

# Sports training in Ancient Greece and its supposed modernity

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## ABSTRACT

The present work aims to establish links between the knowledge we have on the precepts that drove the modes of sports training that took place in Ancient Greece, and the principles governing the achievement of sports performance today. From the result of this comparative analysis we can provide a more justified opinion about the reality of the level reached during this long historical period (the interval in which took place the development of the Ancient Olympic Games: 776 BC - 393 AD, that is, around a thousand years). For this we briefly review the origins and the stages by which sports training evolved in Ancient Greece, together with the most relevant aspects that shaped their training, which allow us to relate it to modernity. Finally, an "adventurous" parallelism with the principles of the current sports training is approached to verify its fulfilment in order to be able to establish to what degree sports training in ancient Greece can be considered modern. In light of the above, it is considered that, either by intelligent search in ways to improve performance and fulfil the desire to win (agonistic) or the spontaneous emergence of effective ways, sports training in Ancient Greece contains enough significant elements related to current scientific knowledge and, in particular, to the *biological laws of adaptation to the effort* and the *Principles of sports training*, in order to determine that it had a certain modern character. **Keywords:** Ancient training; Modern training; Principles of sports training.

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## INTRODUCTION

In the present essay, after deepening the precepts and concepts that were used in the Hellenic world in the development for the training of the athletes, we intend to emphasize the comparative analysis of these with the current principles of sports training, with the intention to establish the character of modernity that they contained and thus be able to assess its transcendence from a perspective intrinsically related to what it is being analysed.

It should also be noted that such an approach is scarce in the sources reviewed, highlighting above all the great work of Diem (1966), which points out many ideas connecting Ancient Greek training with the modern one. I cannot fail to mention the wonderful text written by García Romero (1992), underlining its rigor and clarity, without which my perspective on sport in Ancient Greece would not have evolved in the same way. Of course, due to the specific theme of the work, I have also used in a special way the Philostratus' *Gymnasticus*.

## ORIGIN AND DEVELOPMENT OF TRAINING IN ANCIENT GREECE

In general, the spiritual ideal of Ancient Greek's people (*areté*) considered the harmonious coexistence of ethics, physical and mental virtue. Likewise, they had an agonistic ideal of life, which led to the *agon* (contest to be the best), an inherent part of their *modus vivendi*.

Like in other ancient civilizations (it is difficult to find any that were not so), in the Hellenic world the germ of the body preparation is in the military field. Of course, together with the coexistence of other origins: cult, recreational, hygienic...). What makes the Greek civilization different is the development it had in the sports field, materialized in a framework of competitive contests (perhaps motivated by ritual reasons), that generated the need for specialized preparation.

Attributed to Epicarmo of Sicily (6th century BC), in classic antiquity it is reasonably possible the existence of a training theory based on the conviction that "natural dispositions can be improved through due preparation" (Diem, 1966, p. 171).

Later, at a time when the sport had fallen into a certain decline because of, according to Philostratus (*Gymnasticus*, 14), the lack of good coaches:

*"It seems to me that not one of these sports would have appeared in the competitions nor would have excited the eleos and all the Greeks, if the gymnastics had not perfected them and created the appropriate training, since the victories of the athletes are owed to the athletes themselves and, to a lesser degree, to their gymnasts".*

Philostratus, throughout his *Gymnasticus*, abounds on the tasks that the gymnast must know and apply (in reality, the main objective of his work): he must not be a charlatan, or sparing in words; must pay attention to the physiognomy; proceed to the examination of its nature, in what it consists and for what it is apt; identify the characteristics that come from their parents; take into account his temperament, distinguishing between "warm-wet", "bilious" and "phlegmatic"; adjust the tasks to those who eat a lot, those who drink too much wine and those who will train after having sexual; massages must mild with moderate frictions. The author also points out the type of training (*Gymnasticus*, 50) that each type of athlete should accomplish:

*"The pentathletes must be trained with light exercises, the runners with exercises not extenuating but quiet and that force them to increase their stride, the boxers with light movements of arms, hitting the air (...), should make use of the leather bag, and much more still those who want to practice the pankration".*

From the above, it is evident the importance that in this field the Greeks gave to the gymnast (coach), in relation to their development and optimization of sporting results.

