












# ANEXOS.

## FIFA, F-MARC, Football for health: "The 11"

Fuente: FIFA, F-MARC, Football for health: "The 11", recuperado en 18 de Noviembre de 2007, disponible en <http://es.fifa.com/aboutfifa/developing/medical/the11/popup.html>.

|   |   |   |
|---|---|---|
| <b>1.- Apoyo en antebrazo:</b><br>1-2 series * 15 segundos * cada pierna            | <b>2.- Apoyo en antebrazo en posición lateral:</b><br>2 series * 15 segundos * cada lado                  | <b>3.- Corva:</b><br>5 repeticiones   |
|    |                          |    |
| <b>4.- Esquí de fondo:</b><br>15 repeticiones * pierna                              | <b>5.- Apoyo en una pierna con lanzamiento:</b><br>1 serie * 10 repet. * cada pierna                      | <b>6.- Apoyo una pierna y flexión de tronco:</b><br>1 serie * 10 repet. * cada pierna |
|    |                         |   |
| <b>7.- Apoyo una pierna, "ochos":</b><br>1 serie * 10 repet. * cada pierna          | <b>8.- Saltos con ambas piernas:</b><br>1 serie * 10 repeticiones * cada lado, hacia delante, hacia atrás |   |
|  |                        |  |
| <b>9.- Saltos en zig-zag:</b><br>1 serie * 2 repeticiones                           | <b>10.- Saltos largos y altos</b><br>1 serie * 2 repeticiones * 30 metros                                 | <b>11.- Fair Play</b>   |
|  |                        | <p style="text-align: center;"><b>Juego Limpio</b></p>                                |

## **PEP Program: ACL Prevention Program**

*Fuente: Santa Monica Orthopaedic Group: PEP Program: ACL Prevention Program, recuperado en 12 de Mayo de 2008, disponible en [www.sportsmedicine.about.com/od/kneepainandinjuries](http://www.sportsmedicine.about.com/od/kneepainandinjuries) y [www.aclprevent.com/pepprogram.htm](http://www.aclprevent.com/pepprogram.htm)*

### ***The Santa Monica Orthopaedic and Sports Medicine Research Foundation***

#### **The PEP Program: Prevent injury and Enhance Performance**

This prevention program consists of a warm-up, stretching, strengthening, plyometrics, and sport specific agilities to address potential deficits in the strength and coordination of the stabilizing muscles around the knee joint. It is important to use proper technique during all of the exercises. The coaches and trainers need to emphasize correct posture, straight up and down jumps without excessive side-to-side movement, and reinforce soft landings. This program should be completed 3 times a week.

The field should be set up 10 minutes prior to the warm-up. This will allow for a smooth

transition between the activities. A sample field set-up has been included in your packet.

This program should take approximately 15 – 20 minutes to complete. Along side each exercise you will notice a box with the approximate amount of time that should be spent on each activity. This will serve as a guideline to you in order to conduct your warm-up in a time efficient manner.

1. Warm-up: Warming up and cooling down are a crucial part of a 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 line to line* (cone to cone): Elapsed Time: 0 - .5 minute

*Purpose:* Allows the athletes to slowly prepare themselves for the training session; while minimizing the risk for injury. Educate athletes on good running technique; 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: .5 to 1 minute

*Purpose:* engage hip muscles (inner and outer thigh). This exercise will promote increased speed. Discourage inward caving of the knee joint.

*Instruction:* Start is an athletic stance 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.

C. *Backward Running* Elapsed Time: 1 – 1.5 minutes

*Purpose:* continued warm- up; engage hip extensors/hamstrings. Make sure the athlete lands on her toes. Be sure to watch for locking of the knee joint. As the athlete brings her foot back, make sure she maintains a slight bend to the knee.

*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.

2. 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 such as brisk walking for five to 10 minutes 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: 1.5 to 2.5 minutes

*Purpose:* stretch the calf muscle of the lower leg

*Instruction:* Stand leading with your right leg. Bend forward at the waist and place your hands on the ground (V formation). 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.

B. *Quadricep stretch* (30 seconds x 2 reps) Elapsed Time: 2.5 to 3.5 minutes

*Purpose:* stretch the quadricep muscle of the front of the thigh

*Instruction:* Place your left hand on your partner's left shoulder. Reach back with your right hand and grab the front of your right ankle. Bring your heel to 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.

Hold for 30 seconds and switch sides.

C. *Figure Four Hamstring stretch* (30 sec x 2 reps) Elapsed Time: 3.5 – 4.5 min

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

*Instruction:* Sit on the ground with your right leg extended out in front of you. Bend your left knee and rest the bottom of your foot on your right 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* (20 sec x 3 reps) Elapsed Time: 4.5 – 5.5 min

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

*Instruction:* Remain seated on the ground. Spread you legs evenly apart. Slowly lower yourself to the center with a straight back. You want to feel a stretch in the inner thigh. Now reach toward the right with the right arm. Bring your left arm overhead the stretch over to the right. Hold the stretch and repeat on the opposite side.

