chapter

16

Exercise Technique for Alternative Modes and Nontraditional Implement Training

Chapter Objectives

- Understand the basic guidelines for performing resistance exercise with alternative modes and nontraditional implements
- Describe the benefits and limitations of bodyweight training activities
- Identify the benefits and limitations associated with core training



Chapter Objectives (continued)

- Identify the appropriate technique and key technical flaws associated with the alternative mode exercises
- Appropriately determine how to apply resistance bands and chains to traditional ground-based free weight exercise
- Determine the appropriate use of alternative methods and nontraditional implement exercises

General Guidelines

- Ensure proper body alignment via selection of a stable body position.
- If the exercise is a free-standing groundbased exercise, the athlete's feet should be placed slightly wider than shoulder-width and remain flat on the ground.
- Use the appropriate grip for the exercise based on the type of exercise performed.

General Guidelines (continued)

- Athletes should exhale during the concentric portion of the exercise and inhale during the eccentric phase.
- With heavy loads (80% of maximal voluntary contraction or greater) or with lighter loads performed to failure, the Valsalva maneuver may be a useful technique for maintaining spinal stability.

Bodyweight Training Methods

Benefits of bodyweight training

- Specific to each individual's anthropometrics
- Often includes closed chain—based exercises
- Strengthens several muscle groups at once
- Develops relative strength
- Improves body control
- Is a low-cost training alternative

Core Stability and Balance Training Methods

Anatomical focus

- Anatomical core: The axial skeleton and all of the soft tissues with proximal attachments that originate on the axial skeleton
- It is suggested that increasing an athlete's core stability will result in a better foundation for force production in the upper and lower extremities.

Core Stability and Balance Training Methods (continued)

Isolation exercises

 Typically involve dynamic or isometric muscle actions designed to isolate specific core musculature without the contribution of the lower and upper extremities.



 Ground-based free weight activities appear to offer similar or, in most cases, greater activation of the core musculature when compared to traditional isolation exercises designed to engage the core.

Core Stability and Balance Training Methods

Machines versus free weight exercises

- Machines offer greater stability and may result in a better ability to target specific muscle groups.
- Free weights cause greater activation of stabilizer muscles and offer the ideal combination of specificity and instability.

Core Stability and Balance Training Methods (continued)

Instability devices

- Exercises performed on unstable surfaces or devices, whose usage stems from use in physiotherapy settings
- May increase core muscle activation, but can lower force output of an exercise by 30% or more

Key Point

 Ground-based free weight exercises (e.g., squats, deadlifts, Olympic lifts) involve a degree of instability that allows for simultaneous development of all links of the kinetic chain, offering a much better training stimulus for the development of core stability and the enhancement of athletic performance than do instability devicebased exercises.

Variable Resistance Training Methods

- Constant external resistance
 - The most common method for applying resistance, represented by traditional methods such as free weights.
 - The external load remains constant throughout the full ROM and better represents real-life activities.

Accommodating resistance

- May also be called *semi-isokinetic resistance*
- Allows for the speed of movement or the isokinetic resistance to be controlled throughout the full ROM
- May not provide adequate training stimulus when compared to traditional resistance methods

Variable resistance

- Attempts to alter resistance so the muscle maximizes force throughout the full ROM
- Usually involves the use of chains or resistance bands, or cams if using machines

Chain-supplemented exercises

- Determining resistance with chains
 - Determined by the structure, density, length, and diameter of the chain used
 - Must determine the absolute chain resistance at the top and bottom of the movement, summate, and then average
 - Should be used only with experienced athletes who have stable exercise technique

Chain-supplemented exercises

- Applying chains to free weight exercises
 - Chains can be allowed to touch the floor from a fully extended position or hung from a lighter chain. This allows for the chain to touch the floor only at the lowest portion of the lift.
 - In turn, this can help to increase neuromuscular activation or cause a more rapid stretch shortening cycle.

Chain-Supplemented Exercise



Chain-Supplemented Exercise



Chain-Supplemented Exercise



Resistance band exercises

- Determining resistance with resistance bands
 - Based on Hooke's law (tension = stiffness × deformation)
 - Must be aware that two supposedly equal resistance bands may have 3.2% to 5.2% difference, which could lead to an 8% to 19% difference in mean tension between the bands
 - Highest load experienced at the top position

Back Squat With Bands



Nontraditional Implement Training Methods

- Nontraditional implement training is increasing in popularity.
- There is currently relatively little research directly exploring the efficacy of these types of training methods.

Strongman training

- Tire flipping
- Log lifting
- Farmer's walk



• Tire flipping

- Must select appropriate tire for an athlete based on body dimensions
- Can use sumo, backlift, and shoulders-against-thetire techniques for completing the lift

Tire Flip



(continued)

Tire Flip (continued)



• Tire flipping

Common technical flaws and corrections

- Flaw: Placing the feet too close to the tire when initiating the movement. When this occurs, athletes often have to round their back and position their knees close to their chest in order to initiate the movement.
- Correction: Have the athlete move the feet away from the tire and instruct him or her to raise the chest while contracting the musculature of the lower back.

• Tire flipping

Common technical flaws and corrections

- Flaw: Hips rise faster than the shoulders during the initial pushing motion. This flaw is very similar to what can be seen during traditional deadlifting with incorrect technique.
- Correction: Instruct athletes to keep their hips low and drive the tire forward rather than lifting it. Additionally, coaches should encourage the athlete to keep the hips slightly below the shoulders during this movement. (continued)

• Tire flipping

Common technical flaws and corrections

- Flaw: A lifting motion is used instead of a pushing motion. With heavier tires, this motion reduces the lifting speed as the tire will lose momentum, forcing the athlete to "muscle" the tire over. This is extremely dangerous and should be corrected immediately.
- *Correction:* Drive the tire forward and move forward with the tire as it is elevated.

Log lifting

- Logs are typically designed to have weight added to their end while offering a midrange grip support to accommodate a pronated grip position.
- Very little research has explored the effectiveness of or the best way to use this type of loading.

Log Clean and Press



(continued)

Log Clean and Press (continued)



(continued)

Log Clean and Press (continued)



• Farmer's walk

- Athlete holds a load in each hand while walking forward
- Offers a unique activation pattern for the core and may help to increase grip strength, back endurance, and total body anaerobic endurance
- Should be used only with athletes possessing high levels of strength

Farmer's Walk



Kettlebell training

- Can have a positive impact on cardiovascular fitness, though not as much as traditional aerobic exercise
- Can offer strength gains, but typically much lower than those seen with traditional resistance training

Figures 16.5 and 16.6 (next slide)

- Cast iron class kettlebells
- Competition kettlebells

Figures 16.5 and 16.6





Nontraditional Implement Training Methods

Kettlebell training

- Selecting kettlebells
 - Must choose either fixed- or adjustable-load kettlebells
 - Fixed load requires multiple kettlebells across a range of loads to provide training variety
 - Must also consider the handle of the kettlebell, as it is the major interface between the athlete and the kettlebell
 - Diameter of the handle
 - Handle surface

Two-Arm Kettlebell Swing



Unilateral Training

- Often used to reduce bilateral asymmetries or as a rehabilitation tool
 - Bilateral deficit: asymmetries in force production between unilateral and bilateral movements
 - Bilateral facilitation: an increase in voluntary activation of the agonist muscle group during bilateral movements

Unilateral Training



Unilateral Training



Unilateral versus Bilateral Training





 Trained or stronger individuals have been theorized to exhibit a bilateral facilitation, while untrained, injured, or weaker athletes exhibit a bilateral deficit.