From here, it is worth remembering that sport in Ancient Greece went through different moments, due to its longevity and diversity. What is exposed corresponds to a somewhat global consideration, rather a little late, since it mainly reflects the knowledge and state of the things that Philostratus records in his *Gymnasticus* (since it is the only specific ancient text about the existing gymnastics).

Traditionally the evolution of physical exercise is divided into three stages / epochs:

1. *Dark age*, characterized by an asystematic training: natural tasks (running, jumping, shooting, climbing, digging, rowing, pulling carts, etc.) and military. According to Xenophon (Economic 5.8): *"And what art makes men more skilful than agriculture in running, shooting and jumping?"*; Philostratus (*Gymnasticus*) talks about climbing trees and ropes, swimming long distances (...), pulling carts and even running against horses.
2. *Classical period*, in which the interest in physical education grows (the *kalokagathía* is consolidated, the ideal that pursues a harmonious balance between physical and intellectual aptitudes) and systematic and sophisticated training methods are gradually developed for the following reasons: the victory of the Greeks over the Persians in the Medical Wars generated a popularization towards the physical-sporting exercises that came to be extended to the population by the action of democratic conquests; due to the intrinsic motivation of sport (comes "professionalism"); or the increase of competitiveness: it was not enough the mere natural or military training to win the different competitions.
3. *Hellenistic and Roman period*, characterized by the use of more complex methods: "tetrads", rigid cycles of 4 days described and criticized by Galen (*Trasibulo*) and Philostratus (*Gymnasticus*) (II-III AD), and an advanced development of hygienic gymnastics, of which the main standard bearer is Galen.

## RELEVANT ASPECTS OF TRAINING IN ANCIENT GREECE

We start with Gardiner's statement (1930, in García, 1992), which expressed the few elements that could be found in the gyms of his time that had not been contemplated in Ancient Greece. But, of course, such opinion is distant in time and today the *Theory of sports training* has evolved a lot and, therefore, it is convenient to review it.

In Diem's opinion (1966), training programs in Ancient Greece started from the knowledge about inheritance, personality structure and anthropometry. In our case, the importance given to genetics (as it is nowadays) is especially relevant, since it is currently considered as the basic substrate to achieve high levels of performance along with training. Astrand and Rodahl (1985) consider the genetic factor necessary for those who aspire to the levels required to achieve Olympic medals.

No doubt there were then exercises for physical training (improving performance) and others for the correction of movement. In this sense, Plato in several writings classified pedestrianism as the most important discipline of physical education. Also Hippocrates vividly recommends races over different distances for convalescents. Moreover Antyllos distinguished the effects of pedestrianism according to whether the pace was fast or slow, uphill or downhill, with tips or with the whole sole of the foot.

For Garcia (1992), in the Greek world, in addition to *euexia* (good body condition), through adequate training it was intended to get the athlete to make the most of their own physical condition and, at the same time, benefit from those other factors that always go with competitive sport. It can be confirmed, according to Harris (1972), that Hellenic training, as in all sports and at all times, basically pursued three aims: to acquire skills in the technique of the game, to get the body ready in response to the demands of the competition and mental repair.

The secret of the training was the appropriate measure and the right moment, *kairiós* ("giving the blow in the right place"). The Hellenic concepts that characterize modern training were already known threshold law, supercompensation principle, overload, individualization, progressivity... extracted from long years of experience that allowed a systematic observation of the events that took place around and in the very process of training, and that gives it a certain scientific character, a question that we will later analyse.

According to Diem (1966), the "art" of training aimed to maintain the balance between complete dedication and wise moderation. Thus, normal tiredness and the fatigue caused by reasons other than exercise were carefully distinguished. Galen distinguished no less than seven forms of exhaustion.

Luciano, in the second century AD describes, while depicting a conversation between Solon and the philosopher Anacarsis, the perception he had of athletes, idealizing their courage, ardour and tenacity along with the perfection of their bodies, their unique skill and inexhaustible strength and the terrible efforts that were made in order to achieve victory.