E. *Hip Flexor Stretch* – (30 sec x 2 reps) Elapsed Time: 5.5- 6.5 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. Placing your hands on top of your right thigh, lean forward with your hips. The hips should be square with your shoulders. If possible, maintain your balance and lift back for the left ankle and pull your heel to your buttocks. Hold for 30 seconds and repeat on the other side.

3. Strengthening: This portion of the program focuses on increasing leg strength. This will lead to increased leg strength and 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: 6.5 – 7.5 min

*Purpose:* Strengthen the thigh (quadriceps) muscle.

*Instruction.* Lunge forward leading with your right leg. Push off with your right leg and lunge forward with your left 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 you 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: 7.5 –8.5 min

*Purpose:* Strengthen hamstrings 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. Repeat the exercise for 3 sets of 10, or a total of 30 reps.

C. *Single Toe Raises* (30 reps x 2 reps) Elapsed Time: 8.5 – 9.5 min

*Purpose:* This exercise 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.

4. 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. These exercises are basic, however, it is critical to perform them correctly.

Please take the time to ensure safe and correct completion of these exercises.

A. *Lateral Hops over Cone* (20 reps) Elapsed Time: 9.5 – 10min

*Purpose:* Increase power/strength emphasizing neuromuscular control

*Instruction:* Stand with a 6” cone to your left. Hop to the left over the cone softly landing on the balls of your feet land bending at the knee. Repeat this exercise hopping to the right.

B. *Forward/Backward Hops over cone* (20 reps) Elapsed Time: 10 – 10.5 min

*Purpose:* Increase power/strength emphasizing neuromuscular control

*Instruction:* Hop over the cone/ball softly landing on the balls of your feet and bending at the knee. Now, hop backwards over the ball 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.

*C. Single Leg hops over cone (20 reps) Elapsed Time: 10.5 – 11 min*

*Purpose:* Increase power/strength emphasizing neuromuscular control.

*Instruction:* Hop over the cone/ball landing on the ball of your foot bending at the knee. Now, hop backwards over the ball 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 – 11.5 min*

*Purpose:* Increase height of vertical jump.

*Instruction:* Stand forward with hands at your side. Slightly bend the knees and push off jumping straight up. Remember the proper landing technique; accept the weight on the ball of your foot with a slight bend to the knee. Repeat 20 times and switch sides.

*E. Scissors Jump (20 reps) Elapsed Time: 11.5 – 12 min*

*Purpose:* Increase power and strength of vertical jump.

*Instruction:* Lunge forward leading with your right leg. Keep your knee over your ankle. Now, push off with your right foot and propel your left 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. Repeat 20 times.

## 5. Agilities

*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 (etc...).

*B. Diagonal runs (3 passes) Elapsed Time 13 – 14 min*

*Purpose:* To encourage proper technique/stabilization of the outside planted foot to deter the position from occurring.

*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.

*C. Bounding run (44 yds) Elapsed Time 14 – 15 min*

*Purpose:* To increase hip flexion strength/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.

## 6. Alternative Exercises – Warm Down and 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. Please emphasize the importance of adequate fluid intake (optimally water). Athletes should have a water bottle by their side during the cool down.

The cool down should take approximately 10 minutes. It 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 are recommending two strengthening exercises (see below). Finally, stretch the hamstrings, calves, inner thigh, quadriceps, and low back (all of these are explained in the protocol). In addition to those basic stretches, we are offering some additional stretches to target 3 muscle groups that are often forgotten.

*A. Bridging with Alternating Hip Flexion (30 reps)*

*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 right foot off the ground and make sure that your right hip does not dip down. Lower your right foot and now lift your left foot making sure your left hip does not dip down. Repeat 30 times on each side. As you get stronger, you will place your feet on top of a ball and repeat the exercise.

*B. Abdominal Crunches (30 reps x 2 reps)*

*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 2 reps)*

*Purpose:* Elongate the low back muscles

*Instruction:* Lie on your back. Bring your right knee toward your chest and hug firmly. Keep your left leg out straight in front of you. 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 chest. If you feel any pain in the low back, discontinue the stretch and inform your coach/trainer.

*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 left ankle over your right knee. Place your hands behind your right thigh and pull your right knee to chest. You should feel a good stretch in the left gluteals region and the side of the thigh. Hold for 30 seconds and repeat on the other side. If you experience 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 good stretch of the inner thigh. Hold this for 30 seconds and repeat 2 to 3 times.

# MLS Groin Injury Prevention Protocol

Fuente: Santa Monica Orthopaedic Group: MLS Groin Injury Prevention Protocol, recuperado el 26 de Agosto de 2008, disponible en [http://www.training-conditioning.com/pdf/groin\\_injury.pdf](http://www.training-conditioning.com/pdf/groin_injury.pdf)

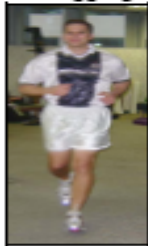


## MLS Groin Injury Prevention Protocol

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### 1. Warm-up Activities

#### a. Jogging line to line



*Directions:* Start jogging at near sideline and jog to far sideline

*Duration:* 1 minute

Avoid excessive Hip/Trunk flexion. Cue into lumbar paraspinals/multifidus activity

#### b. Backward running



*Instruction:* Run backwards from sideline to sideline. Land on your toes without looking over shoulder or hyperextending the knee. .

