



SINGAPORE SPORT & PERFORMANCE CONFERENCE 2022

From Youth to Elite Sport: Harnessing Potential and the Pursuit of Excellence

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Organised by



Supporting Partner



Injury Prevention Exercise Programmes – Drawing Lessons from FIFA and World Rugby

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Objectives

1. Importance of injury prevention
2. Implementation of an injury prevention programme
3. Ingredients of an effective injury prevention exercise programme
4. Examples
 - FIFA
 - World Rugby

Poll time

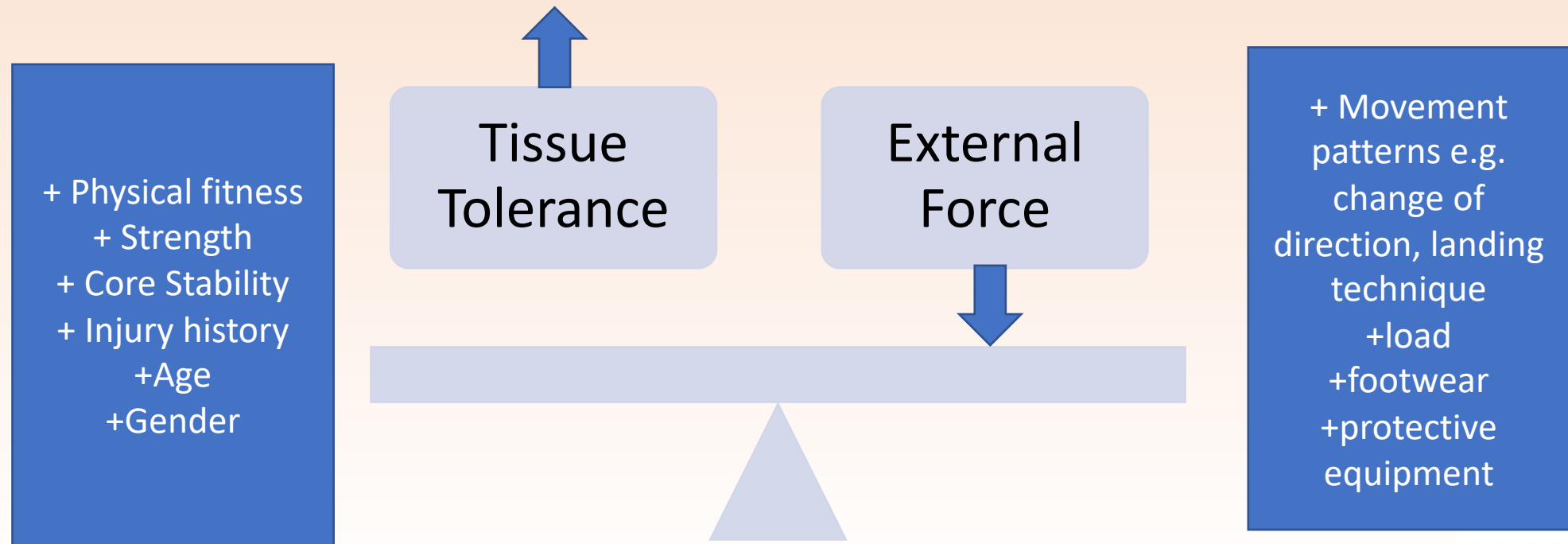
Importance of Injury Prevention

- Costs savings
- Reduced missed training / games
- Reduce player drop-out
- Greater player availability
- Better team sporting performance
 - Higher league ranking
 - Higher points per match
 - Greater success in tournaments

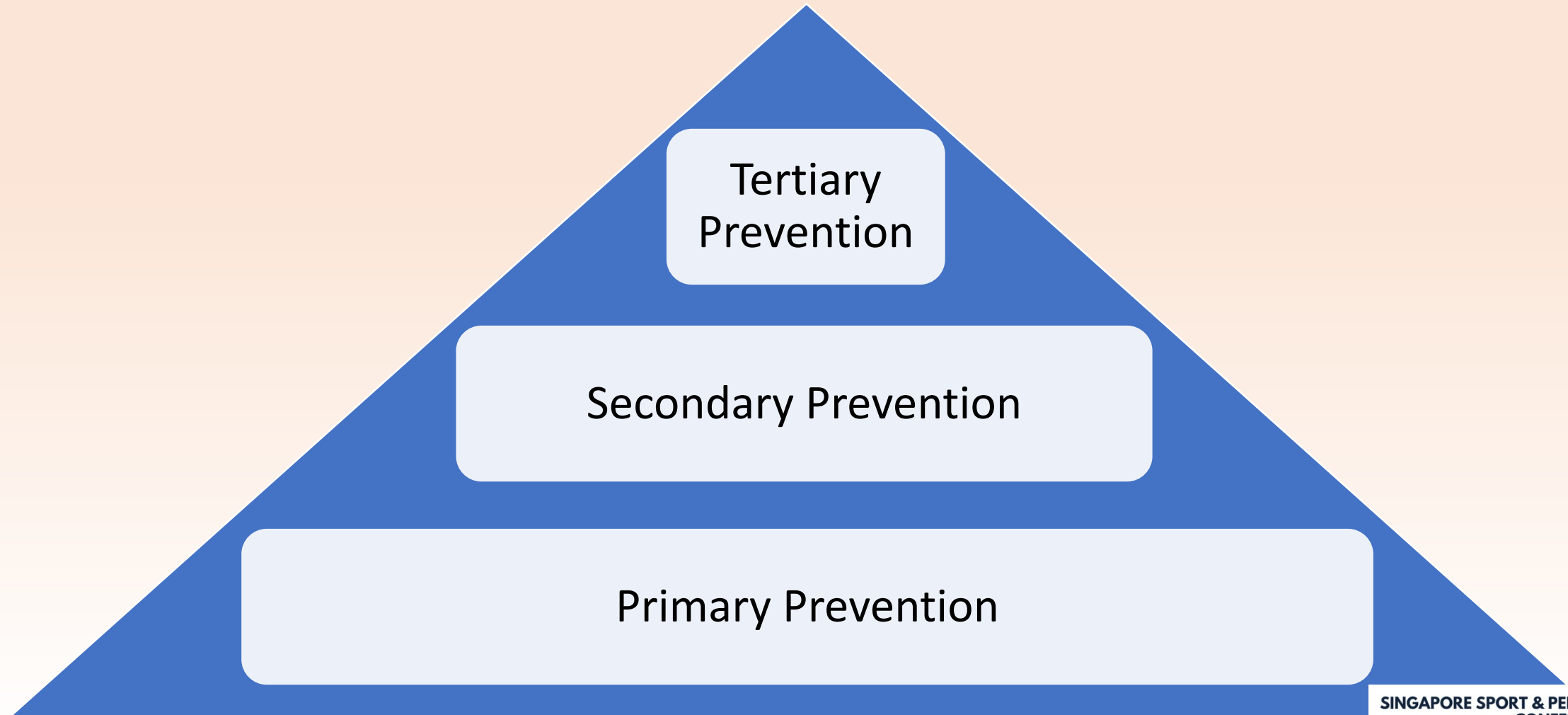
1. SadigurskyD., BraidJ. A., De LiraD. N. L., MachadoB. A. B., CarneiroR. J. F., & ColavolpeP. O. (2017). The FIFA 11+ injury prevention program for soccer players: A systematic review. *BMC Sports Science, Medicine and Rehabilitation*. <https://doi.org/10.1186/s13102-017-0083-z>
2. BizziniM., JungeA., & DvorakJ. (2013). Implementation of the FIFA 11+ football warm up program: How to approach and convince the Football associations to invest in prevention. *British Journal of Sports Medicine*. <https://doi.org/10.1136/bjsports-2012-092124>
3. HägglundM., WaldénM., MagnussonH., KristensonK., BengtssonH., & EkstrandJ. (2013). Injuries affect team performance negatively in professional football: An 11-year follow-up of the UEFA Champions League injury study. *British Journal of Sports Medicine*. <https://doi.org/10.1136/bjsports-2013-092215>

