135 - CAPACITY CARDIORRESPIRATÓRIA IN CHILDREN AND YOUNG: A STUDY OF VALIDATION IN TEST OF ASCENTS AND DESCENDINGS OF BANK ELETRONICO PROTOCOL OF CIRILO (SOUSA, 2001) IN THE JOÃO CITY PERSON.

GIGLIOLA CIBELE CUNHA DA SILVA, JOÃO MARCOS FERREIRA DE LIMA SILVA, PÉRICLES PAES BARRETO CORREIA , MARIA DO SOCORRO CIRILO DE SOUSA.
Universidade Federal da Paraíba - UFPB, João Pessoa - PB - Brasi
Universidade Federal de Santa Catarina - UFSC, Florianópolis - SC - Brasil
Centro Federal de Educação Tecnológica da Paraíba (CEFET) - Juazeiro do Norte - CE Brasil
gigliolacibele@yahoo.com.br

INTRODUCTION

The physical conditioning can be measured through the index of volume of maximum oxygen (VO2max), a predicted parameter of the physical fitness state that makes possible to know the amount of oxygen captured and used in a physical effort. The levels of capacity cardiorespiratory also serve of reference for the prescription of programs of physical activities. PINHEIRO (1998) explains that VO2max can be modified through training even certain point, because it is considered that 90% of the variability is indicated genetically.

SOUSA (1997) tells that different ways exist to test, to measure and evaluate this aerobic capacity or the individual's cardiorespiratory. For each exercise it can choose the ergometer to be more appropriate to the movement specify of the participant, in the intention of obtaining information for the formulation of training program or modification of the already existent.

Due to difficulties associated to the direct measure of the consumption of oxygen, as time and high costs, numerous prediction methods have been developed and with exhaustion used in clinical studies and field researches (WHALEY and collaborators, 1995 apud SURINAM CHERRY, 2004), with that, being possible to the use of an adapted ergometer the individuals' daily physical activities, evaluating the physical fitness of the same ones (SOUSA, 2001).

A great instrument for the measure of the VO2max is the bench test for being of low cost, easy to transport and of handling, it does not depend on electric light and it is possible of assisting to a great number of people in laboratories measured and field, starting from the structure of the protocols, could appeal to one of these references. He is classified as test sub-maximum, because the effort is accomplished among 75% and 90% of the maximum heart frequency (HF max), where one of the objectives is to determine the relationship among the answer of the heart frequency (HF) of an individual during the continuous exercise and his VO2max.

"The beginning of the evolutionary process of development of the physical fitness feels, in the great part inside of the school, then the incentive to the development of the potentialities and the man's improvement organic is fruit of the performance executes of programs of Physical education" (BRAVE, 2002). Studies regarding the child and the exercise are limited to the system owed cardiopulmonary the conditions demanded, and few ethical authors would venture to expose the children to you factor of heat, invasive tests, among others.

The trainings addressed the child and the adolescent should prioritize each individual's age group and his biopsychosocial development together with the particularities of each phase. The concern in to understand and to analyze the behavior of certain important and indicative variables of good health along the life comes if turning an essential routine, should be stimulated and researched there to be a good advantage of them as prevention resources to the appearance of problems of health.

Being like this, that research seeks to answer the following subject: How does it behave the volume of maximum oxygen (Vo2max.) measured in test with use of ascents and descents of a bench for age group from 07 to 12 years and for gender?

OBJECTIVE

To verify the volume of maximum oxygen predicted in ascent tests and bench descent, between the genders and children's ages and young, as validation proposal.

METHODOLOGY

CHARACTERIZATION OF THE RESEARCH

Descriptive traverse in agreement with THOMAS and NELSON (2002) with selection of the sample of probabilistic form stratified proportional.

POPULATION AND SAMPLE

School of the municipal public net of the city of João Pessoa, totaling a sample of 268 students, 128 female and 140 male, among 07 to 12 years of age, certain for the population method according to RICHARDSON et al. (1999).

VARIABLES SELECTED FOR THE STUDY

Dependent: heart frequency, volume of oxygen / minute for kilo of weight;

Independent: Age, Corporal Mass (MC), Stature, Time of execution of the tests, reached apprenticeships, height of the bank reached, physical fitness Degree, Number of touches of the metronome per minute.