Over time, the training methods became more complex, as evidenced by the appearance of subtle systems in Hellenistic and Roman times as the "tetrads", based on rigid four day cycles. This method became very popular and consisted in alternating during each cycle a hard workout with a gentler exercise (García, 1992). Philostratus (*Gymnasticus*, 47) explains it to us:

*"It is called tetrad the period of four days in which different sports activities are alternated: the first day the athlete performs preparation exercises, the second is thoroughly trained, the third relaxes and the fourth exercises at an intermediate pace".*

Diem (1966) and Durántez (1975, 1977), already identified similarities between the tetrad and the current procedures of periodizing training. Despite the widespread use of the tetrads, Philostratus, which initially agrees with this system from a theoretical point of view, was very critical about the practice because it was not profitable because as it did not take into account the individual characteristics of each athlete: *"The tetrads are not recommended as athletic training, their practice has spoiled everything related to gymnastics"* (*Gymnasticus*, 47).

Likewise, other precepts and concepts very close to what is currently used in the Sports training period were developed:

***Distinction between fatigue and over-training***

The normal tiredness after a hard training was carefully distinguished, and this from the fatigue caused by reasons other than exercise. Galen distinguished no less than seven forms of exhaustion.

***Consciousness of the need for acclimatization***

The training period in Elis, one month before the Olympic Games, certifies that acclimatizing to the conditions of the competition was a requirement to achieve maximum performance, especially if it was set at noon.

***Application of the concept of "biorhythm"***

According to Diem (1966), the Greeks understood the benefits of training at the same hour that the competition was going to be held (p. 175).

***Knowledge about hygienic or medical gymnastics (pedestrism, massage, baths and solariums)***

Gymnastics in ancient times was considered essential to recover health. Plato endorsed the theory of Herodikos of Selymbria (considered the founder of hygienic gymnastics) who had experienced in his own body a system of naturopathic medicine. Throughout the centuries a gymnastic therapy was developed whose scientific bases are based on Hippocrates and were fixed by Galen.

Diem (1966) informs us that all physical exercises were examined under the perspective of stimulus theory, which stresses the need of effort as a condition for obtaining benefits, and he never stopped recommending pedestrism, sometimes linked to marches or alternated with them. Neither Hippocrates tired of recommending races over different distances and with different techniques. Plato, in different writings, classifies pedestrism as the most important discipline of physical education. On the other hand, Antyllos distinguished the effects of pedestrism according to whether the pace was fast or slow, up or down slope, on the toe or with the whole plant... all of which is to be taken into consideration in the current training approaches.

The massage was based on an experience of several centuries and developed more systems than we know today. Galen differentiated 18 different methods. The masseuse had to adapt to the physical constitution of the athlete. The golden rule was: "not to harden or soften the constitution too much (...) the massages must not be performed so strong that all the useful humours disappear, nor so weak that they retain the superfluous ones" (Diem, 1966, p. 177). It is considered especially useful the rapid multimassage with "many hands". Usually two massages were applied, one before exercise and another after, and in cases of special exhaustion another at night. There was a wide knowledge of the mixture and use of oils and sands that, according to Philostratus, excites the skin and thus refreshes the body.

Regarding the bathrooms, Galen distinguishes between cold, warm or hot, with fresh or salt water; Steam baths were available before or after the exercises. Olympia, over the years, came to have some bathrooms with seat and heating, a small pool in the arena and finally an authentic pool to relax after the exercises.

Nor was the solarium missing, since the Hellenes appreciated tanned skin. Only the elderly were allowed to lie inactive in the sun "as if they wanted to toast", others should enjoy the sun in motion. Philostratus also expressed himself about it: "*Some are exposed incorrectly to the rays of the sun*" (*Gymnasticus* 58).

### **Extensive development of studies on diet**

Already in ancient times there was a controversy about whether the diet should be rich in meat, vegetarian or mixed. The growing demands of the competitors led to an enormous development of studies on the diet. At first the diet was simple and severe, but later it became more abundant and refined.

According to Philostratus (*Gymnasticus*, 43 ff.) and Pausanias (*Description of Greece* 6.7.10), the diet of the athletes in the first centuries was basically vegetarian and consisted of figs, fresh cheese and wheat flour pasta and barley. By the fifth century BC meat consumption was introduced, becoming widespread, especially among strength athletes (boxing, wrestling, pankration). The most appreciated meats were beef, bull, kid and especially pork. The controversy over whether the food had to be rich in meat, vegetarian or mixed already existed in antiquity. In the period of widespread meat consumption, all kinds of fish were rejected; later it became fashionable and originated a true science of eating fish refining. The refinement reached even bread; the athletes ate sweets like flour bread, with seeds of poppies. Garcia (1992) notes that there were criticisms regarding athletes' way of life, regarded as being limited to eating and sleeping a lot.

