

ESTABLISHING A FOUNDATION: Leg Strength for Young Goaltenders

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When you build a house what is built in the first stage of construction? If you said the foundation, you are correct. A foundation, if strong, gives strength and support to the upper structure. When you plan a training program the same rule applies as to building a house, foundation first. The foundation of our training program is leg strength and core training. Upper body work is important, but only after we have developed the two major areas first. Too many training programs focus on the upper extremities for cosmetic reasons and think that handling the puck is the only hockey skill that needs developing. The legs are responsible for dynamic movement, power, and speed. Developing these qualities, in addition to flexibility, quickness, and reaction time are vital to a goaltenders success.

The purpose of this article is to educate you, the athlete, on methods you can use to help start building a strong base of strength. As a goalie, this will be vital to your future athletic development and success.

WHERE DO I BEGIN?

When developing leg strength there are many different exercises, but only few whose purpose is related to athletic improvement. This type of training is termed “Functional Training”. Boyle states, “Functional training is best described as a continuum of exercises that teach athletes to handle their own body weight in all planes of movement” (Boyle 2004). The exercises described in this article are both double and single leg exercises that will use balance, varying plans of movement, and resistance to develop strength. The purpose of these exercises is to strengthen our “Foundation” so that you become more athletic and make improvements in strength to meet the demands of your position.

Before we move on to the exercises and their descriptions, you first need to be educated on the importance of correct squatting technique and how it relates to safety. The myth that squats hurt your knees is completely false. Squatting with poor technique however, will cause knee pain. Once you understand the responsibilities of your knees and torso during squatting movements, you will become stronger and will remain physically healthy throughout your season. The pictures provided for each exercise will give you a sense of what the exercise is suppose to look like. Training in front of a mirror will further help you analyze and implement the safety principles.

The first stage of squatting begins with the upper body. Since torso/back position is one of the two major concerns when squatting, knee position being the other, we start by sticking our chest out and holding a deep breath for the decent (Fig 1.a). Holding your breath creates pressure within our chest cavity thus supporting our spine as a natural weight belt. Our arms are extended out in front of our body which enables us to keep a more erect posture (Fig 1.b). To begin the downward phase of the movement you want your hips to push back as if you were reaching for a chair to sit down on (Fig 1.c).



Figure 1.a



Figure 1.b

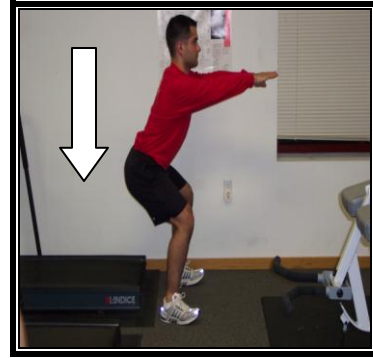


Figure 1.c

By pushing the hips back we ensure that our knees are in a safe position. From the side you can see that the knees are behind the toes (Fig 1.d). Once our knees move in front of the toes (Fig 1.e) we stress the knee joint which if repeated over time can cause pain to that area. As you squat down there should be a weight shift towards the heels. This shift helps the hips to “sit back” and the knees to be in the safest position.

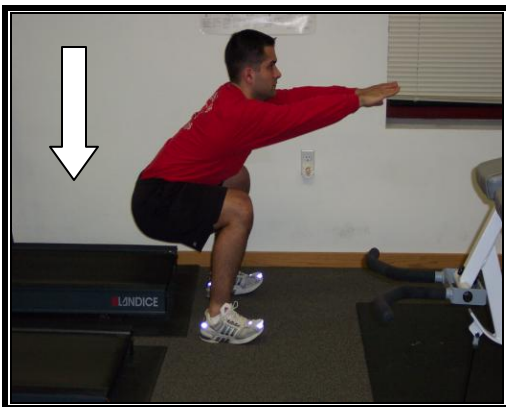


Figure 1.d



Figure 1.e

The depth of the squat should be to the point at which the top of the thigh is parallel to the floor (Fig 1.f). Half squats (Fig 1.g) do not fully train the muscles of the legs due to the limited range of motion.



Figure 1.f

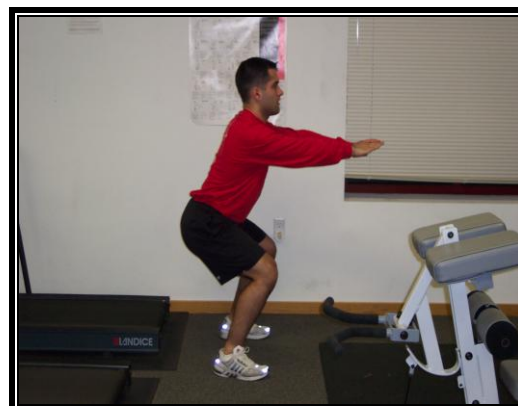


Figure 1.g

In sport we encounter many dynamic movements which require a great range of motion. If we train only half of the range of motion then we are not fully preparing ourselves and limit our development. This is the driving reason we train a full range of motion with every exercise. On the ascent we exhale the breath we have held on the way down, slowly. Our posture remains erect with a focus on keeping the chest up and driving the feet through the floor. In any squatting activity the more force you can put into the floor the easier it will be to squat up.

