Weightlifting Derivatives: Technique, Variations, and Practical Application

Tim Suchomel, PhD, CSCS*D

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Objectives

- Weightlifting (WL) movements introduction
- Technique and coaching of WL pulling derivatives
- Speed development example using WL pulling derivatives

Introduction

- Weightlifting (WL) movements
  - “Olympic lifts”
  - Catching derivatives
  - Pulling derivatives

- Pulling derivatives
  - Remove the catch phase
  - Performed from different starting positions (floor, knee, mid-thigh)
  - Similar (Comfort et al., 2011a; 2011b) or greater (Suchomel et al., 2014a; 2016) force, velocity, power, etc. compared to catching derivatives

Technique and Coaching of WL Pulling Derivatives

Hands-On

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WL Technique Literature

- Countermovement shrug (DeWeese et al., 2012a)
- Hang high pull (Suchomel et al., 2014b)
- Jump shrug (Suchomel et al., 2014c)
- Mid-thigh pull (DeWeese et al., 2013)
- Pull from the floor (DeWeese et al., 2012b)
- Pull from the knee (DeWeese et al., 2016)

*Each pulling derivative may be part of the teaching progression for the full WL movement

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Mid-Thigh Pull

- **Advantages**
  - Low complexity
  - Small load displacement
  - May use > 100% 1RM of catching derivative
  - Performed from strongest WL position

- **Disadvantages**
  - Predominantly a concentric-only movement
  - Upright postural strength

Mid-Thigh Pull

Begin at mid-thigh/power position using clean or snatch grip

- Bar resting between upper thigh and hip crease
- Upright torso, shoulders back, and elbows rotated out and locked
- Brace trunk before extension

Extend hips, knees, and ankles aggressively and “pop” the shrug

- Shoulder shrug should be upward and slightly behind the ears
- Athletes should be taught to slightly flex wrists to keep bar close to body
- Elbows should remain “long and locked”

Flex knees and absorb the weight when returning the bar to mid-thigh

Countermovement Shrug

- **Advantages**
  - Low complexity
  - Small load displacement
  - May use > 100% 1RM of catching derivative

- **Disadvantages**
  - Postural strength during countermovement

Countermovement Shrug

Begin standing in an upright position with knees completely extended

- Upright torso, shoulders back, and elbows rotated out and locked
- Brace trunk before descending into mid-thigh/power position

Drop into the mid-thigh/power position

- Maintain upright torso and locked elbows

Extend hips, knees, and ankles aggressively and “pop” the shrug

- Shoulder shrug should be upward and slightly behind the ears
- Athletes should be taught to slightly flex wrists to keep bar close to body
- Elbows should remain “long and locked”

Flex knees and absorb the weight when returning the bar to mid-thigh

Clean / Snatch Pull from Knee

- **Advantages**
  - Decreased load displacement
  - May use > 100% 1RM of catching derivative

- **Disadvantages**
  - Requires large postural strength
  - May require additional apparatuses such as lifting blocks

Clean / Snatch Pull from Knee

Starting position: knees slightly bent, hip flexion, flat back, arms locked, and chest elevated

- Bar positioned in front of the patellae, but not touching
- Bar positioned over the mid-foot of athlete
- Shoulders of athlete positioned over the bar
- Brace torso before transition to mid-thigh/power position

Transition bar to mid-thigh/power position

- Hips and knees move forward at same tempo as the torso becomes upright
- Bar should move “up and into” the body

Extend hips, knees, and ankles aggressively and “pop” the shrug

- Shoulder shrug should be upward and slightly behind the ears
- Athletes should be taught to slightly flex wrists to keep bar close
- Elbows should remain “long and locked”

Flex knees and absorb the weight when returning the bar to mid-thigh

Hang High Pull

- **Advantages**
  - High velocity movement
  - Emphasizes triple extension

- **Disadvantages**
  - Moderate complexity
  - Large load displacement
  - Load may be limited to 1RM of catching derivative

Hang High Pull

Begin at mid-thigh/power position using clean or snatch grip

- Bar resting between upper thigh and hip crease
- Upright torso, shoulders back, and elbows rotated out and locked
- Brace trunk before countermovement

Countermovement: lower bar to above the knee and transition to mid-thigh/power position

