05 - PHYSICAL FITNESS COMPONENTS RELATED TO HEALTH

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INTRODUCTION

This article will discuss the five components of physical fitness related to health, which are: muscular strength, muscular endurance, cardio-respiratory endurance, flexibility and body composition; showing his concepts, classifications, influencing factors and its importance for health. Weineck (1991) describe the overall strength and local strength, says about the first: "force level developed of the major muscle groups (muscles of the trunk and extremities)"; and on the second, "use of isolated muscles or muscle groups."

Flexibility is the "physical quality responsible for voluntary execution of a maximum angular range of motion of a joint or group of joints, within the morphological boundaries without the risk of causing injury." (Dantas, 1999: 57).

Muscular endurance is the "ability of the muscles to supply a submaximal force repeatedly." (NIEMAN, 1999).

Cardiorespiratory endurance is "When large muscle masses of the body are involved in a continuous, rhythmic activity, circulatory and respiratory systems increase its activities to provide enough oxygen to burn fuel and provide energy to the muscles that are working." (NIEMAN, 1999).

According to Nieman (1999) body composition is the proportion of fat in relation to lean body weight, often expressed in percentage of body fat, or even relative amounts of body fat and lean body tissue or lean body mass (muscle, bone, water, skin, blood and other non-adipose tissues).

FLEXIBILITY

"It is the capacity and the characteristic of an athlete to perform movements of large amplitude or under external forces, or requiring the handling of many joints." (WEINECK 1999: 470) "Voluntary physical quality responsible for implementing a maximum angular range of motion of a joint or group of joints, within the morphological boundaries without the risk of causing injury." (Dantas, 1999: 57)

The degree of flexibility of movement depends on the bone structure from the surrounding tissue accumulation and tendons of muscular elasticity which cross the joint; ie, four components: mobility, elasticity, plasticity and malleability.

The suppleness of the skin and muscle elasticity relate to flexibility and are influenced by some endogenous factors, they are;

- Age: the degree of flexibility is inversely proportional to age. This is due to the muscle tendons and fascia are likely to espessarem (due to aging) and lack of exercise. So the sooner you start the flexibility of work, the greater the chance of achieving great arches of joint mobility.

- Sex: According to Dantas (1999), his wife, for having less dense tissue, is usually more flexible than men. Weineck (. 1986, p 158) reported that: "This fact is caused by hormonal differences: a higher rate of estrogen produces a somewhat higher water retention and a higher percentage of fat and muscle mass lower; the transverse section of the arm revealed in 75% of women compared with the muscles man, in contrast, the portion of fat is nearly twice (Fukunga, 1976). The woman stretchability think is increased by the lower density of the tissues."

- Biological Individuality any variation of the structures that make up the flexibility, is due to genotype or phenotype, cause change in the maximum range of motion.

- Somatotype: the endomorphin and body fat are inversely proportional to the degree of flexibility as well as a large muscle mass may hinder the completion of various movements, physically.

- State fitness: due to inactivity, by allowing the accumulation of fat, elasticity of muscle and connective tissue is reduced.

- Muscle tone: According to Das (1999), increased muscle tone may impair the flexibility that the active components (degree of basal contraction) and passive (muscle level of consistency due to the density and the swelling of the muscle and connective tissues in preventing innervation) are not changing harmonically. One must therefore increase the participation of the liability component through exercise and decrease the active component through relaxation.

- Breathing: made of all, slowly and deeply, using whole lung area, using the abdominal muscles and chest as an adjunct, can assist in achieving greater degrees of flexibility. According to Das (1999, p 67), citing Anderson (1980), on the subject report: "the breath alone, has no evidence that it is able to improve flexibility. However, while serving as a means to achieve concentration, and when used in conjunction with it, synergistically becomes a powerful training tool, and open the doors of self-discovery and body awareness.

