

UTILIZING CENTRIFUGAL FORCE IN THE HIGH JUMP

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INTRODUCTION



#NCAATF

UTILIZING CENTRIFUGAL FORCE IN THE HIGH JUMP

- Understanding the High Jump
- Technical Execution & Common Errors
- Thoughts on Training
- Practice Considerations and Videos

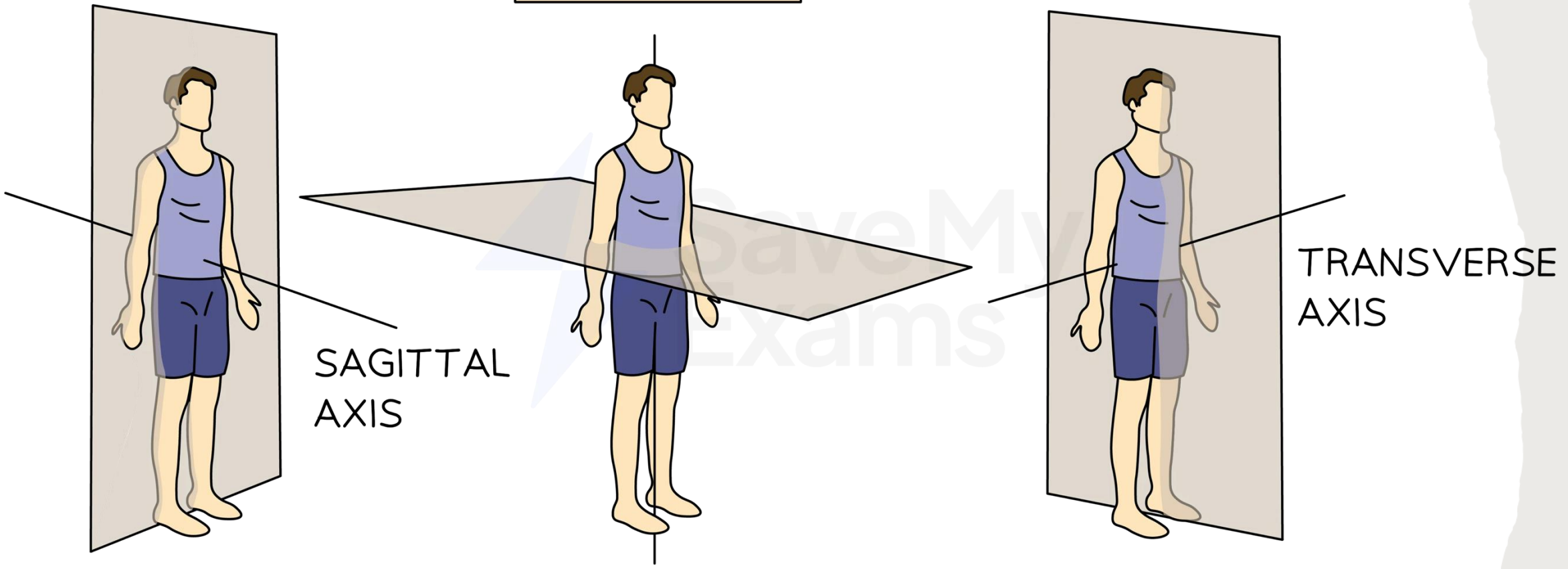
UNDERSTANDING THE EVENT

- Height of COM, Horizontal and Vertical Velocities, Along with Angle of Takeoff Determine Result
- **Running Curve Allows for Greater Velocities**
Increases elastic properties. Eccentric strength, put muscles on stretch. Orientation of body to promote elasticity.
Velocity of approach increases elastic properties of jump leg
- **Resistance to Centrifugal Force also increases elastic properties of jump leg**
Takes care of horizontal element of bar clearance, jumper can focus on jumping up. Creates elastic environment. This creates a 'high jump'
Running effective curve on the ground creates effective flight curve in the air (transverse, sagittal plane rotations)
- **Ground > Flight**
Flight is a natural by-product of ground actions. Once you leave the ground your path is determined, mistakes in flight are compensatory movements
Rotation created on the curve of the approach/takeoff promote rotations in flight & efficient layout positions, but comfort & familiarity in flight allow for utilization of higher velocities (inverse relation too)
- **Goal is to Place the Athlete in Position for Greatest Potential at Takeoff**
COM as high as possible, horizontal velocity as fast as they can handle to convert into vertical velocity, & takeoff angle appropriate for given speed. Speed and ability to convert is key.
- **COM Passes Under the Bar in Flop Technique**
Natural flight curve about the bar