*Duration:* 1 minute

Maintain pelvic tilt (engage abs/lumbar paraspinals and multifidii) and slight hip flexion.

#### c. Shuttle (side) running



*Directions:* Start in an athletic stance (hip and knee flexion with a neutral pelvis). Lead with right foot, & sidestep pushing off with left foot. Avoid genu valgum and femoral IR. Switch sides at half field.

*Duration:* 1 minute

Maintain neutral pelvis and avoid excessive lumbar flexion

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## 2. Stretching – dynamic

### a. Side to side lunges – frontal plane



**Directions:** Start in athletic stance. Lunge to right maintaining neutral pelvis. Do not allow knee to over extend past the ankle joint. Hold 1-2 seconds and switch sides.

**Duration** – 1 minute

Maintain neutral pelvis and avoid excessive lumbar lordosis.

### b. Leg swings – sagittal plane



**Directions:** Utilize teammate for this activity. Stand opposite one another and kick inside leg forward and back in sagittal plane while maintaining pelvic neutral.

**Duration:** 1 minute

Do not allow lumbar flexion and extension (minimize pelvic rotation).

### c. Modified PNF Patterns – D1 and D2



**Directions:** Begin in athletic stance with neutral pelvis. Begin D1 F/E modified “PNF Pattern” -- (hip extension, abduction, IR, ankle PF to hip flexion, adduction, ER, ankle DF) Transition to D2 F/E pattern – Hip flexion, abduction, IR, ankle DF to hip extension, adduction and ER, ankle PF.

**Duration:** 1 minute

Do not allow lumbar flexion and extension (maintain stable pelvic position).

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### 3. Strength

#### a. Supine ball rotations with pelvic neutral



*Directions:* Lying in supine, place ball between ankles. Begin ball rotations (clockwise and counter clockwise) at 90°. Repeat 10 times clockwise and 10 counter-clockwise. Repeat as time permits. Progress to 45° with neutral pelvis (avoid lumbar lordosis). Do not approach 45° if you are unable to maintain contact between your back and the playing surface.

*Duration:* 1 minute

Maintain pelvic tilt and keep lumbar spine flat on the floor.

#### b. Bridging with adduction (ball squeeze at knees)



*Directions:* Lying supine, rise into bridge position with ball between knees. Squeeze ball using adductors while maintaining neutral pelvic position. Hold for three seconds and slightly release adduction and bridge. Repeat bridge/add exercise. Do not flex the hips.

*Duration:* 1 minute

#### c. Bridging on ball with alternate hip flexion



*Directions:* Lying supine, rise into bridge position with feet on top of ball. Slowly lift one leg off the ball with hip and knee flexion, without flexing at the spine. Return foot to ball and repeat on the opposite side. Do not lose neutral pelvic position.

*Duration:* 1 minute

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**d. Supine bridge on ball – knees to chest**



*Directions:* Lying supine with heels on the ball, lift up into a bridge position. Slowly extend legs without flexing at the hip or the lumbar spine. Now, slowly pull knees to chest maintaining pelvic neutral. Do not allow hips to rotate side to side during this activity (envison a tennis ball on the navel – not allowing it to fall off).

*Duration:* 1 minute

Do not let hips deviate in the transverse plane.

**e. Plank in prone with alternate hip extension**



*Directions:* Lying prone, place ball under ankle joint. Slowly lift one leg into hip extension with out rotating at the waist. Return foot to ball and repeat with the opposite leg. Maintain pelvic neutral (no lumbar lordosis)

*Duration:* 1 minute

**f. Pikes in prone (with push-up progression)**



*Directions:* Start in plank in prone position (see above). Slowly lift hips upward with knee and elbow extension. Return to plank in prone position without dipping into lumbar lordosis. Maintain pelvic neutral (no lumbar lordosis)

*Duration:* 1 minute

**g. Side plank with abduction**



**Directions:** Lying on side, prop up onto elbow. Ensure head, shoulder, hip, knee and ankle are all in a straight alignment. Slowly lift top leg into abduction. Maintain pelvic tilt position (abs and lumbar paraspinals co-contracting). Repeat for 30 seconds and switch sides. Progress this exercise to full extension through the elbow.

**Duration:** 30 seconds on each side = 1 minute

**h. Sidelying adduction**



**Directions:** Lying on side, lift top leg into abduction and hold position. Lift lower leg into adduction to approximate top leg. Do not flex hip or spine – maintain pelvic neutral and linear alignment of head, shoulder, hip, knee and ankle. Repeat 30 seconds on each side.

**Duration:** 1 minute

**i. Simulated speed skate with neutral pelvis**



**Directions:** Starting in athletic stance (pelvic neutral, hip and knee flexion with feet shoulder distance apart), slowly extend left leg out into the frontal plane. Do not extend back into the sagittal plane. Bend knee slightly as you draw leg back to midline. Repeat for 30 seconds and switch legs. Avoid lumbar lordosis with this activity.

