38 - BEHAVIOUR OF GENOTYPICAL AND PHENOTYPICAL CHARACTERISTICS IN CHILDREN WHO ARE PRACTITIONERS AND NON-PRACTITIONERS OF SWIMMING

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INTRODUCTION

The childhood is the most important phase on the way to maturity to the adult life, so there is the necessity to ensure that this time will provide adequate and appropriate conditions to his/her evolution and development of motor skills.

The motor coordination acquired in early childhood years will be improved later in adult life. The development of motor coordination and balance will be only provided on the day by day of the child, i.e the practice of regular physical activities (swimming, football, ballet, dance etc) is important and daily activities should vary, in order to highly stimulate the motor development and physical skills of this child. (NETO, 1995).

The development and the refining of motor skills and standards are influenced in a complex manner (GALLAHUE and OZMUN, 2005). It is necessary to highlight that each person is unique in the developing process and reply to the challenge of change and behavior evolution up to a level determined by genetical, environmental and biological conditions, combined with specific needs of motor function.

Regarding the phase of basic movements, it is known that motor skills between the ages of 5 and 7 years constitute a time in which the children are involved in the exploration and experimentation of motor skills of their bodies. Studies carried out in the genetic area indicates a relationship between dermatoglyphic indexes and a pre-disposition to organism coordinative skills (ABRAMOVA, JDANOVA, NIKITINA, 1990).

It is known that the opportunities and experiences lived by the child enrich his/her learning, However, we acknowledge that a child's daily activities, although essential, not always are they enough to improve his/her motor skills (NETO, 1995). We believe that the regular practice of physical activity in the childhood particularly contributes to the fulfillment of these needs. The aquatic activities have been related to the positive aspects of motor development, since the swimming is considered a physical activity which - if regularly practiced - allows to develop all physiological mechanisms: lung and cardiovascular capacity, providing new possibilities of coordination and balance. The main aim of this study is the comparison between the behavior of Static Balance, Dynamic Balance and motor coordination of children who are practitioners and non-practitioners of swimming.

MATERIALS AND METHODS

This study is a descriptive research whose outline is comparative. (THOMAS and NELSON, 2002).

This study complies with the regulations for the research performance in human beings, resolution 196/96, of National Health Council, October 10, 1996 (BRASIL 1996).

The sample was composed of children of both genres, practitioners and non-practitioners of swimming, aged between 5 and 7 years.

The selection criteria for the experimental group(EG) was intentional. The child participants of Olympic Villages project of the Prefeitura Municipal of Rio de Janeiro, Miécimo da Silva Center, in relation to the control group (CG). This was randomly chosen among the non-practitioners of swimming and enrolled in a private school, both located in Campo Grande, District of Rio de Janeiro

To comply with the EG´s criteria, the student must be regularly enrolled in swimming category, present regular attendance and should not practice another type of sport besides swimming, except for daily physical activities at school. In relation to CG, the child must be regularly enrolled at school, present regular attendance and must not practice any other type of sport, besides swimming, except for daily physical activities at school.

In order to make a later statistical analysis of the behavior of genotypic and phenotypic characteristics in children who are practitioners and non-practitioners of swimming, both EG and CG were divided in relation to genetic predisposition levels. It is known that the increase of D10 amounts expresses increased predisposition of coordination. (FERNANDES FILHO, 1997; SILVA DANTAS, 2004, ABRAMOVA et al. 1995). In such case, children who present a D10 rate greater than or equal to 13 should be included in the group of children with highest genetic predisposition to coordination. The children who present a D10 rate less than 13 should be included in the group of children with low genetic predisposition to coordination. Every one agreed to sign a Free and Consented Participation Agreement.

With the selected sample, the collecting of digital printing was made and the pre-test was applied which correspond to the tests of static balance, dynamic balance and motor skill in both groups (LEFEVRE, 1972).

After the pre-test, in addition to attend his/her daily physical activities at school, the experimental group was submitted to a swimming program that was carried out twice a week, with 40 minutes per class in semi-Olympic swimming pool for four months.

During the intervention phase, the control group did not participate in any swimming program and nor any other type of sport, being restricted only to the performance of daily physical activities of school. After the intervention phase, the same tests were applied for both groups.