Why do Sport Injuries Occur?

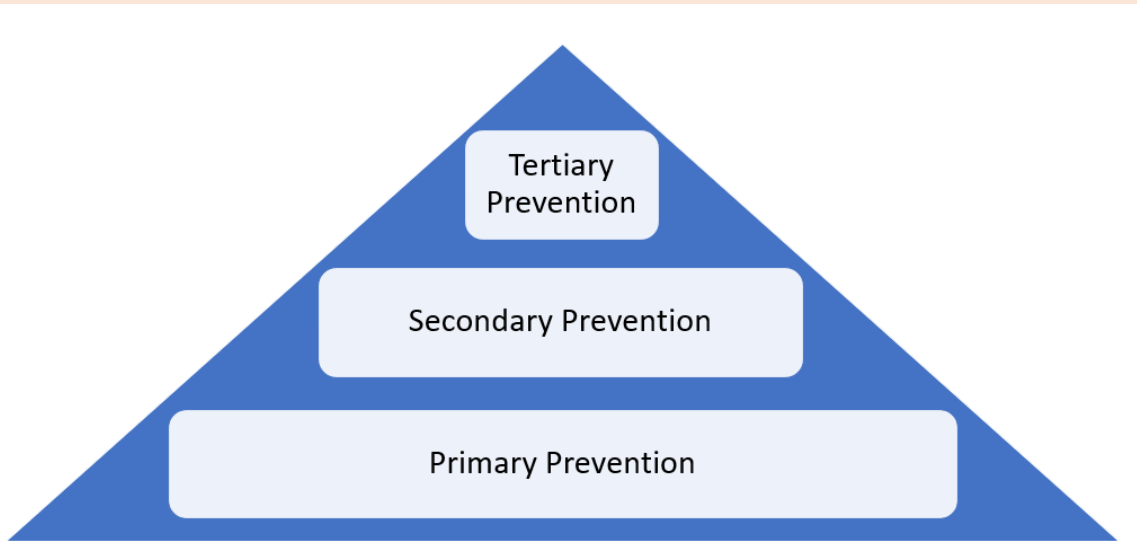
- Tissue acutely exposed to a force $>$ normal tolerance or,
- Repetitive exposure to forces that may result in submaximal load becoming injurious



Injury Prevention Hierarchy



Injury Prevention Hierarchy



Avoid injury exacerbation and complications

Holistic treatment and rehabilitation

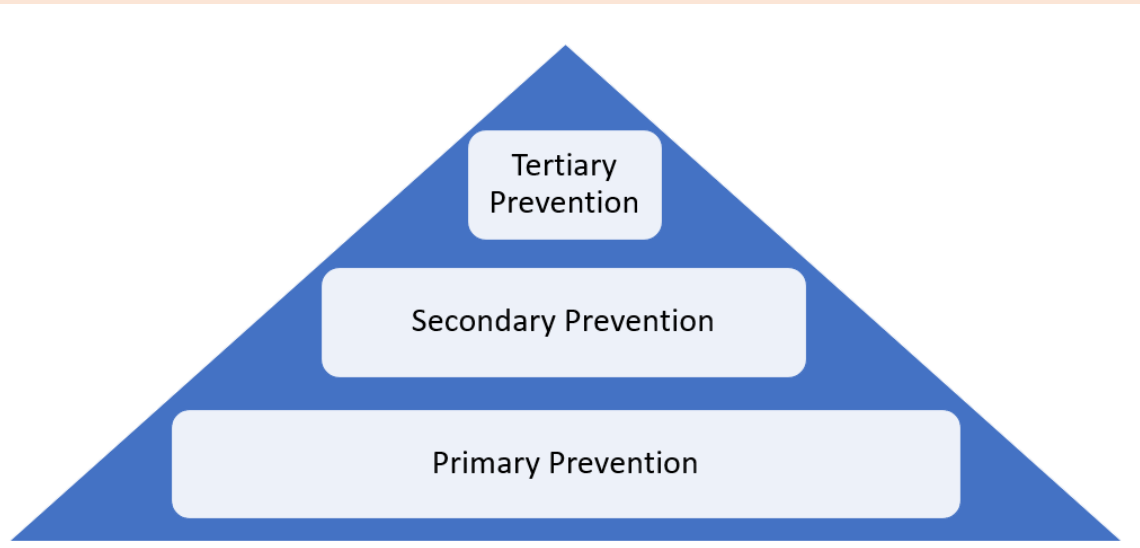
Early detection of injuries

Surveillance programme

Prevention of injury occurrence

Risk factor control

Injury Prevention Hierarchy



+ Graduated, progressive return to play rehab programme
+ Load monitoring and management

+ Period medical screening
+ Proactive injury evaluation and management

+ Periodic medical screening
+ Load monitoring and management
+ Recovery techniques
+ **Exercise programmes**
+ Stress management
+ Equipment

Do Exercise Programmes Reduce Injuries?

