

# Overlooked Aspects of Speed and Agility Development

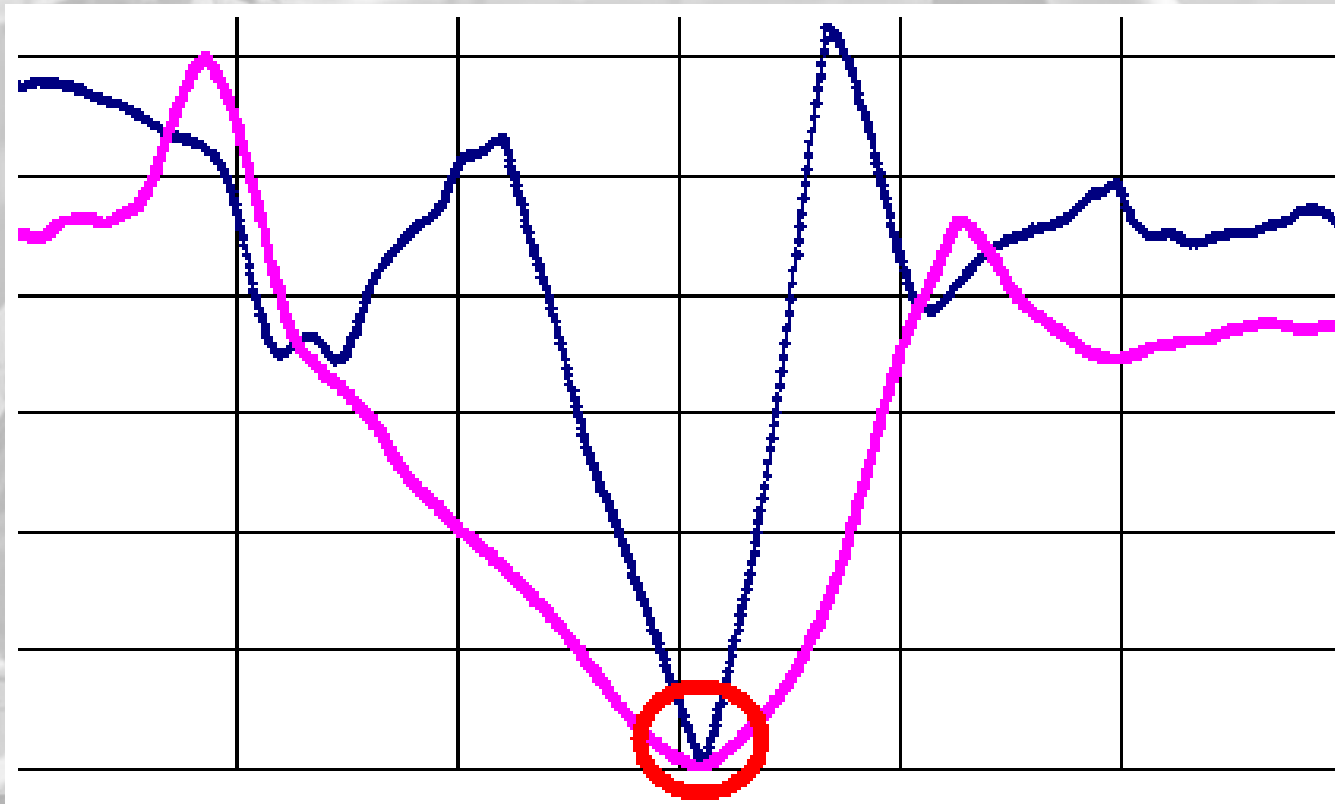
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