



Co-funded by
the European Union



iPrevent

Physical Activity Programme for
Injury Prevention

[This page is intentionally left blank]

Physical Activity Programme for Injury Prevention

Authors:

Daniel Castillo Alvira, PhD

Diego Marqués Jiménez, PhD

Editors:

Marcos López Flores, PhD

Grzegorz Botwina, PhD

Maurizio Bertollo, PhD

Acknowledgements

The following students of the degree in Physical Activity and Sport Sciences (Faculty of Education, University of Valladolid) have participated in the elaboration of the handbook: Víctor Sanz, Jorge Peñaranda, Moisés Nuño, Jorge Botija, Eduardo García, Alba Monge, Sergio Regueiro, Martín de la Rosa, Asier Villegas, Eloy Isla and Xabier Gasko.

Project Information

"I Prevent injuries in grassroots and amateur sports by using digital tools" (iPREVENT) is a three-year project funded by the European Commission's Erasmus+ Sport programme, with the ID: 101089425 dedicated to the researching and promoting injury prevention in grassroots sports.

Disclaimer

iPrevent is funded by the European Commission. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Cover Images:

Images used in the cover art are under a free license with attribution by Ben Weber, Lars Bo Nielsen, Maninder Sidhu and Connor Coyne on Unsplash.

This book is registered under ISBN: 978-84-09-60995-6.

Contents:

1. Background: about the project and its objectives.....	6
About the project's consortium.....	7
2. Research Design	10
Functional Movement Screen	11
1) Deep squat with bar/pike overhead.....	11
2) Hurdle step.....	12
3) Front lunge.....	12
4) Shoulder mobility.....	13
5) Active leg raise.....	14
6) Flexion with trunk stability.....	15
7) Rotational stability.....	15
8) How to measure the score.....	16
Jumping Performances.....	17
1) Squat Jump (SJ).....	18
2) Counter-movement jump (CMJ).....	18
3) Drop Jump (DJ).....	18
4) Lateral Jump (LJ).....	19
5) Standing Broad Jump (SBJ).....	19
Nordic hamstring.....	19
3. Preventive Training Programs	20
Strength training program.....	21
Neuromuscular control training program.....	30

1. Background: about the project and its objectives

Nowadays, one of the main aims of technical and physical staff in soccer is that players perform fully, reaching their maximum potential but in the safest way possible (Raya-González et al. 2019). In this sense, maintaining balance in the triangle composed of recovery-stress and injury prevention seems to be essential during the training process of young soccer players. Also, from the perspective of talent development (Raya-González et al. 2019) injury in young soccer players can lead to

prolonged absence from training and match-play which negatively affects the development of specific soccer-skills (Huijgen et al. 2013). These are considered critical in terms of progression to an elite soccer academy or promotion to professional competitive levels (Read et al. 2018).

In youth soccer, similar number of injuries per 1000h of exposure were registered in males and females (Robles-Palazón et al. 2021). There are 2.77 versus 2.62 injuries per 1000 h in a training context, 14.43

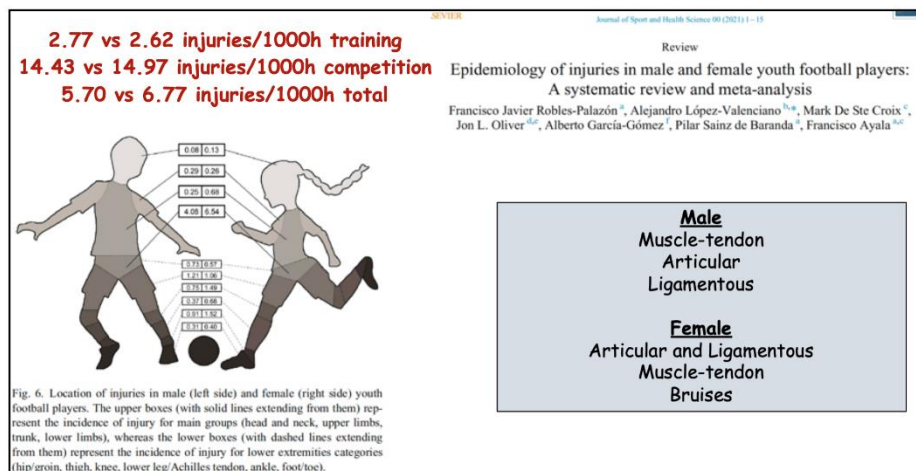


Figure 1. Epidemiology of injuries in male and female youth football players (Robles-Palazón et al. 2021).

versus 14.97 injuries per 1000 h in a competition context, and in total there are 5.70 injuries per 1000 h in males and 6.77 in females (Figure 1).

Since injuries are the main problem that soccer players must face during their career, the interest in to reduce its incidence have gain great importance in sports sciences.

Additionally, when young footballers are considered, the problem is more serious due to the fact that an injury could negatively impact in young athletes in terms of progression and formation.

In this way a European project was born which is entitled “I Prevent injuries in grassroots and amateur sports by using digital tools (iPREVENT)” with the aims of 1) to obtain a better understanding on the injury incidence and preventive strategies of youth soccer players in Europe; 2) to perform strategies to improve performance and to reduce injury risk in athletes; and 3) to convert knowledge, experiences and outcomes from former assessment and intervention into a comprehensive but

applicable programme. This programme will be implemented through an iPrevent App, dedicated to facilitate access to specific injury prevention programmes to coaches and athletes at the grassroots levels.

About the project's consortium

The project is coordinated by the Lithuanian Football Federation (LFF).

The project's consortium is composed by several organisations with extensive experience in the field of sport and injury prevention in grassroots football, including two universities -the University of Valladolid (Spain) and the University of Chieti-Pescara (Italy)-; two football federations -the Lithuanian Football Federation and the Romanian Football Federation; as well as an app development SME, CuiCui Studios, and the European Network for Innovation and Knowledge (EUNIK).



The Lithuanian Football Federation (LFF)

As a member of UEFA and FIFA, it is in charge of all football related activities in Lithuania; youth football development, national and international competitions, promotion of amateur and professional football, football integrity, regulations and disciplinary, all fall under the jurisdiction and responsibilities of LFF.

The Romanian Football Federation (FRF)

The institutional vocation of the FRF is to promote football all over the Romanian territory, to develop the football phenomenon in all its amplitude and to provide an organizational model for Romanian sports. The FRF's activity is based on a set of principles and values that define its identity and manner of acting.



The European Network for Innovation and Knowledge (EUNIK)

The European Network for Innovation and Knowledge (EUNIK) is a Foundation based in the Netherlands but working internationally. EUNIK has been formed by higher education and R&D experts, with more than 15 years' experience working in the international field and with EU Grants management.





The University of Valladolid (UVA)

It counts on four campuses -Valladolid, Palencia, Segovia and Soria-, over nearly 28,000 students enrolled each year, +190 research groups of excellence, 29 doctoral program and 68 postgraduate degrees, accredited international relations and prestigious research Centres.

University G. d'Annunzio of Chieti-Pescara (UdA)

The 'Gabriele d'Annunzio' University, became a state higher education institution in 1982. Today, Ud'A comprises thirteen Departments, five of which are organised under the School of Medicine and Health Sciences and two under the School of Economics, Business, Legal and Sociological Sciences.



Cuicui Studios, SL (CUICUI)

Cuicui Studios (CUICUI) is an EdTech start-up dedicated to the creation of serious games and gamification projects. Born in 2014, our initial activity was focused on the creation of software to improve brain health, detect intelligence profiles and cognitive skills and know the learning styles.



