

# Strength Training: Sprints and Jumps



**Mike Schober**  
**Kent State University**

# Strength Training

- Philosophy
- Overview
- Principles
- Examples

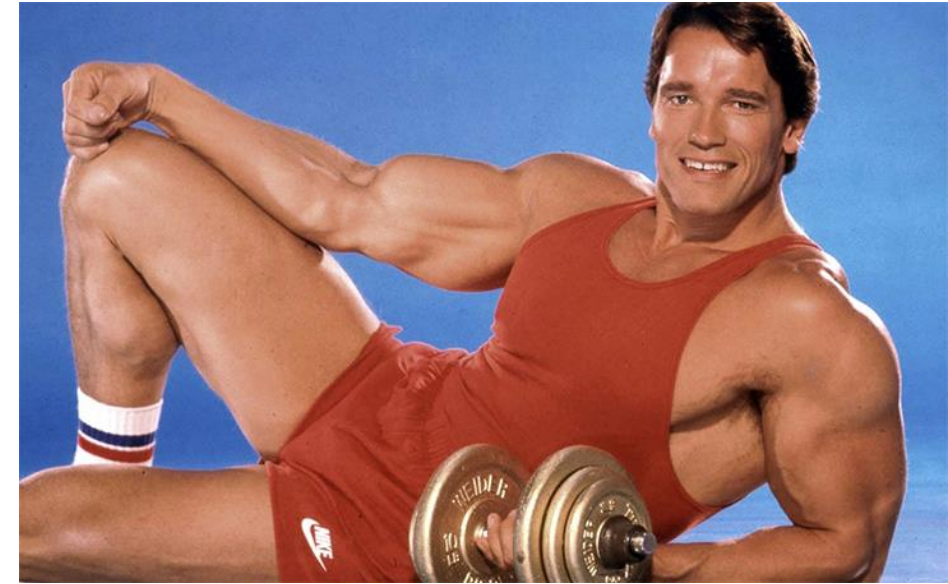


# Special Thanks

- Matt Buffum – Webster Schroder High School
- Bill Lawson- Kent State University
- Kevin Lucas- University of Mount Union
- Charlie Powel- Spire Institute
- John Wallace- Sprite Institute
- Steve Rajewsky- University of Michigan
- Phil Rickaby- Kent State University

# Philosophy

- **Big to Small**
- **Slow To Fast**
- **Contrast Training**
- **Full to ¼ movements**
- **Being Fast not Big**
- **Application to Event**