FRONTAL PLANE

TRANSVERSE PLANE

SAGITTAL PLANE



SAGITTAL
AXIS

TRANSVERSE
AXIS

LONGITUDINAL AXIS

HIGH JUMP TECHNIQUE

- Uniform Controlled Acceleration
- Feet Strike Tangent to Curve
 - Long axes of the feet turn in uniform manner*
- Total Body Lean
 - Postural alignment*
- Outside Shoulder Back
- Compression Through the Curve
 - Low and sneaky to set up penultimate-takeoff mechanism*
- Continuation of Curve Through Takeoff
- Knee Cross
- Take the Time to Rise and Complete the Takeoff
- Completely Vertical as Foot Leaves the Ground

COMMON ERRORS

- Inconsistent Start
- Driving too Long or Anticipating Curve
- Zig Zagging the Curve
- Chopping or Reaching
- Post-Pattern
- Jumping too Close
- Insufficient Lowering at Takeoff
- Drifting into the Bar on Penultimate-Takeoff
- Not Taking Time to Rise ie Fill Out the Takeoff
- Anticipating/ Premature Arch at Takeoff
- Overcooking Flight Movements

- **Ergonomic Analysis**
Majority of the event takes place in front of the bar on the ground. Approach, Curve, Takeoff determine success > Flight
- **Focus on What Happens in Front of the Bar**
What happens over the bar more of an effect of the cause prior to it
- **Teaching Environment vs Competitive Environment**
- *Bar vs Bungee*
- *Goals of session*
- *Put pressure on them at times*
- **Curve is the Key**
Always working out a 'true' circle
- **Monotonous Rehearsal of the Event, Film Review, & Discussion**
Not too many drills. Unless if beginner there's room for that...
- **Special Strength**
Bars & bands
- **% of Goal Height as a Guide in SA and FA**
Primary training modalities are SA and FA
Goal is always replication of technique
- **Checkmarks**
- **Curvilinear Speed Development**

THOUGHTS ON TRAINING

CIRCLE

- Utilized in Virtually Every Jump Practice

Circle Runs, Takeoffs, Scissors, Jumps

- Short Approach & Full Approach Work

- Have to Connect the Run to a True Circle to Maximize Resistance to Centrifugal Force

- Match Radius to Width & Speed of Approach Run

- Have to Be Practical Too

Can't create 6 circles on there

Usually try to create 1-2 circles of different color that cater close enough for everyone

- Chalk or Tape

Can use water to remove chalk

Or remove tape

CREATING ACCURATE CIRCLE

- Pull Tape Measure from Middle of Mats out to 22' or so
- Chalk Out a Line Every 1' or Even More if You Want
- What is the Width of Your Jumpers Approach?
- Add 6'