2. Research Design

A randomized quasi-experimental pre-post design will be used to analyse the effects of preventive training programs on physical and functional performances (Figure 2). The training protocol will be established over 15 weeks during the second part of the competitive season, since in this period generally no significant changes in aerobic performances. Players will be randomly assigned to perform the preventive training (iPrevent group) composed by strength and neuromuscular control

exercises or to carry out their usual training (Control group).

In addition to the proposed training programmes, all players continued participating in their usual training (technical and tactical) sessions and official matches. To assess the effectiveness of preventive training program, a functional movement screen battery tests, jumping performances and Nordic hamstring test will be performed before and immediately after the 15-week period intervention. Before each

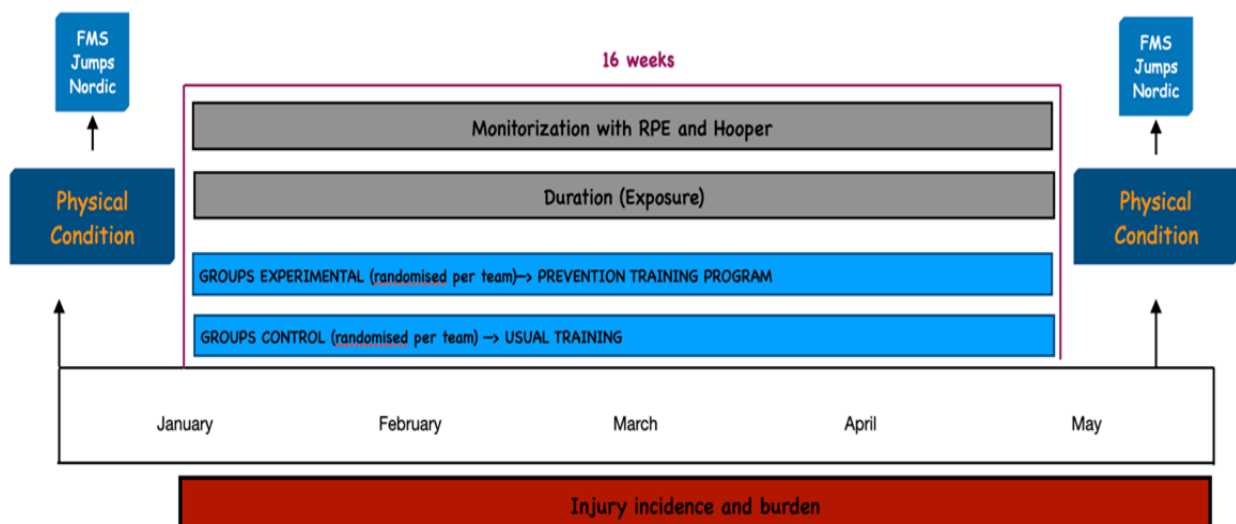


Figure 2. Temporal sequence of research actions in iPREVENT project.

test session, players will undertake a 18-minute standardized warm-up, consisting of 7 minutes of slow jogging and strolling locomotion, followed by 6 minutes of dynamic and ballistic exercises, to finish with 5 minutes of progressive sprints and accelerations. During the 15-week study intervention, the number and type of injuries and absence days will be recorded. Furthermore, the Rating of perceived exertion (RPE; Foster 0–10 scale) and Hooper’s wellbeing state will be also measured after each training session.

Functional Movement Screen

Through this battery, we will be able to evaluate the fundamental movements that the person performs. This battery is made up of seven tests, which put the person evaluated in different positions to be able to assess their weaknesses and imbalances.

1) Deep squat with bar/pike overhead.

Performing a deep squat requires dorsiflexion of the ankles, flexion of the

knees and hips and extension of the spine, and flexion and abduction of the shoulders.

Poor upper extremity execution could be due to low glenohumeral joint or spinal mobility, while poor lower extremity execution could mean low ankle dorsiflexion or low hip flexion.

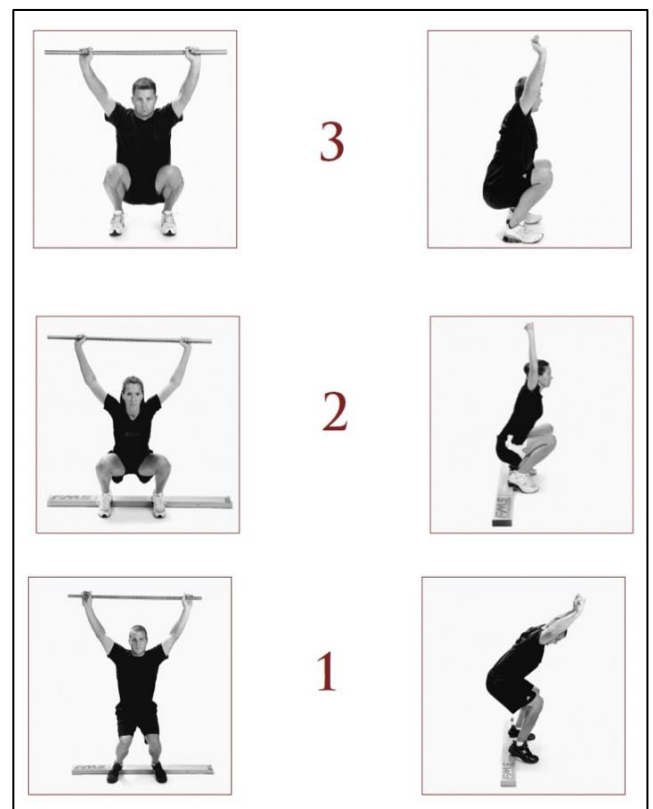


Figure 3. Scores in deep squat with bar/pike overhead. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies.*

If the evaluated person is not able to perform the test correctly, they will be

given the opportunity to repeat it with a wooden plank (approximately 5 cm high and 15 cm wide and a minimum length of 1 meter, so that the evaluated person can be placed comfortably) on which you will rest your heels as shown in the following figure. In this case, it would be marked with 2, since it needed help (the wooden plank) to complete the movement. If, in addition to needing the plank, he made compensatory movements or made a bad execution, he would score a 1.

2) Hurdle step.

Evaluate the stride gesture of the subject during a step with elevation. The movement will require coordination and stability between the hip and trunk as well as single leg balance. Therefore, we will be reassessing the hip-knee-ankle complex.

A score less than 3 could be due to limited ankle dorsiflexion and hip flexion to one leg. If you score a 1, you may have asymmetry in hip mobility and probably low trunk stability.

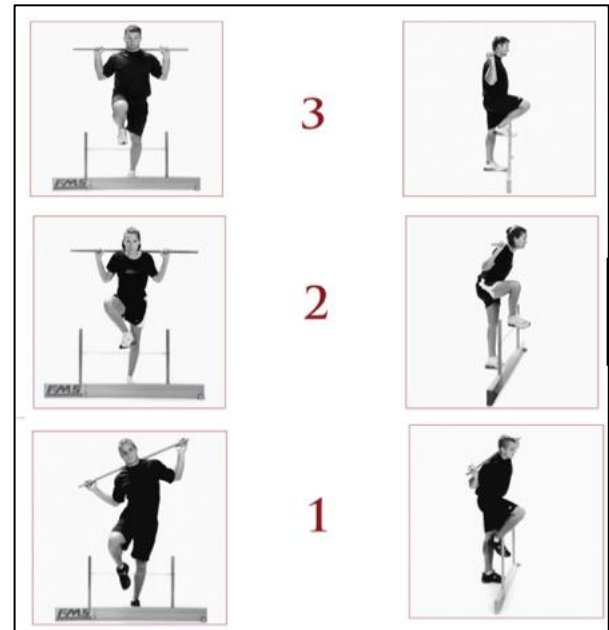


Figure 4. Scores in hurdle step. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies*.