Your understanding of squatting technique and mastery of this skill is vital to your leg development and safety. Having a certified strength and conditioning specialist or certified personal trainer examine your technique will provide you with the teaching and coaching you need to develop proper squatting form.

EXERCISES

The following exercises include simple progressions that improve leg strength, flexibility, and balance in a functional manner. These exercises are not dependent on expensive equipment and can be done in any area. The goal is for you the athlete to understand the exercise directions in this section; we will talk planning later on. To help you understand the exercises better some pictures have arrows in them which indicate the direction of movement for that phase of the exercise.

I. **Body Weight Squats:** (See “Where do I begin section”)

II. **Progression 1, Body Weight Squats with resistance:**

The safest form of external resistance is a weight vest. When purchasing a weight vest make sure the weight is distributed evenly throughout the vest and that you can remove and add weight in one pound increments. Now that you are in a weight bearing situation it is very important that you keep great posture in your torso when squatting down. See figures 2.a-c for exercise technique.

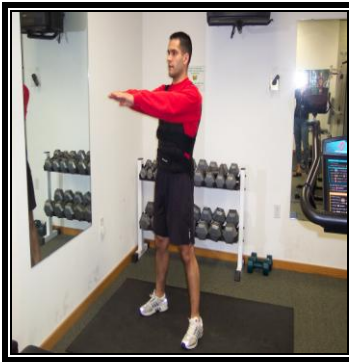


Figure 2.a

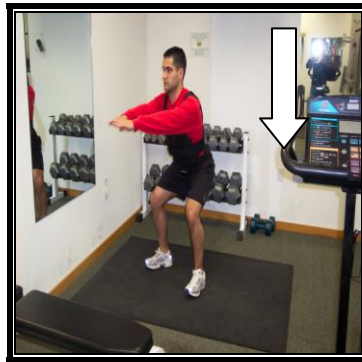


Figure 2.b



Figure 2.c

III. **Split Squats:**

- Begin in a lunge position with your hands behind your head (Fig 3.a). Notice the length between the front foot and back foot.
- In the descent (Fig 3.b) your goal is to drop the back knee down while keeping the torso up. The downward phase ends when the back knee touches the ground gently. The position of the front knee is in line with the ankle and never passes over the toes.

- In the upward phase of the split squat, the front leg pushes up until the knee of the front leg is straight (Fig 3.c). Using the heel to push will be safer for your knees and develop more strength in the glutes and hamstrings.



Figure 3.a

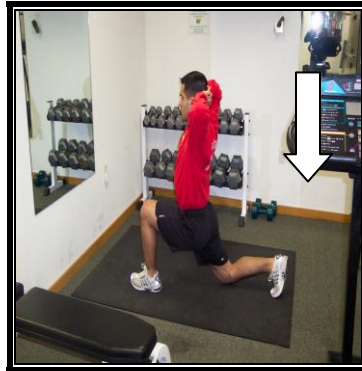


Figure 3.b



Figure 3.c

IV. Progression 1, Split Squats w/ pad:

Our technique here is the same, but we simply add a balance component. A foam mat will be placed under the front foot as seen in (Fig 4.a). The dimensions of the mat are 1-2 inches in thickness, and 1.5 ft long by 1.5 ft wide.



Figure 4.a

V. Progression 2, Rear Foot Elevated Squat (RFE):

In this progression the only change is the position of the back leg (Fig 5.a). We elevate the back leg on a weight bench or box, both 18 inches in height. This puts us in a very dynamic position and challenges our balance and strength in an unstable situation. The descent and ascent of the movement are the same as split squat.



Figure 5.a

VI. Step-Ups:

- Step-ups begin with one foot completely on a bench or 18 inch box (Fig 6.a). The foot that is on the box is responsible for the work. Throughout the upward phase of the movement be sure not to push off the down leg. Using the down leg for assistance will take away from your single leg strength development.
- The heel of the foot on the box, not the toes, will be used to push yourself above the box (Fig 6.b). By using the heel, our knees will be in a safe position throughout the movement. Figure 6.c gives you a visual of where we **do not** want our knees to be during this movement.
- On the descent we follow proper squatting technique by sitting back on our heel and keeping our torso erect (Fig 6.d). We want the bottom foot to touch the ground gently during each rep so that the tension remains on the pushing leg.



