

Promoting Lifestyle and Behavior Change in Overweight Children and Adolescents With Type 2 Diabetes

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Sixteen-year-old Juana is a high school sophomore who loves movies, the local pizza parlor, and salsa music. She is young but has the health risks of someone three times her age. With a BMI > 95th percentile for age, Juana has many of the features of metabolic syndrome and may be only months from displaying the symptoms of type 2 diabetes. Juana is one of 8.8 million American youth who are overweight or obese.¹

The plight of Juana and her age-mates has become increasingly visible in the media and in the scientific literature. Genetics has been blamed. Parents have been blamed. Schools have been blamed. Television has been blamed.² Society has been blamed. Although we are closer to understanding the causes, we lack effective strategies for prevention and management of obesity and diabetes in children and adolescents.

How Did Children Become Part of This Epidemic?

The road to obesity and diabetes may begin in utero. Low birth weight and exposure to maternal diabetes have been implicated.^{3,4} There may be genetic components to the problem.⁵ Certain genes associated with type 2 diabetes have been identified in Cree-Ojibway aboriginal children in Canada.⁶ Largely, however, the rise in childhood obesity corresponds to various environmental changes.

Children today are less physically active than in the past. They play less outside and have less physical education in school. In high school, enrollment in daily physical education (P.E.) classes dropped from 42% in 1991 to 25% in 1995.⁷ Only 19% of all high school students are physically active

for at least 20 minutes in P.E. classes every day during the school week. What has replaced physical activity is television watching, Internet surfing, and computer gaming.

There is a strong correlation between childhood obesity and access to television. Children are more likely to be obese if they eat meals in front of the TV, have multiple TVs in the home, and have a TV in their bedroom.⁸ The prevalence of obesity is highest in children who watch four or more hours of television per day,⁹ and obesity risk increases 6% for each additional hour of TV viewing per day.¹⁰

Sedentary activities are only partly to blame to childhood obesity. Children are consuming more calories and more high-fat foods.¹¹ Food is abundantly available and relatively inexpensive. Vending machines abound and typically contain sweetened beverages or highly refined snack foods. Children who consume soft drinks take in ~ 200 more calories per day in their diets.¹² This can contribute to an annual weight gain of ≥ 10 lb. Portion sizes have exploded. Even the American Diabetes Association and American Dietetic Association have made adjustments to their Exchange Lists for Meal Planning. In 1997, one-half of a bagel was considered to contain 15 g of carbohydrate.¹³ In 2003, the serving size for the same amount of carbohydrate was reduced to one-fourth of a bagel to adjust for the large size of bagels now typically sold.¹⁴

The environment is ideal for children to consume more energy than they expend. And we know there is a strong relationship between childhood

obesity and later insulin resistance.¹⁵ Not surprisingly, these factors are similar to those related to obesity, insulin resistance, and diabetes in adults. But there is an additional factor that may explain why obesity and diabetes are occurring in youngsters: puberty.

As puberty progresses, glucose disposal decreases, indicating an insulin resistance during this stage of development.¹⁶ Adolescents meet this insulin resistance with increased insulin production. In genetically predisposed teens or in those already obese, the scale tips in favor of developing diabetes.^{17,18}

The Aging of Youth

Often diabetes is not an isolated health condition for obese youth.¹⁹ Features of the metabolic syndrome such as hyperlipidemia, hypertension, and polycystic ovarian dysfunction are commonly found at the onset of type 2 diabetes in children.^{20,21} Other health concerns include orthopedic problems, sleep apnea, and depression. These youngsters are at increased risk for the same cardiovascular complications as their older counterparts.²² The pathological mechanisms for cardiovascular disease are already operating in obese children.²³ In fact, Hillier and Pedula²⁴ found that early-onset type 2 diabetes may be “a more aggressive disease from a cardiovascular standpoint.” Yet, while teens’ metabolic functions mimic those of diabetic adults, their developmental concerns are still grounded in adolescence. Medical management of obesity and type 2 diabetes must be sensitive to the child’s or adolescent’s age and maturity.²⁵

Another Picture of Type 2 Diabetes in Youth

Roger is a 13-year-old boy with newly diagnosed type 2 diabetes. He is obese, with a BMI > 95th percentile for age. His typical day includes riding the bus to school, having breakfast and lunch at school, and having P.E. 2 days per week. His mother and father work until the early evening, and he typically stays at home to watch his younger siblings. He and several neighborhood friends meet to compete in the latest computer game. On weekends, he may watch older boys play basketball or take in a movie at the mall. On these days, he usually skips breakfast and eats lunch and supper at a fast-food restaurant.