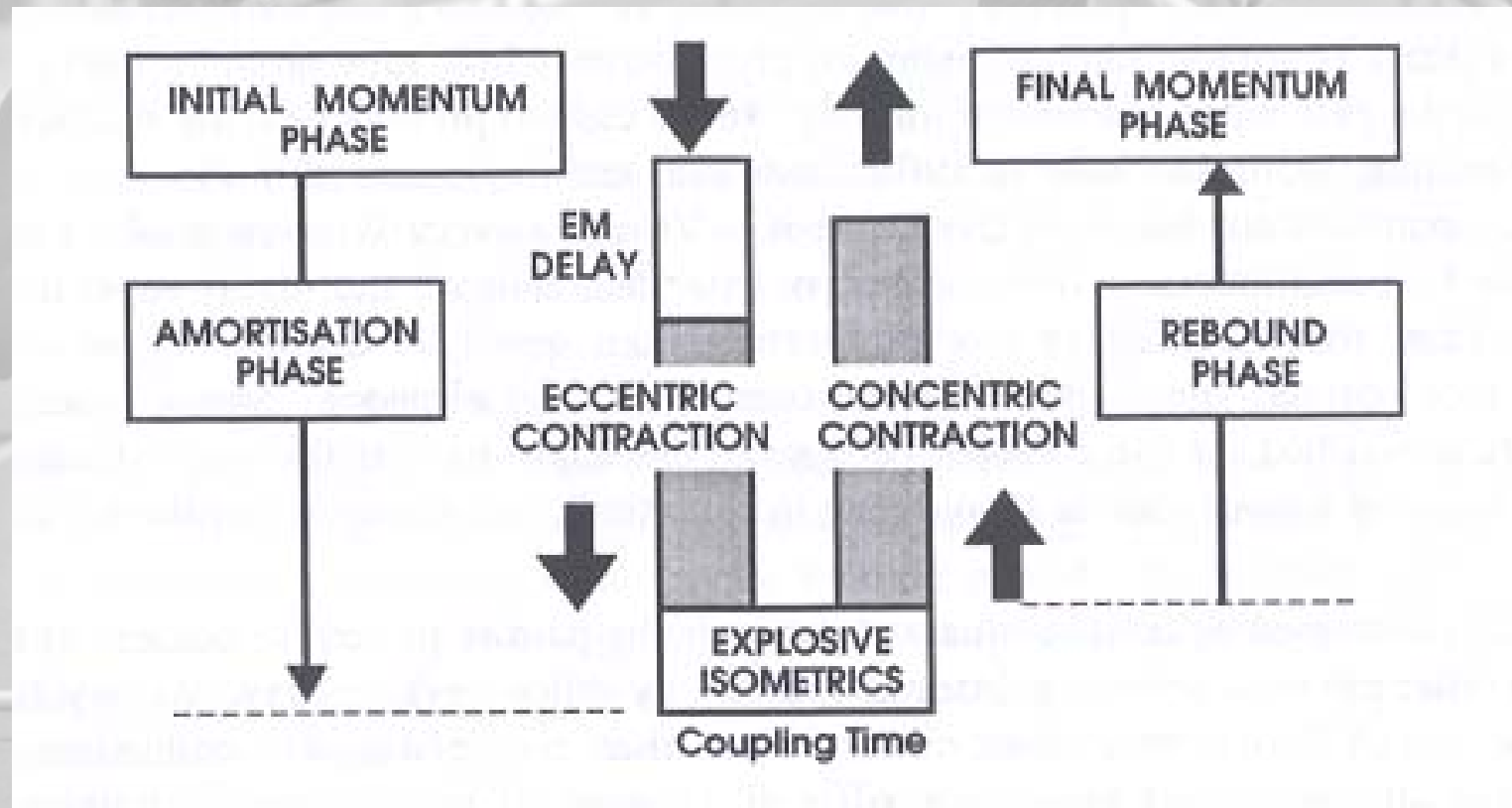
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# Complex Nature of Muscle Action