### **Respect for "invisible training"**

It was considered important to live orderly, eating according to the prescriptions, doing the exercises at the set time, not drinking wine or anything cold and even sexual abstinence was recommended. This is showed by the advices that Epictetus gives to those who want to devote themselves to competition (Discourses, XV, 2 and 3):

*"Do you want to achieve a victory at Olympia? Consider what this presupposes and calibrate the consequences, and so, if it suits you, get down to work. You must submit to discipline, eat regime, abstain from jams, do gymnastics by force at the appointed time, be cold or hot; do not drink cold water or wine when it is cooked; in short, like the doctor, then, you must give yourself to the coach (...) Think about all this well. And if even after that you continue in your purposes... go ahead!"*

Also Navarro (2010) considers that the words of Epictetus confirm the lifestyle required by the Greek athlete aspiring to success, considering that the parallelism with the lifestyle currently required is evident.

### **Use of "training sessions"**

With the data that is available, we can venture that the ancient Greeks divided their training in warm-up, main part and return to calm.

According to Durántez (1977, using the information given by the excellent scholar of Greek sports, Paleólogos, 1961), Luciano lists a series of activities that could be carried out as a warm-up and that:

*"They still have full validity and relevance: marching on different terrains, on slopes or sandy; the race in a circle (*peritrochasmos*); forward, backward (*anatrochasmos*); forward and then backward, progressively shortening the meters that separate the gear changes until standing at the centre of the distance (*ekpletrizein*); jumps with one or both feet, jumping and running on the same ground touching the buttocks with the heels, kicking the air, arms movements in all directions, wrist exercises, etc."* (p. 222).

The words of Stacio (*Tebaida*, 65.87 ff.), are clarifying about the warm-up that the runners were doing: *"leg exercises to tune up the stride, hit the chest with the palms, energetic lifts with the legs, short starts"*.

Regarding the final part of the training, Diem (1966, p.175) explains that: "as an adequate measure at the end of the program maximum effort was not preferred, but a series of attenuation exercises".

**Awareness of the "benefit of post-action sensory activation"**, for example, when runners "tested their speed by competing with horses and hares" (Philostratus, *Gymnasticus*, 43).

**Even the "post-action accelerator effect"**, for instance, running on soft sand and later on firm sand (Galen), "to feel lighter on the hardest terrain of stadiums" (García, 1992, p. 87).

### **And something similar to "body-building"**

García (1992) reports on the lifting of weights, light or large blocks of stone as an activity very popular in all periods. Diem (1966) also informs us that for muscular training they used resistance exercises, either individual: balancing heavy balls and dumbbells, climbing up a rope and climbing on the bar –"pulls up"–, or in pairs: carrying a partner on slopes (transport) or lowering the arms against their resistance.

In the Spartan context, was especially appreciated a muscular development that fulfilled the traits that nowadays are still accepted as the ideal ones: general, symmetrical and balanced. García (2015, p. 10), considering that "the training of the Spartans sought a complete physical development of the whole body", refers us to the words of Xenophon (*The Republic of the Lacedaemonians* 5.9), "you could not easily find healthier men with better trained bodies than the Spartans, because they exercise legs, arms and neck equally".

### **Application of analytical or global strategies for the training of sports techniques**

"In order to improve the technique of difficult movements, these were broken down into their various phases -as is still the case today, despite the doctrine of total movement-, beginning with the preliminary movements and eventually reuniting them in the complete execution" (Diem, 1966, p. 174).

## **CRITERIA OF COMPARISON TO DETERMINE THE DEGREE OF MODERNITY OF THE GLOBAL CONCEPT OF TRAINING IN ANCIENT GREECE**

Nowadays it is accepted that the training processes are based on the individual's capacity to produce adaptive modifications in front of the received stimuli. The same idea is also stressed in the definition of *Biological Adaptation* offered by Álvarez del Villar (1985, p. 613): "Special ability of living beings to maintain a constant balance of their functions before the stimuli that affect it, thanks to the modification that occurs in their organs and systems."

Specifically, it is the dialectic between homeostasis ("set of self-regulation phenomena, which lead to the maintenance of constancy in the composition and properties of the internal environment of an organism", RAE, 2014), that is, the dynamics towards the search for balance, and the stressful stimuli it receives. So when a stressful stimulus hits an organism there are responses (short-term adaptations) and adaptations (long-term).



