

Her sirasında buren solunumunun yeterli kaldığı
 ölçülen öğrencilere göre dağılım :

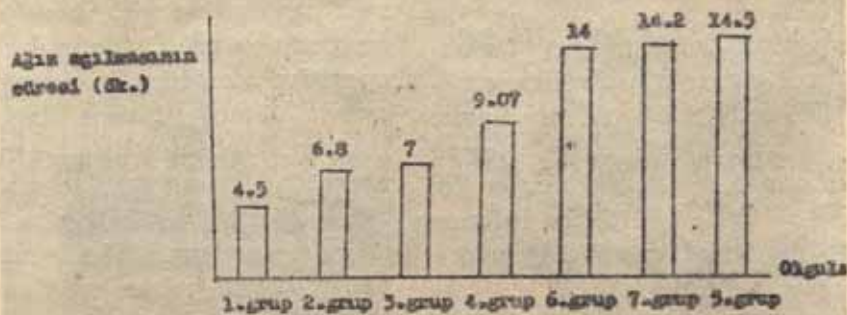


Figure-4, Şekil-4

Her sirasında inspirasyon direncindeki artışın
 ölçülen öğrencilere göre dağılım :

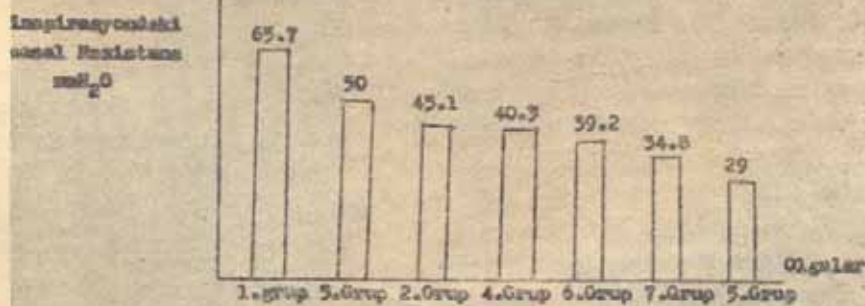


Figure-5, Şekil-5

1. The minimal intranasal pathologic conditions result in an increase in the air flow rates with increasing exercises, but this increase appears to have no meaningful correlation with the resistance.

2. The magnitude of the effect of intranasal minimal pathologic conditions depends on the localisation of the lesion. Especially lesions narrowing the internal ostia, deviations at the second zone or the hypertrophy of the head of the inferior turbinates cause an increase in inspiratory pressure.

3. Some kind of cartilage or muscle weakness must be searched at the valve region when no other intranasal pathology can be detected in patients with nasal obstruction complaints during exercise.

4. Minimal intranasal pathology in patients with increased muscular activity muscular activity must be corrected sur-

gically while the same lesion in patients leading a normal life do not do so.

5. When an electrorhinomanometric examination is not possible, the duration of nasal respiration with mouths closed can be used as a substitute in deciding on the operative correction in patients with intranasal pathology, since these two had a relation between them, even though a rough one. In our study, the average duration of nasal breathing with moderate exercise was found to be 14 minutes. Thus, patients with values less than 14 can be accepted as candidates for operation.

6. We believe what we had come out within this study is important not only for the medical staff in sports but it is also just as important for the medical staff in institutions with heavy workers. We think subject should be emphasized because of its value in preventive medicine and its efficiency in work and sports.

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V. BALKAN CONGRESS OF SPORTS MEDICINE

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This is the second special issue of our Turkish Journal of Sports Medicine, to continue the publication of the Proceedings of the congress. The first article "Sports Medical Problem of Wrestling" is the translation into Turkish of the same article, originally published in our first special issue which was demanded by our turkish readers. It followed by other papers of the congress in their original forms. The remaining articles are going to be published in our next issues.

Physical Effort and Endocrine Control

By Dr. Cloara, Z., Prof. Dr. Stroeescu, V. and Prof. Dr. Demeter, A.

SUMMARY

Main results of the personal studies as well as the results of other research workers conducted both in Romania and abroad, on the relationship between physical effort during sporting activity and endocrine system are synthetically presented.

The role of endocrine system in organism adaptation to effort and its dependence on the morpho-functional integrity of the system, type of effort and training degree is underlined.

Main changes and hormonal effects occurring during the recovery after physical effort are also presented.