- All Dynamic Sporting action are Triphasic



# Complex Nature of Muscle Action

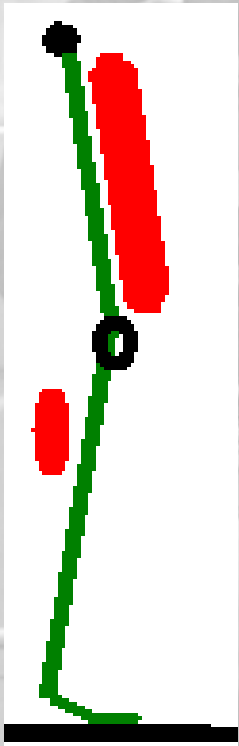


# The Overlooked Stretch Reflex

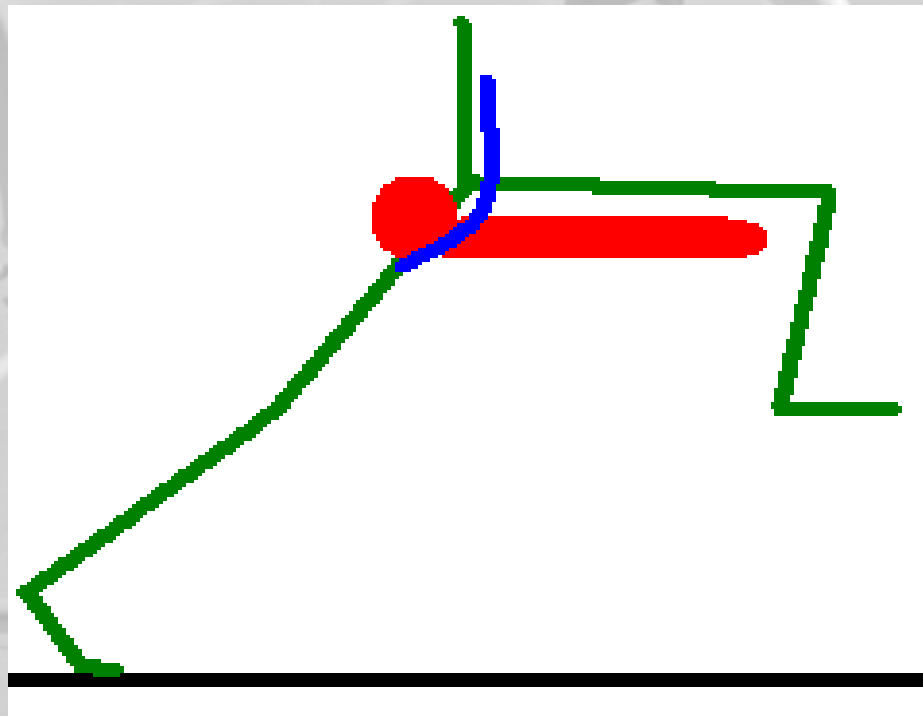
- A **stretch reflex** is a muscle contraction in response to stretching within the muscle. It is a monosynaptic reflex which provides automatic regulation of skeletal muscle length.
- When does the major stretch reflex take place?

# Top Speed Stretch Reflex

Foot Strike

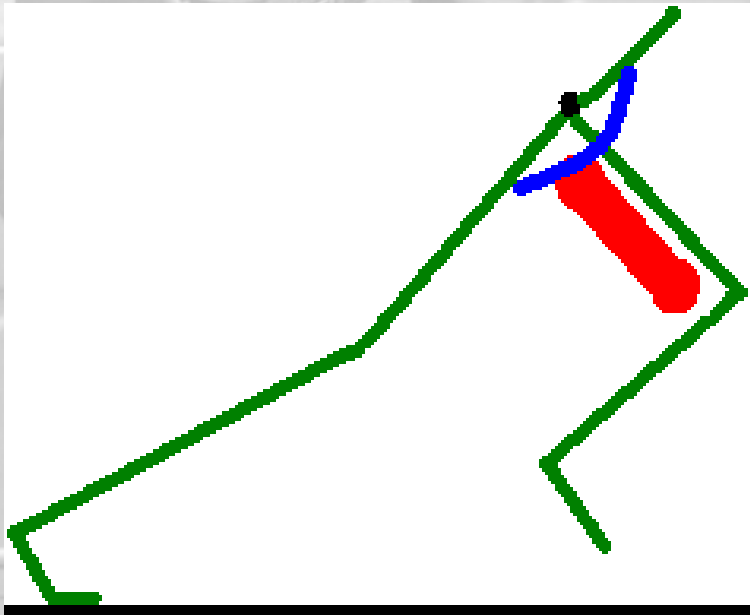


PUSH OFF

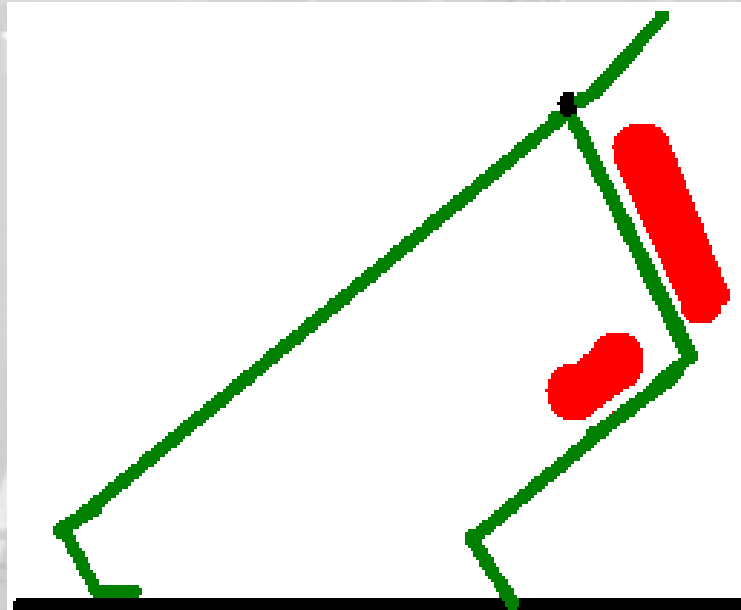


# Acceleration Stretch Reflex

## Front Foot Raise



## Front Foot Strike





# Training Concepts

- **Example:** Baseball Team Pro Agility Testing
  - Fixed in 4 sessions, with special methods
  - Athletes were too weak to complete drill correctly and unable to get into a deep position for transitions
  - Isometrics with “regular strength training”

