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KLIPP
**Knee Ligament Injury
 Prevention Program**

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Our EPA clinics are conveniently located with today's busy schedules in mind. Our professional, friendly team will welcome you to the clinic and assist you in the following ways:

- billing inquiries and payment options
- health insurance provider information (WSIB, MVA, private health insurance)
- booking convenient appointments
- collecting new patient information
- answering questions and directing any concerns to appropriate personnel

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- post-surgical rehabilitation
- acupuncture
- sports injury: prevention & treatment
- concussion management
- acupuncture/IMS
- massage therapy
- motor vehicle accident injuries
- work-related injuries
- several clinic sites offer women's health programs for breast cancer and osteoporosis
- several sites offer custom brace fitting and other braces and support

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D

Figure Four Piriformis Stretch

-
supine (30 sec x 2 reps)

Purpose: Elongate the rotators of the hip.

Instruction: Lie on your back and bend both of your knees. Fold your right ankle over your left knee. Place your hands behind your right thigh and pull your right knee to your chest. You should feel a good stretch in the right buttock region and the side of the thigh. Hold for 30 seconds and repeat on the other side. If you experience any low back pain with this stretch, slowly lower your legs down and let your coach/trainer know.



E

Seated Butterfly Stretch - seated (30 sec x 2 reps)

Purpose: Elongate the inner thigh muscles (adductors).

Instruction: Sit up bringing your feet in so that the soles of your feet are touching.

Gently place your elbows on your knees and slowly push down. You should feel a stretch on the inner thigh. Hold this for 30 seconds and repeat 2 to 3 times.



KLIPP

Knee Ligament Injury Prevention Program

Sports like soccer, basketball, volleyball, rugby and lacrosse are all associated with a risk of injury to the players. Much research has been conducted looking at these injuries in soccer. Significant benefit of physical conditioning interventions in the prevention of injuries has been reported in several studies, particularly with respect to the reduction of Anterior Cruciate Ligament (ACL) injuries of the knee.^{1,2,3,4} F-MARC, the medical research centre of The Federation Internationale de Football Association (FIFA) has recently developed “the 11”; a program consisting of ten physical exercises in addition to the promotion of Fair Play⁵.

The following program⁶ has been adapted specifically toward the prevention of ACL injuries and has been shown to significantly **reduce non-contact ACL injuries**.^{4,6} It consists of a warm-up, stretching, strengthening, plyometrics (jumping exercises), agilities and a cool-down to address potential deficits in the strength and coordination of the stabilizing muscles around the knee joint. It is important that proper technique is used during all of the exercises. Coaches and trainers need to emphasize correct posture, straight up and down jumps without excessive side-to-side movement and reinforce soft landings.

The program should be completed **3 times a week** and should take approximately **15 – 20 minutes** to complete, with a cool-down to follow. Alongside each exercise a box has been provided showing the approximate amount of time that should be spent on each activity.

Warm up

Warming up and cooling down are a crucial part of any training program. The purpose of the warm-up section is to allow the athlete to prepare for activity. By warming up your muscles first, you greatly reduce the risk of injury.

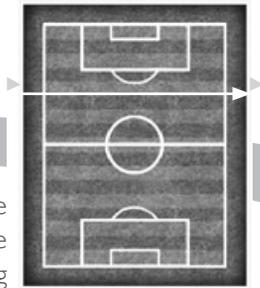
A

Jog to the Line (cone to cone):

Elapsed time = 0 - 30 sec

Purpose: Allows the athletes to slowly prepare themselves for the training session while minimizing the risk for injury. Make sure good running technique is maintained; keep the hip/knee/ankle in straight alignment without the knee caving in or the feet whipping out to the side.

Instruction: Complete a slow jog from near to far sideline



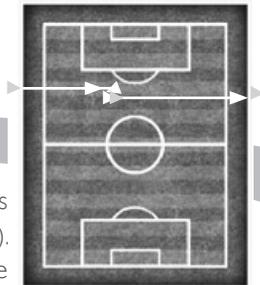
B

Shuttle Run (side to side):

Elapsed time = 30 sec - 1 min

Purpose: Engage hip muscles (inner and outer thigh). This exercise will promote increased speed, and discourage inward caving of the knee joint.