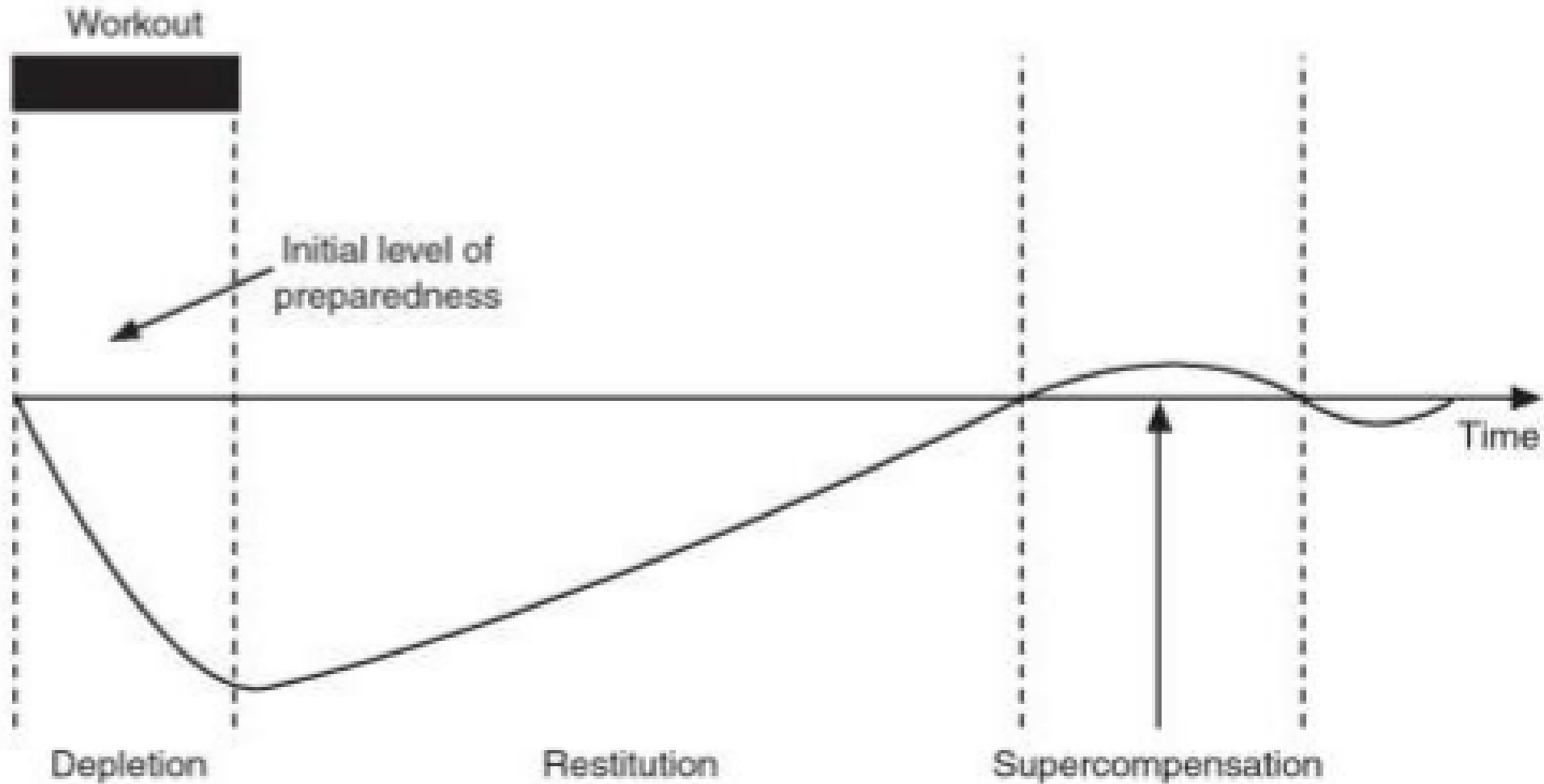
# Categories of Strength Training

- Weight Training
- General Strength Training
- Medicine Ball Training
- Mutli jump Training
- Multi throw Training
- Training with specialty equipment
- Circuit Training

# Categories of Weight Training Exercises

- Static
- Ballistic
- Olympic
- Accessory

# Supercompensation



# Why is Strength Training Vital for Sprinters and Jumpers?

- Body weight (During upward take off motion) and Body Mass (During both horizontal and vertical Push-off) provides high resistance.
  - Leg extension without resistance will result in very little value since there is no relation to development of force production
- Absolute strength correlates with Absolute Speed
  - Long Jump, Pole Vault, High Jump Take off
  - Starting Blocks





# Phases of a Lift

- Eccentric- Lengthening of a Muscle or Plyometric Action
  - Most important but causes most Soft Tissue damage
- Isometric- Muscle remains the same length or static ( Hold Position, high recruitment of Muscle Fibers)
- Concentric – Shortening or Miometric Action (Explosive action)
- All Trained in the weight room generally slower movements

# Weight Training Protocol

- Basic Power Development-
  - Olympic lifts @ 50-65% of 1RM. Sets of 4-9 Reps of 4-5
  - Recovery Sufficient to insure quality of work, but slight lactate accumulation
- Absolute Strength Development-
  - Static Lifts @ 80-100% of 1RM. 4-8 Sets of 1-5 Reps
    - Sessions are 1-2 Body exercises totaling 15-30 reps per body region
  - Recovery is complete
- Absolute Strength Preparation
  - Static Lifts @ 60-80% of 1RM, 3-6 sets of 5-8 reps.
    - Sessions are 1-2 different exercises per body region
  - Recovery sufficient to insure quality
- Absolute Strength Complementary Lifting (ASC)
  - 3-6 sets of 4-8 reps done at 60-80% of 1 RM
    - Containing a total of 30-45 reps, in 2-3 different body regions
  - Recovery Sufficient to insure quality

