144 - BEHAVIOR OF THE FORCE OF SUPERIOR MEMBERS AND OF THE FAT PERCENTAGE IN SCHOLARS OF HIGH SOCIOECONOMIC LEVEL

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INTRODUCTION

The physical aptitude has been defined as the capacity to accomplish the physical activities, being dependent of characteristics innate acquired and/or for an individual (Caspersen, Powell & Christenson, 1985). She is approached in two ways: physical aptitude returned to the sporting abilities and physical aptitude related to the health (AFRS).

The concept that includes AFRS is that a better index in each one of your components is associated with a smaller risk for the development of diseases and/or functional incapacities (ACSM, 1996). These components include the factors morphologic, functional, motor, physiologic and comportamental.

The morphologic component refers to the body composition, one of the most important indicators to evaluate the health condition. This because the excess of fat mass characterizes the obesity, which is directly associated to diseases non transmissible, as: elevated levels of blood cholesterol, hypertension, bony arthritis, diabetes, cerebral vascular accident, coronarian diseases, besides psychological and social problems. On the other hand, little amount of body fat can be associated to the malnutrition (ACSM, 1996; Bouchard, 2000; Nieman, 1999).

The motor components involve the strength/resistance and the flexibility. They are considered the modulators of the skeletal muscle system. The strength/resistance refers to the capacity of the muscle, or of a group of muscles, to sustain repeated contractions for a certain period of time.

It is worth to highlight that the reduction of the levels of daily physical activity in children and adolescents, rule road, is related to the modifications of the lipidic metabolism, to the reduction of the force and of the muscular resistance, and of other components of the physical aptitude, besides being associated to countless risk factors to the health (Boreham and Riddoch, 2001).

Nowadays it has been increasing the researchers' interest in investigating the levels of motor acting and the anthropometric indicators of children and adolescents, once those variables can be important in the levels of health of young populations, (Gonçalves, 2001; Bergmann et al., 2005). Besides those variables, the socioeconomic aspect seems also to be an important referential for the population studies, because socioeconomic differences can interfere directly in the lifestyle of those populations.

Therefore, the objective of this study was to analyze the strength/resistance of superior members (FMS) and the fat percentage (%G) of scholars, from 7 to 11 years of age, high socioeconomic level from Florianópolis, SC, as well as to classify them in agreement with the minimum criteria for health established by the battery of tests FITNESSGRAN of Cooper Institute for Aerobics Research (1999).

METHODOLOGY

The present study was characterized according to Thomas and Nelson (2002), as a descriptive-comparative research of traverse cut.

The population refers to the scholars of the public and private system, from Florianópolis (SC) and that were registered in the Fundamental Teaching (1st to 4th series), in the age group between 7 and 11 years of age, of both sexes. The sample was composed by 285 scholars (130 male (45,6%) and 155 female (54,4%)). In the constitution of the sample, the schools and the scholars were selected by convenience. A state school this located in the continent and two municipal and a private in the central area of the city.

In the identification of the socioeconomic level the questionnaire used was the adopted by the National Association of Company of Research - ANEP (1997), answered by the parents or responsible of the scholar, which considered the amount of consumption goods that the family possessed in house and the level education of the boss of the family. In the present study the socioeconomic levels were divided in three groups: “AB” the highest; “C” medium and “DE” as low, making part of the sample just the scholars classified like AB.

For the collection of the variables of body composition (thickness of the skinfolds triciptal and subscapular), a specific compasses of the mark CESCORF was used, with scale of 0,1 mm and dear constant pressure in 10g/mm^2, independent of its opening. Three measures in an alternate way were accomplished in the anatomical points of the triceps and subscapular, always on the right side of the body. For analysis of the data the intermediate value of the three accomplished measures was used. To calculate the fat percentage (%G) the formula was used suggested by Lohman (1986) that was developed to esteem the children's and adolescents body composition from 7 to 17 years of age, taking in consideration the age, sex and race.

The battery of tests used in this study was the proposed for FITNESSGRAM - Cooper Institute for Aerobics Research (1999), composed by several tests. It was specifically used for this study the flexion and extension of elbows in the modified bar to verify the strength/resistance of superior members (FMS).

