

Designing a Resistance Training Program for the Track and Field Athlete
2010 Illinois State High School Clinic
Larry Judge Ph.D.
Ball State University
Muncie, IN USA

Overall Core Control

To be successful in track and field, athletes must possess postural or core strength, which is the ability to control oneself from the kneecaps upward to the chest.

What the core musculature is, how it is evaluated, how it is trained, and how it is applied to functional performance can be confusing. The core musculature is separated into 2 systems, local (stabilization) and global (movement). Exercises can be separated into 3 categories; core-stability, core-strength, and functional exercises. A multi-faceted approach that addresses the three planes of movement combining medicine-ball work, body-weight circuits, controlled movements, abdominal exercises, dumbbell circuits, and Olympic lifts can provide physiological and biomechanical advantages that enhance performance in most every sport.

A Structured Approach to Exercise Prescription is Paramount

◆A talented athlete is only as good as his or her training program
Improvements of power performance in trained athletes will require complex training strategies

New Research

◆More research has been done in the past decade in the area of strength and conditioning than in the five decades prior to 1987

Misconceptions

- Strength training reduces flexibility & speed
- Strength training makes you bulky
- Circuit Training provides an aerobic benefit
- Long breaks between exercises decrease their effectiveness

Athletic/Strength Qualities

- Maximum Strength (Force)
 - Speed Strength (Force x Velocity)
 - Rate of Force Development (Force Generation)
 - Reactive Strength (Changing movement or direction or both)
 - Muscular Endurance
- Athletic/Strength Qualities
- Relationships of Strength Qualities
 - Training to improve 1 quality will enhance the others
 - Max Strength = force (f)

- Speed Strength or Power = $f \times v$
- Force = Power
- Velocity = Power
- Max Strength = Strength Endurance
- Rate of Force Development = time to peak force
- Power = Time to Peak Force

Relationships of strength qualities

General Adaptations to Strength Training

- Hypertrophy (growth)
- Joint Strength (tendons & ligaments)
- Improved muscle fiber recruitment
- Improved force of contraction
- Improved speed of contraction
- Injury prevention (as an end product)

Adaptations to Strength/Power Training

- Improved motor control
- Technique results from the correct application of force in the right direction, the right magnitude and the right sequence
- Improved strength can enhance learning proper technique

Important Factors in Performance

- Strength
- Ability to produce force
- Explosive Strength
- Movement involving maximum or near maximum rates of force development
- Associated with acceleration
- Power
- $Work/Time = force \times velocity$
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–Most important aspect of sports performance

The Importance of Strength (Force)

- Force is created by muscular contraction
- Maximum strength = maximum capability of the neuromuscular system to produce force
- Force is the characteristic that causes a mass to accelerate
- $F = ma$
- Force is a major component of power
- $Power = F \times V$
- All movement depends upon force
- Force production results in rate of force development (RFD) and duration

-Dynamic force production also produces a power output and a velocity

All athletic action requires force production, rate of force development, speed and power as well as endurance.

Why train for strength?

▪Limiting factors in sprinting (after acceleration) are vertical ground reaction forces (VGRF)

▪VGRF are influenced by maximum available force and rate of force development

-Dynamic (maximum) peak force is related to maximum strength

-If this is true, then running speed is also related to maximum strength

▪Strength training improves maximum strength, power and RFD

Strength/Power & Performance

▪Research has shown **maximum strength** and **peak power** have moderate to high correlations

-**Peak power** is one of the major determinants in speed

▪**Maximum strength** measures are highly correlated with strength/power exercises

-Squat, snatch, clean

▪Measures of **maximum strength** are also associated with sports performance

-Stronger athletes are more powerful and thus, better performers

-Coincidence?

If power is so important, why do we train strength?

▪Strength (ability to produce force) is the foundation for all other athletic qualities

-Technique is learned through the proper application of force through a specific movement

▪Research shows **combined strength/power** training produces superior gains in **power** when compared to high velocity/high power and/or heavy resistance training alone

Keys Points in Strength/Power Training

▪Training is a long term process

-Don't rush

-Successful programs build a strong foundation

▪Variation is the key to success

▪**Different levels of athletes will need different amounts of variation**

-4 year cycles

-Macrocycles (yearly/seasonal cycles)

-Mesocycles (months)

-Microcycles (day to day variation)

-Variation within days

Phases of the Macrocycle

Phases of Training

- Strength Endurance
- General Preparation or Hypertrophy
- Strength (max. strength)
- Power
- Competition or Maintenance

Recovery or Transition Exercises can be Categorized

- ◆ General training exercises/Pre-season = 70% strength
- ◆ Special training exercises/Pre-competitive = 50% strength & power
- ◆ Competition specific exercises/Peaking = 70% power

Implementing a Strength Training Program

- Train to improve the 5 (biomotor) qualities
- Use the weight room for strength training and the track & road for endurance training
- Consider total training volume carefully to avoid overtraining

The Exercises...

Strength Exercises

- Squat
- Leg Press
- Deadlift
- Romanian Deadlift
- Bench Press
- Lat Pulldown

Squat Series

Upper Body Series

Explosive Exercises

- Clean/Snatch Pulls
 - Floor
 - Knee
 - Mid-thigh
- Power Clean/snatch
- Hang Clean/snatch
- Push press/Push Jerk

▪ Split Jerk

Olympic Lifts

Mid Thigh High Pull

The Core

Exercises for Abdominal & Core

•Frontal movements

Entail lateral flexion or bending to the left and right side.

- Standing Dumbbell Side Bends
- Wavings
- Lying side crunch

•Sagittal movements

Engage flexion and extension of the trunk in forward and backward movement.

- Three position crunch
- V-up
- Lying dumbbell leg raise
- Lying Swiss ball leg raise
- Hanging straight leg raise
- Hanging bent leg raise
- Incline sit-up
- Back hyper extension

•Transverse movements

Involve rotary motion or twisting to the left and right.

- V-up Twist
- Seated Twist with dumbbell
- Seated twist with barbell
- Plate walk
- Standing twist
- Twist behind the back
- Russian twist
- Swiss ball twist

•Multi-plane movements

- Delivery lift with dumbbell
- Incline sit-up with twist

- Walking chop with Medicine ball
- Cable chop

Core Exercises

Dumbbell Circuits

▪**Pre-Olympic (Olympic lifting warm-up)**

- Squat press
- High pull
- Jerk
- Seated twist
- Delivery lift

Medicine Ball Exercises

Throwers Circuit

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Questions??