# 50 - SOMATOMOTOR INDICATORS AND FITNESS REFERENCED TO MOTOR PERFORMANCE OF YOUNGS PARTICIPANTS OF SPORTS-SOCIAL PROJECT IN MUNICIPALITY OF CRATO-CE

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## INTRODUCTION

Growth, development and maturation are terms that complement each other when we study the inherent processes to aspects involving the acquisition of human motor skills. These processes occur during the first twenty years of life and despite the similarity in its conceptual aspects, each one has a definition. Marcondes (1994) tells us that growth and development are phenomena that differ in their conception in a physiological vision, being it physical, motor, morphological and / or functional, happening almost always simultaneously in its course and integrated into its meaning, it could be said that two phenomena are in one (LEITE, 2002).

Guedes (1995) and Guedes and Guedes (1997) suggest that when it comes to children and adolescents, the changes that occur until the stage of maturity can be as big or even bigger than the adjustments resulting from a physical activity program. However, habits of regular physical activity, in children and adolescents, are considered important because it influences directly on problems of overweight, as well as in physical and psychosocial development, thus will contribute to healthy lifestyles, which will contribute to a good quality of life in adulthood (SHEPARD, 1995).

Studies about the development of children and adolescents permit to indicate the changes that occur in their biological, physiological, biomechanical, cognitive, social and behavioral aspects, offering support for knowledge and understanding, in making decisions about effective practices to be adopted by teachers and parents, to optimize this process. The environment, circumstances and biological heredity appear to be crucial for the individual development process and reflect in their product (MALINA, 1987 apud LOPES, 2006).

The physical tests and evaluation of individual health are of great importance for the development and effectiveness of the exercise program, the practice of physical activities can offer several benefits to health and well-being of young people (5-18 years), such as reduction of chronic diseases risk factors(blood pressure, lipid profile, bone structure), reduction of overweight and obesity, psychological benefits (psychological well-being, increased self-esteem and reduce symptoms of anxiety and depression) and assists the social and moral development (CAVILL et al., 2001).

Interpreting the results of children and adolescents motor performance, by the motor tests, is still very difficult task, because a number of factors such as socio-cultural, environmental aspects, besides the growth processes, development and maturation, should be considered (OKANO et al., 2001). In children the measurement of physical fitness and health is a common practice in physical education. Usually it is measured by the performance achieved in tests of aerobic power, body composition, flexibility, strength and endurance of skeletal muscles. According to the ACMS (1998) cited by Sousa 2002 physical fitness for children and adolescents must be worked as first goal to encourage for adoption of a lifestyle, in development and maintenance of physical conditioning aiming to improve functional capacity and health.

The use of test batteries for motor skills (sports and performance) has become a common practice, since they involve physical tasks capable of expressing the individual condition of the person assessed, appropriate of measurement and comparison with other subjects in better and worse condition, allowing thus to relate the results with the different behaviors and outcomes relevant to health, developing cut points and classifications of the people evaluated (TRITSCHLER, 2003). Among the options for batteries of tests aimed to assess the physical condition of people, some are more popular, like the battery proposed by AAHPERD, Eurofit, FITNESSGRAM (SOUSA, 2003).

In Brazil we can highlight, in recent years, the actions developed by the Brazil Sport Project - PROESP-BR. Brazil Sport Project (PROESP-BR) seeks to keep control over the indicators of growth and somatomotor development and nutritional status of Brazilian children and youth since 7 to 17 years, with emphasis in sports activities. This project aims to describe, monitor and analyze the behavior of body growth, physical fitness, nutritional status and Brazilian students habits of life (GAYA and SILVA, 2007) and propose public policies for physical education and sport in a school level.

Before what was exposed, the present study had as core question: What are the somatomotor indicators and fitness related to motor performance of young participants from a sport-social project in the municipality of Crato, CE? We had as main objective aimed to analyze the somatomotor indicators and fitness related to motor performance of young people, through of anthropometric, morphological, cardiorespiratory and neuromuscular aspects.

## MATERIALS AND METHODS

**Characterization of the research:** The study is characterized as a descriptive-exploratory study with a quantitative field approach (THOMAS and NELSON, 2002; MATTOS, JR ROSSETO and BLECH, 2004).