**Duration:** 1 minute

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4. Training session – per coaching staff / strength and conditioning staff
5. Cool down – please include these stretches after heart rate has been appropriately reduced

a. Adductor stretches with neutral pelvis



*Directions:* Choose one of both of these variations of an adductor stretch. Avoid lumbar flexion and thoracic kyphosis with these stretches. Hold 30 to 60 seconds and repeat three times. You can use your elbow on the medial side of your knee to enhance the stretch.

b. Piriformis stretch



*Directions:* Lie on back and bend both knees. Fold one ankle over the opposite knee. Place hands behind your thigh and pull knee to chest. Hold for 30 seconds and repeat on the other side.

Repeat 3 times on each limb.

c. Hamstrings



**Directions:** Choose one or both variations of the hamstring stretch. Perform both of these stretches without allowing the lumbar spine to overly flex. Maintain an extended knee and a dorsiflexed foot to enhance the stretch.

Hold for 30 seconds and switch sides. Repeat 3 times.

d. Quadriceps



**Directions:** Reach back with your hand and grab the front of your ankle. Bring your heel to buttock. Make sure your knee is pointed down toward the ground and avoid movement in the sagittal plane. Do not allow knee to wing out to the side and flex at the lumbar spine. Maintain neutral pelvis position (do not allow anterior pelvic rotation).

Hold for 30 seconds and switch sides. Repeat 3 times.

e. Pretzel stretch – deep hip rotators



**Directions:** Lie on your back and bend both of your knees. Fold your knee directly over your opposite knee. Popliteal space will approximate the anterior surface of the patella. Place hands behind thigh and pull knees to chest. Hold for 30 seconds and repeat on the other side. Repeat 3 times.

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|--|---|------------------------|---|---|
| <b>FICHA BIBLIOGRAFICA:</b> Ekstrand J, Gillquist J., Sten-Otto L. (1983) Prevention of soccer injuries. <i>American Journal of Sports Medicine</i> , 11 (3), 116–120.   |   |                        |   |   |
| <b>AUTORES:</b> Ekstrand, J. & Gillquist, J.   |   | <b>DEPORTE:</b> fútbol | <b>EDAD:</b> 17-37 años                           | <b>SEXO:</b> masculino                  |
| <b>MUESTRA:</b> 180 jugadores 15 por equipo 12 equipos (6 GC-6 GE)   | <b>DISEÑO:</b> aplicación de medidas preventivas por entrenadores, preparadores físicos y fisioterapeutas, control de evolución lesional. |                        | <b>NIVEL:</b> senior no especificada la categoría | <b>PAIS:</b> Suecia<br><b>AÑO:</b> 1983 |
| <b>DURACIÓN DEL PROGRAMA:</b> 6 meses  |   |                        |   |   |
| <b>MEDIDAS PROPUESTAS:</b> calentamiento, vuelta a la calma, información a los entrenadores sobre corrección y supervisión del entrenamiento, utilización de espinilleras y tape de tobillos   |   |                        |   |   |
| <b>OBJETIVO PRINCIPAL:</b>   | Prevención general.   |                        |   |   |
| <b>DESCRIPCIÓN GRAFICA DE EJERCICIOS</b>   |   |                        |   |   |
| <b>Corrección del entrenamiento:</b> .no chutar antes del calentamiento, calentamiento de 20 minutos, 10 minutos calentamiento general con balón, utilizando cuadrados de 4-6 jugadores, rondo, 10 minutos de flexibilidad activa de miembro inferior. Vuelta a la calma 5 minutos de carrera y estiramientos pasivos de extremidad inferior en parte final del entreno) |   |                        |   |   |
| <b>Equipamiento:</b> utilización de espinilleras y zapatillas especiales( Adidas especial soccer shoe)   |   |                        |   |   |
| <b>Vendaje de tobillos:</b> tape protector articulación de tobillo   |   |                        |   |   |
| <b>Control en la rehabilitación:</b> regreso con rango articular completo sin dolor y 90% de fuerza, además de progresión en la reincorporación al entrenamiento.  |   |                        |   |   |
| <b>Exclusión:</b> jugadores con inestabilidad de rodilla   |   |                        |   |   |
| <b>Información:</b> sobre el proceso e importancia de la correcta aplicación de las medidas  |   |                        |   |   |
| <b>Supervisión y control.</b> Médicos y fisioterapeutas  |   |                        |   |   |
| <b>RESULTADOS PREVENTIVO:</b> reducción de 75% del numero de lesiones (2,6 lesiones/mes-0,6 lesiones/mes)  |   |                        |   |   |
| <b>VALORACIÓN DEL PROGRAMA:</b> primera aproximación al ámbito de la protección, no se obtuvieron los mismos resultados cuando el plan fue desarrollado por los entrenadores de forma autónoma. Baja valoración del diseño   |   |                        |   |   |

