136 - DERMATOGLYPHIC MARKERS AND THE MUSCULAR FORCE OF STUDENTS FROM 7 TO 17 YEARS.

RAMON CUNHA MONTENEGRO[1,5];
ERIC DE LUCENA BARBOSA[2];
PAULO MOREIRA SILVA DANTAS[3];
JOSÉ FERNANDES FILHO[4];
MARIA IRANY KNACKFUSS[5].
[1]Centro Universitário de João Pessoa - UNIPÊ - João Pessoa / PB Brasil;
[2]Aluno Mestrado em Ciências do Movimento Humano - UAA - Assunção / Paraguai;
[3]Unigranrio - Rio de Janeiro / RJ Brasil;
[4]EEFD/RJ; Laboratório de Biociências da Motricidade Humana - LABIMH/RJ e CNPq - Brasil.
[5]Programa de Pós-Graduação em Ciências da Saúde - PPGCSA - UFRN - Natal / RN Brasil;
proframon@ig.com

INTRODUCTION

Along the years, the impressions dermal papilla have been object of studies of the medical area, mainly in relation to the identification of certain syndromes, establishment of the twins' zygosity and anthropological characteristics (genetics) of populations (Todd, Scott et al. ,2006; Velisavljev,Filipovic, 2006; Loesch, Huggins et al., 2002; Nikitiuk, Trofimova, 1992; Silva Dantas et al. ,2002). besides, the dermatoglyphics have been used thoroughly in the field of the legal identification due to its worldwide acceptance (Mulvihill,1969; Penrose, 1968).

Several studies have approached the strong connection of the genotypical and phenotypical capacities related to the physical features of the individuals. (Abramova et al, 1995; Butova,Lisova,2001;Nikitiuk;1988). Among these studies Fernandes Filho, (1997) reports that the knowledge of the genotype aspect linked to the phenotype influences has contributed to the sporting formation and orientation.

Strength is an indispensable physical quality to the human being, because it is directly related with the health, once, its training will provide the development of the muscular mass, the increase of the bony mass and the force of the conjunctive fabric, among other benefits; hence, having great relevance in the physical acting in several sports modalities, as well as in decreasing and preventing injuries when performing such activities (Schneider et al,2004; Dias et al. ,2005; American Academy of Pediatrics - AAP, 2001; Fontoura et al. ,2004).

Strength training with children and adolescents has presented good results, with the minimum of risks in its applicability, since its safety's criteria and the biological individuality are followed by AAP (2001). The use of the previous knowledge of the genetic qualities, allied to the phenotypic contribution, may significantly contribute to the physical development. Based on such presuppositions, this study aimed at identifying the dermatoglyphic features according to the different levels of muscular strength of students from 7 to 17 years.

CASUISTRY AND METHODS:

The methodological development of this study was descriptive, with comparative and traverse profiles, once the comparisons accomplished, aimed at verifying the behaviors among the variables among 197 males students in the age group from 7 to 17 years, all of them belonging to the *Escola da Polícia Militar* of the city of João Pessoa - PB and they were divided into four groups, according to the conditioning of the muscular strength: GI (N = 16), GII (N=99), GIII (N=72) and G IV (N = 10).

This study follows the patterns and rules of the Resolução do Conselho Nacional de Saúde - CNS 196/96 de 10/10/1996, having been approved in the Committee of Ethics and research of UFPB under protocol 190/05.

The Cummins, Midle protocol (1942) was used for the collection and analysis of the fingerprints and, after the accomplishment of the collections, the fingerprint impressions were divided into three types of drawings classified by the number of present deltas in each fingerprint, as follows:

Arch " A ": That type of drawing is distinct for the absence of deltas in the fingerprint and its dermal crests cross traversely to the digital surface. **Loop " L "** - Characterized by the presence of the drawing of a delta, where its form has an itinerary almost closed, in that the dermal lines begin from an extremity of the finger, they distally curve in relation to the other, however they do not approach the initial part of the lines being considered as an open drawing. **Whorl " W "** - Different for the presence of the drawings of two deltas, where its form has a closed characteristic, so that its central lines enter around the nucleus of the drawing.