- Flex forward at the hip while maintaining knee angle, elevated chest, and locked elbows and lower bar to just above the patellae
- Return to mid-thigh by shifting hips and knees forward (double knee bend movement) at same tempo as the torso becomes upright
- Bar should move “up and into” the body

Extend hips, knees, and ankles aggressively and “pop” the shrug

- Shoulder shrug should be upward and slightly behind the ears
- Athletes should be taught to slightly flex wrists to keep bar close
- Elbows should remain “long and locked”

Elevate the bar to chest height

- Lead with the elbows and keep the bar close to the body
- The bending of the arms should be a continuation of the triple extension movement
- Avoid flexing the hips and knees (i.e. dipping) to reach chest height
- “Finish tall”

Flex knees and absorb the weight when returning the bar to mid-thigh after reaching chest height

Jump Shrug

- **Advantages**
  - Most ballistic WL derivative in nature
  - Emphasizes triple extension

- **Disadvantages**
  - Moderate complexity
  - Load may be limited to 1RM of catching derivative
  - The individual must land

Jump Shrug

Begin at mid-thigh/power position using clean or snatch grip

- Bar resting between upper thigh and hip crease
- Upright torso, shoulders back, and elbows rotated out and locked
- Brace trunk before countermovement

Countermovement: lower bar to above the knee and transition to mid-thigh/power position

- Flex forward at the hip while maintaining knee angle, elevated chest, and locked elbows and lower bar to just above the patellae
- Return to mid-thigh by shifting hips and knees forward (double knee bend movement) at same tempo as the torso becomes upright
- Bar should move “up and into” the body

Extend hips, knees, and ankles aggressively

- “Jump as high as possible” and shrug

Clean / Snatch Pull from Floor

- **Advantages**
  - Foundational exercise
  - May use > 100% 1RM of catching derivative

- **Disadvantages**
  - Moderate complexity
  - Moderate load displacement
  - Requires large postural strength

Clean / Snatch Pull from Floor

- Starting position: flexed hips and knees, elevated chest, elbows turned out and extended, and hips raised slightly above the knees
  - Shoulders should be slightly over (i.e. covering) the bar
  - The bar should be positioned over mid-foot
  - Brace trunk before initial pull off of the floor
- First pull to knee
  - Knees should extend and be pushed back while hips rise minimally and are pushed back
  - Back angle should remain similar to the starting position with the shoulders remaining slightly over the bar
- Transition bar to mid-thigh/power position
  - Hips and knees move forward at same tempo as the torso becomes upright
  - Bar should move “up and into” the body
- Extend hips, knees, and ankles aggressively and “pop” the shrug
  - Shoulder shrug should be upward and slightly behind the ears
  - Athletes should be taught to slightly flex wrists to keep bar close
  - Elbows should remain “long and locked”
- Flex knees and absorb the weight when returning the bar to mid-thigh

Speed Development Using WL Pulling Derivatives

Demonstration and Practical Application

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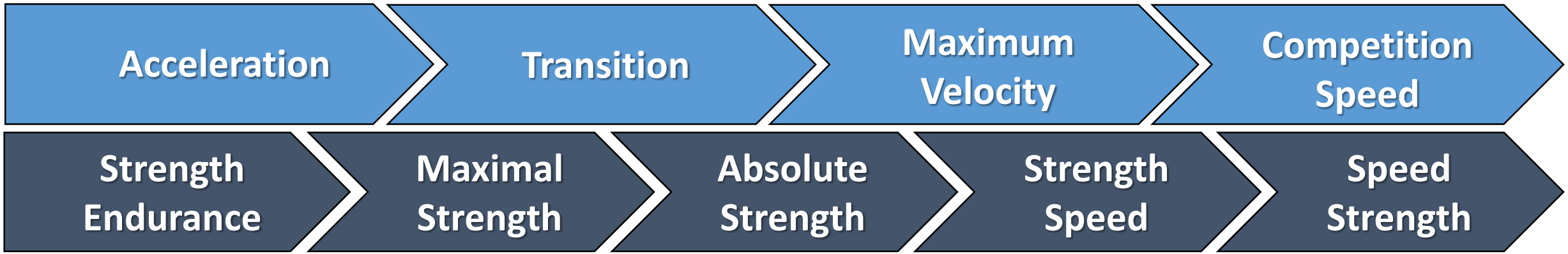
Using Pulling Derivatives for Speed Development



