187 - RELATION AMONG DERMATOGLYPHICS, SOMATOTYPE AND STRENGTH OF IFTO STUDENTS IN DIFFERENT MATURATIONAL STAGES

[1]RONANO PEREIRA OLIVEIRA,.
[2]JOSÉ FERNANDES FILHO
[1]Programa de Pós-Graduação Stricto Sensu em Ciências da Motricidade Humana – Universidade Castelo Branco-RJ/ Brasil
[2]Escola de Educação Física e Desporto – UFRJ – RJ /BRASIL
[2]LABIMH/CNPq – PQ – BRASIL
[1]terradesol@yahoo.com.br

INTRODUCTION

It's been very usual in Brazil that the opportunity for sports orientation occurs in schools. For this reason, physical education professionals have the important task of identify the students' sports potentialities and, at the same time, orienting them in the best possible manner. For this purpose, they need simple and effective methods to identify and orient the sport practice.

Literature shows us that all high performance sportsman shows similar anthropometrical, somatotypical, dermatoglyphic and physical aptitude characteristics. This way, it has been necessary to submit students to these evaluations to comprehend their sport potentialities. FERNANDES FILHO (2003); FILIN & VOLKOV (1998); ANJOS (2002); CARVALHO (2003); CASTANHEDE (2003); CUNHA et al (2006); CUNHA & FERNANDES FILHO (2004); FERNANDES FILHO (1997); FERRAZ FILHO (2004); FERREIRA & FERNANDES FILHO (2003); JOÃO (2002); MEDINA (2000); MENEZES et al (2002); NOGUEIRA et al (2005); PAVEL & FERNANDES FILHO (2004); ROQUETTI FERNANDES & FERNANDES FILHO (2004); SILVA DANTAS (2001); SILVA DANTAS (2004) ZARY (2005)

Despite this, in the adolescence occurs several physiological and morphological changes, which are resultant of the development and growing process known as biological maturation. It means that the adolescents with the same chronological ages can be in different maturational stages, that can represent differences in body composition and basic physical qualities FONSECA JÚNIOR, DANTAS & FERNANDES FILHO (2009); LINHARES et. al. (2009); MORTATTI & ARRUDA (2007).

By this perspective, the evaluation of the biological maturation becomes indispensable when intend to study the anthropometrical, somatotypical and strength characteristics of students at this phase of life. Among the resources utilized to evaluate the biological maturation, it can be emphasized the sexual maturation method, because is an easy method of execution which consists in the identification of the secondary sexual characteristics and for further classification as pre-puberty, puberty, post-puberty FONSECA JÚNIOR & FERNANDES FILHO (2009); (COSTA ET. AL. 2006); DUARTE (1993).

Therefore, the possibility to evaluate the anthropometrical, somatotypical and strength characteristics in students of different maturational stages can be useful for expanding the knowledge related to the biological maturation effect in the studied characteristics.

MATERIALS AND METHODS

The study has been descriptive according with Thomas, Nelson and Silverman (2007) propose, characterized by concerns with the status. The analyzed sample in this study was composed by 192 students, 112 masculine and 80 feminine, subdivided in Puberty and Post-Puberty groups, officially registered in the Education, Science and Technology Federal Institute of Tocantins – IFTO, Campus of Araguatins-Brazil in the age bracket from 14 to 17 years old. The sample selection process was casual random type, because all the students, who have filled the inclusion and exclusion criteria, had the opportunity to participate in the data collecting. The protocol to determinate the dermatogliphics characteristics was the Dermatogliphics Method of Cummins & Midlo (1961). In this method, fingerprints are obtained and their posterior processing are for analysis, verifying:

A) the draw type of each finger: Arch “A”, draw without deltas; Loop “L”, one delta draw; Whorl “W”, two deltas draws;

B) the quantity of lines in each finger and the TRC, the total ridge count found in the fingerprints of the ten fingers;

C) the quantity of draws of different types found in the palms and the D10, sum of delta quantity found in the fingerprints of the ten fingers;

D) the types of digitals formulas which indicate the representation in the individuals of different combinations of types of draws in the ten fingers.