The sportive activity represents an adaptative effort of the entire human body, as the achievement of the high skill which the sportmen should be capable of, requires a training of tremendous amount and intensity. In this context, a complex physiological investigation of the competition sportsmen has become a necessity both on the line of selecting, controlling the effort and improving the biological potential, and on the line of maintaining a good state of health. All the more as in many branches the best results are obtained already at a very young age.

In this context the investigation of the endocrine system subject to an effort is a current and important problem under many aspects.

First of all it is unquestionable that an organism cannot be capable of high per-

formances unless its state of health is very good and all its components are perfectly equilibrated; the endocrinic changes affect the organism in variable extents and under different degrees of intensity.

Second, the relationship sporting effort - endocrine system is bidirectional - as on the one hand, hormones influence specifically the structure and functions ensuring the accomplishment of the physical effort, and on the other hand, physical effort establishes changes of the endocrine functional tonus (the adaptability of the endocrine system).

Therefore, we consider the possibility that an independent endocrine pathology (favoured or not by the physical effort, compatible or not with the performance effort) might exist or occur with sportmen.

However it is necessary to delimit certain limit states which are compatible with the effort, but which require a certain orientation as far as the option for a specific sport branch. We also take into account certain circumstances when the adaptability requirement may exceed or exhaust the functional resources of the system resulting in morbid states of a special type.

All these considerations impose an investigation of the endocrinic - metabolic component in all training phases starting from the option for a certain sport branch and following with the phase of important sport events.

Although it was long ago that the role played by this system in the adaptation of the organism to the physical effort was conceived, the inappropriate and laborious methods of hormone dosing made impossible their assimilation in the sport medicine practice.

In recent years, as a result of the advances in the effort physiology, as a result of making clear the important role played by the endocrine glands and their hormones in controlling the general metabolic function, as a result of the assimilation of several modern technologies and the advancements in the hormone dosing methods which are more rapid and sensible, the concern of sport medicine with these problems has been considerably increased. This interest has been materialized into many papers issued in the last few years. However a large number of them deal with particular aspects, using varied methodologies and often drawing contradictory conclusions.

Although there are numerous problems in this area which have not been ma-

de clear so far, there is still a number of elements which have been accurately defined by the common consent of all scientists. Among them we can list the following:

1. The adaptation of an organism to effort is specifically controlled by endocrine complexes which affect the functional systems and not by a sum of isolated effects. These complexes provide a more rapid stimulation of all functions and their maintenance at a satisfactory level according to the specific needs. As far as the extension of the system response and the involved components are concerned, there is a close dependence on the morpho-functional integrity of the system, the training programme (its intensity, the amount of the respective effort, its duration), as well as on the conditions under which the effort is made (training or sport events, low or high temperatures, high altitude, a.s.o.).

2. During an intense but short physical effort, the sympyathoadrenal activity prevails. This results in both pure vegetative effects (the chronotropic and inotropic adaptation of the heartbeat, the intensification of the blood circulation, a.s.o) and metabolic effects, particularly the glicogenolysis of the supplies in muscular and hepatic tissues. After low-and mean-intensity efforts the rate of catecholamines in urine changes insignificantly in well - trained sportsmen.

During such a high-intensity and short time effort, the energy needs are provided under anaerobiosis conditions, when a more relevant dependence on the local fuel supplies is established.

3. Under a prolonged physical effort (resistance test), the effect of the hypophyseal-adrenal axis is preponderant, especially with metabolic effects on the activa-

tion of carbohydrate and lipide metabolism i.e., gluconeogenesis and lipolysis. In the lipolysis process, the cortisone has only a permissive role, but as regards gluconeogenesis, cortisone is essential in the activation of the main key enzymes of the gluconeogenesis process in the liver. This process ensures the synthesis «de novo» of glucose from its precursors, i.e., lipides, alanine, and glycerol and the release in the blood stream of new amounts of glucose. Other hormones (catecholamine, glucagon, growth hormone) have not only lyolytic but also specific effects. With the increase in the sympathicoadrenal tonus, an inhibition of insulin secretion occurs concurrently with a gradual development of preponderance status as an energetic substrate of lipide and FFA (free fatty acids) consumption.

With this type of efforts, the energy is supplied aerobiotically and the overall pattern of energy consumption may be characterized as a triphasic sequence; in this sequence, the intramuscular substrate, first glycogen, followed by glucose supplied by the liver in glycogenolysis and gluconeogenesis and finally by FFA from adipose tissue are successively preponderant as major energy suppliers.

Under these conditions, besides the cortisone effects, the intervention of glucagon (both in glycogenolysis and gluconeogenesis) and especially of the growth hormone which in the absence of insuline ensures glucose passage through the membrane of muscle cell, owing to its insuline-like and cell membrane repolarization effects is important. Also, the growth hormone stimulates both the FFA mobilization, transport and access into the muscle cell.