# Single Leg Isometric Deadlift

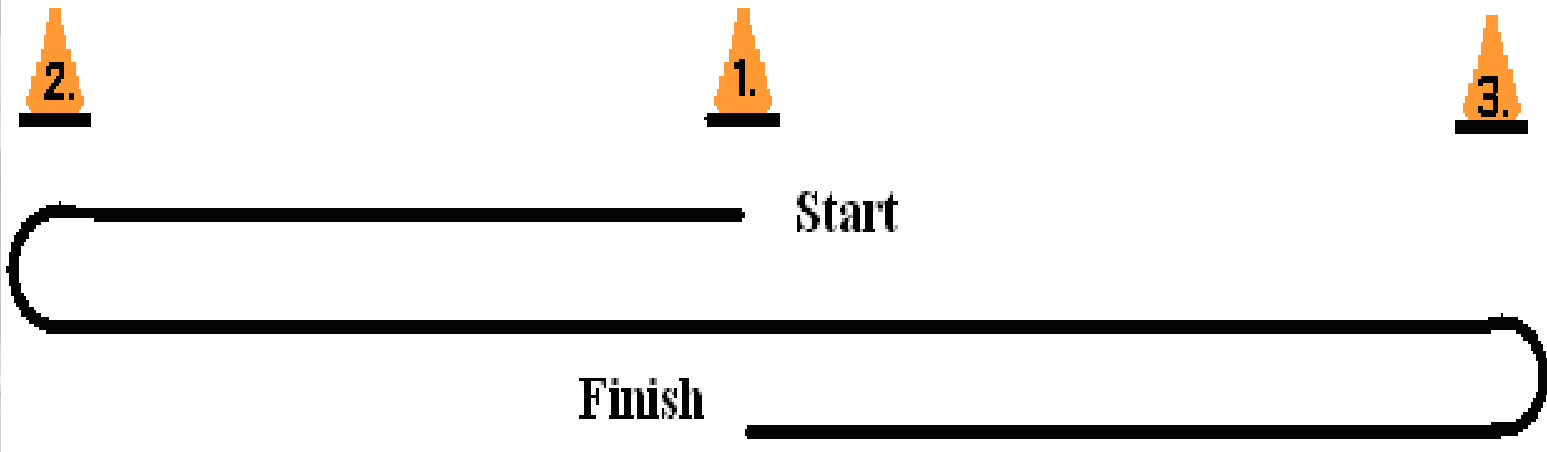
- Single leg Isometric Deadlift



- Alternating reps of 2
- 2 to 3 sets
- 6 seconds per rep

# Don't Do What The Pro's DO!

- Pro agility – Touch hand on lines?
  - This slows down the transition action and lessens the impact of the training session



# Try Not To Run On Sand

Frame 1



Frame 2



Frame 3



# Dynamic Action Concept

- 3 phases of movements
- Block 1 - Focus on Eccentric Movement
- Block 2 - Focus on Stretched Isometric Phase
- Block 3 – Focus on Explosiveness
- Key Movements – Back Squat – Glute ham  
Hyper- Bench Press
- Block with **DAC** should only be 2 to 3 weeks
- General blocks can be 2 to 6 weeks



# Testing Factors

- **Explosive Strength Deficit Test**
- **Explosive Strength Deficit Test**
  - An effective way to decide if an athlete needs to develop more strength (through strength training) or more speed (through plyometric and explosive training)
- **To Develop Speed Strength**
  - Use 55% - 75% of 1-Repetition Maximum
- **To Develop Strength**
  - Use 80% - 95% of 1-Repetition Maximum

# Explosive Strength Deficit

- The Explosive Strength Deficit Test can show an athlete if they need to either work on strength to increase their vertical jump, or if they need work on plyometrics to get faster for improved vertical jump performance.
- In order to complete this test, the athlete must perform a **counter movement** in the squat jump, and then a **static jump**. The key to performing the static jump properly is to use a three second pause at the bottom of the squat.
- If the results are **10 or less**, you need to add more plyometrics to the workouts to increase your vertical jump performance. If you have results **11 or greater**, you need to place more emphasis on getting stronger.