# Weight Training Protocol

- Rate of Force Development Prep
  - Olympic Lifts
    - 4-9 sets of 2-4 reps @ 70-80% of 1RM
    - Recovery to insure quality of work
- Rate of Force Development
  - Olympic Lifts
    - 90-100% of 1RM
    - Reps 1-2 sets of 5-9
      - Recovery: Complete
- Reactive Strength Development
  - Ballistic Lifts
    - 3-8 sets of 5-12 reps at 10-50% of athletes Body weight
      - Requires basic power, Absolute strength, and general Strength
      - Requires well planned progression of multi jump training- used with athletes of high training age

# Hypertrophy Production

- Hypertrophy- is an increase in Muscle size.
  - Athletes respond to hypertrophy development are highly individualistic
  - Sarcoplasmic Hypertrophy-
    - High Reps 10-12, multiple sets done for each body region @ 60-70% of 1rm.
    - Recovery brief- 60-90 seconds
    - Believed to enhance endurance capabilities, does not improve force production
  - Myofibrillar Hypertrophy-
    - Low reps 4-6 at 80 to 90%
    - Rest 90 sec to 2:30
    - Does improve force production capabilities in muscles
- General Strength Endurance
  - 8-12 reps at 70-75%
  - Short recovery has ability to enhance training effect

# Regeneration protocol

- Body Building exercises
  - 20-24 total sets of 10 reps with loads designed to challenge the athlete on final rep
  - Exercise all body parts
  - Recovery 60-90 seconds
  - Think about order of exercises
  - Accelerates recovery, accelerates glycogen replenishment accelerate testosterone and growth hormone release

## Compatible Weight Training Constructs

Session Theme	Likely On-Track Components	Compatible Weight Exercises	Compatible Training Protocols
Speed/Power Development	Acceleration or Speed Dev. Multijumps Multithrows	Olympic Lifts Static Lifts Ballistic Lifts	BPD, ASD, ASP, ASC RFDP, RFD, SM, MHYP
Recovery/Restoration	General Strength Medicine Ball Extensive Tempo	Regional Lifts	BB, GSE, SHYP
Aerobic Development	Continuous Running Aerobic, Lactate Threshold	Regional Lifts	BB, GSE, SHYP
Advanced Glycolytic Development	Tempo Running Special Endurance Lactate Tolerance Speed Endurance	Olympic Lifts Static Lifts, Ballistic Lifts or Regional Lifts	BPD, ASP, ASC, ASD, RFDP, RFD, SM, MHYP or BB, GSE, SHYP

# Med Ball Training

- Improves Strength
- Improves Strength endurance
- Improves coordination
- Accelerating Recovery and restoration

# Med Ball Circuits

<p><b><u>MB Throw Circuit 3</u></b> <i>Hop-Hop- OHB</i> <i>Hop- Hop- Between the legs forward</i> <i>Box- OHB</i> <i>Box- Btw the leg forward</i></p>	<p><b><u>MB Throw Circuit 4</u></b> <i>OHB</i> <i>Explosive chest</i> <i>UHF</i> <i>Over shoulder Toss</i></p>	<p><b><u>MB Throw Circuit 5</u></b> <i>Lunge Chest</i> <i>OHF w/ Step</i> <i>Shoulder W/ Step</i> <i>KOHF</i> <i>Square OHF</i></p>
<p><b><u>MB Throw Circuit 6</u></b> <i>1 hop + OHB</i> <i>1 Hop + BLF</i> <i>2 Hops + OHB</i> <i>2 Hops + BLF</i> <i>1 Box + OHB</i> <i>1 Box + BLF</i></p>	<p><b><u>Series A</u></b> <i>OH Standing Toss</i> <i>Standing Chest Toss</i> <i>Standing Truck twist (R-L)</i> <i>OH Hike</i></p>	<p><b><u>Series B</u></b> <i>Sitting OH Straddle</i> <i>Knee Toss (R-L)</i> <i>Hamstring Flick</i> <i>Seated Abductor/Adductor</i></p>
<p><b><u>Series C</u></b> <i>Rollover toss</i> <i>V-sits</i> <i>Shoulder toss (R-L)</i> <i>Ankle Flicks</i></p>	<p><b><u>Series D</u></b> <i>Back Arches</i> <i>Side to Side arches</i> <i>Heel to Heel semi circles</i> <i>Kneeling Arch</i> <i>Over/Under arch passes</i> <i>Back to back partner twist</i> <i>OH Toss</i></p>	