3) Front lunge.

The length of the tibia will be recorded by measuring it from the floor to the tibial tuberosity. The evaluator will be instructed to place his heel at the end of the wooden plank (with a width of 15 cm) or at the end of a tape measure attached to the floor. The length of the tibia will be used to make a mark on the tape measure or plank, at a distance equal to that of the tibia starting to count from the big toe.

The evaluated person will be asked to hold the pike behind the back parallel to the trunk, touching the pike to the head,

spine and intergluteal area. The hand opposite the front foot should hold the spike at the level of the cervical area while the other hand should hold the spike at the lumbar level.



Figure 5. Scores in front lunge. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies.*

The evaluated person will be instructed to take a step forward, keeping the pike in the indicated manner and with both feet pointing forward, stepping on the indicated mark with the front heel, touching the ground with the back knee. Movement must be controlled at all times. Three chances will be given with each leg, and both will be scored. It would be scored with 2 points, since the verticality of the pike is not maintained,

and the feet and the knee do not remain in the same plane. A 1 would be scored if balance is lost or the athlete is unable to get down to the bottom.

4) Shoulder mobility.

The evaluated person will be asked to close their hands into a fist, with the thumb inside it. One of the hands will be passed over the same shoulder and the other under and behind the back with

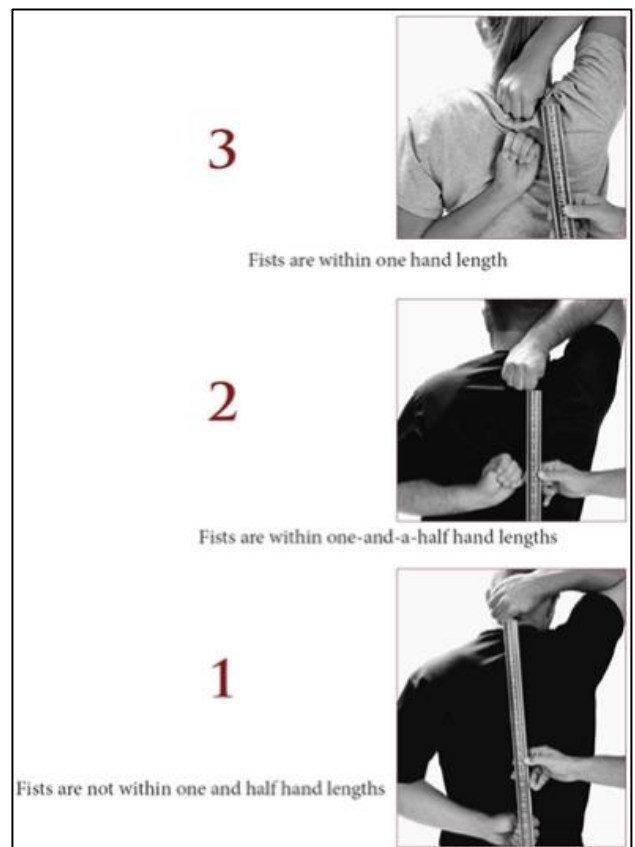


Figure 6. Scores in shoulder mobility. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies.*

the aim that both try to touch each other at the level of the back.

The distance between the hands will be recorded as can be seen in the following image. If the distance is equal to or less than that of the hand, it will be scored with a 3. If the distance between fists is less than 1.5 times, the distance of the hand will be scored with a 2. If it is greater, it will be scored with a 1. A score less than 3 could indicate shortening of the scapulohumeral or axiohumeral muscles. A 1 could indicate scapulothoracic dysfunction.

5) Active leg raise.

The person being evaluated will be asked to lie supine with the arms in anatomical position and legs on top of the wooden plank used in the previous exercises.

The evaluator will identify the midpoint between the patella and the anterior point of the iliac spine (remember anthropometry classes). Once identified, it will place a spike at the height of the marked point perpendicular to the body, as can be seen in the following image.

The subject will be asked to raise the leg (with 90° ankle flexion) and knee extension. During the test the opposite knee should remain in contact with the ground and the feet should point upwards. The head must be resting on the ground at all times.



Figure 5. Scores in active leg raise. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies*.

It will be marked with a 3 if the evaluated person manages to raise the leg passing the tibial malleolus of the same the point marked with the pike. It will be scored with a 2 if the tibial malleolus remains at a

height between the kneecap and the midpoint of the thigh (the mark where we had initially placed the spike).

A score of 1 will be given if the tibial malleolus is below the patella.

6) Flexion with trunk stability.

The person evaluated will be placed in a prone position with their feet glued together. The position that men and women have to adopt is different, since men will start with their thumbs at the height of their foreheads, while women will start with their thumbs at chin height.

The knees are fully extended.

The person being evaluated will be asked to perform a push-up, raising the body like a plank. If the person cannot perform a flexion from that position, the height of the hand will be lowered to the height of the chin in men and to the height of the shoulders in women. A maximum of three attempts will be allowed. A 3 will be scored if the body rises like a plank and without excessive lumbar lordosis. If the hands are lowered to facilitate the exercise, it will be scored with a 2. If the body cannot be raised like a plank, it will be scored with a point.

7) Rotational stability.

The person evaluated is positioned on all fours, with the shoulders and hips at 90° in relation to the trunk. The previously used wooden plank or a 15-centimetre-thick mark will be placed on the floor. The plank or the mark will go parallel to the trunk as can be seen in the following figure.

The subject will be asked to flex the shoulder and extend the leg on the same side. This will be done bilaterally and you will have three attempts on each side. If

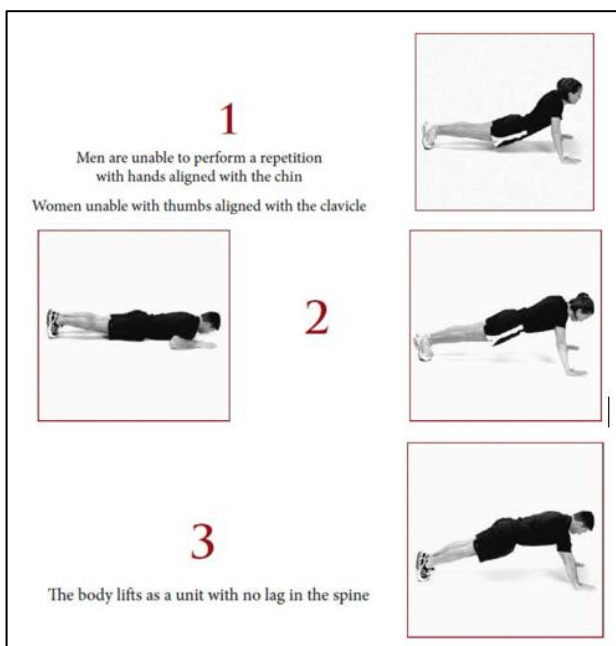


Figure 6. Scores in flexion with trunk stability. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies*.

the person fails to perform the exercise correctly, he can perform the alternate leg and arm extension (raising the left leg at the same time as the right arm).