# Lack of Plantar Flexion

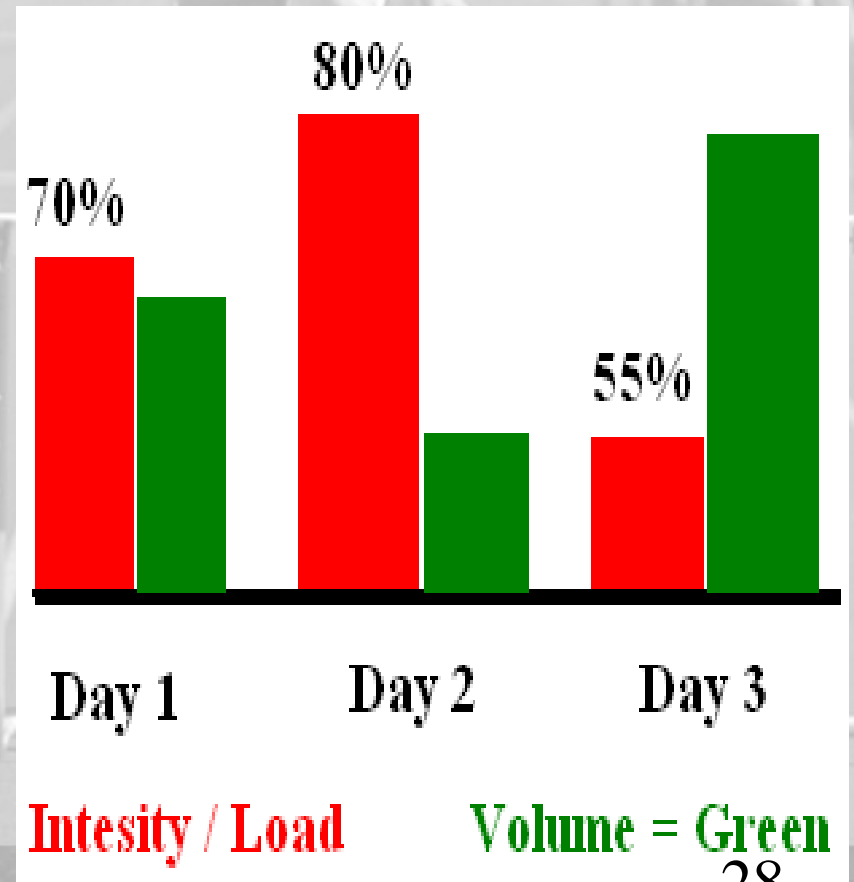
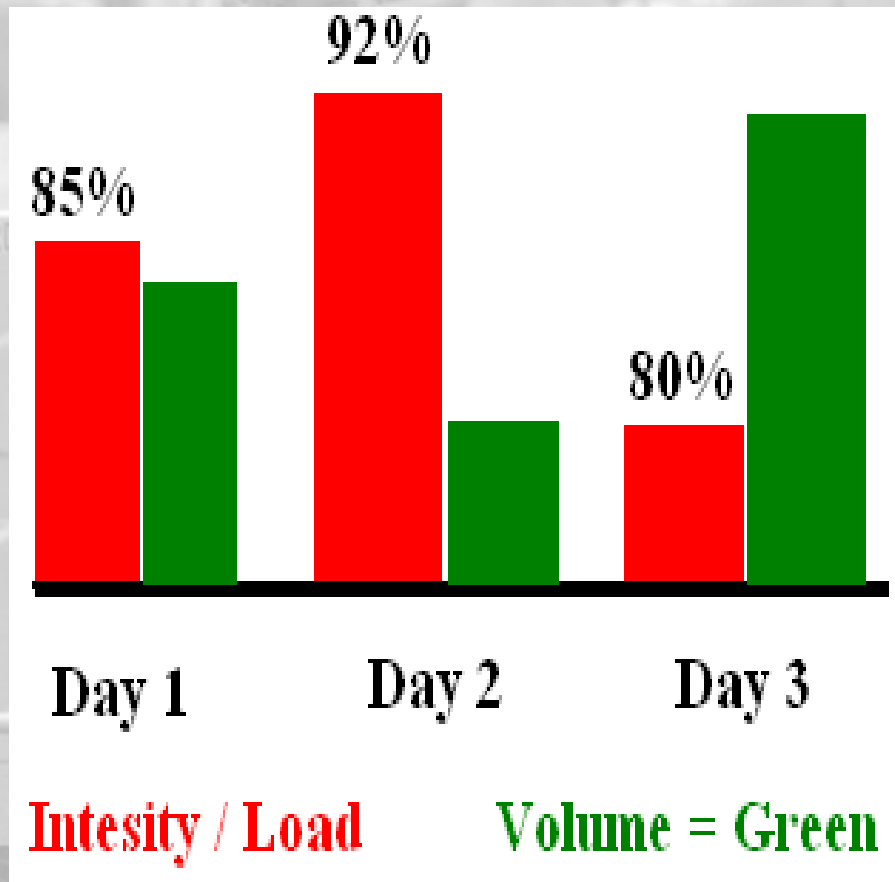
Mike T Nelson Blog/Ramblings



# Exercise Sequencing

- **Lunge Sequence**
- **Block 1 – Lunge in place**
- **Block 2- Walking lunge with weight with pause and squeeze up on toes**
- **Block 3 – Walking lunge jumps with bands**