**BLUE:**

Standing OHF  
 HIP Catch to Toss  
 Good Morning  
 V-sit  
 Soccer Push  
 Hurdle Reach  
 Partner Exchange Hip  
 Kneeling Catch and Toss  
 Knee Toss  
 Prone Catch and toss  
 Seated Roll  
 Pike-Shoot

**GOLD:**

Standing Shoulder Throw and Catch  
 Reach and Hike  
 Back Toss  
 Seated Oblique Twist Throw and Catch  
 Leg Toss  
 Torso Circles  
 Kneeling OHF  
 Prone OHB  
 Leg Ab  
 Prone OHB  
 Allah Arch  
 Partner Exchange Kneeling OHB  
 Arm Ab

**Golden Flash**

Over Head Step Throw  
 Standing OHF  
 Over Head Hike  
 Behind the back throw  
 Hurdle Stretch  
 Kneeling Hammer  
 Front Loader  
 V-sits  
 Seated Oblique toss and Catch

**Kent State**

Chest Pass  
 Stand OHF  
 Shoulder Throw L/R  
 Standing Hip Toss and Catch  
 V-ups  
 Soccer Push  
 Hurdler Reach  
 Partner Exchange  
 Knee toss  
 Seated Rolling Chest pass  
 Seated Roll OHF  
 Laying Oblique Catch and toss  
 Back Toss  
 Prone OHB  
 High Knee March  
 Torso Circles

**MB Throw Circuit 1**

Overhead back  
 Between the legs forward  
 Hammer-hip (left and right)  
 Squat Chest pass

**MB Throw Circuit 2**

Lunge Chest pass (L and R)  
 Shoulder Step (L and R)  
 Overhead Step (L and R)

# General Strength Circuits

<p><b><u>BLUE:</u></b>  <i>Turkish get ups</i>  <i>Squat holds</i>  <i>Squat jumps</i>  <i>¼ squats feet out</i>  <i>Push-up</i>  <i>Plank get-ups( Left and Right)</i>  <i>L-overs</i>  <i>Lunge Drops</i>  <i>Lateral Lunges</i></p>	<p><b><u>GOLD:</u></b>  <i>Pushups</i>  <i>Prisoner Squats</i>  <i>V-Sits</i>  <i>Back Hyper</i>  <i>Pushups w/Clap</i>  <i>Rocket jumps</i>  <i>Dips</i>  <i>L-Overs</i>  <i>Superman's</i>  <i>Burpees</i></p>	<p><b><u>Golden Flash: Use Hurdle</u></b>  <i>Single Leg Squat (L-R)</i>  <i>Stationary Lunges (L-R)</i>  <i>Lunge Jumps (L-R)</i>  <i>Incline Pushups</i>  <i>Dips</i>  <i>Decline Pushups</i>  <i>Lateral Squats</i>  <i>Prisoner Squats</i>  <i>Rocket jumps</i>  <i>Kneeling Good Mornings</i>  <i>Alternate Pelvic Tilt Heel Slides</i>  <i>V-Sits</i>  <i>L-Overs</i>  <i>Crunches</i>  <i>Squat Lunge Walks</i></p>
<p><b><u>Kent State</u></b>  <i>Planks/elbow SL leg</i>  <i>Reverse Plank/elbow SL Leg</i>  <i>Plank/Hand SL Leg</i>  <i>Reverse Plank/ Hand SL Leg</i>  <i>Side Elbow SL Leg</i>  <i>Side Hand SL Leg</i>  <i>Bridges on elbows</i>  <i>Bridges on Elbow SL Leg</i></p>	<p><b><u>Lower Back</u></b>  <i>Pelvic Tilts</i>  <i>Single knee to Chest</i>  <i>Double Knee to Chest</i>  <i>Lumbar Rotation</i>  <i>Back Press-ups</i>  <i>Bridging</i></p>	<p><b><u>Bill Lawson</u></b>  <i>Prisoner Squats</i>  <i>V-sits</i>  <i>Pushups</i>  <i>Back <del>Hypers</del> w/ twist</i>  <i>Rocket jumps</i>  <i>Leg Toss</i>  <i>Wrestlers Bridge</i>  <i>Cossack Extension</i>  <i>Crunch</i>  <i>Decline Push Up</i>  <i>Prone Single Leg Hip Extension</i></p>
<p><b><u>Black Squirrel</u></b>  <i>SL Leg Squat</i>  <i>Toe Touchers</i>  <i>Push Ups</i>  <i>Back <del>Hypers</del></i>  <i>Yogis-Hamstring</i>  <i>Side-up</i>  <i>Good Mornings</i>  <i>Lunge Walk</i>  <i>Toe walks</i>  <i>Prone Flex Leg Hip Ext.</i></p>	<p><b><u>Pedestal</u></b>  <i>Prone, Plank SL Raise</i>  <i>Supine Plank SL Raise</i>  <i>Prone Hand Stand SL Raises</i>  <i>Supine Hand Stand SL raises</i>  <i>Lateral Elbow Stand SL Raises</i>  <i>Lateral Hand Stand SL Raises</i>  <i>Prone, Flexed Knee Elbow Stand Hip Left</i>  <i>Supine, Flexed Knee , hip lift</i>  <i>Crunch</i>  <i>Crunch with twist</i></p>	<p><b><u>Pillar Circuit</u></b>  <i>V-sit</i>  <i><del>Backhypers</del></i>  <i>Leg Toss</i>  <i>Wrestler's Bridge</i>  <i>Crust w/ Twist</i>  <i>Prone Hip extension (Flexed)</i>  <i>Toe touches</i>  <i>Back <del>Hypers</del> W/ Twist</i>  <i>L-Overs</i>  <i>Side Ups</i>  <i>DBL Leg Eagle</i>  <i>Low Level Bicycle</i></p>