The somatotypical characteristics was determinate by the Heath-Carter method (Fernandes Filho, 2003, p. 118-126). This method consists in the calculus of the three somatotypical components– Endomorphism, Mesomorphism and Ectomorphism. This method contains a r = 0.98, that makes them safe for the proposed evaluation (CARTER & HEATH, 1990). Besides the standard equations for each somatotypical component was necessary to utilize the protocols to measure the body mass, height, corrected mid-arm perimeter, corrected leg perimeter, skinfold, subscapular, triciptal, supraspinatus, calf medial and biepicondilar bone diameters of humerus and femur. To determinate the explosive strength in the lower limbs were utilized the Sargent Jump Test (Vertical Jump) and the Standing Broad Jump (Horizontal Jump), which indirectly measure the muscular strength of the lower limbs. The tests have respectively r = 0.93 and r = 0.96, that make them safe for the proposed evaluation (FERNANDES FILHO, 2003).The Sexual Maturation was determinate by the Matsudo (2005) proposal. In this case, the student has received a picture with the maturational stage description. After that, the student has to make a self analysis to identify his/her maturational stage in accordance with the presence of pubic hairs, describe by TANNER (1962), in that P1 is pre-puberty; P2, P3 and P4 is puberty; P5 and P6 is post-puberty. The result was given in P1, P2, P3, P4, P5 or P6, and delivered to the researcher in charge. For study purposes, the following instruments have been utilized:

Welmy Nacional Estadiometer connected with a scale for biometric exam with precision of 1 cm, to determinate the height of the students.

Welmy Nacional scale for biometric exam with precision of 0.1 kg and capacity from 0 to 150 kg, to determinate the students' body mass.

Sanny scientific Adipometer, with precision of 0.1 mm, and measuring field from 0 to 78 mm, to measure the skinfold of the students.

Sanny Medical Starret Anthropometrical yardstick with precision of 0.1 cm, to measure body perimeter of the students.

Sanny Small Anthropometric Paquimeter, resolution in millimeters, field of usage from 0 to 300 mm, made by anodized aluminum and polycarbonate jaws, to measure the bone diameters of the students.

Tramontina Metric yardstick of 5 m made by tempered steel, with precision of 0.1 cm, to measure the horizontal and vertical Jumps of the students.

To collect fingerprints of the students was necessary: paper of medium density and roughness; 15 x 25 cm metallic plate; 15 x 25 cm wooden plate; ink for fingerprints; rubber; magnifying glass; water and soap.

The descriptive statistic was utilized to characterize the studied groups, through localization measures (mean, minimum and maximum) and dispersion (deviation pattern and standard error) with the objective of define groups role. Later Pearson's Correlation has been utilized to establish the relation among the dermatoglyphic and strength studied variables and the non-parametric test of χ^2 Qui-quadrate to observe the association among somatotype, dermatoglyphics and strength.

This research follows rigorously the criteria proposed by the National Health Council resolution 196/96, dated on October 10th 1996, because has attended all the Norms Related to Researches in Human Beings, being approved by the Ethic Committee of the Castelo Branco University in protocol nº 103/2009.

RESULTS AND DISCUSSIONS

The results of the dermatogliphics, somatotypical, strength and sexual maturation caracteristics of the students of the IFTO are showed in TABLES 1, 2, 3 and 4.

TABLE 1 – DERMATOGLYPHIC, SOMATOTYPE AND STRENGTH CHARACTERISTICS OF THE MASCULINE PUBERTY STUDENTS OF IFTO

Masculine Puberty	Age (years)	D10	TRC	Endo morphism	Meso morphism	Ecto morphism	Vertical Jump (cm)	Horizontal Jump (cm)
N	71	71	71	71	71	71	71	71
Minimum	14	1	5	0.8	1.5	0.1	25	130
Maximum	17	19	226	6.7	8.2	6.5	57	233
Mean	15.1	12.4	117.2	1.9	4.0	3.9	41.3	190.6
Deviation pattern	1.0	3.8	48.1	0.8	1.2	1.3	6.8	20.2
Standard Error	0.1	0.5	5.7	0.1	0.1	0.2	0.8	2.4

TABLE 2 – DERMATOGLYPHIC, SOMATOTYPE AND STRENGTH CHARACTERISTICS OF THE MASCULINE POST-PUBERTY STUDENTS OF IFTO

Masculine Post-Puberty	Age (years)	D10	TRC	Endo morphism	Meso morphism	Ecto morphism	Vertical Jump (cm)	Horizontal Jump (cm)
N	41	41	41	41	41	41	41	41
Minimum	14	7	52	1.1	1.0	0.1	26	152
Maximum	17	19	228	5.9	10.1	5.3	58	243
Mean	15.7	12.5	122.5	2.5	4.8	2.8	42.1	198.3
Deviation pattern	1	3.2	34.7	1.4	1.9	1.5	7.2	22
Standard Error	0.1	0.5	5.4	0.2	0.3	0.2	1.1	3.4