- **Example**

12' wide on approach

18' radius

- **How Far Out Do You Prefer They Jump?**

Less experience or less speed means closer, more advanced faster means further

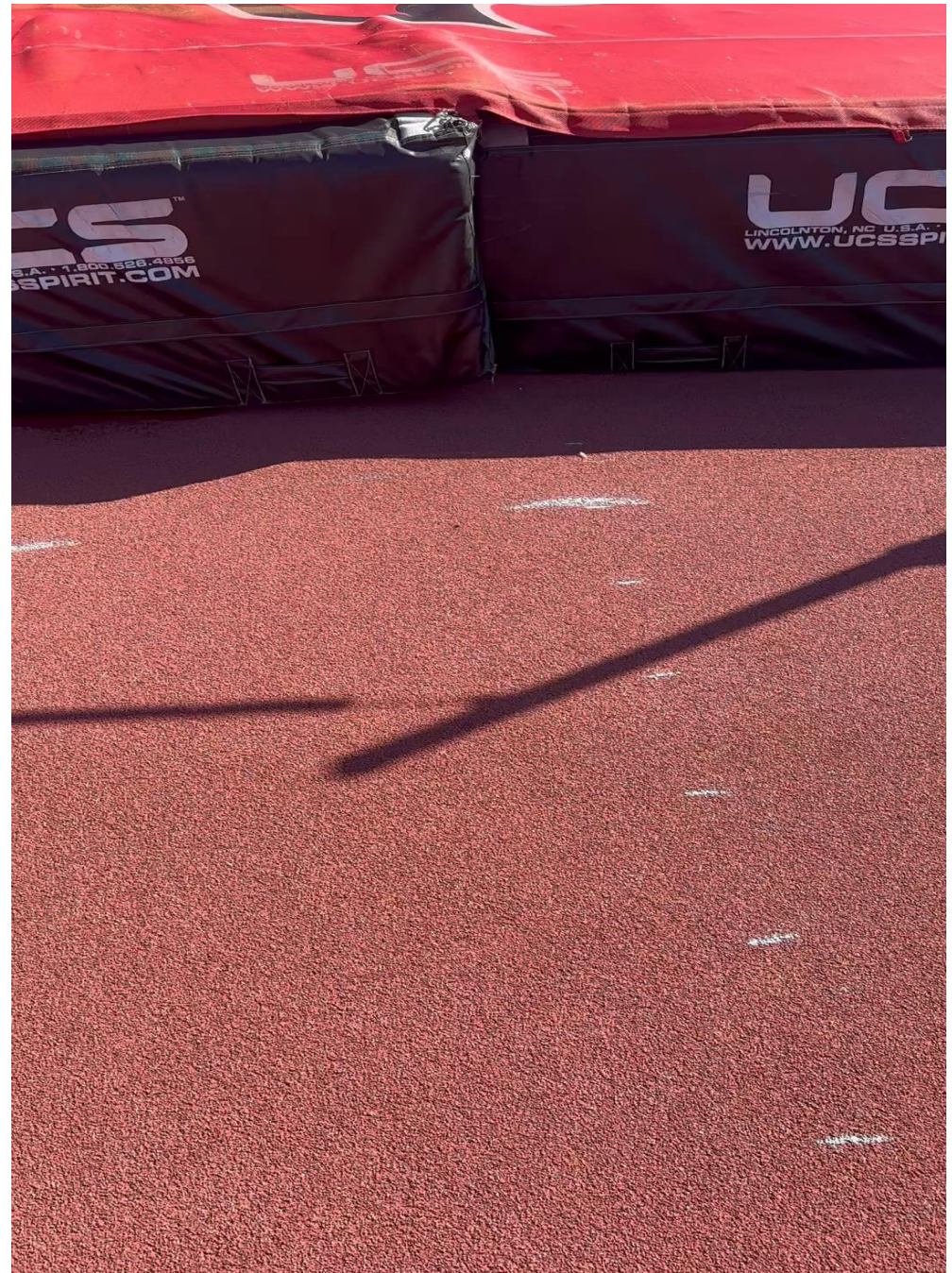
Short Approach vs Longer Approach Considerations

- **Example**

Advanced Short Approach from 6-Step go out 2'