- Concentration: the meditative state has a very strong influence on body functions. Through transcendental meditation with the deep, slow breathing, Bloomfiels et allii note the following changes: "significant decrease in blood lactate concentration; increase of 0.4 ° to 1.6 ° C in skin temperature; increase up to 300% in blood flow to the skeletal muscles"

The flexibility is also influenced by exogenous factors, which are reversible. Are they:

- Time of day: according Weineck (1986, p. 157), on the theme: "In the morning, after getting up, the muscle spindles sensitivity threshold is sharp." Therefore, any stretching of the muscles will trigger the stretch reflex. Around noon, these factors have already been outlined, and flexibility back to its normal level.

- Room temperature: the cold stimulates increased muscle tone and reduces the muscular elasticity, thus decreasing the degree of flexibility. Since the high ambient temperature causes the body temperature to rise, causing muscle relaxation and increased flexibility.

Exercise: when heating aiming light (duration 5-20 minutes, average 60% of VO2max, causing rise of 2 ° -3 ° C in body temperature) causes an increase flexibility; since, when causing severe fatigue (decrease in the concentration of ATP makes it difficult to break the connection actinomiosina occurred during the contraction by preventing the complete relaxation of the musculature), causes decrease in flexibility.

Flexibility has plays an important role in various factors. As:

- Engine Improvement: a good flexibility enables the execution of sports movements and gestures that would otherwise be impossible. For a sedentary individual, allows it to perform everyday gestures without help and elegantly.

- Mechanical Efficiency: According to Das (1999), increased flexibility will allow the sports gesture is made entirely out of high-strength area (the last 10% to 20% of the joint arch).

- Injury Prevention: Dantas (1999, p 79), citing Tubino (1979), says: "facilitating improvement in the techniques of sports; increased mechanical capacity of muscles and joints, allowing a more economic use of energy; preventive factor against sporting accidents (injuries, bruises, etc.); and conditions for an improvement in agility, speed and strength."

- Expressiveness and body awareness: "... with attention focused on the gesture, the person working flexibility, paying attention to their own sensations, learn how the movement is triggered and the systemic changes it causes in all the surrounding musculature. From the cognition of the movement, one can gradually move to the affective field. It is the fullness of psychomotor awareness, cognitive and affective movement that allows you to use the body as a means of communication, expressing through the motor, the feelings that one experiences and the will to relate to people, and reveal the inner sensations (Dantas, 1999, p. 81-2)

Flexibility is classified in four different ways, as:

- By type: Ballistic (the muscles surrounding the joint employed in the movement is in state of total relaxation, and body segment is mobilized by an external agent - another muscle group or someone else - quickly and explosively); static (the muscles surrounding the joint employed in the movement is in state of total relaxation and there is mobilization of the slow and gradual segment by external agent, trying to reach the ceiling); dynamic (is the most widely used in physical education, is expressed by the maximum range of motion obtained by the muscles engines of the same, volitionally, quickly); and controlled (motion under the action of the agonist muscle slowly, until you reach the largest range where it is possible to perform an isometric contraction).

- In the scope: general (is the reference for all movements of an individual including all your joints) and specific (it is related to one or a few movements performed in certain joints).

- By reference: relative (it compared the degree of flexibility achieved from the body lengths and dimensions) and absolute (the measurement of a specific movement, considers only the arc articulate maximum reached, disregarding anthropometric measurements).

- At joints involved: simple (observed in a particular stock to articulate a single joint) and composite (one that involves more than one joint or more than one type of joint action into a single joint).

FORCE

Conceptualize force becomes very difficult as it give a definition that addresses the physical, as well as the psychological, it becomes extremely complicated. It is the strength influenced by various forms of force to demonstrate that try to describe below:

- Types of force:

Depending on with which to observe the strength, we can describe it by the portion of the involved muscles, which will differ in overall strength and local strength; if in case the form of observation is the aspect of the specificity of the sport a sport, the strength may be general or special; under the type of work the muscle, dynamic power and static; the main forms of motor requirement involved, maximum, fast strength and strength endurance; finally on the aspect ratio of the body weight, the absolute and relative strength.