INSTRUMENTS FOR COLLECTION OF DATA

Portable Estadiômetro (stature meter) marks Sanny precision 0.01cm; it Balances digital Filizola precision 100g; I support Electronic of Cirilo; evaluation room; Polar frequencímetro (frequency meter) and transmission strip, all gaged and tested, being approved for the teacher-advisor.

PROCEDURES FOR COLLECTION OF DATA

After approval in the committee of Ethics of UFPB for the accomplishment of the research (recorded of registration 118/01-B), and already of ownership of the necessary authorizations, close to the Secretary of Education of the Municipal district of the City of João Pessoa - PB, was obtained the relationship with names and location of the municipal schools, providing the draw of the schools for neighborhood and for section. 15 schools were visited, inviting the students raffled to participate, sending to their parents a term of illustrious free consent so that in the subsequent day they were accomplished the check necessary. It

took place to gauging of the instruments for the collection of data.

Before beginning the collection of data they were used the data of the doctorate theory that it validated the electronic bank of Cirilo (2001) that presented the same characteristics of age for generation of an equation that would come to be tested with the present work.

EQUATION FOR CALCULATION OF VO_2máx

= - 93,402 - [0,0548 x (age)] - [0,152 x (stature)] - [0,0874 x (I weigh)] - [0,568 x (gender)] + [0,05996 x (time)] + [0,0118 x (final FC)] + [0,798 x (height bank)] - [16,221 x (aptitude)] + [1,095 x (n° of touches)].

Where:
Age: in years
Stature: in centimeters
Weight: in kilograms
Gender: FEM = 0 / MALE = 1
Time: total time of execution of the test
Final FC: heart frequency in the end of the test
Height Bank: final height reached in the bank
Aptitude: untrained = 1 / I activate = 2 / = 3
Number of touches: FEM. untrained = 116 / FEM. I activate = 132 / FEM. = 152
MALE. untrained = 120 / MALE. I activate = 144 / MALE. = 160

For the accomplishment of the test, initially the stature and the corporal mass were checked, with the minimum of clothes. Soon afterwards, the children were prepared for the test using the strip of transmission of the Polar with the clock to monitor the heart frequency.

It was used the ascent test and descent of the electronic bank according to the protocol of Cirilo (SOUSA, 2001) appropriate to the stature. The test consists of ascents and descents in an ergômetro bank with progressive load, appropriate to the stature of the appraised. The rhythm of the last ones is certain for the sex and level of physical fitness of the appraised. The test is composed by 3 apprenticeships, having increment in the passage of an apprenticeship for the other. The duration of each apprenticeship is defined in agreement with the aptitude of the appraised. During the application of each test the effort and the accommodation postural of the appraised were observed by indication of tables, as the one of Acomodação Postural's Scale and of the Perception of Effort of BORG (BORG, 2000). Each test was applied directly in a child by time and the logged data in the record of registration of data.

ANALYTICAL PLAN

The statistical program was used for tabulation of the database and obtaining of the necessary statistics, taking place all statistical descriptive, Test "t" of Student for dependent and independent samples and finally, variance analysis among the ages for sex, being adopted a level of significância of 5% ($p < 0,05$).

RESULTS AND DISCUSSION

In agreement with the obtained data, it was observed that all of the individuals (n=268) they completed the total time of the test of 180 seconds (s) for if they frame in the untrained individuals' group. They completed the 3 apprenticeships of the test with minimum height of the bank of 20 cm, and maximum height of the bank found of 38 cm.

The Table 01 presents the descriptive statistics of average, standard deviation, values maximum and minimum of the appraised variables.

TABLE 01: Descriptive statistics of minimum and maximum value, average and standard deviation, of the variables FC before, FC 1min, FC 2min, FC 3min, FC rec1, FC rec2, Corporal Mass (CM), Stature and VO_2máx. (N=268).

ABLES	Minimum	Maximum	Average and standard deviation
fore	67	139	99,08 ± 12,43
min	85	180	140,38 ± 14,61
min	100	183	152,78 ± 13,03
min	110	202	164,58 ± 12,87
c1	71	192	109,21 ± 18,86
c2	64	134	101,81 ± 14,39
	16,00	70,80	30,79 ± 8,17
re	113,50	163,80	135,50 ± 9,71
ml/kg/min)	26,76	39,10	34,52 ± 2,83

In agreement with the Table 02, the test "t" of Student for independent samples, evidenced significant differences among the sexes, could be observed that the averages of the variables for the girls were larger than the one of the boys, except for the corporal mass (MC), of the stature and of the boys' VO_2máx that stood out. The corporal mass and the stature went to the only variables that didn't have significant differences when compared among the sexes (p=0,395 and p=0,081, respectively).