- Can prevent up to 30-70% of injuries
- Reduce moderate/severe injuries by 31%
- Injuries mainly occur during the 1st and last 15 minutes of the game
 - Warm up
 - Fatigue reduction through conditioning
- Improvements in components of neuromuscular and motor performance
 - Acute
 - Speed (2.2%)
 - Power (6.2%)
 - Agility (1%)
 - Balance and proprioception (2.9%)
 - Resting VO₂ (14%)
 - Chronic
 - Reduce injuries + improve performance

1. SadigurskyD., BraidJ. A., De LiraD. N. L., MachadoB. A. B., CarneiroR. J. F., & ColavolpeP. O. (2017). The FIFA 11+ injury prevention program for soccer players: A systematic review. BMC Sports Science, Medicine and Rehabilitation. <https://doi.org/10.1186/s13102-017-0083-z>
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3. BizziniM., ImpellizzeriF. M., DvorakJ., BortolanL., SchenaF., ModenaR., & JungeA. (2013). Physiological and performance responses to the “FIFA 11+” (part 1): is it an appropriate warm-up? Journal of Sports Sciences. <https://doi.org/10.1080/02640414.2013.802922>

How does an exercise programme alter injury risks?

- Improve tissue load tolerance
 - Improved strength
 - Enhance muscular balance between agonist (e.g. quadriceps) and antagonist (hamstrings)
 - Enhance joint stability through strengthening of stabilizing muscles e.g. shoulder rotator cuff muscles for shoulder dislocation / instability
- Reduce / dissipate external forces
 - Improved joint proprioception (positional sense)
 - Improve voluntary and reflexic muscle activation
 - Movement feedback training e.g change of direction, landing technique
 - Rehearsal of high risk movements e.g. unanticipated cutting manoeuvre
 - Strength as a means to dissipate forces e.g. neck strengthening to reduce concussion risks

Ingredients of an Effective Injury Prevention Exercise Programme

- Traditional warm-up
 - Components
 - Jogging
 - Dynamic stretching
 - Static stretching
 - Objectives
 - Increase core body temperature
 - Increase blood flow to muscles
 - Increase range of motion
 - Psychological preparedness
- Effective for injury prevention?

Ingredients of an Effective Injury Prevention Exercise Programme

- Neuromuscular warm-up strategies
 - Components
 - stretching
 - strengthening and balance exercises
 - sports-specific agility drills and landing techniques
 - duration of longer than three consecutive months
 - Hypothesized to improve joint position sense, enhance joint stability and develop protective joint reflexes, ultimately preventing lower limb injuries.
- Evidence for reducing injury incidence and burden for multi-component exercises and balance training
 - 23-72% lower match injuries
 - 26%-50% lower match injury burden
 - 59% lower training injuries
 - 59% fewer concussions

Ingredients of an Effective Injury Prevention Exercise Programme

- Frequency
 - Minimum 1-2 times a week
 - The more sessions, the better
- Duration
 - 10-20 minutes per session
 - total weekly duration of 30-60 minutes
 - 20-60 sessions to induce injury risk reduction
 - > 3 months
- Progression

1. Hübscher, M., Zech, A., Pfeifer, K., Hänsel, F., Vogt, L., and Banzer, W. (2010). Neuromuscular training for sports injury prevention: a systematic review. *Med. Sci. Sports Exerc.* 42, 413–421. doi: 10.1249/MSS.0b013e3181b88d37
2. SteibS., RahlfA. L., PfeiferK., & ZechA. (2017). Dose-Response Relationship of Neuromuscular Training for Injury Prevention in Youth Athletes: A Meta-Analysis. *Frontiers in Physiology*. <https://doi.org/10.3389/fphys.2017.00920>

Challenges in Translation

Internal validity

≠

External validity



Beaker and sample test tubes on the table Stock Photo by ©jrstock1 111684192 (depositphotos.com)



Photo: ST

PA expands football scheme for children, Singapore News – AsiaOne

Challenges in Translation

- Internal Validity
 - Extent to which the results represent the truth in the studied population
 - Not due to methodological errors
- External Validity
 - Involving contextual factors
 - Different stake holders involved
 - Community e.g. players, parents, coaches – ‘context experts’
 - Academics e.g. scientists – ‘content experts’
 - Policy makers e.g. coaches – ‘process experts’

Challenges in Translation

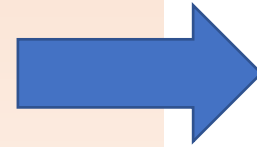
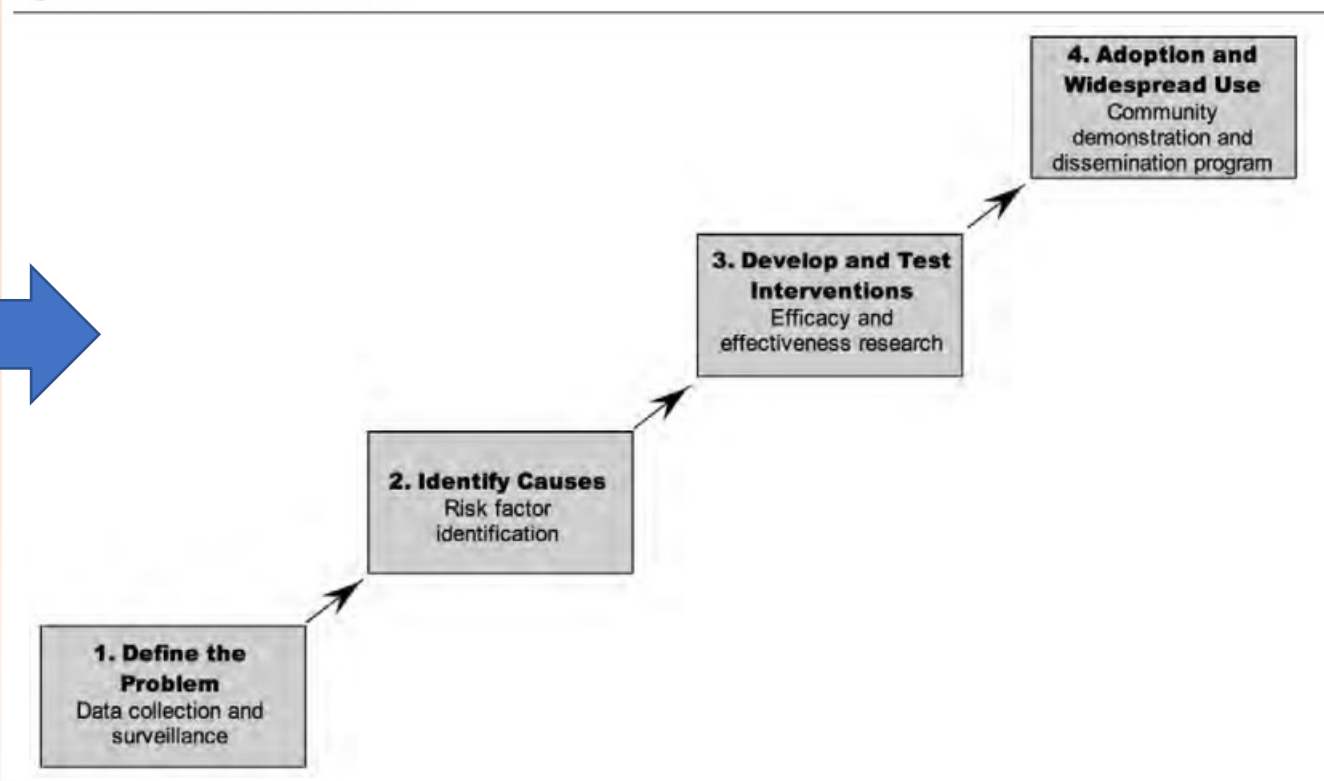


Figure 1. The Public Health Model^a



Adapted from Sleet DA, Hopkins KN, Olson SJ. From discovery to delivery: injury prevention at the CDC. Health Promot Pract 2003;4:98-102. Used by permission from the Society for Public Health Education.

