



STRENGTH TRAINING PROGRAM GUIDELINES IN FOOTBALL

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INTRODUCTION

Football is a collective sport with a high degree of uncertainty full of strength-demanding movements such as jumping, landing, starting and braking, changes of direction, striking, charging, fighting and grappling.

It also has an aerobic component and demands a good decision-making capacity.

For this type of sport we will try to look for "game strength" as it is not so important the amount of force/power we can exert but the ability to manage the force in the most appropriate way at all times (adapting the force to the environment).



GOALS

The aim of our work will be to explain the different variables to be taken into account in the programming of strength training oriented to football. We will also talk about how to quantify these variables, the alternatives that we can follow to carry out effective and specific training for this sport and the different phases that make up a mesocycle of a regular week. In summary we will talk about the daily work of a professional Strength training and conditioning in the world of football.



VARIABLES TO TAKE INTO ACCOUNT

It is clearly that the S&C coach has a dual role: not only provide effective injury reduction based training, but also to aim to improve the physical capabilities (such as rate of force development (RFD), speed, endurance, strength) of their players.

To achieve this, you will need to take into account the following variables:

- The time available in training sessions
- The matches scheduled
- The distribution and frequency of sessions
- Monitoring of on-field
- Training load.
- Fatigue monitoring
- Return to play criteria
- Periodisation strategies
- Programming
- Methodologies used
- Session compliance.
- Employees who can collaborate
- Objectives of the team at all times



TRAINING PROGRAMMING SESSIONS FREQUENCY

The following study (Beere et al., 2020) takes into account the strategy followed by 46 English and 6 American teams in the planning and periodisation of strength training.

Table 1. Competition standard of respondents' clubs

PREMIER LEAGUE	CHAMPIONSHIP	LEAGUE ONE	LEAGUE TWO	NATIONAL LEAGUE PREMIERSHIP	SCOTTISH SOCCER	MAJOR LEAGUE
9	17	8	7	2	3	6

In the study, coaches were asked how many Strength Training & Conditioning sessions they carried out each week (mesocycle) depending on the matches they had ahead and this was the answer:

Eighty-four percent (n=43) of coaches answered that 'yes' they do use a periodisation strategy; 16% (n =8) said 'no' they did not.

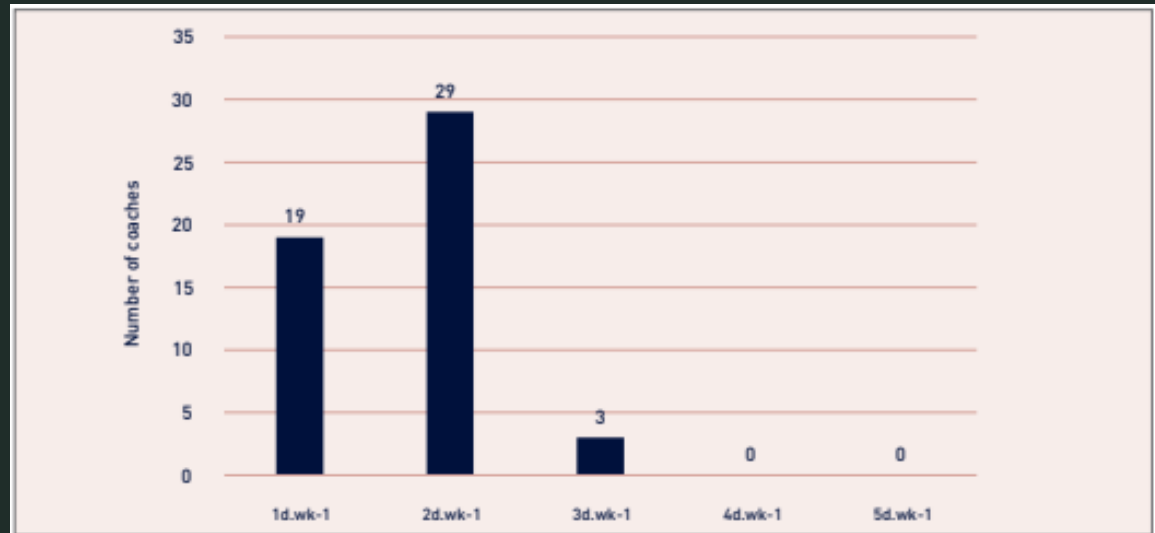


Figure 3. The number of strength and conditioning sessions provided in-season during a two-game week