4 Under the efforts with nervous and physical stresses but limited energetically, the sympho-adrenal and thyroid activation prevails. However, the thyroid reaction was studied in a lesser extent.

5. Generally, during training, the pluriglandular activation prevails. Under competition conditions, the emotional factor is added, with implications in the catecholamine and neuro-vegetative activation.

6. It is noteworthy that in the trained people, for the same type of effort and under the same conditions, the amplitude of the hormone activation is lower than in the non-trained ones, and restoration to the basal values is more rapid.

Our studies concerning the radioimmunologic assay of the growth hormone evidenced significant differences concerning reaction intensity and length of restoration period not only between sportsmen and a control group (common subjects, not active in sports) yet, between differently trained sportsmen. Similar results were obtained by other research workers with cortisone.

As concerning the mechanisms generating the above mentioned differences, we think that they may be regarded as effects of physical training.

7. The period of recovery after physical effort is characterized by a multitude of metabolic and physical reactions.

Hormonal changes which accompany the period of recovery are characterized by a rapid increase in the insulin concentration occurring 2-10' after the effort even in the absence of glucose ingestion; this increase is probably mediated through a cessation of inhibitory adrenergic effect. By contrast with the rapid changes affect-

ing both circulatory insulin and sympatho-adrenal effects, glucagon concentration is maintained at high values during the period of recovery contributing to a massive take-over by the liver of the gluco-energetic precursors.

It was shown that the speed of this take-over is higher after physical effort as compared to the value noted under effort and it exceeds 3-4 times the figure characteristic to normal, basal conditions.

In our researches, we also noted high concentrations of cortisone and especially growth hormone during the recovery. This would explain the results of certain studies in which high arterial levels of FFA were noted with a peak value approximately two times higher as compared to the value obtained during the effort.

The supply of energetic and formative compounds continues to be compensated and restored in the late recovery period, especially after food ingestion. An increased synthesis of proteins and macroergic compounds (ATP, CP) occurs under these conditions. Glicogen, proteins and lipides are synthetized within the main pools (liver, muscles, adipose tissue).

During this period the intervention of the insuline-entirely anabolic hormone is preponderent.

We think that these considerations on the endocrinic system under effort, without exhausting the multitude of aspects, emphasize once more the complex problems the medical-biological research in sport is confronted with and the acute need to continue these research works.

Early Orientation of Children Toward Sport

V. Mihajlova*, B. Milenovic**, N. Hristov*, I. Arslanagic**

S U M M A R Y

Early sport orientation by children is more frequently present today. Achievement of top sport results is in direct connection with early sport orientation. Most professionals and the literature give priority to separate important disciplines which are responsible for early child orientation. We believe that all of these disciplines should be studied as one integrated system due to their mutual effect and influence. Among these we would like to mention:

1. Hereditary factors
2. Physical development
3. Specified motor activity
4. Environmental influence.

Sports medicine has been mainly concerned so far with the problems of adults going in for sport. Professional education and subsequent specialization of physicians has been directed toward adults (and adult athletes). However, the proportion of children and youths participating in Top level sport, increases day after day. Physical education and sports schools for children and youth are founded all over the world resulting in an ever increased participation of children in the competitive sports, with a tendency of becoming

even greater in the future. Pediatricians, school physicians and sports physicians therefore are expected to be more often faced with the problems which are not familiar to them. They should be, however well acquainted with the problems encountered. This must be taken into account in professional education and specialization of physicians. The problems, that the sports physicians will face more often in the future, are not only unknown to them but they are also very specific.

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One of the main characteristics of contemporary sport is a continual search for gifted - talented children and youth. Through selection organized on the scientific bases, girls and boys are chosen for an early training, for the purpose of enabling them, at the age of puberty, to become members of the national teams in many sports, champions and record holders - top athletes.

Selection is not, though many think so only a problem referring to social, pedagogical or psychological sciences. It is also a problem of biomedical sciences, and it should be studied from the biological and medical aspects. We think that medico - biological researches into selection problems and sports orientation should involve above all, the following:

1. Body constitution problems
2. Problems referring to specificities connected with manifestation of capabilities of different body functions.
3. Biomechanical prerequisites for prediction of sports achievement.