Barriers to Adoption / Implementation / Maintenance

- Time cost
- Performed in addition to team training as opposed to integrated within
- Need to record data – injuries / exposure
- Language barriers
- Scepticism
- Fear of player non-compliance
- Lack of interest / motivation / supervision
- Prevention a low priority
- Contentment with current programme
- Injuries cannot be prevented
- Warm-up programme not sport specific enough
- Delayed onset muscle soreness

Facilitators to Adoption / Implementation / Maintenance

- Players
 - Group training
 - Qualified instructor
 - Informing all relevant staff
 - Motivation of players coach
 - Regular contact from researchers
 - Programme variation and progression
 - Partner exercises
 - Integration into normal training
 - Individual education of players

Facilitators to Adoption / Implementation / Maintenance

- Coaches
 - Staff available to do warm-up
 - Motivation of players coach
 - Regular contact from researchers
 - Programme variation and progression
 - Voluntary participation
 - Educational / informative information
 - Media influence
 - Influence of high profile players
 - Sport-specific programmes

Facilitators to Adoption / Implementation / Maintenance

- Teams / Clubs
 - Integration in team practice
 - Supervision
 - Previous injury problems
 - Information material
 - Incentives
 - Free medical imaging
 - Free footballs
 - Media
 - Previous study results

Established Injury Prevention Exercise Programmes



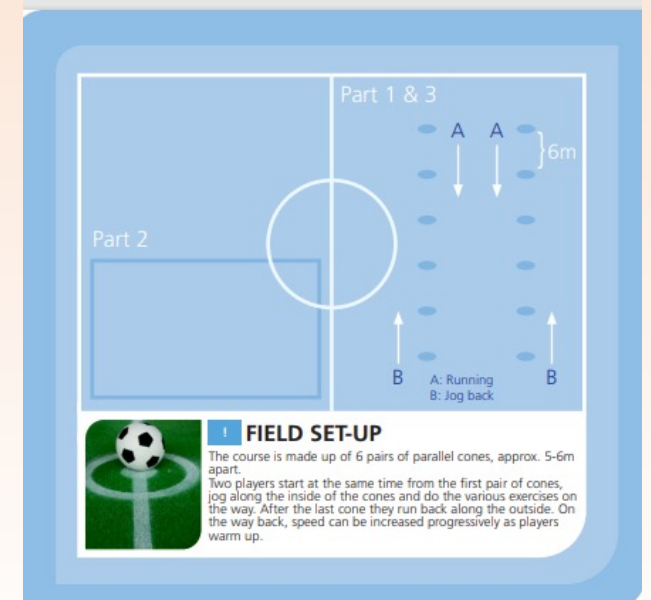
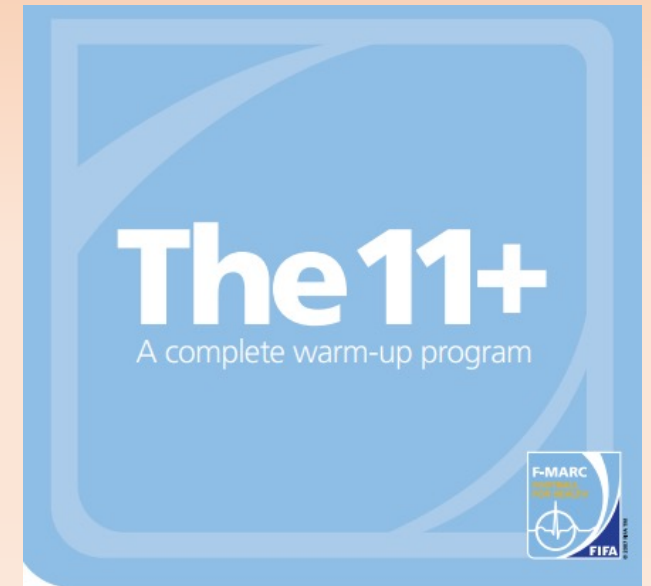
FIFA 11+ Programme

- Developed in 2006
- Includes 15 structured exercises over 3 parts
 - Core stabilization
 - Eccentric thigh training
 - Proprioceptive training
 - Dynamic stabilization
 - Plyometric exercises
 - With focus on proper form (good body control, knee-over-toe, soft landing)
- Performed as part of warm-ups at least twice a week, for at least 10-12 weeks
- Completed within 10-15 minutes

1. SadigurskyD., BraidJ. A., De LiraD. N. L., MachadoB. A. B., CarneiroR. J. F., & ColavolpeP. O. (2017). The FIFA 11+ injury prevention program for soccer players: A systematic review. BMC Sports Science, Medicine and Rehabilitation. <https://doi.org/10.1186/s13102-017-0083-z>
2. BarengoN., Meneses-EchávezJ., Ramírez-VélezR., CohenD., TovarG., & BautistaJ. (2014). The Impact of the FIFA 11+ Training Program on Injury Prevention in Football Players: A Systematic Review. International Journal of Environmental Research and Public Health. <https://doi.org/10.3390/ijerph111111986>

FIFA 11+ Resources

The screenshot shows a YouTube video player interface. The search bar contains 'fifa 11+'. The video title is 'FIFA TV RUNNING STRAIGHT AHEAD' with 'Repetitions: 2x' below it. The video thumbnail features a soccer player running next to a large number '1'. The F-MARC logo is visible in the bottom right of the video frame. The video progress bar shows 0:09 / 1:04. To the right of the video is a playlist titled 'FIFA 11+' containing 7 items, each with a thumbnail and duration: 'The "11+" Warm-up: Part 1' (1:05), 'The "11+" Warm-up: Part 2' (1:33), 'The "11+" Warm-up: Part 3' (1:33), 'The "11+" Warm-up: Part 4' (1:46), 'The "11+" Warm-up: Part 5' (1:44), 'The "11+" Warm-up: Part 6' (2:09), and 'The "11+" Warm-up: Part 7a' (2:09).