The fundamental standardized indexes of the fingerprints correspond to the sum of the total amount of lines STAL and the sum of the total amount of lines in the 10 fingers of the hands (D 10). The amount of cutaneous crests, inside the drawing, represents the quantitative feature. The D10 presents " 0 " as the minimum value and " 20 " as the maximum one, the value " 0 " can be justified by the presence of the arch (A) which refers to the absence of deltas and the other values are represented by the number of drawings that can be (L) = 1 delta and (W) = 2 deltas. The values of D10 are found after using the following formulas: $D\ 10 = \Sigma L + 2 (\Sigma W)$.

The protocol of the test of 1 MR was used in the evaluation of the muscular strength, for being regarded as " the golden pattern" for such an evaluation (ACSM,2000-2003), applied for the upper limbs through the straight supine and in the lower limbs the squat, the Smith Machine was used for such performance and one bench in the straight supine for the exercises.

All the evaluated students accomplished the movements with low intensities in the previous sessions, in order to get used to the biomechanics of the movements, but those, who did not manage that during the phase of recognition of the exercises, were evaluated after being well familiarized with the equipment.

The determination to find the maximum weight was through the attempt and mistake, where an initial weight was stipulated as being smaller than the maximum weight.

At the end of the data collection, the relative force of both the supine and the squat was calculated through the division of the result of the maximum muscular force by the individuals' corporal weight.

With the results of the relative force, a distribution of frequency of classes was organized with the calculation of the value of the total width (Tw) which represents the difference between the largest and the smallest observed value of the variable used. The classes were determined through Sturges' rule and then the width of the intervals of the classes (h) was calculated, which corresponded to the differences between Tw and k. Hence, the classes for the supine variables and squat were identified, which were distributed in ten groups for both exercises.

That procedure served to organize a new distribution of frequencies that classified the evaluated students in four groups, through the addition of the points attributed to each class of both exercises, that is, Σ of the exercises = 20 points. Therefore, the classification table arose for the conditioning of the muscular force.

The evaluations were accomplished at the school due to the practicality of the fingerprints collections (Dermatoglyphics)

as well as the Maximum Repetition test (1-MR).

The statistics used was descriptive accounting for the values of the central tendency and their derivations, being associated to a test of normality by Komogorov-Smirnov. Since the comparisons were parametric, the Anova one-way was used in conjunction with scheffe´s post-hoc test for groups of different quantitatives. Still, the normatization of the data was used as a discretionary and comparative treatment, aiming at correcting the dimensional variations of the variables investigated through the equation [observed Value - smaller observed value]/[larger observed value - smaller observed value] that, according to Silva Dantas (2004), constituted as analyses of the proportionalities.

Aiming at the testing measurement, this research is ruled in consonance to the basic considerations of the statistical treatment, in order to keep it scientifically, regarding the significance level p <0,05, that is, 95% of probability for affirmative and /or negative answers*, denoted during the investigations.*

RESULTS AND DISCUSSION

In Table 1, the values of both the relative muscular strength and the fundamental standardized indexes are described, which presented significant differences among the groups through the muscular strength, in other words, SupRF (F = 67,056; p = 0,00) and R_FSqua (F = 102,847; p = 0,00). In the fundamental standardized indexes there were not significant differences, being D10 (F = 1,628; p = 0,184) and STAL (F = 1,622; p = 0,186). In Table 2, the values referring to the drawings of the fingerprints are demonstrated, in which significant differences did not occur: "A" (F = 0,831; P = 0,478), L " (F = 1,290; P = 0,279) and " W " (F = 1,333; P = 0,265).