Figure 6.a



Figure 6.b

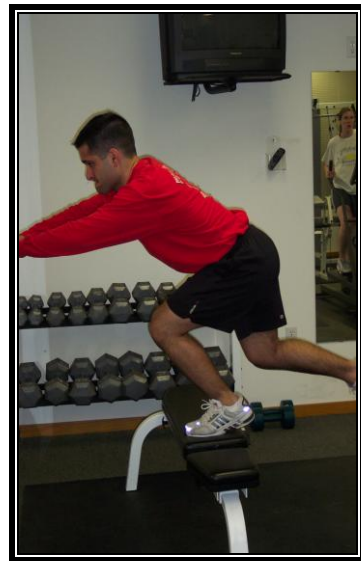


Figure 6.c

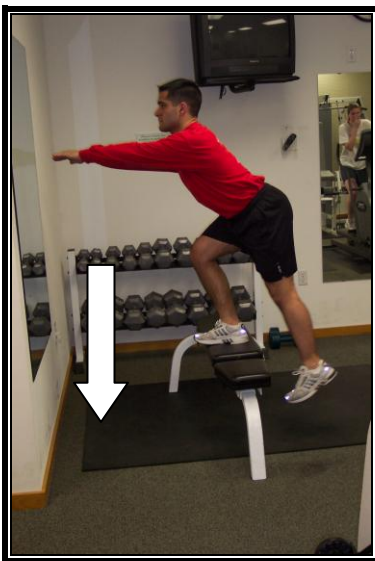


Figure 6.d

VII. Progression 1, Lateral Step-ups:

- To make the step-up exercise more challenging we change the plane of movement but still maintain the same squatting principles. In Fig 7.a you will see that we start on the side of the bench or box and squat up, finishing at the top standing on one leg.
- This exercise is specific to a hockey player because it strengthens an area which is highly prone to injury, the groin muscles.

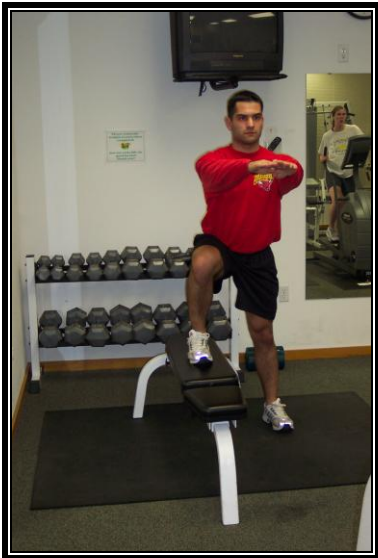


Figure 7.a

VIII. Lateral Squat:

- The starting position of the lateral squat has your feet wide and your hands extended out in front of you (Fig 8.a). The width between your feet is four to five feet (Boyle 2004). This exercise focuses on strengthening and stretching the groin musculature. The strengthening of the groin muscles helps to make us better skaters, prevents injury, and improves a goaltenders mobility around the crease.
- As we squat to one side we want to sit back on our heel and straighten the opposite leg while keeping the torso flat (Fig 8.b and c).
- During the upward phase, push off the heel and keep the knees behind the toes.



Figure 8.a

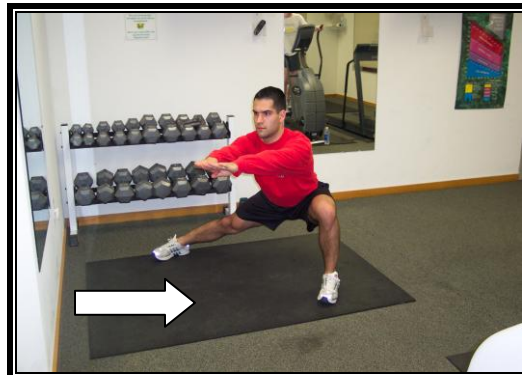


Figure 8.b



Figure 8.c

IX. Progression 1, Lateral Squat with step:

- The starting position is depicted in (Fig 9.a).
- When you step out your goal is to stop yourself and squat into position (Fig 9.b and 9.c).
- The most challenging part of the exercise is the return to the starting position (Fig 9.d). The harder you push against the ground when in the squat position the easier it will be to return to the starting position.