# Strength vs. Speed




# Strength vs. Speed

- Lifting heavy weight slowly all of the time can make the nervous system function at a slower rate, even in other motor tasks
  - If it could make you faster then power lifters would be extremely fast.
- Peaking during year's end with speed month

# Acceleration Strength Exercises

- **Key Factors in Specificity – Same Joint Angle –**

	<p><u><a href="#">Back Squat</a></u></p> <p><u><a href="#">Back Step Up - Band</a></u></p> <p><u><a href="#">Walking Lunge</a></u></p> <p><u><a href="#">Walking Lunge W/ Band</a></u></p> <p><u><a href="#">Piston Squats</a></u></p> <p><u><a href="#">Balance Single Leg Squat</a></u></p>
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# Acceleration Strength Exercises

Power Step Up

Relaxed Box Jump

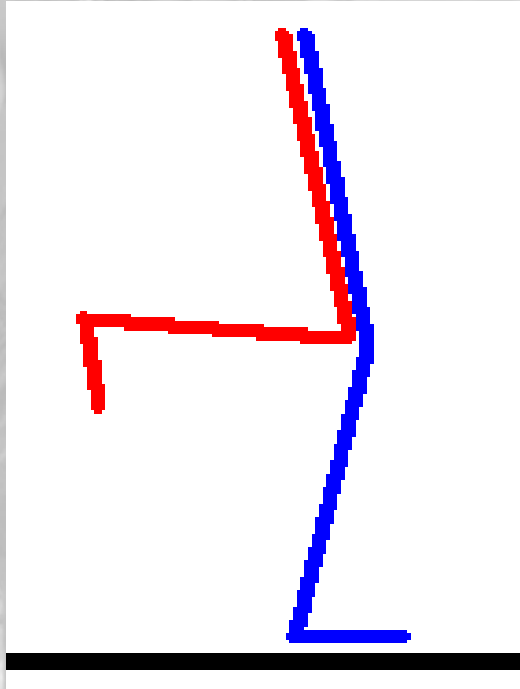
Squat Jump Pause

Half Squat Jump

Double Knee Jump

Alternating Split Lunge  
Jump

# Top End Speed Strength Training



[Straight Leg Deadlift](#)

[Straight Leg Walking](#)

[Good Morning](#)

[In Line RDL](#)

[Glute Ham Hyper](#)

[Incline](#)

[Glute Lift](#)

# Top End Speed Strength Jump Training

Single Dumbbell Leg  
Bench Hop

Good Morning Jump

Low Hurdle Hop For  
Distance

Depth Drop – Jump

Pike Jump – Distance

Half Squat Jump -  
Distance

# Exercise Selection

Power Snatch

Back Squat

Glute Ham Hyper

Squat Jump

Back STEP up

Clean and Jerk

Walking Lunge With  
Band

Clean

Power Clean

RDL Shrug

Back Step Up

# Specific

- **Band Leg Speed Adduction**
- **Band Leg Speed Abduction**
- **Hip Flex Band Pulls**