Table 1 - descriptive Measures of the muscular strength and fundamental standardized indexes

	SupRF		R_FSqua		STAL		D 10	
	ì s	Min_Max	ì s	Min_Max	ì s	Min_Max	ì s	Min_Max
G I	0,59±0,12	0,34_0,79	0,93±0,17	0,72_1,28	118±38	41_178	12±4	4_18
G II	0,77±0,12	0,51_1,03	1,47±0,22	0,97_2,04	131±40	20_200	13±3	5_20
G III	0,97±0,18	0,69_1,50	1,89±0,31	1,21_2,61	125±49	18_200	12±4	3_19
G IV	1,22±0,18	0,97_1,45	2,38±0,32	1,92_2,76	102±37	46_149	10±2	8_14

Legend: SupRF_ = Supine Relative Forces; R_FSqua = Squat Relative Forces;
ì = Average; **s** = Deviation Pattern.
Source: author.

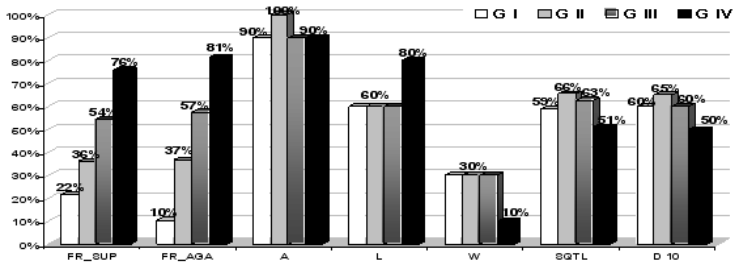
Table 2 - descriptive Measures of the fingerprints drawings

	Arch - A		Loop - L		whorl - W	
	ì s	Min_Max	ì s	Min_Max	ì s	Min_Max
G I	1 ±2	0_6	6 ±3	2_10	3 ±3	0_8
G II	1 ±1	0_7	6 ±3	0_10	3 ±3	0_10
G III	1 ±1	0_5	7 ±3	1_10	2 ±3	0_9
G IV	1 ±2	0_6	7 ±2	3_10	3 ±2	0_7

Legend: SupRF_ = Supine Relative Forces; R_FSqua = Squat Relative Forces

Graph 1, presents the proportionality of the groups through the minimum and maximum values of the muscular force of the evaluated students with the medium results of the groups. As for the dermatoglyphic variables, the minimum and maximum values of the literature were used with the medium results of the groups.

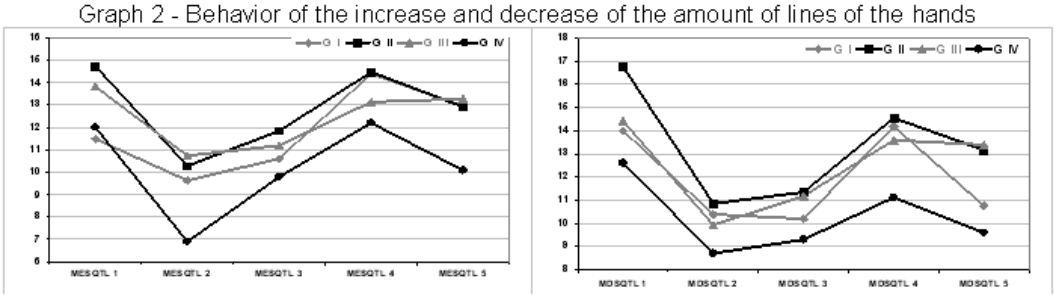
Graph 1 - Proportionality of the genetic markers and of the muscular strength



Legend: SupRF_ = Supine Relative Forces; R_FSqua = Squat Relative Forces;
A = Arch; **L** = Loop ; **W** = Whorl

In Graph 2, the results of the behavior of the increases and decreases of the amounts of lines of the left and right hand are described. The averages of the sum of the amount of lines of the first and fifth finger of the right hand were statistically different, in other words, RHSTAL1 (F = 3,732; p = 0,012) and RHSTAL 5 (F = 2,780; p = 0,042).

Graph 2 - Behavior of the increase and decrease of the amount of lines of the hands



Legend: LHSTAL = Sum of the Total Amount of Lines of the Left Hand;
RHSTAL = Sum of the Total Amount of Lines of the Right Hand.