|  |  |  |                                   |                        |
|--|--|--|-----------------------------------|------------------------|
| <b>FICHA BIBLIOGRAFICA:</b> Engebretsen, A.; Myklebust, G.; Holme, I.; Engebretsen, L. & Bahr, R. (2008). Prevention of Injuries Among Male Soccer Players. Prospective, Randomized Intervention Study Targeting Players With Previous Injuries or Reduced Function. <i>The American Journal of Sports Medicine</i> , 36, 1052-1060  |  |  |                                   |                        |
| <b>AUTORES:</b> Engebretsen, A.; Myklebust, G.; Holme, I.; Engebretsen, L. & Bahr, R.  |  | <b>DEPORTE:</b> fútbol   | <b>EDAD:</b> sin definir          | <b>SEXO:</b> masculino |
| <b>MUESTRA:</b> 508 jugadores de 31 equipos  | <b>DISEÑO:</b> decisión en tres grupos HR intervención, HR control, LR control. Se le entrega un programa según zona de riesgo (isquios, adductores, tobillo, rodilla) |  | <b>NIVEL:</b> 1ª, 2ª, 3ª división | <b>PAIS:</b> Noruega   |
|  |  | <b>AÑO:</b> 2006   |                                   |                        |
| <b>DURACIÓN DEL PROGRAMA:</b><br>10 semanas  |  | <b>PROGRESIÓN DE LA CARGA:</b> cada jugador según clasificación recibe su plan específico, tres días a la semana |                                   |                        |
| <b>OBJETIVO PRINCIPAL:</b>   | Prevención tobillo, rodilla, isquiotibiales y adductores   |  |                                   |                        |
| <b>DESCRIPCIÓN GRAFICA DE EJERCICIOS</b>   |  |  |                                   |                        |
| <b>RESULTADOS PREVENTIVO:</b><br>4,7 lesiones/1000 h totales<br>11,9 lesiones/1000 h partido<br>2,7 lesiones/1000 h en entrenamiento<br><b>3,2</b> lesiones/1000 h LR control; <b>5,3</b> lesiones/1000 h LR intervención; <b>4,9</b> lesiones /1000h HR intervención<br><b>2,3</b> lesiones/1000 h de juego<br>La introducción de trabajo preventivo de carácter específico no reduce el riesgo lesional. No encuentran diferencias entre el grupo HR control y HR intervención atribuido posiblemente a una bajo seguimiento del programa.<br>19 de 31 no realizaron un adecuado seguimiento del programa. |  |  |                                   |                        |
| <b>VALORACIÓN DEL PROGRAMA:</b> reducido control en el seguimiento del programa, con lo que las conclusiones presentan una validez cuestionable.   |  |  |                                   |                        |



**FICHA BIBLIOGRAFICA:** Junge, A.; Rösch, D.; Peterson, L.; Graf-Baumann, T. & Dvorak, J.( 2002). Prevention of Soccer Injuries: A Prospective Intervention Study in Youth Amateur Players. *The American Journal of Sports Medicine*, 30, 652 – 659.

**AUTORES:** Junge, A.; Rösch, D.; Peterson, L.; Graf-Baumann, T. & Dvorak, J.      **DEPORTE:** fútbol      **EDAD:** 16-17      **SEXO:** masculino

**MUESTRA:** 194      **DISEÑO:** experimental de grupo control      **NIVEL:** amateur      **PAIS:** Suiza      **AÑO:** 2002

**DURACIÓN DEL PROGRAMA:** 2 año (1 temporada observación/1 temporada aplicación de programa)      **PROGRESIÓN DE LA CARGA:** no existe

**OBJETIVO PRINCIPAL:** Prevención de lesiones múltiple

### DESCRIPCIÓN GRAFICA DE EJERCICIOS

Realizan medidas de calentamiento, vuelta a la calma, vendaje en tobillo, rehabilitación adecuada y promoción del espíritu de juego limpio (FMarc), utilización del programa de ejercicios FMarc, 10 ejercicios diseñados para mejorar la estabilidad de tobillo y articular de la rodilla, flexibilidad, fuerza del tronco, cadera y músculos de extremidad inferior, así como su coordinación, tiempo de reacción y resistencia.



**RESULTADOS PREVENTIVO:** reducción importante de numero de lesiones en el grupo de intervención.

**VALORACIÓN DEL PROGRAMA:** definición escasa de las medidas tomadas, buena muestra en cuanto a número, escasa calidad de la muestra.

**FICHA BIBLIOGRAFICA:** Brooks J.; Fuller, C.; Kemp S. & Reddin, D. (2006). Incidence, Risk, and Prevention of Hamstring Muscle Injuries in Professional Rugby Union. *The American Journal of Sports Medicine*, 34, 8, 1297-1306.

**AUTORES:** Brooks J.; Fuller, C. & Kemp S. **DEPORTE:** rugby **EDAD:** 19-34 años **SEXO:** masculino

|                                  |   |                              |                            |                     |
|----------------------------------|---|------------------------------|----------------------------|---------------------|
| <b>MUESTRA:</b><br>546 jugadores | <b>DISEÑO:</b> Estudios de corte, descriptivo. Cohort study (prevention): 1.- Cuestionario sobre tipo de entrenamiento 2.- Excéntrico/concéntrico 3.- isométrico+Concéntrico/excéntrico 4.- isométrico+Concéntrico/excéntrico + Nordic Hamstrings | <b>NIVEL:</b><br>1ª división | <b>PAIS:</b><br>Inglaterra | <b>AÑO:</b><br>2006 |
|----------------------------------|---|------------------------------|----------------------------|---------------------|

**DURACIÓN DEL PROGRAMA:** 2002-2004) 2 años **PROGRESIÓN DE LA CARGA:** no aparece

**OBJETIVO PRINCIPAL:** Prevención de lesiones en isquiotibiales

**DESCRIPCIÓN GRAFICA DE EJERCICIOS:** No descritos

**RESULTADOS PREVENTIVO:** el ejercicio “Nordic Hamstring” puede reducir considerablemente el numero de lesiones en isquiotibiales.

