DEVELOPING BILATERAL SYMMETRY FOR BASKETBALL PLAYERS—CONSIDERATIONS FOR THE USE OF ROTATIONAL SUSPENSION BODYWEIGHT TRAINING

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It is often difficult to develop the bilateral symmetry necessary to perform athletically at high levels, especially when there is a propensity for one side of the body to dominate muscular strength, balance, neural patterns, and movement. Take for example swinging a golf club or baseball bat. For these movements, the athlete is in a fixed stance, rotating their body in the transverse plane to perform the necessary athletic movement. It has been shown that if one were to take an athlete who swings, throws, or kicks for their sport, and ask that athlete to perform any sort of movement screen or muscular balance analysis, it would be likely that a muscular imbalance or dominance would be seen in nearly every athlete tested (2,9). For a sport like basketball that requires movement in all planes of motion, the value of bilateral symmetry cannot be discounted or unvalued. In addition, studies have shown that bilateral symmetry of the lower limbs is correlated with better jumping performance (3,6,7). This suggests that inclusion of unilateral/asymmetrical movements would benefit basketball athletes in order to attain better symmetry.

While most training programs focus on bilateral movement and exercises, many of the movements found within these programs are designed to increase strength and power, but not necessarily improve the movement patterns seen within the specified sport or activity (4). This is not meant to discount bilateral movements or the necessity to develop strength and power in athletics. However, basketball is a game of rotation, acceleration, deceleration, jumping, finely-tuned motor skills of the hands, wrist, and upper body, as well as the ability to perform these movements while on one foot, moving horizontally, falling, twisting, or moving in multiple directions. This means movements in basketball are rarely exclusively bilateral in nature, which indicates that training should include unilateral/asymmetrical movements and exercises in order to better enable these athletes to perform basketball-specific movements optimally during competition. In addition, research shows a connection between unilateral power and performance in team-sport athletes, specifically multidirectional speed and horizontal power (5). This reinforces the value of including unilateral/asymmetrical exercise into a program for basketball athletes, as both of these traits are required for optimal performance in the sport.

One method for implementing unilateral/asymmetrical exercises is suspended bodyweight training with an added aspect of rotation and anti-rotation, or rotational bodyweight training. Although this training method uses suspended bodyweight to provide resistance, rotational bodyweight training works mechanically and physiologically much differently than suspension bodyweight training that lacks a rotational/anti-rotational aspect.

To understand how the inclusion of rotation differs from traditional suspension bodyweight training, it is important to understand how suspension bodyweight training works. All suspension bodyweight training exercises are based on several common factors including body angles, lever systems (i.e., height of the anchor and/or length of the straps or ropes), gravitational load or mass/weight of the athlete, and foot or hand positioning (1).

Traditional suspended bodyweight training exercises allow for linear and lateral movement. Because the anchor point is locked or limited in movement, the length of the straps remain constant, potentially limiting the range of motion (ROM) of the joints involved. Most suspension bodyweight trainers have locked or static anchor points. This means the anchor point either is individually locked/attached or attached at a central anchor/pivot point with little to no movement.

However, with rotational bodyweight training, the pulley system of the anchor can be unlocked, which creates rotational and anti-rotational demand, thus providing an additional stimulus to the body while performing suspended bodyweight exercises. A free moving pulley or anchor point creates an additional stabilization demand upon the individual, much like the difference between using a bar and dumbbells for a similar movement pattern.

Furthermore, because of its centralized moving anchor point, a rotational bodyweight trainer can potentially provide greater challenge to one's center of gravity and core musculature engagement when compared to a locked attachment or anchor. It has been shown that suspension bodyweight training exercises increase core muscle activation (8). So, the inclusion of rotational and anti-rotational aspects to suspension bodyweight exercises has the potential to increase instability of the moving handles/cradles, requiring greater focus to stabilize not only the actively engaged joint(s) and musculature, but also the entire core and kinetic chain. This also potentially has the added effect of making stabilization or bilateral equalization more difficult than with a static/locked anchor. Developing core stability can potentially benefit basketball athletes as well because evidence suggests that there is a connection between core stability and athletic performance (10).

The ability to train unilaterally with bodyweight effectively is not an option with a fixed anchor or attachment point on most suspended bodyweight training devices. When single-arm or single-leg movements are performed, the free arm or leg is not actively engaged in the action. However, with rotational bodyweight trainers, athletes can perform unilateral/asymmetrical movements, which require dynamic stabilization and eccentric engagement of the opposite side of the body; this can improve the ability to reduce muscular imbalances by requiring the synergistic stabilizers to work in unison (4).

Because the goal is to develop basketball players who can move optimally in every plane of motion within fractions of a second, training should include elements that can better challenge them in multiple planes, while providing various resistance and proprioceptive challenges. This added aspect of rotation to suspended bodyweight training is a consideration that strength and conditioning coaches could implement into their training programs to potentially improve bilateral symmetry of the basketball players they train. Below are several sample exercises that could be incorporated as a part of the overall programming designed to increase bilateral symmetry.

FLUTTER KICKS WITH STRONGBOARD OR BOSU

For this movement, the instability of both distal anchor points requires an increase in the core stabilizing musculature as well as cross movement pattern engagement.

FIGURE 1. FLUTTER KICKS WITH STRONGBOARD OR BOSU

FIGURE 2. FLUTTER KICKS WITH STRONGBOARD OR BOSU

TABLE TOP (INVERTED ROW) WITH ALTERNATING ROW

This movement engages the lumbar spine as the primary core stabilizer, while allowing emphasis to be placed on rotation and muscular activation of the thoracic spine.

FIGURE 3. TABLE TOP (INVERTED ROW) WITH ALTERNATING ROW

FIGURE 4. TABLE TOP (INVERTED ROW) WITH ALTERNATING ROW

ALTERNATING HAMSTRING CURL

This movement focuses on hip disassociation and the ability to engage the hamstrings and posterior leg musculature asymmetrically.

FIGURE 5. ALTERNATING HAMSTRING CURL

FIGURE 6. ALTERNATING HAMSTRING CURL

STEP BEHIND LUNGE WITH ROW

This is a multiplanar movement that activates the entire body's musculature while focusing on balance, stability of the lower body, and rotation of the thoracic spine.

FIGURE 7. STEP BEHIND LUNGE WITH ROW

FIGURE 8. STEP BEHIND LUNGE WITH ROW

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