The results of the fundamental standardized indexes of the fingerprints D10 and STAL, together with the digital formulas, have shown low coordination and relative force for G I, having an accentuated predisposition to the force due to the biggest percentage of " L>W " and " A ", the latter being responsible for the genotypical decrease of the coordination for reducing the number of deltas and lines; the G II obtained a characteristic of low relative force with the endurance coordination and predisposition to the force due to the biggest percentage of " A " and " L>W "; the G III was classified with low coordination and high forces; the G IV

presented low coordination, high force and pre-disposition to speed due to the superior values of " L ", which stood out of from the other groups and the smallest percentages of " W " (Nikitiuk, 1984; Abramova et al,1995; Silva Dantas et al. ,2002).

In Medeiros' studies *apud* Dantas(2005), he identified a dominant functional profile of loops, which he characterized as explosive force and, due to the moderate amount of whorls, a coordination potential and resistance with the predominance of the digital formula L>W was determined.

Another outstanding fact that clarifies the behavior of Table 1 is the increase of D10 and of STAL, which occurred while the levels of force in the other groups had reduced, once the high indexes of the two variables (D10 and SQTL) are indicative for the resistance predisposition and coordination, according to Abramova et al (1996); Fernandes-Filho(1997). Those features did not interfere in the tests of force accomplished in the research.

The discoveries are confirmed in the literature by Abramova et al. (1995); Silva Dantas (2004), in which the values closer to 26,5 of the STAL and 5,5 of the D10 are features of the high force index. According to Cunha Júnior et al. (2006), the results of the Seleção Brasileira de Handebol presented features for high muscular strength with all members of the team due to the low indexes of D 10 and STAL.

When analyzing the increases and decreases of the amounts of lines of the hands in graph 2, the separation of the groups was identified with relationship to the behavior of G IV (excellent), which presented homogeneity and inferior values to the number of lines of the others. However, when verifying the group G I (weak), the non-mirroring of the fingers was observed, i.e, heterogeneous behavior as outstanding characteristics of the decrease of the muscular force.

The behavior of the curve for the students with larger conditioning of force presented the following pattern: left hand begins high, and falls in the second finger, it increases until the fourth one and it falls in the fifth one. In the right hand it begins high and falls in the second, then it increases slightly until the third and increases at the fourth and then falls in the fifth finger. In studies by Silva Dantas et al (2004), the behavior of the number of the lines of each finger in the high performance of futsal, besides being more homogeneous, is always superior in number of lines.

It was observed that the strongest individuals G IV, presented the phenotype potentialization and muscular strength, through the pure speed demonstrated in the genotype, that is, superior indexes of "L" larger than W and the amount of lines in each finger of the hands was similarly mirrored, with both D10 and STAL low. In terms of similarity, Group GI obtained different results with the values of D10, and the STAL relatively high.

These results have highlighted a pattern of identification of the physical quality of muscular strength as Dermatoglyphics.

CONCLUSION

It was concluded that the similarities found in the dermatoglyphic features have occurred due to the natural selection of the groups, which were influenced by the variations of the strength levels. More studies, involving the evaluation of the state (phenotype) and of the genetic potential (dermatoglyphics), are recommended as well as analyses of muscular strength with athletes in order to identify the behavior of the fingerprints.

REFERENCES

AMERICAN ACADEMY OF PEDIATRICS. Strength Training by Children and Adolescents. Pediatrics. n. 6, v. 107, jun. 2001. Disponível em: <http://aappolicy. aappublications.org/cgi/
reprint/pediatrics;107/6/1470.pdf>. Acesso em: 22 jul. 2006;

AMERICAN COLLEGE OF SPORTS MEDICINE. Diretrizes do ACSM para os Testes de Esforço e sua Prescrição. 6ªed. Rio de Janeiro: Guanabara Koogan, 2003.

ABRAMOVA, T. F; NIKITINA, T. M; CHAFRANOVA, E. I. Impressões Dermatoglíficas - Marcas genéticas na seleção nos tipos de esporte // Atualidades na preparação de atletas nos esportes cíclicos. Volvograd: Coletânea de artigos científicos, p. 86-91, 1995.