TABLE 02: Statistics of the variables FC before, FC 1min, FC 2min, FC 3min, FC rec1, FC rec2, Corporal Mass (CM), Stature and VO_2máx, through the Test "t" of Student among the sexes.*

VARIABLES	Averages and standard deviations		Test "t" Student
	FEM	MAS	
FC before	103,43±11,10	95,11±12,29	0,000*
FC 1min	144,48±3,92	136,62±14,25	0,000*
FC 2min	156,39±12,09	149,47±13,02	0,000*
FC 3min	168,60±11,57	160,91±12,94	0,000*
FC rec1	116,55±19,36	102,49±15,67	0,000*
FC rec2	106,69±14,29	97,35±13,01	0,000*
CM	30,3477±8,85	31,20±7,50	0,395
Stature	134,42±10,05	136,50±9,31	0,081
VO_2	33,50±3,24	35,46±1,97	0,000*

* Dif sig $p \leq 0,05$

As mentioned by Silva, Belt, Silva and Cirilo (2006), "in agreement with the studies of Jogging; Weiler-Ravell; Whipp and Wasserman (1984) they moderated values of VO_2máx (mL/min/kg) with average of 38 + 7 for girls no-athletes with medium age 9 years old, while Armon; Jogging; Flowers et al. (1991) they told average same to 43 + 6mL/min/kg for children (boys and girls) no-athletes with ages between the 6 and 12 years", averages those that don't approach the reality of the results obtained with the referring research, but all results classified as excellent in agreement with Fernandes Filho (2003, pág.174), indicating a great index of volume of oxygen.

In the Table 03 the values of FC are presented before, during and to the end of the test, as well as the values of VO_2máx for sex and age. It is observed that the children of both sexes in the age group of 7 and 8 years were the ones that obtained the largest indexes of VO_2máx.

In the Table 03 the values of FC are presented before, during and to the end of the test, as well as the values of vo_2max for sex and age.

TABELA 03: Averages and standard deviations of FC before the test, of the FC máx, FC rec1, FC rec2 and VO_2máx for sex and age.

AGE	FC before the test	FC MAX	FC REC 1º min	FC REC 2º min	VO_2MAX
7	107,26 ± 8,75	172,79±14,77	120,00±16,85	109,58±14,48	35,67±2,19
8	108,60 ± 7,32	169,13±10,29	116,63±19,36	109,58±14,06	35,78±1,89
9	104,28 ±12,22	169,84±9,65	119,32±21,59	107,96±11,76	34,23±2,77
10	97,25 ± 10,88	162,75±9,76	107,69±15,96	97,81±15,16	30,87±1,68
11	98,19 ±13,43	167,94±9,74	120,06±24,30	105,88±13,75	29,80±1,61
12	93,58 ± 7,00	166,33±16,12	112,25±13,27	102,75±16,15	29,45±0,98
7	97,76 ± 10,53	161,24±12,24	106,57±13,48	99,19±10,21	37,42±1,08
8	99,86 ± 7,54	159,18±9,15	100,50±15,77	98,73±13,23	36,99±1,04
9	97,50 ± 12,58	166,08±12,79	107,73±19,40	99,96±15,48	36,25±0,86
10	92,42 ± 13,12	158,31±16,40	98,31±13,33	96,19±9,58	34,94±1,34
11	96,52 ± 12,82	163,43±11,31	105,65±13,45	100,48±14,27	33,79±2,04
12	86,68 ± 12,16	156,64±12,76	96,00±14,92	89,23±11,96	33,52±1,37

In different studies, same those accomplished with children in before-pubescent phase, already differences exist in relative VO_2máx related to the sex (McMURRAY, et al., 2003; GUEDE and GUEDES, 1998; SLEAP and TOLFREY, 2001; STANGANELLI, 1991; STANGANELLI et al, 2001; JANZ et al., 2000; ROWLAND et al., 2000; DOCHERTY, 1996 apud BRUM, 2004, ARMON, 1991), standing out to present researches. But it was not possible to notice an increase of VO2máx comparing the age groups as explicated for the authors: "the increase of the one of absolute VO2máx increases lineally of the 4 years to the end of the adolescence, where for girls, after the 12 years a development plateau begins, but for the boys the one of VO2máx continues growing" (HAYWOOD; GETCHEL, 2004), having an in accordance decline the increase of age.

