



### **The Importance of Deceleration**

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Lacrosse is advertised as the fastest sport on two feet, and for good reason. With every increase in age level and even increase in skill level within an age group the speed of the game increases. The game is played at a faster pace than it was ten years ago and ten years from now will be even faster. Much like in hockey, the players are bigger and stronger than ever and speed is a quality that is highly desired by coaches and players alike. As a performance coach I talk with coaches, athletes, and parents daily and the first thing I do is ask what their goals are and what they would like to improve most. Almost 100% of the time quickness, speed, or 'the first step' is the answer I hear first. This is very understandable as gaining a single step or even half step on your opponent is often the difference between scoring a goal and not even getting a pass from your teammate. Therefore it stands to reason that speed training, more specifically acceleration training, should be the most important movement training that a lacrosse player participates in. While I do not dispute the importance of acceleration training and advocate it greatly, I am going to suggest that for the sport of lacrosse deceleration training is actually more important to becoming faster than your opponent and having a quicker 'first step.' As well, I will also discuss how training for deceleration not only makes you faster but actually helps to reduce the likelihood of injury.

Now usually when I state that deceleration is the key to being faster to the coach or athlete I am met with a very puzzled look. I can see it in their eyes; they are asking 'why if the game is about speed and I want to get faster are you telling me I need to practice and train to slow down more efficiently?' If you analyze the game of lacrosse and think of all the different movement skills that occur during a game and how they occur I am sure that very rarely if ever will you see two players from opposite teams standing still next to each other while the play is ongoing just waiting to sprint in a straight line for the ball. Invariably, there is always some form of constant movement by a player whether it be walking, jogging, backpedalling, shuffling, or running. Also, these movements don't just occur in a linear or straight ahead fashion. Movement in a lacrosse game is primarily multi-directional and changing all the time. When changing directions you must first slow yourself down and stop moving in your initial direction before you can begin to run in another direction. The more efficiently and quicker that you can stop yourself the faster and quicker you can begin to run in that new direction. It is often the ability to decelerate faster than your opponent that creates the gap that gets the player open. If you were to look at a basic cut in box lacrosse or dodge in field lacrosse you will always see that the player is moving in one direction and then decelerates and plants their foot and accelerates in the opposite direction to avoid the defender and create space. Acceleration cannot become the most important skill until you have already decelerated and stopped moving in your initial direction, therefore the ability to decelerate under control becomes the key movement in that sequence and the deciding factor in whether or not the cut or dodge is effective.

The next question about deceleration is how do you train it? Well, before we can discuss how to train deceleration we must first understand the biomechanics and physiological stress that deceleration imposes on the body. Biomechanically, stopping requires coordinated bending of the ankle, knee, and hip in order to control the body and absorb the shock while controlling your centre of gravity. Physiologically, it places a high neural demand on the body as decelerating is a highly eccentric (the muscle lengthens while contracting) action<sup>1</sup>, as opposed to acceleration which is highly concentric (the muscle shortens while contracting). It should be noted that the majority of injuries to muscles take place while the muscle is contracting eccentrically. Also many other injuries, specifically ankle sprains, occur due to a combination of poor deceleration mechanics and a lack of body control to prevent putting the ankle in a vulnerable position. Training deceleration helps us not only to move faster and more efficiently but also helps to reduce injuries, two qualities that are highly desirable in a training program.



There are too many drills and exercises that can be done to specifically improve deceleration to list for the purpose of this article so I will just begin with a basic program to help you improve your ability to decelerate by training the body to be stronger and more efficient during eccentric muscle actions (this should only be completed after the athlete has warmed up appropriately):

1. **Sprint to Stop:** (1 set x 5 reps) Exactly as it sounds. Sprint as hard as you can for 20 yards and then try to come to a complete stop in an athletic position in 7 steps. As you progress you should aim for 5 steps, and then eventually try for 3 although from a full sprint that is very difficult.

2. **Squat Jump (Landing Emphasis):** (3 sets x 8 reps) Standing tall, begin the exercise by performing a half squat and then immediately explode and jump as high as possible. Upon landing, contact the ground with both feet first with the balls of the feet and then immediately sit back and down with the heels on the ground into the half squat position. Hold for 3 seconds. Landing is an eccentric muscle action and directly relates to your eccentric strength and injury prevention<sup>2</sup>. It is very important to land and stay stable in the athletic position for 3 seconds.

3. **Single Leg Hops:** (2 sets x 6 reps each leg) Same as the squat jump only performed on one leg, landing on the same leg you take off from. When landing in this exercise be aware of the knee and make sure it goes directly over your toes. It will want to go into a valgus position (knee towards the centre of the body) but we want to prevent that. A side benefit from this exercise is it helps strengthen the gluteus medius (a muscle under the gluteus maximus which I think is much better known!). The gluteus medius directly controls the femur and if strong really helps to prevent against knee injuries.

4. **Forward Lunge Walk:** (3 sets x 8 reps each leg) Step forward into a lunge making sure the weight is always on the heel of the front foot, not the toes. Have control of the body and get as low as you can maintaining an upright torso and without your back knee making contact with the ground. Stand up and then repeat stepping forward with the opposite leg. Begin this exercise using only your bodyweight and only after it is mastered do you then progress to adding external resistance.

5. **Lateral Lunge:** (2 sets x 6 reps each leg) Standing tall, take a lateral (sideways) step into a lunge position while keeping your toes pointing in a forward position. Head and chest always stay up, sit back and down with the weight on the heel of the foot at all times. Push back to the starting position. Repeat on the same leg for desired number of reps and then begin on the opposite leg. Begin using bodyweight only and only after mastery is attained do you then progress to adding external resistance.

This is a great introductory program to help improve your deceleration ability and to prevent against injury. Perform this twice per week and you will begin to see very tangible results in your multi-directional speed rapidly, and your body will be more resilient to injury. And when anybody asks how you have gotten so fast, you can tell them it's because you learned and trained to slow down!!!

#### Sources

Gambetta, V. 2007. *Athletic Development: The Art and Science of Functional Sports Conditioning*. Champaign, IL. Human Kinetics.

Boyle, M. 2004. *Functional Training for Sports*. Champaign, IL. Human Kinetics.