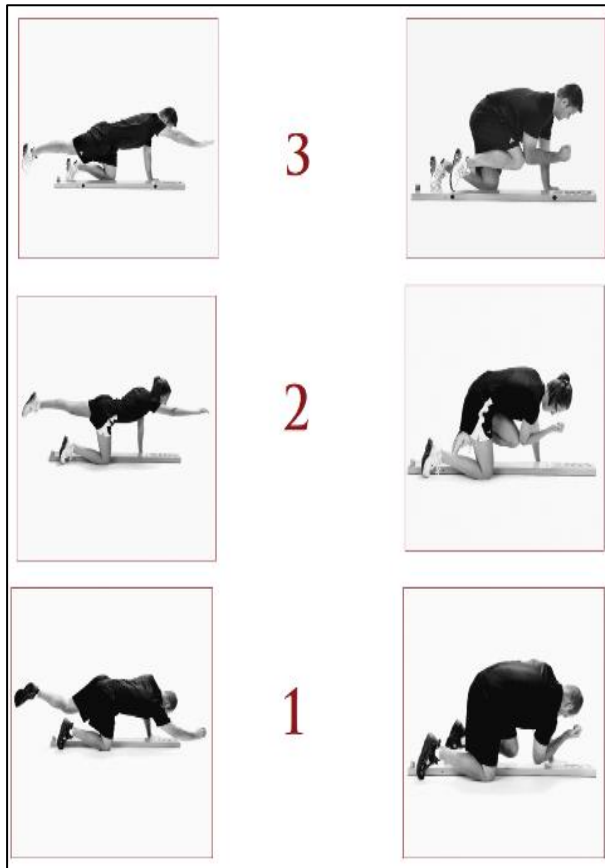


Figure 7. Scores in rotational stability. Taken from Cook (2011). *Functional Movement Systems: Screening, Assessment, Corrective Strategies*

If, even with this modification, the person is not able to perform a straight arm and straight leg raise and becomes unbalanced on each attempt, the score will be 1.

8) How to measure the score

After performing each of these movements, the scores of participants will be taken. As it has been explained exercise by exercise, the score of all the tests that make up the battery ranges from 0 (worst) to 3 (best), taking into consideration issues such as pain or compensatory movements, as follows:

Score	Considerations
0	The person experiences pain during exercise.
1	There is no pain, but the person is not able to complete it.
2	The person does not present pain and completes it, but has to make compensatory movements.
3	The person completes the perfect exercise without any compensatory movement.

Jumping Performances

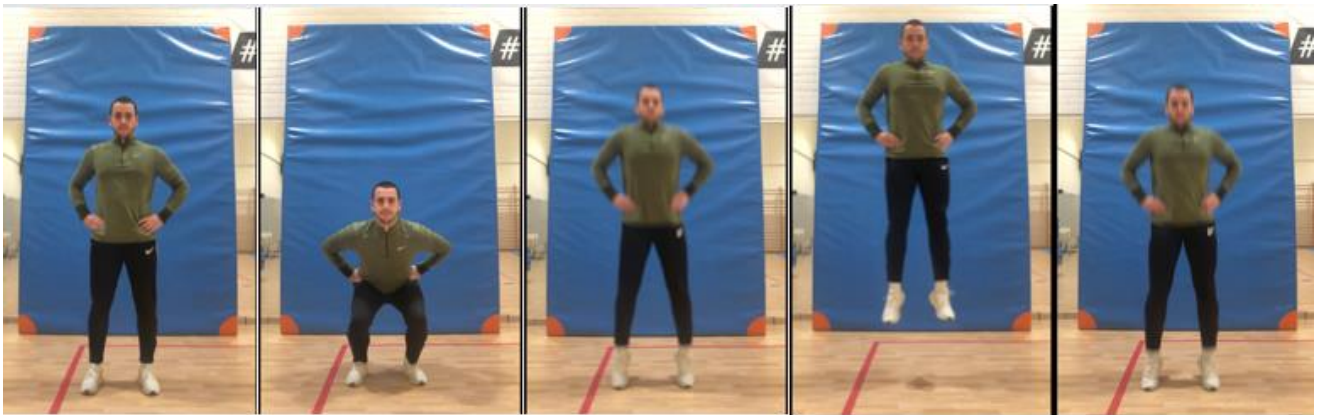
Jump testing comprised the following bilateral and unilateral power tests: countermovement jump (CMJ), squat jump (SJ) and drop jump (DJ). Participants will perform two maximal trials for each jump, separated by a 45 s resting period. The MyJump app will be installed on an iPhone running iOS and filmed with the iPhone's built-in 240 fps high-speed camera at a quality of 720p. SJ assess the explosive strength and athletes must perform a vertical jump starting from the position of a half squat ($\frac{1}{2}$ squat) with knees flexed to a maximum of 90° (ideally, just 90° , since it is the angle that will allow us to jump more efficiently), with the trunk rectum and the hands on the iliac crests. You must perform the test without countermovement and without the help of arm drive. CMJ evaluate the elastic-explosive strength and athletes start from an upright position with your hands on your waist. Next, the subject must perform a 90° knee flexion (half squat)

and immediately, without leaving any waiting time in the flexed position, the vertical jump is executed. It is about executing a countermovement action that favours the use of the elastic component of the muscle. DJ assess the reflex-elastic-explosive strength, and athletes start from standing position on an initial height of 20–40 cm, hands on the waist and body erect. Then, they drop and flex their knees to a 90° angle. Then concentric extension action and shortening-stretching cycle. Also, participants will perform leg lateral jump (LJ) and standing broad jump (SBJ) starting from a standing position, swinging their arms and bending their knees to provide maximal forward frontal and lateral drive, respectively. Using a metric tape, jump-length was determined from the take-off line to the nearest point of landing contact (i.e. back of the heels). The highest distance of two trial will be recorded.

1) Squat Jump (SJ)



2) Counter-movement jump (CMJ)



3) Drop Jump (DJ)



4) Lateral Jump (LJ)



5) Standing Broad Jump (SBJ)



Nordic hamstring

The performance in the Nordic hamstring exercise (NHE) will be evaluated by means of app which measures with high accuracy the breakpoint angle achieved on the NHE, based on recent research that

shows that this angle is highly related to hamstring eccentric strength. Moreover, based on that angle and using some cool biomechanics, it also measures an important metric, the torque (rotational force) at that point.



3. Preventive Training Programs

Preventive training program will last 15 weeks between January and May. These programs will be individualized to the level of participants. In this sense, we have prepared a handbook composed by eight exercises focused in strength and neuromuscular control exercises with different levels of practice (Basic, Advanced and Pro). Then, strength and conditioning coaches can observe

the progression of each exercise and programs. In total there are 48 preventive exercises. Here, professionals can visualize the description and progression of each strength and neuromuscular control exercise:

In each page we will indicate the description, image and progression of the preventive exercises.

