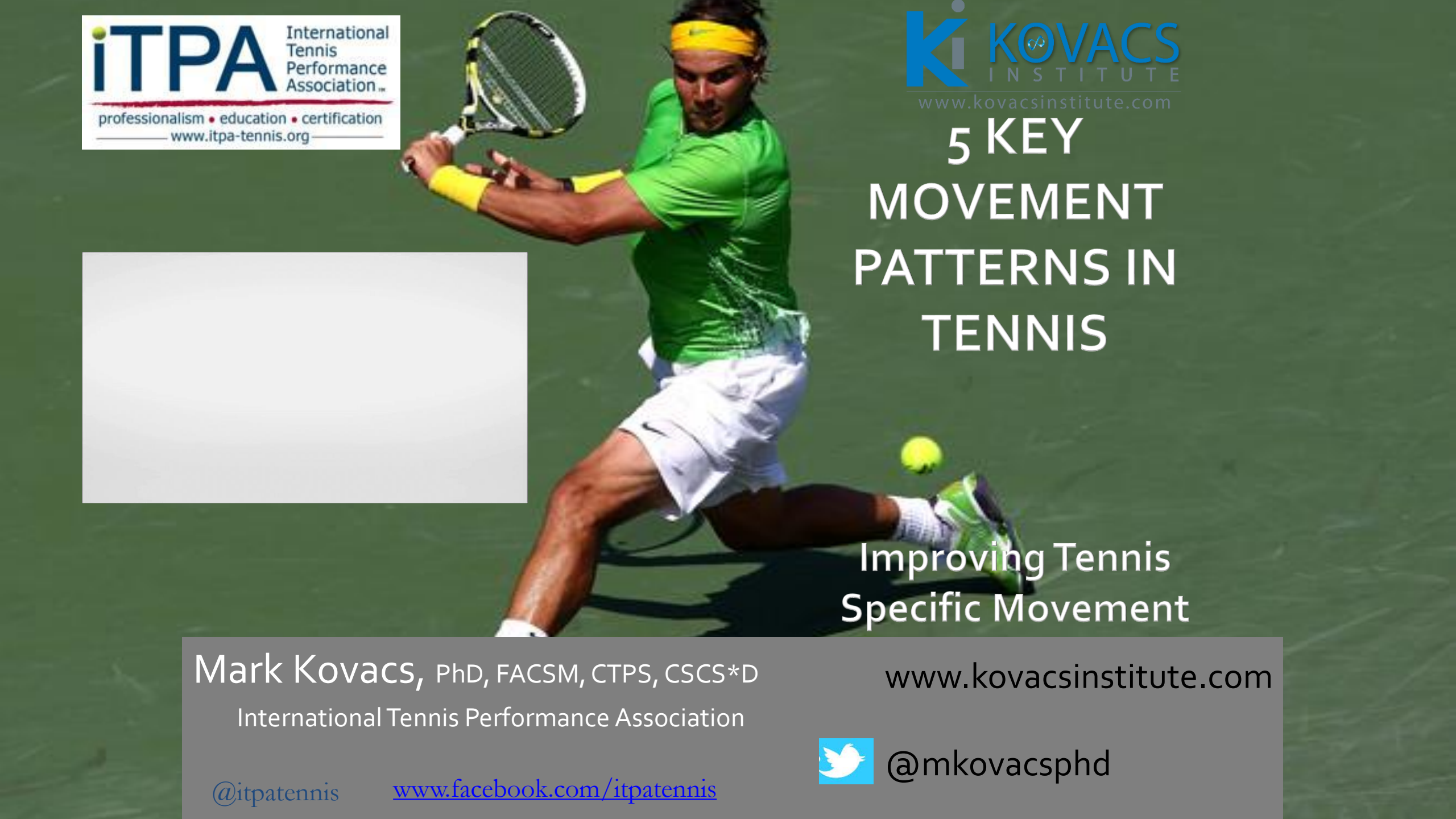


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5 KEY MOVEMENT PATTERNS IN TENNIS

Improving Tennis Specific Movement

Mark Kovacs, PhD, FACSM, CTPS, CSCS*D
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Have A Reason For Every Drill or Exercise





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TENNIS FITNESS COMBINE

THE STEP BY STEP GUIDE TO TENNIS TESTING

ARE YOU A TENNIS PLAYER? IF SO YOU NEED TO BE TESTED.

IF YOU WORK WITH TENNIS ATHLETES YOU NEED TO TEST THEM TO BE ABLE TO TRAIN EFFECTIVELY.

TESTING IS VITAL



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#LivePoll

Tennis Players Are Faster .....?

- In The Air
- On The Ground

Vote Now

BIOMECHANICAL PRINCIPLES



- ***NEWTON'S 1ST LAW:*** **INERTIA**

  every object continues in its state of rest or of uniform motion in a straight line unless it is compelled to change that state by forces impressed upon it.

- ***NEWTON'S 2ND LAW*** **ACCELERATION**

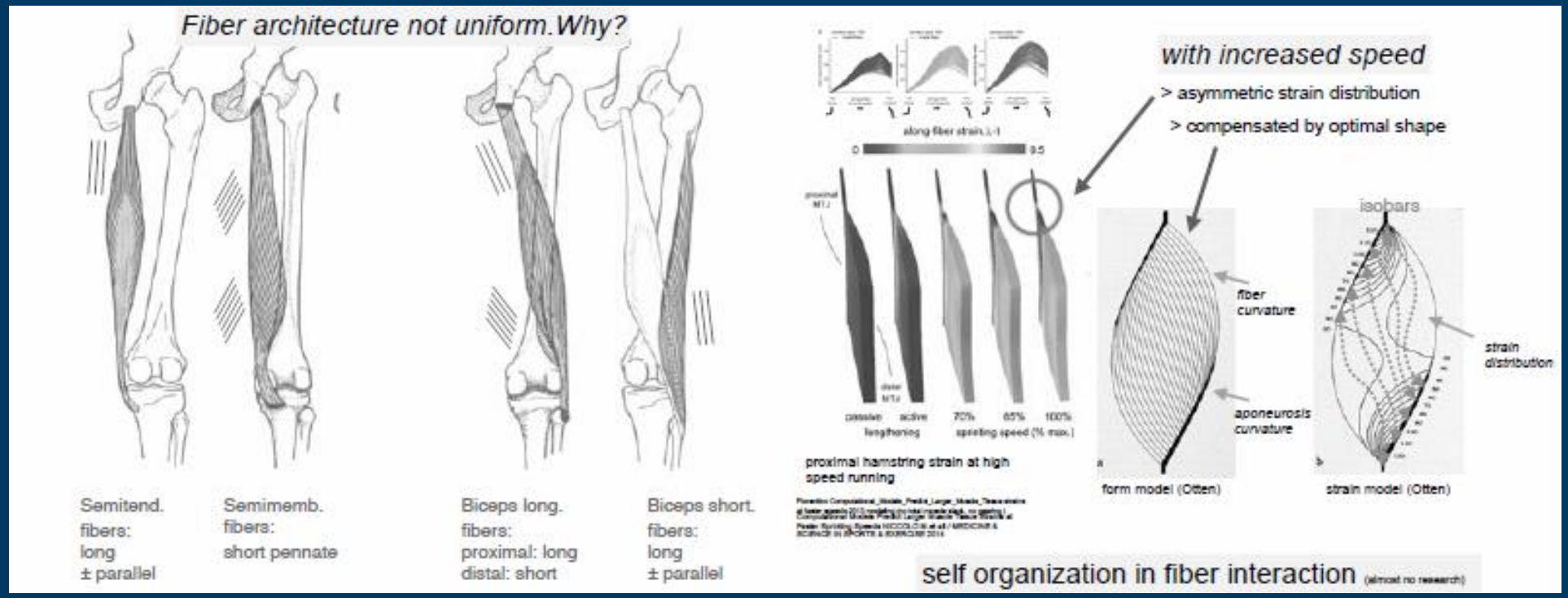
  The acceleration of an object is directly proportional to the net force acting on the object; is in the direction of the net force, and is inversely proportional to the mass of the object.