TABLE 3 – DERMATOGLYPHIC, SOMATOTYPE AND STRENGTH CHARACTERISTICS OF THE FEMININE PUBERTY STUDENTS OF IFTO

Feminine Puberty	Age (years)	D10	TRC	Endo morphism	Meso morphism	Ecto morphism	Vertical Jump (cm)	Horizontal Jump (cm)
N	28	28	28	28	28	28	28	28
Minimum	13	4	17	1.8	1.1	0.1	20	120
Maximum	17	20	172	7.2	6.8	5.1	48	245
Mean	14.6	12.3	114.4	3.9	3.7	2.9	30.8	157.6
Deviation pattern	0.9	3.8	40.9	1.3	1.3	1.3	5.8	23.9
Standard Error	0.2	0.7	7.7	0.2	0.2	0.2	1.1	4.5

TABLE 4 – DERMATOGLYPHIC, SOMATOTYPE AND STRENGTH CHARACTERISTICS MASCULINE POST-PUBERTY STUDENTS OF IFTO

Feminine Post-Puberty	Age (years)	D10	TRC	Endo morphism	Meso morphism	Ecto morphism	Vertical Jump (cm)	Horizontal Jump (cm)
N	52	52	52	52	52	52	52	52
Minimum	14	0	0	1.2	1.3	0.1	21	91
Maximum	17	18	186	8.0	6.4	4.9	53	250
Mean	15.2	11.2	103.9	4.0	3.9	2.7	33.6	159.3
Deviation pattern	1.1	4.2	49.5	1.7	1.1	1.2	7	30.2
Standard Error	0.2	0.6	6.9	0.2	0.2	0.2	1	4.2

The dermatoglyphics results of the puberty masculine students (MPG) and post-puberty (MPPG) are similar to the found by Linhares et. al. (2009) in adolescents, by Medina (2002) in volleyball athletes, by Pável & Fernandes Filho (2004) in long-distance swimmers. And of puberty feminine students (FPG) and post-puberty (FPPG) are similar to the found by João & Fernandes Filho (2002) in Feminine Olympic Gymnastics Team, by Cunha & Fernandes Filho (2005) in the Brazilian Feminine Fencing Team and by Fonseca et. al. (2008) in volleyball athletes.

The results of the somatotype components in the MPG are different than found by Macêdo & Fernandes Filho (2003) in children and are similar to the found by Nishioka, Dantas & Fernandes Filho (2007) in men ballet dancer. The results of the somathotype components in the MPPG, has shown a higher mesomorphism followed by ectomorphism and endomorphism with difference lower than 0.5 are similar to the found by Barbosa et al. (2007) in students and by Pável & Fernandes Filho (2004) in long-distance swimmers.

The results of the somatotype components in the FPG and FPPG are different than found by Menezes & Fernandes Filho (2006) in rhythmic gymnastics athletes, by João e Fernandes Filho (2002) in Feminine Olympic Gymnastics Team, by Barbosa et. al. (2007) in students and are similar to the found by Macêdo & Fernandes Filho (2003) in children. Analyzing the differences between the means of somatotype components in the FPG and FPPG, it can be notice a slight increase of endomorphism and mesomorphism and a discrete reduction in the Ectomorphism similar to the related by FONSECA JÚNIOR, DANTAS & FERNANDES FILHO (2009); FONSECA JÚNIOR & FERNANDES FILHO (2009).

The Results of the Horizontal Jump in the MPG and FPG are similar to the found by Klein (2003) in students, Vertical Jump in the FPG and FPPG are lower than the found by Fonseca et. al. (2008) in volleyball athletes and higher than found by Macêdo & Fernandes Filho (2003) in children. A discrete increase of strength observed in the Horizontal Jump between MPG and MPPG has been described by Linhares et. al. (2009) in adolescents in the transition phase from Puberty to post-Puberty due to

the increase of the sexual steroids secretion.

