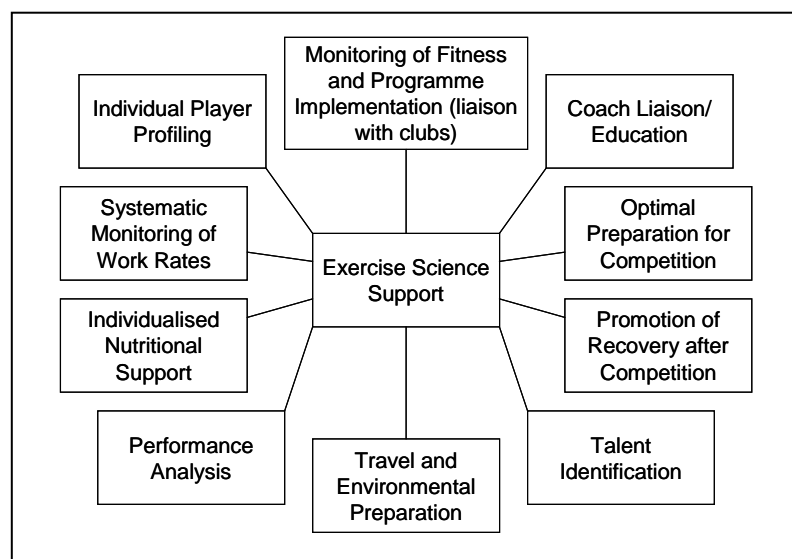


## EXERCISE SCIENCE SUPPORT AS PART OF THE STRATEGY FOR THE DEVELOPMENT OF INTERNATIONAL TEAMS AND PLAYERS

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A player who is aspiring to play international football must achieve top-level performance. Many different physiological parameters as well as technical, tactical, psychological and sociological issues that can impact upon player's performances underpin this level of performance. Insufficient performance capacity or weakness in one of these components leads inevitably to functional disturbances of the body with a higher susceptibility to injuries, infections and exercise-reduced regenerative capacity. Exercise science support in an International setting can promote the optimal physiological preparation of players for sustained fitness and performance, which is an important prerequisite for success. The role of the Exercise Scientist has been to assist in the development of junior International players from both a short- and long-term perspective. There are several areas that can be impacted upon as detailed in Figure 1 below. Many of the areas overlap, successful implementation being dependent on a sound support structure developed between players, clubs and country.



**Figure 1: Areas of Exercise Science Support for International Teams.**

### Systematic Monitoring of Work Rates

Every training session is conducted with a specific aim in mind be it technical, tactical or physiological. Via a systematic monitoring of work rates, achieved via heart rate monitoring, a greater scientific approach to the training of players is being implemented. The benefits of such a system include:

- Enabling the exercise intensity during training to be monitored and controlled.
- Ensuring that the metabolic loading experienced during training is appropriate for the build up to and recovery from a game.
- Minimising the risk of overtraining.
- Providing coaches/players with objective feedback relating to physical performance.
- Motivating players.
- Assisting in the evaluation of players and their readiness to play a competitive match.

### Preparation and Recovery from Competition

The process of regeneration from a competitive match is the first step towards the preparation for the next match. During tournaments these parameters play a vital role in determining the performance

potential of players. The importance of adequately preparing for a match can not be overstated, functional warm-ups and half-time activities therefore needing to be adequately implemented to prepare players from both a neurological as well as a metabolic perspective. Following the completion of a competitive match, or indeed a heavy training session, areas of exercise science support that promote recovery and regeneration are essential, such areas include:

### **Recovery Training**

- Recovery sessions are implemented the day after a hard training session or match and assist players return to a normal physical state.
- During periods of frequent training and competition (especially tournaments) this type of training helps to assist in the avoidance of overtraining.
- The intensity of recovery training sessions is approximately 65% of maximum heart rate.
- Stretching, massage and icing sessions are also implemented to assist the recovery process.
- Pool sessions are also employed and are ideal for such work, the properties of water helping to promote the recovery of players.
- Resting heart rates have been monitored to help assist in the evaluation of the stresses imposed on players, and to highlight their recovery/regeneration capabilities.
- Self assessment protocols have also been introduced to assist in the subjective evaluation of each player's recovery.

### **Nutritional Support**

- Appropriate nutritional intervention strategies are being used immediately following training and matches to aid the recovery process and ensure that the muscles energy stores are adequately restocked.
- Dietary guidelines for players to adhere to, help ensure that high quality training and competition can be maintained.
- Fluid intake is carefully monitored and prescribed on an individual basis to ensure that players are optimally hydrated and the residual effects of dehydration are avoided. The effects of dehydration cannot be underestimated, every individual's sweat rate is calculated and addressed accordingly with the correct concentration of fluid in terms of carbohydrate and electrolyte content.