  F= ma A=f/m

- ***NEWTON'S 3RD LAW*** **ACTION-REACTION**

  Whenever one object exerts a force on a second object, the second object exerts an equal & opposite force on the first. "For every action there is an equal & opposite reaction"

Genetics & Training

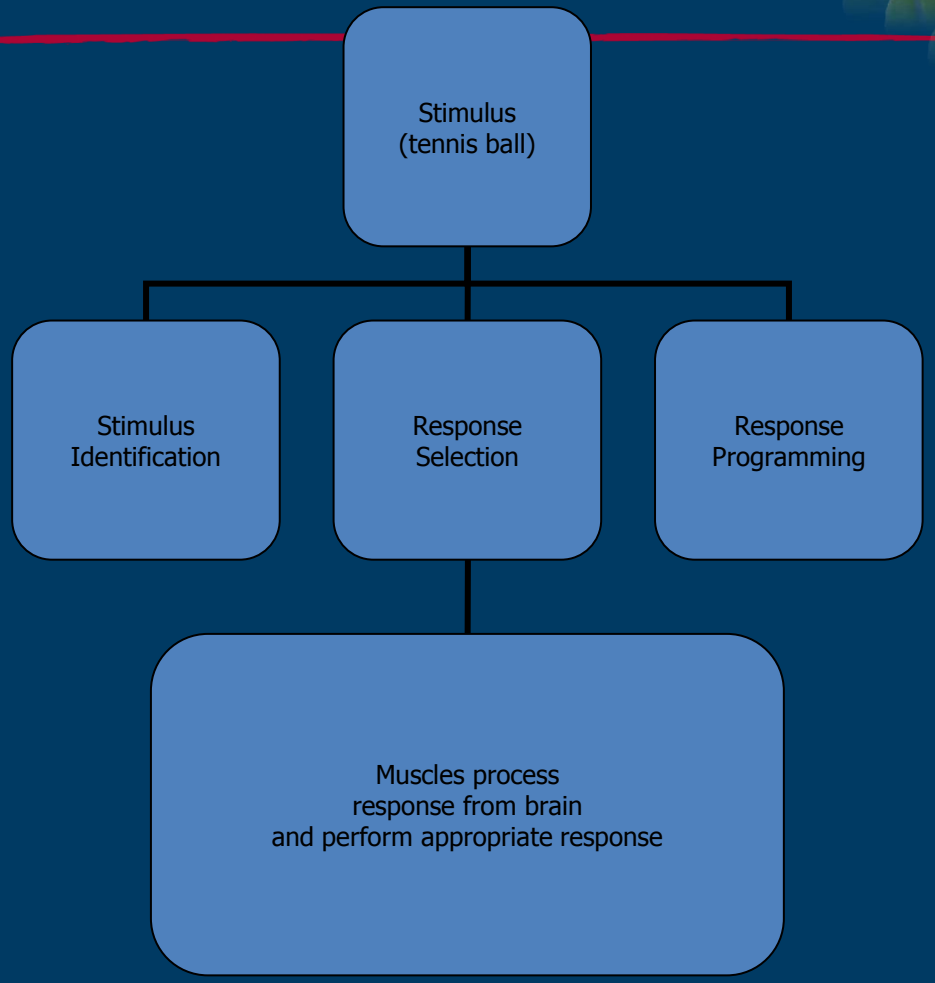


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NEURAL FOCUS

- Movement is reliant on **neural** processes

- Improvement in Movement is not a physical adaptation that requires overload, but a neuromuscular adaptation that requires explosive and precise movement patterns that utilize perfect technique.
  - Increased firing rate of motor neurons
  - Selective and maximal recruitment of fast-twitch fibers
  - Improved reaction time
  - Improved force production



Skill Acquisition and Motor Learning of Tennis Movement



- The types of muscle action must be similar to those used during tennis movement - TRANSFERABILITY IS SPECIFIC
- The structure of the movement must resemble that seen during tennis movement (motion of the limbs)
- The sensory information must resemble that which seen during tennis matchplay
- The majority (dominant) energy system used during tennis competition

DOUBLE STEP

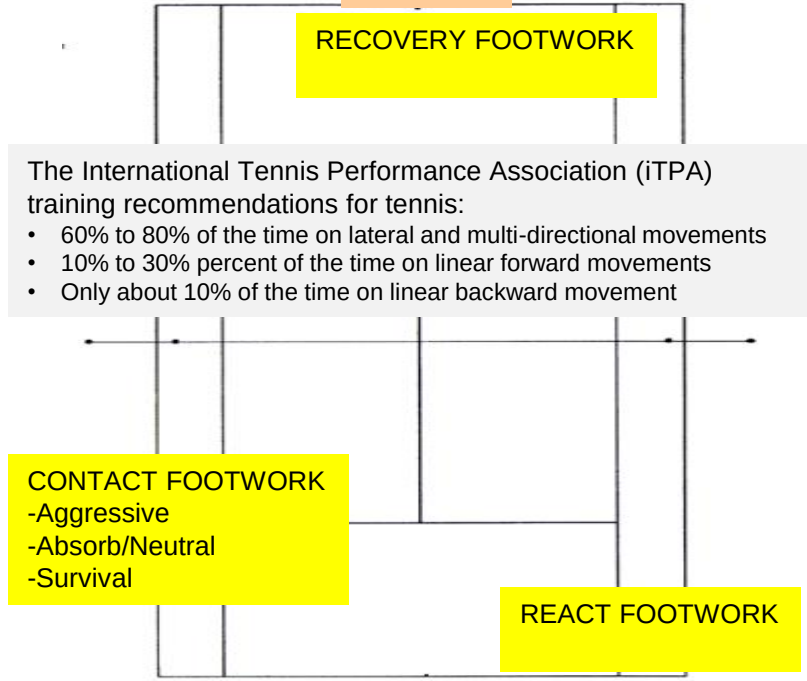
CROSSOVER

STABILIZE

RECOVERY FOOTWORK

The International Tennis Performance Association (iTPA) training recommendations for tennis:

- 60% to 80% of the time on lateral and multi-directional movements
- 10% to 30% percent of the time on linear forward movements
- Only about 10% of the time on linear backward movement