TABLE 6  
The Influence of Hamstring Training Exercises on the Incidence (Number of Injuries per 1000 Player Hours) and Severity (Days Lost) of Match and Training Injuries<sup>a</sup>

| Injuries     |                    | Hamstring Training Exercises               |   |   |
|--------------|--------------------|--|---|---|
|              |                    | Strengthening<br>(n = 148, f = 80, b = 68) | Strengthening and Stretching<br>(n = 144, f = 77, b = 67) | Strengthening, Stretching, and Nordic Strengthening<br>(n = 200, f = 111, b = 89) |
| Match        | Incidence (95% CI) | 7.5 (4.8-10.2)                             | 7.5 (4.4-10.6)  | 4.2 (2.3-6.0)   |
|              | Severity (95% CI)  | 17 (11-23)                                 | 16 (9-23)   | 13 (7-18)   |
| Training     | Incidence (95% CI) | 0.61 (0.36-0.85)                           | 0.30 (0.11-0.49)  | 0.13 (0.04-0.21)  |
|              | Severity (95% CI)  | 19 (11-26)                                 | 28 (10-45)  | 16 (5-28)   |
| All injuries | Incidence (95% CI) | 1.1 (0.74-1.4)                             | 0.59 (0.34-0.84)  | 0.39 (0.25-0.54)  |
|              | Severity (95% CI)  | 17 (13-23)                                 | 21 (12-30)  | 14 (9-19)   |

<sup>a</sup>f, forwards; b, backs; CI, confidence interval.

**VALORACIÓN DEL PROGRAMA:** no aparece especificada claradamente la progresión de la carga el numero de sesiones, difícil establecer los protocolos utilizados partiendo de los datos del estudio.

**FICHA BIBLIOGRAFICA:** Powers, M.; Buckley, B.; Kaminski, T.; Hubbard, T. & Ortiz, C. (2004) Six Weeks of Strength and Proprioception Training Does Not Affect Muscle Fatigue and Static Balance in Functional Ankle Instability. *Sport Rehabilitation*, 13, 201-227.

**AUTORES:** Powers, M.; Buckley, B.; Kaminski, T.; Hubbard, T. & Ortiz, C.    **DEPORTE:** físicamente activos    **EDAD:** 22-16 años    **SEXO:** masculino y femenino

**MUESTRA:** 38 participantes con inestabilidad unilateral de tobillo    **DISEÑO:** pre-test pos-test estudio randomizado.    **NIVEL:** amateur    **PAIS:** USA    **AÑO:** 2004

**DURACIÓN DEL PROGRAMA:** 6 semanas/ 3 veces por semana después del periodo de entrenamiento    **PROGRESIÓN DE LA CARGA:** utilizan la misma progresión en la carga en cuanto a tensión de los dispositivos elásticos en el trabajo de fuerza y de propiocepción.

| Week | Color | Sets | Reps |
|------|-------|------|------|
| 1    | red   | 3    | 10   |
| 2    | red   | 4    | 10   |
| 3    | green | 3    | 10   |
| 4    | green | 4    | 10   |
| 5    | blue  | 3    | 10   |
| 6    | blue  | 4    | 10   |

**OBJETIVO PRINCIPAL:** Mejorar la estabilidad en articulación de tobillo

**DESCRIPCIÓN GRAFICA DE EJERCICIOS**



Flexión / extensión/ eversión/ Inversión    En equilibrio golpes suaves sobre un apoyo    Combinación de trabajo de fuerza y flexibilidad

**RESULTADOS PREVENTIVO:** miden fatiga de muscular a través de electromiografía y nivel estabilidad sobre una pierna, no mejora ninguno de los dos aspectos en ninguno de los grupos que forman parte del estudio

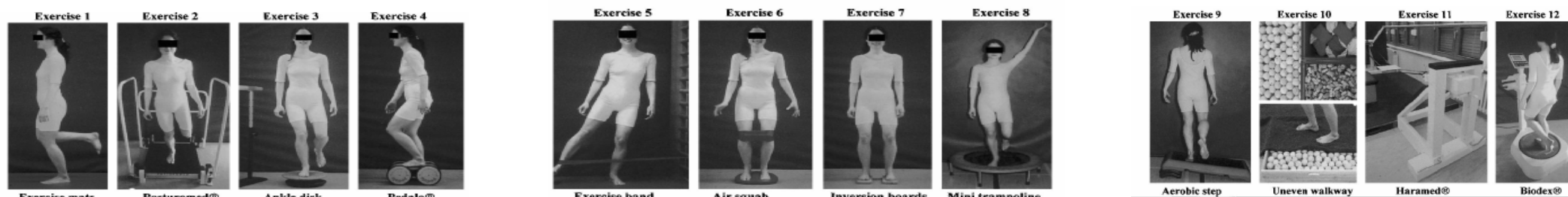
**VALORACIÓN DEL PROGRAMA:** diseño y control de la muestra, descripción ajustada de los programas a utilizar.