For the analysis of dermatoglyphic printing, the Cummins and Midlo Protocol (1961) was used. In relation to the evaluation of static balance, dynamic balance and motor coordination conditions the Lefèvre (1972) was used, which is only evaluated as positive and negative, i.e., what is verified is if the child does or does not the test in a satisfactory manner. From this moment, a percentage value is created to determine the success rate of each child and after the success average of the group

Initially the Statistical Treatment was descriptive where the Kolmogorov-Smirnov Test was applied, to check the data normal state, in order to decide between the parametric or non-parametric tests. After checking the performance of these variants, the inferences were produced by the non-parametric Mann-Whitney Test.

RESULTS

The sample was composed of children, both genres, aged between 5 and 7 years. Initially, the sample was divided in 4 groups: Male Experimental Group n=12; Male Control Group n=16; Female Experimental Group n=10 and Female Experimental Group n=14.

The children who present a D10 rate greater than or equal to 13 should be included in the group of children with highest genetic predisposition to coordination. Higher Male Experimental Group (n=6), D10=15,33 ± 1,75; Higher Male Control Group (n=7), D10=15 ± 2,10; Higher Female Experimental Group (n=5), D10=16 ± 1,63 and Higher Female Control Group (n=7), D10=14,5 ± 1,38. The children who present D10 rate less than 13 should be included in the group of children with low genetic predisposition to coordination. Lower Male Experimental Group (n=6), D10=8,8 ± 1,64; Lower Male Control Group (n=10), D10=7,67 ± 3,35; Lower Female Experimental Group (n=6), D10=10,4 ± 1,14 and Lower Female Experimental Group (n=8), D10=8 ± 3,65.

In the following tables the values of static balance, dynamic balance and motor skill tests, pre-test and post-test of the experimental and control group divided in male and female are displayed.

Table 1. VALUES OF STATIC BALANCE, DYNAMIC BALANCE AND MOTOR SKILL TESTS, PRE-TEST AND POST-TEST.

FEMALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	11	11	11	11	11	11
Média	78	96	79,28	88,75	51,66	80,00
Mediana	100	100	92,86	100	66,66	66,66
dp	41,58	12,65	32,38	31,43	22,84	17,22
Mínimo	0	60	0	0	0	66,66
Máximo	100	100	100	100	66,66	100

MALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	12	12	12	12	12	12
Média	81,82	89,09	90,65	90,91	60,60	84,85
Mediana	100	100	100	100	66,66	100
dp	22,72	20,71	19,13	30,15	15,41	17,41
Minino	40	40	40	0	33,33	66,66
Máximo	100	100	100	100	83,33	100

FEMALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
Média	75,71	81,43	65,82	75	75,00	73,81
Mediana	100	100	60,71	100	66,66	83,33
dp	41,64	38,00	36,12	37,98	25,11	32,50
Mínimo	0	0	0	0	33,33	0
Máximo	100	100	100	100	100	100

MALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
Média	90	75	87,5	87,5	69,79	70,83
Mediana	100	80	100	100	66,66	66,66
dp	16,33	33,86	28,87	28,87	22,95	16,67
Mínimo	60	0	0	0	33,33	33,33
Máximo	100	100	100	100	100	100

Test values of static balance, dynamic balance and motor coordination, pre-test and post-test, for experimental group and male and female control group separated by genotype will be presented in the following tables.

Tabela 2. VALUES OF STATIC BALANCE, DYNAMIC BALANCE AND MOTOR SKILL TESTS, PRE-TEST AND POST-TEST SEPARATED BY GENOTYPE

HIGHER MALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	6	6	6	6	6	6
Média	73,33	80	100	83,33	55,55	77,77
Mediana	70	90	100	100	66,66	66,66
Desvio padrão	24,22	25,30	0	40,82	17,21	17,22
Mínimo	40	40	100	0	33,33	66,66
Máximo	100	100	100	100	66,66	100

HIGHER FEMALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	5	5	5	5	5	5
Média	70	100	83,93	100	50,00	75,00
Mediana	90	100	92,86	100	66,66	66,66
Desvio padrão	47,61	0	23,60	0	33,33	16,67
Mínimo	0	100	50	100	0	66,66
Máximo	100	100	100	100	66,66	100

LOWER MALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	6	6	6	6	6	6
Média	92	100	85,142	100	63,33	86,66
Mediana	100	100	100	100	66,66	100
Desvio padrão	17,89	0	25,98	0,00	18,26	18,26
Mínimo	60	100	40	100	33,33	66,66
Máximo	100	100	100	100	83,33	100