Radius is 18' but out 2' so go to 20' on your grid from center of mats

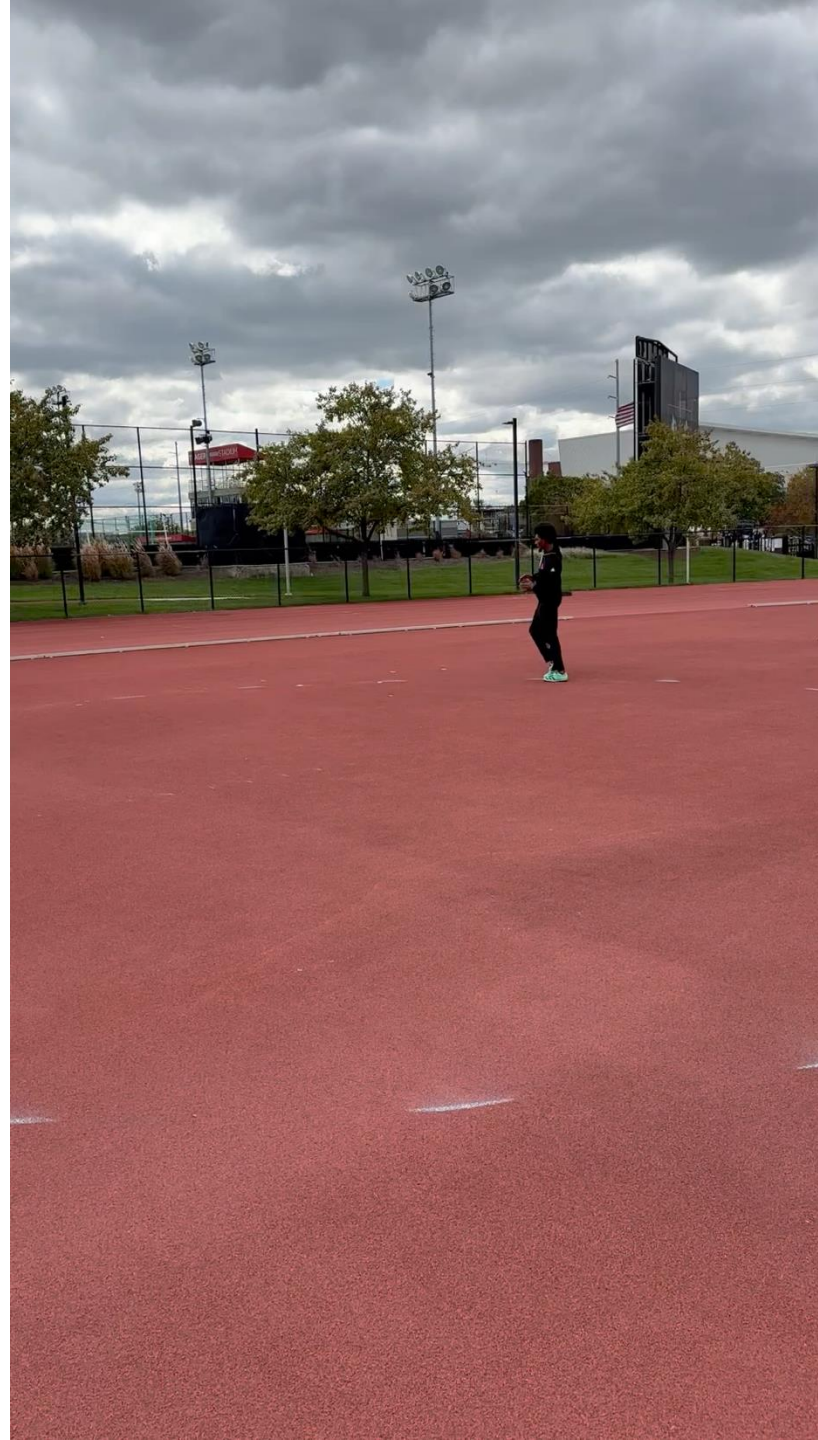
Pin down tape measure, pull tape measure out to 18' and chalk circle



SHORT APPROACH JUMPING

- Main Training Modality for Jumping Purposes
- Competitive vs Teaching Environment
 - Working to high bars vs low bars*
 - Bungee or Bar?*
- Circle Jumps, Competition Rehearsal, Box
 - Takeoffs, Scissors, Jumps*
 - Complexes are very useful*
- % of Goal Height for Programming Purposes
 - 4-Step: 80-85%*
 - 6-Step: 86-91%*
- Jump Count
 - Depends on practice environment and weekly/monthly load*
- Replication is Key!
 - Be demanding!*
- Start the Same as Full Approach