Complexity and wide scope of a sports talent phenomenon, undoubtedly, call for a detailed analysis of problems of selection and early sports orientation by means of systematic investigations of a series of factors which are indispensable for achieving top results in a certain sports branch. Within this complex sphere of factors, medico - biological factors certainly play significant role.

I.

Sport selection is a permanent process. We may always distinguish one kind of selection in sport, if selection is understood to be nothing more than an elimination. i.e. selection of the best candidates by

means of elimination. We all know that in sport, owing to this constant elimination, the most efficient athletes go forward - placing for further competition. There are different forms of sports selection. It is often made simultaneously. It means that someone may decide to go in for a certain sport on the basis of his own inclinations, as well as on the basis of the influence of the environment which he lives and works in. Selection and choice of candidates are frequently left to the experts.

The expert picks out the candidates on the basis of his own experience (founded on his knowledge of properties required for a certain sports branch and of age and other characteristics). Knowledge also is often tested. The two methods of selection are deficient in many aspects not to be discussed here, because of rather short time. More efficient method of selection is obtained by applying the special tests for assessing the motor and functional capabilities, as well as the other abilities of candidates. In this way, the actual abilities of candidates are revealed, so that candidates are selected on the basis of qualitative measurements and assessments. The best selection is the one which is based upon the results of inter - disciplinary researches. There are applied medical, biological and psychological parameters. Today's availability of scientific methods and instruments help us to assess different aspects of sports capacities and to evaluate the factors determining individual sports capacities, as well as the degree of their determination. Organizational forms of selection are founded upon science, while selection and sports orientation are subjected to further investigation. Following forms of sports selection may be differentiated:

1. Sports orientation (guidance) - with the basic aim of determining a sports branch or a discipline which will enable candidate to obtain the most efficient training in it.

2. Selection: - with the basic aim of making periodical selection of the best athletes at the different stages of sports advanced training.

3. Composition of a team (a group)- with the basic aim of its acting as a whole while participating in a competition. Each individual ought to right into the group.

In all the forms of sports selection, medico - biological aspects are considered as important. In the phase of sports orientation, medico - biological aspects play the most prominent role. It its therefore useful to point out their content and significance.

II.

The highest sports achievements in the age of boyhood is the reality we are faced with every day. The attitudes of physicians (specially of the pediatricians) toward the participation of the youngest in top level sports are rather cautious, to put it this way. It may be easily understood ,because the physician has to take care of child's health, among other things, while the actual, on the scientific basis founded indicators about the negative effects of children's participation in the competitive sport, still are small in numbers. We must take into account all dangers to health of the child beginning an intensive training at the age of 7 or 8. In order to find out the real consequences, it is necessary to examine several factors which affect the child, taking into account the specificity of a sports branch or dis-

cipline he is engaged in, as well as the boy's or girl's age when they begin their intensive training. Sufficient attention has been paid lately to investigation of these factors, and the situation will be somewhat beter in this regard. However, for determining the actual effects of an early intensive training it is necessary to follow many generations of the athletes who began their training at an early age of life. Permanent intensification and extensification of training process also should be considered in order to enable us to accept the obtained results with certainty. This is indispensable because the methods to be applied in the future, should not be based upon experience or intuition but upon research results.

In early sports orientation, negative effects of excessive load may threaten the body growth and lead to disproportion in development of certain bodily function and abilities and, in some cases, to repetitive injuries of loco-motor apparatus resulting in disturbance of developmental process of this apparatus. We think that at this moment we should have both objective and in everday practice easily applicable methods for an early discovery of overload of certain body system in order not to allow many undesirable consequences to happen.

III.

Man, as a human being possessing the intellect, develops and forms his motor abilities during the struggle for life, as well as during the work and game. Similar to body composition, motor abilities also are subject to hereditary laws and they are changeable. This applies to the whole animal world. Man is not an exception in this regard. It means that man inherits his mo-

tor abilities from his ancestors. They are contained in his genetic apparatus. These properties are manifested phenotypically during man's growth and under the influence of man's living and environmental conditions. Certain motor action should be therefore considered, first, as a result of man's natural abilities, second, as a result of conditions of man's whole life in the past, and third, as a result of his everyday motor activity and special motor learning. Since the motor abilities develop during the daily activities, they may be improved by the systematic everyday exercises.

Sports achievement is, a result of mutual effect of hereditary factors and influences of the environment which surrounds man (living and environmental conditions). Mutual effect of these factors, though a complicated problem, is thoroughly studied. However, the problem of relationship between both heredity and external factors will continue to be a subject matter of many researches because priority is alternately given to both of them to such an extent that influence of the former is completely denied on the account of the latter, and vice versa.

