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Research Article

The Teaching of the Traditional Physical Activities and the Physiologicals Adaptations in the Congo Pupils

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Abstract: The aim of this study was to evaluate the physiological adaptations during the teaching of Physical Education Sport (EPS) with the use of Activities Traditional Physical (APT) among Congolese students of primary education for the integration of these APT in the teaching of the EPS) at school. Four eighty three students including 37, 44 boys and girls classes (CP1, CE2, CM1 and CM2) ranging between6, 5±1,8 and 11, 60±1,13 years of age for girls and between 6, 62±0, 51, 11, 64±2, 07 years for boys divided by class and used APT (EKIENGA, MFONGO and NDZANGO) had participated in our experimentation. Each experiment consisted of a teaching/learning during a cycle of EPS with evaluation before and after the cycle of a few selected physiological variables: 1) vital capacity (cv), 2) expiratory peak flow (PEF), 3) heart rate of rest (FCO), 4) Systolic Blood Pressure (SBP), 5) Diastolic Blood Pressure (PAD), 6) blood pressure mean (map), 7) vertical jump (ΔH), 8) alactic aerobic maximum power (P.M.A.AL) 9) cardiovascular index (ICV).The members of these physiological variables evaluated before and after teaching and learning, both among girls than among boys showed highly significant statistical differences at $p<0.001$. These results suggest taking into consideration in our official instructions from the use of the APT in the teaching of the EPS.

Keywords: Teaching of traditional physical activities, physiological Adaptations

INTRODUCTION

Traditional physical activities are characteristic of African cultural values (Lembe, 2012). As stated by (Jaouen, 2002) traditional physical activities (APT) had social and educational values. These traditional physical activities have been used in the re-creation of the preparation towards the survival activities. These activities also contribute to the development of the address, of the force, endurance... (Lembe, 2012). The Congolese APT is of several kinds: athletic, artistic, fighting, water and mystical types... (Lembe, 2012) had shown that the APT EKIENGA, NFONGO and NDZANGO which are among our traditional games and probably contribute to the development of sociomotrices and psychomotor skills.

The ancient populations of the Congo consisted of groups of practitioners of the APT. These APT were among others in the hunting initiation, is the case of MBENGA, EKIENGA, PEMBE and KONGOTU (Lembe, 2009).

The traditional MFONGO Wrestling was practiced to express strength and resistance capabilities. The expression of force by the NGALA was for multiple reasons, which is particularly distinguished: tie broken by young men in the conquest of a same daughter to marry, identity and social inclusion, spatial occupation (Ewamela *et al*., 2013).

The NDZANGO was practiced under the Moon in rivers during floods and the bands of sand during low flows to facilitate the choice of the spouse by the young man, then as activity of consolation of men by women

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after a hard race and finally served as recreational game in Catholic convents (Lembe, 2009).

Lembe (2009) had reached inspired (Parlebas and Dugas, 1998) the existence of elaborate for the content of teaching activities and internal logic. In this same logic we had also proven the driving logic of belonging through specific report company space, objects, time and the roles assumed by the practitioners. Into account the instructions of the UNESCO for the teaching of the EPS with for corollary the activities of each culture; our thinking is oriented this time to physiological changes induced by the teaching-learning process of the traditional physical activities of the Republic of the CONGO (Brazzaville).

The teaching of the traditional physical activities (APT) in EPS at school requires knowledge endogenous and therefore, increases the effectiveness of learning and/or motor efficiency (Jonnaert, 2002).

The presence in the spirit of effort and acquisition of values, of African cultures which have been used in the context of the recreation and preparedness activities as hunting, gathering and address, and could probably contribute to the installation of the physiological adaptations in the subjects.

The aim of this study was to evaluate the physiological adaptations during the teaching of Physical Education Sport (EPS) with the use of Activities Traditional Physical (APT) among Congolese students of primary education for the integration of these APT in the teaching of the EPS) at school.

MATERIALS AND METHODS

This transversal type study consisted of a survey based on APT EKIENGA, MFONGO and NDZANGO education in mixed classes of primary (CP1, CM1 and CM2), all taking before physiological variables and after the long cycles of learning was conducted from February 19 to June 10, 2011 or 3 months and 22 days in the commune of Brazzaville , at the Chaminade high school with students of the private school KOSHIRO FATIMA, with a sample of 28 students as follows: 14 students of CP1 (6 girls and 8 boys), 14 students in CE1 (7 girls and 7 boys).

