

CORE VECTOR TRAINING



FOR GYMNASTICS

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The core is an area of the body roughly defined as the region from the armpits to the knees. Most of our movements occur through the core after beginning somewhere else. For instance, in jumping the area of the core will move toward the ground as the arms reach back or up and the legs flex. Upon forceful extension of the arms and legs the body is propelled upward with the force moving through the core to the blocked arms. In sprinting approaches for the vault and floor routines the arms and legs are dynamically moved throughout the range of motion in order to develop the velocity of the body, moving the core forward. These ballistic arm and leg movements occur around a generally stationary strong core. If the core lacks proprioceptive strength, (strength with balance and stability) then energy leakage can occur upon force production or force absorption and the power generated by the limbs and transferred through the core can be lost, resulting in less speed or height generated for an event, routine or technique. During force reduction, the compensation pattern to accommodate these weaknesses can lead to injury.

In training the core it is important that the many vectors of stress and planes of motion be addressed as the demands of

gymnastics occur at high speeds and a variety of angles. Training the core in the variety of angles needed is similar to the angles of attack in martial arts. The attack vectors of martial arts are up and down; diagonally up and down; across the body; and straight in, which is unnecessary for core development.

If we can train the core in these various angles with a variety of implements then the core will better be able to withstand as well as transfer the forces needed in preparation and competition. The labels for the various vectors are as follows:

Straight Down	-----	Slams
Straight Up	-----	Scoops
Side to Side	-----	Twists
Diagonal Up	-----	Lift
Diagonal Down	-----	Chop

The stances are relatively simple to master as there are four basic stances with three levels of difficulty. There is the lunge stance (kneeling or standing), the squat stance (kneeling or standing), diagonal variations off of each of these and the single leg stance. Begin wider than hip width in the squat stance for ease, move to hip width to increase the difficulty and less than hip width for the most difficult position. The narrower the base



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the more difficult it is to maintain core stability. Needless to say 1-2 foot widths wider than, or away from the opposite knee. The next level of difficulty the foot/knee is on one side of a line and the opposite foot/knee on the other side of the same line. The most difficult lunge stance is the one in which the foot/knee and opposite foot/knee are on the same line, as if on a balance beam. In the squat stance start out wider than hip width, move to hip width and the most difficult stance in order to maintain core stability during a strength movement is with the feet less than hip width. Needless to say, the single leg stance is the most difficult of all to maintain balance and execute pillar core training.

As for modalities used to implement core training, the Keiser Functional Trainer is excellent for the constant variety of speeds and loads at any angle and it has a power output reading. Most of us are not so fortunate to be able to afford a Keiser, so substitute some light to medium resistance tubing in order to give resistance in the proper ranges of motion. Medicine balls are excellent in order to mimic the movements in the various vectors and stress the ability to maintain a tall pillar core without arching or collapsing with rotation. The medicine ball can also be thrown to the floor or off of a wall in the various vectors in order to increase the power developed and force transfer through the core. The most stressful implement to use in core vector training is the water ball. The water ball is simply a small stability ball with about a gallon or 8.8 pounds of water. Get a small piece of tubing and fill the sink with water. Inflate the smaller stability ball to about $\frac{3}{4}$ full and insert the tubing into the sink and siphon the water into the tube to begin the flow of water. Insert the tube into the ball in order to siphon the water from the higher sink into the lower ball on the floor. Keep adding water until about a gallon of water is added into the ball. During the movements the added water will move about inside the stability ball and cause the core to react and proprioceptively stabilize in order to execute the movements.

Another way to execute core vector training is by using dumbbells and ankle weights and moving the limbs through a variety of movement vectors while maintaining a long, strong pillar core on the floor for front side training or on a stability ball for back side core. A 2-5 pound dumbbell and 2-5 pound set of

ankle weights are sufficient for most any athlete. While on the back, the dumbbell is extended above the head and the opposite leg is extended while the same side leg is flexed at the knee. The athlete will bring the dumbbell and ankle weight up in a long arm and leg movement and meet in the middle for a sit-up type movement. As the dumbbell and ankle weight are returned to the ground it is imperative the athlete get long through the core but does not arch the back. The second vector is to move the arm out to “2 o’clock” position and the opposite leg out to the “8 o’clock” position and now execute the same sit-up type movement in a diagonal type vector. The final movement starts from a totally different position. The arm is extended above the shoulder straight up at the ceiling while the opposite leg is extended up above the hip in a similar fashion. The arm moves away from the body toward the “3 o’clock” position and the leg moves away from the center of the body toward the “9 o’clock” position. Neither the arm nor leg will touch the floor as the core of the body fights to keep the belly button facing straight up to the ceiling. Do not let the belly button follow the long, straight leg away from center is one cue, the other being to maintain ground contact with both hips throughout the movement.

The same concept can be utilized on a stability ball for the “super man” type of exercise. However, we will change the vectors and emphasis of motion. Just about everyone is familiar with the “superman” exercise. However, we will add a dumbbell in one arm and ankle weights as well as provide a different aiming point and cue for technique execution. Most people will coach and execute the movement by reaching up for the ceiling with the arm and leg. The optimal execution is to reach the foot and hand for the meeting point between the wall and floor and let the long stable core support the shoulder extension at the deltoid and hip extension at the glute. The foot should not get higher than the glute and the hand should not get higher than the deltoid. The cue is to “reach” and get “longer” through the back side core. The vectors are the normal superman with either the same arm or opposite arm involved. The second vector is the arm at “2 o’clock” and the leg at “8 o’clock” and the final vector is with the arm at either 3 or 9 o’clock and the opposite leg at either 6 or the opposing 8 or 4 o’clock angles. ✧