**FICHA BIBLIOGRAFICA:** Eils, E. & Rosenbaum, D. (2002) A multi-station proprioceptive exercise program in patients with ankle instability. *Medicine & Science in Sports Exercise*, 33,12, 2001, 1991–1998.

|  |   |                                |                                  |                                   |                     |
|--|---|--------------------------------|----------------------------------|-----------------------------------|---------------------|
| <b>AUTORES:</b> Eils, E. & Rosenbaum, D. |   | <b>DEPORTE:</b> no deportistas | <b>EDAD:</b> 14-47 años          | <b>SEXO:</b> femenino - masculino |                     |
| <b>MUESTRA:</b><br>48 (GE=31, GC=17)     | <b>DISEÑO:</b> pretest, aplicación (sentido de la posición articular, equilibrio 1 pierna tiempo de reacción de tibial anterior, peroneo lateral corto y largo) programa preventivo, postest. |                                | <b>NIVEL:</b><br>no especificado | <b>PAIS:</b><br>Alemania          | <b>AÑO:</b><br>2001 |

**DURACIÓN DEL PROGRAMA:** 6 semanas **PROGRESIÓN DE LA CARGA:** 5-10 min calentamiento, 12 ejercicios x 45 seg trabajo-30 seg cambio de ejercicio

### DESCRIPCIÓN GRAFICA DE EJERCICIOS



| No. | Stations  | Description   | Modifications  |
|-----|---|---|--|
| 1   | Exercise mats (Airex ®) (Gaugler&Lutz oHG, Aalen-Ebnat, GER)              | Single-limb stance on different surfaces  | Standing on carpet, exercise mats with different thickness                           |
| 2   | Posturomed ® (Halder Blöwing, Pullenreuth, GER)                           | Maintain balance in single-limb stance on a mobile platform   | Decrease resistance to increase movement of the platform                             |
| 3   | Ankle disk (Hasi GmbH, Munich, GER)                                       | Maintain balance in single-limb stance on an ankle disk   | Decrease number of pads under the ankle disk to increase movements of the ankle disk |
| 4   | Pedalo ® (Holz-Hortz GmbH, Muensingen, GER)                               | Movement in different directions  | Forward, backward and combined cycling on the Pedalo-device                          |
| 5   | Exercise band (Thera-Band ®) (Thera-Band GmbH, Hadamar, GER)              | Maintain balance in single-limb stance with abduction of the contralateral leg against resistance of an exercise band | Standing on carpet, exercise mats with different thickness                           |
| 6   | Air squab (Sissel ®) (Jela GmbH, Bad Duerkheim, GER)                      | Maintain balance in double- and single-limb stance on an air squab  | Double and single-limb stance with and without knee abduction against exercise band  |
| 7   | Wooden inversion-eversion boards (customized)                             | Maintain balance in double- and single-limb stance on inversion-eversion boards                                       |  |
| 8   | Mini trampoline (Trimilin ®) (Trimilin Ltd, West Sussex, UK)              | Maintain balance in single-limb stance on a mini trampoline   |  |
| 9   | Aerobic step (BodyBench ®) (Megaspport Vertriebs GmbH, Schwetzingen, GER) | Maintain balance with the forefoot on an aerobic step   |  |
| 10  | Uneven walkway (customized)   | Experience different surfaces in walking  |  |
| 11  | Harned ® (Original Norsk-MPTT, Ertstadt-Lechenich, GER)                   | Maintain balance on a horizontally and vertically mobile platform   |  |
| 12  | Biodes ® Balance System (Biodes Medical Systems, Inc, New York, US)       | Maintain balance on a computer controlled moveable platform   |  |

**RESULTADOS PREVENTIVO:** Mejora significativa en los niveles de equilibrio, sentido de la posición y mejora en el tiempo de reacción muscular. Parece un programa adecuado para la prevención de lesiones de tobillo producidas por mecanismo de inversión.

**VALORACIÓN DEL PROGRAMA:** ventaja al tener una baja frecuencia de aplicación y mostrarse efectivo. No utiliza deportistas, realiza con pacientes con inestabilidad crónica en el tobillo

**FICHA BIBLIOGRAFICA:** Tyler, T.; Nicholas, S.; Campbell, R.; Donellan, S. & McHugh, M. (2002) The Effectiveness of a Preseason Exercise Program to Prevent Adductor Muscle Strains in Professional Ice Hockey Players. *The American Journal of Sports Medicine*, 2002, 30, 5.