**Population and sample:** The sample was intentional and voluntary, composed of 31 adolescents that participate of a sport-social project in the municipality of Crato-CE, being 17 boys (15.81 + 1.89 years) and 14 girls (15.80 + 1.94 years).

**Measuring instruments:** For the appropriate realization of this job, has become as instrument for collecting the variables the battery of measures and somatomotor tests proposed by PROESP-BR (2007), adding the body composition analysis, using the two-compartment model (analysis of fat mass and mass without fat). For the level of adiposity and body fat percentage, it was decided by the equation proposed by Boileau et al. (1985) cited by Petroski (2007), the levels of adiposity were classified according to Lohman (1992) adapted by Silva (2002)

**Procedures for data collection:** First, a information word was sent to the institution explaining the purpose and objective of this research. After the permission from the institution was delivered to youth responsible the Term of Free and Clear Agreement (TCLE) according to resolution 196/96 of the National Health Council, 10/10/1996 (BRAZIL, 1996). For effective participation in the study all participants had to answer the readiness questionnaire for physical activity practice for young people,

were excluded from the study people that showed some restriction to physical activity practice, and those that did not deliver the TCLE signed by the responsible. The tests were applied in the morning and afternoon in a place and room properly prepared. Before the evaluation realization ,were made and demonstrated brief explanation about how to perform the tests. Followed the following sequence: Anthropometric measures of body weight, stature, spread and skinfolds, motor performance tests: flexibility, muscular strength / abdominal muscle resistance, lower and upper limbs strength power, Agility, Speed and Cardiorespiratory Resistance. This research was approved by the Ethics Committee in Research of the Castelo Branco University (UCB-RJ), under the protocol 0017/2009 (UCB/VREPGPE/COMEP/PROCIMH) of March 12, 2009.

**Data analyses:** It was made a database in Microsoft Office Excel 2007 for Windows® software. For the data analysis made use of the descriptive statistics with measures of central tendency and dispersion, average, pattern deviation, maximum and minimum value. For inferential statistics was held the "U" test of Mann Whitney for comparison between groups. Aiming to assess the total possibilities of comparison it was used = 5.00%. All results were presented as tables.

## RESULTS

Table 01 presents the anthropometric characteristics of individuals studied. The groups, female n = 14 and male n = 17, showed similar values regarding age, demonstrating a homogeneity of the sample. Among the groups were found significant differences in statistics ($p<0.05$) in all anthropometric variables analyzed.

Table 01: Anthropometric characteristics of weight, stature, spread and %G according to gender.

| | *Female* | | | | |
|---|---|---|---|---|---|
| | ***Age*** | ***Weight (Kg)*** | ***Stature (cm)*** | ***Spread (cm)*** | ***%G*** |
| **Mean** | 16,14 | 50,04* | 157* | 163,34* | 28,13* |
| **SD** | 0,77 | 7,75 | 0,08 | 9,06 | 3,98 |
| **Minimum** | 15 | 39 | 1,47 | 142 | 18,40 |
| **Maximum** | 17 | 71,2 | 1,73 | 176 | 32,85 |
| | ***Masculine*** | | | | |
| | ***Age*** | ***Weight (Kg)*** | ***Stature (cm)*** | ***Spread (cm)*** | ***%G*** |
| **Mean** | 16,12 | 56,70* | 167* | 176,93* | 17,90* |
| **SD** | 0,78 | 11,48 | 0,07 | 7,75 | 6,29 |
| **Minimum** | 15 | 46,2 | 1,535 | 164,3 | 11,32 |
| **Maximum** | 17 | 95,2 | 1,785 | 195 | 34,43 |

* Significant differences between genders for $p<0.05$

Table 02 presents the results of performance in physical fitness tests referenced to motor performance according PROESP-BR battery: Flexibility (Flex), strength / abdominal resistance(Abd), strength of upper limbs (MedBall), Strength of lower limbs (HorJump), agility (Square), Speed (20m) and General Resistance (Res). The male group showed average values higher than the female group. All tests showed significant differences in statistics, except the flexibility one ($p <0.05$).