Weineck (1991) describe the overall strength and local strength, says about the first: "force level developed of the major muscle groups (muscles of the trunk and extremities)"; and on the second, "use of isolated muscles or muscle groups."

Soon after, it makes a comparison of overall strength with the special. At this point, says that while the overall force is developed by the major muscle groups, special covers determinants of performance muscle groups, those who participate in a particular sequence at a sporting event. And finally, states that under certain conditions, local and special forces will be identical.

- Dynamic and static muscular work:

Dynamic: it is understood as the muscle work that will lead to a contraction or relaxation, consequently, a distinct change in muscle length. Subdivided into positive and negative; the first when the master movement and the second movement while the yields. According to the training method, the dynamic force divided in maximum, fast and force resistance.

Static: also called isokinetic, tension is developed only, there is no shortening or lengthening visible musculature.

And finally, the absolute and relative forces, which respectively represent the development of independent and related to body weight force.

To better understand static and dynamic strength, it is necessary to provide a description of the two.

- Static force, "is that tension that a muscle or muscle group can exert arbitrarily in a certain position, compared with a fixed resistance" (HOLLMANN & HETTINGER, 1980, p 184.). It can be divided into static maximum strength and static strength endurance.

Static maximum strength: developing this type of force depends on certain factors, including: 1) the cross section of muscle fiber: diameter that has the fiber. This section depends on its share of myofibrils, sarcoplasm, interstitial connective tissue and fat. Your increase will occur through hypertrophy (caused by training, where there is an increase in muscle fiber size, due to the increase of myofibrils). 2) Muscular Volume: diameter of the product by muscle length that limits the maximum force of contraction. There is a maximum correlation between muscle strength and body weight, which compares the strength of people of different weights through the concept of relative strength, which is, in turn, force related to body weight. 3) muscle structure: as mentioned above, the maximum static strength depends on the cross section of muscle, however, as the muscle structure is determined anatomically, can not be influenced by training. 4) fiber types: static maximum force depends on the composition of muscle fibers. The greater the number of type II fibers, the better will be trained muscle strength and better maximum strength. 5) Obtaining energy: thanks to maximum strength have a few seconds of time space in its development, the energy-rich phosphates (ATP-CP) have a decisive and important role in developing this power mode. A maximum load when performed until exhaustion slightly leads to an intracellular superacidez (increased lactate), consequently a drop in performance. 6) Fiber Length and angle of pull: rapid contraction force is dependent on the angle of articulation which, by itself, determines the initial length of the muscle and the traction angle. 7) muscle coordination: related to muscle innervation capacity, the amount of force is variable and depends on the number of motor units are activated, as well as the frequency and synchronization of nerve impulses that will enable motor units in order to produce force. 7) Sex: as muscle mass and cross section of women, relative to men, is about 30% lower, the woman naturally has a lower maximum static strength. 8) Age: increasing age decreases the maximum static force through the loss of different muscle groups for everyday wear and coordination capacity level. But through strength training, regression may be delayed until approximately 50-60 years.

Resistance static strength: according Weineck (1991) "... the higher the static work to be carried out, plus the force component depends on the level of the maximum static force; on the contrary, the smaller the force component, the more it depends on the resilience of each muscle is working. "

- Dynamic Strength: differs from the static to be held during the sequence of movement. It can be subdivided into full strength, rapid strength and strength endurance.

Maximum force "is the maximum force that the nerve-muscle system can perform within a motion sequence, with a contraction" (FREY, 1977, p 341.). Adopts certain factors that determine performance, such as: 1) the level of static force: the defining factors are decisive for maximum strength and its sub-categories. 2) Muscle coordinative capacity: the muscles ability to coordinate among themselves, cooperating for the movement to be controlled and well executed. A small desoordenação between the muscles are antagonists or synergists, lead to a loss in the development of the maximum possible dynamic force. 3) Prior muscle stretching; 4) Movement speed; 5) Strength Development Type (positive dynamics / negative); and 6) the degree of fatigue.