FIFA 11+ Programme Components

PART 1 RUNNING EXERCISES · 8 MINUTES



1 RUNNING STRAIGHT AHEAD

The course is made up of 6 to 10 pairs of parallel cones, approx. 5-6 metres apart. Two players start at the same time from the first pair of cones. **Jog together** all the way to the last pair of cones. On the way back, you can increase your speed progressively as you warm up. **2 sets**



2 RUNNING HIP OUT

Walk or jog easily, stopping at each pair of cones to lift your knee and **rotate your hip outwards**. Alternate between left and right legs at successive cones. **2 sets**.



3 RUNNING HIP IN

Walk or jog easily, stopping at each pair of cones to lift your knee and **rotate your hip inwards**. Alternate between left and right legs at successive cones. **2 sets**.



4 RUNNING CIRCLING PARTNER

Run forwards as a pair to the first set of cones. Shuffle sideways by 90 degrees to meet in the middle. **Shuffle an entire circle around one other** and then return back to the cones. Repeat for each pair of cones. Remember to stay on your toes and keep your centre of gravity low by bending your hips and knees. **2 sets**.



5 RUNNING SHOULDER CONTACT

Run forwards in pairs to the first pair of cones. Shuffle sideways by 90 degrees to meet in the middle then **jump sideways towards each other to make shoulder-to-shoulder contact**.
Note: Make sure you land on both feet with your hips and knees bent. Do not let your knees buckle inwards. Make it a full jump and synchronize your timing with your team-mate as you jump and land. **2 sets**



6 RUNNING QUICK FORWARDS & BACKWARDS

As a pair, run quickly to the second set of cones then run **backwards quickly to the first pair of cones keeping your hips and knees slightly bent**. Keep repeating the drill, running two cones forwards and one cone backwards. Remember to take small, quick steps. **2 sets**.

- Running at slow speed with active stretching and controlled partner contacts

FIFA 11+ Part 1 Example



FIFA 11+ Programme Components

PART 2 STRENGTH · PLYOMETRICS · BALANCE · 10 MINUTES

LEVEL 1

7 THE BENCH STATIC



Starting position: Lie on your front, supporting yourself on your forearms and feet. Your elbows should be directly under your shoulders.
Exercise: Lift your body up, supported on your forearms, pull your stomach in, and hold the position for 20-30 sec. Your body should be in a straight line. Try not to sway or arch your back. **3 sets.**

8 SIDEWAYS BENCH STATIC



Starting position: Lie on your side with the knee of your lowermost leg bent to 90 degrees. Support your upper body by resting on your forearm and knee. The elbow of your supporting arm should be directly under your shoulder.
Exercise: Lift your uppermost leg and hips until your shoulder, hip and knee are in a straight line. Hold the position for 20-30 sec. Take a short break, change sides and repeat. **3 sets on each side.**

9 HAMSTRINGS BEGINNER



Starting position: Kneel on a soft surface. Ask your partner to hold your ankles down firmly.
Exercise: Your body should be completely straight from the shoulder to the knee throughout the exercise. Lean forward as far as you can, controlling the movement with your hamstrings and your gluteal muscles. When you can no longer hold the position, gently take your weight on your hands, falling into a push-up position. Complete a minimum of 3-5 repetitions and/or 60 sec. **1 set.**

10 SINGLE-LEG STANCE HOLD THE BALL



Starting position: Stand on one leg.
Exercise: Balance on one leg whilst holding the ball with both hands. Keep your

LEVEL 2

7 THE BENCH ALTERNATE LEGS



Starting position: Lie on your front, supporting yourself on your forearms and feet. Your elbows should be directly under your shoulders.
Exercise: Lift your body up, supported on your forearms, and pull your stomach in. Lift each leg in turn, holding for a count of 2 sec. Continue for 40-60 sec. Your body should be in a straight line. Try not to sway or arch your back. **3 sets.**

8 SIDEWAYS BENCH RAISE & LOWER HIP



Starting position: Lie on your side with both legs straight. Lean on your forearm and the side of your foot so that your body is in a straight line from shoulder to foot. The elbow of your supporting arm should be directly beneath your shoulder.
Exercise: Lower your hip to the ground and raise it back up again. Repeat for 20-30 sec. Take a short break, change sides and repeat. **3 sets on each side.**

9 HAMSTRINGS INTERMEDIATE



Starting position: Kneel on a soft surface. Ask your partner to hold your ankles down firmly.
Exercise: Your body should be completely straight from the shoulder to the knee throughout the exercise. Lean forward as far as you can, controlling the movement with your hamstrings and your gluteal muscles. When you can no longer hold the position, gently take your weight on your hands, falling into a push-up position. Complete a minimum of 7-10 repetitions and/or 60 sec. **1 set.**

10 SINGLE-LEG STANCE THROWING BALL WITH PARTNER



Starting position: Stand 2-3 m apart from your partner, with each of you standing on one leg.

LEVEL 3

7 THE BENCH ONE LEG LIFT AND HOLD



Starting position: Lie on your front, supporting yourself on your forearms and feet. Your elbows should be directly under your shoulders.
Exercise: Lift your body up, supported on your forearms, and pull your stomach in. Lift one leg about 10-15 centimetres off the ground, and hold the position for 20-30 sec. Your body should be straight. Do not let your opposite hip dip down and do not sway or arch your lower back. Take a short break, change legs and repeat. **3 sets.**

8 SIDEWAYS BENCH WITH LEG LIFT



Starting position: Lie on your side with both legs straight. Lean on your forearm and the side of your foot so that your body is in a straight line from shoulder to foot. The elbow of your supporting arm should be directly beneath your shoulder.
Exercise: Lift your uppermost leg up and slowly lower it down again. Repeat for 20-30 sec. Take a short break, change sides and repeat. **3 sets on each side.**

9 HAMSTRINGS ADVANCED



Starting position: Kneel on a soft surface. Ask your partner to hold your ankles down firmly.
Exercise: Your body should be completely straight from the shoulder to the knee throughout the exercise. Lean forward as far as you can, controlling the movement with your hamstrings and your gluteal muscles. When you can no longer hold the position, gently take your weight on your hands, falling into a push-up position. Complete a minimum of 12-15 repetitions and/or 60 sec. **1 set.**