The analysis of the data was accomplished through the descriptive statistics, variance analysis ANOVA One-Way, with the use of the test post hoc of Scheffé ($p < 0,05$) and the test "t” of student for independent samples.

RESULTS AND DISCUSSIONS

In the last decades the presence of the obesity in the childhood and adolescence became a private concern that wins space in the referring discussions to the youths' health, at the same time in that grew countless investigations of scientific character to verify the effects of the excessive earnings of corporal weight and of the increase of the corporal fat in child age (Damaso, Teixeira and Birth, 1994).

The prevalence of the overweight and of the child obesity, in developed countries as United States, Canada, England and other, seem to be more evident in groups considered as low socioeconomic level, contrarily to what happens at the countries in development, like Brazil, Bolivia, Mexico, Colombia and other, where the children and the adolescents more reached by the phenomenon of the overweight and obesity belong to classes economically more privileged (Cyrino and Nardo, 1996).

Peres (1994), with the purpose of analyzing the somatic, cardiobreathing and neuromotors characteristics, analyzed a sample of 248 children from 11 to 14 years of age from Santa Maria - RS, of two groups (A and B), being A of high socioeconomic level and B of low. The results referring to the corporal fat showed a lower percentage of fat in the children of

low socioeconomic level tie the 13 years of age.

The Table 1 presents the averages and standard deviations of the variable of the body composition (%G) and the differences found in the comparisons between the sexes and ages.

Table 1. Distribution of the averages and standard deviations of the fat percentage (%G) for sex and age.

Age	Male		Female	
	n	Average	n	Averege
7	34	12,54±4,32*	34	17,24±4,03
8	27	13,47±4,62*	29	16,89±4,03
9	26	13,29±4,67*	36	18,19±4,10
10	26	14,36±4,83*	33	17,91±3,99
11	17	13,25±4,19*	23	18,08±4,55

It was observed that in all ages the girls presented a superior fat percentage that the boys (p=0,05). Such results confirm the study of Hobold (2003) that investigated the indicators of physical aptitude related to the children's health and adolescents from Marechal Cândido Rondon - PR, finding significant differences (p=0,05) in all ages in the comparison among the sexes. Different were the results from the study of Guedes and Guedes (1995) that investigated the body composition in children and adolescents from Londrina - PR, where the results demonstrated that in the comparison among the sexes in each age group, the values were significant only starting from the 12 years. In the same city, Gonçalves et al. (2002), studying the body composition in scholars from 7 to 14 years of age of high socioeconomic level didn't verify significant differences in the comparison among the sexes. In the present study were not found significant differences in the comparison among the ages in both sexes.

The Table 2 presents the distribution of the percentage of reach of the minimum criteria for health established by FITNESSGRAN for %G for sex and ages.

Table 2. Distribution of the sample in agreement with the criteria for health of FITNESSGRAN for %G.

Age	Male			Female		
	Below the weight	Appropriate weight	Overweight	Below the weight	Appropriate weight	Overweight
	%	%	%	%	%	%
7	26,5	67,6	5,9	41,2	52,9	5,9
8	14,8	70,4	14,8	34,5	58,6	6,9
9	23,1	65,4	11,5	22,2	75,0	2,8
10	26,9	53,8	19,2	18,2	69,7	12,1
11	17,6	70,6	11,8	26,1	60,9	13,0
Total	22,3	65,4	12,3	28,4	63,9	7,7

It was verified that most of the scholars, in both sexes, is inside of the appropriate weight for the health, however a considerable percentage is below the weight causing concerns with the aspects related to the malnutrition, being more significant in the girls to the 7 (41,2%) and 8 (34,5%) years of age and in the boys to the 10 (26,9%) and 7 (26,5%) years of age. Among the boys with 10 years of age was observed that 19,2% are with overweight and in the girls the largest percentage was found to the 11 years of age (13%). Results different from most of the studies accomplished in Brazil, where in more privileged economical classes most of the scholars is with overweight and obesity (Peres, 1994; Cyrino and Nardo, 1996).