"A performance improvement in the development of dynamic force is only achieved with a combined strength training and technique." (WEINECK, 1991, p.191)

Fast strength: according Weineck (1991, p. 193), citing Harre (1976) and Frey (1977), reports that: "... covers the ability of the nerve-muscle system master contraction strength with speed as high as possible". The same author also says that the degree of correlation between maximum strength and movement speed increases with lifting the load.

Strength endurance: "The strength of dynamic force has the resilience to fatigue the muscles in long-term strength of performance." (WEINECK, 1983, p. 127)

MUSCULAR STRENGTH

"Capacity of the muscles to supply a submaximal force repeatedly." (NIEMAN 1999)

Muscle strength can be classified as:

- The participation of the muscles in an exercise: general (when it requires more than 1/7 - 1/6 of the total muscular body mass) and localized (when it requires less than 1/7 - 1/6 of muscle mass on the body).

- To sports mobility: General ["ability to perform effectively and for a long time way, a non-specific work that has a positive effect on the sporting excellence consolidation process, due to a high degree of adaptation to the charges and the transfer phenomena of training demand levels, going from non-specific types for specific ". (PLATONOV & Bulatova, 2003)] and specific ["ability to effectively perform the job and overcome fatigue under certain conditions by the demands of competitive activity of each sport." (PLATONOV & Bulatova, 2003)].

- Energy mobilization: aerobic (oxidation of carbohydrates and lipids in the presence of oxygen - from 3 minutes) and anaerobic (alactic: fosfoquinática reaction, ATP muscle, and lactic: glycolysis with formation of lactic acid - up to 3 minutes).

- Duration: short (45 seconds to 2 minutes), medium (from 2 minutes to 8 minutes) and long term (over 8 min). The latter is classified into type I (up to 30 minutes - glucose catabolism), type II (30 to 90 minutes - catabolism of more free fatty acids glucose) and type III (over 90 minutes - fatty acid catabolism).

- The main engine requirements: strength endurance, fast strength endurance and speed endurance.

There are several factors that affect muscular endurance. These include:

- Athlete Willpower
- Aerobic capacity
- Anaerobic capacity
- Velocity reserve
- Central nervous system (CNS)

Muscular endurance benefits the individual in the general improvement in the defense system, the cardiovascular system, muscle metabolism, and also reduces blood lactate.

CARDIORESPIRATORY RESISTANCE

"When large muscle masses of the body are involved in a continuous, rhythmic activity, circulatory and respiratory systems increase its activities to provide enough oxygen to burn fuel and provide energy to the muscles that are working." (NIEMAN 1999)

It is the heart and lung capacity to support rhythmic and continuous aerobic activities. These activities include: running, swimming, cycling, brisk walk, among others.

Global interest in cardio-respiratory fitness came through Dr. Cooper, where in his book, talked about the lifestyle and aerobic exercise practices, made a continuous and regular basis, being beneficial to combat heart disease, obesity, and others.

Bike or treadmill coupled to a metabolic cart is the main laboratory test used to calculate VO2max.

According to the ACSM is recommended that, to increase cardiopulmonary resistance or VO2max, it is necessary that the basic aerobic schedule is performed 3-5 times per week, with sessions of 20-60 minutes, at an intensity of 50% -85% VO2max (or 60% -90% of maximum heart rate). As the frequency, duration and intensity increase, there will be major gains in VO2max.

BODY COMPOSITION

According to Nieman (1999) body composition is the proportion of fat in relation to lean body weight, often expressed in percentage of body fat, or even relative amounts of body fat and lean body tissue or lean body mass (muscle, bone, water, skin, blood and other non-adipose tissues).

When body composition relate to health, the ideal percentage of body fat is 15% for men and 23% for women; whereas, the farther this rate (more or less), less healthy will be the individual and, therefore, more susceptible to diseases.