LOWER FEMALE EXPERIMENTAL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	6	6	6	6	6	6
Média	80	92	74,28	77,50	53,33	80,00
Mediana	100	100	100	100	66,66	66,66
Desvio padrão	44,72	17,89	43,33	43,66	18,26	18,26
Mínimo	0	60	0	0	33,33	66,66
Máximo	100	100	100	100	66,66	100

HIGHER MALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	7	7	7	7	7	7
Média	90	63,33	66,67	91,67	77,77	66,66
Mediana	100	70	75	100	66,66	66,66
Desvio padrão	16,73	38,82	40,82	20,41	17,22	0,00
Mínimo	60	0	0	50	66,66	66,66
Máximo	100	100	100	100	100	66,66

HIGHER FEMALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	7	7	7	7	7	7
Média	80	90	66,67	83,33	77,78	88,89
Mediana	100	100	75	100	83,33	100
Desvio padrão	40	24,49	40,82	40,82	27,22	27,22
Mínimo	0	40	0	0	33,33	33,33
Máximo	100	100	100	100	100	100

LOWER MALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	10	10	10	10	10	10
Média	88,89	82,22	100	83,33	68,51	77,77
Mediana	100	100	100	100	66,66	66,66
Desvio padrão	17,64	32,32	0	35,36	24,22	16,67
Mínimo	60	0	100	0	33,33	66,66
Máximo	100	100	100	100	100	100

LOWER FE MALE CONTROL GROUP

	E.B Pre	E.B Post	D.B Pre	D.B Post	M.C Pre	M.C Post
n	7	7	7	7	7	7
Média	80	90	66,67	83,33	77,78	88,89
Mediana	100	100	75	100	83,33	100
Desvio padrão	40	24,49	40,82	40,82	27,22	27,22
Mínimo	0	40	0	0	33,33	33,33
Máximo	100	100	100	100	100	100

DISCUSSION

Initially, the results of dermatoglyphic characteristics and static balance, dynamic balance and motor coordination tests of the experimental and control group divided in male and female were analyzed.

In relation to the average values of static balance and dynamic balance tests, we may notice that all groups presented a success rate equal to 100% in the post-test, except for the male control group that obtained a decrease related to the pre-test, in which the characteristics were noticed by Sá (2002).

In the motor coordination, as well as Lopes´study (2004), all groups improved their average values. However, only the male and female experimental groups presented significant differences in the pre and post tests. The values p=0.008,i.e., p<0.01 for both were found.

We discuss below the results of male and female experimental and control groups divided by genotype, i.e., a group of children who are included in the group with highest genetic predisposition to coordination and another group of children with lowest genetic predisposition to coordination.

When the average balance values are observed, we notice that all experimental groups improved their performance; however, no improvement was statistically significant, whose characteristics were also noticed by Sá (2002). The male Control group of highest predisposition to coordination and the female control group of lowest predisposition did not present a decrease in their results of post-test in static balance and dynamic balance respectively.

In the motor coordination, the experimental groups of lowest predisposition to coordination displayed significant differences in the pre and post tests in the male group to p=0.041 and the female group to p=0.032, i.e., p<0.05.

The male experimental groups of highest predisposition, p=0.312 and female p=0.240 did not display any significant differences in the results of motor coordination the same way as the experimental groups of lowest predisposition; however, they increased their minimum and maximum values in the pre and post tests.

Both male and female control groups of lowest predisposition presented a decrease in their results in the post test.

In most of the results, the test values of motor coordination are inferiors to values of static balance and dynamic balance. According to Fonseca (1995), some aspects that influence in a better income of motor coordination as concentration and optical-manual organization are developed in the ages of 5 and 7, where the studied sample is found, while some aspects influence in the balance as gravitational security and development of locomotor standards are taught in this age group.

The non-existence of significant differences in the experimental groups of highest predisposition to coordination may reinforce the assumptions that the environment in which children interact has a fundamental role in the motor development, which may alter, therefore, the results shown in the study (FERREIRA, 2000).

It is vital to assess the balance and motor coordination in children, since changing such skills can interfere with learning in school, general conduct and children daily activity with irreversible consequences for adult life (LOPES, 2004). It is important to point out among those consequences, the slowness in performing bodily movements and the relationship of the body with the environment in which the child is inserted, increasing its motor difficulties (MASCARETTI, 1999).