Table 02: Variables of physical fitness referenced to motor performance - PROESP-BR

| | *Female* | | | | | | |
|---|---|---|---|---|---|---|---|
| | ***Flex (cm)*** | ***Abd (rep)*** | **HorJump *(cm)*** | ***MedBall (cm)*** | ***Square (sec)*** | ***20 m (sec)*** | ***Res (m)*** |
| **Mean** | 30,18 | 22,14* | 157,74* | 320,71* | 06,99* | 04,24* | 1220,97* |
| **SD** | 13,10 | 7,52 | 16,75 | 39,85 | 00,70 | 00,53 | 170,62 |
| **Minimum** | 00 | 09 | 127 | 245 | 06,00 | 03,43 | 883 |
| **Maximum** | 48 | 33 | 191,5 | 380 | 08,72 | 05,09 | 1412,5 |
| | ***Masculine*** | | | | | | |
| | ***Flex (cm)*** | ***Abd (rep)*** | ***HorJump (cm)*** | ***MedBall (cm)*** | ***Square (sec)*** | ***20 m (sec)*** | ***Res (m)*** |
| **Mean** | 31,88 | 30,59* | 199,09* | 435,29* | 06,05* | 03,56* | 1600,36* |
| **SD** | 8,53 | 9,49 | 18,55 | 69,88 | 00,40 | 00,40 | 175,56 |
| **Minimum** | 16 | 10 | 168,5 | 335 | 05,29 | 02,78 | 1256 |
| **Maximum** | 55,5 | 46 | 234,5 | 540 | 06,94 | 04,40 | 1924 |

*Significant differences between genders, for $p<0.05$

## DISCUSSION

Before the period of adolescence the anthropometric aspects of body weight increase in proportion to the increase of height, in girls and boys. But in adolescence lean body mass increases quickly and the difference between the sexes with respect to lean body mass is greater than the difference in the height and weight. This occurs mainly in boys, because body fat decreases, the measure that increases lean body mass because of bone and muscle growth (BORGES, MATSUDO and MATSUDO, 2004). In a study accomplished by Leite (2002) about somatic growth in students was perceived that the average weight and height of male individuals were higher than the female which goes to show that these data corroborate with those found in the literature.

Malina and Bouchard (2002) report that fat mass increases during adolescence in girls and that they have larger amounts of fat than boys in this period. The amount of relative fat also increases gradually during adolescence with the total fat. This also occurs in boys until around 11 to 12 years of age, but reaches a lowest percentage between 16 and 17 years, increasing gradually until adulthood (MALINA and BOUCHARD, 2002).

Bergmann et al (2005) in research with children from Rio Grande do Sul, about the variables physical fitness of flexibility, abdominal strength and general resistance observed that the female group aged 16 years (n = 222) presented respectively values for this variable of: FEM (16 years): flex (27.02 ± 11.13), abd (28.29 ± 8.37), general resistance (1204.70 ± 198.32); For the group male 16 years (n = 209) the values were: flex (24.52 ± 11.15), abd (39.39 ± 1054); general resistance (1576.51 ± 306.72). Thus we see that our results (Table 02) in absolute numbers are below the above-mentioned study, considering the average age for the FEM (16.14 ± 0.77) and MALE (16.12 ± 0.7). However the variable flexibility in our study was higher than the study cited in both groups and in the female group general resistance showed a small difference in their values.

Since the force components of lower and upper limbs, agility and speed presented for a study by Lorenzi et al. (2005) with students from Rio Grande do Sul at the age of 16 years (n = 222) male and female (n = 209) the results were: horizontal jump, FEM (130.33 ± 22.52), MALE(187.89 ± 31.77); MedBall FEM (323.1 ± 40.7), MALE (474.6 ± 77.9), agility FEM (6.87 ± 0.68)

MALE (5.97 ± 0.60); Racing 20m FEM (4.24 ± 0.55), MALE (3.47 ± 0.39). We realize that comparing with our results (Table 02) variables of lower limbs(HorJump), speed (20m) and Agility (Square) were better in our individuals, only the strength of upper limbs (MedBall) was smaller.

