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Original Article

The phenomenon of load management

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Abstract
In the last decade, the focus on load management, i.e. on the correct management and administration of training loads, has become increasingly popular on the pages of leading sports magazines. The topic is increasingly becoming central in sports and physical training conferences, since the implications of athletes' injuries are increasing. The world of basketball, and that of the NBA to be precise, is the starting point of this trend, followed by the sports world of football. So load management is also taking hold in the NBA, where the players, in agreement with the technical and athletic staff of the various teams, have begun to manage the minutes on the court especially in the regular season, in order to arrive in the best physical and athletic condition at the playoffs period.For years now the teams try to elaborate systems to keep their roster intact. Many and different opinions about load management; from one side many stakeholders are against load management, on the other, many franchises seem increasingly inclined to use it.Even in football, for quite a few seasons the coaches have been applying the so-called 'turnover', that is, letting the players themselves, in particular the most representative ones, run around, managing their playing time. Anyway the purpose of this work is to provide a first overview of the phenomenon of load management, in order to try to clarify and analyze the main dynamics related to it from different perspectives.
Keywords: load management, load, periodization**.**

Introduction

It is evident that every sports activity has unique and particular features. Such features must be initially analyzed in order to make the sport considered unique, and then to direct the whole training towards the improvement of the most important factors of this discipline. These factors, once observed and carefully trained, will determine a high level of performance. All this means studying the competition model and the athletes themselves, clarifying the technical and biomechanical objectives of the various sports, physiological and cognitive gestures. These studies certainly involve the coaches, who will have to choose the best means and methods over time to improve the performance of their athletes. But what happens every time a subject undergoes any kind of sports exercises? What happens to the human body in such situations? To answer these questions, we have to start from the concept of homeostasis, a state of balance that includes various physiological phenomena. By homeostasis we mean "the balance reached by an organic function over time" (Cannon, 1972). At this point, it is useful to define the concept of training as a specific and methodical preparation of the athlete for a sports test or competition. Training means preparing specifically and peculiarly for the performance objective. Training "breaks" the physiological balance by subsequently rebuilding the physiological levels mentioned above from a higher level, thus increasing each athlete's skills. Therefore, training means providing external stimuli to the body. The human body will try in any way to restore the homeostasis existing before the training session, unless the training stimuli are constantly maintained and a continuous process of adaptation is achieved. The general adaptation syndrome starts from the fact that the body reacts to stimuli coming from outside by means of defense mechanisms called stressors, in order to keep structures and function intact (homeostasis). The reactions to stressors occur in a linear way;

- Alarm reaction, with the onset of adaptation;
- Resistance stage, with constant exposure to the stressor;
- Exhaustion stage.

After these events (training stimulus - homeostasis break - recovery), a "supercompensation reaction" of the human body occurs; this is a return to homeostasis, but occurring from a higher level than the initial ones. This process is extremely individual and personal. Therefore, the training processes are based on the principles of the general adaptation syndrome, and on the ability to withstand even greater stimuli than those triggering adaptation itself.

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Methods and Materials

This project was included in the category of applied research, specifically in the analytical one. In this context, the methodology chosen was the literary review. The sources used for this project were divided into preliminary, primary and secondary.As far as the scientific literature in the mid-1990s is concerned, Foster et al. analyzed the performance of runners, cyclists and speed skaters, showing that performance is inextricably linked to the training load, and that athletes with higher training loads performed better. Thus, the term physical load refers to that system of exercises, with consequent internal results provoking such a stress in the body as to lead to the general syndrome of adaptation. It can be classified as:

- External physical load, or the measure of the effort produced;
- Internal physical load, or the organic modifications produced by the exercises.

The external physical load category includes every form of exercise defined as a single stimulus constituting the load. They follow a very precise classification which determines training aspects and effects. However, going back to the wider concept of load, it can be measured according to two variables: quantity (volume) and hardness (intensity). The general adaptation syndrome is the main objective of the administration of loads, and therefore of the stimuli. It then becomes indispensable to learn about/introduce the principles governing their administration:

1. *Principle of load alternation and recovery*;

The adaptation of the organism is the result of a correct alternation between load administration and proper recovery. The structural and functional changes occur at different times, depending on the training aspects involved.

2. *Principle of load progressivity*;

The process of adaptation is reluctant to change; in order to overcome this stabilization, it is good practice to proceed with a progressive increase of the loads, particularly from the perspective of the training volume.

3. *Principle of load continuity*;

By this principle we mean the administration of the exercises over a long period of time, like a year or more. Without long periods of activity, it is not possible to achieve the necessary increase in load that leads to better sports performance.

4. *Principle of load variability (correct sequence)*;

This principle supports the need to program the load in the short and long term, alternating all the motor skills useful to the performance model.

5. *Principle of load periodization*;

Consistently with the above-mentioned principles, this one defines the need to plan the load in the long term (periodization), bearing in mind the different training effects of the various biological structures.

