not required)*. Lexington Clinic also offers a Walk-in Clinic Monday-Friday from 7:30 am – 7 pm *(no appointment necessary)*.