Gonçalves (1995), investigating the anthropometric and motor aspects in scholars from 7 to 14 years of age from high socioeconomic level from Londrina - PR, observed that, in both sexes, the thickness of skinfolds of the appraised ones presented superior values to the suitable ones for the reference. Ronque (2003) investigating the physical growth and aptitude related to the health in school of high socioeconomic level, in Londrina - PR, found prevalence indexes of overweight (37% and 27% in boys and girls respectively) and of obesity (29% and 14% respectively) quite preoccupying.

The Table 3 presents the averages and standard deviations of FMS and the differences found in the comparisons between the sexes and ages.

Table 3. Distribution of the average and standard deviation of the force of superior members (FMS) for sex and ages.

Age	Male		Female	
	n	Average	n	Average
7	34	4,26±2,59[a]	34	3,44±1,81[a]
8	27	5,15±2,77	29	5,45±3,79
9	26	6,50±4,33	36	4,94±3,05
10	26	7,88±3,83[b]	33	7,06±5,81[b]
11	17	8,65±4,90[b]	23	6,13±4,81

It can be noticed (Table 3) that didn't happen significant differences in the comparison among the sexes, result similar to the found by Guedes (1994) where the differences among the sexes begin to appear starting from the 11 years of age. However, in the comparison among the ages (ANOVA) it was found significant differences (p<0,05) in the 7 year-old boys with the one of 10 and 11 years and for to 7 year-old girls with the one of 10 years. An increment of the medium distance was observed with the increase of the age in both sexes. Hobold (2003) verified that the boys obtained larger results than the girls starting from the 9 years of age (p<0,05).

The Table 4 presents the distribution of the reach percentage of the minimum criteria for health established by FITNESSGRAN for FMS for sex and ages.

Table 4. Distribution of the sample in agreement with the criteria of FITNESSGRAN to FMS.

Age	Male			Female		
	Below the criteria	Inside the criteria	Above the criteria	Below the criteria	Inside the criteria	Above the criteria
	%	%	%	%	%	%
7	44,1	50,0	5,9	55,9	44,1	0,0
8	48,1	51,9	0,0	44,8	48,3	6,9
9	38,5	50,0	11,5	50,0	47,2	2,8
10	11,5	80,8	7,7	33,3	48,5	18,2
11	41,2	47,1	11,8	34,8	52,2	13,0
Total	36,9	56,2	6,9	44,5	47,7	7,7

In the variable force/resistance of superior members the scholars presented reasonable results where most (63,1% of the boys and 55,4% of the girls) was classified as inside or above the minimum criterion for health. However when analyzed

by age, the scholars (both sexes) presented preoccupying values in the classification below the criterion, mainly in the ages 7 to 9 years of age. Hobold (2003) found a larger number of scholars inside or above the criterion, 87,9% and 89,1% respectively for boys and girls.

CONCLUSIONS

Related to the body composition (%G) the girls demonstrated a tendency of larger fat deposits then the boys in all ages (p <0,05). Comparing with other researches, in the same socioeconomic level, it was verified that the scholars of this study presented inferior averages to the other studies. In relation to the overweight prevalence and obesity, both sexes demonstrated values considered normal for the age groups, getting the attention for compromising values in relation to low weight.

In the force/resistance of superior members the scholars didn't present differences in the comparison among the sexes, just among some ages. The scholars presented preoccupying results in the classification for the health, getting attention for a possible absence of more vigorous activities, since the corporal composition cannot be influencing in the execution of the specific movement of the test, because most of the scholars is classified with normal weight or below the weight, could also suffer influence of nutritional aspects.

Studies are suggested that besides the socioeconomic level, can control the physical activity level and the scholars' nutritional aspects.

REFERENCES

ACSM. American College of Sports Medicine. **Manual para teste de esforço e prescrição de exercício**. 4.ed. Rio de Janeiro: Revinter, 1996.

ASSOCIAÇÃO NACIONAL de EMPRESA de PESQUISA - ANEP. (1997). **Critério de Classificação Econômica do Brasil** (On-line). Disponível em: <http://www.inep.gov.br> Acessada em 08/03/2004.