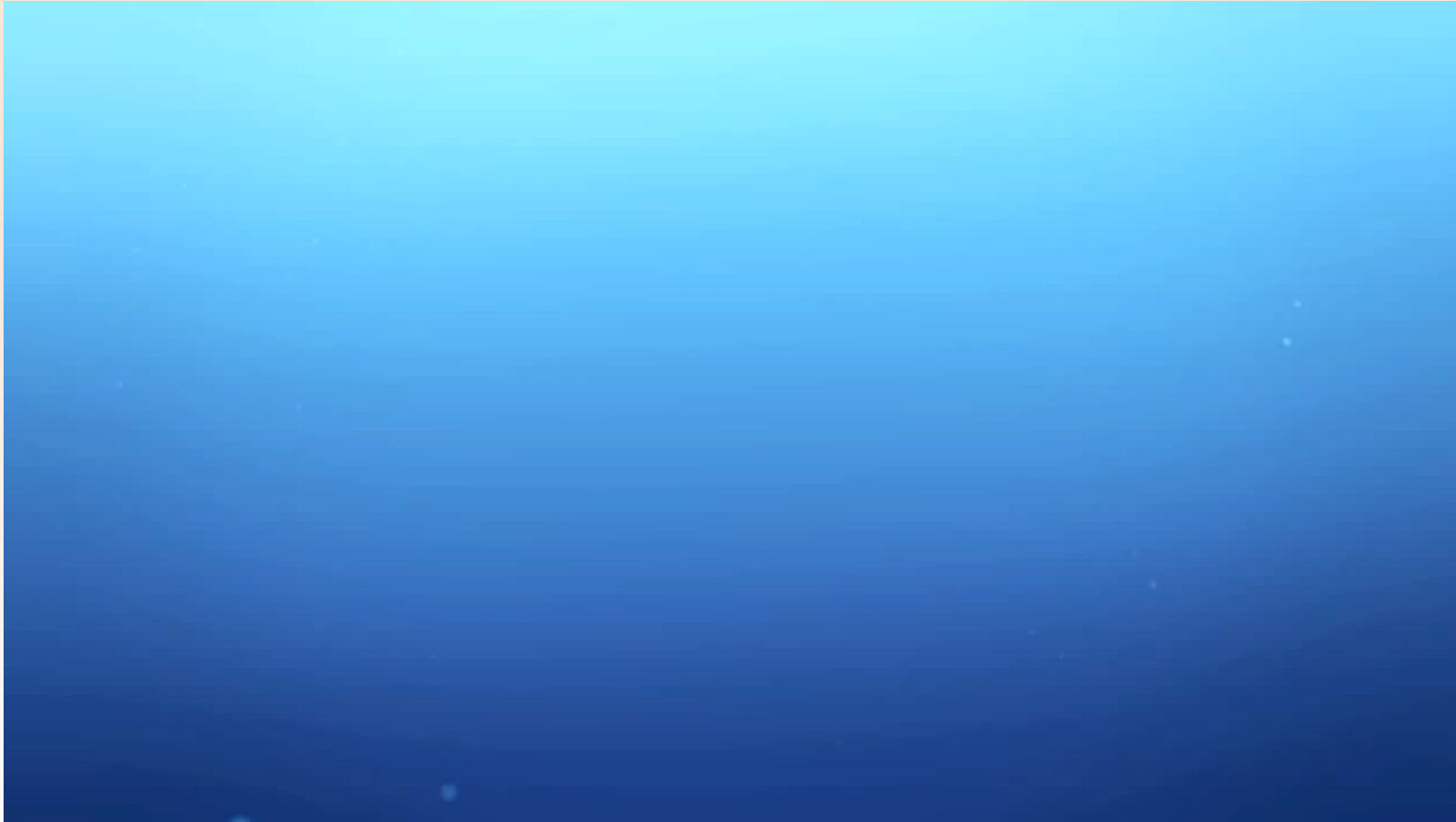
10 SINGLE-LEG STANCE TEST YOUR PARTNER



Starting position: Stand on one leg opposite your partner and at arm's' length apart.

- Core and leg strength, balance, plyometrics with progressive difficulty

FIFA 11+ Part 2 Example



FIFA 11+ Programme Components

PART 3 RUNNING EXERCISES • 2 MINUTES



13 RUNNING ACROSS THE PITCH

Run across the pitch, from one side to the other, at 75-80% maximum pace. **2 sets.**



14 RUNNING BOUNDING

Run with high bounding steps with a high knee lift, landing gently on the ball of your foot. Use an exaggerated arm swing for each step (opposite arm and leg). Try not to let your leading leg cross the midline of your body or let your knees buckle inwards. Repeat the exercise until you reach the other side of the pitch, then jog back to recover. **2 sets.**