- Clean/Snatch Pull from Floor*
- Clean/Snatch Pull to Knee
- Clean/Snatch Grip Shrug

- Clean/Snatch Pull from Floor
- Clean/Snatch Pull from Knee
- Mid-Thigh Pull

- Clean/Snatch Pull from Floor
- Clean/Snatch Pull from Knee
- Mid-Thigh Pull
- CM Shrug
- Hang Power Clean/Snatch
- Power Clean/Snatch

- Clean/Snatch Pull from Floor
- Clean/Snatch Pull from Knee
- Mid-Thigh Pull
- CM Shrug
- Jump Shrug
- Hang Power Clean/Snatch
- Power Clean/Snatch

- Clean/Snatch Pull from Floor
- Clean/Snatch Pull from Knee
- Mid-Thigh Pull
- CM Shrug
- Jump Shrug
- Hang High Pull
- Hang Power Clean/Snatch
- Power Clean/Snatch
- CM Clean/Snatch

Modified from DeWeese et al., 2014

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Acceleration

- Knee angles in the starting blocks or 3 point stance
  - 90°(front foot) and 120°(back foot) (Mero et al., 1983)
  - Angles mimicked by WL derivatives that start from the floor (Kipp et al., 2012)

- Given the speed development goals, it is important to consider which derivatives are foundational

- Must consider fatigue during strength-endurance phase
  - WL pulling derivatives may serve as better alternatives
  - Technique during catching derivatives may break down after 4-6 reps (Häkkinen et al., 1984; Hardee et al., 2012)

Acceleration

- HOLD ON! What about the horizontal component?
  - Consider the position and movement sequence of the athlete



  - Horizontal to ground, but vertical relative to athlete



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Transition

- Amount of knee flexion during ground contact becomes smaller as the athlete becomes more upright

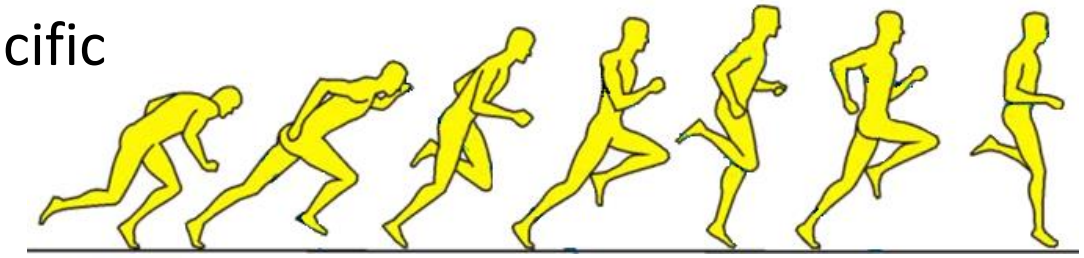
- Important to implement WL derivatives that train through the angles specific to the transition phase
  - Forward lean position
  - Upright position

- Consider purpose of maximal and absolute strength phases
  - High force production
  - Begin RFD development

Transition

- High force production
  - Use of heavier loads
  - Movement specific

- Begin RFD development
  - Moderate-heavy loads
  - Higher velocity
  - Movement specific



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Max Velocity

- Knee angle at top speed
  - 120-140° (Mann, 2013; Mero et al., 1992)

- Upright position with a short ground contact time requires implementing derivatives that produce high magnitudes of force and RFD

- Strength training goals require moving heavy and light loads quickly (i.e. higher velocities)
  - Combination loading (Haff & Nimphius, 2012)

Max Velocity

- Strength-Speed
  - Moving heavy loads quickly
  - Angle specificity
- Speed-Strength
  - Moving light loads quickly
  - Angle specificity
  - Most ballistic in nature
- Load absorption component

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Take Aways

- WL pulling derivatives are less complex with regard to technique compared to catching derivatives

- WL derivatives can be implemented effectively to improve sprint speed

- A sequenced progression of WL derivatives may be implemented based on:
  - Goals of resistance training and speed development phases
  - Force-velocity characteristics of each derivative
  - Movement characteristics of speed phase
    - Angle specificity of joints
    - Movement pattern (i.e. coordination)

Thank you!

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