ABRAMOVA, T. F; NIKITINA, T. M; OZOLIN, N. N. Impressões Dermatoglíficas: marcas genéticas no potencial energético do homem. In: Anais científicos 1995. Moscou: GRAF, 1996.

BUTOVA, O. A; LISOVA, I. M. Correlation of certain parameters of human constitution. Morfologia, Gippokraf - Saint Petersburg - Russia, n. 2, v. 119, p. 63-66, 2001.

CUMMINS, H; MIDLO, C. H. Palmar and plantar dermatoglyphics in primates. Philadelphia, 1942.

CUNHA-JUNIOR, A. T. da; CUNHA; A. C. P. T. da; SCHNEIDER, A. T; SILVA-DANTAS, P. M; FERNANDES-FILHO, J. Características dermatoglíficas, somatotípicas, psicológicas e fisiológicas da seleção brasileira feminina adulta de handebol. Fitness & Performance Journal, Rio de Janeiro, v. 5, n. 2, p. 81-86, 2006.

DANTAS, E. H. M; FERNANDES-FILHO, J. Atividade Física em Ciências da Saúde. Rio de Janeiro: Shape, 2005.

DIAS, R. M. R. et al. Influence of familiarization process on muscular strength assessment in 1-RM tests. Rev. Bras. Med. Esporte, v. 11, n. 1, Niterói, 2005. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1517-86922005000100004 &lng= en&n rm=iso . Acesso em: 10 abr. 2006.

FERNANDES FILHO, J. Impressões dermatoglíficas - marcas genéticas na seleção dos tipos de esporte e lutas (a exemplo de desportista do Brasil). Tese (Doutorado). Moscou - URSS, 1997.

FONTOURA, A. S. da; SCHNEIDER, P; MEYER, F. Effect of the muscular strength detraining in prepubertal boys. Rev. Bras. Med. Esporte, v. 10, n. 4, Niterói, 2004.
Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1517-8692200 40004000
05&lng=en&nrm =isso>. Acesso em: 10 abr. 2006.

LOESCH, D. Z; R. M. HUGGINS, et al. Application of robust pedigree analysis in studies of complex genotype-phenotype relationships in fragile X syndrome. Am J Med Genet 107(2): 136-42, 2002.

MULVIHILL, J. J; SMITH, D. W. The genesis of dermatoglyphics. J. Pediatrics, v. 75, n. 4, p. 579-589, 1969.

NIKITIUK B. A. Impressões dermatoglíficas como marcas do desenvolvimento pré-natal do ectoderma // Marcas genéticas na antropologia e medicina: Anais de trabalhos científicos no Simpósio. Rimelnitzki, p. 133. 1988.

_____, FILIPOV V.N. Complexo Dermatoglífico que acompanham o alto desenvolvimento das qualidades motoras. Método biológico de gêmeos, médico e esporte.- Vinitza, pág.83-87, 1984.

_____, and TROFIMOVA V. V. The correlations of somatotypes and the total ridge count in Russian men of the White Sea area. Morfologia 102(6): 67-75. 1992.

PENROSE, L. S. Memorandum on dermatoglyphic nomenclature. Birth Defects: original article series, v. 9, n. 3, p. 1-12, 1968.

SCHNEIDER, P.; BENETTI, G.; MEYER, F. Muscular strength of 9-18-year old volleyball athletes through computational dynamometry. Rev. Bras. Med. Esporte, v. 10, n. 2, Niterói, 2004. Disponível em: <http://www.scielo.br/scielo.php?script=sci_
arttext&pid=S151786922004000200003&lng=en&nrm=iso>. Acesso em: 12 mai. 2006.

SILVA-DANTAS, P. M; ALONSO, L; FERNANDES FILHO, J. A dermatoglifia no futsal brasileiro de alto rendimento.