Figure 9.a

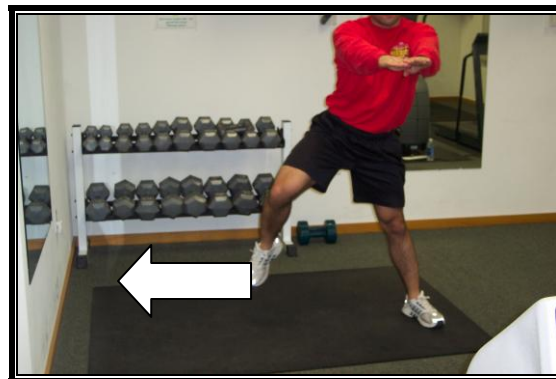


Figure 9.b

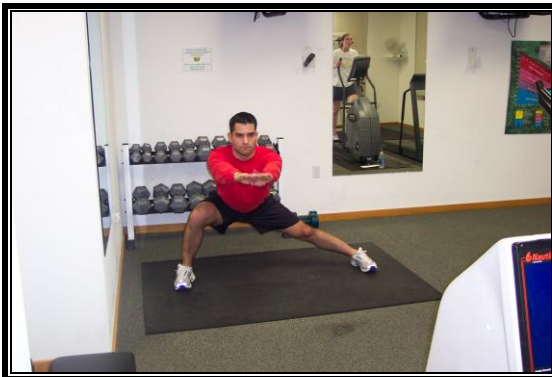


Figure 9.c

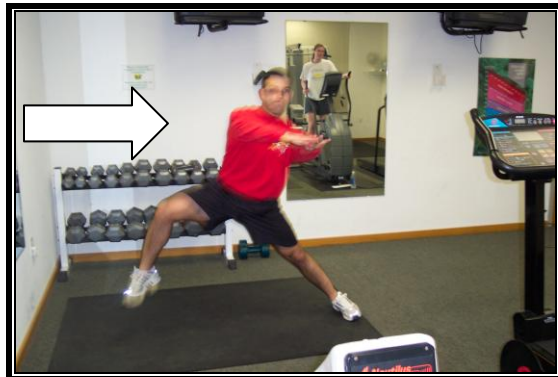


Figure 9.d

PLANNING

Up to this point we have discussed why you should use squatting movements to improve leg strength, techniques, and exercises, both single and double leg. In this section, we will discuss how much (sets and reps) and how often (number of times per week) you should perform these exercises.

Table 1 is the list of exercises we discussed earlier, but now I have included sets and repetitions. The amount of time dedicated for rest in-between each set is one and a half minutes. As the program progress from week to week it becomes harder due to the change in exercises and change in repetitions. Also, keep in mind more reps are not always better. The goal of the workout is to master these movements, not to work yourself to exhaustion and develop bad technique and habits. Proper technique and form will allow for maximal strength gains. You may progress to the next group of exercises only if you have mastered the first.

Table 2 lists the order in which each exercise should be performed. Your leg training is planned for thirteen weeks and should be performed two days per week. Take one or two days to rest in-between each leg training day. An example of a rest schedule would be to perform leg training on Monday, rest on Tuesday, and then perform the leg training exercises again on Wednesday. On the “off” day work on hockey skills, cardiovascular conditioning, or upper body strength.

EXERCISES table-1				
<u>Exercise</u>			<u>Sets</u>	<u>Reps</u>
1.) Body Weight Squat			3	12
2.) Body Weight Squats w/ v			3	12
3.) Split Squats			3	10 each leg
4.) Split Squats w/ pad			3	10 each leg
5.) RFE Squat			3	8 each leg
6.) Step-ups			3	8 each leg
7.) Lateral Step-up			3	8 each leg
8.) Lateral Squat			3	10 each leg
9.) Lateral Squat with step			3	8 each leg

EXERCISE PLANNING table-2	
Group 1	Week 1-4, 2 times per week
1.) Body Weight Squat	
2.) Split Squats	
3.) Lateral Squat	
Group 2	Weeks 5-7, 2 times per week
1.) Body Weight Squats w/ vest	
2.) Split Squats w/ pad	
3.) Lateral Squat	
Group 3	Weeks 8-10, 2 times per week
1.) Step-ups	
2.) RFE Squat	
3.) Lateral Squat w/ step	
Group 4	Weeks 11-13, 2 times per week
1.) Lateral Step-ups	
2.) RFE Squat	
3.) Lateral Squat w/ step	

FINAL THOUGHTS

The demands of a hockey goalie are unique. Quickness, reaction, hand-eye coordination, flexibility and strength are the most important physical qualities needed to be successful at all levels. When a young athlete begins training (13-17 years old) their focus needs to be on establishing a foundation based on technique and mastery of body weight exercises. The goals of a youth training program are to become more athletic and develop a base of training. During the early stages of one's development, strength benefits come as a result of proper technique, not heavy external resistance. Since a goalie is frequently in dynamic positions while making saves and moving across the crease, training in dynamic positions becomes vital for improvement of strength, flexibility, and preventing injury.

REFERENCES

Boyle, Michael. 2004. Functional Training for Sports. Champaign, IL: Human Kinetics.