Developmentally, Roger and Juana, the youth discussed earlier, are facing the same psychosocial issues as other adolescents. Peers become increasingly more important than parents and family. Both teens will strive for independence and development of a strong sense of self. School is their social milieu, and the local mall or pizza restaurant is their meeting place.

Personal appearance can be excruciatingly important. Teens want to look like others in their peer group, in both style and size. They want to differentiate themselves from parents and adults. They may aspire to look like the latest pop singer or actor. They want to be different, but not too different, from their peers.

For overweight or obese children or adolescents, meeting these developmental needs can be difficult and fraught with emotion. Obese adolescents may have difficulty fitting in. They look too different from the crowd. They may not be able to keep up in a basketball game. They may not have the physical stamina to dance with their peers.

Self-esteem and obesity may be correlated. Strauss²⁶ reported that scholastic and global self-esteem did not differ among 9- to 10-year-old obese and nonobese children. However, 4 years later, in the same cohort, significantly lower levels of self-esteem were observed in obese boys, obese Hispanic girls, and obese white girls. These children also exhibited higher rates of sadness, loneliness, and nervousness and were more likely to engage in tobacco or alcohol use.

Despite increased participation in risky behaviors, obese youngsters face more social stigmatization²⁷ and tend to be more socially isolated.²⁸ They are also more likely to be involved in bullying, as either victim or perpetrator.²⁹

With a diagnosis of diabetes superimposed, the challenges mount. Now such teens have the impact of additional self-care demands. Their sense of feeling different can escalate. And they may feel burdened with the requirements of blood glucose monitoring and medication management. Managing diabetes demands a complex set of behavioral patterns and psychomotor skills. Not surprisingly, many adolescents succumb to the pressure and ignore their diabetes self-care during their teen years.

Supporting Children and Adolescents With Type 2 Diabetes

Supporting overweight youngsters with type 2 diabetes requires an integrated plan of nutrition and physical activity, enhanced by emotional support from parents, family, and their health care team. Guiding appropriate food choices is a key component. Yet, moderate dieting has been associated with negative self-esteem in some teens, and starting a diet may increase the risk of eating disorders in adolescent girls.³⁰ In addition, older children are persistently exposed to high-fat and high-calorie foods on a daily basis. Fast-food restaurants are sources of both sustenance and social interaction. Understanding children's developmental needs for peer contact and for fitting in will guide the choice of intervention (Table 1).

Simple, clear messages are most effective.³¹ "Drink less sugary beverages,"^{32,33} "Watch portion sizes," and "Decrease fast-food intake."¹¹ Other important messages include "Avoid skipping meals" and "Choose healthy snacks." These approaches should be followed with specific actions. For example, teens could carry peanuts or almonds for a quick snack when a meal is delayed. When dealing with fast-food restaurants, teens should think about healthy choices before arriving and stick with their choices despite the tempting marketing promotions. Portion control is challenging but can be taught. Teens can learn

to estimate portions using their hand as a gauge (1 cup is the size of a fist; 3 oz is the size of the palm).

Increasing physical activity is the other key component to managing obesity in youth.³⁴ Social, family, and school variables all contribute to a more sedentary life for children and adolescents. The only approach is to decrease sitting and increase moving. Many overweight adolescents have never been successful with exercise programs because of their lack of stamina or their size. They often drop out of sports or other activities when they are unable to perform as well as their peers. Consequently, the focus should be on moving or being physically active rather than on competing. Team sports may not be right for these teens. Rather, individual activities, such as walking, juggling, dancing, swimming, or biking may be better choices. Some teens will find motivation, at least for a time, with a pedometer and a walking plan. Even marching or walking in front of the TV can be effective. Interactive computer or digital games requiring physical activity are becoming more available and are attractive to youth. Games such as Dance Dance Revolution (DDR; www.ddrgame.com) require players to make physically active dance moves.

