BigO: The use of novel technologies for the management of childhood obesity – A clinical pilot study

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bigoprogram.eu

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Background: Obesity represents one of the most challenging public health problems of the 21st century. According to the World Health Organization (WHO), there is a need to create reliable monitoring and behavioral systems, and to investigate their effectiveness in preventing childhood obesity.

Objective: To evaluate a range of novel technologies for collecting photographs, information regarding physical activity and geographic data (GPS) in overweight and obese children and adolescents during their day-to-day life.

Methodology: The study was carried out as part of the four-year European project BigO (http://bigoprogram.eu, Horizon2020, No. 727688). Overweight and obese children and adolescents aged 9-18 years participated in the study following approval by the local Committee on the Ethics of Human Research. Written informed consent was obtained by parents/guardians in all cases. The data collection system includes the BigO technology platform, which interfaces with a Smartphone and Smartwatch, and records data objectively (using inertial sensors and GPS) for each patient. Data are then transmitted to BigO servers to extract behavioral indicators, including: (a) physical activity/exercise, (b) dietary habits, and (c) environmental conditions (urban, socio-economic, nutritional). During the first pilot phase, participants used the BigO system for 2 weeks to take photographs of the food they consumed, as well as food advertisements, and wore the watch for specific periods during the week (at least 2 weekdays, 1 weekend and 3 nights). Finally, they were asked to return the watch and complete a questionnaire.

Results: Forty children and adolescents aged 9-18 years (11 males, mean BMI ± SD: 29.94 ± 3.32 kgr/m^2; 29 females, mean BMI ± SD 30.86 ± 3.69 kgr/m^2) participated in the study. All subjects uploaded a total of 571 meal photographs from their mobile camera and recorded 177 days of inertial sensor data from the smatphone or smartwatch (accelerometer). Seventy-seven percent of the participants expressed a positive or neutral opinion when assessing the system.

Conclusions: These novel tools and interventions record the behavior of overweight and obese children and adolescents in an objective way and provide information about their environment. Therefore, they may be useful at designing new public health policies and strategies in order to effectively address childhood obesity.
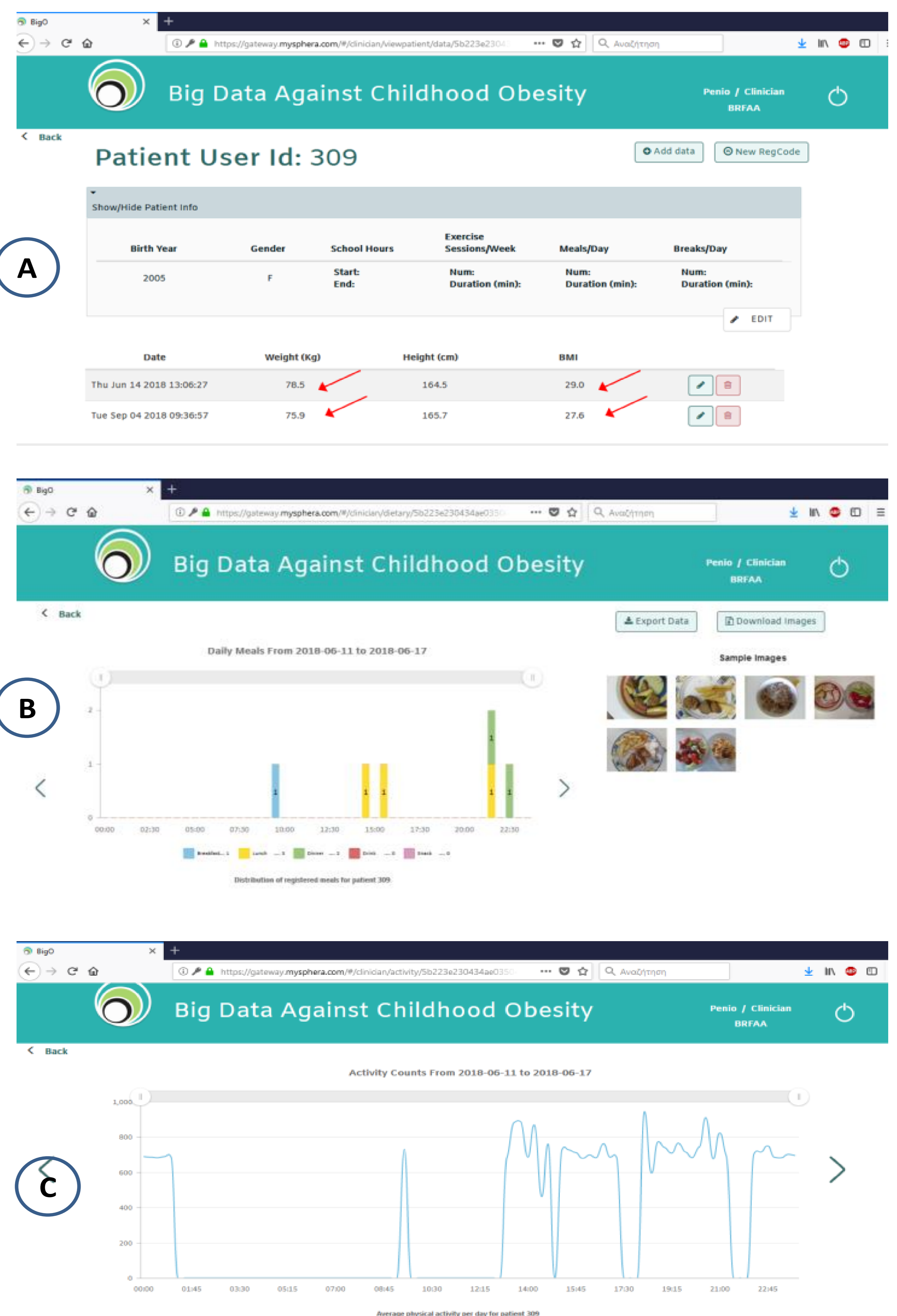

Figure 1. The BigO Technology Platform

A) **Weight and BMI decrease**
B) **Photographs of foods consumed**
C) **The average physical activity per day per week**