The processes of biological adaptation applied to sports training are specified in three laws or principles:

1. Threshold Law or of Schultz-Arnoldt → Stressful Stimulus
2. Supercompensation Principle → Response
3. General Adaptation Syndrome (GAS) → Adaptation

Once exposed the knowledge we have about the modes and ways of training that were used in Ancient Greece, it is interesting to start from the definitions of sports training of the two situations that we are going to compare, the current one and that of Ancient Greece.

MODERN TRAINING: "Planned and complex process, which is concretized by organizing the physical exercise in quantity and with such intensity that stimulates the physiological processes of supercompensation in the organism and promotes the development of the different capacities in order to promote and consolidate sports performance" (Mora, 1995, pp. 43-44).

TRAINING IN ANCIENT GREECE: As we mentioned earlier, the Greeks understood that "natural dispositions can be improved through timely preparation" (Diem, 1966, p. 171).

In principle, we must start from the certainty that sports training is based on a process of biological adaptation, which will occur if the relation between the magnitude of the training load is correctly estimated (Mattéev, 1985, p.58): "Optimal adaptation is the result of the assimilation of optimal stimuli" and the time and mode of the recovery process ("replenishment of the energy lost during the effort that takes place during the period between two stimuli"). This relationship establishes the Supercompensation Principle, manifested in such a way that the energies lost during the effort are replenished in an increased way, that is, once the adaptive supercompensation cycle has been completed, a greater amount of energy will have been obtained than what was originally available.

But the question is, were the Greeks aware that the best performance comes after rest following an effort (Supercompensation Principle)? There are three facts that lead us to believe that they knew the Supercompensation Principle: on the one hand, the assurance that in the Greek world the application of the *kairios* was especially valued, as a principle of general action and specifically as a key element of the training. On the other hand, the knowledge they had about fatigue and the methods they used to combat and prevent it. Finally, the existence of the tetrads, and its implications: rational distribution of different training loads alternating days with strong loads and others with softer loads, thus causing the appearance of Supercompensation effects.

## **THE PRINCIPLES OF MODERN TRAINING AND ITS RELATIONSHIP WITH PRECEPTS ON ENTERING AND ENVIRONMENT ANCIENT GREEK**

The principles of sports training are accepted scientific postulates that lead the training process in a correct direction, respecting the laws of biological adaptation and allowing to elevate effectively and safely the functional level of the individual.

For the comparative analysis that we want to outline, we base ourselves on the principles of sports training proposed by Zintl (1991). From there, we will question if ancient Greek sport developed and put in place training methods that are adjusted to some extent to those that are used today with a scientific status, and therefore modern.

## PRINCIPLES OF LOADING OR EFFORT

### ***Effective stimulation of the load***

According to Diem (1966, p. 174), "the Hellenes knew the old principle of overtraining, gave preference to the *theory of stimulation*, knowing that development is not stimulated by any exercise, but only by the one that requires effort".

Diem's words already reflect the idea that the improvement pursued in training required exercise with a minimum of stimulation, so it is reasonable to admit that it is closely related to the *Threshold Law* or Schultz-Arnoldt, which marks some margins in relation to the magnitude of the load of physical effort, identifying a point (threshold of stimulation) from which training stimulates the organism producing benefits for the performance, and another, higher (maximum tolerance), which, when exceeded, leads to overtraining.

### ***Progressive increase of the load***

The well-known (albeit doubtful) anecdote of Milo de Crotona, perhaps the most famous and laureate athlete of the antiquity (fighter), in which it is said that he used as a method to develop his strength to lift and transport a steer every day, from his birth until he was a bull, so that the animal's daily weight gain provided him with a unique mechanism of increased load, demonstrating that they were fully aware that in the training process the burden must be increased progressively, as a consequence of the growing adaptive process that requires raising the level of effort so that it continues to produce an effective stimulation (dynamic character of the stimulation level of the *Threshold Theory*).

### ***Variety of the load***

This principle, which is also known as principle of *variability and versatility of the load*, is defined by Roldán (2009, p. 87): "as the proposal of various trainings and little monotonous, both in content and in functional unit trained".

Referring to the variation of the intensity of training, its use is reflected by the implementation of the tetrad, in which charges of different magnitudes occur.