The method of data collection was the anthropometric measures (age, weight, and height), the calculation of body mass index and the physiological measures (FCO, PA, the CV and the DEP) and at the end of physiological tests (Sergeant Test: to assess the vertical jump, speed and alactic anaerobic maximum power).

A paragraph which should enrich: year of the study? Sampling data collection method? etc...

Statistical study: The frequency of occurrence of variables was used in the calculation of the indices of descriptive statistics, including: the average arithmetic) and standard deviation (δ).

The average arithmetic means were compared by the test of WILCOXON MANN WITHNEY, because of reduced strength.

RESULTS AND DISCUSSION

Adaptation sphysiological during EKIENGA learning:

Physiological adaptation during the MFONGO learning:

Physiological adaptations during the NDZANGO learning: Physiological variables are very important during physical effort (Lembe, 2012). In this study we measured surge Vital Capacity (CV), expiratory flow (DEP), the average heart rate of rest (FCO), the systolic blood pressure (SBP), Diastolic Blood Pressure (PAD), blood pressure (map), the vertical jump (ΔH) and alactic maximal aerobic power (P.M.A.AL), during the apprenticeship of EKIENGA, the MFONGO and the NDZANGO.

Of EKIENGA, the MFONGO and the NDZANGO learning. Table 1 to 3, the analysis of the results showed that the girls and boys of the classes of CP1, CM1 and CM2 (of primary school), presented at the end of learning of the EKIENGA, the MFONGO and the NDZANGO of significant differences compared with the values obtained before this learning ($p<0.05$, $p<0.01$ and $p<0.001$). This can be justified by the fact that the learning of the APT process certainly changed subjects learning, physiological variables which is in concordance with the results of a study in which the author states that learning is a process that allows a physiological change in the physical capabilities (Rigal, 1996).

Indeed, obtained significant differences are both among girls than among boys, this can be justified by the fact that the influence of EKIENGA, the MFONGO and the NDZANGO learning is not function of sex but the relevance of the physical, educational and cultural values that abounds with these APT. Proof that the practice organized, structured with educational topics would allow both the girls and boys so this is the acquisition of the educational values, with a most original cultural impact.

A this subject, (Lembe, 2009) showed that the EKIENGA APT develops address and force, and this regardless of the sex. The values of CV and DEP post learning are larger share compared to those obtained at the end of EKIENGA learning for girls and boys ($p<0.05$;) $p<0.001$); (Table 1) there for the learning of MFONGO (Table 2) and NZANGO (Table 3), this may indicate that physical exertion induced alterations in respiratory function.

The FCO at the end of the learning of EKIENGA, the MFONGO and the NDZANGO was significantly less large compared to that obtained before teach (Table 1 to 3) ($p<0.001$). It is known that learning of physical exercise improves the FCO by a decrease (Brooks and

Table 1: Vital capacity (cv), peak expiratory flow rate (DEP), Frequency Cardiac Rest (FCO), Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (PAD) and mean arterial pressure (map) of students of the preparatory first year courses (CP1) before and after learning of the EKIENGA in the form of average and standard deviation ( ) ±Δ)

	Learning Ekienga		Signifiance	
Physiological characteristics of girls and boys	Pre (±Δ)	Post (±Δ)	T	P
Girls	(n = 7)	(n = 7)	/	/
Age (years)	6.5±1.8	/	/	/
Height (m)	1, 21±0, 029	/	/	/
Weight (kg)	22, 00±3, 26	/	/	/
BMI (kg.m^{-2})	14, 8±2, 16	/	/	/
CV (l)	3.51±0.48	3.91±0.19*	2.05	<0.050
DEP (l/mm)	235,71±20.60	292,85±34.93***	3.70	<0.001
FCO (bpm)	140.00±10.13	90.00±6.90***	4.76	<0.001
NOT (mmHg)	105,00±8.78	97.42±7.55***	6.58	<0.001
PAD (mmHg)	99.67±5.97	77,16±4.43***	5.82	<0.001
PAM (mmHg)	240,46±3 8.46	200,64±38.81***	7.05	<0.001
Boys	(n = 8)	(n = 8)		
Age (years)	6, 62±0, 51	/	/	/
Height (m)	1, 24±0, 05	/	/	/
Weight (kg)	23, 75±2, 12	/	/	/
BMI (kg.m^{-2})	15, 40±0, 87	/	/	/
CV (l)	3.02 ± 0.48	4.87±1.64*	2.05	<0.05
DEP (l.mm - l)	189.00 ± 103	290.00±49.85*	2.49	<0.05
FCO (bpm)	104,12±8.99	89.00±6.90***	3.73	<0.001
NOT (mmHg)	126,87±14.64	109, 08±4 91**	3.04	<0.01
PAD (mmHg)	88.87±4.91	61, 12±18 21	3.26	<0.01
PAM (mmHg)	278,44±23.04	184,08±4 90	5.46	<0.001