CONTACT FOOTWORK
-Aggressive
-Absorb/Neutral
-Survival

REACT FOOTWORK

ADJUST

SHUFFLE

CROSS OVER

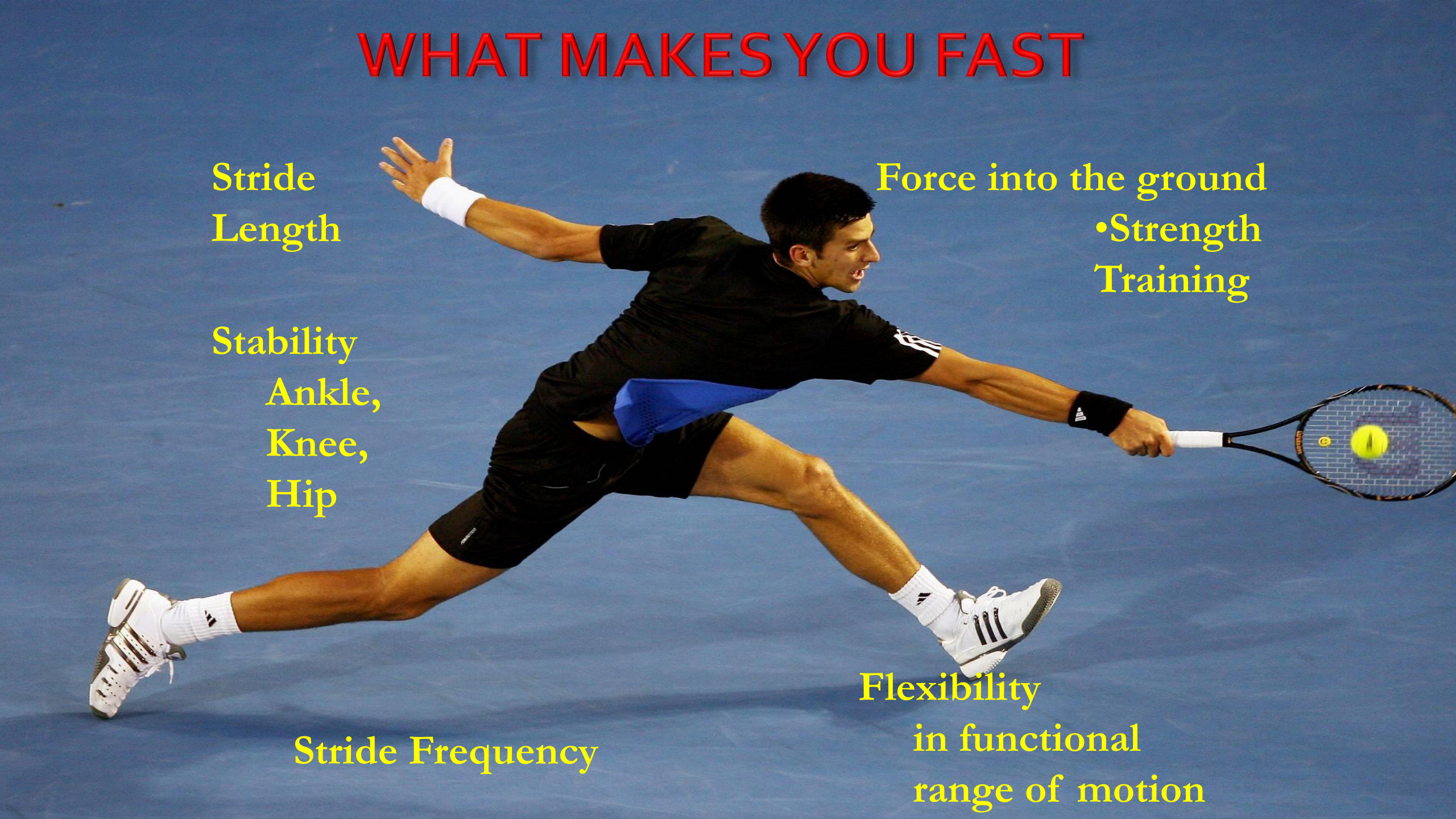
SPRINT

Tennis-Specific Movement



- Players average 4 direction changes per point.
- Usually less than 5 meters is run in one direction.
- Maximum acceleration position is rarely reached.
- Most movement is lateral or multi-directional, not linear.

WHAT MAKES YOU FAST



Stride Length

Force into the ground
•Strength Training

Stability
Ankle,
Knee,
Hip

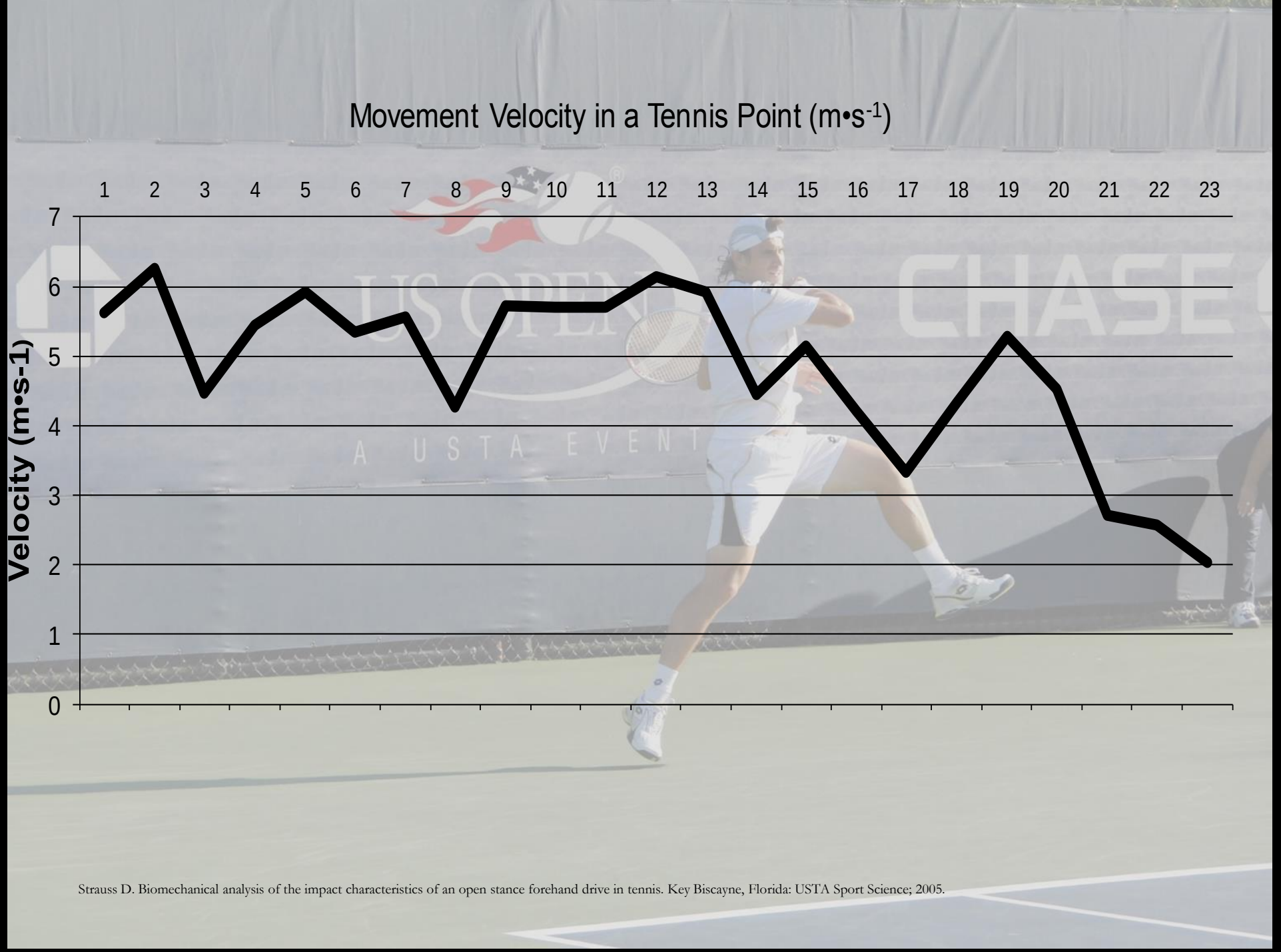
Flexibility
in functional
range of motion