Instruction: Stand with feet shoulder-width apart, with a slight bend at the knee. Leading with the right foot, sidestep pushing off with the left foot (back leg). When you drive off with the back leg, be sure the hip/knee/ankle are in a straight line. Switch sides at half field.



B

Abdominal Crunches (3 sets x 30 reps)

Strengthening

Purpose: Strengthen the abdominals (rectus abdominus, obliques).

Instruction: Lie on the ground with your knees bent. Place your hands behind your head with your elbows out wide. Support your neck lightly with your fingers. Take a deep breath in and slowly contract your abdominal muscles as you exhale. Repeat 30 times. Drop your legs off to the right side. Slowly crunch up with your elbows out wide. You should feel your oblique muscles working on the side of your waist. Repeat 30 times and switch to the other side.



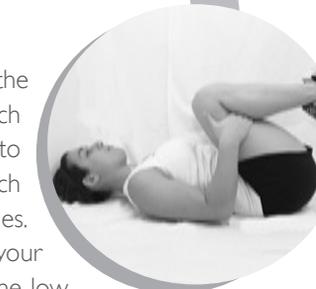
C

Single and Double Knee to Chest (supine) (30 sec x 3 reps)

Stretching

Purpose: Elongate the low back muscles.

Instruction: Lie on your back. Bring your right knee toward your chest and hug firmly. Keep your left knee bent with your foot on the ground. You should feel a stretch along your low back and into your buttocks. Hold the stretch for 30 seconds and switch sides. Now bring both knees to your chest. If you feel any pain in the low back, discontinue the stretch and inform your coach/trainer.



Cool Down

We all know how imperative a cool-down is. Please don't skip it. It allows the muscles that have been working hard throughout the training session to elongate and deters the onset of muscle soreness. Adequate fluid intake is important in the cool down period. Athletes should have a water bottle by their side during the cool-down.

The cool-down should take approximately 10 minutes and should begin with a slow jog to allow the heart rate to come down before stretching. This should be followed by some light strength training exercises. **We recommend two strengthening exercises.**

Finally, complete the previous stretches for the hamstrings, calves, inner thigh, quadriceps, and low back. In addition to those basic stretches, we recommend some additional stretches to target **three muscle groups** that are often forgotten.

A

Bridging with Alternating Hip Flexion (30 reps)

Strengthening

Purpose: Strengthen outer hip muscles (hip abductors, flexors) and buttocks.

Instruction: Lie on the ground with your knees bent with feet on the ground. Raise your buttocks up off the ground and squeeze. Now, lift your left foot off the ground and make sure that your right hip does not dip down. Lower your left foot and now lift your right foot making sure your left hip does not dip down. Repeat 30 times on each side. As you get stronger, you can place your feet on top of a ball and repeat the exercise.



C

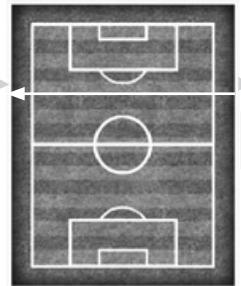
Backward Running:

Elapsed time = 1 - 1/2 min

Purpose: Continued warm-up; engage hip extensors/hamstrings.

Instruction: Run backwards from sideline to sideline.

Land on your toes without snapping the knee back. Stay on your toes and keep the knees slightly bent at all times. Make sure you **land on your toes**. Be sure to **watch for locking of the knee joint**. As you bring your foot back, make sure to maintain a slight bend to the knee.



Stretching

It is important to incorporate a short warm-up prior to stretching. Never stretch a “cold” muscle. By doing the exercises outlined here, you can improve and maintain your range of motion, reduce stiffness in your joints, reduce post-exercise soreness, reduce the risk of injury and improve your overall mobility and performance.

- Do a large muscle warm-up before stretching.
- Don't bounce or jerk when you stretch. Gently stretch to a point of tension and hold.
- Hold the stretch for 30 seconds. Concentrate on lengthening the muscles when you're stretching.
- Breathe normally; don't hold your breath.