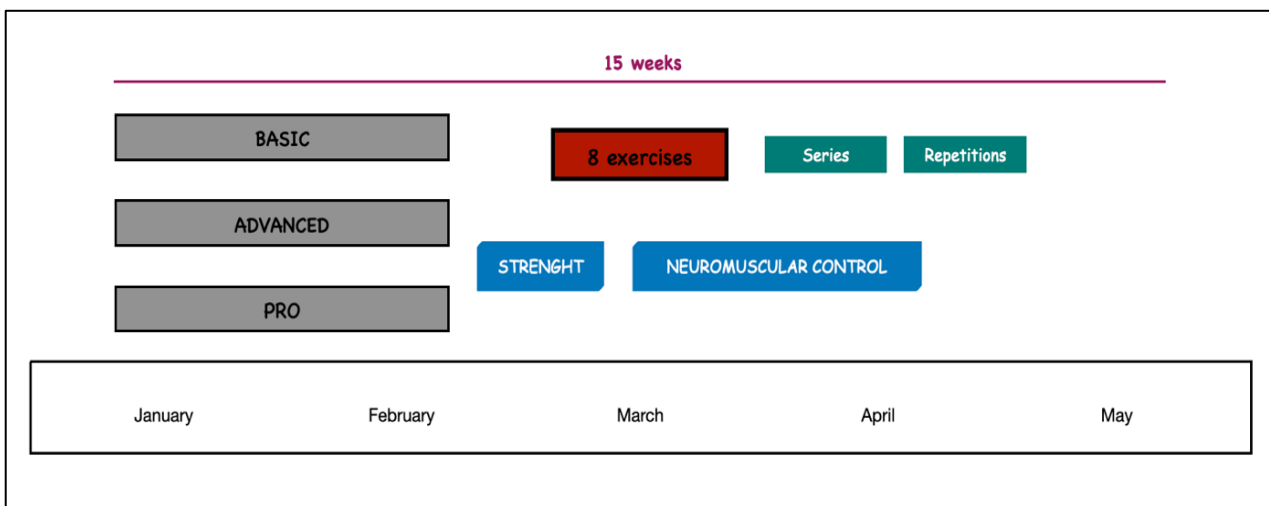


Figure 8. Main characteristics of the preventive training programs









Co-funded by
the European Union









iPrevent


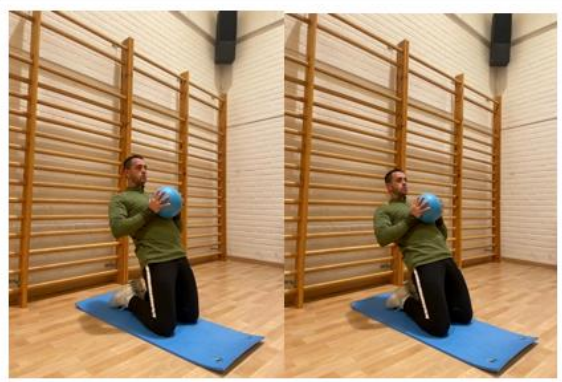

Strength Training Programme




PLYOMETRIC EXERCISES (1)		
BASIC	ADVANCED	PRO
		
<u>Lateral Jumps with medicinal ball</u>	<u>Unilateral Jumps with medicinal ball</u>	<u>Jumps in with medicinal ball</u>
<p>You begin in a standing position to one side of the line selected for the exercise and holding the ball close to your body.</p> <p>The exercise consists of performing lateral jumps over the selected line while extending the elbows, separating the ball from the trunk in each repetition with the medicine ball.</p>	<p>You begin on one leg to one side of the line selected for the exercise and holding the ball close to the body.</p> <p>The exercise consists of performing lateral jumps over the selected line while extending the elbows, separating the ball from the trunk in each repetition. Each series will consist of performing it with each leg.</p>	<p>You begin on one leg placed in the center of 4 cones separated by a distance of 2 meters and holding the ball close to the body.</p> <p>The exercise consists of making jumps in different ways towards each cone, having to return to the central position before going to the next one while extending the elbows separating the ball from the trunk in each repetition. Each series will consist of performing it with each leg.</p>
Week 1: 2x20 rep (30 s rest)	Week 6: 1x20 rep (30 s rest)	Week 11: 1x8 rep (1 min rest)
Week 2: 2x30 rep (30 s rest)	Week 7: 1x30 rep (30 s rest)	Week 12: 1x10 rep (1 min rest)
Week 3: 3x20 rep (45 s rest)	Week 8: 2x20 rep (45 s rest)	Week 13: 1x12 rep (1 min rest)
Week 4: 3x30 rep (45 s rest)	Week 9: 2x30 rep (45 s rest)	Week 14: 2x8 rep (1 min 30 s rest)
Week 5: 4x25 rep (1 min rest)	Week 10: 3x25 rep (1 min rest)	Week 15: 2x10 rep (1 min 30 s rest)




PLYOMETRIC EXERCISES (2)		
BASIC	ADVANCED	PRO
		
<p>BILATERAL HURDLING</p> <p>Five height fences are placed separated by 1 meter. The exercise consists of making jumps getting the maximum possible height to overcome each hurdle seeking to have the shortest possible contact time with the ground when chaining the next jump.</p> <p>A repetition will mean a roundtrip to all the fences.</p>	<p>BILATERAL HURDLING AND GO TO A CONE</p> <p>Five height fences are placed separated by 1 meter. The exercise consists of performing jumps looking for the maximum height to overcome each hurdle and immediately making a lateral displacement towards the cone to go around it and return to the row of hurdles to continue with the sequence.</p>	<p>UNILATERAL HURDLING AND JUMP TO A CONE</p> <p>Five height fences are placed separated by 1.5 meters. The exercise consists of performing jumps looking for the maximum height to overcome each hurdle and immediately performing a lateral jump towards the cone to perform another one back towards the row of hurdles to continue with the sequence.</p>
Week 1: 2x3 rep (1 min rest)	Week 6: 2x3 rep (1 min rest)	Week 11: 2x3 rep (1 min rest)
Week 2: 3x3 rep (1 min 30 s rest)	Week 7: 3x3 rep (1 min 30 s rest)	Week 12: 3x3 rep (1 min 30 s rest)
Week 3: 2x4 rep (1 min rest)	Week 8: 2x4 rep (1 min rest)	Week 13: 2x4 rep (1 min rest)
Week 4: 3x4 rep (1 min 30 s rest)	Week 9: 3x4 rep (1 min 30 s rest)	Week 14: 3x4 rep (1 min 30 s rest)
Week 5: 4x3 rep (2 min rest)	Week 10: 4x3 rep (2 min rest)	Week 15: 4x3 rep (2 min rest)




PLYOMETRIC EXERCISES (3)		
BASIC	ADVANCED	PRO
		
<p align="center">DROP BILATERAL JUMP</p> <p>You drop to the ground and bounce with a jump in the most immediate way possible</p>	<p align="center">DROP BILATERAL JUMP AND JUMP</p> <p>You drop to the ground and bounce with a jump over a fence.</p>	<p align="center">DROP BILATERAL JUMP</p> <p>You drop to the ground and bounce with a unilateral jump in the most immediate way possible</p>
Week 1: 2x10 rep (1 min rest)	Week 6: 2x6 rep (1 min rest)	Week 11: 2x10 rep (1 min rest)
Week 2: 2x12 rep (1 min rest)	Week 7: 2x8 rep (1 min rest)	Week 12: 2x12 rep (1 min rest)
Week 3: 3x8 rep (1 min rest)	Week 8: 3x6 rep (1 min rest)	Week 13: 3x8 rep (1 min rest)
Week 4: 3x10 rep (1 min rest)	Week 9: 3x8 rep (1 min rest)	Week 14: 3x10 rep (1 min rest)
Week 5: 3x12 rep (1 min rest)	Week 10: 3x10 rep (1 min rest)	Week 15: 3x12 rep (1 min rest)