Stride Frequency

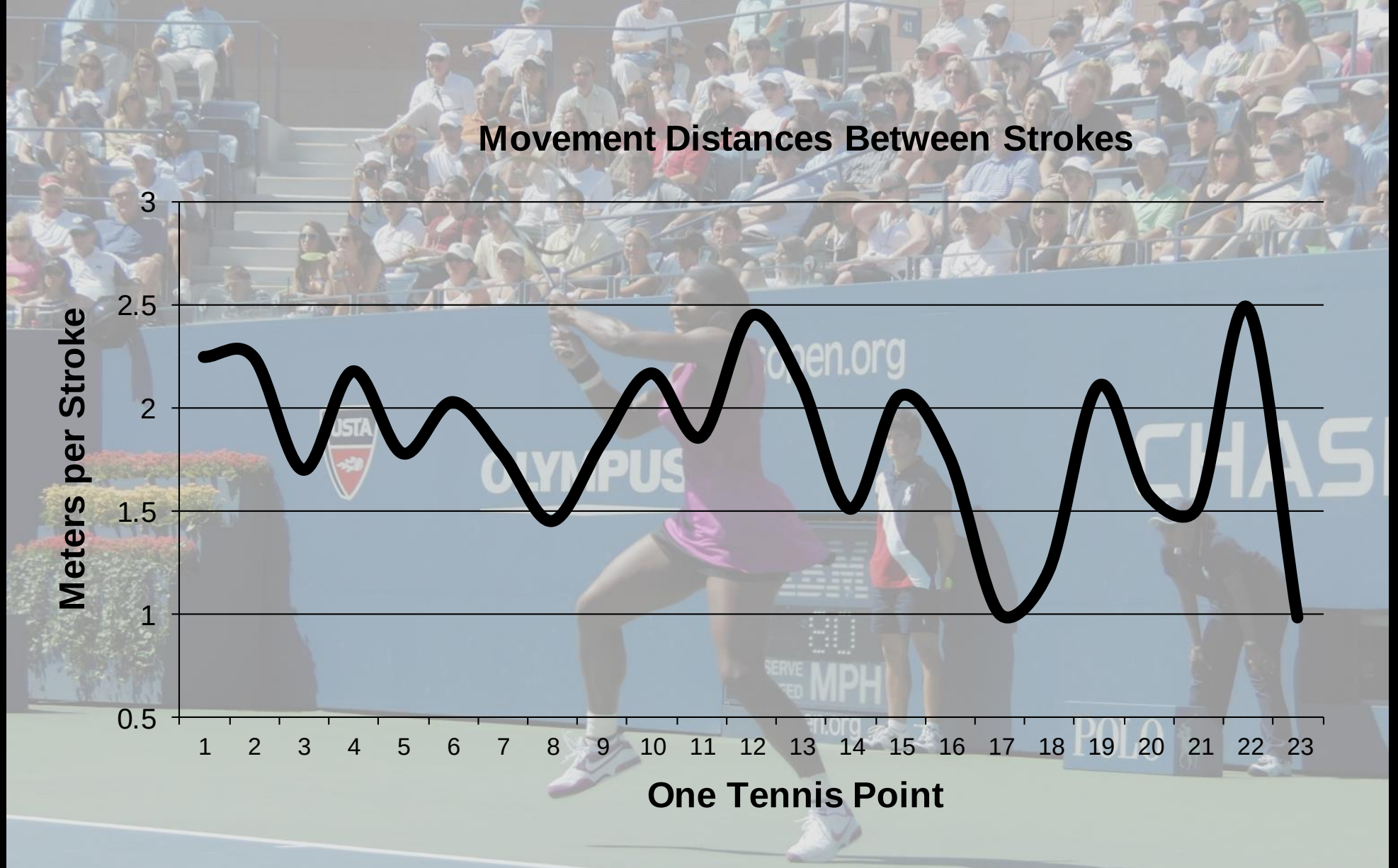
#LivePoll

In One Word, What Do You Think Is Most Important Aspect of Tennis Movement?

Vote Now



Strauss D. Biomechanical analysis of the impact characteristics of an open stance forehand drive in tennis. Key Biscayne, Florida: USTA Sport Science; 2005.

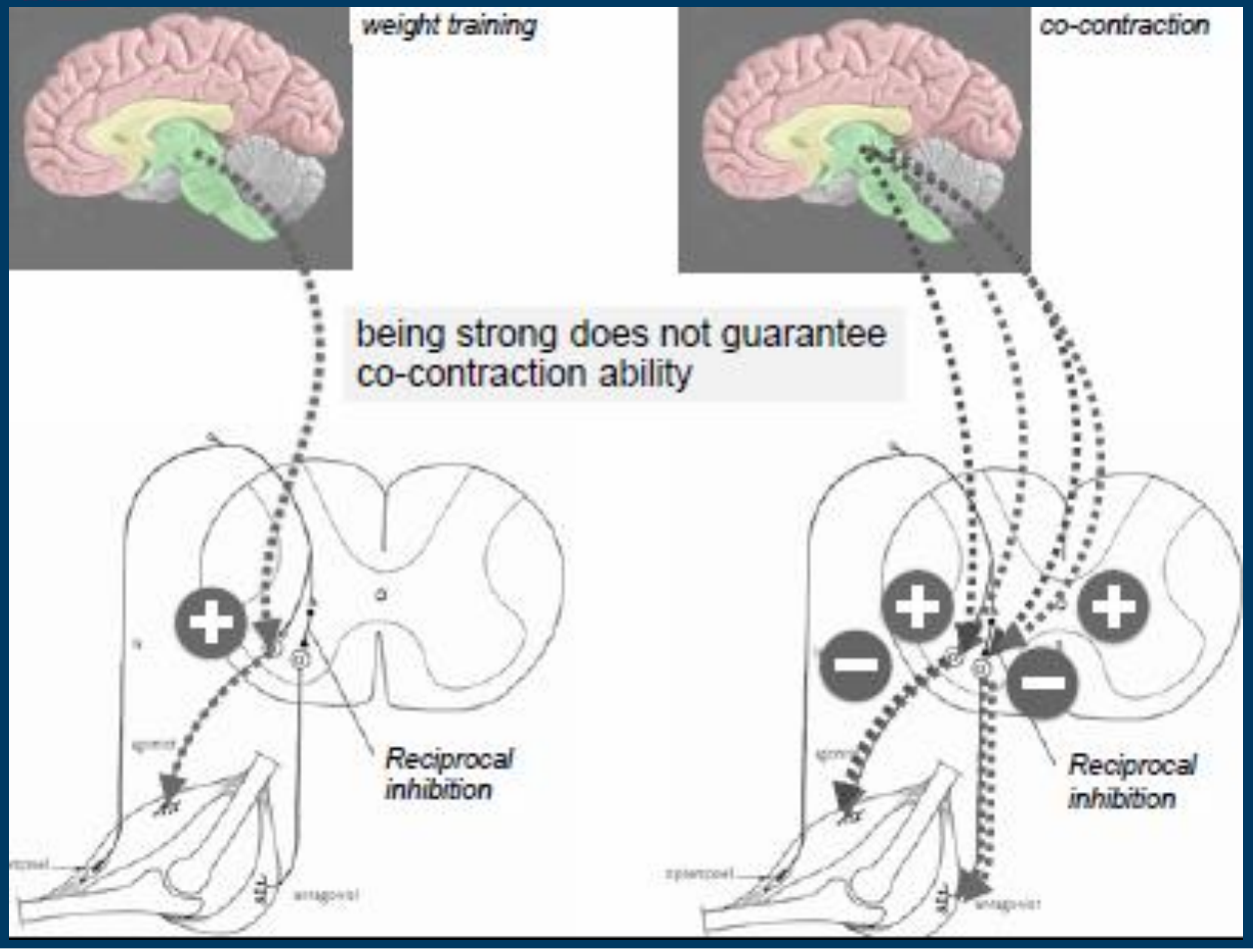


Strauss D. Biomechanical analysis of the impact characteristics of an open stance forehand drive in tennis. Key Biscayne, Florida: USTA Sport Science; 2005.




WR ODELL BECKHAM JR.
LSU (2014 NFL DRAFT)
WR JULIO JONES
ALABAMA (2011 NFL DRAFT)

Being Strong Does Not Solve All The Problems…
But Does Make A World Of Difference