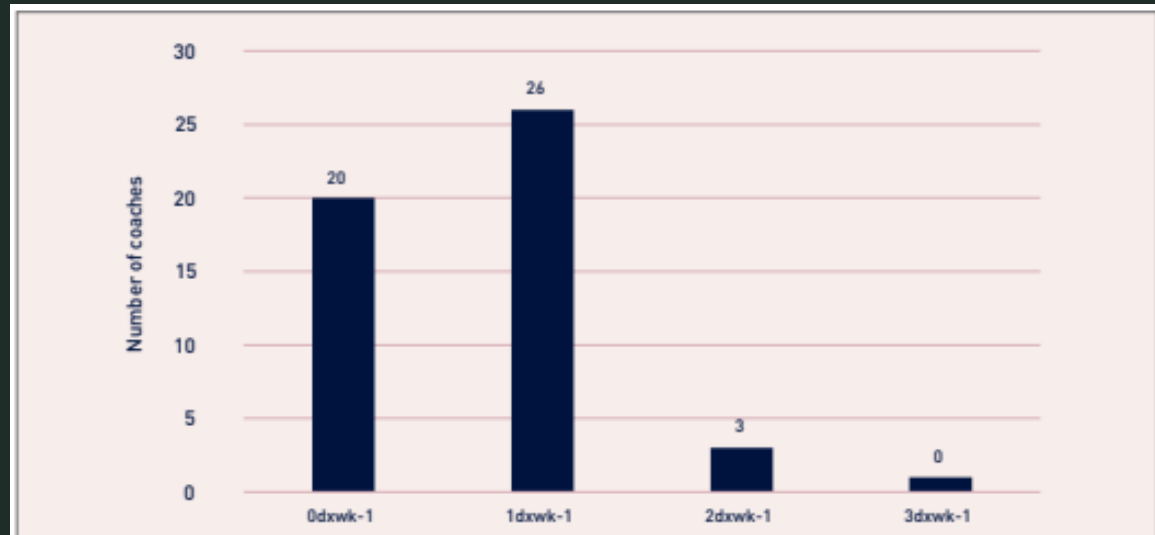


Figure 4. The number of strength and conditioning sessions provided in-season during a three-game week

TRAINING PROGRAMMING SESSIONS TIMING

A typical duration of an in-season S&C session was 30-45 minutes during a two-game week (eg, Saturday and Saturday). The most frequent training day was match day-4 (MD-4) because gives enough time to recover from last game and to be prepared for the next one.

S&C practices may therefore not only be determined by fatigue and physiological responses to matches, but also by the manager's desired periodisation strategy.

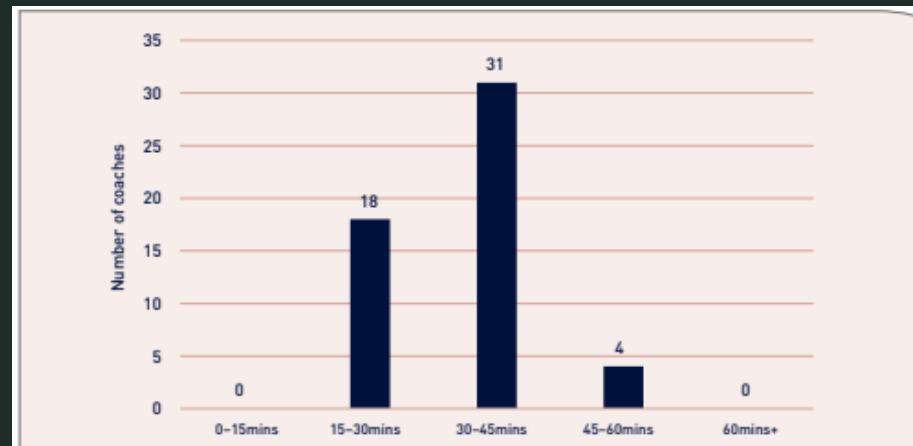


Figure 2. Average length of soccer strength and conditioning coaches' in-season S&C session

TRAINING PROGRAMMING

EXERCISES SELECTION

Lower limb strength training, has been shown to have a positive influence on football-specific movements.

Most used exercise modalities by the surveyed teams:

- 72.5% of the coaches ranked the use of free weight resistance (barbell, dumbbell or kettlebell) first.
- Plyometric exercises ranked second.
- Nordic hamstring curl.
- Derivatives from Olympic weightlifting movements.
- Isometric trainings.

The most selected exercise were the next ones (we must not forget the individualisation principle) :

1. TRAP BAR DEADLIFT

Hex bar deadlift 51% of 51 coaches incorporate this exercise into their programs.

The use of a Trap Bar Deadlift results in greater force, power and rate of force development (RFD) and has a greater correlation with vertical jump due to similar body positions when compared to traditional squat or deadlifts.



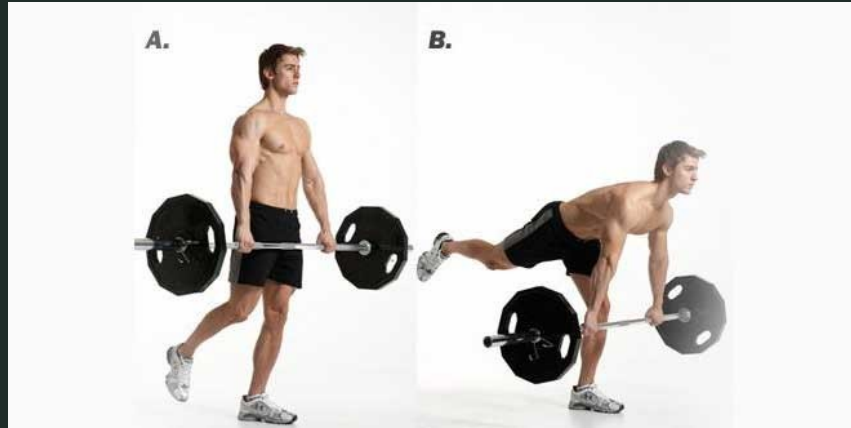
2. SPLIT STANCE SQUAT

Rear foot or split stance squat variations (n=20, 39%). It may still be valuable due to the reported high RFD and their unilateral nature.

Unilateral exercises such as split stance squats or step-ups have a relatively high concentric Rate of Force Development and as such may be useful for training athletic activities such as sprinting or single leg jumps.