BASIC	NORDIC HAMSTRING ADVANCED	PRO
		
<p><u>NORDIC HAMSTRING ASSISTED</u> Feet will be fixed and an elastic rope will be placed higher up which will be passed at chest level below the armpits. The exercise consists of letting yourself fall forward.</p>	<p><u>NORDIC HAMSTRING</u> The exercise consists of letting yourself fall forward with feet fixed.</p>	<p><u>NORDIC HAMSTRING WITH WEIGHT</u> The exercise consists of letting yourself fall forward with feet fixed and medicine ball in hands.</p>
<p>Week 1: 2x10 rep (1 min rest)</p>	<p>Week 6: 2x10 rep (1 min rest)</p>	<p>Week 11: 2x10 rep (1 min rest)</p>
<p>Week 2: 2x10 rep (45 s rest)</p>	<p>Week 7: 2x10 rep (45 s rest)</p>	<p>Week 12: 2x10 rep (45 s rest)</p>
<p>Week 3: 2x10 rep (30 s rest)</p>	<p>Week 8: 2x10 rep (30 s rest)</p>	<p>Week 13: 2x10 rep (30 s rest)</p>
<p>Week 4: 2x12 rep (30 s rest)</p>	<p>Week 9: 2x12 rep (30 s rest)</p>	<p>Week 14: 2x12 rep (30 s rest)</p>
<p>Week 5: 2x15 rep (30 s rest)</p>	<p>Week 10: 2x15 rep (30 s rest)</p>	<p>Week 15: 2x15 rep (30 s rest)</p>

BASIC	REVERS NORDIC ADVANCED	PRO
		
<p align="center">REVERS NORDIC</p> <p>The exercise consists of starting from a position with your knees supported and your body straight, begin to go down backwards with your body completely straight, and come back up to the starting position.</p>	<p align="center">REVERS NORDIC CON PESO</p> <p>The exercise consists of starting from a position with your knees supported and your body straight, begin to go down backwards with your body completely straight, and come back up to the starting position. In addition, medicine ball in hands.</p>	<p align="center">REVERS NORDIC RESISTIDO</p> <p>The exercise consists of resisting the force of the elastic rope attached to the back. Starting position will be with your knees supported and your body straight.</p>
<p>Week 1: 2x10 rep (1 min rest)</p>	<p>Week 6: 2x10 rep (1 min rest)</p>	<p>Week 11: 2x10 rep (1 min rest)</p>
<p>Week 2: 2x10 rep (45 s rest)</p>	<p>Week 7: 2x10 rep (45 s rest)</p>	<p>Week 12: 2x10 rep (45 s rest)</p>
<p>Week 3: 2x10 rep (30 s rest)</p>	<p>Week 8: 2x10 rep (30 s rest)</p>	<p>Week 13: 2x10 rep (30 s rest)</p>
<p>Week 4: 2x12 rep (30 s rest)</p>	<p>Week 9: 2x12 rep (30 s rest)</p>	<p>Week 14: 2x12 rep (30 s rest)</p>
<p>Week 5: 2x15 rep (30 s rest)</p>	<p>Week 10: 2x15 rep (30 s rest)</p>	<p>Week 15: 2x15 rep (30 s rest)</p>

BASIC	LUNGE ADVANCED	PRO
		
<p align="center"><u>LUNGE</u></p> <p>Long strides are made, going down until almost touching the knee of the back leg on the ground. Each series will consist of performing it with each leg.</p>	<p align="center"><u>JUMP WITH DROP IN LUNGE</u></p> <p>Perform a landing jump with one leg in front of the other (simulates the lounge position). Each series will consist of performing it with each leg.</p>	<p align="center"><u>4 LUNGES WITH JUMP</u></p> <p>Perform 4 jump lunges with jump</p>
<p>Week 1: 2x10 rep (1 min rest)</p>	<p>Week 6: 2x10 rep (1 min rest)</p>	<p>Week 11: 2x10 rep (1 min rest)</p>
<p>Week 2: 2x10 rep (45 s rest)</p>	<p>Week 7: 2x10 rep (45 s rest)</p>	<p>Week 12: 2x10 rep (45 s rest)</p>
<p>Week 3: 2x10 rep (30 s rest)</p>	<p>Week 8: 2x10 rep (30 s rest)</p>	<p>Week 13: 2x10 rep (30 s rest)</p>
<p>Week 4: 2x12 rep (30 s rest)</p>	<p>Week 9: 2x12 rep (30 s rest)</p>	<p>Week 14: 2x12 rep (30 s rest)</p>
<p>Week 5: 2x15 rep (30 s rest)</p>	<p>Week 10: 2x15 rep (30 s rest)</p>	<p>Week 15: 2x15 rep (30 s rest)</p>

BASIC	JUMPS (1) ADVANCED	PRO
		
<p align="center"><u>STRIDE TO A BOX</u></p> <p>From a standing position and, aimed to higher speed execution, raising the foot to the box. Each series will consist of performing it with each leg.</p>	<p align="center"><u>BILATERAL JUMP TO A BOX</u></p> <p>From a standing position and, aimed to higher speed execution, perform a bilateral jump to a box bending your knees</p>	<p align="center"><u>RESISTED ACCELERATION AND JUMP TO A BOX</u></p> <p>Carry out a resisted run (grabbed from behind) and when released, brake in front of the box and perform a bilateral jump to a box bending your knees</p>
<p>Week 1: 2x10 rep (1 min rest)</p>	<p>Week 6: 2x10 rep (1 min rest)</p>	<p>Week 11: 2x10 rep (1 min rest)</p>
<p>Week 2: 2x10 rep (45 s rest)</p>	<p>Week 7: 2x10 rep (45 s rest)</p>	<p>Week 12: 2x10 rep (45 s rest)</p>
<p>Week 3: 2x10 rep (30 s rest)</p>	<p>Week 8: 2x10 rep (30 s rest)</p>	<p>Week 13: 2x10 rep (30 s rest)</p>
<p>Week 4: 2x12 rep (30 s rest)</p>	<p>Week 9: 2x12 rep (30 s rest)</p>	<p>Week 14: 2x12 rep (30 s rest)</p>
<p>Week 5: 2x15 rep (30 s rest)</p>	<p>Week 10: 2x15 rep (30 s rest)</p>	<p>Week 15: 2x15 rep (30 s rest)</p>

BASIC		JUMPS (2) ADVANCED		PRO	
					
<p align="center"><u>HALF-SQUAT WITH TRX</u></p> <p>From a half-squat position, with legs shoulder-width apart without the knees exceeding the toes, generating tension in the TRX, the concentric movement is performed with full knee extension.</p>		<p align="center"><u>HALF-SQUAT AND JUMP WITH TRX</u></p> <p>From a half-squat position, with legs shoulder-width apart without the knees exceeding the toes, generating tension in the TRX, a jump is performed with full knee extension.</p>		<p align="center"><u>UNILATERAL HALF-SQUAT AND JUMP WITH TRX</u></p> <p>From a half-squat position, with legs shoulder-width apart without the knees exceeding the toes, generating tension in the TRX, a unilateral jump is performed with full knee extension. Each series will consist of performing it with each leg.</p>	
<p>Week 1: 2x10 rep (1 min rest)</p>		<p>Week 6: 2x10 rep (1 min rest)</p>		<p>Week 11: 2x6 rep (1 min rest)</p>	
<p>Week 2: 2x10 rep (45 s rest)</p>		<p>Week 7: 2x10 rep (45 s rest)</p>		<p>Week 12: 2x6 rep (45 s rest)</p>	
<p>Week 3: 2x10 rep (30 s rest)</p>		<p>Week 8: 2x10 rep (30 s rest)</p>		<p>Week 13: 2x6 rep (30 s rest)</p>	
<p>Week 4: 2x12 rep (30 s rest)</p>		<p>Week 9: 2x12 rep (30 s rest)</p>		<p>Week 14: 2x8 rep (30 s rest)</p>	
<p>Week 5: 2x15 rep (30 s rest)</p>		<p>Week 10: 2x15 rep (30 s rest)</p>		<p>Week 15: 2x10 rep (30 s rest)</p>	






