



ACE YOUR GAME

Physically Speaking
September 2007

There you are, at the baseline, bouncing the ball anticipating the perfect serve over the net. You contemplate your opponent and your strategy; you toss the ball and “BAM” you hit your shot. It was the perfect Ace and for a moment you feel a rush of adrenalin flow through your body as you prepare for your next shot.

Acing the perfect shot takes hours of practice, good coaching, proper technique and equipment, a healthy body and good frame of mind. Putting it all together looks easy, but as every player knows, it's not.

Before you can Ace your shots to play a great match, you must begin with a health body and efficient stroke mechanics. Take an inventory of yourself and consider:

- How does your body feel? Do you have recurring injuries?
- Do you know if you have any weak links that need to get stronger?
- Do you have restricted areas that limit your movement on the court?
- Are your strokes efficient? Do they generate the power you need to win? Do they allow you to play with effective power over a long career?



Tennis and Sport
Photos: Getty Images

Apply the following stroke mechanics principles to your game today to ACE IT!

IS INJURY HURTING YOUR TENNIS?



Do you ever wonder why you get the same injuries over and over again? Did you know that some body parts become “victims” of other weak links (“culprits”) in the body?

The culprits cause:

- Repeated extra loading on the “victims”
- Increase risk of injury and long-term damage
- Reduce your power and accuracy
- Breakdown your on-court performance

“Victims” = Injuries

“Culprits” = Weak Links

Shoulder	Scapulae (shoulder blades) Weak scapular stabilizers or tight shoulder internal rotators
Elbow	Pelvis- Weak or stiff?
Low Back	Thoracic Spine (upper trunk) stiffness Weak trunk extensors or tight trunk rotators
Knee	Hips- Weak or tight?

POWER UP YOUR STROKES

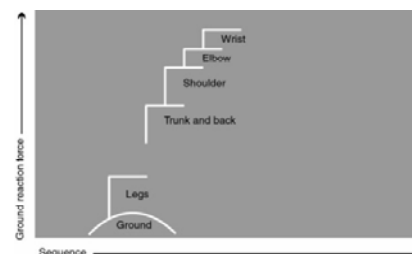
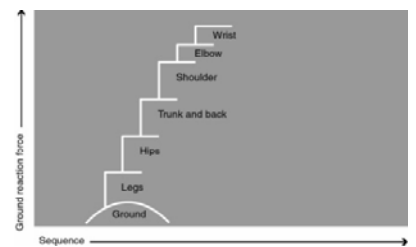
The **kinetic chain** is sequential movement of force up the body from the ground and coordinated activation of body segments. A normal kinetic chain, starting at the ground and moving through the legs, torso, shoulder, and arm to the racquet, as is seen in the top diagram (right).

→ When a link is broken (bottom diagram right), all of the energy and power generated below it is lost and it cannot contribute to the power in the shot.

→ Kinetic chain breakage is common in tennis players. Did you know that:

- If your knees are bent less than 10 degrees in the serve cocking phase, it places a 23% greater load on the shoulder and 27% greater load on the elbow to achieve the same serve speed?
- If your hips don't rotate away and then rotate into the serve, you place 28% more load on your elbow to reach the same ball speed?
- If the trunk does not rotate to provide force to the shoulder, it requires a 34% increase in shoulder velocity to achieve the same ball speed?

→ **Is your technique helping or hurting you?**



TECHNICAL TALK

IDENTIFY AND CORRECT YOUR CULPRITS TO ACE IT!

Are you using your whole kinetic chain effectively? Are ground reaction and rotational forces generating your power, precision and control in your shots? For example, do you bend your knee at the right time in your serve so you use the ground to push off and generate more power? Are you using hip and trunk rotation to get your arm in the right position to generate power? Does your chain have a missing link? If yes, you risk:

- ➔ A breakdown in your game
- ➔ Injuries
- ➔ Shortening your career
- Studies show that when an athlete cannot move from the waist down (hips, pelvis and low back) and throws or hits a ball, the speed of a ball **decreases by 50-60%**. Not using the lower body and trunk decreases the amount of power generated and increases the stress and load on the upper body. This has a negative affect on your game, and can cause injury.
- How do you examine your technique? Here is the proper kinetic chain sequence for these strokes:

The Serve

The ground reaction force (GRF) provides the base of the stroke.
Strong leg drive starts with adequate knee bend (at LEAST 10-15 degrees)
In cocking (picture 1):

1. Hips and trunk counter-rotate (away from the court).
2. Scapula and shoulder move together to maximum external rotation

In Long axis rotation of the arm = a coupled motion with shoulder internal rotation and forearm pronation.



← Picture 1 (Left)

Great technique with good knee bend, hip and trunk counter-rotation and good arm cocked position (shoulder external rotation)

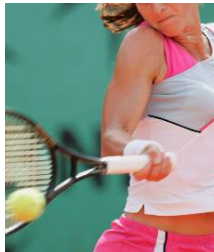
Picture 2 (Right) ➔

This serve shows: Shoulder lacks full cocking, and "jams" shoulder; hips, trunk and scapula forward (no counter-rotation), arm back at back scratch



The Forehand

GRF provides the base of the stroke.
Strong leg drive off the back leg.
Trunk rotation around the back leg.
Long axis rotation of the entire arm so that the elbow points towards the path of the hit ball.



← Picture 3 (Left)

This forehand technique shows: Elevated shoulder, lack of entire arm long axis rotation and elbow not pointing towards the path of the ball

The Backhand

Strong leg drive off the back leg.
Trunk counter-rotation (away from the court).
One-handed backhand: trunk and front shoulder rotate into the shot.
Two-handed backhand: trunk rotation into the shot.

WHAT IS YOUR NEXT MOVE?

ASSESS YOUR MOBILITY:

- A Primary Health Care Provider (PHCP) can evaluate your flexibility and prescribe specific exercises to target tight areas which you can include in your routines.

GET FUNCTIONAL TO ENHANCE YOUR POWER AND CONTROL:

- All players need a good functional exercise program that mimics what your body does on court.
- See a PHCP to learn how to get your kinetic chain drivers working to enhance your movements on court, decrease injury and promote muscle memory by performing the correct exercises.

ESTABLISH AND EXECUTE STROKE EFFICIENCY: It takes teamwork! Your coach, the PHCP and You...

- The body works together as series of links from your foot on the court to your hand that is holding your racquet.
- Your coach and the PHCPs can help to identify any weak links in your kinetic chain that may hold you back.
- The PHCPs can help you and your team to eliminate these weak links and improve your game through motor patterning.

MATCH PREPARATION AND RECOVERY COUNT:

- Include dynamic warm-up before and cool-down after every practice and match.
- This prepares your muscles to handle on court demands and assists recovery afterwards so you bounce back fresh.

KEY THINGS YOU SHOULD INCORPORATE:

- Perform dynamic warm up for 20 minutes before your match. This helps you to pattern an effective kinetic chain.
- Keep the intensity at 75-80% of your maximum heart rate to optimize performance without over-fatiguing your **body**.
- Include rotational movements of your hips and trunk and the entire body in your warm-up and cool-down routines.
- Cool down for 15 minutes at a lower intensity in order to help remove lactic acid and promote recovery.
- During your cool down integrate exercises that open your body and stretch the muscles you have just worked on court.