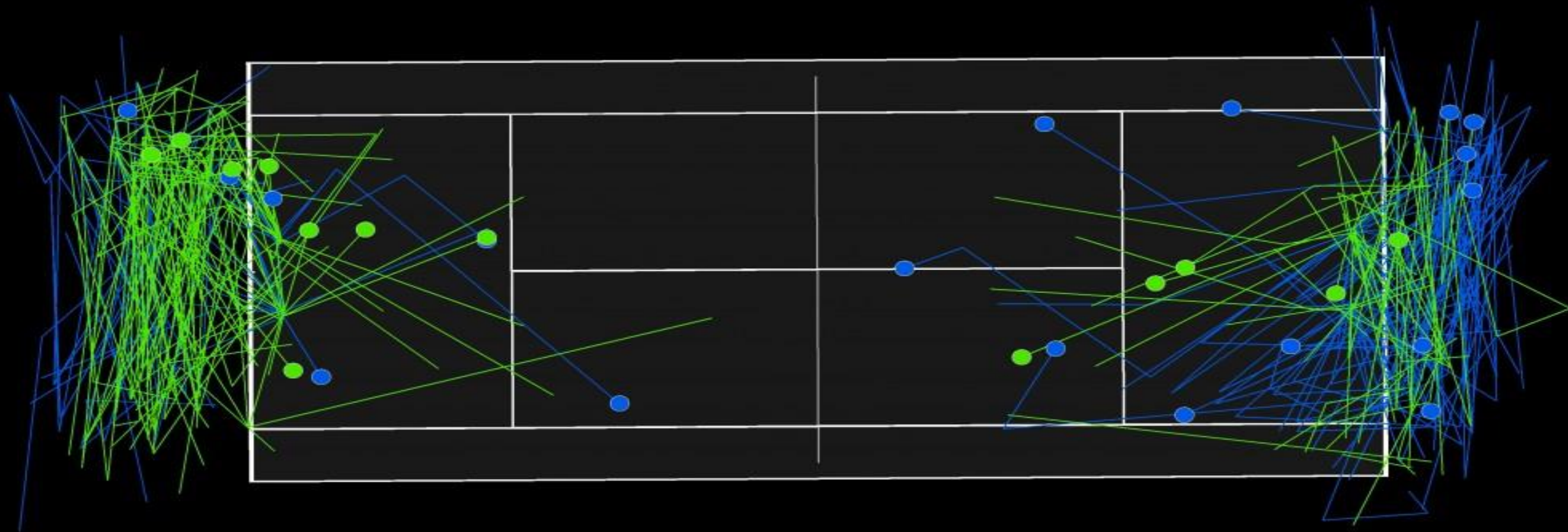


Understanding Court Position & Movement

Federer v Murray

Player movement and winning shot position

Gold Medal Match, London Olympics



Federer

- Winning shot position
- Movement

Murray

- Winning shot position
- Movement

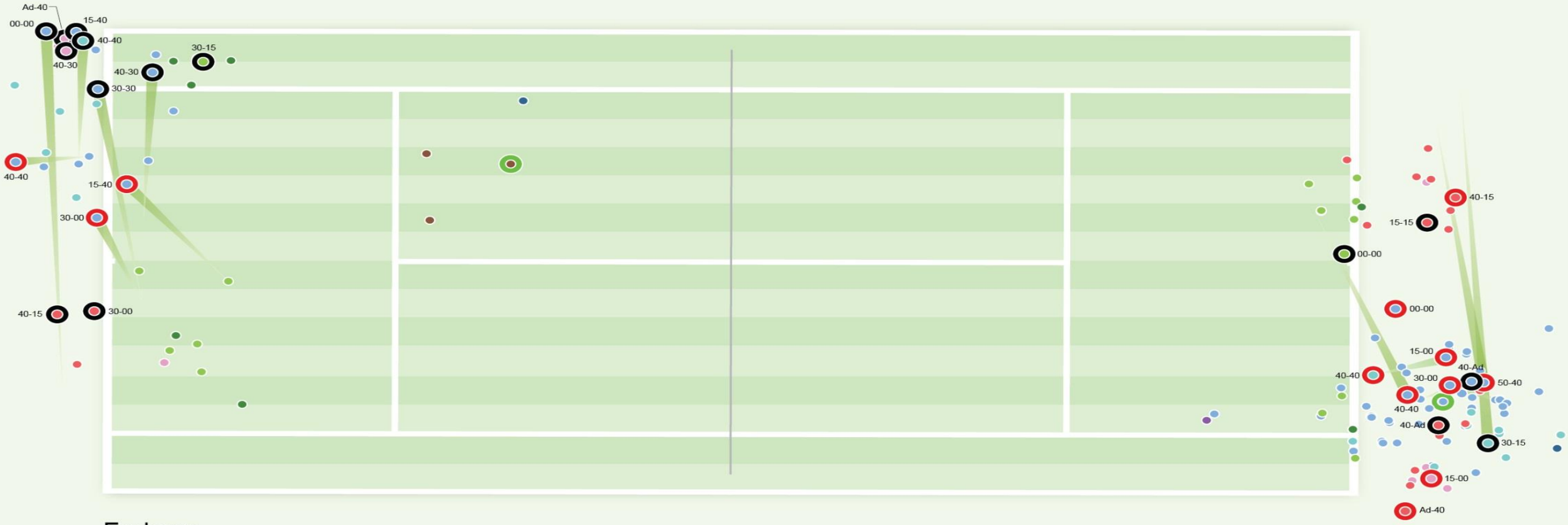
esri

Design: @damiendemaj

Federer v Murray

Federer's backhand shot position and shot result

London Olympics, Gold Medal Match
Murray won 6-2, 6-1, 6-4



Federer

100 Backhands played — **27%** Error rate

52% Backhand errors were made at game point for or against Federer

Compared to:

146 Forehands played — **35%** Error rate

22% Forehand errors were made at game point for or against Federer

- Backhand
- Backhand Drop Shot
- Backhand Lob
- Backhand Return First Serve
- Backhand Return Second Serve
- Backhand Slice
- Backhand Slice Return First Serve
- Backhand Slice Return Second Serve
- Backhand Volley

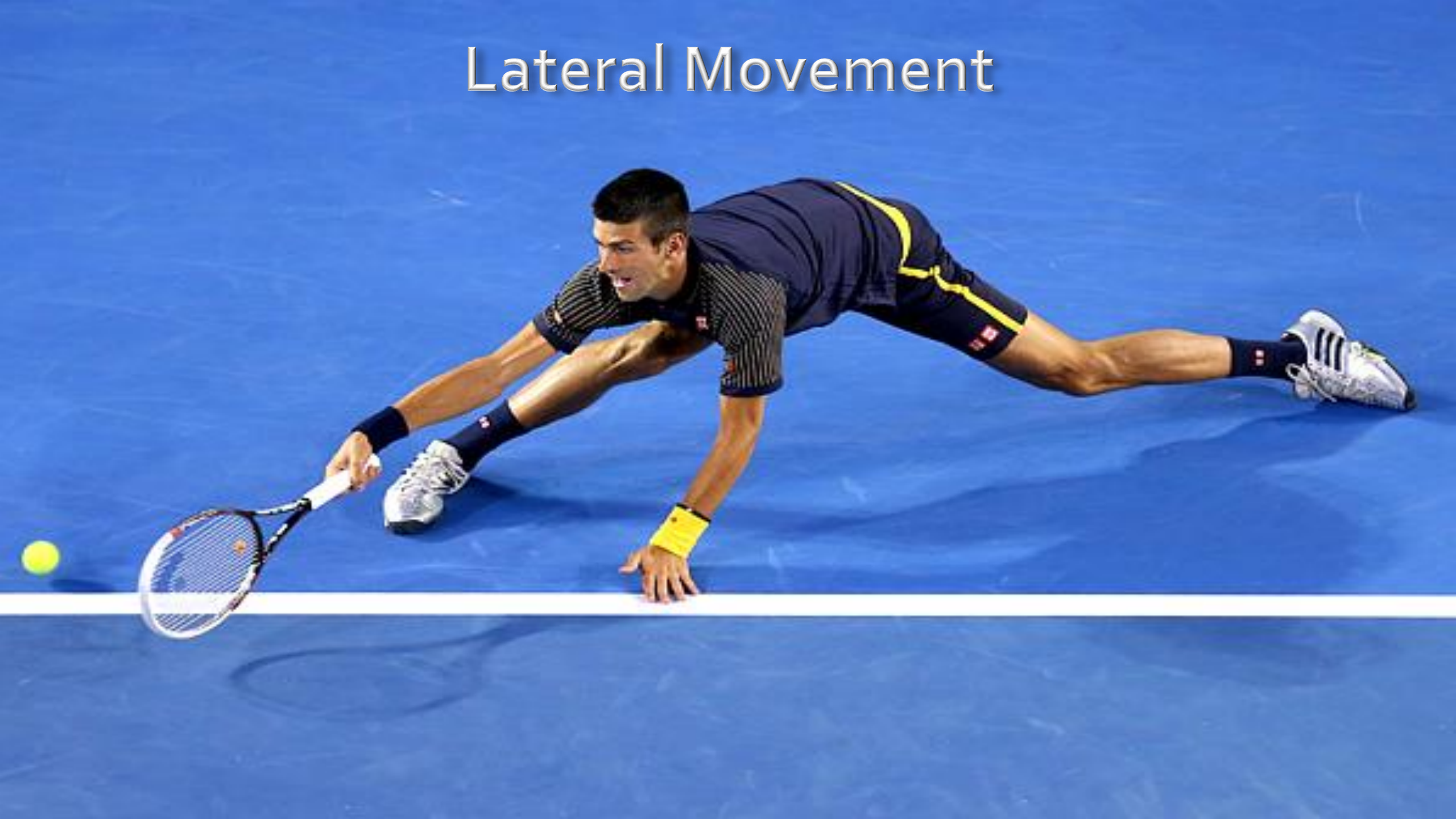
- Forced error
- Unforced error

Direction and length of player movement to shot. *(Serve return shots show no player movement)*

Federer's backhand is considered the weakest link in his heavy artillery. It comes under constant attention in the media and by his opponents. However during the Gold Medal match Federer's error rate from his backhand was much less than his forehand (27% to 35%). His backhand errors did however come at more critical times during the match. 52% of Federer's backhand errors occurred on game point for or against him, compared to 22% on his forehand. 12 of Federer's 14 backhand errors (86%) came from a backward movement to the shot, which is an area of interest to his opponents. The graphic also highlights the variation in play from each end of the court. The data for this particular outdoor match shows a distinct variation in shot position from each end. The conditions during the match did not appear to favour one end.