TABLE 04: Averages and standard deviations of the stature, corporal mass and IMC for sex and age

AGE	Stature	Corporal Mass	IMC
7	123,16±6,44	25,16±4,44	16,50±2,23
8	129,32±4,50	25,57±4,27	15,25±2,28
9	133,33±6,17	29,44±6,02	16,47±2,41
10	140,28±6,91	33,25±8,67	16,70±3,13
11	145,98±7,09	40,27±12,22	18,60±4,11
12	148,34±6,26	39,28±7,01	17,79±2,50
7	126,66±4,99	27,32±7,30	17,00±4,35
8	129,70±5,14	25,98±3,13	15,40±1,14
9	133,18±3,92	28,68±4,41	16,16±2,32
10	138,89±5,94	32,13±4,97	16,57±1,60
11	143,65±8,65	35,69±7,30	17,14±2,34
12	146,31±7,90	37,34±9,50	17,26±2,98

Flor e Gueths (2004) they mention that with the training aeróbico, the children and adolescents increase the corporal mass (growth) as the maturation, that accelerates during the puberty (development). it Still happens an increase of VO_2máx in absolute terms along the age, being a larger acceleration in boys than in girls. The increase of VO_2máx is related to the increase of the muscular mass. But in the present research it was not possible to notice such event, because the children that possessed the largest values of VO_2máx (in the age group of 7anos) they were the ones that had smaller corporal mass. What can be explained by several reasons, as mentioned by Afonso and Braga (2005) in that the socioeconomic variables exercise important influence in the growth, as: the per capita income, the parents' age, the size of the family, house conditions and sanitation, education and the parents' culture, among others.

In the Table 05, we can observe the results of the statistical test of variance among the averages of the ages for sex (in agreement with the test ANOVA).

TABLE 05: Test of variance analysis (ANOVA) among the variables FC before the test, FC MAX and VO_2 máx among the averages of the ages for sex.

Sex	Variables	Meaning
Male	FC before the test	0,000*
	FC MAX	0,187
	VO_2MAX	0,002*
Female	FC before the test	0,112
	FC MAX	0,043**
	VO_2MAX	0,000*

* Dif sig p ≤ 0,01 / ** Dif sig p ≤ 0,05

In agreement with the Table 05, the statistical test didn't just evidence significant differences for FC male MÁX and for FC before the test for the feminine sex (p> 0,050). Guedes and Guedes (1998) in studies involving children and young of both

sexes in the age group from 07 to 17anos, they found that, for the aerobic capacity, there is a difference among the answers for the girls and boys. The girls tend to present points discreetly higher about the 11 to the 13 years of age and the boys indicated an evolutionary lineal behavior with the age, having a slowing down starting from the 12 years.

Fernandes Filho (2003) he/she affirms that before the 12 years significant difference doesn't exist between girls and boys; after the puberty the difference among the sexes is from 15% to 20% and, later, between men and women they reach from 25% to 30%, when related with corporal weight.

In the studies of Strassburger and Borges (2001) regarding the results of the tests of resistance cardio-respiratory it was noticed that the best indexes were found among the masculine gender regarding the feminine gender, although the percentile among them is still considerable low for both sexes. With that, corroborating for the research here presented, where the boys also stood out regarding the girls.

It "seems that you factor as level of habitual physical activity and mainly cultural factors related to the practice of physical exercises great influence in the results of the tests, because of course the tasks that involve the force and muscular resistance are particularly favorable to the boys than he/she enters the girls." (STRASSBURGER and BORGES, 2001)

Like this, in the presented data he/she identified a great significant difference between the heart frequencies and analyzed VO_2máx. Belonging not just notable the individualities to each individual involved in the research as of the individuals' group, when analyzed by sex or for age.