CONCLUSION

The male and female experimental groups presented significant differences in the pre and post tests in the results of motor coordination test. The static and dynamic balance tests presented success rate equal to 100% in the post test.

When the groups divided by genotype are observed, we notice that all experimental groups, in relation to balance, improved their performance, however, no improvement was statistically significant.

The male Control group of highest predisposition to coordination and female control group of lowest predisposition did not present a decrease in their results of post-test in static balance and dynamic balance respectively.

The male and female experimental groups of highest predisposition increased the minimum and maximum values in pre and post tests; however, in the motor coordination test, they didn´t present significant differences in the same test.

In the motor coordination, the experimental groups of lowest predisposition to coordination showed significant differences in the pre and post test in the male group and female group.

Because of the work carried out through swimming, we notice satisfactory results for the motor development of these children based on genotypical characteristics.

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BEHAVIOR OF GENOTYPE AND PHENOTYPE CHARACTERISTICS IN CHILDREN PRACTICING AND NOT PRACTICING SWIMMING

ABSTRACT

The acquired motor ability in the first years of infancy will be perfected later in the adult phase. The development of the motor coordination and the balance only occurs through child day by day, this means that the practice of regular sporting activities is necessary. Studies performed in genetics area indicate a relation of dermatoglyphic indexes with tendency for coordinate qualities of the organism and affirm that use of the previous knowledge of the capacities and genetic trends, allied to the phenotypic contribution, would give aid, either in talent determination or in its global development. The objective of the present study is centered in the comparison of the behavior of static balance, dynamic balance and motor coordination of children from 5 to 7 years practicing and not practicing swimming. The groups had been compared in its complete form and later divided in accordance with the genotype. For dermatoglyphics impressions analysis, Cummins & Midlo (1961) protocol was used and for evaluation of the balance condition, Lefèvre (1972) protocol was used. The characteristic of this study is a descriptive research whose delineation is comparative. The experimental groups, masculine and feminine, had presented significant differences, before and after testing, in the results of motor coordination testing. In static balance and dynamic balance tests, they presented a 100% utilization after-test. On the other hand, in experimental groups divided by genotype, only experimental groups, masculine and feminine, of lesser genetic predisposition to the coordination had presented significant differences in its results. With the work performed through swimming, we observed satisfactory results for motor development of these children having as reference their genotypical characteristics.

KEY-WORDS: Swimming, Motor Coordination and Dermatoglyphics.

LE COMPORTEMENT DES CARACTERISTIQUES GENOTIPES E FENOTIPES DANS LES ENFANTS QUI PRATIQUENT ET CELLES QUEI NE PRATIQUENT PAS LA NATATION

RESUME

L'habilité des mouvements acquise dans les premières années de l'enfance sera perfectionnée postérieurement dans la phase adulte. Le développement de la coordination des mouvements et de l'équilibre se fait a travers le jour a jour de l'enfant, cela veut dire qu'il est nécessaire la pratique d'activités sportives régulières. Des études réalisées dans la génétique indiquent une relation des indices dermatoglificos avec la pré disposition pour les qualités coordinatrices de l'organisme et affirment que l'utilisation de la connaissance d'avance des capacités et tendances génétiques, alliée a la contribution fenotypes, aiderai, tant pour la détermination du talent, quant a son développement global. L'objectif de cet étude se concentre sur la comparaison du comportement de l'équilibre statique, l'équilibre dynamique et de la coordination de mouvement des enfants de 5 a 7 ans qui pratiquent et celles qui ne pratiquent pas la natation. Les groupes ont été comparés dans sa forme complète et postérieurement divisés selon le génotype. Pour l'analyse des impressions dermatoglificas, il a été utilisé le protocole de Cummins & Midlo (1961) et pour le jugement de la condition de l'équilibre, il a été utilisé le Protocole de Lefèvre (1972). Cette étude possède comme caractéristique une recherche descriptive dont sa forme est comparative. Les groupes expérimentaux, masculins et féminins, ont présentés des différences significatives, avant et après les testes, dans les résultats des tests de coordination des mouvements. Dans les de l'équilibre statistique et l'équilibre dynamique, il a été présenté un profitant égal à 100% après le teste. Dans les groupes expérimentaux divisés par le génotype, seulement les groupes expérimentaux, masculins et féminins, d'une meilleure pré disposition génétique à la coordination il a été présenté des différences significatives dans ses résultats. Avec le travail réalisé à travers la natation, nous observons des résultats satisfaisants pour le développement des mouvements de ces enfants, avec références ses caractéristiques génotypes.