OTHER RANKED EXERCISES



Romanian or stiff leg deadlift
(n=22, 43%)



Hip thrust
(n=13, 25%)

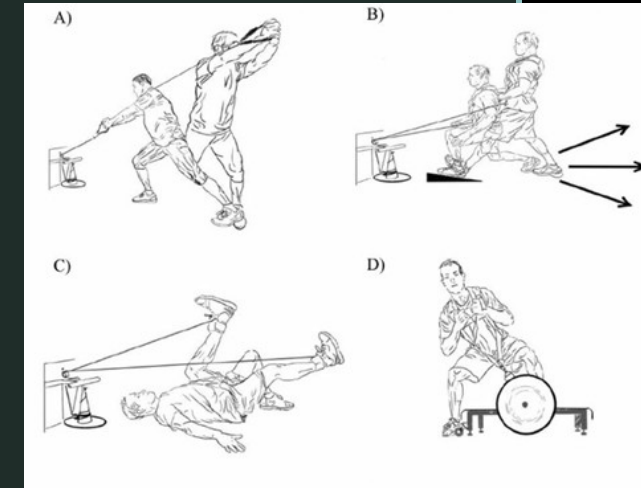


**Barbell
squat**
(n=21, 41%)

TRAINING PROGRAMMING EXERCISES SELECTION

Movements acts as the vertebral column of the training proposal and not the muscle groups. It is better to work on habitual movements of football players such as changes of direction than on the speed/power at which a load is moved.

Movements in football are three-dimensional so we should not limit ourselves to vertical movements. Strength gains are specific to the type of muscle action and movement. Isoinertial resistances accommodate the force that players are willing or able to apply.



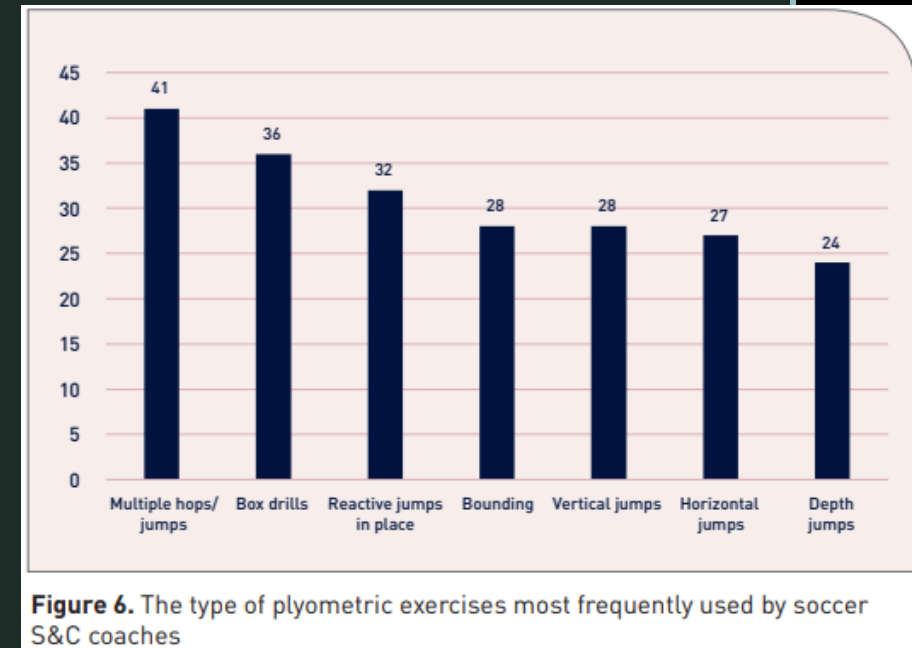
EXERCISES SELECTION

PLYOMETRICS

The purpose of plyometric training is to increase the power of the stretch shortening cycle (SSC) involved structures. Plyometrics cover a wide range of jumping, hopping, and bounding-based exercises. It is also commonly used for injury prevention. 100% of coaches reported using plyometrics.

Other question was how they integrate plyometric training into their S&C programs. Much of them stated that it is 'dependent on the individual athlete'. others said that 'plyometrics and resistance training are done as complex training during the same session', 'only included on the grass during the warm-up', and 'on separate days to resistance training'.

In comparison to similar studies in other sports, plyometrics used as complex training with resistance exercises is a far more common practice.



ECCENTRIC EXERCISES

It has been suggested that eccentric exercises may prevent injury by improving the muscles' ability to absorb more force before failing. Eccentric exercises have previously been ranked as the most effective way to prevent non-contact injuries in football players. Training with eccentric overload to optimise deceleration or braking sporting actions.

In this research, 88% of coaches reported using eccentric exercises, with 78% using eccentrics for preventing injuries.

Some of the critics were:

'We don't have time to recover from eccentric overload exercises during the season'.

'Maximal effort eccentric work provides too much DOMS' and 'players have a negative perception of eccentric exercises, such as the Nordic'.

Maybe practitioners need to follow this advice early in pre-season to allow players to adapt to the demands of the exercise before congested season begins.



