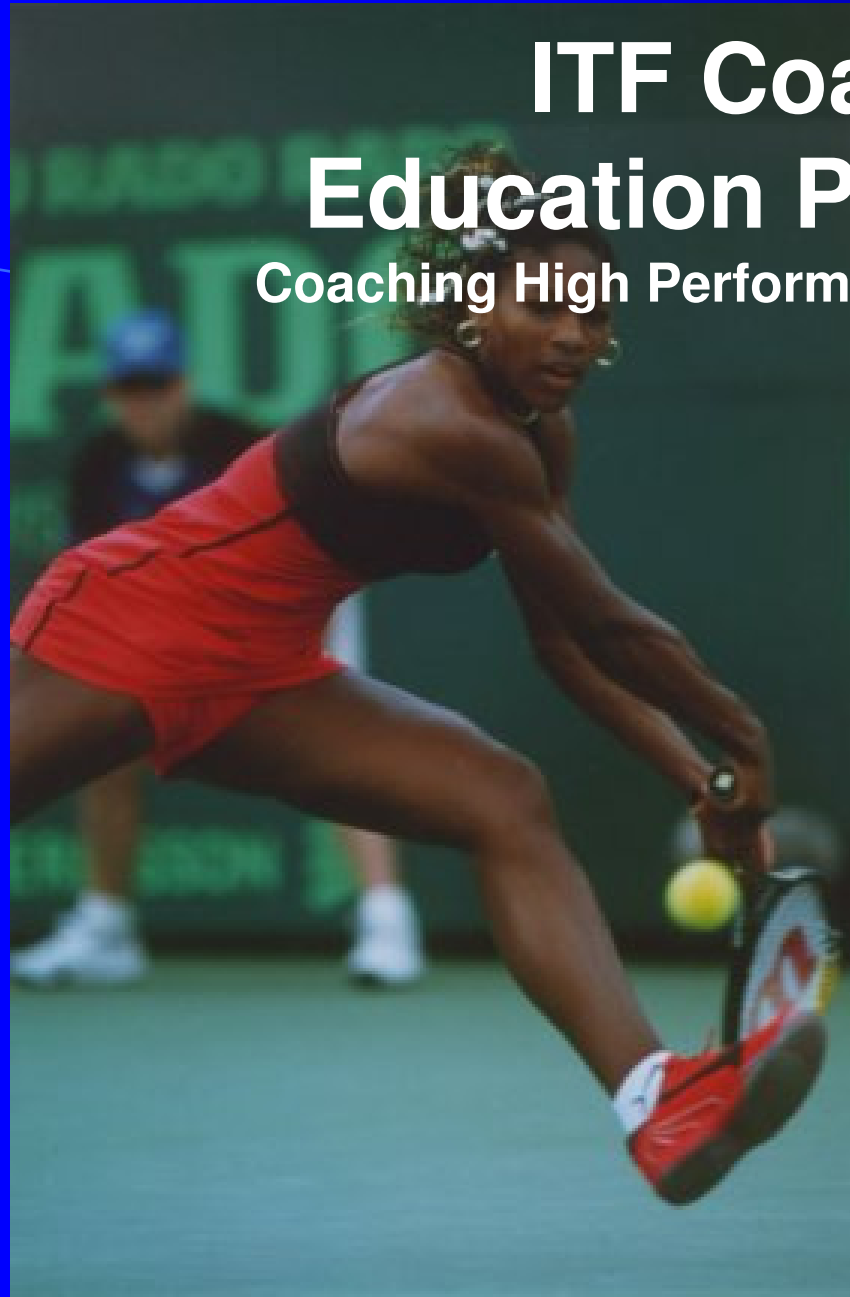


ITF Coaches Education Programme

Coaching High Performance Players Course



Biomechanics of Tennis Movement

By Machar Reid & Miguel Crespo





Effect of Court Surface

AVERAGE RALLY DURATION

Women's singles matches = 7.1 seconds

Men's singles matches = 5.2 seconds

Clay courts = 10 seconds

Hard courts = 5.2 seconds

Grass courts = 2.8 seconds

PROPORTION OF BASELINE RALLIES

French Open 51%

Australian Open 46%

US Open 35%

Wimbledon 19%



**Different strategies +
movement demands**

Responding to emergency situations



30 % of all strokes are hit under time pressure

Dynamic Balance

“Sprinting, starting, stopping, bending, jumping, changing direction etc...”