MOTS CLES: Natation, Coordination des mouvements et Dermatoglifia.

COMPORTAMIENTO DE LAS CARACTERÍSTICAS GENOTÍPICAS Y FENOTÍPICAS EN NIÑOS PRACTICANTES Y NO PRACTICANTES DE NATACIÓN

RESUMEN

La habilidad motora adquirida en los primeros años de la infancia será perfeccionada posteriormente en la fase adulta. El desarrollo de la coordinación motora y del equilibrio solamente se da a través del día a día del niño, esto quiere decir que es necesaria la práctica de actividades deportivas regulares. Estudios realizados en el área de la genética indican una relación de índices dermatoglíficos con la predisposición para las cualidades coordinativas del organismo y afirman que la utilización del conocimiento previo de las capacidades y tendencias genéticas, aliada a la contribución fenotípica, proporcionaría ayuda, tanto en la determinación del talento, cuanto en su desarrollo global. El objetivo del presente estudio se centra en la comparación del comportamiento del equilibrio estático, equilibrio dinámico y coordinación motora de niños de 5 a 7 años practicantes de natación. Los grupos fueron comparados en su forma completa y posteriormente divididos de acuerdo con el genotipo. Para el análisis de las impresiones dermatoglíficas fue utilizado el protocolo de Cummins & Midlo (1961) y para evaluación de la condición de equilibrio, fue utilizado el Protocolo de *Lefèvre (1972).* Este estudio tiene como característica una investigación descriptiva cuyo delineamiento es comparativo. Los grupos experimentales, masculino y femenino, presentaron un aprovechamiento igual a 100% en la posprueba. Ya en los grupos experimentales divididos por el genotipo, solamente los grupos experimentales, masculinos y femeninos, de menor predisposición genética a la coordinación presentaron diferencias significativas en sus resultados. Con el trabajo realizado a través de la natación observamos resultados satisfactorios para el desarrollo motor de esos niños teniendo como referencia, sus características genotípicas.

PALABRAS LLAVES: Natación, Coordinación Motora y Dermatoglifía.

COMPORTAMENTO DAS CARACTERÍSTICAS GENOTÍPICAS E FENOTÍPICAS EM CRIANÇAS PRATICANTES E NÃO PRATICANTES DE NATAÇÃO

RESUMO

A habilidade motora adquirida nos primeiros anos da infância será aperfeiçoada posteriormente na fase adulta. O desenvolvimento da coordenação motora e do equilíbrio só se dá através do dia a dia da criança, isto quer dizer que é necessário a prática de atividades esportivas regulares. Estudos realizados na área da genética indicam uma relação de índices dermatoglificos com a pré-disposição para as qualidades coordenativas do organismo e afirmam que utilização do conhecimento prévio das capacidades e tendências genéticas, aliada à contribuição fenotípica, prestaria ajuda, tanto na determinação do talento, quanto no seu desenvolvimento global. O objetivo do presente estudo centra-se na comparação do comportamento do equilíbrio estático, equilíbrio dinâmico e coordenação motora de crianças de 5 a 7 anos praticantes e não praticantes de natação. Os grupos foram comparados na sua forma completa e posteriormente divididos de acordo com o genótipo. Para a análise das impressões dermatoglíficas, foi utilizado o protocolo de Cummins & Midlo (1961) e para avaliação da condição de equilíbrio, foi utilizado o Protocolo de *Lefèvre (1972).* Este estudo tem como característica uma pesquisa descritiva cujo delineamento é comparativo. Os grupos experimentais, masculino e feminino, apresentaram diferenças significativas, pré e pós-teste, nos resultados do teste de coordenação motora. Nos testes de equilíbrio estático e equilíbrio dinâmico, apresentaram um aproveitamento igual a 100% no pós-teste. Já nos grupos experimentais divididos pelo genótipo, somente os grupos experimentais, masculinos e femininos, de menor predisposição genética à coordenação que apresentaram diferenças significativas em seus resultados. Com o trabalho realizado através da natação, observamos resultados satisfatórios para o desenvolvimento motor dessas crianças tendo como referência, suas características genotípicas.

PALAVRAS-CHAVES: Natação, Coordenação Motora e Dermatoglifia.