BERGMANN, G. et al. Aptidão física relacionada à saúde de crianças e adolescentes do Estado do Rio Grande do Sul**. Revista Perfil**, ano 7, n. 7, 2005, p. 12-21.

BOREHAM, C.; RIDDOCH, C. The physical activity, fitness and health of children. **Journal of Sports Sciences**, v.19, n.12, p.915-929, 2001.

BOUCHARD, C. et. al. The genes in the constellation of determinants of regional fat distribution. **International Journal of Obesity** v.15, n.1, p.9-18, 1991.

BOUCHARD, C. The obesity epidemic. In: BOUCHARD, C. (Ed.). **Physical activity and obesity**. Champaign: Human Kinetics, 2000.

CASPERSEN, C.J.; POWELL, K.E.; CHRISTENSON, G.M. Physical activity, exercise, and physical fitness: definitions and distinctions for health-relates research. **Public Health Reports,** Rockville, v.100, n.2, p.172-9, 1985.

COOPER INSTITUTE for AEROBICS RESEARCH. **The prudential FITNESSGRAM test administration Manual**. Dallas: Author, 1999.

CYRINO, E.S.; NARDO JÚNIOR, N. Subsídios para a prevenção e controle da obesidade. **Revista Brasileira de Atividade Física e Saúde**, v.1, n.3, p.15-25, 1996.

DÂMASO, A.R.; TEIXEIRA, L.R.; NASCIMENTO, C.M.O. Obesidade: subsídios para o desenvolvimento de atividades motoras. **Revista Paulista de Educação Física**, v.8, n.1, p.98-111, 1994.

GONÇALVES, H. R.; ARRUDA, M.; BARROS FILHO, A. A.; GONÇALVES, L. A. P. (2002) Composição corporal em escolares de 7 a 14 anos de ambos os sexos de alto nível socioeconômico. **Arquivos de Ciências da Saúde da Unipar**, 6 (3), 119-126.

GONÇALVES, H.R. Aspectos antropométricos e motores em escolares de 7 a 14 anos de alto nível socioeconômico. **Revista da Associação dos Professores de Educação Física de Londrina**, v.10, n.17, p.71-80, 1995.

GONÇALVES, H.R. **Indicadores de tendência secular de variáveis associadas ao crescimento, à composição corporal e ao desempenho motor de crianças de 7 a 14 anos**. Dissertação (Mestrado em Educação Física), Faculdade de Educação Física. Universidade Estadual de Campinas, 2001.

GUEDES, D.P. **Crescimento, composição corporal e desempenho motor em crianças e adolescentes do município de Londrina (PR), Brasil**. Tese (Doutorado em Educação Física), Escola de Educação Física e Esporte. Universidade de São Paulo,1994.

GUEDES, D.P.; GUEDES, J.E.R.P. Composição corporal em crianças e adolescentes do município de Londrina - Paraná. **Revista da Associação dos Professores de Educação Física de Londrina**, v.10, n.18, p.3-15, 1995.

HOBOLD, E. **Indicadores de aptidão física relacionada à saúde de crianças e adolescentes do município de Marechal Cândido Rondon Paraná, Brasil**. Dissertação de Mestrado. Universidade Federal de Santa Catarina, 2003.

LOHMAN, T. G. Applicaility of body composition techniques and constants for children and youth. **Journal of Physical Education, Recreation and Dance**. 58(9), 9,1986, p.8-102.

MALINA, R.M.; BOUCHARD, C.; BAR-OR, O. GROWTH, MATURATION and PHYSICAL ACTIVITY. 2nd ed. Champaign: Human Kinetics Books, 2004.

NIEMAN, D. C. **Exercício e saúde**. São Paulo, SP: Ed. Manole Ltda., 1999.

PERES, L.S. **Características somáticas, cardiorrespiratorias e neuromotoras de escolares por idade, entre 11 e 14 anos de diferentes níveis socioeconômicos**. Dissertação (Mestrado em Ciência do Movimento Humano) da Universidade Federal de Santa Maria, 1994.

RONQUE, E. R. V. **Crescimento físico e aptidão física relacionada à saúde em escolares de alto nível socioeconômico.** Dissertação (Mestrado em Educação Física), Faculdade de Educação Física. Universidade Estadual de Campinas, 2003.