Fitness & Performance Journal, Rio de Janeiro, v. 3, n. 3, p. 136-42, mai./jun. 2004.
SILVA-DANTAS. Relação entre estado e predisposição genética no futsal brasileiro. 2004. Tese (Doutorado em Ciências da Saúde). Universidade Federal do Rio Grande do Norte, Natal, 2004.
SILVA DANTAS P. M, FERNANDES-FILHO, J. Identificação dos perfis, genético, de aptidão física e somatípico que caracterizam atletas masculinos, de alto rendimento, participantes do futsal adulto, no Brasil. Fitness&Performance Jornal, 1(1): 28-36, 2002.
TODD, E. S; SCOTT, N. M et al. Characterization of dermatoglyphics in PHOX2B-confirmed congenital central hypoventilation syndrome. Pediatrics, 118(2): 408-14, 2006.
VELISAVLJEV-FILIPOVIC, G. Arthrogryposis multiplex congenita--a rare congenital stiff joints syndrome. Med Pregl, 59(7-8): 375-9, 2006.

Rua Enfermeira Ana Maria Barbosa de Almeida, n 943, Ap. 103, Bairro Jardim Cidade Universitária, Cidade de João Pessoa/PB, CEP 58052-270.
e-mail: profframon@ig.com - Fone: 55 031 (83) 9995 7809

DERMATOGLYPHIC MARKERS AND THE MUSCULAR FORCE OF STUDENTS FROM 7 TO 17 YEARS.

ABSTRACT

This study aimed at analyzing the dermatoglyphic features in the different levels of muscular force of 197 male students, with age group from 7 to 17 years, distributed into four groups, according to the force levels: G I - Weak (n=16); G II - Regular (n=99); G III - Good (n=71) and G IV - Excellent (n=10). In order to accomplish the goal, the fingerprints were collected through the Dermatoglyphic protocol and the 1RM test for the identification of the force. The results indicated that the average values of the D10 digital formulas and the addition of the total amount of lines of the SQTL fingers did not present significant differences. However, the averages of the sum of the amount of lines of the first and fifth finger of the right hand were different statistically, being thus RHSTAL 1 (F = 3,732; p = 0,012) and RHSTAL 5 (F = 2,780; p = 0,042). It was Observed that the strongest individuals G IV, presented the potentialization of the phenotype, muscular strength, through the pure speed as demonstrated in the genotype, due to the superior indexes of " L " being larger than W. The amount of lines in each finger of the hands was similarly mirrored with D10 and low STAL. The same occurred in G I, with the values D10 and STAL, relatively high. It was concluded that the likeness found in the dermatoglyphic features occurred due to the natural selection of the groups, which were influenced by the variations of the levels of force. KEY-WORDS: Genetic markers, fingerprints, 1RM.

LES MARQUEURS DERMATOGLYPHIQUES ET LA FORCE MUSCULAIRE D´ELEVES DE 7 A 17 ANS.

RÉSUMÉ

Cette étude a cherché à analyser les caractéristiques dermatoglifiques à différents niveaux de la force musculaire de 197 étudiants de sexe masculin, dans une fourchette d´âge comprise entre 7 et 17 ans, divisés en quatre groupes, selon les niveaux de force : GI - Faible (n=16) ; GII - Normal (n=99) ; GIII - Bon (n=71) et GIV - Très bon (n=10). Pour se faire, les empreintes digitales ont été recueillies au moyen du protocole de Dermatoglyphie et l´identification de la force par le biais du test de 1RM. Les résultats ont indiqué que les valeurs moyennes des formules digitales D10 et la somme de la quantité totale de lignes des doigts SQTL n´ont pas montré de différences significatives. Néanmoins, les moyennes de la somme de la quantité de lignes du premier et du cinquième doigt de la main droite ont été statistiquement différentes : le MDSQTL1 donnant (F = 3,732 ; p = 0,012) et le MDSQTL5 étant de (F = 2,780 ; p = 0,042). On a observé que les individus plus forts G IV ont présenté la potencialisation du phénotype, de la force musculaire, par le biais de la vitesse pure démontrée dans le génotype, en raison de taux plus élevés de "L" plus grand que W. La quantité de lignes sur chaque doigt des mains a été similaire, débouchant sur un D10 et un SQTL bas. Il s´est produit la même chose pour le GI, avec des valeurs de D10 et de SQTL relativement hautes. Il en a été conclu que les similitudes trouvées dans les caractéristiques dermatoglyphiques sont survenues de par la sélection naturelle des groupes, lesquels ont été influencés par les variations des niveaux de force.
MOTS-CLEF: Marqueurs Génétiques, Empreintes Digitales, 1RM.