GameSetMap
@damiendemaj #federermap

Lateral Movement



Lateral Movement



JAB STEP



PIVOT STEP



GRAVITY STEP

Split Step



- Elite players actually react in the air during the split and land on the foot furthest from their intended target a split second ahead of the other foot.

SPLIT-STEP



Split Step and First Step Training



Split Jump Before & After



If Cannot Do The Previous



First Step Loading



STROKES & THEIR MOVEMENT PATTERNS

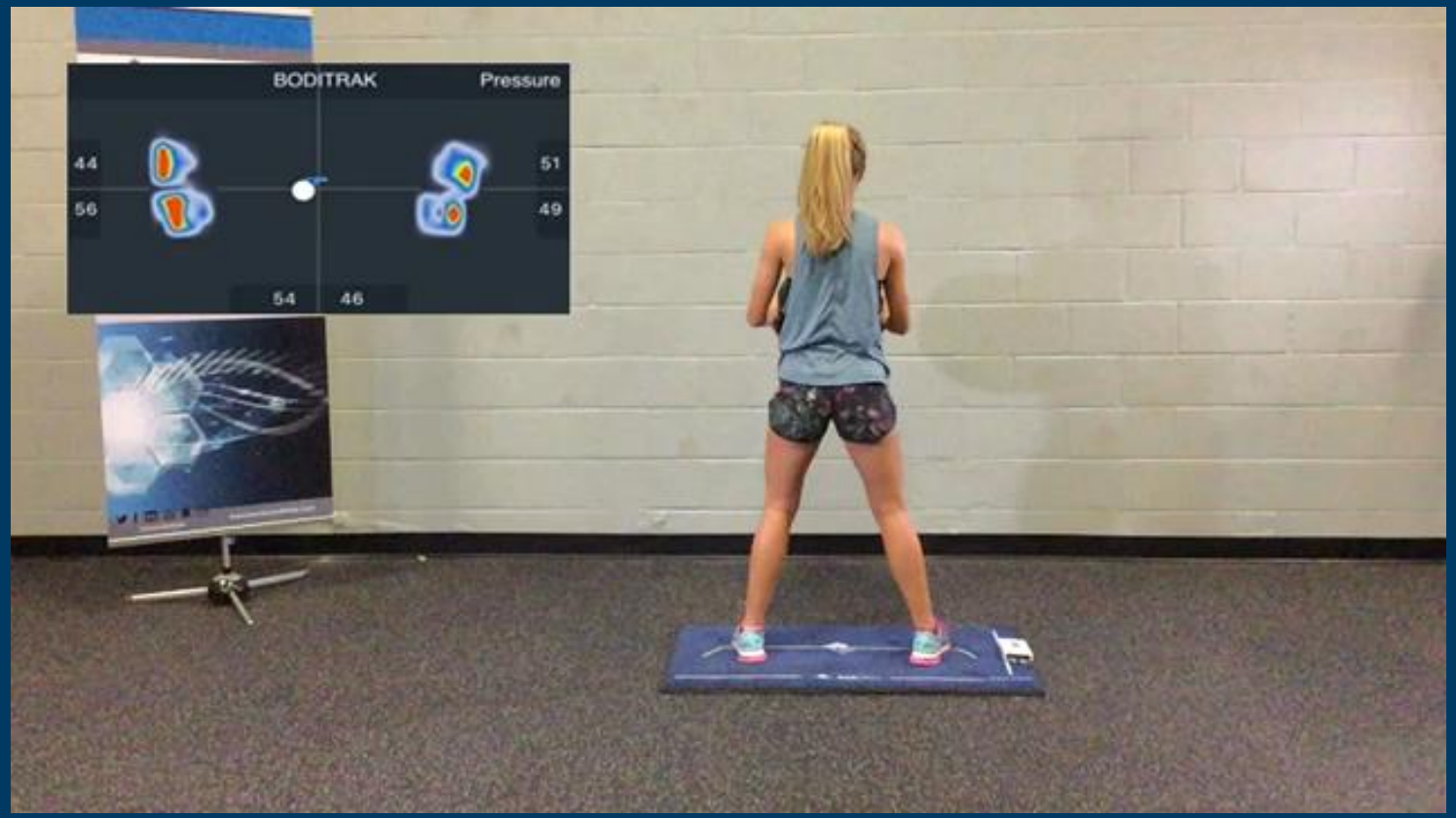


1. WIDE (TIME PRESSURE)
2. WIDE AGGRESSIVE
3. DEEP (TIME-PRESSURE)
4. RUN-AROUND

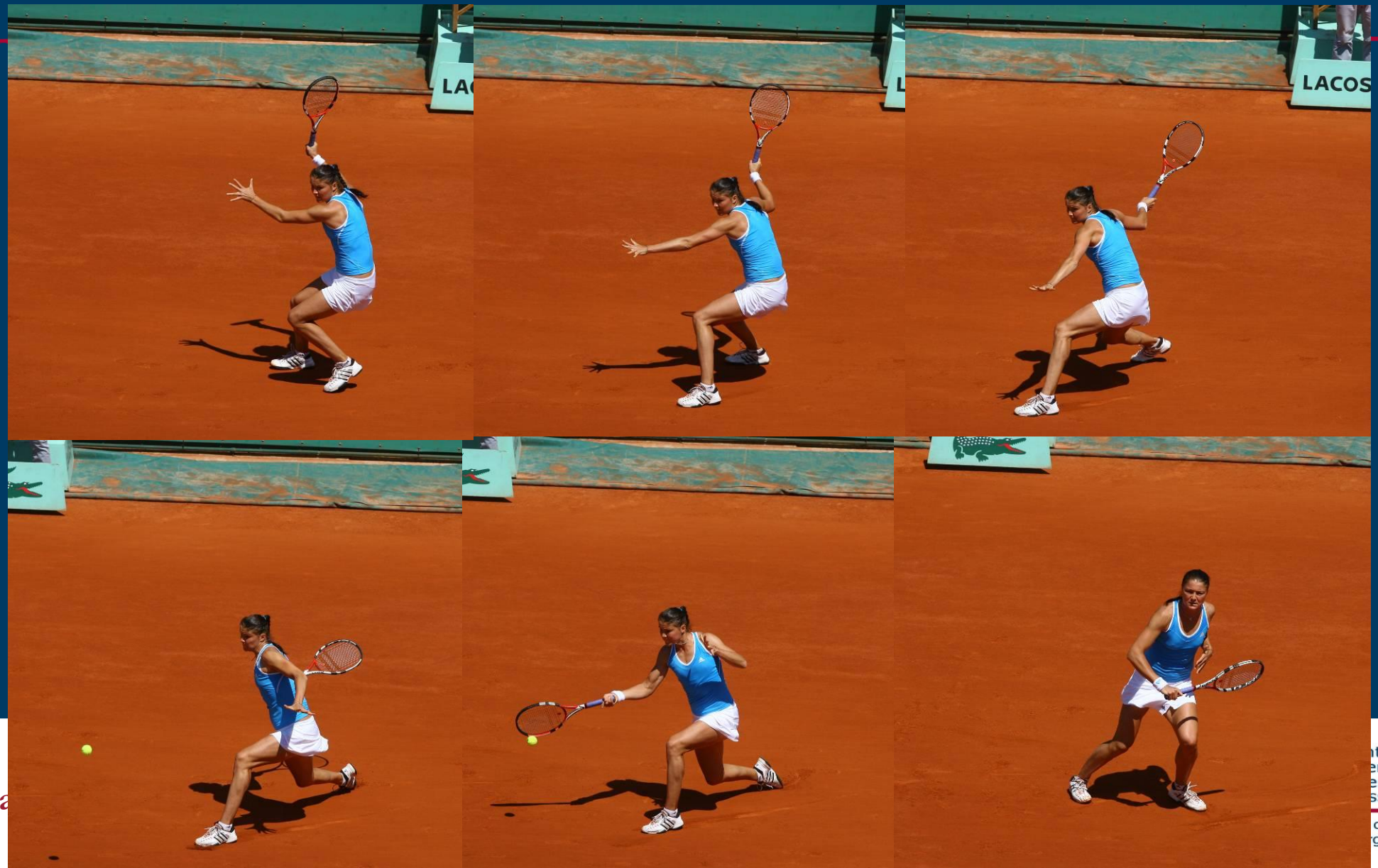
WIDE (TIME-PRESSURE)



