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KINEMATICS ANALYSIS OF RUNNING THE OLD OBESE

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INTRODUCTION

At present in Brazil, the elderly population is growing every day as compared to the total population. IBGE data show that in 2000, 30% of Brazilians had zero to 14 years, and over 65 accounted for 5% of the population. In 2050, these two groups will be equal: each represents 18% of the Brazilian population. With this increase, it becomes increasingly important health policies geared to seniors [1].

The third age is the phase of life that may be related to the body's physiological and losses can be exemplified by reason of an exponential function, are the deficiencies, compared to the same period, but at different times. From 50 to 60 years, a man loses more functionality from your body when compared to the period from 20 to 30 years. Is thus a progressive degeneration in the physical structure of man in relation to his age, the body begins to show cellular dysfunctions consequent aging [2].

At this stage of life can cite obesity as a factor in mobility. Despite being a global problem, fat is one of the biggest health problems in many countries, especially in industrialized countries where the indicators point to a disadvantage in the quality of life in obese people [3].

One of the key factors in the lives of the elderly which guarantees autonomy and a better quality of life is walking. The gait cycle begins when a member of the heel touches the ground and ends when the heel of the same limb touches the ground again [4, 5].

The total cycle time of will members extend, without contact with soil and swing phase, when the foot is in the air, where they realize that the stance phase is in contact with the ground for 62% from the first contact with the ground until the detachment toes, swing phase will the moment of detachment toes up when the heel makes contact with the ground 38% of phase [6].

Maintaining mobility is essential gear for the day to day or the elderly, where one of the main factors that hinder the life of them during the march is imbalance.

Through it all, the objective of this study was to analyze whether there are differences between kinematics gaits of elderly obese compared to non-obese adult gait.

METHODS

The research was conducted in accordance with resolution 196/96 which regulates research involving humans in Brazil.

Initially the study was referred for evaluation of the ethics committee of the Faculty Assis Gurgacz, which was approved in the opinion of No 024/2012. The group was composed of nine seniors.

For two-dimensional kinematics analysis was used a camera brand Canon, whose frequency of image acquisition was 60 Hz. For image editing program was used Adobe Premiere Pro CS3 3.0. For data processing system was used to analyze two-dimensional cinematic videography Simi Twinner Pro.

Data collection was initially measured anthropometric measures of body weight and height to check the body mass index (BMI) of each senior. The elderly who were classified as obese performed the second stage of data collection was that the march.

For the present study we analyzed the gait cycle, and verified the temporal kinematics variables that were double support time (1AD/2AD), single support time (AS/RIGHT – AS/LEFT), step time (TP/RIGHT – TP/LEFT), swing time (FB/RIGHT – FB/LEFT) and total cycle time (or the last) (TPASS), and the spatial variables of stride length (CP/RIGHT – CP/LEFT) and cycle length or past (CPASS) and gait speed.

Data were stored in SPSS version 15.0 and analyzed using descriptive statistics, through measures of central tendency (mean) and measures of variability (standard deviation and coefficient of variation). To examine differences in gait variables between obese and elderly gait pattern model [6] was used the Mann-Whitney.

RESULTS AND DISCUSSION

The seniors had an average age of 70 and 89 years old, weight 81,01kg, height of 1,56m and a BMI of 33,26.

The values of temporal variables of TP Right and TP Left elderly group analyzed, shown in Table 1, are in line with the literature [6] consider that 50% of the time a gait cycle TP Right and 50% for TP Left, this for normal adults, and in this study we found values of 50%, which demonstrates a bilateral symmetry, showing that, despite being obese elderly, individuals can still follow the basic pattern of motion. The values for 1 AD and 2 AD normal adults [6] are 12% and in this study was found 17% to 1 AD indicating a difference of 5%, and 16% for 16% for 2AD, showing a difference of 4%.

Table 1 – Mean and standard deviation of normalized temporal variables.

Variables	This Study	Study Reference [6]
1 AD *	0,17 ± 0,02	0,12
2 AD *	0,16 ± 0,01	0,12
AS Right*	0,34 ± 0,02	0,38
AS Left*	0,34 ± 0,02	0,38
TP Right	0,50 ± 0,01	0,50
TP Left	0,50 ± 0,01	0,50
FB Right*	0,34 ± 0,02	0,38
FB Left*	0,34 ± 0,02	0,38

* Significant difference between groups for $p \leq 0,05$

In the present study analyzed the group showed 34% for AS Right/Left e FB Right/Left, pointing to a 4% difference in values relative to benchmark study [6], who consider values of 38% of the gait cycle for these variables.

Though the application of the Mann-Whitney found significant differences in gait variables between obese and elderly gait pattern model [6]. There were significant differences in the variables 1 and 2 AD, AS Right/Left and FB Right/Left.

These results corroborate [7], where there major and minor phases of support phase balance compared to younger populations. These results can be explained by this population have increased need for security, prolonging double support to enhance the maintenance of equilibrium on the other hand the increase in this phase involves a decreased speed of gait.

The stride length during the gait cycle is related to gait velocity and length of the lower limb. In the present study shows that the right step and left step when normalized by the length of the lower limbs showed values of 0,68±0,06% and 0,69±0,08% respectively, showing one of the steps bilateral symmetry. The group had an average speed for the march of 0,98±0,17m/s, and lower than in studies with non-obese elderly [8].

CONCLUSIONS

The results of this study allow us to visualize the gait of elderly obese have significant differences compared to non-obese adult gait, which can be justified by some specific characteristics related to age and high weight.

These differences may be justified by the fact that the groups of obese older possess some characteristics such as increased age, increased mass, loss of strength and muscle power. These characteristics generate uncertainty in the elderly because they are more vulnerable to falls and possible injuries and so end up adapting the model running.

Thus, it takes into account that in these conditions age and weight, the elderly requires a slower pace, the reduction step length and increased stance phase, because in this way it acquire a greater stability and balance, seeking thus a safer gait pattern.

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