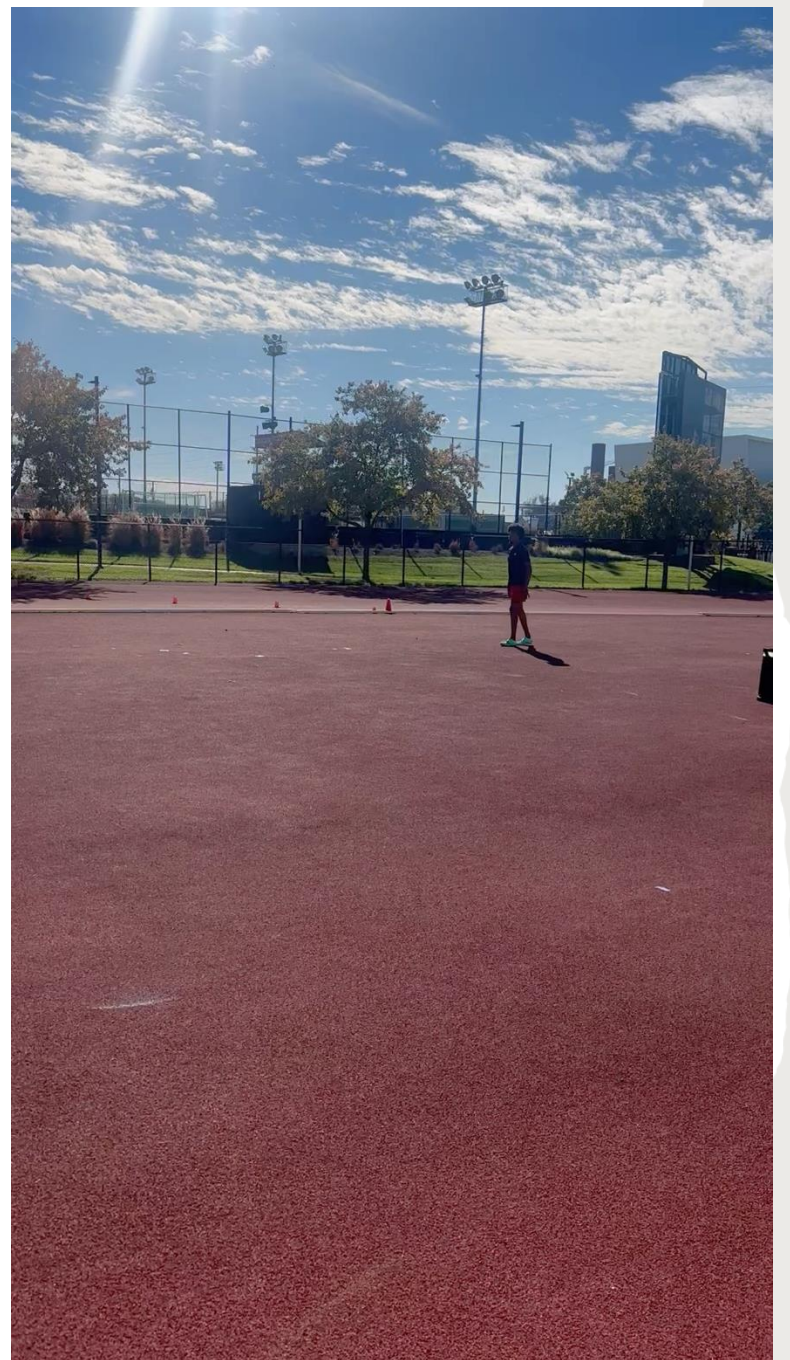


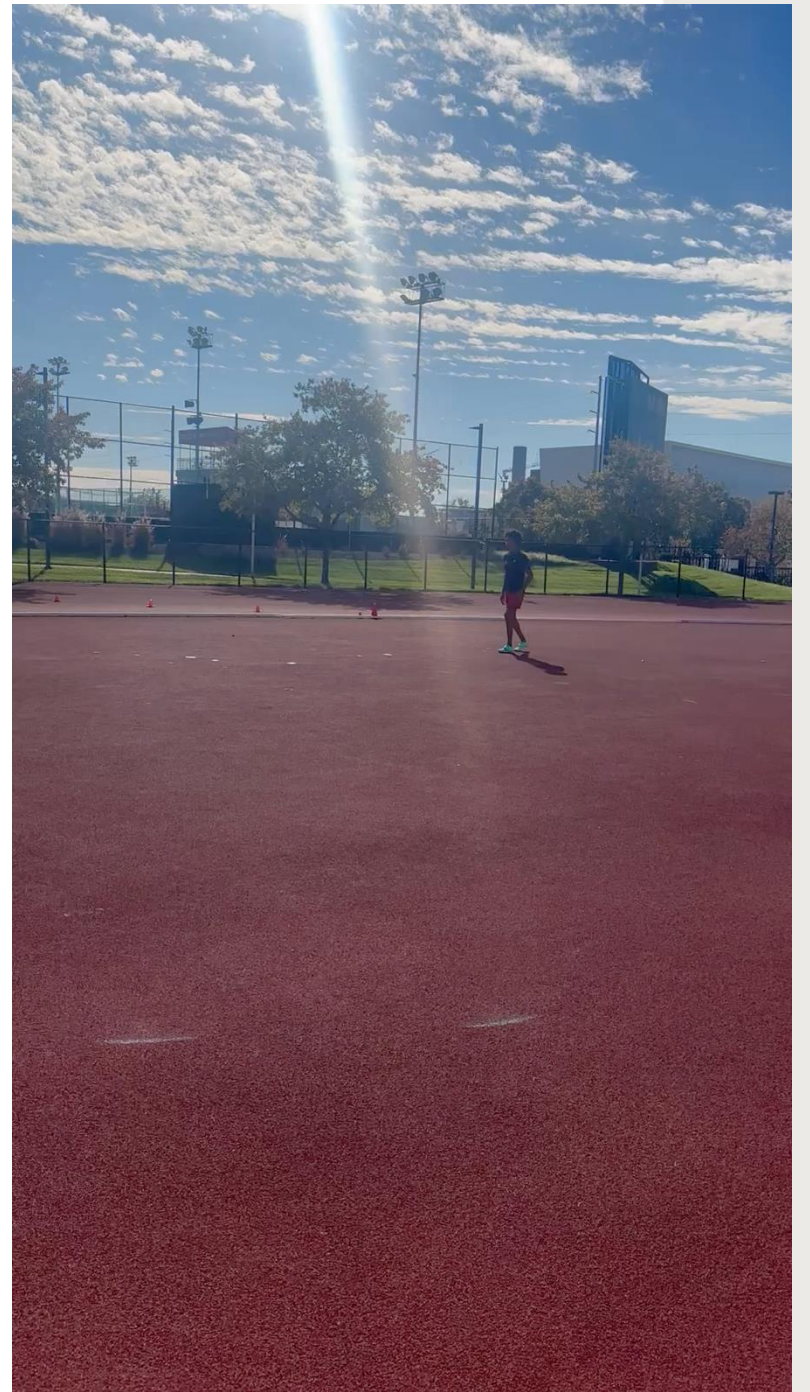
2. Tuesday, October 22

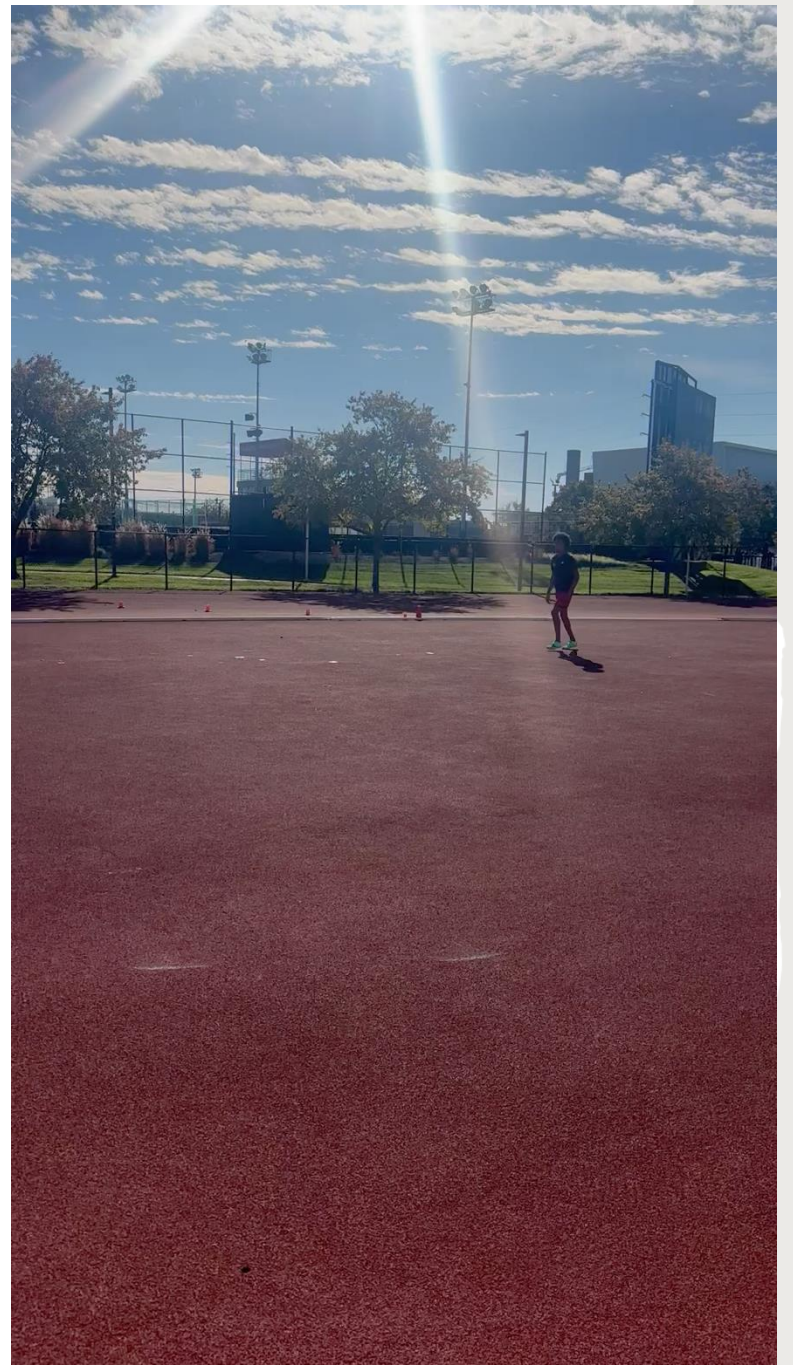
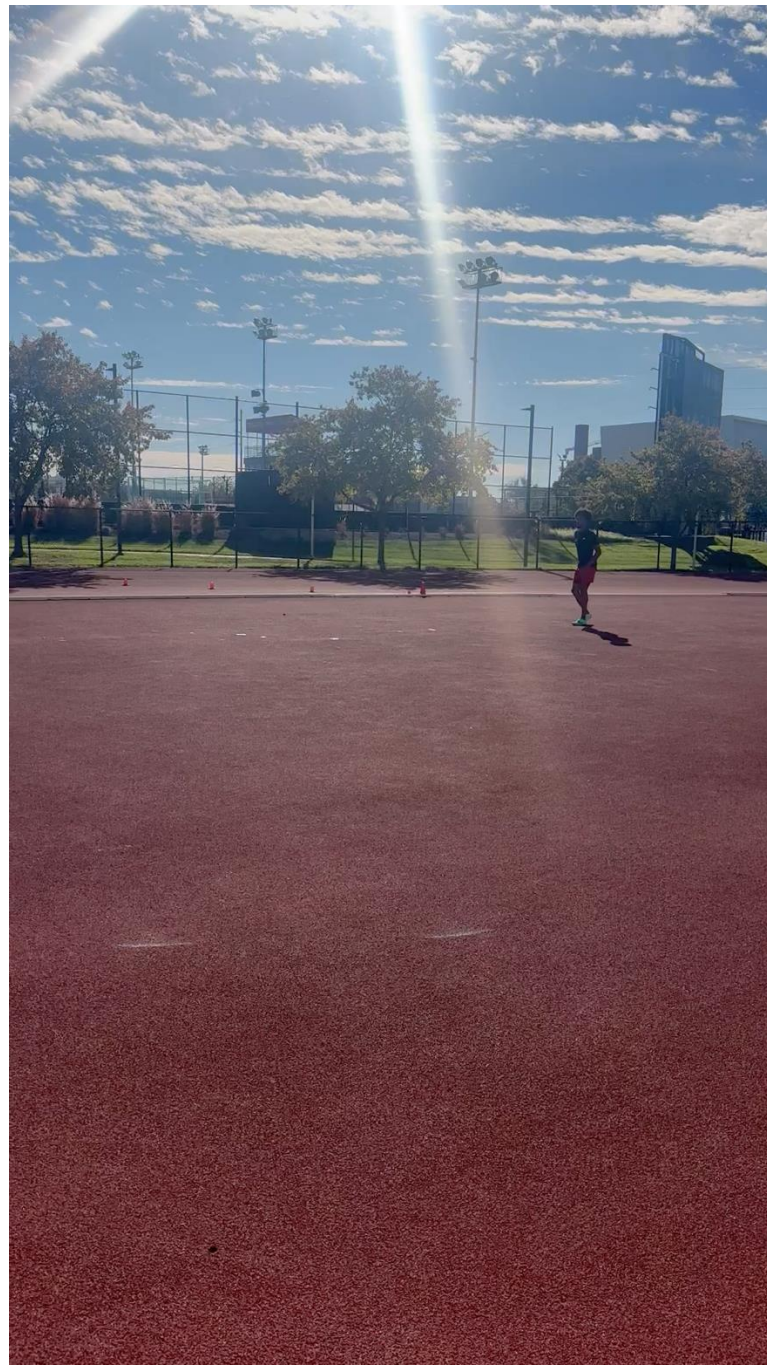
- *Warmup (Max Velocity A)*
- *Technical Execution*
 - Bridges
 - U-Runs
 - Walking Drills (Bar)
 - Short Approach HJ from 6
 - Competitive
 - 1.98m (6'6") O, 2.09m (6'10.25") O, 2.15m (7'0.25") O, 2.18m (7'1.75") XXXXXO
- *Multijumps*
 - Stair Hops or Box Thrusts
 - Backward/Lateral Hops
- *Coordination (Injury Prevention and Rehab – Orange)*
 - Pretension Arms Crossed SL Step to Box
 - Accel Switches
 - Step Through with Plate 2 Boxes
 - Single Leg Snatch
- *Cool Down (Cool Down B)*
 - Sand Foot Turns
 - Sand Backward Skip
 - Sand Side Shuffle
 - Sand Zig Zag Skip
 - Supine Knee Across Chest
 - Supine Knee to Chest
 - Straddle
 - Frog Stretch

