

Review

# Principles and practices of training for soccer

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## Abstract

The complexity of the physical demands of soccer requires the completion of a multi-component training programme. The development, planning, and implementation of such a programme are difficult due partly to the practical constraints related to the competitive schedule at the top level. The effective planning and organisation of training are therefore crucial to the effective delivery of the training stimulus for both individual players and the team. The aim of this article is to provide an overview of the principles of training that can be used to prepare players for the physical demands of soccer. Information relating to periodisation is supported by an outline of the strategies used to deliver the acute training stress in a soccer environment. The importance of monitoring to support the planning process is also reviewed.

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## 1. Introduction

The physiological demands of soccer are complex. This complexity is partly a consequence of the nature of the exercise pattern. The requirement for frequent changes in both the speed of movement (e.g., walking, jogging, high intensity running, and sprinting) and direction, makes the activity profile intermittent. The intermittent exercise associated with soccer necessitates contributions from both the aerobic and the anaerobic energy systems. Training programmes for players will therefore need to include activities and exercise prescriptions that stress these systems. Players also need to possess muscles that are both strong and flexible. These attributes are important for the successful completion of the technical actions (e.g., passing, shooting, etc.) which ultimately determine the outcome of the match. Effective ways to develop both strength and range of

movement, especially in the lower limbs, also needs to be systematically planned and performed in training.

The need to include a number of components of fitness into the training programmes of soccer players would indicate that the exercise prescription should be multi-dimensional. The inclusion of specific training plans for the development of a number of energy systems as well as specific muscle exercises would lead to a need for multiple types of physical training sessions. The completion of a large number of such training sessions is problematic in a sport such as soccer for various reasons. The need to include training that is focussed on the development/practice of technical skills and sessions that impact on the tactical requirements of soccer prevent the completion of numerous physical training sessions. Technical/tactical sessions are frequently the priority in the training plan and will therefore often take precedent overall other training activities. The large number of competitive fixtures, as well as the need for frequent travel, further limits the time that is available to undertake physical training in the competitive season. These restrictions promote the need for a more global approach to the training of players by devising sessions that promote the simultaneous development of physical, technical, tactical, and mental qualities.

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The restrictive framework that governs the inclusion of sessions focussed on purely physical conditioning makes planning a priority. Detailed planning of both the acute and chronic physical training sessions ensures that training is efficient in its delivery. This will help to maximise the performance improvements associated with the training completed by the players. This article aims to outline the theoretical approach used to plan physical training in soccer. It also includes important information on the sport-specific way to deliver a physical training stimulus. A short section on the importance of monitoring the activity completed by players will also be included as such strategies are vital to performance, especially for the modern elite player.

## 2. Planning training for soccer: the importance of periodisation

Periodisation is a theoretical model that offers a framework for the planning and systematic variation of an athlete's training prescription.<sup>1</sup> Periodisation was originally developed to support the training process in track and field or similar sports in which there is a clear overall objective such as training tailored towards a major championship such as the Olympics.<sup>2</sup> The inclusion of variation in the prescribed training load is thought to be a fundamentally important concept in successful training programmes.<sup>3</sup> This is a consequence of the sustained exposure to the same training load failing to elicit further adaptations. Sustained training loads, especially if they are high, can also lead to mal-adaptations such as fatigue and injury. Both these outcomes would result in ineffective training sessions and a failure to benefit performance of both the individual athlete and the team.

The variation in training load important for periodisation is obtained by the use of a number of structural units that are used to fulfil the specific aim(s) associated with a training programme.<sup>4</sup> While the specific terminology to name these units can vary within the literature the nature of the units is inherently similar. The three most important sub-divisions are termed by Cissik<sup>4</sup> as the phase of training, the macro-cycle, and the micro-cycle. The major difference between these three sub-divisions is the time period associated with each other (6–30 weeks for the phase of training; 2–6 weeks for a macro-cycle, 1 week for a micro-cycle). This difference in duration enables easier planning as well as an increased flexibility to respond to the athlete(s) reaction to the recently completed training sessions. While different models of periodisation are available (these in simple terms utilise different approaches to vary the training load) they all employ similar structural training units and conceptual approaches to planning. The specific choice of periodisation model will be dictated by factors such as the training requirements of the athlete and the competition schedule that is needed to be fulfilled.<sup>5</sup>

Despite the popularity of periodisation with conditioning coaches in the USA,<sup>3</sup> there is limited research to support this model as the most effective theoretical framework to train athletes especially soccer players. In addition, a lack of

evidence prevents the direct application of traditional periodisation models to team sports such as soccer.<sup>3</sup> These challenges centre around the need for soccer players to attain multiple physical training goals within similar time periods and a competitive fixture schedule that requires multiple (around 40–50) peaks across a large number of months ( $n = 10$ ). While it is clear that some general concepts associated with periodisation (for example, the division of the year into phases of training, namely pre-season, the competitive season, and the off-season) are applied within the elite professional game, there is little evidence for the wholesale application of the principles of periodisation. Relatively little information is available, either in the peer reviewed scientific literature or applied professional journals, that provides a detailed outline of the longitudinal training loads experienced by players in soccer. Recent unpublished research from our group<sup>6</sup> has attempted to characterise such training load patterns in an elite Premier League soccer team. The data have illustrated small variations in training load across both phases of training and macro-cycles indicating that the loading patterns completed by these players does not comply with that which would be expected if the principles of periodisation was applied. While the data are limited to the training load prescription of one team and its coaches it is likely to reflect a common occurrence within the sport. This is a direct consequence of an inability to systematically manipulate loading patterns across long periods of time due to the requirement to play competitive fixtures in both domestic and international league and cup competitions. Variations in training load are, however, much more frequently seen within the smallest structural planning unit of the micro-cycle. While the micro-cycle is traditionally associated with a 7-day period it can easily be manipulated to reflect the number of days between competitive fixtures. In this way practitioners are able to use the basic principles of periodisation to plan training loads that provide a physical training stimulus to the players as well as facilitate recovery and regeneration from/for competitive matches.

Effective training requires a structured approach to plan the variation in training load albeit across relatively short time periods in soccer. The recognition of a number of key principles when planning facilitates the adaptive process. The importance of progressive overload has already been discussed above. As the improvement in performance is a direct result of the quantity and quality of work completed, a gradual increase in the training load is required to underpin an increase in the body's capacity to do work.<sup>7</sup> The progression of load is obtained through subtle changes in factors such as volume (the total quantity of the activity performed), intensity (the qualitative component of the exercise) and the frequency (the number of sessions in a period of time-balance between exercise and recovery)<sup>7</sup> of training. The approach to such progressions in training should ideally be individualised as each athlete will be unique in their current ability and their potential to improve. Such individualisation is frequently ignored in team sports such as soccer where the training prescription is often focused on the group. Specificity is widely identified as a

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