Regarding the variety of content, we can argue since we have no references that explicitly endorse this principle, the fact of the existence of the pentathlon as one of the consolidated events in all competitions, allowing us to interpret that different modalities in the preparation of the athletes were appreciated and performed.

It is true that there was some controversy regarding its consideration: on the one hand, Aristotle, contrary to excessive specialization, considered the pentathlon as an unparalleled sport: "This is why the athletes in the pentathlon are most beautiful, because they are naturally adapted for bodily exertion and for swiftness of foot" (*Rhetoric* 1361b). Contrary to this, García (1992) understands that not all Greeks shared the opinion of the philosopher, "and among the general public it is possible that the pentathlon was often considered as a consolation for athletes who did not excel especially in any given discipline" (p. 298).

## PRINCIPLES OF CYCLIZATION

### ***Optimum ratio between load and recovery***

The justification for the existence of this principle in Greek training is found in Diem (1966, p. 175) which tells us how "the philosopher Pythagoras led his young team, harvester of many triumphs, from the field of sport

to the fresh air of the forests, taking care to regularly alternate effort and physical rest, during which he gave his philosophy lessons ".

Also, the alternation of the magnitude of the training loads the tetrad contains, testifies that they considered necessary to establish periods of rest, alternating these with those of more intense exercise as a measure of recovery, as Philostratus expresses when describing the third day of the tetrad: "*The period of rest serves for the body to recover properly*" (*Gymnasticus*, 47).

### **Repetition and continuity**

Both are implicit in the training put in place by Milon de Crotona (as we saw it previously). However, the tetrads also testify, as they subject the athlete to a continuous repetition of efforts and breaks.

Continuity in training, was a condition *sine qua non* for the processes of biological adaptation. It was always fulfilled due to military and survival demands, but it was boosted since the beginning of professionalism (by the end of the 5th century BC and the beginning of the 4th century BC).

In any case, the most reliable evidence of the application of this principle by the Hellenes is provided by the level reached in physical education and sports, something that would not have been possible if it had not been respected.

### **Periodization**

While tetrad attests a timed stimulation of the contents of training in Ancient Greece, that could be compared to the modern concept of microcycle, we cannot ignore the period of training that took place before the Olympics in Elis in which for one month athletes "refined" their preparation with a special preparation cycle (mesocycle), culminating ten months of training on their own, which can be interpreted as an annual process (macrocycle).

From a current point of view, we can interpret that the previous reasoning corresponds to an overly simplistic conception of the training periodization, due to the development that it has experienced in modern times (the traditional one, with one or several "peaks" of shape, depending on the competitions; the contemporary one, with a prolonged medium-high maintenance of the shape, and currently the ATR with a structure of mini-macrocycle, to name the most relevant ones). But it is also true that from the prism of this analysis, we can say that the training of the ancient Greeks essentially respected the need for a temporary periodization in the short, medium and long term, which allowed to exercise a certain control over the acquisition, maintenance and temporary loss of fitness ("stages of the General Adaptation Syndrome"), which directly connects with the laws of adaptation, fulfilling the first intention pursued by periodizing the training process: to control the building of physical condition.

We must not forget that the diversity of sporting events in different places, dates, years and at different levels, would require planning the training with a certain periodization, and this leads us to think that they understood that the training process is governed by dynamics of cyclical adaptation.

## **PRINCIPLES OF SPECIALIZATION**

### **Individuation and age adequacy**

Apparently, Aristotle was also concerned about the individualization of training as he thought that "not all bodies admit or need the same type of training; therefore, each one should be given the proper measure of

adequate effort" (Diem, 1966, p.137), adding that "each age, gender and physical constitution have their appropriate exercises" (García, 2009, p. 19.).

On age adequacy the philosopher criticized the widespread practices that demanded too much from young people, as they could not find more than two or three names of young people who had also triumphed in the adult category (*Policy* 1338 b) It is clear that he questions the early specialization, just like today when it is recommended to respect the evolutionary stages of motor development. In this sense we have received the complaints of Philostratus (*Gymnasticus*), who denounces that young people were trained just like men.

On the other hand, it is known that in Ancient Greece different programs corresponded at different ages, differentiating gymnastics for children, another for teenagers and another one for adults; even for breastfeeding were recommended certain exercises (Diem, 1966). In any case, and in general terms, the Greek sports world showed great sensitivity for each phase of the physical and psychological development, as evidenced by the fact that normally there were three categories in the competitions (children, adolescents and adults), and even, in some places up to five.