The main methods of measuring body fat are skin folds and underwater weighing; however, there are still others also used, such as bioelectrical impedance, infrared interactance, dual energy X-ray absorption and computed tomography.

"The percentage of body fat, which is the percentage of the total weight represented by fat weight is the preferred index used to assess the body composition of a person." (NIEMAN 1999)

Importantly, not only excess fat, but its location is a factor that further aggravates the risk of complications to diseases. The area most at risk is located in the trunk and abdomen (android obesity - more frequent in men), other than it is situated in the hips and thighs (gynecoid obesity - more frequent in women).

One way to assess the type of obesity of an individual is through the ratio between the diameter of the waist and hips; should be less than or equal to 0.8 for women and 0.9 for men.

CONCLUSION

We have seen that each of the health-related fitness components can be separately measured and, therefore, techniques have been developed (specific exercises) for this purpose.

From the explanation made here on the fitness components, we can understand and relate better to each individual, whether athlete or not, puts into practice in their daily lives.

Importantly, the more balanced fitness levels (components), ie, how much more regularly an individual physical activity, the better its basic energy level, presenting thus lower risk of developing heart disease, diabetes, cancer, osteoporosis, among other diseases.

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PHYSICAL FITNESS COMPONENTS RELATED TO HEALTH

ABSTRACT

This article will discuss the five components of physical fitness related to health, which are: muscular strength, muscular endurance, cardio-respiratory endurance, flexibility and body composition; showing his concepts, classifications, influencing factors and its importance for health. Weineck (1991) describe the overall strength and local strength, says about the first: "force level developed of the major muscle groups (muscles of the trunk and extremities)"; and on the second, "use of isolated muscles or muscle groups." Flexibility is the "physical quality responsible for voluntary execution of a maximum angular range of motion of a joint or group of joints, within the morphological boundaries without the risk of causing injury." (Dantas, 1999: 57). Muscular endurance is the "ability of the muscles to supply a submaximal force repeatedly." (NIEMAN, 1999). Cardiorespiratory endurance is "When large muscle masses of the body are involved in a continuous, rhythmic activity, circulatory and respiratory systems increase its activities to provide enough oxygen to burn fuel and provide energy to the muscles that are working." (NIEMAN, 1999). According to Nieman (1999) body composition is the proportion of fat in relation to lean body weight, often expressed in percentage of body fat, or even relative amounts of body fat and lean body tissue or lean body mass (muscle, bone, water, skin, blood and other non-adipose tissues).

KEYWORDS: Strength, Flexibility, Body Composition.

PHYSIQUE COMPOSANTES LIÉES À LA SANTÉ

RÉSUMÉ

Cet article va discuter les cinq composantes de la condition physique liée à la santé, qui sont: la force musculaire, l'endurance musculaire, cardio-respiratoire endurance, la souplesse et la composition corporelle; montrant ses concepts, les classifications, les facteurs d'influence et son importance pour la santé. Weineck (1991) décrivent la force globale et la force locale, dit à propos de la première: «niveau de force développé des principaux groupes musculaires (muscles du tronc et des extrémités)"; et sur la deuxième, "l'utilisation de muscles isolés ou de groupes de muscles." La flexibilité est la «qualité physique responsable de l'exécution volontaire d'une portée maximale de mouvement angulaire d'une articulation ou un groupe d'articulations, dans les limites morphologiques sans risque de causer des blessures." (Dantas, 1999: 57). L'endurance musculaire est la «capacité des muscles à fournir une force sous-maximale à plusieurs reprises." (NIEMAN, 1999). L'endurance cardiorespiratoire est "Lorsque de grandes masses musculaires du corps sont impliqués dans une activité rythmique en continu, les systèmes circulatoires et respiratoires augmentent ses activités pour fournir assez d'oxygène pour brûler le combustible et fournir de l'énergie aux muscles qui travaillent." (NIEMAN, 1999). Selon Nieman (1999) la composition du corps est la proportion de graisse par rapport à pencher poids corporel, souvent exprimée en pourcentage de graisse corporelle, ou même des quantités relatives de la graisse du corps et les tissus du corps maigre ou la masse maigre (muscles, os, l'eau, peau, du sang et d'autres tissus non adipeux).