### **Rest & Regeneration**

- The programmes are structured to include sufficient rest between training sessions and games to enable regeneration to take place.
- Via the measurement of activity profiles, resting heart rates and well-being self assessments, an insight is gained as to whether appropriate rest has been taken.
- Overall, the training and match schedule with its associated metabolic demands imposed on the player's dictates the rest periods required.

### Monitoring of Fitness and Programme Implementation (including Player Profiling)

It is important that the conditioning of International players is monitored, not necessarily while on International duty, but via liaison with individual clubs and the necessary staff. This enhances our understanding of a player's physiological status, providing guidance towards the steps that may need to be undertaken to ensure that all players are in optimal physiological condition whilst on international duty.

During tournaments when extended time periods with a squad are likely many physiological parameters need to be adequately maintained, this being of greater importance for those players on the fringe of the first eleven. It is of paramount importance that every player is given the best opportunity to maintain, improve or rehabilitate their physical/physiological condition, without compromising the time spent on technical and tactical factors. As such, the Exercise Scientist contributes to and is responsible for the following areas:

- In conjunction with the physiotherapist providing appropriate training for injured players.

- Maintaining fitness attributes of players not involved in competitive matches.
- Conducting appropriate sessions to stimulate the nervous system and maintain appropriate levels of fitness throughout the squad.
- Testing players for short-term assessment of metabolic or neurological fatigue and also identifying appropriate goals for the long-term development programme.
- Constructing individual player profiles with information ranging from heights, weights and body fat levels to more functional fitness assessments.

It is important that a good working relationship is maintained between the coaching, scientific and medical staff at club and international level with the practices and procedures of both parties being reciprocal to ensure optimal player development is accrued.

### Performance Analysis

The advancement of match analysis systems allows objective feedback of player performance to be readily obtained. Relevant physical performance related information from match analysis used in conjunction with player profiles assist in the formulation of specific player development programmes.

### Travel and Environmental Preparation

Playing in foreign environments is a frequent occurrence when playing at International level. There exists a need to consider the effects of jet lag and the possible contingencies that can be implemented. Also, the impact of extreme environmental conditions are often underestimated, especially during the winter months, and the effects on the performance of players, especially youth players, could well be disastrous. It is important that all impeding factors are addressed appropriately, enabling players to adequately cope with the demands placed upon them.

#### **Travel/Jet Lag**

Symptoms of jet lag include fatigue and general tiredness, inability to sleep at night, loss of concentration, loss of drive, headaches and general malaise. The severity of jet lag is affected by a variety of factors and generally, the more time zones crossed, the more difficult it is to cope.

Various strategies are employed to offset the effects of jet lag. However some methods have included the taking of several forms of drugs. The effects of these remain equivocal and one would suggest that preference is given to the use of light or behavioural measures to resynchronise circadian rhythms. The subsequent planning of sleep patterns and training schedules are the important factors that are considered and vary depending upon the flight times and also whether the travel is westward or eastward.

#### **Acclimatisation to Altitude, Heat and Cold**

There are several practical issues that are usually considered when playing and training at altitude. It needs to be accepted that altitude training will have a detrimental effect if the player is not physically and mentally well prepared and if the training is not well monitored. Physiological parameters that are monitored at altitude include training volume, training intensity, urea, creatine kinase, haemoglobin, haematocrit, resting pulse, and the subjective feeling of wellness.

Playing in the heat is the most severe stress a player can encounter. It is therefore essential that the severity of this challenge is understood and that effective acclimatisation strategies are implemented in order to adequately prepare players for competition in the heat. This area is closely linked with the hydration strategy and the systematic monitoring of work rates.

Strategies and procedures are also implemented in cold environments to limit any possible performance decrements taking place. Ideally, players have to ensure that high levels of aerobic fitness are maintained, ensuring that the demand placed on muscle energy reserves is reduced as much as possible, thus delaying the onset of fatigue. Another area for consideration is the warm-up,

which should be well structured at all times. This aspect takes on even greater significance during exposure to cold climatic conditions due to the effects the cold can have on muscle physiology.

### Talent Identification

Over the last two years The Football Association have placed a great emphasis on talent identification with many articles being published on the topic in journals such as Insight. Once again with co-operation from medical and science staff at clubs themselves an anthropometric and performance based database is being established. This type of endeavour requires a longitudinal commitment, which is currently being shown by all parties concerned. In conjunction with coaches future steps can be taken towards the identification of more objective predictors of talent. This long term project recognises that the identification of potential football talent is based on a structured understanding of the different ages, stages of development and realistic performance expectations.

### Education

The whole process of support currently provided to players on International duty will serve to raise their awareness of the need to adequately prepare and condition themselves in order to compete at the highest level of competition. The lessons learned while on International duty should be borne out in their careers with the right training ethic being passed on to others. This long term approach can incorporate the establishment of a mentor programme where junior players can learn from senior players. It is the role of the Exercise Scientist to assist with this process, creating a healthy football culture for years to come!