**Nordic
hamstring curl
(n=15, 29%)**



**Eccentric leg
curls in yo-yo
device**

EXAMPLE OF THE STRUCTURE OF A MESOCYCLE IN A 2-MATCH WEEK

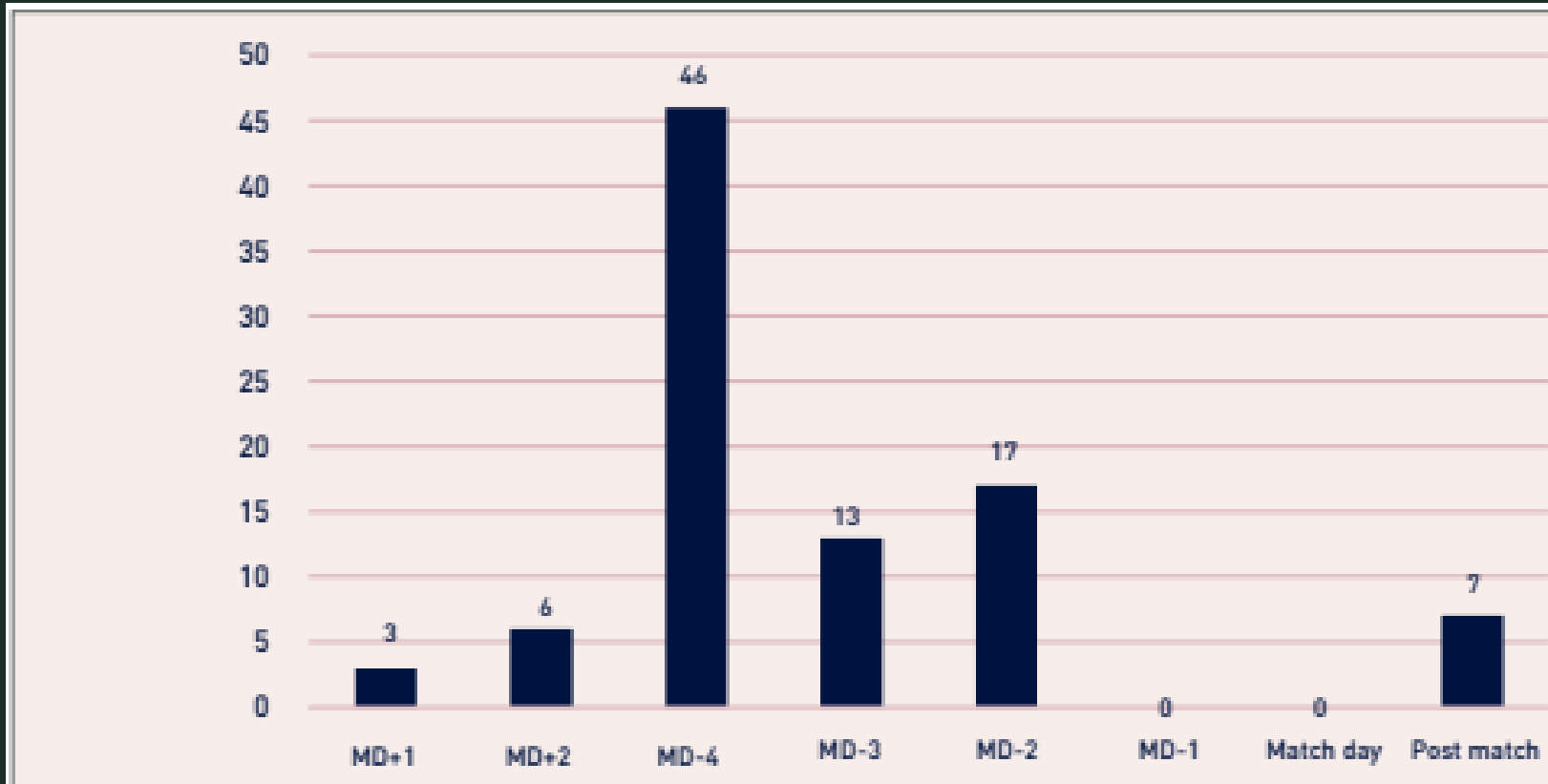


Figure 5. Days of the week strength and conditioning sessions were performed in relation to the next match day (MD)

DAYS	WORKOUT
MD+1	<p>(REGENERATIVE/COMPENSATORY) Divide the group according to the load accumulated during the match (+/- 60min). The players with +60min played will do a regenerative block while the rest of the players will do a compensatory block to reach values close to those of competition.</p> <p>Recovery block: Low impact aerobic work, upper body strength, low opposition and low uncertainty situations.</p> <p>Compensatory block: Multidirectional movements, reduced spaces, high intensity efforts and a total distance of about 6-7km.</p>
MD+2	<p>TOTAL RECOVERY. Activities aimed at the complete recovery of the organism. Individual responsibility for invisible training. Importance of correct nutrition and hydration in recovery.</p>
MD-4	<p>TENSION. More sectoral and individual work. High volume of combined field and gym work. Large number of accelerations/decelerations, changes of direction, technical and fighting actions.</p>
MD-3	<p>DURATION. More complex tasks, more intersectoral and collective tactical work. Total distance oriented tasks, distance at high intensity, pace of play.</p>
MD-2	<p>SPEED. Speed-oriented tasks with good intra and inter-set rest.</p>
MD-1	<p>ACTIVATION. The aim is to gently activate the player the day before the competition. We will mainly work on reaction speed and decision making.</p>

WARM UP

In our case we propose a generic warm-up, the FIFA11+ protocol proposed by FIFA, which is divided into 3 blocks:

Block 1: Activation exercises. Low-intensity joint mobility, active stretching, controlled contact and coordination. Generic exercises.