LOADING MECHANICS



WIDE AGGRESSIVE (SQUARE OR CLOSED)



WIDE AGGRESSIVE - OPEN



Hip Trunk Rotation Specific Work

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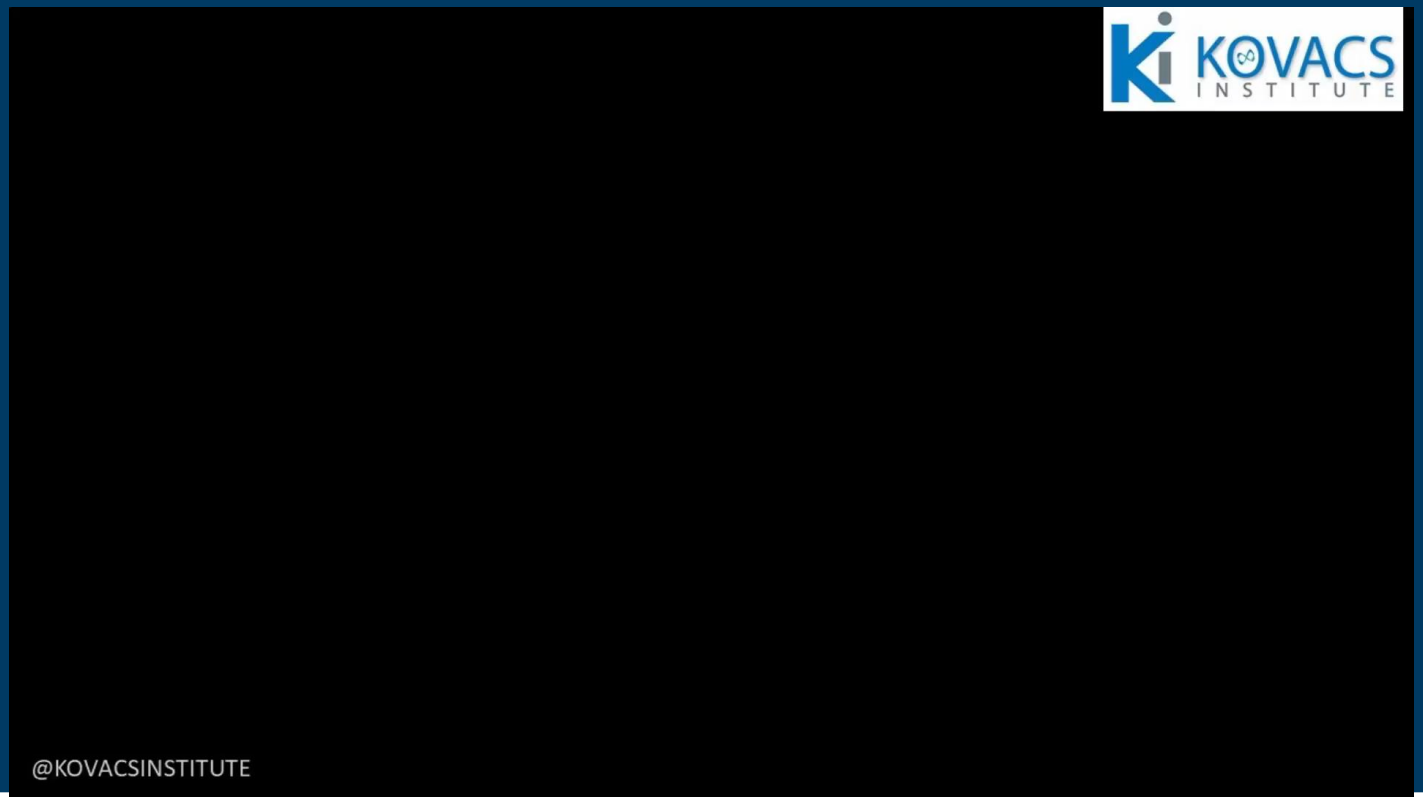
MB V -Drill



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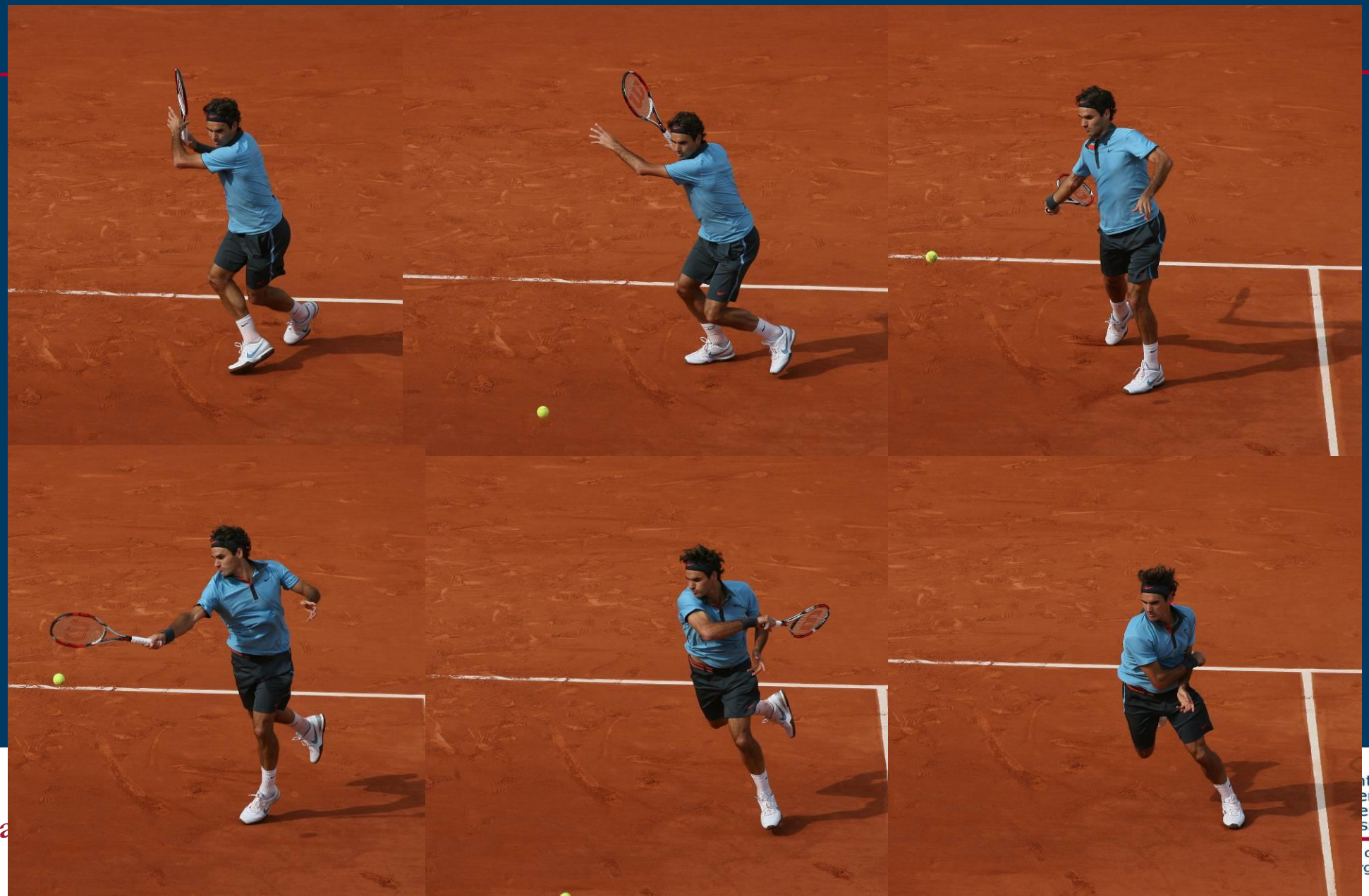
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DEEP – TIME PRESSURE (FOREHAND)



RUN-AROUND (DROP STEP)



Run Around Forehand



- Run around forehand - can turn a neutral position into a highly offensive position
- Poor movement can result in leaving the player off-balanced and out of position.
- Drop-step – positioning dominant leg behind non-dominant leg with a hip turn allowing the athlete to perform an arc or semi-circle movement which provides greater room to setup and allows the player to shift his bodyweight forward and into the court

