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# ABSTRACT

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**Antecedents:** *There exist up to the date enough works of the metabolic and cardiovascular response in adults and some less in children but very few ones have centered on investigating it brings over of the cardiorespiratory and metabolics alterations that the infantile obesity implies. An authentic epidemic for the 21st century. It becomes necessary to restore new scoreboards for these responses of obese children to adapt the treatments in this field.*

**Objective:** *To improve and to advance in the knowledge that allows to propose new methods to estimate patterns of physical activity of the obese child in ambulatory and clinical scenarios and to study his cardiorespiratory response in situations of rest and effort in order to generate scoreboards that help to characterize him better allowing to increase the efficiency of the applied treatment.*

**Methods:** *For this purpose three types of studies were carried out. During the studies a group of physiological signals (electrocardiogram (ECG), breathing rate (BR), pulse oximetry (SpO<sub>2</sub>)), and accelerometer (ACC) have been measured by a new monitoring platform that in its last version has been integrated into an intelligent fabric (TIPS shirt). Joined to clinical information the signals from the TIPS have been correlated by the metabolic consumption and ventilatory response measured by calorimeter. In the study A, 21 obese boys and 29 normal weight boys were measured to determine and to analyze the basal metabolism. In the study B it was measured the energetic consumption of a group of 61 obese children and 31 normal weight children that completed an effort test and a series of daily sedentary activities for a child; finally in the study C, 60 obese children and 40 normal weight children completed an effort test to analyze the cardiorespiratory response. All the studies were carried out in the General Hospital and in the college Max UAB of Valencia.*

**Results:** *In the study A there were compared the values obtained of basal metabolism opposite to the values predicted by models of the literature and it was found a high variability in the predictions that advise the real measurement of this parameter. In addition they appreciated differences between the obese group and the normal weight group in the autonomous response in rest. In the study B the models that combined heart rate and accelerometer showed the strongest relation with the metabolic variables measured by an indirect calorimeter and in the study C, results found significant differences in the recovery of the maximum effort of the obese opposite to the normal weight especially in parasympathetic tone.*

**Conclusion:** *On this Thesis it has been stated that inclusion of new clinical tests and new data processing techniques are necessary for making more effectiveness interventions during the treatment of obese children. On the measurements of the basal metabolism made it has been observed that it's necessary to determine in an effective way the basal metabolism of every subject by means of a real measure and not by means of predictive models, on the other hand it is necessary to realize an effort Test that allows us to determine the individual both metabolic and cardiovascular response with high ecological tools, specially analyzing parameters of possible dysfunction of the autonomous system and with regard to the prediction of the metabolic consumption in ambulatory measures it becomes necessary develop new models extracted exclusively from obese population specially combining cardiac signal and accelerometer signals. These markers extracted from these new clinical tests will help health professional to adapt and personalize the intervention applied on every clinical case.*