Among the components of physical fitness, aerobic fitness is important because is viewed as an indicator of general physical fitness (WELSMAN et al, 1996) and in children and adolescents should be interpreted with caution because it can suffer constant influence during the growth and maturation period. The aerobic fitness depends basically of three factors, the first is the maximum aerobic power or maximal oxygen (Vo2max), the second is the mechanical efficiency, which can be understood as the muscle ability to perform the physical tasks with less expense of energy, and third is the aerobic resistance or aerobic threshold (MESA et al, 2006). Regarding children and adolescents, the study of VO2max, still requires some further order to obtain better explanations about specifics involved in it.

The use of the 9 minutes test to check the aerobic resistance comes from its easy application on a large scale and its correlation with VO2max measured by laboratory resources, according to Jackson and Coleman (1976) cited by Colantonio (2002). In a study by Guedes and Guedes (1995) with 4289 students from the city of Londrina-PR of both sexes and from 7 to 17 years old, met on the results of run / walk tests in a long distance a rate around 50% who have achieved the criteria from the proposed "Physical Best", showing a significant decrease with increasing age and with gender differences from the age of 11. Girls tend to present points slightly higher around 11 to 13 years old and boys showed a linear evolution conduct with age, with a slowdown from 12 years (GUEDES and GUEDES, 2001).

The process of human evolution is marked by a series of physiological, morphological, functional and social changes arising along their existence on earth, both in habits of daily life, and anthropometric, cardiorespiratory and neuromuscular aspects. These changes are more pronounced in puberty and adolescence which is recorded the highest levels of growth, development and maturation (GALLAHUE and OZMUN, 2005), in this period teenagers are more vulnerable to changes of this process due to the action of growth spurt and/or hormonal changes to maturity.

Changes in children and adolescents motor performance tend to conform the changes in the anatomic growth and physiological changes. An important factor for obtaining an optimal and individualized sports performance will be directly connected to a harmonious balance of all factors (morphological, physical, functional and emotinoal), where such qualities can be obtained through of a healthy and responsible practice of physical activity, being possible to get significant improvements with respect to aerobic and anaerobic conditioning, strength and resistance of muscles, flexibility, balance, motor coordination, body harmony (the proportion of fat and lean body mass) and emotional control (BOMPA, 2004).

**CONCLUSION**

Our results do not differ from the literature, but we can not regard them as satisfactory, because young people surveyed are participants of physical and sports activities regularly. The variables studied showed that the male group showed average values higher than the female group. Boys in this age tend to have better fitness levels than girls. This usually occurs because of the influences and differences in their physical, hormonal, morphological and cultural aspects.

Social Projects related to sports, that aimed the engagement of young people, should seek the incentive to improve health, not just the improvement of motor performance with athletic purpose. It is suggested that other studies are conducted with students and practitioners of other activities to determine parameters of growth and development in our region. And that studies like this serve to the adoption of public policies for sport and leisure of the communities.

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**SOMATOMOTOR INDICATORS AND FITNESS REFERENCED TO MOTOR PERFORMANCE OF YOUNGS PARTICIPANTS OF SPORTS-SOCIAL PROJECT IN MUNICIPALITY OF CRATO-CE**

**ABSTRACT**

Several studies attempt to relate aspects of growth, development and maturation with sports performance specially in search of young people with differentiated motor skills. This study aimed to evaluate somatomotor indicators and fitness related to motor performance of young people. The study is characterized as a descriptive-exploratory one, with a quantitative field approach. We evaluated 31 young, feminine-14 (FEM) (16,14±0,77 years) and 17 masculine-(MASC) (16,12±0,78 years) participants of a sports-social project. To evaluate the physical components resort to battery evaluation proposed by PROESP-BR, being added the analysis of body composition. It was made a database in Microsoft Excel 2007 for Windows ®, to analyze the results we resort to descriptive statistics and inferential statistics with “U” test of Mann Whitney always with =5,00%.The relative adiposity presented FEM group (28,13%±3,98%) and the MASC (17,9%±6,29%), being the male group rated as great. In the neuromuscular components results were: flexibility (FEM= 30.18±13.10; MASC= 31,88±8,53), strength / abdominal resistance (FEM= 22,14±7,52; MASC= 30,59±9,49), MMII strength (FEM= 157,74±16,75; MASC= 199,09±18,55) and MMSS (FEM=320,71±39,85; MASC= 435,29±69,88); agility (FEM= 06,99±00,70; MASC= 06,05±00,40), speed (FEM= 04,24±00,53; MASC= 03,56±00,40). In general resistance results were: (FEM= 1220,97±170,62; MASC= 1600,36±175,56). Our results do not differ from the literature, but we can not regard them as satisfactory, because young people surveyed are participants in physical and sports activities regularly. These projects that aimed the engagement of young people in physical and sports activities should seek to encourage the improvement of health, not just the improvement of motor performance. It is suggested that other studies are conducted with students and practitioners of other activities.