A

Calf Stretch (30 seconds x 2 reps)

Elapsed time = 1½ - 2½ min

Purpose: Stretch the calf muscle of the lower leg.

Instruction: Stand leading with your right leg forward and hands leaning against the goal-post or on a partner's shoulders. Keep your right knee slightly bent and your left leg straight. Make sure your left foot is flat on the ground. Do not bounce during the stretch. Hold for 30 seconds. Switch sides and repeat.



C

Bounding run

Elapsed time = 14 - 15 min

Purpose: To increase hip flexion strength and increase power/speed.

Instruction: Starting on the near sideline, run to the far side with knees up toward chest. Bring your knees up high. Land on the ball of your foot with a slight bend at the knee and a straight hip. Increase the distance as this exercise gets easier.



Agilities

These exercises focus on challenging your balance, power, speed and muscle coordination. When performing these exercises, proper form is essential. When landing, stay on the ball of your foot with a slight bend to your knee and ensure that the knee stays over the ankle joint.

A

Shuttle run with forward/backward running

Elapsed time = 12 - 13 min

Purpose: Increase dynamic stability of the ankle/knee/hip complex.

Instruction: Starting at the first cone, sprint forward to the second cone, run backward to the third cone, sprint forward to the fourth cone and run backward to the fifth cone.



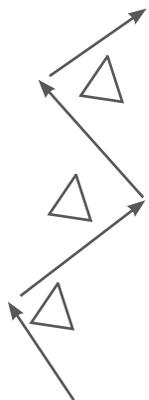
B

Diagonal runs (3 passes)

Elapsed time = 13 - 14 min

Purpose: To encourage proper technique/stabilization of the outside planted foot and to deter an **inward force** occurring on the knee.

Instruction: Face forward and run to the first cone on the left. Pivot off the left foot and run to the second cone. Now pivot off the right leg and continue onto the third cone. Make sure that the outside leg does not cave in. Keep a slight bend to the knee and make sure the knee stays over the ankle joint.



B

Quadricep Stretch (30 seconds x 2 reps)

Elapsed time = 2 1/2 - 3 1/2 min

Purpose: Stretch the quadriceps muscle of the front of the thigh.

Instruction: Place your left hand on a partner's left shoulder for balance if necessary. Reach back with your right hand and grab the front of your right ankle. Bring your heel to your buttock. Make sure your knee is pointed down toward the ground. Keep your right leg close to your left. Don't allow knee to wing out to the side and do not bend at the waist. Do not bounce during the stretch. Hold for 30 seconds. Switch sides and repeat.



C

Figure Four Hamstring Stretch (30 seconds x 2 reps)

Elapsed time = 3 1/2 - 4 1/2 min

Purpose: To stretch the hamstring muscles of the back of the thigh.

Instruction: Sit on the ground with your left leg extended out in front of you. Bend your right knee and rest the bottom of your foot on your left inner thigh. With a straight back, try to bring your chest toward your knee. Do not round your back. If you can, reach down toward your toes and pull them up toward your head. Do not bounce. Hold for 30 seconds and repeat with the other leg.



D

Inner Thigh Stretch (30 seconds x 2 reps)

Elapsed time = 4 1/2 - 5 1/2 min

Purpose: Elongate the muscles of the inner thigh (adductor group).

Instruction: Stand in a stride stance with your right foot further forward than your left. Keeping your left leg straight, bend your right knee and lean your body weight forward and over your right foot until a stretch is felt in the inner thigh of the left leg. Do not bounce during the stretch. Hold for 30 seconds. Switch sides and repeat.



E

Scissors Jump (20 reps)

Elapsed time = 1 1/2 - 12 min

Purpose: Increase power and strength of vertical jump.

Instruction: Lunge forward leading with your left leg. Keep your knee over your ankle. Now, push off with your left foot and propel your right leg forward into a lunge position. Be sure your knee does not cave in or out. It should be stable and directly over the ankle. Remember the proper landing technique; accept the weight on the ball of your foot with a slight bend to the knee.