Block 2: Strength, plyometric and balance exercises. To be individualised according to the level of the players.

Block 3: Perform football-specific actions, at a higher intensity. They can be specific according to the type of session.

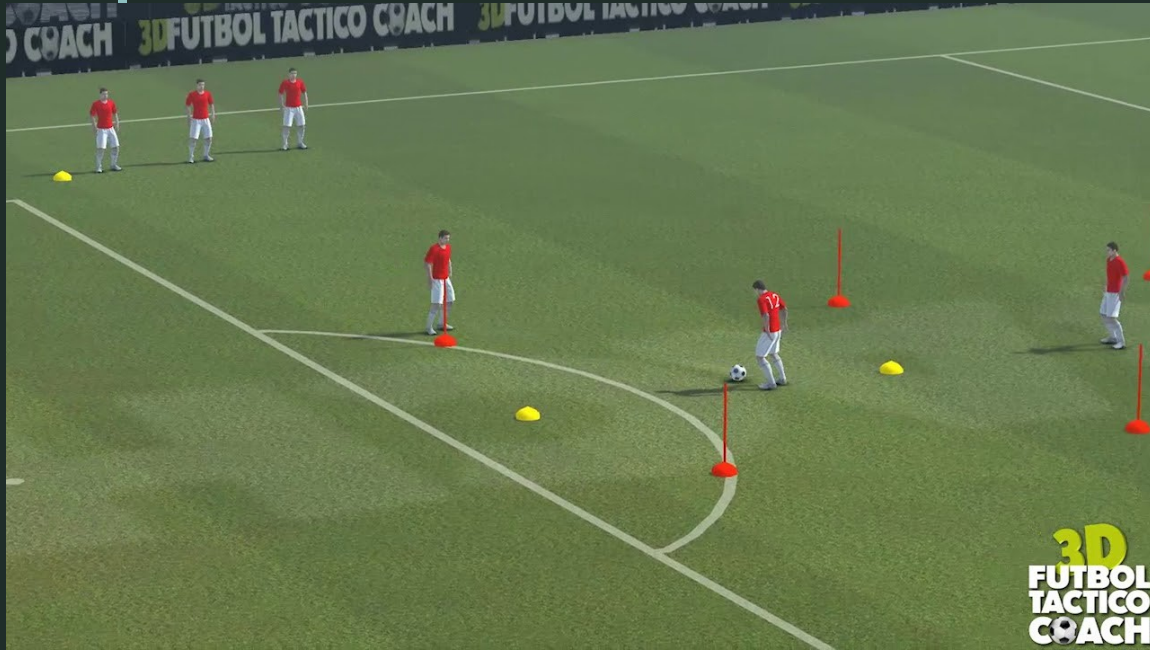
BLOCK 1



BLOCK 2



BLOCK 3



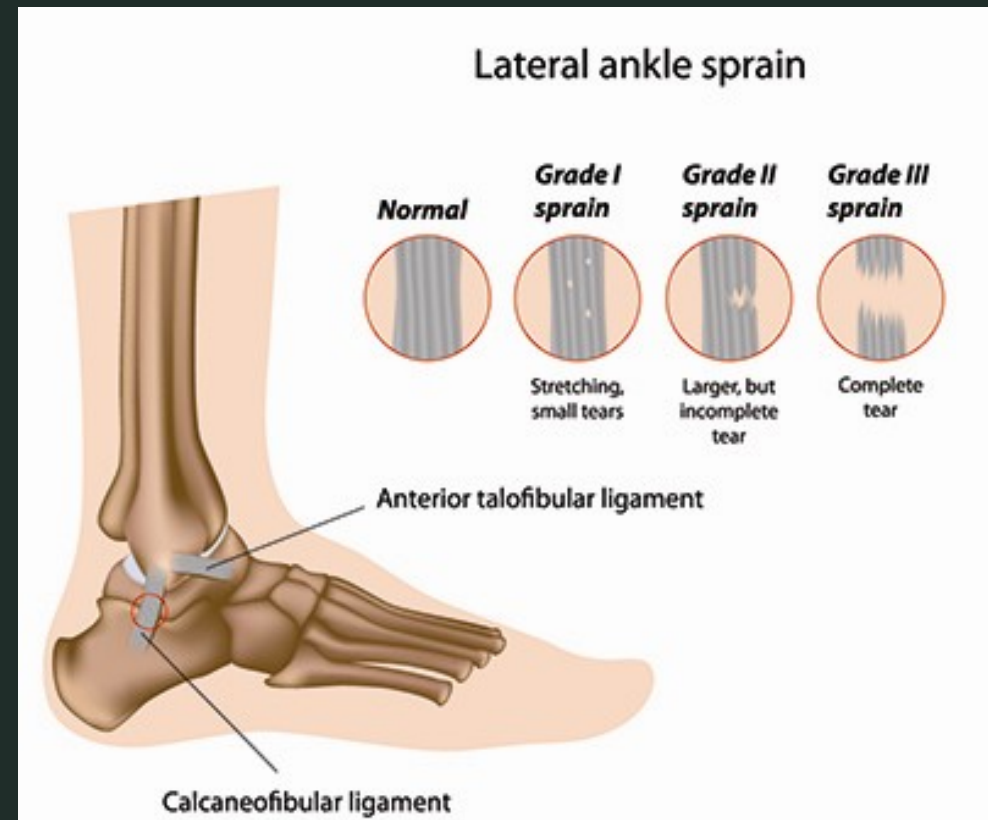
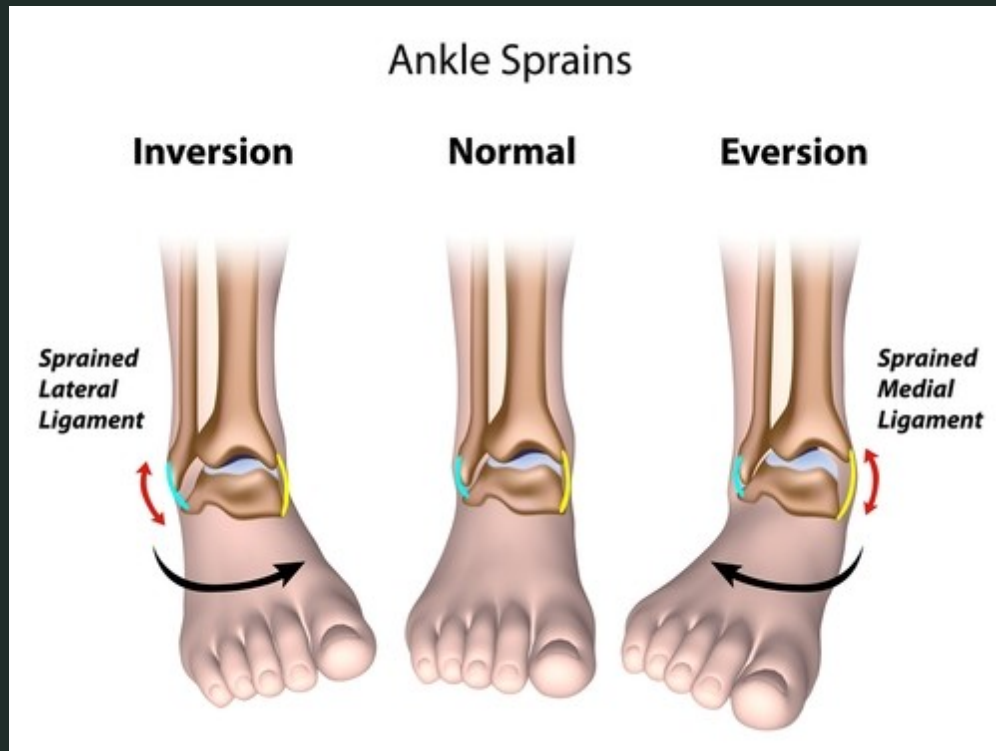
MOST COMMON FOOTBALL INJURIES