### ***Progressive specialization***

In reference to the motor evolution, we have come back to the previous opinions of Aristotle and Philostratus.

If we centre this principle on its application in the training program of the athletes over a long period (for example, a year), it is important to consider the month of previous training in Elis as an element from which we can interpret that at a certain time existed a program that was adapted for the specific demands of the competition.

Regarding the degree of specialization that Greek training reached, we can remember the words of Philostratus (*Gymnasticus*, XV), which express the need for specialized coaches in each sport event:

*"However, nobody could claim that he knows everything about gymnastics; in fact, the one who understands races, knows nothing about fighters or pankration fighters, or the one who dedicates himself to training heavy specialties, completely ignores the rest".*

### ***Alternation***

Also called *synergy* and closely linked to the concept of the body as a *functional unit*, it requires the coordinated training of different physical qualities in interdependence with other capabilities that influence the performance (technical and psychological ability), which "allows that adaptations at a metabolic and muscular level can relate to the adaptations at the central nervous system level (...) the organism functions as an indissoluble unity. All organs and systems are interrelated with each other, to the point that the failure of any of them makes impossible continuity in training" (Roldán, 2009, p. 91).

Perhaps initially, guided by the ideal of the complete man (with its maximum expression in the pentathlete), was carried out a training that alternated different qualities, but with the arrival of professionalism and a greater specialization, the training would be oriented towards improvement of the fundamental quality of the events.

Nowadays we have a fairly accurate awareness of the differentiation of the different qualities and the need for them for a competitive event, something that was not present so clearly in the antiquity. Their workouts, since they were not so defined and delimited, would participate in the development of various qualities (given

its more global nature), thereby benefiting from the positive effects that this principle brings to balance the skills of an athlete, considered as a functional unit composed of different elements.

## THE SENSE OF THE TETRAD

As it has been possible to appreciate, the appearance of the Tetrad was a great step forward in the organization of training. We do not know exactly when it emerged, but we can imagine that it would not be long before the criticisms expressed by Galen and Philostratus (given the virulence of them, presumably they would be relatively recent). It should be noted that these criticisms are aimed at the rigidity with which the new techniques were applied.

The existence of the tetrads presupposes that they were aware of elements that improved performance like:

- The need to vary the daily load of training.
- Alternation of workout's content, depending on the load.
- Inclusion of recovery sessions.
- The establishment of a microcycle structure, generation supercompensation.
- The understanding that functional improvement works in an undulatory way.

All this does not go reject all the opinions that were expressed against it because, as we know, sport performance is not only based on the quality of training, as there are many other factors that also affect it. In any case, by not registering the "marks" (by not wanting and / or not being able to), it is difficult to know if with the presence of the tetrads the performances decreased or not.

## PERSONAL ASSESSMENT

Table 1. Evaluative questionnaire of the different elements to be considered to determine the degree of modernity of physical training in Ancient Greece

Element to evaluate	Compliance Degree		Nothing 0	Little 1	Something 2	Acceptable 3	A lot 4
	↓	→					
Biological laws of adaptation to effort							
1. Threshold Law						Ω	
2. Principle of Supercompensation						Ω	
3. General Adaptation Syndrome					Ω		
Principles of sports training							
4. Effective stimulation of the load						Ω	
5. Progressive increase of the load					Ω		
6. Variety of the load					Ω		
7. Optimum relationship between loading and recovery					Ω		
8. Repetition and continuity						Ω	
9. Periodization						Ω	
10. Individualization and adaptation to age					Ω		
11. Progressive specialization					Ω		
12. Alternation				Ω			

Beyond the description and relative evaluation on the training in Ancient Greece, it seems appropriate to establish an evaluative mechanism that allows us to determine its degree of modernity. For this reason, I have conceived a questionnaire (Table 1) that relates the estimated level of compliance (in quantitative: from 0 to 4, and qualitative terms: nothing, little, something, acceptable and a lot), with the elements considered to be the parameters on which the training plans are currently built and developed; We have divided these into two fields: the first, biological laws of adaptation to effort, and the second: principles of sports training.