THOMAS, J. R & NELSON. J. K. **Métodos de pesquisa em atividade física**. 3 ed. Porto Alegre: Artmed, 2002.

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BEHAVIOR OF FORCE/RESISTANCE OF SUPERIOR MEMBERS AND OF THE FAT PERCENTAGE IN SCHOLARS OF HIGH SOCIOECONOMIC LEVEL

Abstract

The purpose of this study was to analyze the force/resistance of superior members (FMS) and the fat percentage (%G) of scholars, from 7 to 11 years of age, from high socioeconomic level of Florianópolis, SC. The sample was constituted of 285 scholars of the fundamental teaching (130 male (45,6%) and 155 female (54,4%) of the public and private teaching system). In the constitution of the sample, the schools and the scholars were selected by convenience. The socioeconomic level was identified through the questionnaire of socioeconomic classification published by the National Association of Company of Research - ANEP (1997). In the collection of data the anthropometric measure was used (thickness of skinfolds), and the test of the modified bar, proposed by the FITNESSGRAM battery, of Cooper Institute for Aerobics Research (1999). The analysis of the data was accomplished through the descriptive statistics, variance analysis ANOVA One-Way, with the use of the test post hoc of Scheffé ($p<0,05$) and the test "t" of student for independent samples. The results evidenced that the girls obtained a larger fat percentage than the boys in all ages ($p <0,05$). In force/resistance of superior members (FMS) didn't happen differences among the sexes, just among the ages 7 years-old with the 10 and 11 years-old for the boys and among the 7 years-old with the 10 years-old for the girls. Most of the scholars are inside of the criteria for health. However, it is important to point out that a considerable group, so much of the boys as of the girls, are below the criterion, supposing a tendency to the subjects related to the malnutrition.

Key words: fat percentage, force of superior members, scholars of high socioeconomic level.

LE COMPORTEMENT DE LA FORCE/RÉSISTENCE DES MEMBRES SUPÉRIEURS ET DU POURCENTAGE DE MATIÈRE GRASSE CONCERNANT LES ÉCOLIERS DE HAUT NIVEAU SOCIAL ET ÉCONOMIQUE.

Résumé

Le but de cette recherche fut celui d'analyser la force/résistence des membres supérieurs (FMS) et le pourcentage de matière grasse (%G) chez les écoliers,agés de 7 à 11 ans, appartenant à un niveau social et économique élevé, de Florianópolis,SC. .Léchantillon a été constitué de 285 écoliers du niveau d'enseignement élémentaire (130 du sexe masculin(45,6%) et 155 du sexe féminin(54,4%) du réseau publique et privé d'enseignement). Dans la constitution de l'echantillon, les écoles et les écoliers ont été sélectionés par convenance. Le niveau social et économique a été identifié par le *moyen* d'un questionaire de classement socio-économique lancé par la "Associação Nacional de Empresa de Pesquisa"-ANEP (1997). Pour la collecte des données, on s'est servi des mesures antropométriques (épaisseur des plis cutanés) , et l'éssai de la barre modifiée, proposé par la batterie FITNESSGRAM, du *Cooper Institute for Aerobics Research (1999*). L'analyse des données a été réalisée au moyen des statistiques descriptives et une analyse de variété ANOVA *One-Way*, avec l'utilisation du test *post hoc* de Scheffe ($p<0,05$) et le test "t"de *student* pour échantillons indépendents. Les résultats ont démontré que les filles ont obtenu un plus grand %G que les garçons à tous les âges($p<0,05$). Dans la FMS, il n'y a pas eu de différence entre les sexes éxcépté entre les âges de 7 ans avec les 10 et 11 ans pour les garçons et les 7 ans avec les 1^0 ans pour les filles. La plupart des écoliers se situe dans les critères de santé normale. Cependant, il est important de faire remarquer q'un groupe considérable, aussi bien chez les garçons que chez les filles sont au-dessous de la ligne de la normalité ,soupçonant une tendence à la malnutrition.

Mots clés: Pourcentage de matière grasse,force des membres supérieurs,écoliers de haut niveau socio-économique.