4m covered/stroke

4 changes of direction/point

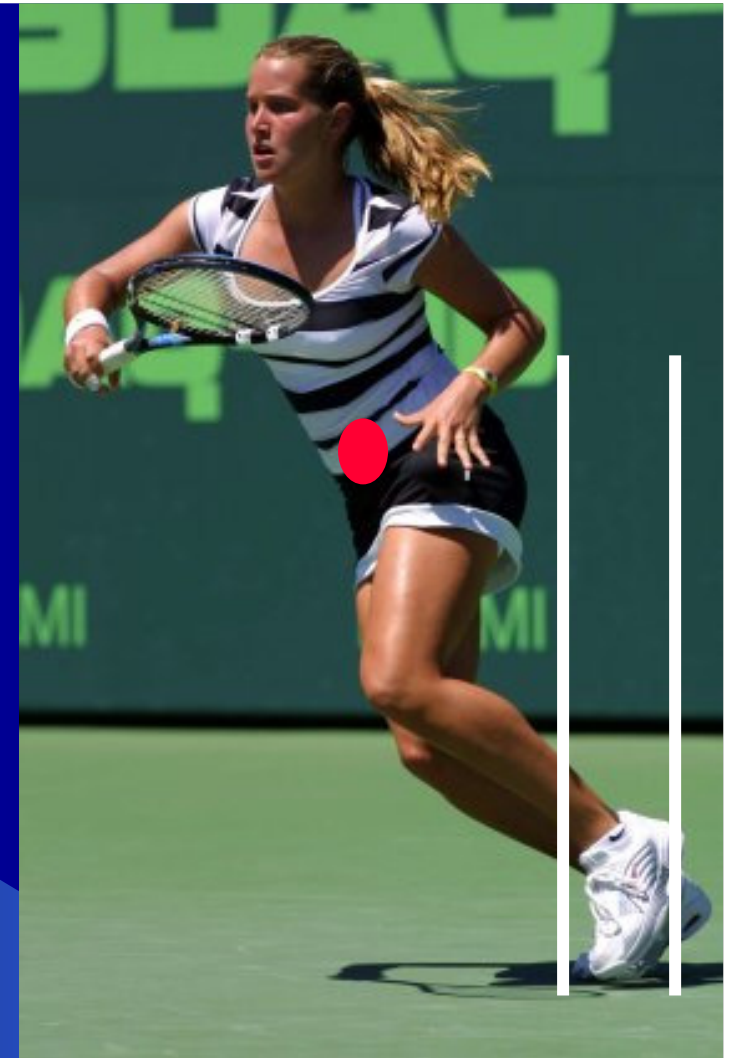
Centre of Mass

Women - 55% of height

Men – 57% of height

Centre of Gravity

Shifts with movement



Posture and Core Stability

Contraction of deep (*transversus abdominus, multifidis*) and **superficial muscles** (*obliques, rectus abdominus, erector spinae*)



Creates intrathoracic pressure



Stable trunk platform / Erect trunk



Solid foundation for the head



Improved information processing



More efficient transfer of force

Tennis strokes (ground up) and movement (to ground)



(Verstegen & Marcello, 2002)



Three main areas of tennis movement

Close proximity

Within $\approx 4\text{m}$ of offensive position

Wide-ball recovery

Doubles alley and beyond

Baseline to volley

Explosive forward and transition



(Verstegen & Marcello, 2002)



Split step

Both feet come down from the air and land on the court simultaneously



Hop or upward movement specific landing and foot position sequence



Forward movement – First step?