# Developing a Lifting Inventory

<i>Upper</i>	<i>Lower</i>	<i>Total</i>
<i>Bench DB/BB</i>	<i>Squats</i>	<i>Clean From Thigh</i>
<i>Incline Bench DB/BB</i>	<i>Lunges</i>	<i>Clean from knees/box</i>
<i>Military Press DB/BB</i>	<i>Step-ups</i>	<i>Clean from floor</i>
<i>Push-ups</i>	<i>Side Lunges</i>	<i>Snatch from tigh</i>
<i>Dips</i>	<i>RDL</i>	<i>Snatch from Knees/box</i>
<i>Pull-ups</i>	<i>Front Squat</i>	<i>Snatch from floor</i>
<i>Rows</i>	<i>Split Squat</i>	<i>Jerks</i>
<i>Lat-pulls</i>	<i>leg press</i>	<i>Clean to Jerk</i>
<i>Standing Over Head Press</i>	<i>Reverse lunges</i>	<i>Dead Lift</i>
<i>Shrug Pull</i>	<i>Low Step-ups</i>	<i>Clean Pull</i>
<i>Inverted Pull- Ups</i>	<i>Over-Head Squats</i>	<i>Snatch Pulls</i>
		<i>Split Jerk</i>

# Multi Jumps

- In-Place Jumps
- Short Bounds
- Extended Bounds
- Depth Jumps

# Multi Jumps con't

- Horizontal Vs Vertical jumps
- Simple Vs Complex
- Single vs Double

# Multi Jump Protocol

- Short Bounds
  - 2-5 reps of 4-6 different exercises
  - Total volume 30-70 contacts
- In-place Jumps
  - 6-8 different exercises
  - 12-16 reps
  - Or 12-20 seconds on 30 seconds off
  - Rest 1:2
- Extended bounds
  - 2-4 reps of 3-6 exercises
  - Rep range 20-40m
  - Session volume 250-500m
- Depth Jumps
  - 3-5 reps 3-6 exercises
  - Session volume 25-50

# Program Development

- Simple to complex
- Double to single
- Slow to fast
- CONTRAST TRAINING
- TIER SYSTEM

QUESTIONS ?