Co-funded by
the European Union









iPrevent


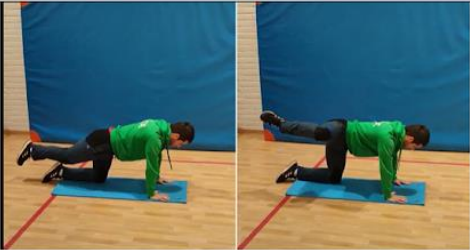
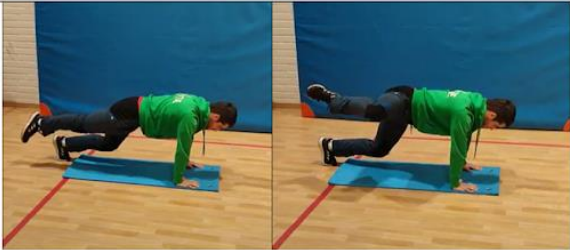
Neuromuscular control
Training Programme


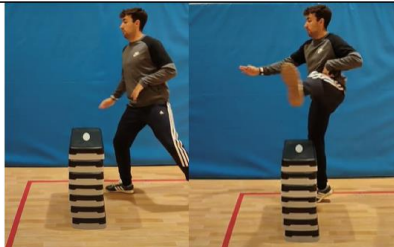






NEUROMUSCULAR CONTROL (1)		
BASIC	ADVANCED	PRO
		
<p align="center"><u>SINGLE LEG DEADLIFT</u></p> <p>You will start from a unilateral standing position. A hip extension is performed bringing the chest closer to the ground until the stretched leg is completely straight to then return to the starting position. Weight can be included in the hand.</p>	<p align="center"><u>BALL IN DIFFERENT WAYS</u></p> <p>You will start from a unilateral standing position in front of a partner, who throws a medicine ball at different heights. The pass is received and returned to the teammate. Each series will consist of performing it with each leg.</p>	<p align="center"><u>CONTROL WITH A BAND</u></p> <p>You will start from a unilateral standing position in front of a partner. Both grab the end of an elastic band trying to destabilize the other by pulling to their side or up and down. Each series will consist of performing it with each leg.</p>
<p>Week 1: 2x8 rep (1 min rest)</p>	<p>Week 6: 2x8 rep (1 min rest)</p>	<p>Week 11: 2x20 s (30 s rest)</p>
<p>Week 2: 2x10 rep (1 min rest)</p>	<p>Week 7: 2x10 rep (1 min rest)</p>	<p>Week 12: 2x25 s (30 s rest)</p>
<p>Week 3: 3x8 rep (1 min rest)</p>	<p>Week 8: 3x8 rep (1 min rest)</p>	<p>Week 13: 2x30 s (30 s rest)</p>
<p>Week 4: 3x10 rep (1 min rest)</p>	<p>Week 9: 3x10 rep (1 min rest)</p>	<p>Week 14: 3x20 s (30 s rest)</p>
<p>Week 5: 3x12 rep (1 min rest)</p>	<p>Week 10: 3x12 rep (1 min rest)</p>	<p>Week 15: 3x30 s (30 s rest)</p>




NEUROMUSCULAR CONTROL (2)		
BASIC	ADVANCED	PRO
		
<u>LATERAL GLUTEUS</u>	<u>LATERAL GLUTEUS WITH BAND</u>	<u>ISOMETRIC LATERAL GLUTEUS</u>
Lying laterally on the floor with the legs fully extended, the leg furthest from the floor will be abducted. Each series will consist of performing it with each leg.	Lying laterally on the floor with the legs fully extended, the leg furthest from the floor will be abducted with an elastic band. Each series will consist of performing it with each leg.	Form a lateral isometric position on the floor with the legs fully extended, the leg furthest from the floor will be abducted. Each series will consist of performing it with each leg.
Week 1: 2x15 rep (30 s rest)	Week 6: 2x10 rep (30 s rest)	Week 11: 2x6 rep (30 s rest)
Week 2: 2x20 rep (30 s rest)	Week 7: 2x12 rep (30 s rest)	Week 12: 2x8 rep (30 s rest)
Week 3: 2x25 rep (30 s rest)	Week 8: 2x15 rep (30 s rest)	Week 13: 2x10 rep (30 s rest)
Week 4: 3x20 rep (30 s rest)	Week 9: 3x12 rep (30 s rest)	Week 14: 3x6 rep (30 s rest)
Week 5: 3x25 rep (30 s rest)	Week 10: 3x15 rep (30 s rest)	Week 15: 3x8 rep (30 s rest)




NEUROMUSCULAR CONTROL (3)		
BASIC	ADVANCED	PRO
		
<u>HIP ABDUCTION AND EXTERNAL ROTATION</u>	<u>HIP ABDUCTION AND EXTERNAL/INTERNAL ROTATION</u>	<u>HIP ABDUCTION AND EXTERNAL/INTERNAL ROTATION</u>
From seated, with the hands resting on the ground and the legs bent, keeping the soles of the feet resting on the ground at approximately shoulder height. From this position, a hip abduction and external rotation movement is performed unilaterally, with each leg.	From seated, with the hands resting on the ground and the legs bent, keeping the soles of the feet resting on the ground at approximately shoulder height. From this position, a hip abduction, and internal rotation in one leg, and external rotation in the other leg.	From seated, a hip abduction, and internal rotation in one leg, and external rotation in the other leg. Hip extension and retroversion of the pelvis. It ends in a kneeling position.
Week 1: 2x10 rep (1 min rest)	Week 6: 2x10 rep (1 min rest)	Week 11: 2x8 rep (1 min rest)
Week 2: 2x12 rep (1 min rest)	Week 7: 2x12 rep (1 min rest)	Week 12: 2x10 rep (1 min rest)
Week 3: 3x8 rep (1 min rest)	Week 8: 3x8 rep (1 min rest)	Week 13: 2x12 rep (1 min rest)
Week 4: 3x10 rep (1 min rest)	Week 9: 3x10 rep (1 min rest)	Week 14: 3x8 rep (30 s rest)
Week 5: 3x12 rep (1 min rest)	Week 10: 3x12 rep (1 min rest)	Week 15: 3x10 rep (30 s rest)

NEUROMUSCULAR CONTROL (4)		
BASIC	ADVANCED	PRO
		
HIP ABDUCTION (1)	HIP ABDUCTION (2)	HIP ABDUCTION (3)
From quadruped position, that is, with hands, knees and toes resting on the ground. A unilateral hip abduction is performed. Each series will consist of performing it with each leg.	From quadruped position, that is, with hands, knees and toes resting on the ground. A unilateral hip abduction and knee extension is performed. Each series will consist of performing it with each leg.	From hands and one toe position resting on the ground. A unilateral hip abduction is performed. Each series will consist of performing it with each leg.
Week 1: 2x15 rep (30 s rest)	Week 6: 2x10 rep (30 s rest)	Week 11: 2x6 rep (30 s rest)
Week 2: 2x20 rep (30 s rest)	Week 7: 2x12 rep (30 s rest)	Week 12: 2x8 rep (30 s rest)
Week 3: 2x25 rep (30 s rest)	Week 8: 2x15 rep (30 s rest)	Week 13: 2x10 rep (30 s rest)
Week 4: 3x20 rep (30 s rest)	Week 9: 3x12 rep (30 s rest)	Week 14: 3x6 rep (30 s rest)
Week 5: 3x25 rep (30 s rest)	Week 10: 3x15 rep (30 s rest)	Week 15: 3x8 rep (30 s rest)