According to several studies, the incidence of match injuries is almost 10 times higher than the incidence rate of training injuries. In addition, we can divide injuries into those that are caused by individual actions of the player either by a collision with another player, a bad fall or a bad tackle.

And among those that are more long term, these injuries are the result of a continuous improper use in the game, or simply the overuse of a certain body part of a particular part of the body.

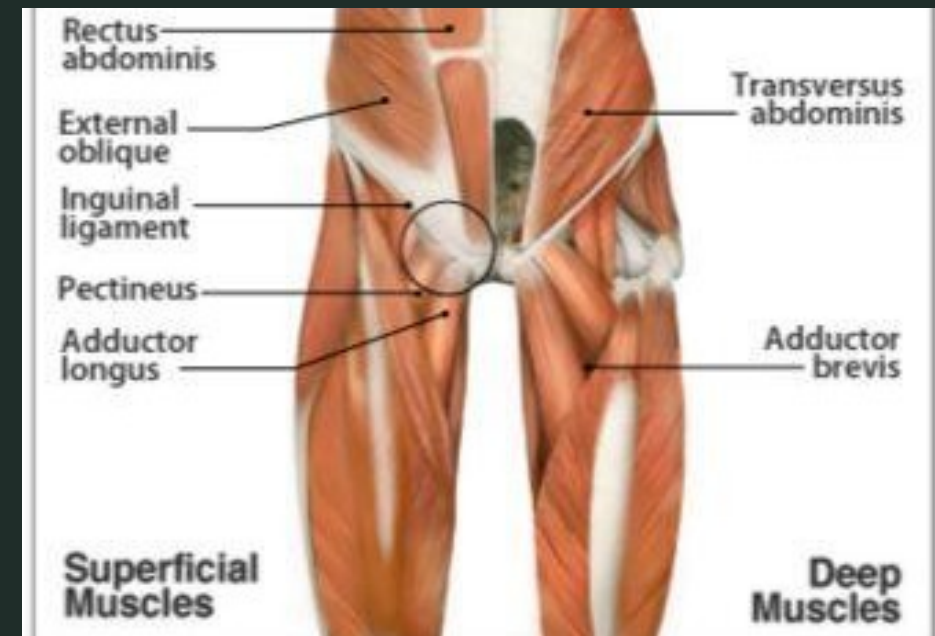
1. Ankle sprain

This is caused by an abrupt twisting or stretching of the ligament beyond its capacity for elasticity. This is an injury affecting the ligaments, which are solid, elastic, non-deformable structures that bind bones together within a joint and whose function is to restrict and direct their movement.