PUBERTY			POST- PUBERTY		
Correlation among variables	**r**	**p-Value**	**Correlation among variables**	**r**	**p-Value**
D10 x Vertical Jump	0.0069	0.9544	**D10 x Vertical Jump**	-0.0222	0.8905
D10 x Horizontal Jump	0.0729	0.5459	**D10 x Horizontal Jump**	-0.1121	0.4851
TRC x Vertical Jump	-0.0243	0.8403	**TRC x Vertical Jump**	0.0337	0.8345
TRC x Horizontal Jump	0.0754	0.5319	**TRC x Horizontal Jump**	-0.0256	0.8737

TABLE 6 – PEARSON'S CORRELATION FOR FEMININE STUDENTS

PUBERTY			POST- PUBERTY		
Correlation among variables	**r**	**p-Value**	**Correlation among variables**	**r**	**p-Value**
D10 x Vertical Jump	0.0977	0.6208	**D10 x Vertical Jump**	0.0868	0.5402
D10 x Horizontal Jump	0.2019	0.3028	**D10 x Horizontal Jump**	0.1942	0.1678
TRC x Vertical Jump	0.1431	0.4675	**TRC x Vertical Jump**	0.1075	0.4482
TRC x Horizontal Jump	0.1958	0.3179	**TRC x Horizontal Jump**	0.1808	0.1995

In TABLES 5 and 6 the discrete quantitative variables (D10 and TRC) were correlated with the continuum quantitative variables (Vertical Jump and Horizontal Jump) through Pearson's Correlation obtaining P>0.05 and the r of Pearson near to zero in all studied groups characterizing that there is a low relationship between the studied variables.

TABLE 7 – κ^2 (QUI-QUADRATE) TEST FOR MASCULINE STUDENTS

PUBERTY		POST- PUBERTY	
Crossing of variables	***p-Value***	**Crossing of variables**	***p-Value***
Somatotype x D10	0.949	**Somatotype x D10**	0.774
Somatotype x TRC	0.856	**Somatotype x TRC**	0.592
Somatotype x Vertical Jump	0.042	**Somatotype x Vertical Jump**	0.932
Somatotype x Horizontal Jump	0.579	**Somatotype x Horizontal Jump**	0.079

TABLE 8 – κ^2 (QUI-QUADRATE) TEST FOR FEMININE STUDENTS

PUBERTY		POST-PUBERTY	
Crossing of variables	***p-Value***	**Crossing of variables**	***p-Value***
Somatotype x D10	0.745	**Somatotype x D10**	0.498
Somatotype x TRC	0.319	**Somatotype x TRC**	0.819
Somatotype x Vertical Jump	0.687	**Somatotype x Vertical Jump**	0.014
Somatotype x Horizontal Jump	0.301	**Somatotype x Horizontal Jump**	0.021

The qualitative variables (Somatotype) were intersected with the discrete quantitative variables (D10 and TRC) and with the continuous quantitative variables (Vertical Jump and Horizontal Jump). This crossing has generated a double entry Table de (Contingency Table), after that the χ^2 (Qui-quadrate) non-parametric test has been applied with the intuit of verify if the variables are associated to (P<0.05). When applied the χ^2 (Qui-quadrate) test, it was verified that only one of the results of these crossings in the MPG has shown values for (P<0.05), when Vertical Jump was related with o somatotype . Two of these crossings in the FPPG have shown values for (P<0.05), when Horizontal and Vertical Jump were related with somatotype, characterizing that the variables doesn't associate themselves, because have their result with (P>0.05) in 13 of 16 crossings. There is no relation among them, being that the found results in the crossing between somatotype and strength were similar to the found by Araújo & Fernandes Filho (2005) in children and adolescents.

CONCLUSION

According with the showed results, it can be observed that the studied groups, according to sex and maturational stage, have shown similar results in some variables, what make us presupposed a relation of compensation among dermatoglyphics, somatotype, strength and maturational stage. A significative difference in the dermatoglyphics, strength and somatotype test results in relation to the maturational stage was expected, but the results, which have been found, have shown similar when it has been statistically related, showing a low relationship between the studied variables.

