

Master Pro Corner

The Advantages of Serving American Style

By James R. Shaughnessy, USPTA Master Professional, CSCS

The sport and science of tennis has been my passion from earliest youth – as a competitive player, a professional coach, an adjunct university instructor of biomechanics and a tennis research scientist.

It is my experience that every tennis professional, myself included, can benefit from ongoing education. In 25 years of gathering and analyzing the only 3D motion analysis library of the world's highest ranked professional tennis players in live tournament play, I have discovered that science can reveal hidden information that cannot be detected with the naked eye or with the slowest motion video.

Sometimes this quantitative data contradicts conventional schools of thought.

It has been my honor to share the findings from my laboratory with universities, in private consultation with some of the world's greatest tennis coaches, with professional athletes, and at USPTA World Conferences and ITA

Career Service Points Played and Won					
	Player	Won	Played	% Won	Style
1	Roddick	41561	58486	71.06	American
2	Sampras	46271	66629	69.45	American
3	Federer	67179	97018	69.24	Trophy
4	Nadal	44605	66479	67.10	American
5	Djokovic	42073	62727	67.07	American

conferences. By continually educating ourselves, tennis professionals can consider adapting our practices to benefit from quantifiable technique differences and commonalities that cannot be revealed by our gut, our eyes or the slowest motion video.

Here is a study of a 134 mph ace from Andy Roddick and a 130 mph ace from Roger Federer from my lab that may benefit USPTA professionals in their coaching practices. The study indicates that serving American Style generates a more

efficient use of the stretch reflex, creating more ball speed and spin.

American Style vs. Trophy Style

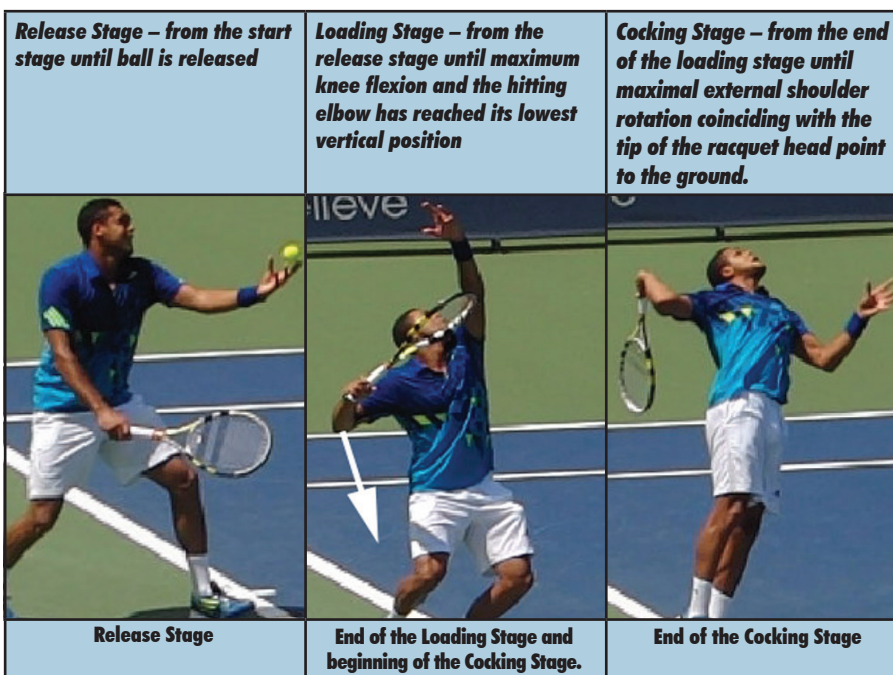
The majority of the top-50 ranked ATP players are Trophy Style servers. American Style servers are rare. However, if we compare statistics of players reaching the No. 1 ATP ranking since the year 2000, based on their percentage of career service points played and won, we see that four of the top five players are American Style servers (see chart above).

It is perhaps notable that Novak Djokovic, traditionally a Trophy Style server, changed his serve to the American Style in 2010. He did not reach the No. 1 ranking until switching to American Style, and most recently, serving American Style, his percentage of service points won is 71 percent.