The existing contradictions may be understood because we are still faced with many secrets and unreliable factors while trying to determine whether some characteristics are inborn or attained during the process of intensive training.

Today we know that the transfer of genetic information from parents to children makes a basis of heredity. By this it is determined to a great extent how the organism will be formed, and how it will be adapted to the external circumstances, in other words, how fast it will be developed at the different ontogenesis stages. He-

redity is accomplished according to certain laws. These regularities are revealed if they are adequately affected by the environmental conditions. It means that the genetic factors are brought into being by manifestation of a certain characteristic, but only if required external conditions are provided. If there is not any proper genetic information, certain characteristics cannot be developed even under the most suitable external influences. It means further that the levels of development of certain quality may be improved by training and exercise only to a certain limit.

This limit is determined by the genotype. Unfavourable external environment will not allow the hidden hereditary capabilities to develop completely. However, a favourable environment which enables full development of inherited properties may have an effect only to the limits determined by the heredity. Beyond this limit, certain properties cannot be developed in spite of persistent exercise.

The influence of both genetic and environmental factors upon the development of the human body has been studied by the twins method. By considering the similarities and differences in the body compositions of the twins in the course of their life and work, it is established that inherited causality of body height is greater in comparison to body weight. The influence of external conditions upon the weight is manifested to a greater extent with the aging of twins.

Transmission of sports capabilities by heredity has been studied by genealogical tracing of the families of well-known athletes. Obtained results confirm the assertion that the sports capabilities are inherited to a great extent .

The influence of heredity and environment upon the development of man's motor abilities has been also followed. Significant inherent predestination has been observed in certain motor properties, though the effect of environment has been also pointed out.

It is interesting to note that a great number of researches show that the aerobic capacities of the human body, as the maximum oxygen consumption, are mainly determined by genetic factors.

Significant role of the genetic factor has been also proved in numerous investigations of many other capacities of human body. Absolute value is often attached to genetic factor. This is wrong. Genetic factor is very important, however the effect of environment should not be neglected. We have already said that the genetic factor may be expressed and it may have an optimal effect, only if it acts mutually with certain environmental conditions in each of the developmental phases. The environmental conditions should be accorded with morphological and functional characteristics of human body growth at a certain developmental stage.

The influence of the environmental factors is not the same for each stage of body development. In certain stages of individual growth the most active factors of environment exert a more important influence. It is thus obtained a "personal complex" which is a specific total of these factors. They all are connected with genetic factors and changes which have occurred in the previous developmental phase. It means that only the mutual relationship between genetic factors and environmental effects enables genetic factors to be fully manifested. Whether certain talent

or capabilities will be expressed and developed it depends to a great extent on external factors and conditions in which they will be developed.

Potential capacities will not be revealed if the necessary conditions are not provided.

The question of the critical period of growth should be specially mentioned. These are the periods of the greatest susceptibility to the effects of certain factors of environment, whether they are favourable or unfavourable. The mutual effects of environmental and genetic factors are the strongest in this period.

We should be able to recognize these periods (they are not strictly determined) in order to influence optimally human body at the different stages of ontogenetic development. Planning of individual development also is connected with this. It should be mentioned that we do not still dispose of competent scientific data on these critical periods of human growth. Attention should be paid to this problem in the future period of medico-biological sciences development. Special attention is to be paid to investigation of the problems of critical periods which are connected with intensive exertions of the child's body while trying to achieve the most successful training effects in certain phases of the growth.

Morphological structure of individual body functions and systems does not develop fully at the same time. This is very important for the activities in top level sport because while acting together the growth factors overlap with many of the natural and social factors. In this mutual action, the scope of activity of environmental factors is determined not only by

specific characteristics of this factor but also by specific characteristics of the periods in which the environment factor exerts its influence. In sport, consequently, the critical periods cannot be determined by so called chronological, but by biological age. It is quite comprehensible because the practice has proved that the range of individual differences has been considerably extended so that one age, chronologically observed, involves the children with different levels of biological maturation. Acceleration of the youth also is responsible for this.