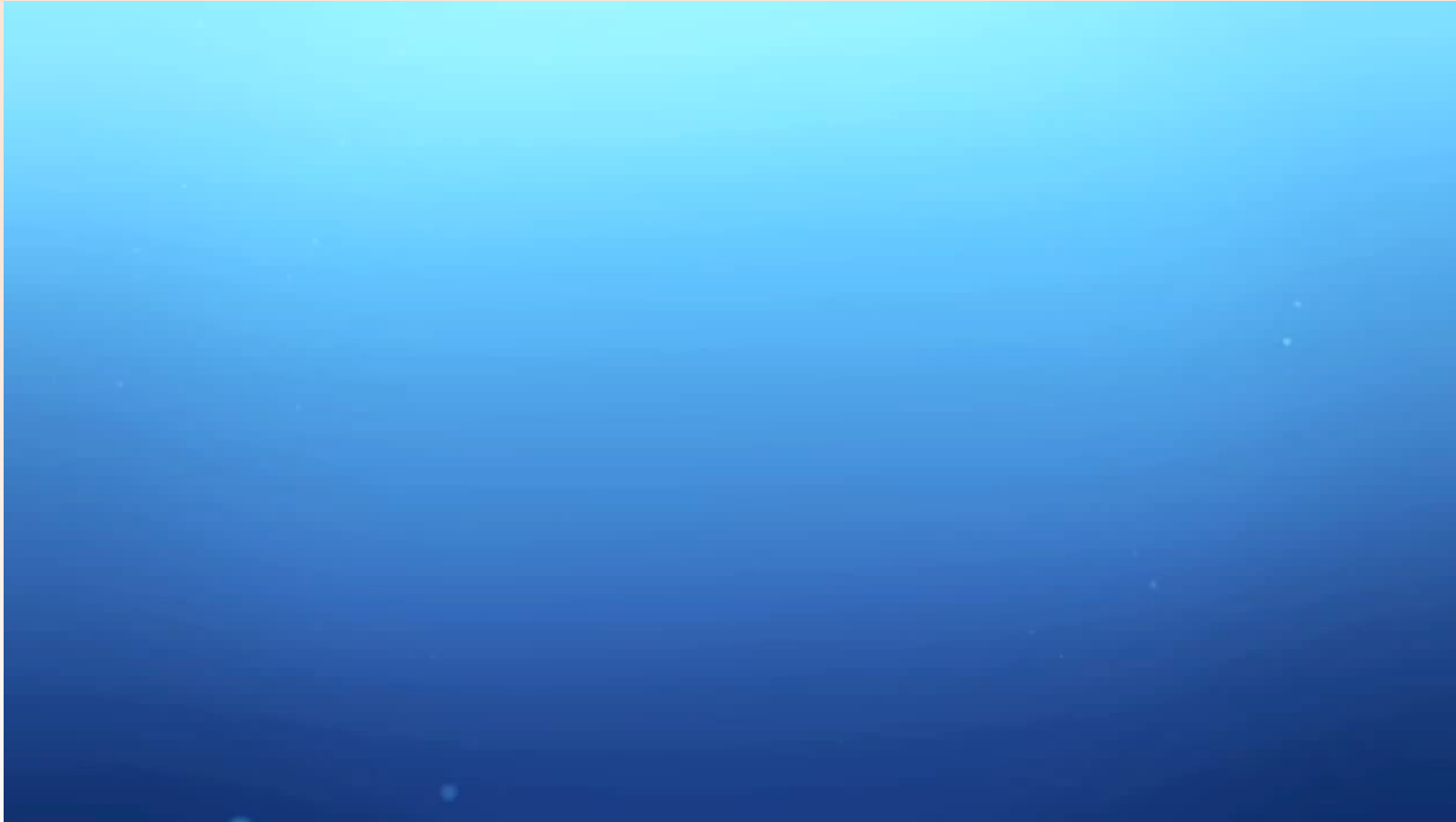


15 RUNNING PLANT & CUT

Jog 4-5 steps, then plant on the outside leg and cut to change direction. Accelerate and sprint 5-7 steps at high speed (80-90% maximum pace) before you decelerate and do a new plant & cut. Do not let your knee buckle inwards. Repeat the exercise until you reach the other side, then jog back. **2 sets.**

- Running at moderate / high speed with planting and cutting movements

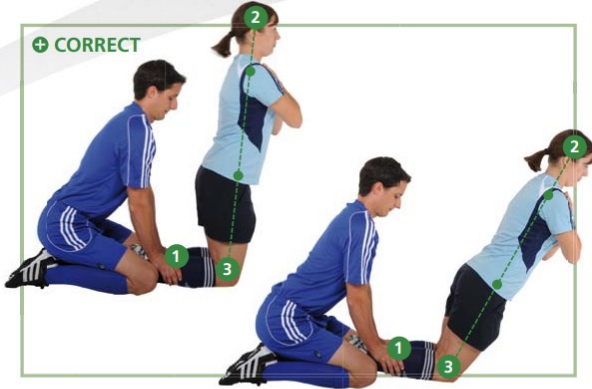
FIFA 11+ Part 3 Example



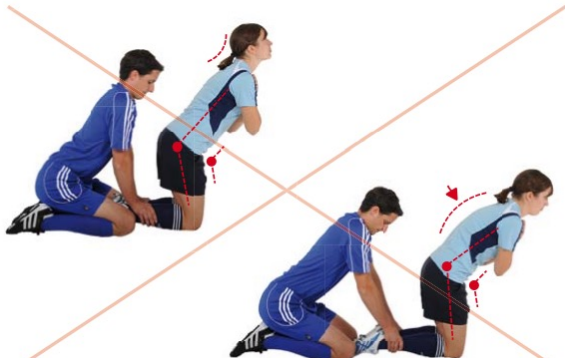
Proper Form

9 HAMSTRINGS BEGINNER – INTERMEDIATE – ADVANCED

+ CORRECT



- WRONG



+ CORRECT



- WRONG

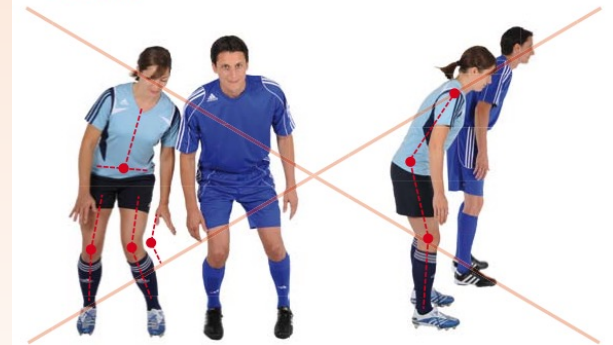


5 RUNNING JUMPING WITH SHOULDER CONTACT

+ CORRECT



- WRONG



FIFA 11+ Kids

**EXERCISE 1
JOG & LOOK AT THE COACH (TO STOP)**

- 3x 5 step commands
- 3x 5 step commands
- 3x 5 step commands
- 3x 5 step commands

**EXERCISE 2
SKATING HOP**

- 2x 10 hops (5 on each leg)
- 2x 10 hops (5 on each leg)
- 2x 10 hops (5 on each leg)
- 2x 10 hops (5 on each leg)

**EXERCISE 3
ONE LEG STANCE**

- 1x To right/foot and 5 passes per player
- 1x To right/foot and 5 passes per player
- 1x To right/foot and 5 passes per player
- 1x To right/foot and 5 passes per player
- 1x To right/foot for ca. 20 seconds

**EXERCISE 4
PUSH UP**

- 2x until reach hand into the ball (max. 8 hops)
- 3x 10 seconds
- 3x 10 seconds
- 3x 10 seconds

**EXERCISE 5
ONE LEG HOPS**

- 2x 5 hops on right leg and 5 hops on left leg
- 2x 5 hops on right leg and 5 hops on left leg
- 2x 5 hops on right leg and 5 hops on left leg
- 2x 5 hops on right leg and 5 hops on left leg

**EXERCISE 6
SPIDERMAN**

- 3x 10 seconds
- 3x 10 seconds
- 3x over 5-10 meters
- 3x over 5-10 meters
- 3x over 5-7 meters

**EXERCISE 7
ROLL OVER**

- 5-7x per side
- 5-7x per side
- 5-7x per side
- 5-7x per side

FIFA 11+ KIDS

Health for All

FIFA 11+ Programme – Implementation Best Practice

- Engaging national / state federations and associations
- Educating club personnel (coaches, officials, medical staff and players) on:
 - Sport-specific injury education to key stake-holders
 - 11+ programme and its effectiveness
 - Barriers to uptake
 - Coach education on the importance of their role in 11+ uptake
 - Progression of 11+ exercises
- Video material, posters, field cards

FIFA 11+ Programme – Implementation

- Problems
 - time required to complete and boredom associated with the program
 - fatigue and soreness caused by exercises contained in Part 2
 - a lack of awareness and knowledge of how to perform the program
 - strengthening exercises performed in Part 2 of the 11+ program are often modified or not performed due to potential fatigue and perceived resultant increase in injury risk

FIFA 11+ Programme - Sectioning

- Completing parts 1 and 3 as warm up, and part 2 of the programme (strengthening) after training as part of cool down did not reduce effectiveness in injury prevention, compared to full programme as warm-up
- Reduced incidence of severe injuries (>28 days lost)
- Overall improved compliance

World Rugby Activate Programme

- Structured, progressive exercise programme to reduce injuries in youth and adult community rugby
- Balance training, whole-body resistance training, plyometric training, and controlled rehearsal of landing and cutting maneuvers



1. Hislop M. D., Stokes K. A., Williams S., McKay C. D., England M. E., Kemp S. P. T., & Trewartha G. (2017). Reducing musculoskeletal injury and concussion risk in schoolboy rugby players with a pre-activity movement control exercise programme: A cluster randomised controlled trial. *British Journal of Sports Medicine*. <https://doi.org/10.1136/bjsports-2016-097434>

World Rugby Activate Programme

- U-15 (13-15 year olds)
 - U-16 (15-16 year olds)
 - U-18 (16-18 year olds)
 - Adult (18+ year olds)
-
- Used as training / match warm-up, and during training as exercises

World Rugby Activate Programme

Youth Programme Structure

Each phase of the youth programme consists of four parts and has 16 exercises to complete in total.