**KEYWORDS:** somatomotor indicators, motor performance, body composition, adolescents

**INDICATEURS SOMATO-MOTEURS ET APTITUDE REFERENCE A LA PERFORMANCE MOTRICE DE JEUNES PARTICIPANTS DU PROJET SOCIAL-SPORTIF DE LA MUNICIPALITE DE CRATO-CE**

**RÉSUMÉ**

Plusieurs études ont cherché à mettre en relation les aspects de croissance, de développement et de maturation avec la la performance sportive, principalement chez les jeunes porteurs d'aptitudes moteurs différentes. La présente étude a eu comme objectif lánalyse des indicateurs somato-moteurs et de condition physique par papport à la performance motrice des jeunes. L'étude se caractérise du type descriptive et exploratoire avec recherche sur le terrain. Il a été évalué 31 jeunes, 14 femmes(FEM) (16,14±0,77 ans) et 17 hommes (HOM) (16,12±0,78 ans), tous participant d'un projet socio-sportif. Pour l'évaluation des variables de condition physique par le PROESP-BR, a joutée à l'ánalyse de la composition corporelle. Une banque de données a été établi sur Microsoft Excel 2007 pour Windows®, pour l'analyse de résultats on a eu recour à la statistique descriptive et à la statistique inférentielle avec test "U" de Mann Whitney toujours avec =5,00%. La Graisse relative a présentée dans le groupe FEM (28,13%±3,98%) et dans le group HOM (17,9%±6,29%), celui-ci étant concidéré comme optimum. Dans les conposants neuromusculaires les résultats présents ont été: flexibilité (FEM= 30,18±13,10; HOM= 31,88±8,53), la force/résistance abdominale (FEM= 22,14±7,52; HOM= 30,59±9,49), force mmii (FEM= 157,74±16,75; HOM= 199,09±18,55) et mmss (HOM= 320,71±39,85; HOM= 435,29±69,88); agilité (FEM= 06,99±00,70; HOM= 06,05±00,40), vitesse (FEM= 04,24±00,53; HOM= 03,56±00,40). Pour la résistance générale les résultats ont été (FEM= 1220,97±170,62; HOM= 1600,36±175,56). Nos résultats ne diffèrent pas des articles déja publés, toutefois nouns ne pouvons pas les considérer satisfaisant, car les jeunes participants pratiquent régulièrement des activités physiques-sportives doivent chercher à stimuler l'amélioration de la performance motrice. Nous Suggérons que d'áutres études soient réalisés avec des étudiants et des pratiquants d'autres activités.

**MOTS-CLÉS:** Indicateurs somato-moteurs, performances motrice, composition corporelle, adolescents

**INDICADORES SOMATO-MOTRIZ Y APTITUD REFERENCIA AL RENDIMIENTO DEL MOTOR DE JOVENES PARTICIPANTES DEL PROYECTO DE DEPORTIVAS Y SOCIALES MUNICÍPIO DEL CRATO-CE**