Determination of biological age of young athletes is more complicated than the assessment of biological age of children and adolescents. In determining the biological age of young athletes, many specifications influencing certain age group should be taken into account. We may agree that there are many indicators for assessing the biological age in children and youth not included into the process of training. In some sports branches and disciplines, however, top results are quite often achieved by the athletes characterized by delayed periods of sexual maturation. (delayed menstrual cycles in the girls going in for competitive swimming and sports gymnastics). Which factors are affecting the late sexual maturation? There is definite data referring to this problem. We think, however, that this problem still has not been sufficiently studied and that further investigation will be necessary. In these researches, we should certainly look for a relationship between biological age and sports achievements. We may conclude that there are still many problems in sports selection and orientation which are worth studying. They are connected with the biological age, results achieved by athletes at a certain development stage, as

well as with the results to be expected in the future. It has been proved in practice that the highest sports achievements are attained by boys and girls in different years of life.

IV.

In recent time the technical literature available offers more data on characteristics of a top athlete model in different sports branches and disciplines. It is already known that every sports branch and discipline make specific demands to the athlete. The athletes competing in different sports branches and disciplines are distinguished not only by physical, technical, tactical and other capabilities, which are directly connected with a certain sports branch and discipline, but also by body composition, functional, psychological and other characteristics.

This is very important for selection and early orientation of children toward sport. In order to fully accomplish the process of sports advanced training, it is necessary to respond properly to all the requests made by certain sports branches and disciplines. In determining of a model of top athlete, we should take into account not only the parameters which are considered as the most important indices (model characteristics), but also the potential deviations from this ideally conceived model. It is also necessary to predict the changes expected as a result of an anticipated increase in achievements. Since we ought to go through several «transitional» phases to reach the final goal, the knowledge of certain models appearing in these phases is also required. In each phase we are faced with a series of characteristics which are typical for the model in that phase of development. The coach should know the

type of athlete model at the beginning of his work with him, as well as the type he is going to achieve in the later work. He should also know the model of program of training effects, as well as the model of those changes which are going to occur under the influence of training loads. This is very important because only the knowledge of model characteristics enables optimal development of certain motor abilities and functional capacities of the human body, as well as the prediction of certain sports achievements. Knowledge of a model of top athlete is important for selection and early orientation of children toward sport.

What is a model of top athlete like, and on the basis of which indicators it may be developed, is a special question. The basic informations about the model of top athlete may be obtained by studying the specificities of a certain motor activity. There are numerous data in the literature referring to this subject, but in this, rather wide scope of activity, many researches still are to be carried out, because everyday the new characteristics of certain motor activities are discovered. Certain specificities of motor activities are studied in various track and field events, team games and other sports.

Definite parameters of specific physical preparation are also regarded as constituent parts of a top athlete model. By means of the method of evaluation of specific physical fitness (determination of motor abilities by tests), it is determined the dominant characteristic and its influence in forming of a top athlete model.

Important part of a model of best athlete is functional preparation of the body. Results of many sports branches and di-

sciplines depend upon capabilities of individual systems and organs; volume, efficiency and capacities of metabolic processes, functional state of respiratory and cardiovascular systems as well as of neuromuscular apparatus, etc. Many indicators proved as efficient, are applied in evaluation of functional efficiency of these body systems and organs.

Body composition is considered to be one of the most important distinctions of a model of top athlete. Every sports branch and discipline make certain demands to the future top athletes in regard to the anthropometric characteristics. The researches of certain anthropometric dimensions (longitudinal dimensionality, transversal dimensionality, body mass and others) have been recently applied in researches of the most important characteristics of a model of top athlete. Sometimes we pay, unjustifiedly, a greater attention to anthropometric indicators, while they are completely neglected the other time. This is not a proper attitude. We think that in certain sports the anthropometric characteristics (specificities) play more important role, while in other sports they play a less important role (body height is important for basketball, while it is not so important in skiing).

When the anthropometric characteristics, regarding the selection and early sports orientation, are concerned, it is necessary to mention that some anthropometric characteristics, influenced by sports training, are less susceptible (longitudinal dimensions), while the other characteristics (volumenous dimensions are more susceptible to changes, and they respond fast to application of certain body exercises.

Body composition may be regarded as a very important factor in individual

sports, owing to both environment in which they take place or the apparatuses used.

Body composition is for example, important in swimming because of the environment in which this activity takes place, influencing thus the final result. The swimmer should possess the hydrodynamic capacities, so that he can resist the motion of water. Even the different swimming technique (backstroke and breaststroke) requires not only different physical fitness, but also the definite differences in body composition.

In gymnastics, the final results also depend upon body composition. Necessary requirements regarding the body composition should be satisfied, when certain gymnastic apparatuses are in question. Definite characteristics of lower extremities are required for the pommeled vault exercises, while the muscle strength of upper extremities are required for the rings.

Today the top results in the same sports branch or discipline are achieved by the athletes characterized by different body compositions.

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