



BIOMECHANICS OF THE SERVE

Level II Coaches Course



The serve

Preparation

- Pre-serve ritual:
 - Bouncing the ball
 - Deciding where to serve
 - How to set up the point
 - Relax and visualise the intended serve
- The front-toe and feet:
 - Generally pointed at an angle to the baseline
 - Allow the rotation of hips and shoulders
 - Feet comfortable distance apart



The serve

Ball toss: Upper body work

- “Pushed” into the air:
 - “Straight forward and up” technique or
 - “Rotary style” (enhances trunk rotation, more difficult to control the accuracy)
- Full extension of tossing arm
- Shoulders tilted and weight leaning forward
- Hips and shoulders rotate to enhance the ability to generate racket-speed



The serve

Knee bend: Foot-back service technique

- Leave the back foot near its original position
- Drive upward and forward
- The back foot must play a role in this drive



The serve

Knee bend: Foot-up service technique

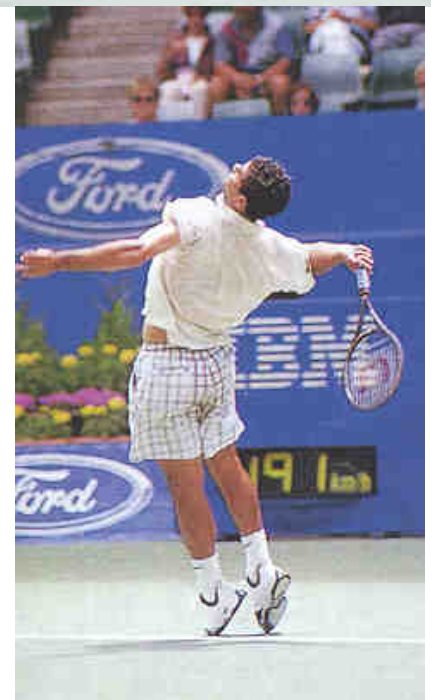
- Bring the back leg forward
- Create a "platform" to explode up with both legs
- Back-foot not positioned in front of the front-foot as this will generally impede the timing of the rotation of the hips
- Produces a better “up-and-out” hitting action



The serve

Leg drive

- An effective drive in conjunction with trunk rotation is designed to:
 - Assist in driving the racket down, behind and away, from the back (putting muscles on stretch)
 - Increasing the distance of racket movement to the ball
- A good drive will increase hitting height by allowing impact to occur off the court



The serve

The swing to impact

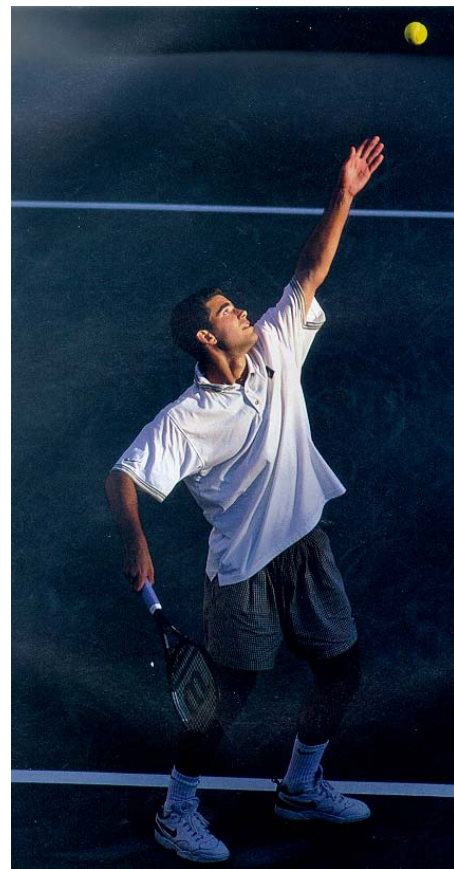
- The key to an effective serve is rhythm
- It is a sequence of coordinated movements that produces:
 - **Racket-speed,**
 - **Impact height and**
 - **Racket trajectory**



The serve

The swing to impact: type of backswing

- Individual characteristic
- Full (e.g. Sampras):
 - Better rhythm
 - Decrease the load placed on the shoulder
 - Involves more rotational movement.
- Abbreviated (e.g. Rafter):
 - Up-down structure



The serve

9

Coordinated movement

Segment Rotation	Joint Moved	Contribution to Racket – Speed at Impact
Leg drive and trunk rotation	⇒ shoulder speed	10-20%
+		
Upper arm elevation and flexion	⇒ elbow speed	≈ 10%
+		
Forearm extension, pronation and upper arm internal rotation	⇒ wrist speed	≈ 40% (Primarily internal rotation of upper arm)
+		
Hand flexion	⇒ racket speed	≈ 30%

The serve

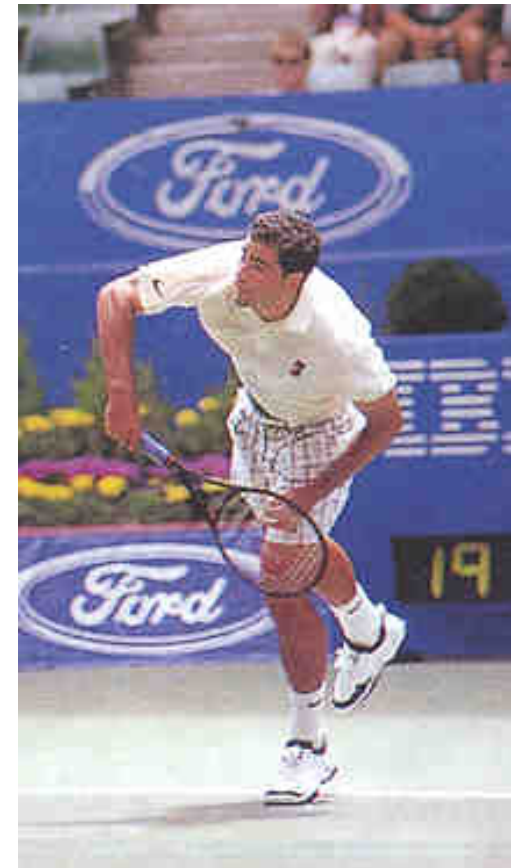
Trunk rotation towards impact

- In the 3 planes of motion:
 - A. Forward rotation (somersault action) allows the player to produce momentum which is shifted from the trunk, to the arm and finally to the racket
 - B. Shoulder-over-shoulder rotation (cartwheel action) produces momentum for and prepares the body for impact
 - C. Twist - minor levels of rotation about the long axis of the body, helps drive the racket backward

The serve

Follow through

- Early phase:
 - Internal rotation of the upper arm
 - Pronation of the forearm both continue
- Needed to allow the racket to slow gradually and not stop abruptly, such that stress is placed on the body
- Players land in the court with their front-foot
- The racket will then generally move across the body to complete the follow through action



Thank you!

Questions?



The serve

Important mechanical features

- Main characteristics of modern serve.
- Critical mechanical features integral to a successful service action are common to the majority of players with an effective serve
- “Ineffective service actions” are generally the result of poor development of one or more of these critical features