**AUTORES:** Tyler, T.; Nicholas, S.; Campbell, R.; Donellan, S. & McHugh, M.      **DEPORTE:** hockey hielo      **EDAD:** 24 ± 4.5      **SEXO:** masculino

**MUESTRA:** 58 jugadores      **DISEÑO:** prospectivo de intervención      **NIVEL:** 1ª división profesionales      **PAIS:** USA      **AÑO:** 2002

**DURACIÓN DEL PROGRAMA:** 6 semanas      **PROGRESIÓN DE LA CARGA:** 3 veces por semana, 6 semanas en pretemporada

**OBJETIVO PRINCIPAL:** Prevención de lesiones de aductores

**DESCRIPCIÓN GRAFICA DE EJERCICIOS**

|   |  |
|---|--|
| <p>TABLE 1<br/>Adductor Muscle Strain Injury Prevention Program</p> <p>Warm-up<br/>Bike<br/>Adductor muscle stretching<br/>Sumo squats<br/>Side lunges<br/>Kneeling pelvic tilts</p> <p>Strengthening program<br/>Ball squeezes (legs bent to legs straight)<br/>Different ball sizes<br/>Concentric adduction with weight against gravity<br/>Adduction while standing with a cable column or elastic resistance<br/>Seated adduction machine<br/>Standing with involved foot on sliding board and moving in the sagittal plane<br/>Bilateral adduction on sliding board and moving in the frontal plane (that is, bilateral adduction simultaneously)<br/>Unilateral lunges with reciprocal arm movements</p> <p>Sports-specific training<br/>On ice kneeling adductor pull together<br/>Standing resisted stride lengths with a cable column to simulate skating<br/>Slide skating<br/>Cable column crossover pulls<br/>Clinical Goal: Adduction strength at least 80% of the adduction strength</p> |  |
|---|--|

**RESULTADOS PREVENTIVO:** reducción del número de lesiones de aductores totales. No tanto en relación con el número de exposición. 17-13,6 P=0.08

**VALORACIÓN DEL PROGRAMA:** diseño adecuada, muestra de alto nivel competitivo, plan preventivo bastante detallado si en cuanto a los ejercicios no tanto en relación a la progresión

**FICHA BIBLIOGRAFICA:** Söderman, K.; Werner, S.; Pietillä, T.; Engström, B. & Alfredsom, H. (2000). Balance Board training: prevention of the low extremities in female soccer players. *Sports Medicine*, 8, 356-363

**AUTORES:** Söderman, K.; Werner, S.; Pietillä, T.; Engström, B. & Alfredsom, H.      **DEPORTE:** Fútbol      **EDAD:** 20.4±5.4      **SEXO:** femenino

**MUESTRA:** 221 jugadoras: 121 (GE) 100(GC)      **DISEÑO:** Estudio experimental prospectivo randomizado. Medida de flexibilidad (tobillo/ isquiotibiales /rango en abducción),estabilidad monopodal antes y después.      **NIVEL:** 2ª-3ª división      **PAIS:** Suecia      **AÑO:** 2000

**DURACIÓN DEL PROGRAMA:** 7 meses (una temporada)      **PROGRESIÓN DE LA CARGA:** 15 minutos de equilibrio, (trabajo en casa con su plato)30 días un día por semana el resto de la temporada, 3 veces por semana, 5 ejercicios progresando la dificultad

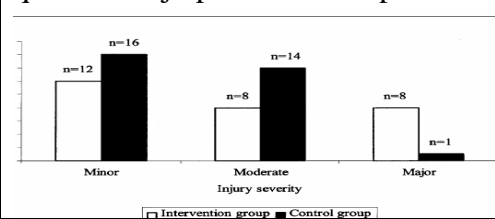
**OBJETIVO PRINCIPAL:** Reducir las lesiones en extremidad inferior

**DESCRIPCIÓN GRAFICA DE EJERCICIOS**



|                                 |                                     |  |  |   |
|---------------------------------|-------------------------------------|--|--|---|
| Apoyo monopodal brazos en cruz. | Apoyo monopodal brazos en el pecho. | Apoyo monopodal botando la pelota en el suelo. | Apoyo monopodal cambiando la pelota de mano. | Dibujar figuras en el aire con la pierna contraria. |
|---------------------------------|-------------------------------------|--|--|---|

**RESULTADOS PREVENTIVO:** mayor ratio de lesiones graves en el grupo de intervención que en el grupo control; en el grupo experimental 5 LCA. Sugieren que el trabajo preventivo en plano inestable no contribuye a reducir las lesiones de miembro inferior. No presentan cambios significativos en flexibilidad.



**Table 3** Injury incidence rates (injuries/1000 h) and ratio of incidence rates (RR), 95% confidence intervals (CI)

|                           | Intervention group (n=62) | Control group (n=78) | RR    | 95% CI    |
|---------------------------|---------------------------|----------------------|-------|-----------|
| Soccer                    | 4.75                      | 3.83                 | 1.24  | 0.74–2.06 |
| Practice                  | 1.82                      | 1.47                 | 1.24  | 0.45–3.41 |
| Game                      | 10.23                     | 8.72                 | 1.17  | 0.65–2.12 |
| Minor injuries, soccer    | 2.03                      | 1.97                 | 1.03  | 0.49–2.17 |
| Moderate injuries, soccer | 1.36                      | 1.73                 | 0.78  | 0.33–1.86 |
| Major injuries, soccer    | 1.36                      | 0.12                 | 10.96 | 2.10–57.3 |

**VALORACIÓN DEL PROGRAMA:** reducción de la muestra a 62(GE)-78(GC) después de la fase experimental, registro telefónico de incidencias lesionales.