Step backwards

Necessary for maximal acceleration

OR

Counterproductive

3 starting positions

- ***Individual preference***
- ***Step forwards***
- ***1 Fw, 1 Bw start***

**** Highest push-off force with step backwards**



Foot and Ankle Mechanics

***Initial contact – outside
of ball of foot***

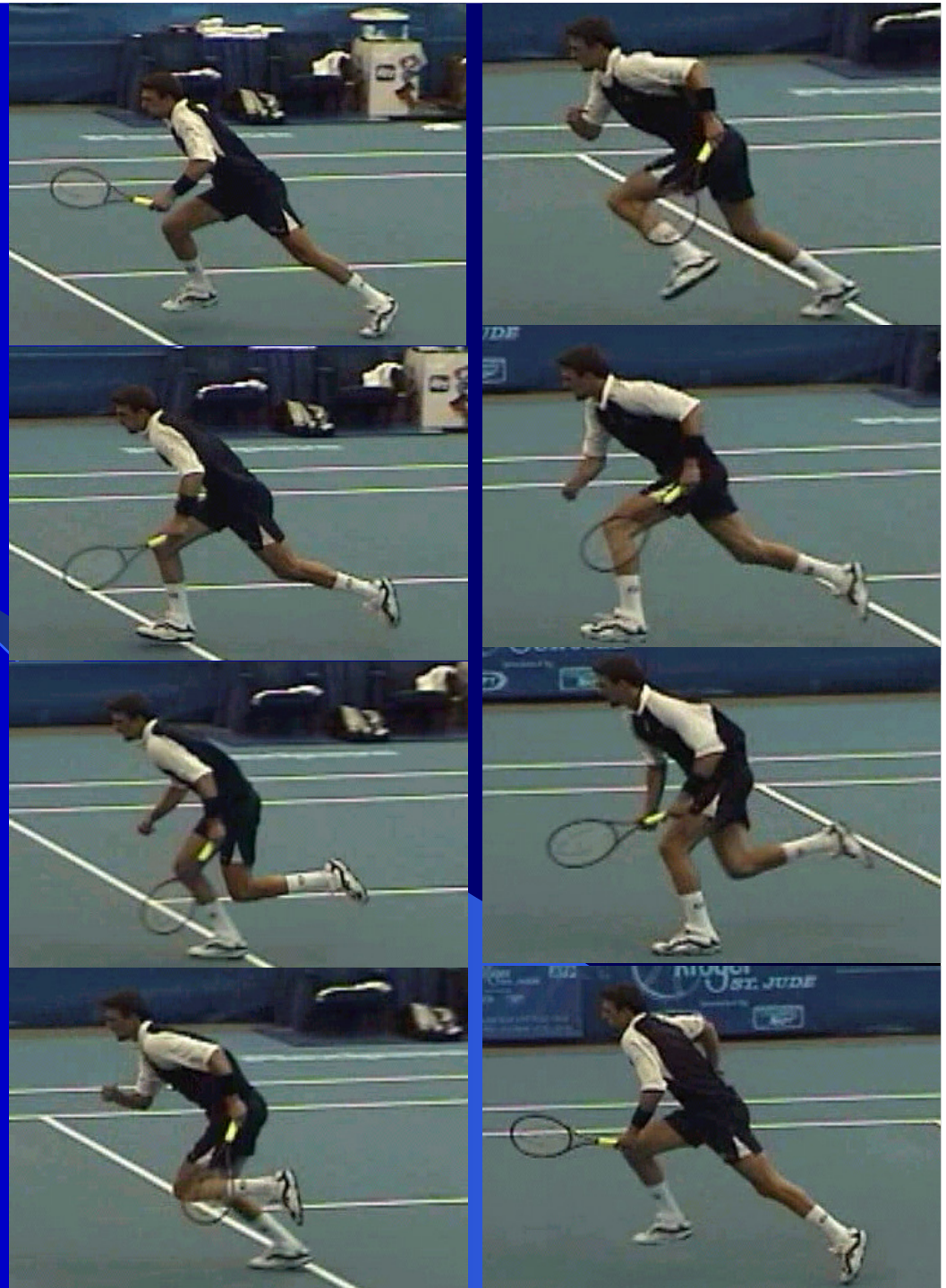
Heel to toe progression

Toe-up position

***Adaptation to
court surface***

Pronation

***Shock
absorption***



“Play every stroke at right angles (sideways) to the net” (Tilden, 1925)

Early lower body movement to a groundstroke



Initial stages of shoulder rotation occurring without substantial racket movement



Permits trunk and shoulder rotation devoid of awkward racket positions

Beginners  arm + racquet straight out behind



Recovery



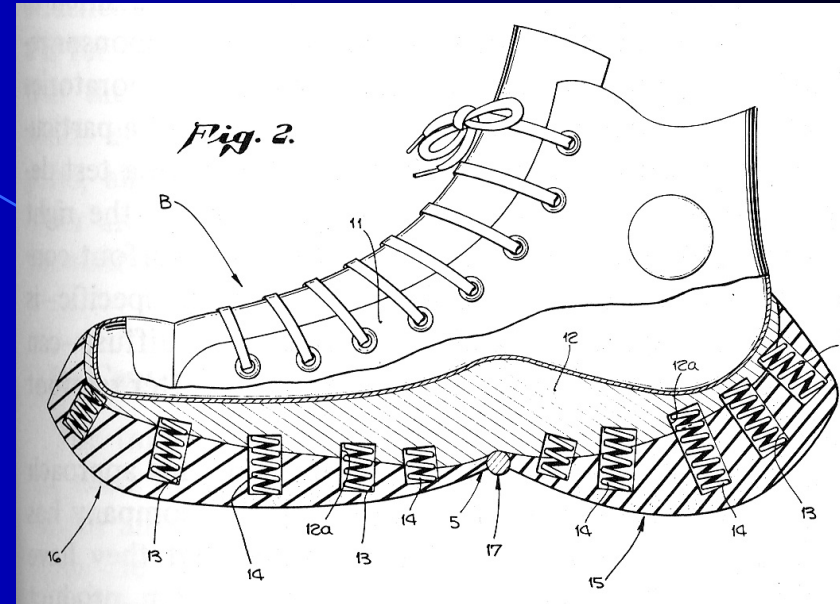
Effect of tennis equipment

The Tennis Shoe

Protect Against Injury

Enhance Performance

Provide Comfort



The Larger Ball?

***Impact locations closer to
the net***



More time??

Thank you

Any questions?