*: Significant difference (p<0.05) , * Difference significant (p< 0.01) , *: Significant difference (p<0.001)

Table 2: Vertical jump (ΔH), alactic maximal aerobic power (P.M.A.AL), Index Cardiovascular (ICV), peak expiratory flow rate (DEP), (WFP) average heart rate of rest (FCO), Systolic Blood Pressure (SBP), and blood pressure Diastolic Blood Pressure (PAD) of the pupils of CM2 before and after learning of the MFONGO in the form of average and standard deviation ( )±Δ).

	Learning of the MFONGO		Significance	
Physiological characteristics of girls and boys	Pre)±Δ)	Post)±Δ)	T	P
Girls	(n = 9)	(n = 9)	/	/
Age (years)	10, 54±3, 43	/	/	/
Height (m)	1, 42±º0, 07	/	/	/
Weight (kg)	32, 00±3, 15	/	/	/
BMI (kg.m^{-2})	14, 31±0, 87	/	/	/
ΔH (m)	0.16±0, 08	0, 18±0, 03 *.	7.07	<0.001
P.M.A.AL (watts)	1107,35±12.8	1120,79±17.86***	15.66	<0.001
ICV	10.92±3.90	8.3±3.15*	2.67	<0.050
FCO (bpm)	92,09±2.16	84.00±3.57***	10.33	<0.001
NOT (mmHg)	127.09±2.84	117,72±3.57***	6.88	<0.001
PAD (mmHg)	75.27±4.80	69,72±6.19*	2.36	<0.010
PAM (mmHg)	94.36 ±1 82	85,72±2.31***	9.81	<0.001
Boys	(n = 8)	(n = 8)		
Age (years)	11, 14±0, 83	/	/	/
Height (m)	1, 38±0, 03	/	/	/
Weight (kg)	28, 85±2, 64	/	/	/
BMI (kg.m^{-2})	15, 94±2, 46	/	/	/
ΔH (m)	0.22±0. 08	0, 28±0 07***	3	<0.001
P.M.A.AL (watts)	1279,42±13.68	1438,34 ±1 0.16***	28.02.	<0.001
ICV	14.60±2.72	11.73 ±2 31*	1.97	<0.05
FCO (bpm)	86.00±2.01	78,14±2.41***	6.71	<0.001
NOT (mmHg)	118,14±1.62	111,57±1.96***	8.91	<0.001
PAD (mmHg)	76.85±3.40	74.42±3.96	1.20	NS
PAM (mmHg)	90.61±0. 51	88.8±0.63***	6.46	<0.001

NS: No significant difference , *: Significant difference (p<0.05), * Difference significant (p<0.01), *: Significant difference (p<0.001)

Fahet, 1985). This decrease is probably dependent on a predominance of the parasympathetic system by the X nerve and acetylcholine which is the cardio-moderatrice hormone, and which reduces heartbeat (Billat, 1998).

The PAS, PAD and WFP presented statistical differences between the pre and post learning values. This difference shows a reduction of systolic, diastolic and mean (Table 1 to 3) (p<0.01;) p<0.05; p<0.001). This reflects the amendment of PAS, PAD and WFP which could be dependent on learning of the APT EKIENGA, MFONGO and NDZANGO, which in turn is due to the multiple lessons that resembles the

Table 3: Vertical jump (ΔH), the maximum aerobic speed (VMA), the maximum consumption of oxygen (VO_2max) alactic maximal aerobic power (P.M.A.AL), Cardiovascular Index (ICV), peak expiratory flow (DEP), heart rate tip of rest (FCO), Systolic Blood Pressure (SBP) and diastolic blood pressure (PAD) and blood pressure mean (map) of the pupils of the CM1 before and after learning of the NZANGO in the form of average and standard deviation ( )±Δ)