# More Specific Jumping



# Resisted Lateral Band Jumps



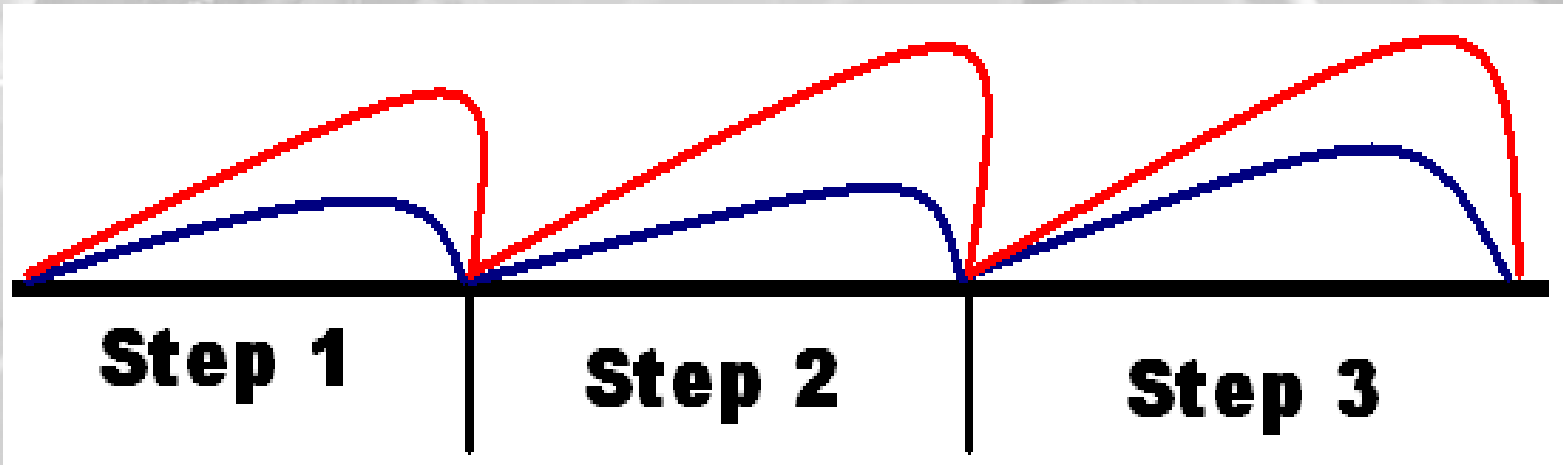
# Russian Box



# Deep Squat Bench Drops

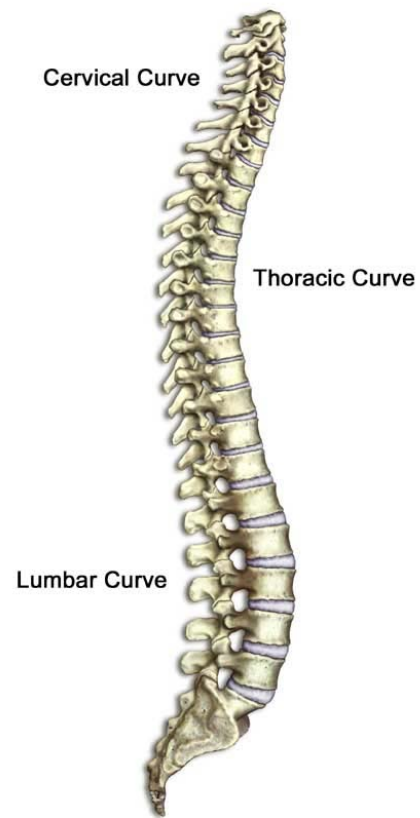


# Speed Myth



# Spine Position

**An erect posture will increase the change of direction potential during transition phases of agility**



# Drills That Don't Work

- Speed Ladders **DO NOT** make you faster.
- [Speed & Quickness Article](#)