CONCLUSION

With the progress of the age, the levels of predicted maximum oxygen (VO2máx) they presented a decrease in their relative values for both goods. However, in all of the age groups the masculine gender presented a better acting in this variable could be justified for the selection of different activities that you/they involve the daily of the two groups (MALE and FEM) and the physical demands of these.

That there is a limited amount of studies that you/they link to the child and the exercise. This feels due to the ethical conditions of the study, because according to the few authors they would take a risk to expose the child to you tests invasive, among others. In reason of that the knowledge on the training for children is limited, mainly, to the system cardiopulmonary. New studies should be accomplished being compared the values obtained in the several ergômetros and field tests, mainly with the ergômetro bank so that this instrument is validated for this age group, and could accompany like this these varied in a reliable and accessible way, be as for costs as the practical.

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Endereço: Rua Tenente Gama Cabral, n° 215, Bairro: Ipês CEP: 58028-400
JOÃO PESSOA - PARAÍBA - BRASIL Tel.: (83) 3225-1207 / 8846-7322
gigliolacibele@yahoo.com.br

CAPACITY CARDIORRESPIRATÓRIA IN CHILDREN AND YOUNG: A STUDY OF VALIDATION IN TEST OF ASCENTS AND DESCENDINGS OF BANK ELETRONICO PROTOCOL OF CIRILO (SOUSA, 2001) IN THE JOÃO CITY PERSON.

VO_2máx as predicted of the physical fitness state is recognized and enough used, expressing the amount of captured oxygen and used in a physical effort, indicating state of conditioning cardio-respiratory. To present research he/she concentrates on the analysis of VO_2máx predicted in test of bank electronic Protocol of Cirilo (SOUSA, 2001) in children of the public net of the city of João Pessoa. The sample was composed by 268 children, being 128 female (FEM) and 140 male (MAS) with age group from 07 to 12anos of age. A portable stature meter was used, it balances digital, I support electronic (SOUSA, 2001); POLAR frequency meter, Scale of Accommodation Postural and the table of Borg. The research gave beginning after the authorization for the Committee of Ethics in Research, and the collection was accomplished after signature of the consent term by the parents, being applied the bank test mentioned previously. It was verified that the children MAS they obtained the largest average of VO_2máx 35,46 + 1,97ml.kg/min-1 standing out in all of the ages when compared the children FEM, that obtained an average of 33,50 + 3,24 ml.kg/min-1. The analyzed variable differed his behavior when being compared between goods and ages, result this could be justifiable for the selection of activities that you/they involve the daily of the groups (MAS and FEM) and the physical demands of these.

Key words: VO_2 maximum, bank test, children, capacity cardio-respiratory.

CAPACITÉ CARDIORRESPIRATÓRIA CHEZ LES ENFANTS ET DES JEUNES : Une ÉTUDE DE VALIDATION DANS L'ESSAI DES MONTÉES ET LE DESCENDINGS DU PROTOCOLE de la BANQUE ELETRONICO DE CIRILO (SOUSA, 2001) LA de VILLE de JOÃO PERSONNE.

VO_2máx comme preditor de l'état de la mise en forme est reconnu et assez a utilisé, en exprimant le montant d'oxygène capturé et usagé dans un effort physique, indiquer état de conditionner cardiorrespiratório. Présenter recherche il/elle il/elle concentre sur l'analyse de VO_2máx prédite dans épreuve de banque Protocole électronique de Cirilo (SOUSA, 2001) dans enfants du filet public de la ville de João Pessoa. L'échantillon a été composé par 268 enfants, en étant 128 femme (FEM) et 140 mâle (MAIS) avec tranche d'âge de 07 à 12anos d'âge. L'estadiômetro portatif a été utilisé, il équilibre numérique, je supporte électronique (SOUSA, 2001); frequencímetro POLAIRE, Échelle d'Acomodação Postural et la table de Borg. Les recherches ont donné le commencement après l'autorisation pour le Comité d'Éthique dans Recherche, et la collection a été accomplie après signature du terme du consentement par les parents, être appliqué l'épreuve de banque mentionné précédemment. Il a été vérifié que les enfants MAIS eux ont obtenu la plus grande moyenne de VO_2máx 35,46 + 1,97ml.kg/min-1 qui ressortent dans tous les âges quand a comparé les enfants FEM qui a obtenu une moyenne de 33,50 + 3,24 ml.kg/min-1. La variable analysée a différé son comportement quand être comparé entre marchandises et âges, résultat ce pourrait être justifiable pour la sélection d'activités que les you/they impliquent le quotidien des groupes (MAS et FEM) et les demandes physiques de ceux-ci.