MOTS-CLÉS: force, la flexibilité, la composition corporelle.

COMPONENTES FISICO RELACIONADOS CON LA SALUD

RESUMEN

Este artículo discutirá los cinco componentes de la condición física relacionada con la salud, que son: fuerza muscular, resistencia muscular, resistencia cardio-respiratoria, la flexibilidad y la composición corporal; mostrando sus conceptos, clasificaciones, los factores que influyen y su importancia para la salud. Weineck (1991) describen la fuerza general y la fuerza local dice sobre el primero: "nivel de fuerza desarrollada de los principales grupos musculares (músculos del tronco y extremidades)"; y en el segundo, "el uso de músculos aislados o grupos musculares." La flexibilidad es la "calidad física responsable de la ejecución voluntaria de un rango angular máxima de movimiento de una articulación o grupo de articulaciones, dentro de los límites morfológicos sin el riesgo de causar lesiones." (Dantas, 1999: 57). La resistencia muscular es la "capacidad de los músculos para suministrar una fuerza submáxima en varias ocasiones." (NIEMAN, 1999). La resistencia cardiorrespiratoria es "Cuando grandes masas musculares del cuerpo están involucrados en una actividad continua, rítmica, los sistemas circulatorio y respiratorio aumentan sus actividades para proporcionar suficiente oxígeno para quemar combustible y proporcionar energía a los músculos que están trabajando." (NIEMAN, 1999). Según Nieman (1999) la composición corporal es la proporción de grasa en relación a inclinarse peso corporal, a menudo expresada en porcentaje de grasa corporal, o incluso cantidades relativas de grasa corporal y el tejido corporal magra o masa corporal magra (músculo, hueso, agua, piel, sangre y otros tejidos no adiposos).

PALABRAS CLAVE: fuerza, la flexibilidad, la composición corporal.

COMPONENTES DA APTIDÃO FÍSICA RELACIONADOS À SAÚDE

RESUMO

Abordaremos neste artigo os cinco componentes da aptidão física relacionados à saúde, que são eles: força muscular, resistência muscular, resistência cárdio-respiratória, flexibilidade e composição corporal; mostrando seus conceitos, classificações, fatores influenciadores e sua importância para a saúde. Weineck (1991) ao descrever força geral e força local, diz sobre a primeira: “nível de força desenvolvido dos principais grupos musculares (musculatura do tronco e das extremidades)”; e sobre a segunda: “utilização de músculos isolados, ou grupos musculares”. Flexibilidade é a “Qualidade física responsável pela execução voluntária de um movimento de amplitude angular máxima, por uma articulação ou conjunto de articulações, dentro dos limites morfológicos, sem o risco de provocar lesão”. (DANTAS, 1999: 57). Resistência Muscular é a “Capacidade dos músculos de suprir uma força submáxima repetidamente”. (NIEMAN, 1999). Resistência Cardiorespiratória é “Quando grandes massas musculares do corpo são envolvidas numa atividade contínua e rítmica, os sistemas circulatório e respiratório aumentam suas atividades para fornecer suficiente oxigênio para queimar combustível e fornecer energia para os músculos que estão trabalhando”. (NIEMAN, 1999). Segundo Nieman (1999) composição corporal é a proporção de gordura em relação ao peso corporal magro, freqüentemente expressa em porcentagem de gordura corporal, ou ainda, quantidades relativas de gordura corpórea e tecido corpóreo magro ou massa corporal magra (músculos, ossos, água, pele, sangue e outros tecidos não-gordurosos).

PALAVRAS-CHAVE: Força, Flexibilidade, Composição Corporal.