INTRODUCTION

The body alignment adapts itself for the balance by posture adjustments that correct the position of head, trunk, arms and legs every time posture is changed. These factors act intrinsically, but are noticeable externally through the whole body’s posture, for example, in compensatory actions during overload tests.

In searching for the solution of balance problems, Biomechanics, according to Amadio (1996), is an important instrument to combat and prevent the labour diseases. Helping to diminish human costs and limiting the overload efforts, by biomechanical and physiological criteria which determine minimum energetic cost and maximum posture sustentation. This study had as a goal to describe the behavior of the angle trunk, hip and knee without overload and with different overloads during child gait.

METHODS

The sample was chosen intentionally and composed by eight children (five girls and three boys), average 10 years old, average height .1.43 meters and body mass average of 36.4 kg, who use school knapsack everyday.

Two cameras with frequency of 60 Hz were used for data collection, three attempts were filmed for the execution of a complete gait cycle, at free speed, without overload and with overload of 8% (first situation – S1), 12% (second situation – S2) and 16% (third situation – S3) of the body mass. For data acquisition related to the angles, the left and right side of the body were filmed separately and identified by external landmarks in the both side of the body (glenohumeral joint, anterior superior spine, greater trocanter of the hip, epicondyle of the humerus, lateral maleolo and the second metatarsal bone).

The data were processed by Peak Motus system, and a Butterworth filter was used at a cut frequency of 60 Hz. The data were normality checked through Shapiro Wilk test. The angular displacement pattern was compared using ANOVA test, at each 10% of the cycle, When a significative statistical difference was found, the Tukey key test was used.

RESULTS AND DISCUSSION

The analyses of the trunk angle related to the vertical, to gait carrying the backpack, showed a greater front inclination and a smaller posterior, with a significant statistical difference (p<0,05), when compare 0% of the cycle, without the knapsack and in situation S2 and S3, in 10% and 20% of the cycle when compare a gait without knapsack with S2, and in 90% and 100%, when compare the gait without knapsack with S1, S2 and S3

The behavior of the angle of the hip, characterized by the maximum extension in the contact of the opposite foot and for a maximum flexion in the terminal swinging phase according to Sutherland et al (1998), presented a larger flexion degree, a significant statistical difference (p <0,05),when comparing the instants of 0%, 90% and 100% of the cycle, for the gait without knapsack in relation to S2 and S3 and, again at 10% of the cycle in relation to S3, what can be resulting of a compensatory posture of the trunk. Related to the behavior of the knee and ankle angle, no significant statistical difference was identified (p<0,05). The angular displacement pattern and its values were similar to the one found in the literature (David, 2000).

CONCLUSION

The results of this study, point out to an expressive increase of trunk frontal inclination, which reflect in the hip angular movement, when loads in the knapsack, handle kind, were used, related to 8, 12 and 16% of the person’s body mass. Although of the control strategies and protection of the body structures and of the spine in the situations of load support, the damages, under the mechanical aspect to a child’s organism in growth phase, generate harmful functional reactions to the corporal alignment and the mobility to articulate.

REFERENCES