E

Hip Flexor Stretch (30 seconds X 2 reps)

Elapsed time = 5 1/2 - 6 1/2 min

Purpose: Elongate the hip flexors of the front of the thigh.

Instruction: Lunge forward leading with your right leg. Drop your left knee down to the ground. Keeping your trunk upright, lean forward with your hips until a stretch is felt in the front of the left thigh. The hips should be square with your shoulders. Do not bounce during the stretch. Hold for 30 seconds. Switch sides and repeat.



C

Single Leg Hops over cone (20 reps)

Elapsed time = 10½ - 11 min

Purpose: Increase power and strength, emphasizing neuromuscular control.

Instruction: Hop over the cone landing on the ball of your foot, bending at the knee. Now, hop backwards over the cone using the same landing technique. Be careful not to snap your knee back to straighten it. You want to maintain a slight bend to the knee. Repeat for 20 reps. Now, stand on the left leg and repeat the exercise. Increase the number of repetitions as needed.



D

Vertical Jumps with headers (20 reps)

Elapsed time = 11 - 11½ min

Purpose: Increase height of vertical jump.

Instruction: Stand forward with hands at your side. Slightly bend the knees and push off to head the ball; your hands should be up in the air. Remember the proper landing technique; accept the weight on the balls of your feet with a slight bend to the knee.



Strengthening

This portion of the program focuses on increasing leg strength which will lead to a more stable knee joint. **Technique is everything;** close attention must be paid to the performance of these exercises in order to avoid injury.

A

Walking Lunges (3 sets x 10 reps)

Elapsed time = 6½ - 7½ min

Purpose: Strengthen the thigh (quadriceps) muscle.

Instruction: Lunge forward leading with your left leg. Push off with your left leg and lunge forward with your right leg. Drop the back knee straight down. Make sure that you keep your front knee over your ankle. Control the motion and try to avoid your front knee from caving inward. If you can't see your toes on your leading leg, you are doing the exercise incorrectly.



B

Russian Hamstring (3 sets x 10 reps)

Elapsed time = 7½ - 8½ min

Purpose: Strengthen hamstring muscles

Instruction: Kneel on the ground with hands at your side. Have a partner hold firmly at your ankles. With a straight back, lead forward leading with your hips. Your knee, hip and shoulder should be in a straight line as you lean toward the ground. Do not bend at the waist. You should feel the hamstrings in the back of your thigh working. When this body position can no longer be maintained by the hamstrings then use both hands to control your fall. Repeat the exercise for 3 sets of 10, or a total of 30 reps.



C

Single Toe Raises (2 sets x 30 reps)

Elapsed time = 8½ - 9½ min

Purpose: Strengthens the calf muscle and increases balance.

Instruction: Stand up with your arms at your side. Bend the left knee up and maintain your balance. Slowly rise up on your right toes with good balance. You may hold your arms out ahead of you in order to help. Slowly repeat 30 times and switch to the other side. As you get stronger, you may need to add additional repetitions to this exercise to continue the strengthening effect of the exercise.



Plyometrics

These exercises are explosive and help to build power, strength and speed. The most important element when considering performance technique is the landing. **It must be soft.** When you land from a jump, you want to softly accept your weight on the balls of your feet slowly rolling back to the heel with a bent knee and a straight hip. It is critical to perform these exercises correctly. Please take the time to ensure safe and correct completion of them.

A

Lateral Hops over cone (20 reps)

Elapsed time = 9½ - 10 min

Purpose: Increase power and strength, emphasizing neuromuscular control.

Instruction: Stand with a sideline cone to your right. Hop to the right over the cone softly landing on the balls of your feet land bending at the knee. Repeat this exercise hopping to the left.



B

Forward/Backward Hops over cone (20 reps)

Elapsed time = 10 - 10½ min

Purpose: Increase power and strength, emphasizing neuromuscular control.

Instruction: Hop over the cone softly landing on the balls of your feet and bending at the knee. Now, hop backwards over the cone using the same landing technique. Be careful not to snap your knee back to straighten it. You want to maintain a slight bend to the knee.