BRION STEPHENS

SHORT APPROACH SESSION







FULL APPROACH

- **Lots of Rehearsal**

Drive phase to checkmark

U-Run

Takeoff/Scissor

Low Bar/Bungee Jumps & High Bar/Bungee

- **Mostly do Full Approach Work on Speed Days**

Circle Runs too

Short approach/technical jump days typically separate

- **Full Approach Jump in Practice**

Necessary

Focus more on opening height

Need some looks at high bungee/bar

SPECIAL STRENGTH CONSIDERATIONS

- Drills?
- Bar & Bands
- Prefer Variations on Main Menu Items
 - Short Approach, Circle Runs/Jumps*
 - Shorter Approach on main things instead of drills?*

BRION STEPHENS 2.23M (7' 3.75')



SOLEDAD JEAN 1.84M (6'0.5")



CONCLUSION

- Ergonomic Analysis: What Are You Spending Your Time On?
You can do all the drills you want, but main thing needs to be the main thing
- Repetition of Main Menu Items and Replication of Sound Technique are Key!
Lots of reps!
Hold them accountable on curve and takeoff
- Differentiate Practice Environment
Competitive
Learning
Need both and important to have clear definition of practice
- The Curve is the Essence of the Event
Connect everything to a 'true' geometric circle



THANKS FOR COMING!

- Instagram: @bobthurnhoffer7
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- Email: bob@gocards.com or bobthurnhoffer@gmail.com
- Further Resources

Coachtube.com: <https://coachtube.com/users/rthurnhoffer>

Linktree: <https://linktr.ee/bobthurnhoffer>