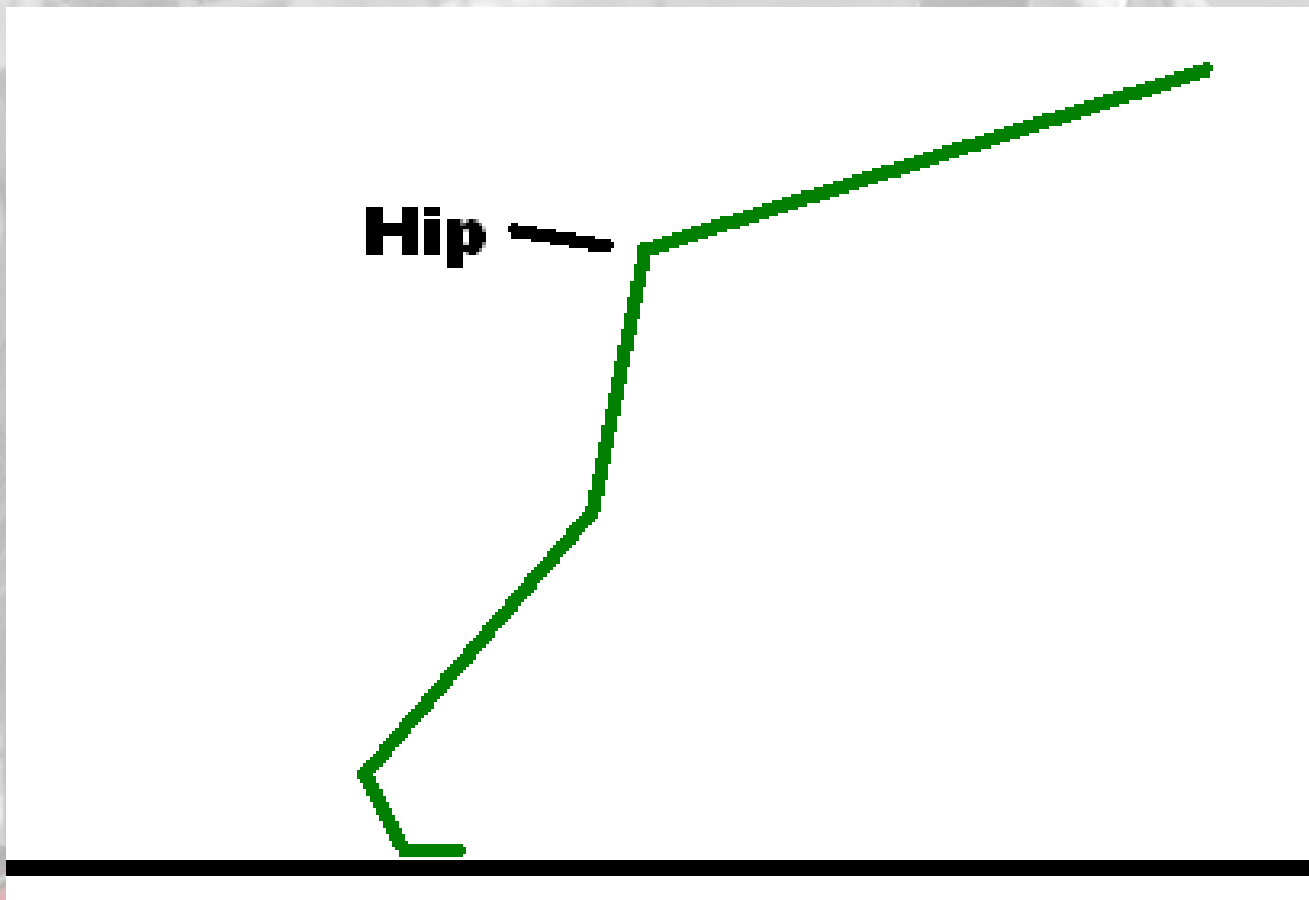


**One Foot Every Other Square**

# Drills That Don't Work

- **The little hurdle drills- Flexion of Hip Flexor in Front Side Mechanics**
- **Running bag drills**
- **Drills that don't mimic the actual speed of the game**

# Don't Coach Forward Bend



# Coaching concepts

- **Stadium Step Running – 1 Steps versus 3 Steps**
- **Visually Freezing the Eyes**
- **Lateral Lunge Technique**

# Conditioning vs. Speed

- Speed Development – You must train above 90% to maintain your speed development. 93- 95%

## Agility Drills

- Example – if an athlete runs a 4.6 40-yd dash then he or she must run **no slower** than a 5.0 to maintain speed development
- If athlete is running 100 yds for conditioning and best 100 is 12 seconds you need to run this distance in **13.3 seconds or slower**

# Alactic/Anaerobic Work Capacity

## Workout 1 - Level 7

Distance	Effort	Rest	Sets
40 Yard Sprint	Maximum Speed	2 to 2:30 Minutes Rest	6

## Workout 2 - Level 7

Distance	Effort	Rest	Sets
60 Yard Sprint	Maximum Speed	3 to 3:30 Minutes Rest	6

## Workout 3 - Level 7

Distance	Effort	Rest	Sets
80 Yard Sprint	Maximum Speed	3 to 4 Minutes Rest	6

# Alactic/Anaerobic Work Capacity

## Workout 1 - Level 7

Distance	Effort	Rest	Sets
40 Yard Sprint	Maximum Speed	30 Seconds to 60	12

## Workout 2 - Level 7

Distance	Effort	Rest	Sets
60 Yard Sprint	Maximum Speed	45 Seconds to 1:15	12

## Workout 3 - Level 7

Distance	Effort	Rest	Sets
80 Yard Sprint	Maximum Speed	60 Seconds to 1:30	12

# Questions?

- Thank you for your interest!
- Please feel free to visit:

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**800 Videos - Free**

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# References

- Brunner, Rick. & Tabachnik, Ben. Soviet Training Methods and Recovery Techniques, Soviet Press 1991
- Gambetta, Vern. & Winckler, Gary. Sport Specific Speed, Gambetta Sports Systems Inc. 2001
- Henson, Todd Maximum Velocity Mechanics, 2004 USATF Annual Meeting. Portland, OR
- Valdimir M. Zatsiorsky Ph.D. Science and Practice of Strength Training, Human Kinetics 1995
- Winckler, Gary Starting and Acceleration Studying Speed as a Skill, Presentation 2006
- Yessis, Michael, Ph.D. Soviet Sports Review, Published 1967-1994
- Yessis, Michael, Ph.D. Explosive Running, Contemporary Books 2000

# References

- <http://en.wikipedia.org>
- The effects of accommodating resistance training on the development of motor learning patterns

**Ben Newby, Martyn Girvan, James Cato, Victoria University**

- <http://www.cbass.com/ANDERSON.HTM>
- Supertraining Mel Siff 2003
- [http://www.cedars-sinai.edu/images/468325\\_SPINE\\_CURVES\\_OF.jpg](http://www.cedars-sinai.edu/images/468325_SPINE_CURVES_OF.jpg)