Run Around Progression 1



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DECELERATION



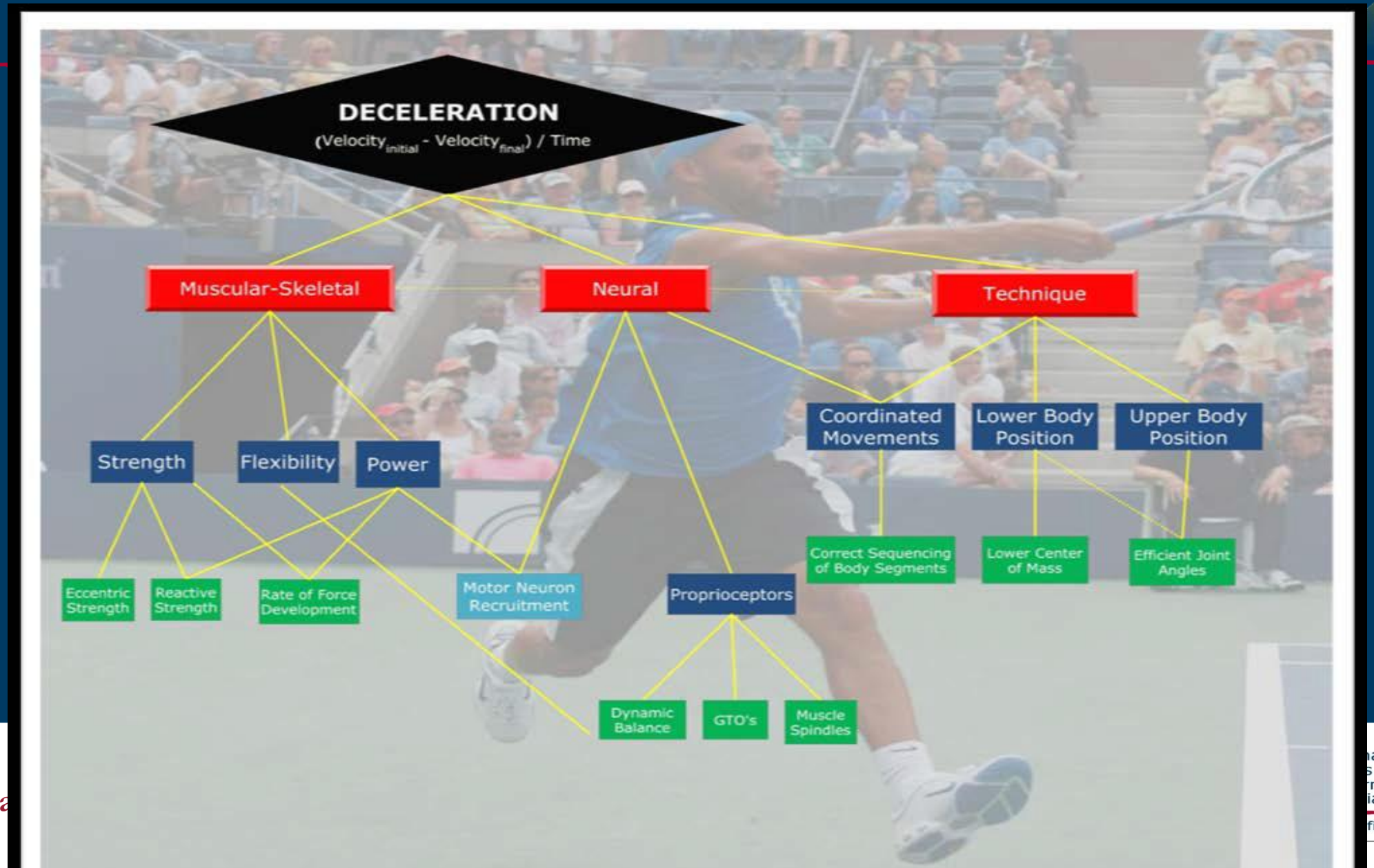
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Deceleration



- Deceleration is needed to prepare for and recover after groundstrokes, volleys, as well as during the follow-through and landing phase of the serve.
- An athlete who can decelerate faster and in a shorter distance is an athlete who will not only be faster, but will also have greater body control during the tennis stroke.
- Poor deceleration = increased chance of injury

Deterministic Model of Deceleration



Recovery Movement

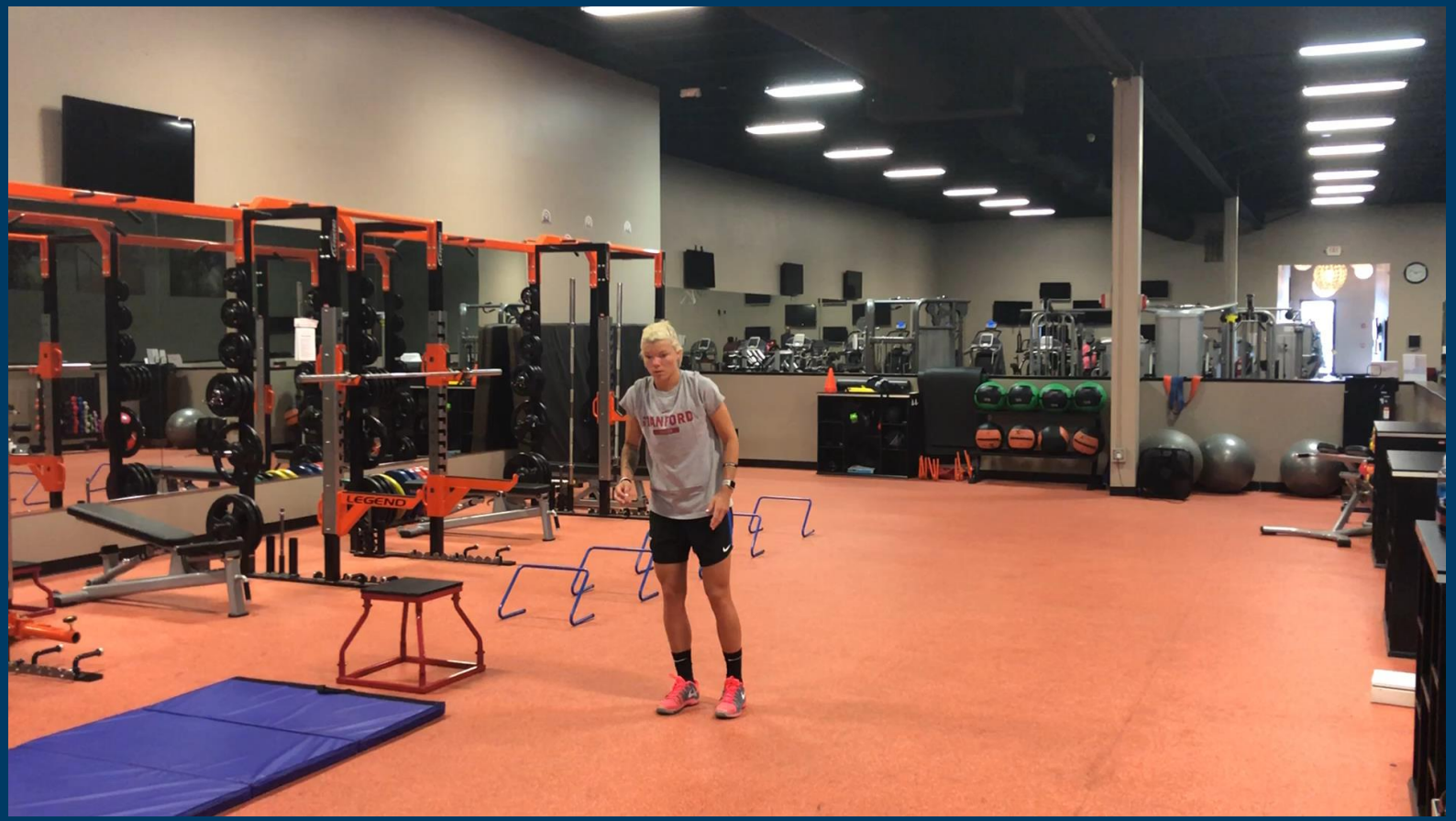


Lateral Run - Challenges



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Lateral Recovery Step Training



QUESTIONS

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Questions