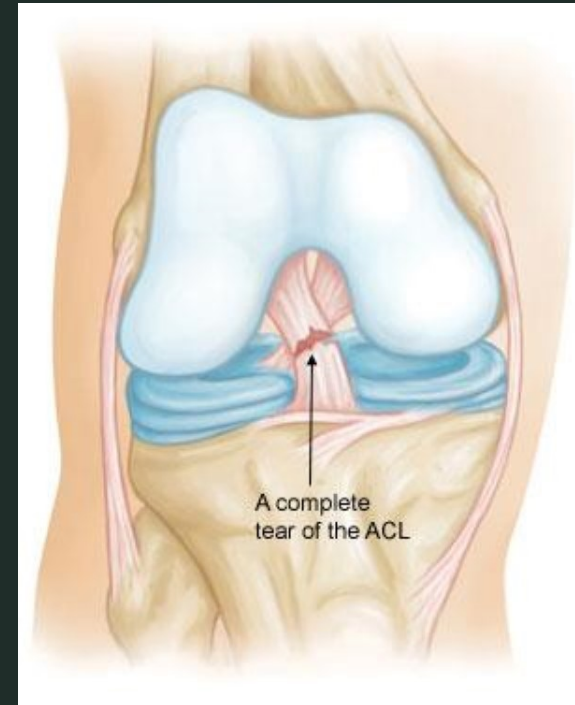
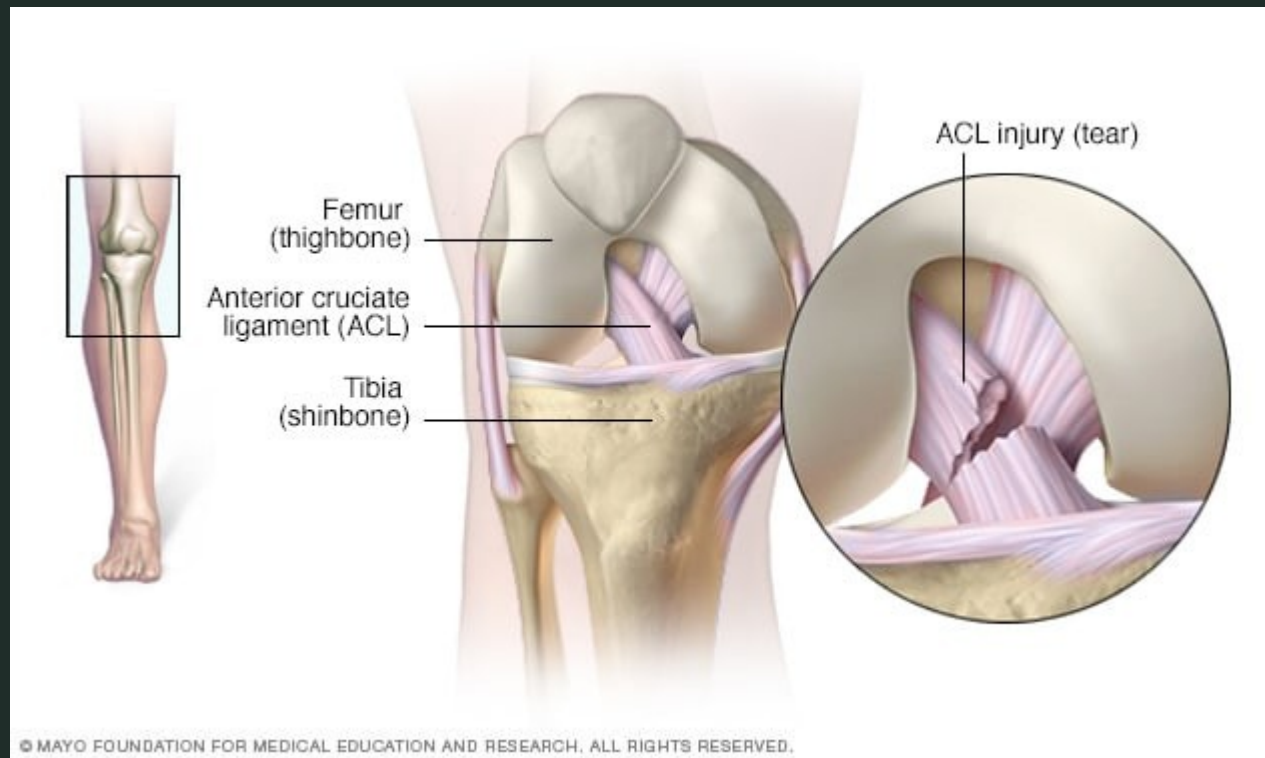
2. Pubalgia

It's a injury which affects the muscle groups located in the pubic area. It occurs in athletes when it is caused by alterations of the musculoskeletal system. Generally, this injury is caused by a fall or an incorrect jump and also by tendinopathies of the adductor muscles on the inside of the thighs and also by pathologies of the tendons of the rectus abdominis which are above the pubis and which insert into the pubis.