NEUROMUSCULAR CONTROL (5)		
BASIC	ADVANCED	PRO
		
<p align="center"><u>PASS HURDLE (1)</u></p> <p>The exercise consists of passing 5 hurdles as follows: bend the knee 90° and maintain the dorsiflexion of the foot. Accompaniment of the arms and hip in retroversion. Each series will consist of performing it with each leg.</p>	<p align="center"><u>PASS HURDLE (2)</u></p> <p>The exercise consists of passing 5 hurdles as follows: knee extended and hip abduction. Each series will consist of performing it with each leg.</p>	<p align="center"><u>PASS HURDLE (3)</u></p> <p>The exercise consists of passing 5 hurdles as follows: knee flexion and hip abduction. Each series will consist of performing it with each leg.</p>
Week 1: 1x4 rep (30 s rest)	Week 6: 1x4 rep (30 s rest)	Week 11: 1x4 rep (30 s rest)
Week 2: 1x6 rep (30 s rest)	Week 7: 1x6 rep (30 s rest)	Week 12: 1x6 rep (30 s rest)
Week 3: 1x8 rep (30 s rest)	Week 8: 1x8 rep (30 s rest)	Week 13: 1x8 rep (30 s rest)
Week 4: 2x6 rep (30 s rest)	Week 9: 2x6 rep (30 s rest)	Week 14: 2x6 rep (30 s rest)
Week 5: 2x8 rep (30 s rest)	Week 10: 2x8 rep (30 s rest)	Week 15: 2x8 rep (30 s rest)

NEUROMUSCULAR CONTROL (6)		
BASIC	ADVANCED	PRO
		
<u>PRONE PLANK</u>	<u>PRONE PLANK UNBALANCED</u>	<u>PRONE PLACK WITH A BAND</u>
It is a prone plank exercise. Important to keep contracting the gluteus so that the core works and trying y to maintain balance without rocking to the sides.	It is a prone plank exercise with supporting one arm alternatively. Important to keep contracting the gluteus so that the core works and trying y to maintain balance without rocking to the sides.	It is a prone plank exercise with holding an elastic band against a partner. Important to keep contracting the gluteus so that the core works and trying y to maintain balance without rocking to the sides.
Week 1: 2x20 s (1 min rest)	Week 6: 2x10 rep (30 s rest)	Week 11: 2x20 s (1 min rest)
Week 2: 2x25 s (1 min rest)	Week 7: 2x12 rep (30 s rest)	Week 12: 2x25 s (1 min rest)
Week 3: 2x30 s (1 min rest)	Week 8: 2x15 rep (30 s rest)	Week 13: 2x30 s (1 min rest)
Week 4: 3x20 s (1 min rest)	Week 9: 3x12 rep (30 s rest)	Week 14: 3x20 s (1 min rest)
Week 5: 3x25 s (1 min rest)	Week 10: 3x15 rep (30 s rest)	Week 15: 3x25 s (1 min rest)

NEUROMUSCULAR CONTROL (7)		
BASIC	ADVANCED	PRO
		
<u>PRESS PALLOF</u>	<u>PRESS PALLOF WITH PARTNER</u>	<u>PRESS PALLOF IN LUNGE</u>
<p>From a standing position and with the body positioned perpendicular to the place from which the elastic band comes out, the arms are extended forward, trying to make a straight line up to the maximum extension of the elbow, forming an angle of approximately 90° with the trunk. Each series will consist of performing it with each side.</p>	<p>The arms are extended forward, trying to make a straight line up to the maximum extension of the elbow, forming an angle of approximately 90° with the trunk. A partner holds the elastic band. Each series will consist of performing it with each side.</p>	<p>From a lunge position and with the body positioned perpendicular to the place from which the elastic band comes out, the arms are extended forward, trying to make a straight line up to the maximum extension of the elbow, forming an angle of approximately 90° with the trunk. Each series will consist of performing it with each side.</p>
Week 1: 2x15 rep (1 min rest)	Week 6: 2x10 rep (1 min rest)	Week 11: 2x10 rep (1 min rest)
Week 2: 2x20 rep (1 min rest)	Week 7: 2x12 rep (1 min rest)	Week 12: 2x12 rep (1 min rest)
Week 3: 2x25 rep (1 min rest)	Week 8: 2x15 rep (1 min rest)	Week 13: 2x15 rep (1 min rest)
Week 4: 3x20 rep (1 min rest)	Week 9: 3x12 rep (1 min rest)	Week 14: 3x12 rep (1 min rest)
Week 5: 3x25 rep (1 min rest)	Week 10: 3x15 rep (1 min rest)	Week 15: 3x15 rep (1 min rest)

NEUROMUSCULAR CONTROL (8)		
BASIC	ADVANCED	PRO
		
<p><u>PASSES WITH TENNIS BALL</u></p> <p>In pairs, face each other with a tennis ball. The ball is thrown in different directions and in unipodal support, it receives and returns it to the partner.</p>	<p><u>CLOCK DIRECTIONS</u></p> <p>Starting from a unipodal position, the opposite leg is extended by flexing the supporting leg, simulating the movement of the hands of a clock. He will perform a turn, extending his leg through the different positions of the "circle" that you must draw.</p>	<p><u>UNBALANCE AND PASS</u></p> <p>From a standing position and in front of a bosu, the subject will approach the bosu frontally and jump on it unilaterally, to then push off it and land with the same driving leg on the ground. Once the subject is going to contact the ground, a teammate will throw him a ball that he must receive from the unipodal position in which he finished the jump.</p>
<p>Week 1: 2x15 s (30 s rest)</p> <p>Week 2: 2x20 s (30 s rest)</p> <p>Week 3: 2x25 s (30 s rest)</p> <p>Week 4: 3x15 s (30 s rest)</p> <p>Week 5: 3x20 s (30 s rest)</p>	<p>Week 6: 1x4 rep (30 s rest)</p> <p>Week 7: 1x6 rep (30 s rest)</p> <p>Week 8: 1x8 rep (30 s rest)</p> <p>Week 9: 2x6 rep (30 s rest)</p> <p>Week 10: 2x8 rep (30 s rest)</p>	<p>Week 6: 1x8 rep (30 s rest)</p> <p>Week 7: 1x10 rep (30 s rest)</p> <p>Week 8: 1x12rep (30 s rest)</p> <p>Week 9: 2x8 rep (30 s rest)</p> <p>Week 10: 2x10 rep (30 s rest)</p>

Disclaimer

“I Prevent injuries in grassroots and amateur sports by using digital tools” is funded by the European Commission. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Cover Images:

Images used in the cover art are under a free license with attribution by Ben Weber, Lars Bo Nielsen and Maninder Sidhu on Unsplash.

This book is registered under ISBN: 978-84-09-60995-6.

[This page is intentionally left blank]





iPrevent