MARCADORES DERMATOGLÍFICOS E LA FUERZA MUSCULAR DE ESCOLARES DE 7 AL 17 AÑOS.

RESUMEN

Este estúdio busco analizar las características dermatoglíficas em los dirferentes niveles de la fuerza muscular de 197 estudiantes del sexo masculino, com faja etária de 7 a 17 años, distribuídos en cuatro grupos, conforme los niveles de fuerza: GI - Flaco (n = 16); GII - Regular (n = 99); GIII - Bueno (n = 71) e GIV - Óptimo (n = 10). Para tal, fueram colectadas las impresiones digitales a través del protocolo de la dermatoglifia, mensurando si la fuerza con el test de 1RM. Los resuetados indicaram que los valores medios de las fórmulas digitales D10 e el somatório de la cantidad total de líneas de los dedos SQTL no presentaram diefercias significativas. Pero, los medias de la suma de la cantidad de líneas del primero e quinto dedo de la mano derecha fueram estatisticamente diferentes, siendo el MDSQTL (F = 3,732; p = 0,012) e el MDSQTL5 (F = 2,780; p = 0,042). Se observo que los indivíduos mas fuertes, presentaram la potencializacion del fenótipo, fuerza muscular, a través de la velocidad pura demonstrada em el genótipo, debido a los índices superiores de “L” major que “W”. La cantidad de líneas en cada dedo de las manos que semejante, espejados, con el D10 e el SQTL bajos. En el GI ocurrió el mismo, con los valores de D10 e SQTL relativamente altos. Se concluje que las semejanzas encontradas en las características dermatoglíficas ocurrieron debido à la seleccion natural de los grupos, los cuales fueron influenciados por las variaciones de los niveles de fuerza.
PALABRAS-CLAVE: Marcadores Genéticos, Impresions Dermatoglíficas, 1RM.

MARCADORES DERMATOGLÍFICOS E A FORÇA MUSCULAR DE ESCOLARES DE 7 A 17 ANOS.

RESUMO

Este estudo buscou analisar as características dermatoglíficas nos diferentes níveis da força muscular de 197 estudantes do sexo masculino, com faixa etária de 7 a 17 anos, distribuídos em quatro grupos, conforme os níveis de força: GI - Fracos (n=16); GII - Regular (n=99); GIII - Bom (n=71) e GIV - Ótimo (n=10). Para tal, foram coletadas as impressões digitais através do protocolo da Dermatoglifia e o teste de 1RM para identificação da força. Os resultados indicaram que os valores médios das fórmulas digitais D10 e o somatório da quantidade total de linhas dos dedos SQTL não apresentaram diferenças significativas. Porém, as médias da soma da quantidade de linhas do primeiro e quinto dedo da mão direita foram estatisticamente diferentes, sendo o MDSQTL1 (F = 3,732; p = 0,012) e o MDSQTL5 (F = 2,780; p = 0,042). Observou-se que os indivíduos mais fortes G IV, apresentaram a potencialização do fenótipo, força muscular, através da velocidade pura demonstrada no genótipo, devido aos índices superiores de “L” maior que W. A quantidade de linhas em cada dedo das mãos foi semelhante, espelhados, com o D10 e o SQTL baixos. No GI ocorreu o mesmo, com os valores de D10 e SQTL relativamente altos. Concluiu-se que as semelhanças encontradas nas características dermatoglíficas ocorreram devido à seleção natural dos grupos, os quais foram influenciados pelas variações dos níveis de força.
PALAVRAS-CHAVE: Marcadores Genéticos, Impressões Digitais, 1RM.