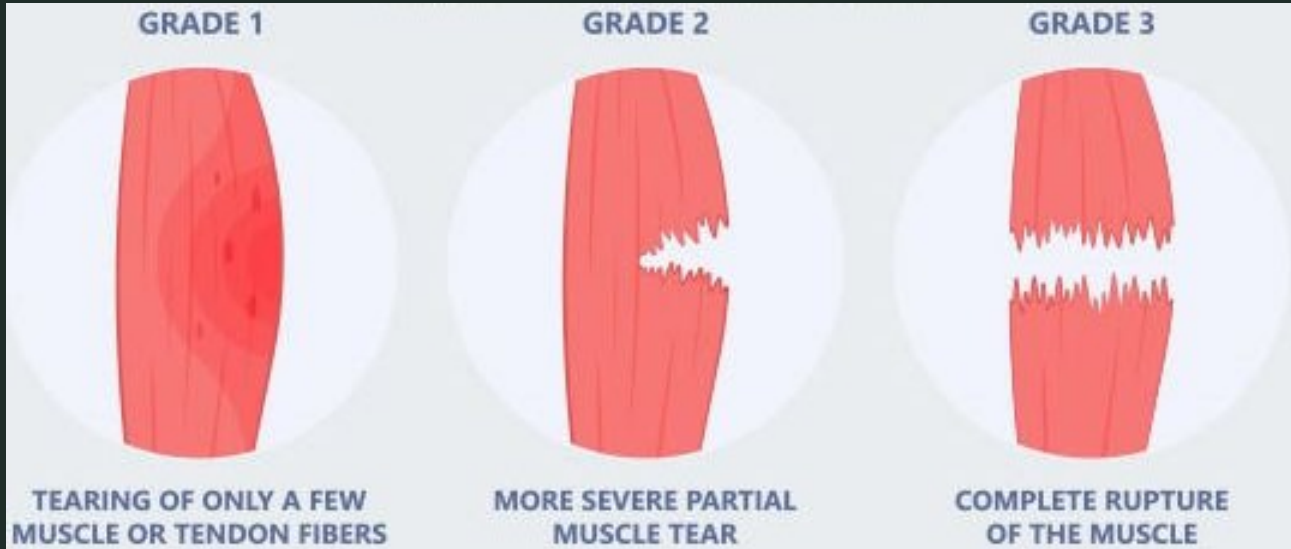
3. Knee injuries

One of the most frequent injuries in football is the rupture of the Anterior Cruciate Ligament. It is a tear or sprain of that ligament, which is one of the strong bands of tissue that help connect the thigh bone (femur) to the tibia.



4. Muscle tear

This injury to the inside of the muscle occurs in football most commonly in the thighs and legs. When muscle fibres are damaged, they rupture and bleed, resulting in haemorrhage. The damaged fibres can be deep or superficial, so a bruise will not always form on the skin. Generally, this injury is caused by fatigue or strain of the muscle, although there are also tears caused by a direct blow.



PREVENTION OF INJURIES

- Proper warm up.
- Healthy lifestyle.
- Massages and exercises of reactivating muscles to relax it.
- Compensation exercises.
- Using protection in the legs, head and boots that fit your feet to prevent the ankle sprain and another injuries that you could have training or in the match.
- Balance exercises focusing on neuro muscular control and landing.
- Keep hydrated.
- Focus in exercises that includes core stability, balance, dynamic stabilization and eccentric hamstrings strength.
- Convenient rest

COOLDOWN



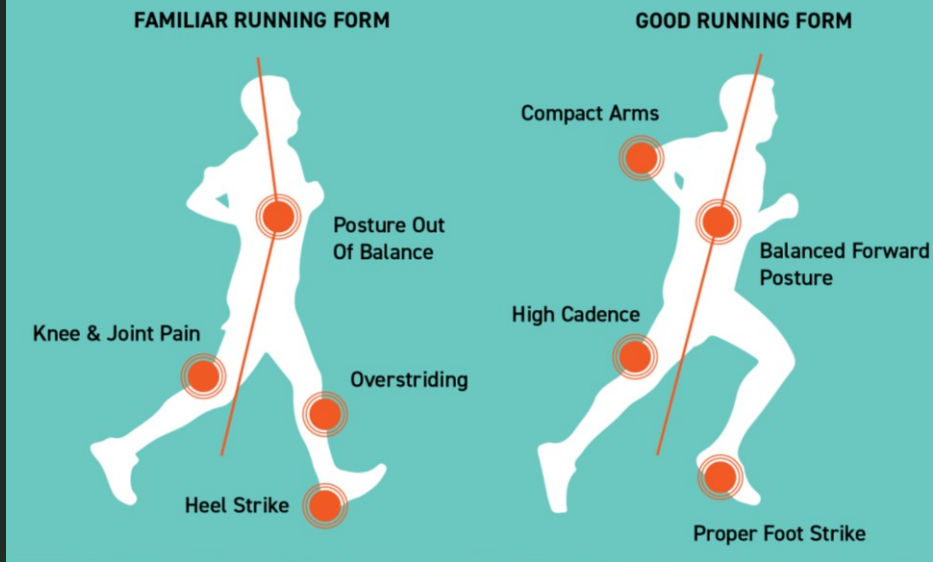
OTHER IMPORTANT FACTORS: STABILITY AND RUNNING TECHNIQUE

The stability is the ability to restore the movement pattern after statoclastic or external perturbations. This response consists of different neuromuscular mechanisms such as different myotatic reflexes and having a good muscular predisposition to improve the anticipatory response to these perturbations.

Stability work is often confused with tasks on unstable surfaces that increase motor abundance without any control. Such exercises would be better for working on proprioception, for example.



Optimal Running Forms



As we have seen, the ankle is often the joint that suffers the most in football and to prevent injuries it must be a source of stability and then mobility as it has a fundamental role in the landing of the jump and in running.

For its part, working on running technique will bring benefits such as optimisation of movement improved performance reduced risk of injury.

We must bear in mind that each athlete's running will be unique and personal due to the differences (strength, coordination, anthropometry...) between one athlete and another.



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