**RESUMEN**

Varios estudios intento de relacionar los aspectos de crecimiento, desarrollo y maduración, con el rendimiento deportivo, en particular, en la búsqueda de las personas con capacidades motoras diferentes. Este estudio tuvo como objetivo evaluar los indicadores somato-motriz relacionados con la aptitud y el rendimiento del motor de los jóvenes. El estudio se caracteriza como un estudio exploratorio-descriptivo cuantitativo de campo. Se evaluaron 31 jóvenes, las mujeres-14 (MUJ) (16,14±0,77 años) y 17 hombres-(HOM) (16,12±0,78 años) que participan en un proyecto de deportivas y sociales. Para evaluar el recurso a los componentes físicos de la batería de evaluación propuesto por PROESP-BR, que aumentó el análisis de la composición corporal. La gente hace una base de datos en Microsoft Excel 2007 para Windows®, para analizar los resultados que recurrir a la estadística descriptiva y estadística inferencial con prueba de "U" de Mann Whitney siempre con una = 5,00%.La grasa proporcional en el grupo FEM presentados (28,13%±3,98%) y el HOM (17,9%±6,29%), y el grupo masculino calificado como excelente. En los resultados de los componentes neuromusculares fueron: flexibilidad (MUJ= 30,18±13,10; HOM= 31,88±8,53), la fuerza/resistencia abdominal (MUJ= 22,14±7,52; HOM= 30, 59±9,49), la fuerza de miembros inferiores (MUJ= 157,74±16,75; HOM= 199,09±18,55) y de miembro superior extremidades (MUJ=320,71±39,85; HOM= 435,29±69,88), agilidad (MUJ= 06,99±00,70; HOM=06,05±00,40), velocidad (MUJ= 04,24±00,53; HOM= 03,56±00,40). En los resultados de la resistencia general fueron: (MUJ= 1.220,97±170,62; HOM =1600,36±175,56). Nuestros resultados no difieren de la literatura, pero no podemos considerar como satisfactorio, ya que los jóvenes encuestados participan en actividades físicas y deportivas con regularidad. Estos proyectos destinados a involucrar a los jóvenes en actividades físicas y deportivas deben tratar de fomentar la mejora de la salud, no sólo la mejora del rendimiento del motor. Se sugiere que los estudios se llevan a cabo con los estudiantes y practicante de otras actividades.

**PALABRAS CLAVE:** indicadores de somato-motriz, rendimiento del motor, composición corporal, adolescentes

**INDICADORES SOMATOMOTORES E APTIDÃO FÍSICA REFERENCIADA AO DESEMPENHO MOTOR DE JOVENS PARTICIPANTES DE PROJETO ESPORTIVO-SOCIAL DO MUNICÍPIO DE CRATO–CE**

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**RESUMO**

ários estudos procuram relacionar os aspectos de crescimento, desenvolvimento e maturação com o desempenho esportivo em especial na busca de jovens com habilidades motoras diferenciadas. O presente estudo teve como objetivo analisar os indicadores somatomotores e a aptidão relacionada ao desempenho motor de jovens. O estudo caracteriza-se como do tipo descritivo-exploratório, com abordagem quantitativa de campo. Foram avaliados 31 jovens, 14 feminino-(FEM) (16,14±0,77 anos) e 17 masculino-(MASC) (16,12±0,78 anos) participantes de um projeto esportivo-social. Para avaliação das variáveis da aptidão física recorre-se a bateria de avaliação proposta pelo PROESP-BR, sendo acrescida a análise da composição corporal. Confeccionou-se um banco de dados no Microsoft Excel 2007 for Windows®, para análise dos resultados recorreu-se a estatística descritiva e estatística inferencial com teste “U” de Mann Whitney sempre com =5,00%. A gordura relativa apresentou no grupo FEM (28,13%±3,98%) e para o MASC (17,9%±6,29%), sendo o grupo masculino classificado como ótimo. Nos Componentes neuromusculares os resultados apresentados foram: flexibilidade (FEM=30,18±13,10;MASC=31,88±8,53); força/resistência abdominal (FEM=22,14±7,52; MASC=30,59±9,49); força MMII (FEM=157,74±16,75;MASC=199,09±18,55) e MMSS (FEM=320,71±39,85;MASC=435,29±69,88); agilidade (FEM=06,99±00,70; MASC=06,05±00,40); velocidade (FEM=04,24±00,53;MASC=03,56±00,40). Na resistência geral os resultados foram: (FEM=1220,97±170,62; MASC=1600,36±175,56). Nossos resultados não diferem da literatura, porém não podemos considerá-los como satisfatórios, pois os jovens pesquisados são participantes de atividades físico-esportivas regulares. Tais projetos que visam o engajamento de jovens em atividades físico-esportivos devem buscar o incentivo a melhoria da saúde, não apenas a melhoria do desempenho motor. Sugere-se que outros estudos sejam realizados com escolares e praticantes de outras atividades.

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