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RUA ANTÔNIO FERNANDES DE OLIVEIRA, 787, PRAÇA DA BÍBLIA, NOVA ARAGUATINS
ARAGUATINS-TO – BRASIL – CEP. 77950-000
TEL: (63) 9955 – 4178 – terradesol@yahoo.com.br

RELATION AMONG DERMATOGLYPHICS, SOMATOTYPE AND STRENGTH OF IFTO STUDENTS IN DIFFERENT MATURATIONAL STAGES

ABSTRACT

Dermatoglyphics, somatotype and strength of IFTO students in different maturational stages. This study was conducted with 192 students, officially registered in the Education, Science and Technology Federal Institute of Tocantins – IFTO, Campus of Araguatins-Brazil, in the age bracket from 14 to 17 years old. , sub-divided in masculine puberty groups (MPG n= 71) and masculine post-puberty (MPPG n= 41) and feminine puberty groups (FPG n= 28) and feminine post-puberty (FPPG n= 52). Identify the dermatoglyphic, somatotype and strength characteristics according to the maturational stages of the students compose one of the necessary stage for the sport orientation. Dermatoglyphic evaluation through the Dermatoglyphic Method of CUMMINS & MIDLO (1961) has been made; somatotypical evaluation through the HEATH-CARTER (1967) Technique has been made; sexual maturation test through the pubic hair auto-evaluation by the Method proposed by TANNER (1962) and MATSUDO

(2005) has been made; Horizontal Jump and Vertical Jump determinate by the STANDING BROAD JUMP for explosive strength determination through the SARGENT JUMP TEST have been made. The dermatoglyphics results related with strength have shown P>0.05 and r of Pearson near to zero. Whereas the somatotype related with the dermatoglyphics and strength has shown 13 of 16 crossing with P>0.05. A significative difference hasn't been found.

KEYWORDS: Students, Dermatoglyphics and Somatotype.

RELATIONS ENTRE DERMATOGLYPHIQUE, SOMATOTYPIQUE ET FORCE EN ÉTUDIANTS À IFTO À STADES DIFFÉRENTS DE MATURATION.

RÉSUMÉ

Dermatoglyphique, somatotypique et force en étudiants à IFTO à différents stades de maturation. Cette étude a été réalisée avec 192 étudiants de l'Institut Fédéral de l'Éducation Science et Technologie-IFTO, régulièrement inscrits dans le campus Araguatins-TO, âgés de 14 à 17 ans., sous-divisés en groupes de filles (GPM n = 71) et mâles post-pubères (GPPM n = 41) et groupes de filles (GPF n = 28) et les femmes post-pubères (GEPF n = 52). Identifier les caractéristiques dermatoglyphiques, somatotypiques et de force en fonction des étapes de maturation de les étudiants se compose des étapes nécessaires pour guider les sportifs. Dans cette étude a été réalisée l'évaluation dermatoglyphique avec la Méthode Dermatoglyphique de CUMMINS & MIDLO (1961); a été effectuée évaluation somatotypique par la Technique de HEATH-CARTER (1967); L'évaluation de la maturation sexuelle a été effectuée par auto-évaluation de la maturation des poils pubiens par l'intermédiaire du méthode proposée par TANNER (1962) e MATSUDO (2005); ont été réalisées saut horizontal déterminé par STANDING BROAD JUMP et saut vertical déterminé par SARGENT JUMP TEST, pour déterminer par la force explosive. Les résultats dermatoglyphiques liés à la force ont montré P>0,05 et r de Pearson proche de zéro. Alors que le somatotype liée avec le dermatoglyphique et la force a montré 13 des 16 traversées avec P>0,05. Selon les résultats présentés, nous avons observé que les groupes étudiés selon le sexe et le stade de maturation, ont montré des résultats similaires pour certaines variables, ce qui nous fait supposer une rélation de compensation entre dermatoglyphique, somatotypique, force et le stade de maturation. On se pensait d'avoir une différence significative dans les résultats des essais de force en fonction du stade de maturation, dermatoglyphique et somatotypique, mais les résultats étaient semblables quand ils étaient liés statistiquement montrant un faible relation entre les variables.

MOTS- CLÉS: Étudiants, Dermatoglyphique et Somatotype.

