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SOCCER WARM UP & INJURY PREVENTION

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Why Warm Up??

Prepare the body for exercise:

- Increase core body temperature
- Increase oxygen uptake so can more readily get to a steady state if need
- Enhance nervous system activation therefore enhance reaction time
- Rehearsal of the movements to be performed

Prevent Injury??

NO direct evidence to support decreased injury risk

However there has been studies showing decreased risk of injury with dynamic warm up (Olsen et al I I+)

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What Kind of a Warm up?

HOW
HOW LONG
HOW HARD
STRETCHING - DYNAMIC OR STATIC??

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HOW?

Goal is to prepare the body for:
- intense bursts of running
- lower extremity stretching/reaching
- change in direction
- pivoting.
- jumping to head balls
- contact with other players

Incorporates whole body movements. Athletes actively and rhythmically contract muscle groups through part of their range of motion

Mimic sport movements!! (see dynamic stretching examples and Part 1 of 11+)

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Examples of Active Warm Up that incorporate Dynamic Stretches

- Easy skip with arm swings
- Skip for distance using arms to drive forward
- Skip for height using arms to drive upward
- Backward run (extend heel backwards during stride)
- Step into single leg Romanian dead lift

- Lateral low shuffle
- Walking diagonal lunges,/lunge twist to same side

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- High knee pulls (knee to chest, on toe)

- Heels to bum
- A's B's for track
- Hip rotations out and in to side with 2 steps in between
- Extend leg out front and sweep hands towards it

- Carioca
- Straight leg strides
- Gradual accelerations (50%, 75%, 90%)

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How Long? How Hard?

15-20 minutes of activity at 60-70% of max heart rate prepares the body for ballistic exercise Beedle 2007

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Stretching- Dynamic or Static?

RESEARCH - **Static stretching:**

•decreases max force production
•decrease peak height with jumps
•decreases sprint times
•decreases reaction time

Static stretching creates elongated muscles therefore when asked to contract must contract over longer distance therefore slower time to peak contraction
These deficits were still present in studies 30 minutes after the static stretch despite dynamic activity after
Amiri 2010 found static stretching decreased the agility performance on an agility test

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Dynamic Stretching

Dynamic stretching incorporates whole body movements. Athletes actively and rhythmically contract muscle groups through part of their range of motion

HOW -- Can involve skipping, swinging of limbs, rotational movements of limbs designed to elevate core body temperature , enhance motor unit excitability, improve balance and provide an opportunity for movement rehearsal

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Both Dynamic and Static stretches showed improvement in the sit and reach flexibility test

SOOO before activities use dynamic stretches and get the benefit of the increased flexibility without the affect on decreasing performance static stretching has been found to do

Dynamic stretching performed at a jogging pace yielded better sprint times than those done on the spot

Dynamic stretching resulted in faster sprint times in professional soccer players

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Standing Dynamic Stretches

Side leg swing - with body facing the wall, swing leg out to the side (abduct) and then swing leg back across midline (adduct) as far as possible with forward facing, neutral pelvis.

Forward leg swing - with body perpendicular to the wall, swing leg closest to the wall forward, keeping knee extended. On the backward return swing,
allow thigh to extend as far back as possible at the hip joint.

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When Should I Static Stretch?

Following sport in the **cool down** period is a great time to incorporate static stretching.
Especially if there is an area of tightness, injured area, or muscle imbalance from side to side. Differences in sides of the body in flexibility can become a source of injury. If one side is tighter spend more time stretching that side.

Following the game/practice have the athletes jog back and forth across the soccer pitch and then do their static stretching
Stretch just until the muscle tightness is felt and then hold it there for 30 seconds do relaxed breathing.
Relax the muscle and repeat trying to take the stretch further

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Injury Prevention WHY??

Soccer most popular sport in the world!!
Increase in numbers annually especially in females

In soccer, 58% of injuries are non-contact
•Most ACL injuries are non-contact, occurring during deceleration, landing or changing direction such as pivoting
•Rate of ACL injuries 3-5x higher for girls than boys age 12-18 16%

Chinese striker Ma Xiaoxu will miss the **Olympic women's soccer** competition for injury

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Implications of Injury

•Long recovery time many competitive athletes 2/3 do not return to their pre injury sport one year after their surgery (2011 AJSM)

•Athlete may give up sports, become inactive lead to many preventative health conditions as an adult

•Increased risk of osteoarthritis later in life and perhaps joint replacement

•Cost associated with the injury; bracing, surgery, and therapy
May lose out on a scholarship opportunity

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Girls at risk

Girls have laxer ligaments than boys (hormones may play a role in this,)
Girls tend to land from jumps with their knees in valgus

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Athletes who run and change direction in a more upright position are at more risk of ACL injury
Girls tend to play with a straighter knee
Girls change direction with their knee in valgus

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"11+ Program"

Developed by: FIFA's Medical Assessment and Research Centre and the Oslo Sports Trauma Research Centre and the Santa Monica Orthopaedic and Sports Medicine Research Centre

11+ Program is a structured warm-up programme designed to prepare the body for activity and improve awareness and knee and ankle control during landing and pivoting movements in order to prevent knee and ankle injuries among youth athletes

BJM Structured warm up (11+) can prevent severe l/e injuries and overuse injuries 1/3
Study in Sweden 15 min exercise program incorporated into warm up decreased ACL injuries by 64% even 1x a week helped decrease incidence of acute injuries

Preventive training should be routine in training programmes for adolescents in pivoting sports

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Look at hip and knee position in all positions and learn proper biomechanical technique and improved awareness/control during running, cutting, landing from a jump, and planting.