Subsequently, to determine the degree of modernity, we propose a table 2 of scores that establishes a relationship with the points obtained.

Table 2. Scores that establishes a relationship with the points obtained

POINTS OBTAINED	LEVEL OF MODERNITY
0 – 12	NULL
13 – 24	LOW
25 – 36	MEDIUM
37 – 48	HIGH

In our case, the overall score obtained is 28 points, which places the degree of modernity at the lower limit of the MEDIUM level. This is linked to the fact that the categories obtained a value above 0 (identified with the letter Ω), that is, it has been considered that to some extent they complied with what is currently required.

To validate the assessment in some way, I remember the opinion of Zintl (1991), on the role of the principles he himself proposed:

*"The principles formulated do not constitute a theoretical background superfluous for the reality of the training but they have a lot of applications for the practice of training. The experience indicates that the measures of practical control of the training undertaken by the trainer are not more than the application of certain principles of training" (p. 26).*

## CONCLUSION

The assessment of the various aspects related to the practice of training, together with the result of the evaluation allows us to state that the training of the ancient Greeks had a certain degree of modernity, for which we should credit them.

Perhaps further work from this perspective on the sources that we have at our disposal will be able to shed light on new aspects related to the topic, which could even help to design new techniques that help to achieve the goals of modern training.

## REFERENCES

- Álvarez del Villar, C. (1985). La preparación física del futbolista basada en el atletismo. Madrid: Gymnos.
- Aristóteles (2014). Política. FV Éditions.
- Astrand, P. O. y Rodahl, K. (1985). Fisiología del trabajo físico. Bases fisiológicas del ejercicio. Buenos Aires: Panamericana.
- Diem, C. (1966). Historia de los deportes (Vol. 1). Barcelona: Luis de Caralt.
- Durántez, C. (1975). Olimpia y los Juegos Olímpicos antiguos (2 vol.). Pamplona: Delegación Nacional de Educación Física y Deportes-Comité Olímpico Español.

- Durántez, C. (1977). Las Olimpiadas griegas. Pamplona: Delegación Nacional de Educación Física y Deportes-Comité Olímpico Español.
- Epicteto (1957). Pláticas. Barcelona: Ediciones Alma Mater.
- Estacio (1888). Tebaida. Madrid: Librería de la Viuda de Hernando y C<sup>a</sup>.
- Filóstrato (1996). Gimnástico. Madrid: Gredos.
- Galeno (2005). Trasíbulo. Madrid: Ediciones Clásicas.
- García, F. (1992). Los juegos olímpicos y el deporte en Grecia. Sabadell: AUSA.
- García, F. (2009). Alabanza y crítica del deporte en la literatura griega. *Materiales para la Historia del Deporte*, VII, 9-22.
- García, F. (2015). Deporte y educación en la Grecia Clásica. *Materiales para la Historia del Deporte, Suplemento Especial*, 2, 17-36.
- Harris, H. A. (1972). El aficionado y el profesional en el deporte griego y romano. *Citius, Altius, Fortius*, XIV.
- Jenofonte (1993). Económico. Madrid: Gredos.
- Jenofonte (2017). La república de los lacedemonios. Menorca: textos.info.
- Luciano de Samósata (1889). Anacarsis o sobre la gimnasia, en: *Obras completas*. Madrid: Librería de los herederos de Hernando.
- Matvéev, L. P. (1985). Fundamentos del entrenamiento deportivo. Moscú: Raduga.
- Mora, J. (1995). Teoría del entrenamiento y del acondicionamiento físico. Cádiz: Coplef- Andalucía.
- Navarro, J. L. (2010). Aspectos modernos del olimpismo en la Antigua Grecia. *Citius, Altius, Fortius*, 3 (2), 26-36.
- Paleólogos, Cl. (1961). El entrenamiento antiguo y el moderno. *Citius, altius, fortius*.
- Platón (2008). La república. Madrid: Akal.
- Pausanias (1994). Descripción de Grecia. Madrid: Biblioteca Clásica Gredos.
- R.A.E. (2014). Diccionario de la Lengua Española (23<sup>a</sup> ed., actualización 2017).
- Roldán, E. E. (2009). Bases fisiológicas de los principios del entrenamiento deportivo. *Revista Politécnica*, 5(8), 84-93.
- Zintl, F. (1991). Entrenamiento de la resistencia. Barcelona: Martínez Roca.



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