How to recognize American Style

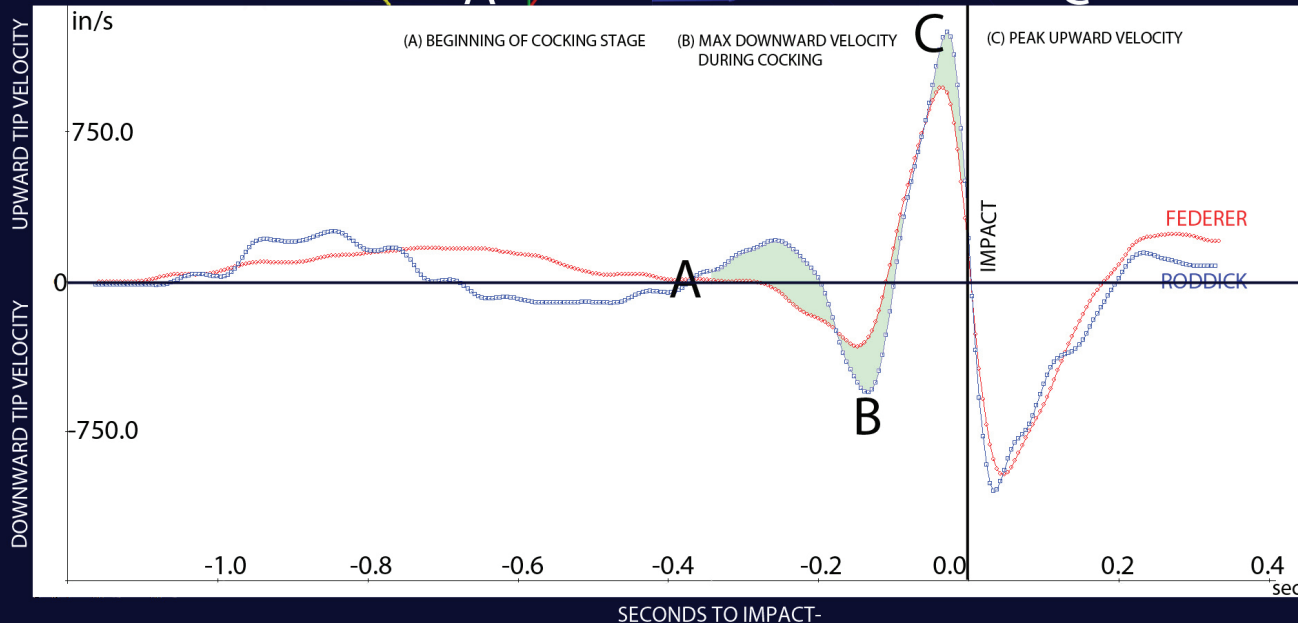
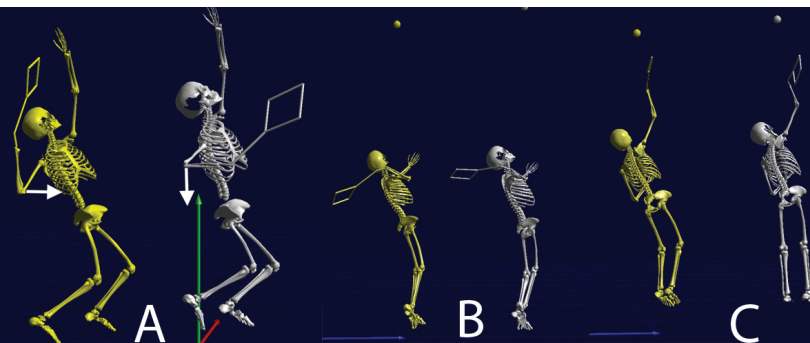
American Style servers, like Andy Roddick, Novak Djokovic, Pete Sampras and Rafael Nadal, end the loading stage and start the cocking stage with the medial epicondyle of the hitting elbow pointed at the ground (see arrow in middle picture left). The medial epicondyle is a good marker for a coach to see how far the humerus (upper arm) has rotated. The medial epicondyle, a part of the humerus bone, is the bump on the inside of the elbow.

Unlike Trophy Style servers, in the cocking stage of the service motion, American Style servers rotate the humer-



Note: The center image shows the medial epicondyle of the humerus (upper arm) is pointed at the ground at the beginning of the Cocking Stage.

FEDERER 130 mph ace
RODDICK 134 mph ace



us through the trophy position without stopping or slowing. This generates the opportunity to build up angular velocity of the humerus through an additional 90 degrees of external rotation of the humerus (upper arm). The external rotation stretches the internal rotator muscles in the end on the cocking stage (image to the far right previous page).

This is important because when the internal rotator muscle fibers get stretched rapidly enough and in a large enough range of motion, the spindle embedded in the internal rotator muscles triggers an automatic reflex action that has been scientifically proven to cause more potent and forceful contractions. This is called the stretch reflex. The velocity and magnitude of the stretch is best measured in live match 3D analysis by maximum downward velocity of the racquet tip in the cocking stage. Charles Dillman, Ph.D., has shown that this rotation of the humerus is “one of the most dynamic movements in the human body.” Powerful internal rotation of the humerus is a key to large racquet velocities, side-

spin, topspin and forward ball speed.

How to recognize Trophy Style

Nick Bollettieri explains the Trophy position as the “ready to launch position.” Paul Roetert, Ph.D., calls this the “preparatory or throwing position common to elite players.”

Trophy Style servers end the loading stage and start the cocking stage with the medial epicondyle pointing in a straight line to the side fence at an angle parallel to the ground.

Trophy Style servers stop or slow down at the end of the loading stage and/or the beginning of the cocking stage. At this point Trophy Style players have already rotated their humerus 90 degrees externally. Therefore, Trophy Style servers have 90 degrees less external humerus rotation with which to build up angular velocity to stretch the internal rotator muscles. This is less efficient use of the stretch reflex than American Style.

Here is what the study showed

Using the extra 90 degree of humerus rotation to stretch the muscle spin-

dles of the internal rotators more effectively contributes to key biomechanical features of the serve that create more ball speed, topspin and sidespin in serving. Additional studies at the SCiO 3D Sports lab show the same trends with other American Style servers, e.g., Pete Sampras and Novak Djokovic when compared to Roger Federer, the No. 1 Trophy Style server.

Players encouraged and trained to develop the American Style will achieve more ball speed and spin than Trophy Style. To do so, USPTA Pros should observe whether the medial epicondyle of the hitting humerus is pointed perpendicular to the ground when maximum knee bend is reached and the point of the hitting elbow is in its lowest position. ☞



James R. Shaughnessy is Director of Tennis at Oakwood Country Club in Enid, Okla. He is an award-winning professional with 27 years of experience as a speaker, researcher, analyst and consultant in sports biomechanics, specializing in the applied science of tennis. He has a Bachelor of Science degree in exercise science from Oklahoma Baptist University and a master's degree in sports science from the United States Sports Academy where he is a doctoral candidate.