COMPORTAMIENTO DE LA FUERZA/RESISTENCIA DE MIEMBROS SUPERIORES Y DEL PORCENTUAL DE GRASA EN ESTUDIANTES DE ALTO NIVEL SOCIOECONÓMICO

Resumen

El objetivo de este estudio fue analizar la fuerza/resistencia de miembros superiores (FMS) y el porcentual de grasa (%G) de estudiantes de 7 a 11 años de edad, de elevado nivel socioeconómico de Florianópolis/SC. La muestra fue constituida de 285 estudiantes de la enseñanza fundamental de Brasil (130 del sexo masculino (45,6%) y 155 del sexo femenino (54,4%) de la red pública y privada de enseñanza). En la muestra, las escuelas y los estudiantes fueron seleccionados por conveniencia. El nivel socioeconómico fue identificado por medio de cuestionario de clasificación socioeconómica divulgado por la Asociación Nacional de Empresa de Pesquisa - ANEP (1997). En la coleta de datos se utilizó la medida antropométrica (espesura de pliegas cutáneas), y el teste de la barra modificada, propuesto por FITNESSGRAM, de *Cooper Institute for Aerobics Research* (1999). El análisis de los datos fue realizado por medio de la estadística descriptiva, análisis de variancia ANOVA *One-Way*, con utilización del teste *post hoc* de Scheffe ($p<0,05$) y el teste “t” de *student* para muestras independientes. Los resultados evidenciaron que las niñas obtuvieron un mayor %G que los niños en todas las edades ($p<0,05$). En la FMS no ocurrieron diferencias entre los sexos, solamente entre las edades de 7 años con los 10 y 11 años para los niños, y entre 7 años con las de 10 años para las niñas. La mayoría de los estudiantes encontrase dentro de los criterios para la salud. Sin embargo, es importante destacar que un grupo considerable, tanto de los niños cuanto de las niñas están por debajo del criterio, suponiendo una tendencia a las cuestiones relacionadas a la desnutrición.

PALABRAS-CLAVE: porcentual de grasa, fuerza de miembros superiores, estudiantes de alto nivel socioeconómico.

COMPORTAMENTO DA FORÇA/RESISTÊNCIA DE MEMBROS SUPERIORES E DO PERCENTUAL DE GORDURA EM ESCOLARES DE ALTO NÍVEL SOCIOECONÔMICO

Resumo

O objetivo deste estudo foi analisar a força/resistência de membros superiores (FMS) e o percentual de gordura (%G) de escolares, de 7 a 11 anos de idade, de elevado nível socioeconômico de Florianópolis, SC. A amostra foi constituída de 285 escolares do ensino fundamental (130 do sexo masculino (45,6%) e 155 do sexo feminino (54,4%) da rede pública e privada de ensino). Na constituição da amostra, as escolas e os escolares foram selecionados por conveniência. O nível socioeconômico foi identificado por meio do questionário de classificação socioeconômica divulgado pela Associação Nacional de Empresa de Pesquisa - ANEP (1997). Na coleta de dados utilizou-se a medida antropométrica (espessura de dobras cutâneas), e o teste da barra modificada, proposto pela bateria FITNESSGRAM, do *Cooper Institute for Aerobics Research* (1999). A análise dos dados foi realizada por meio da estatística descritiva, análise de variância ANOVA *One-Way*, com a utilização do teste *post hoc* de Scheffe ($p<0,05$) e o teste “t” de *student* para amostras independentes. Os resultados evidenciaram que as meninas obtiveram um maior %G que os meninos em todas as idades ($p<0,05$). Na FMS não ocorreram diferenças entre os sexos, apenas entre as idades de 7 anos com os 10 e 11 anos para os meninos e entre as 7 anos com as 10 anos para as meninas. A maioria dos escolares encontra-se dentro dos critérios para saúde. Porém, é importante salientar que um grupo considerável, tanto dos meninos quanto das meninas estão abaixo do critério, supondo uma tendência às questões relacionadas à desnutrição.

Palavras chave: percentual de gordura, força de membros superiores, escolares de alto nível socioeconômico.