



POSTURAL BALANCE OF OBESE AND NON-OBESE CHILDREN: A LONGITUDINAL STUDY

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INTRODUCTION

Obesity is a worldwide epidemic and studies indicate that excess weight compromises the health of individuals. For genetic and / or environmental factors, some children may develop overweight and know that when obesity is acquired in childhood, the probability of being obese in adulthood tends to increase [1]. Obese children appear to exhibit differences in gait variables [2] and plantar pressure distribution [3] compared with non-obese children. Some studies suggest an improvement in the balance as the child matures [1,4]. It has been found also that the increase in body mass causes an increase in the absolute values of displacements of center pressure [5] impairing balance. So how obesity affects the development of balance can aid in clinical diagnosis of associated diseases, treatment planning and interventions. However, it is unclear, the long term effects of obesity in developing postural balance. Therefore, the objective of this study was to describe the postural balance in obese and normal children from 8 to 12 years old, during the period of one year.

METHODS

We evaluated 82 children of both sexes, with 37 non-obese and 32 obese. BMI was calculated according to Cole [6]. Balance assessment was performed using a force platform AccuSway Plus, AMTI with the child in a base open and eyes open. The frequency of acquisition of signals was 100 Hz and a filter at 10 Hz cutoff. The first assessment (pre-

test) was in May 2011 and the second assessment (post-test) in May 2012. The Student t-test for paired samples was used to evaluate possible differences in the variables of the COP in the pre-test and post-test ($\alpha = 0.05$).

RESULTS AND DISCUSSION

There was no statistically significant difference between the first and second assessment for most of the balance variables (Table 1), both normal children and obese children. However, the COParea (Area 95) showed a significant difference between pre-test and post-test for the groups of 8-9 years non-obese and 8-9 years obese as well as the variable COPml for the 8-9 years obese group.

There was no change in most of the balance variables during the period of one year for both groups of obese and non-obese children. Studies show that there is a gradual improvement in the balance function with age [1, 4]. However, Mickle et al. [7] suggests that 12 months is insufficient to identify the development of balance, which is corroborated by the results of our study. It has been found higher values of COPml for obese compared to normal weight [5]. In our study, we found significantly higher values of COPml only for the 8-9 years obese group after a year of assessment. However, there is a perceived increase tendency of the COP absolute values for both obese groups and non-obese groups. Some factors may have influenced the results, such as the self-selected position of the feet on base open. The position of the feet in the pre and post test was not controlled.

Table 1: COP variables (av \pm sd) for normal weight and obese groups in the pre and post-test

		COPml (cm)	COPap (cm)	PathLgth (cm)	Vel (cm/s)	Area 95 (cm ²)
Non-obese 8-9 years N=19	Pre-test	1.73 \pm 0.53	2.25 \pm 0.66	41.87 \pm 8.25	1.40 \pm 0.28	2.45 \pm 1.27
	Post-test	1.97 \pm 0.72	2.42 \pm 0.67	41.50 \pm 7.69	1.38 \pm 0.26	3.26 \pm 1.64
	p	-	-	-	-	0.013*
Non-obese 10-11 years N=18	Pre-test	1.62 \pm 0.60	2.20 \pm 0.35	37.51 \pm 7.55	1.25 \pm 0.25	2.58 \pm 1.36
	Post-test	1.84 \pm 0.69	2.26 \pm 0.58	38.24 \pm 10.03	1.26 \pm 0.33	2.79 \pm 1.61
	p	-	-	-	-	-
Obese 8-9 years N=12	Pre-test	1.60 \pm 0.66	2.09 \pm 0.32	39.27 \pm 9.55	1.31 \pm 0.32	1.54 \pm 0.47
	Post-test	1.92 \pm 0.67	2.17 \pm 0.46	39.29 \pm 9.61	1.31 \pm 0.32	2.20 \pm 0.76
	p	0.023*	-	-	-	0.011*
Obese 10-11 years N=20	Pre-test	1.78 \pm 0.37	2.40 \pm 0.41	43.57 \pm 10.35	1.45 \pm 0.35	2.91 \pm 1.14
	Post-test	2.48 \pm 2.69	2.72 \pm 0.80	41.47 \pm 9.33	1.38 \pm 0.31	3.45 \pm 1.37
	p	-	-	-	-	-

* Statistically significant differences between pre-test and post-test.

CONCLUSIONS

This study suggests that 12 months is insufficient to identify the development of balance. Furthermore, it is suggested that in future studies longitudinal evaluation is performed with feet together so that one can separate the effects of maturation or development of mechanical matter-sized base.

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