Mots de la clef: Maximum VO_2, épreuve de banque, enfants, cardiorrespiratória de la capacité.

CAPACIDAD CARDIORRESPIRATÓRIA EN NIÑOS Y JÓVENES: Un ESTUDIO DE LA VALIDACIÓN EN LA PRUEBA DE SUBIDAS Y DESCENDINGS DEL PROTOCOLO DEL BANCO ELETRONICO DE CIRILO (SOUSA, 2001) DE LA CIUDAD de JOÃO PERSONA.

VO_2MÁX como predicho del estado de salud se reconoce y bastante usó, mientras expresando la cantidad de oxígeno capturado y usó en un esfuerzo físico, mientras indicando estado de condicionar cardiorrespiratorio. La presente investigación se concentra en el análisis de VO_2MÁX predicho en la prueba de Protocolo electrónico bancario de Cirilo (SOUSA, 2001) en los niños del precio neto público de la ciudad de João Pessoa. La muestra estaba compuesta por 268 niños, mientras siendo 128 hembra (FEM) y 140 varón (MAS) con el grupo de 07 a 12anos de edad. Un metro de la estatura portátil fue usado, equilibra digital, yo apoyo electrónico (SOUSA, 2001); el metro de frecuencia POLAR, Balanza de Alojamiento Postural y la mesa de Borg. La investigación dio el principio después de la autorización para el Comité de Ética en la Investigación, y la colección era cumplida después de la firma del término de consentimiento por los padres, siendo aplicada la prueba bancaria mencionó previamente. Fue verificado que los niños MAS ellos obtuvieron el promedio más grande de VO_2MÁX 35,46 + 1,97ml.kg/min-1 que destacan en todo las edades cuando comparó a los niños FEM que obtuvo un promedio de 33,50 + 3,24 ml.kg/min-1. La variable analizada difirió su conducta al compararse entre el género y edades, resultado esto podría ser justificable para la selección de actividades que los involucran el periódico de los grupos (MAS y FEM) y las demandas físicas de éstos.

Las palabras de la llave: VO_2 la prueba máxima, bancaria, los niños, la capacidad cardiorrespiratorio.

CAPACIDADE CARDIORRESPIRATÓRIA EM CRIANÇAS E JOVENS: UM ESTUDO DE VALIDAÇÃO EM TESTE DE SUBIDAS E DESCIDAS DO BANCO ELETRONICO PROTOCOLO DE CIRILO (SOUSA, 2001) NA CIDADE DE JOÃO PESSOA.

O VO_2máx como predito do estado de aptidão física é reconhecido e bastante utilizado, expressando a quantidade de oxigênio captado e utilizado em um esforço físico, indicando estado de condicionamento cardiorrespiratório. A presente pesquisa concentra-se na análise do VO_2máx predito em teste de banco eletrônico Protocolo de Cirilo (SOUSA, 2001) em crianças da rede pública da cidade de João Pessoa. A amostra foi composta por 268 crianças, sendo 128 do sexo feminino (FEM) e 140 do sexo masculino (MAS) com faixa etária de 07 a 12anos de idade. Utilizou-se, balança digital, banco eletrônico (SOUSA, 2001); frequencímetro POLAR, Escala de Acomodação Postural e a tabela de Borg. A pesquisa deu início após a autorização pelo Comitê de Ética em Pesquisa, e a coleta foi realizada após assinatura do termo de consentimento pelos pais, aplicando-se o teste de banco citado anteriormente. Verificou-se que as crianças MAS obtiveram a maior média do VO_2máx 35,46 $\pm$ 1,97ml.kg/min^{-1} se sobressaindo em todas as idades quando comparadas as crianças FEM, que obtiveram uma média de 33,50 $\pm$ 3,24 ml.kg/min^{-1}. A variável analisada diferiu seu comportamento ao ser comparada entre gêneros e idades, resultado este podendo ser justificável pela seleção de atividades que envolvem o cotidiano dos grupos (MAS e FEM) e as exigências físicas destas.

Palavras chaves: VO_2 máximo, teste de banco, crianças, capacidade cardiorrespiratória.