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11+ Program - 3 Parts

1- Dynamic warm up - 8 min

2- Strength, plyometrics, balance exercises - 10 min

3- Running exercises - 2 min

To see the entire **11+ Program manual** with complete instructions go to: http://issuu.com/vongrebelmotion/docs/11plus_workbook_english

3 levels in part 2 to be progressed as the season progresses

Take 2-3 training sessions to teach the correct technique especially in Part 2

All three parts performed 2x a week before practices
Parts 1 and 3 before games

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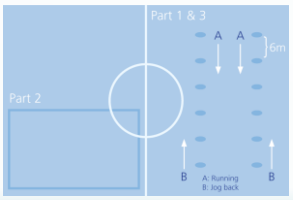
Field Set Up



The course is made up of six pairs of parallel cones, approximately 5-6m apart. Two players start at "A" doing running exercises to end of cones and they run back along the outside "B" speed can be increased progressively as players warm up

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Part 1

Running Exercises, 8 minutes
(opening warm up, in pairs; course consists of 6 pairs of parallel cones): do each one 2 times

- Jog straight ahead to final cone faster back(running technique!!)
- Jog to first cone lift knee up and rotate hip out, alt legs at cones
- Jog to first cone lift knee and rotate hip in as above
- Jog to first cone shuffle sideways circle partner while facing forward, shuffle back to cone jog to next and repeat
- Jog to first cone shuffle sideways to partner in middle jump to make shoulder to shoulder contact with your partner, land on both feet
- Run quick to second cone back quickly to first cone run 2 fwd 1 back

Instead of doing each one 2x can incorporate other dynamic stretches described above

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Part 2

Strength, plyometrics, balance, 10 minutes
(one of three exercise progression levels each training session)

The plank:
Level 1: both legs 3×20-30 seconds
Level 2: alternate legs 3×20-30 seconds
Level 3: one leg lift 3×20-30 seconds
Side plank:
Level 1: static 3×20-30 seconds (each side)
Level 2: dynamic 3×20-30 seconds (each side)
Level 3: with leg lift 3×20-30 seconds (each side)
Nordic hamstring lower:
Level 1: 3-5
Level 2: 7-10
Level 3: 12-15

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Part 2 cont.

Single leg balance: Balance training reduces risk of injury
Level 1: holding ball 2×30 seconds (each leg)
Level 2: throwing ball with partner 2×30 seconds (each leg)
Level 3: testing partner 2×30 seconds (each leg)
Squats:
Level 1: with heels raised 2×30 seconds
Level 2: walking lunges 2×30 seconds
Level 3: one leg squats 2×10 (each leg)
Jumping:
Level 1: vertical jumps 2×30 seconds
Level 2: lateral jumps 2×30 seconds
Level 3: box jumps 2×30 seconds

Progressing levels in part 2
When the athletes can do all the reps/time frame with good technique typically within **3-4 weeks** if done regularly (at least 2x a week)

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Balance work

Walking lunges

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Part 3

Running exercises, 2 minutes (final warm up)

Running over pitch 2x

Bounding run 2x

Running and cutting 2x

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Game Warm ups

Part 1 and 3 (10 minutes)

OR…

Part 1 and **Small Sided Soccer Games**
Zois 2011 Found that small sided games warm ups performed better in speed and agility tests felt the traditional warm up fatigued the athletes prior to a game

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Points of Interest

Top class soccer players cover 11 km in a 90 min match, females run a shorter distance (probably we pass more!!)

Midfields run more at low speeds than defenders and forwards,
Fullbacks sprint 2x more than central defenders,
Midfielders and attackers sprint 1.6x more than central defenders.

Per game do:
10-20 sprints which last 2-4 seconds every 70-90 seconds, 15 tackles, 10 heads, 50 touches, 30 passes

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The average work intensity of soccer is 80-90% max heart rate an aerobic sport! But close to anaerobic threshold

Training INTERVAL TRAINING for soccer for athletes (not to be done by unconditioned athletes or under age of 14yrs at this intensity)90-95% max HR for 3-8 minutes followed by an active recovery at 70% max HR to remove lactic acid

Helgerud **"4x4 program"** 4 min 90-95% maxHR (takes 1-2 minutes to get to max speed and heart rate) followed by 3 min at 70%max HR repeated 4x can increaseVO2 max 7% after 13 sessions

Elite soccer player (male 75kg) can squat >200 kg, bench press 100kg, vertical jump 60cm
Goal bench press .8x BW, ½ squat 1.5x BW

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Positive coach attitudes associated with higher compliance

See benefits within 10-12 weeks

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Thank you for caring about your athletes!!!

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