

11 DIGITAL MANAGEMENT OF CHILDHOOD OBESITY

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Childhood obesity is today considered a severe disease with markedly increased mortality and morbidity. In addition to the well-established cardiovascular and metabolic comorbidities, hypertension, fatty liver disease and type 2 diabetes, childhood obesity is also associated with increased risk for several cancers and autoimmune diseases such as multiple sclerosis, thyroiditis, arthritis and type 1 diabetes.¹ The most important causative factor is probably the low grade inflammation which appears already early in life in children with obesity. To prevent inflammatory-induced diseases, a normalization of the weight already before puberty is required¹ and this requires an early and intensified lifestyle treatment.

It is well established that successful lifestyle treatment requires continuous support and frequent visits, at least every other week.² As this is difficult to realize both for families and the health care system a digital support system, Evira, has been developed.³ Evira consists of a scale for daily home weight measurements. The scale does not present any data to reduce measurement stress. Instead, data is transferred to a mobile application in the parent's smart phones. There, the degree of overweight is presented graphically as BMI z-score. The system can, with high accuracy, predict the height velocity required for BMI z-score calculation for children with obesity. Degree of obesity, height at clinical visits, age and gender are used and the calculation is based on height velocity data for obese children.⁴ BMI z-score data is in turn transformed into a database and presented to the clinical staff which communicate weekly with the families via a chat.

The system has been evaluated in several studies in Sweden. The one-year results are twice as good as conventional treatment and the dropout rate is lower.³⁻⁵ Also, after three years the treatment effect is significantly better than conventional treatment. The system has now been implemented at 12 ordinary pediatric clinics and preliminary one-year data indicates that similar results are obtained there. Based on these results Evira is now implemented via NHS in the UK and also evaluated in an ongoing study in Abu Dhabi.

In conclusion, weight loss early in life is required to reduce severe obesity-induced morbidity and mortality. Evira is a digital support system which makes high-intensity lifestyle treatment effective and affordable. The number of physical visits can be reduced from 26 to 4 visits per year with remaining excellent weight loss for a large number of children. Evira is also good in combination with pharmacological treatment

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12 METABOLIC AND BARIATRIC SURGERY IN ADOLESCENTS: EFFICACY AND OUTCOME PREDICTORS

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Background and Aims The increasing prevalence of obesity resulted in more adolescents undergoing metabolic and bariatric surgery (MBS). There are few studies of pre-operative predictors of MBS outcomes in adolescents. The aims of this study were to quantify changes in weight loss and biochemical parameters in adolescents undergoing bariatric surgery and identify preoperative predictors of postoperative weight loss.

Methods This was a prospective, observational cohort study of 73 adolescents (12–19 years) living with obesity who underwent MBS between March 2020 and November 2022 at the SKMC. Absolute and relative changes in anthropometric measures of weight and lipid, HbA1c, and liver function (ALT, AST) parameters were evaluated up to 30 months postoperatively. Differences in anthropometric measures over time were assessed using a mixed residual maximal likelihood model with Tukey's multiple comparison test, and univariable and multivariable logistic regression were used to identify predictors of a >35.0% reduction in BMI z-score from baseline to 12 months. Predictive accuracy was assessed by ROC-AUC analysis and the optimal cut-point established with Youden's index.

Results Seventy-three adolescents (65.8% female, mean age (SD) 17.6 (1.83) years) were included in the study. Most patients (87.7%) underwent laparoscopic sleeve gastrectomy. All anthropometric measures of weight (weight, weight z-score, BMI, BMI z-score) significantly decreased over 30 months of follow-up (all $p < 0.001$), with a -4.2%, -14.6%, -23.7%, -35.1%, -39.6%, -40.9%, and -53.8% relative change in BMI z-score at 2 weeks and 3, 6, 12, 18, 24, and 30 months, respectively. The mean (SD) BMI z-score at 30 months was 1.17 (0.8), and all patients had persistent reductions in BMI z-scores compared with baseline. There was a significant increase ($p = 0.02$) in HDL cholesterol and a significant decrease in triglycerides ($p = 0.0001$) and ALT ($p = 0.0004$) after surgery. A higher preoperative BMI was associated with a reduced odds (OR 0.89, 95%CI 0.79-0.97, $p = 0.03$) of a >35% reduction in BMI z-score at 12 months by multivariable logistic regression analysis. A baseline BMI of >52.6 kg/m² had a sensitivity of 100% and specificity of 40.6% for detecting a >35.0% postoperative change in BMI z-score.

Conclusions MBS results in sustained weight loss in adolescents. A high preoperative BMI predicts resistance to optimal weight loss after surgery and argues against delaying surgery once eligibility thresholds are met. These data pave the way for identifying subpopulations of adolescents undergoing MBS who require additional interventions to optimize outcomes.