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Patrick Hagerman, EdD, CSCS, *D; NSCA-CPT, *D
Column Editor
E-mail: patrick-hagerman@utulsa.edu

Putting on the Brakes: Deceleration Training

Michael Griffith PT, CSCS
3-D Performance Systems, Norman, Oklahoma

summary

This column looks at deceleration and its significance in enhancing athletic performance.

Deceleration is a crucial component of every sport; yet it is an abstract concept that is rarely addressed or trained. Deceleration may be even more important than acceleration or the ability to maintain velocity because it plays a role in changing direction, cutting, stopping, and transitioning from one move or play to another. If you want to beat your opponent, you will need to be successful at changing direction on the field. If you're not successful, you will lose out on the play and may even end up with an injury.

One vital component of deceleration that makes it challenging is momentum. Momentum is the product of the mass of a moving object and its linear velocity. As speed increases, momentum is amplified, which means that it will take a greater muscle force to control, decelerate, or stop it. Therefore, the most important component of deceleration is speed, because the faster you go, the harder it is going to be to slow down.

Another component of deceleration is eccentric loading of the muscle tissue. If you look at the lower extremity and what it has to do to decelerate, cut, and change direction, you will see that every muscle of the lower extremity will be subjected to an eccentric load in all 3 planes of motion. Training the muscles of the lower extremities to be eccentrically loaded in all 3 planes of motion is important for quick deceleration. Drills that emphasize only the sagital plane will be insufficient and less sport specific.

Deceleration training should follow a warm-up and static exercises. An example of a basic deceleration warm-up is the 3-dimensional (3-D) lunge. The 3-D lunge includes an anterior lunge, a lateral lunge, and a rotational lunge. The anterior and lateral lunges are done in the traditional manner. To do the rotational lunge, an athlete imagines standing facing 12 o'clock on an imaginary clock on the floor. The athlete steps back with his or her right foot between 4:00 and 5:00 on the imaginary clock while the left foot stays forward. Difficulty can be increased by doing the same 3-D lunges while holding onto resistance tubing (Figure 1). This is even more specific to deceleration because the tubing further loads the leg by pulling the center of gravity forward.

An excellent drill you can have your athletes or clients use to enhance deceleration is the DC Drill. Place 2 hurdles 10–15 yards apart, with a 6- or 12-inch cone on the outside of each hurdle. The athlete starts with the left foot facing the cone and the left hand touching the cone; the right foot is off the floor, over a hurdle, and pointed toward the opposite cone (Figure 2). The athlete turns and jumps over the hurdle and runs to and jumps over the other hurdle, landing on the right foot (pointed towards the cone) and

Figure 1. A rotational lunge with resistance tubing adds to the eccentric forces the body has to overcome during deceleration.

Figure 2. The starting position for the deceleration drill, and the end position during a cone touch.

touching the cone with the right hand. Have the athlete alternate jumps over a hurdle on the left foot with changing directions and jumping over the other hurdle on the right foot. The landing foot is forced to decelerate the momentum of the body and then initiate the jump to change directions. The athlete should complete 7 sets of 7 cone touches, with appropriate rest between sets.

Because speed is the main variable of deceleration, time and record each drill. Progress is shown by beating a previous time. You can also progress the difficulty of the drill by adding a weight vest or light dumbbells, by changing the position of the cone so when the athlete reaches to touch the cone the body is driven into a different plane of motion, or by having the athlete touch the cone with the other hand.

Deceleration training will help improve explosiveness and is essential for all sports. The goal of deceleration training is to overload the body through momentum in all 3 planes of motion; so when the athlete has to decelerate on the field or a client experiences deceleration in real life, they will be comfortable and not overloaded. It could be the determining factor for that edge in performance as well as injury prevention. ♦

Michael Griffith specializes in lower extremity function, core training, and comprehensive biomechanical analysis and performance profiles of athletes.