Part	Focus	Time	Number of Exercises
A	Running-based preparation and Change of Direction Practice Focus: Running technique, coordination and changing direction through enhancing movement control in the trunk and lower limbs	2 mins	3
B	Lower body Balance Training Focus: Developing movement control during static and dynamic activities	4 mins	2
C	Targeted Resistance Training Focus: Improving strength, stability, and mobility across the upper and lower body	8 mins	5
D	Landing, Change of Direction, and Plyometrics Focus: Improving control through the trunk and lower limbs during controlled landing and changing direction activities	6 mins	2

Adult Programme Structure

Each phase of the adult programme consists of four parts and has 12 exercises to complete in total.

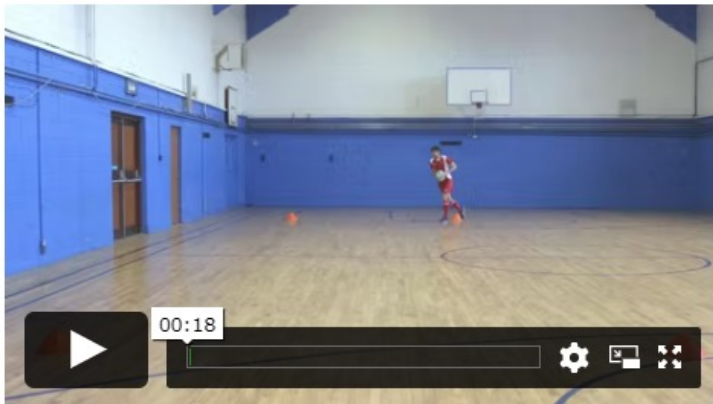
Part	Focus	Time	Number of Exercises
A	Running-based preparation and Change of Direction Practice Focus: Running technique, coordination and changing direction through enhancing movement control in the trunk and lower limbs	10 mins	2
B	Range of Movement, Strength and Balance Focus: Developing movement control and mobility across the upper and lower body	7 mins	6
C	Strength, Stability, Agility and Power Focus: Improving strength, stability, and mobility across the upper and lower body	7 mins	6
D	Strength and Fitness Focus: Developing anaerobic conditioning and neck strength	6 mins	2

Exercise Examples

Part A

Running activities to warm-up and develop control and technique when changing direction

Snake Run



Sets: 1 Repetitions: 2 Distance: 15 metres

Coaching Points:

- Using the full width of the channel, alternate swerving from left to right while running
- Drive the outside leg across the body to swerve

Key Cues:

- Chest up

<https://passport.world.rugby/injury-prevention-and-risk-management/activate-injury-prevention-exercise-programme/under-18-age-16-18-years/level-1/part-a/>

Exercise Examples

Part B

Balancing exercises to develop movement control and stability in the lower body and trunk

Single Leg Balance with Shallow Squat



Sets: 1 **Repetitions:** 6 / leg

Coaching Points:

- Stand on one leg with a slight bend in the knee
- Once stable, perform a half squat by flexing at both the knee and hip of the standing leg

Key Cues:

- Chest up
- Hip, knee, ankle in line
- Knee over toes

<https://passport.world.rugby/injury-prevention-and-risk-management/activate-injury-prevention-exercise-programme/under-18-age-16-18-years/level-1/part-b/>

Exercise Examples

Part C

Bodyweight or partner resistance activities to develop strength and control through the lower body, upper body, and neck area

Prisoner Squat



Sets: 1 Repetitions: 8

Coaching Points:

- Stand with feet a little wider than shoulder-width apart and hands resting behind the head
- Squat down until thighs are parallel with the ground before returning to starting position
- Keep heels in contact with the ground throughout the exercise

Key Cues:

- Chest up
- Pinch the shoulders together
- Knee over toes

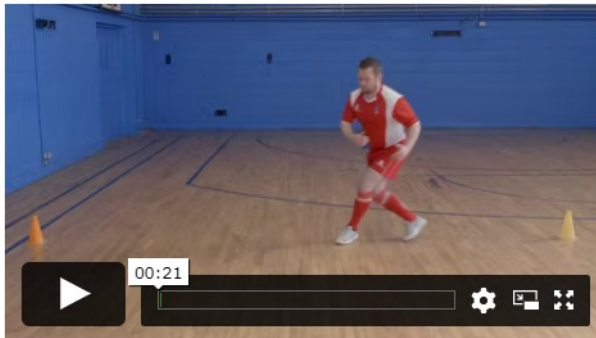
<https://passport.world.rugby/injury-prevention-and-risk-management/activate-injury-prevention-exercise-programme/under-18-age-16-18-years/level-1/part-c/>

Exercise Examples

Part D

Landing, change of direction, and plyometric training to develop power and control

Crossover Side Step and Sway



Sets: 1 Repetitions: 3 / side

Coaching Points:

- Begin by standing with feet shoulder-width apart
 - On coach's cue, perform a crossover step to the left or right
 - Plant the outside foot and perform a crossover step back to the start position
 - Alternate between moving to the left and right with each repetition
- Key Cues:
- Chest up
 - Hip, knee, ankle in line
 - Knee over toes

<https://passport.world.rugby/injury-prevention-and-risk-management/activate-injury-prevention-exercise-programme/under-18-age-16-18-years/level-1/part-d/>

Summary

- Exercise programmes can play a big part as part of overall injury prevention strategy
- Engagement of all stake-holders (coaches, players, administrators) crucial for the adoption, implementation, and maintenance of an effective exercise programme
- Ideal exercise programme
 - Multicomponent (running with dynamic movements, balance training, whole-body resistance training, plyometric training, and controlled rehearsal of landing and cutting manoeuvres)
 - **≥ 2 times a week**
 - **Session duration 10 – 20 minutes**
 - **Total 30 – 60 minutes a week**
 - **20-60 sessions**
 - **Part of warm-up, resistance component may be part of cool down**
- **Plenty of existing resources, e.g. FIFA 11+ / World Rugby Activate**

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