6. *Principle of unity between general and special load*;

This principle underlines the need for a classification of motor exercises (whether general or special).

7. *Principle of regularity*;

This is basically the logical succession of the exercises following a few simple methodological rules;

- administering exercises from the simple to the complex ones;
- from the easy to the difficult ones;
- from the known to the unknown ones.

8. *Principle of stability*;

Stabilizing basically means systematically repeating the exercises designed to maintain constant skill and learning.

9. *Principle of evidence*;

Demonstrations and use of other means, methods and materials must be supported and associated with verbal explanations.

10.Principle of moderation;

When planning the load to be administered it needs to take into account the athlete's age, gender, physique and previous experience.

11. *Principle of awareness*;

This entials actively involving the athletes and informing them about the objectives to be pursued in the training session.

Results

But what are the effects of training load administration? Can the latter be appropriate or harmful? Professor Gabbett, in his article,[1] argued that adequately high training loads reduce the risk of injury and improve the athlete's performance in several ways. First and foremost, constant exposure to the load helps athletes cope with the subsequent load. Second of all, properly administered training develops physical qualities that not only protect against injury, but allow athletes performing the high-intensity tasks required by the competition. Generally speaking, the effects of exercise on the body vary according to the age and the conditions of each exercise over time. These effects can be established in the short, medium and long term. Among the immediate effects, the heart rate can increase to over 200 beats per minute, depending on the exercise performed.

There is an immediate increase in pulmonary ventilation, then comes the sweating for heat dissipation, and lactate production may occur as a result of the first stage of effort. Adaptations in the medium and long term, on the other hand, correspond to a real physiological strengthening. The conditions that lead to stable and enduring adaptations are stabilized. The neuro-muscular apparatus is subjected to hypertrophic events and capillarization phenomena. The neuronal recruitment power of the fibers and the transmission of nerve impulses are improved. The cardiovascular system decreases the heart rate at rest, and recovery times decrease due to the thickening of the heart cavities. Moreover, cardiac output increase. The osteoarticular system gets more nourishment by promoting the production of new cells. Active and passive mobility is improved, just like ligaments and joint capsules elasticity and endurance. Therefore, in the long term, these benefits become the heritage of the individual, but they tend to gradually decrease in proportion to the acquisition times. But what happens if one exceeds in efforts or if the motor load is not well administered over time? Excessive load or its bad organization are at the basis of the overtraining problems, which can be mild but can also lead to partial or total inability to perform. Improper load management is usually at the basis of the overtraining effects, which can lead to stop any sports activity over time. Overtraining is therefore an imbalance between training and its recovery. The work carried out by Nunes et al.[2] on load control by monitoring endocrine responses-related training parameters in female basketball highlights what stated above. Considerable is also the work carried out byMatusinsky et al.[2], whoapplied the load management model for the physical training of a Croatian main league team.

Discussion

Thus, overtraining is the general term indicating that the individual has been subjected to stress, resulting from training and other unrelated events (e.g. lifestyle), so much so that he or she is unable to express an optimal performance level after an appropriate period of recovery. To diagnose overtraining, a clear drop in performance should be observed. The causes of poor performance are manifold and not exclusively related to incorrect training planning and load/recovery time administration. There is no clear distinction between normal effort resulting from training and overtraining; however, there is an intermediate stage represented by overreaching or short-term overtraining. Overreaching is a condition in which athletes work beyond their ability to adapt to that training; it can be considered a form of short-term overtraining in which adaptation is compromised, but there is no loss of previous adaptations. The consequences of these phenomena are easy to understand, i.e. they all lead to injuries.

Conclusions

This theoretical framework includes the concept of Load Management, literally meaning the management or control of the workload. It probably all began in 2007 when, before an NBA championship basketball game, coach Popovich did not field a star of his team, Tim Duncan, for “being old". In 2012, the same coach excluded two other stars of his teams from some important matches, i.e. Ginobili and Green. They might seem just usual choices made from time to time by the coaches/sports trainers, but in that circumstance the NBA league responded with a $250,000 fine for "disservice". Again, recently in 2019, the L.A. Clippers team did not field the star Kawhi Leonard in a crucial championship match, and once again the NBA league responded with a fine. So it immediately seems clear that, on the one hand, there are technicians, athletic trainers, physiotherapists and sports doctors who try to manage human resources by protecting them from any kind of injury, trying to field the best players in the most important moments of the season, maybe in their best physical condition. In the wake of what stated above, some authors clearly link the concept of load administration to injuries and the resulting functional recovery (Finlay). On the other hand, there are all the so-called stakeholders: leagues, televisions, media and fans, who obviously would like the best players always on the field at all times of the season. It is true that there are many sports commitments, in the case of the NBA there are more than 80 matches to play in a sports year between regular season and post season.

This aspect clearly entails a considerable probability of injury. However, it is also true that the NBA league and the media, protected by huge multiannual multi-billion-dollar contracts, always demand to see the top players in the matches.

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