	Learning of the NZANGO		Significance	
Physiological characteristics of girls and boys	Pre)±Δ)	Post)±Δ)	T	P
Girls	(n = 23)	(n = 23)		
Age (years)	11,60±1,13	/	/	/
Height (m)	1,43±0, 09	/	/	/
Weight (kg)	33,39±7, 36	/	/	/
BMI (kg/m^2)	14,31±0, 87	/	/	/
ΔH (m)	0.19 ±0, 06	0, 24±0, 08 *.	5	<0.001
VMA (km/h)	8.45±0. 35	10, 82±1, 05 *.	10.77	<0.001
VO_2max (mL/kg/min)	29.59±1, 25	34, 39±1, 70 *.	11.42	<0.001
P.M.A.AL (watts)	2988,74±78.46	3479,22±50.13***	25,26	<0.001
ICV	15.53±4 48	12.66±3.24***	2.51	<0.050
FCO (bpm)	94,13±3.06	90.30±4.72**	3.30	<0.010
NOT (mmHg)	130.00±4.37	124.60±4.64***	4.09	<0.001
PAD (mmHg)	83.95±7.19	76,21±8.76**	3.27	<0.010
PAM (mmHg)	99.30±5 61	92,47±4.74***	4.49	<0.001
Boys	(n = 28)	(n = 28)		
Age (years)	11,64±2, 07	/	/	/
Height (m)	1,43±0, 08	/	/	/
Weight (kg)	32,75±6, 26	/	/	/
BMI ($kg.m^{-2}$)	15, 94±2, 46	/	/	/
ΔH (m)	0.20±0, 06	0, 25±0, 05 *.	5	<0.001
VMA ($km.h^{-1}$)	8.78±0, 61	11, 50±1, 44 *.	9.710	<0.001
VO_2max ($ml.kg^{-1}.min^{-1}$)	30.75±2, 16	38, 68±3, 06 *.	11.32	<0.001
P.M.A.AL (watts)	2954,13±78,45	3273,86±82,33***	14.10	<0.001
ICV	14.19±3.86	10.43±2.17***	4.530	<0.001
FCO (bpm)	85,78±6.82	80.25±5.33**	3.390	<0.010
NOT (mmHg)	113,07±6.71	119,03±7.08*	2.190	<0.050
PAD (mmHg)	81.71±6.31	81.25±5.78	0.280	NS
PAM (mmHg)	86,81±7 21	92,44±6.93**	2.990	<0.010

NS: Non-significant difference, *: Significant difference ($p<0.05$), * Difference significant ($p<0.01$), *: Significant difference ($p<0.001$)

rehearsals. Indeed, the repetition in learning of the APS/APT may be synonymous with training, and it is known that training induces a proliferation of peripheral capillaries (Billat, 2000) and blood redistribution (Kenney *et al*., 2006), which explain the reduction of the values especially systolic, diastolic, and mean arterial pressure.

Significant differences obtained in the values of the vertical jump (ΔH), post pre learning and learning ($p<0.001$); (Table 2 and 3), both among girls than among boys, may indicate learning of the MFONGO and the NZANGO. Indeed, learning of the latter involves flexing extensions of the lower limbs, thus strengthening the muscles of the thigh, foot and their corresponding joints, which would inevitably lead the increase of relaxation. This reinforces the hypothesis that learning repeated APSA is similar to training and strengthens muscle capacity by good blood redistribution (Kenney *et al*., 2006) and an increase of muscular fibres (Mcardle and Katch, 1987).

The same results show significant differences between the pre and post learning alactic maximal aerobic power (P.M.A.AL), the same students.

Note that the MFONGO is an APT of combat and the NDZANGO artistic activities that induce an influence on alactic maximal aerobic power, added to this are the effects of the environment of the practice of physical activity on the hemodynamic functions. Indeed, our study subjects were submitted to the learning of the MFONGO and the NDZANGO in hot and humid atmosphere that had to lead to a sweat dehydration associated with various consequences including the reduction of plasma, the venous return, stimulation of the peace maker, low contraction of the left ventricle and therefore of any force with which the blood in the arteries to overcome the resistance induced by the blood viscosity is powered and the said artery walls. In this regard, (Sundblad *et al*., 2000 and Gonzàlez-Alonzo *et al*., 2000) obtained results showing the influence of the temperature of the warm and damp atmosphere on physical exertion.

CONCLUSION

The cultural rapprochement (Parlebas, 2008 and UNESCO, 2005) and the importance of the old practices still ignored nowadays have led us to examine the physiological adaptations by the process of teaching-learning of APT EKIENGA, MFONGO and NZANGO.)

The results were used to show that the teaching of the APT EKIENGA, MFONGO and NZANGO has a positive impact on the physiological adaptations therefore allowing their integration in the teaching of

physics and sports (EPS) to school in Republic of Congo.

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