RELACIONES ENTRE DERMATOGLIFIA, SOMATOTYPIA Y FUERZA EN ESCOLARES DEL IFTO EN DIFERENTES PERIODOS MATURACIONAL

RESUMEN

Dermatoglifia, somatotypia y fuerza en escolares del IFTO en diferentes periodos maturacional. Este trabajo ha sido realizado con 192 escolares del Instituto Federal de la Educación Ciencia y Tecnología-IFTO, regularmente matriculados en el Campus Araguatins-TO, en la faja etaria de 14 hasta 17 años, sub-divididos en grupos de púberes (GPM n= 71) y pos-púberes masculino (GPPM n= 41) y grupos de púberes (GPF n= 28) y pos-púberes femenino (GPPF n= 52). Identificar las características dermatoglificas, somatotipicas y de fuerza de acuerdo con los periodos maturacional de los escolares compone una de las etapas necesarias para la orientación deportiva. En este estudio ha sido realizada evaluación dermatoglificas a través del Método Dermatoglifico de CUMMINS & MIDLO (1961); Ha sido realizada evaluación somatotipica a través de la Técnica de HEATH-CARTER (1967); Ha sido realizada evaluación de la maturación sexual a través de la auto-evaluación maturacional de la pilosidad pubiana través del Método propuesto por TANNER (1962) y MATSUDO (2005); Han sido realizados salto horizontal determinado por el STANDING BROAD JUMP y salto vertical determinado por el SARGENT JUMP TEST, para la determinación de la fuerza explosiva. Los resultados dermatoglificos relacionados con la fuerza presentaran P>0,05 y r de Pearson próximo de cero. En cuanto que la somatotypia relacionada con la dermatoglifia y la fuerza ha presentado 13 de los 16 cruzamientos con P>0,05. De acuerdo con los resultados presentados, observamos que los grupos estudiados, conforme el sexo y el periodo maturacional, han presentados resultados semejantes en algunas variables, o que nos faz presumir una relación de compensación entre dermatoglifia, somatotypia, fuerza y periodo maturacional. Esperaba-se una deferencia significativa en los resultados de los testes de fuerza en relación al periodo maturacional, la dermatoglifia y la somatotypia, mas los resultados encontrados han se mostrado similares cuando han sido relacionados estadísticamente demostrando baja relación entre las variables estudiadas.

PALABRAS CLAVES: Escolares, Dermatoglifia y Somatotypia.

RELAÇÕES ENTRE DERMATOGLIFIA, SOMATOTIPIA E FORÇA EM ESCOLARES DO IFTO EM DIFERENTES ESTÁGIOS MATURACIONAIS.

RESUMO

Dermatoglifia, somatotipia e força em escolares do IFTO em diferentes estágios maturacionais. Este trabalho foi realizado com 192 escolares do Instituto Federal de Educação Ciência e Tecnologia-IFTO, regularmente matriculados no Campus Araguatins-TO, na faixa etária de 14 a 17 anos., sub-divididos em grupos de púberes (GPM n= 71) e pós-púberes masculino (GPPM n= 41) e grupos de púberes (GPF n= 28) e pós-púberes feminino (GPPF n= 52). Identificar as características dermatoglíficas, somatotípicas e de força segundo os estágios maturacionais dos escolares compõe uma das etapas necessárias para orientação esportiva. Neste estudo foi realizada avaliação dermatoglífica através do Método Dermatoglífico de CUMMINS & MIDLO (1961); Foi realizada avaliação somatotípica através da Técnica de HEATH-CARTER (1967); Foi realizada avaliação da maturação sexual através da auto-avaliação maturacional da pilosidade pubiana através do Método proposto por TANNER (1962) e MATSUDO (2005); Foram realizados salto horizontal determinado pelo STANDING BROAD JUMP e salto vertical determinado pelo SARGENT JUMP TEST, para determinação da força explosiva. Os resultados dermatoglíficos relacionados com a força apresentaram P>0,05 e r de Pearson próximo de zero. Enquanto que a somatotipia relacionada com a dermatoglifia e a força apresentou 13 dos 16 cruzamentos com P>0,05. De acordo com os resultados apresentados, observamos que os grupos estudados, conforme o sexo e o estágio maturacional, apresentaram resultados semelhantes em algumas variáveis, o que nos faz pressupor uma relação de compensação entre dermatoglifia, somatotipia, força e estágio maturacional. Esperava-se uma diferença significativa nos resultados dos testes de força em relação ao estágio maturacional, a dermatoglifia e a somatotipia, mas os resultados encontrados mostraram-se similares quando foram relacionados estatísticamente demonstrando baixa relação entre as variáveis estudadas.

PALAVRAS-CHAVE: Escolares, Dermatoglifia e Somatotipia.

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