When TV viewing time is decreased, children lose or maintain body weight.³⁵ The national program VERB (www.verbnow.com) offers several age-specific activity suggestions for children and teens.³⁶ In addition, websites (e.g., www.kidnetic.com) offer challenges or games to get children moving while working at the computer.³⁷

Overweight children and teens are often ostracized by their peers. Supporting these youngsters and valuing their strengths is vital. Children and teens need to know how to deal with teasing, when to reply with a snappy comeback, and when to ignore cruel remarks. These are skills that can be taught and practiced. These children should also be guided to find adults in their environment who will support and nurture them. Family members, trusted family friends, school teachers, coaches, and nurses are some examples.

As with any lifestyle change,

personal motivation to adjust eating or exercise behaviors is fundamental. What motivates teenagers? Listening to their concerns, experiences, desires, and dreams will give some insight. A teen's motivation to start a weight management program may be built on health desires, social goals, or dreams of success at sports.

Adolescents may be inspired by peers, family, or athletes. Parents, health care professionals, and other valued adults play an important role in supporting these children's dreams and aspirations. They also need to be available when children's inspiration wanes. Because depression has been associated with both obesity and diabetes in adolescents and adults,³⁸⁻⁴¹ providers should be alert for symptoms of depression in their overweight patients.

Any treatment plan for children and adolescents must include the

family. Often siblings, parents, and other family members share the same lifestyle characterized by unhealthy food choices and limited physical activity.⁴² The role of food, food rituals, and customs within the family must be understood. Finding role models within the family may be challenging. And many family members will exhibit a hopelessness about ever controlling their weight or diabetes. Still, supporting children's parents and family will be important. Encouraging new parenting skills (Table 1) is one approach. Davison and Birch⁴³ found a relationship between parental concerns and restrictions related to food and negative self-evaluation in children. Thus, encouraging parents to avoid blaming and guilt is important.

Recommendations for community resources should be tailored to overweight children's needs. A traditional

diabetes camp, for instance, may not be the best choice for some obese children with type 2 diabetes. Rather, mall walks, cooking classes, image-boosting events, and weekend camps with easy-paced physical activity may be better choices. One program, reported by Sothorn et al.,⁴⁴ focuses on entertaining groups of adolescents while educating their parents. The program successfully capitalizes on the benefits of adolescent group dynamics and peer modeling.

Understanding the impact of type 2 diabetes in children and adolescents and treatment options for the disease has led the National Institutes for Health to fund the TODAY (Treatment Options for Type 2 Diabetes in Adolescents and Youth) study, a multicenter trial.⁴⁵ The trial will compare treatment outcomes for three study arms: metformin, metformin plus rosiglitazone, and metformin plus intensive lifestyle care.⁴⁶

Studies such as the TODAY trial will elucidate the medical and psychosocial options for managing type 2 diabetes in youth. Providers, becoming skilled in glycemic and weight management, will also need to appreciate the unique developmental needs of these young patients.

Table 1. Counseling Overweight Youngsters With Type 2 Diabetes (and Their Parents)

Nutrition and meal planning	<ul style="list-style-type: none"> Decrease total daily calories. Increase fresh fruits and vegetables. Increase fiber-rich foods. Decrease intake of sweetened beverages. Increase low-fat dairy and calcium-rich foods. Decrease dietary fat (especially saturated fat and trans fatty acids). Avoid skipping meals. Choose healthy snacks.
Physical activity approaches	<ul style="list-style-type: none"> Increase physical education time at school. Increase recreational physical activity. Limit TV viewing time to < 1 hour per day. Limit video games and computer time.
Parenting approaches	<ul style="list-style-type: none"> Set limits and be consistent. Practice and model healthy behaviors. Avoid food as a reward. Provide a supportive environment. (Remove high-calorie snacks from the home.) Be a community and school advocate for better environments.
Emotional support	<ul style="list-style-type: none"> Listen to concerns and empathize with frustrations. Teach social skills for dealing with teasing. Express acceptance and approval. Be nonjudgmental. Do not focus on weight loss. Focus on healthy habits, improved fitness, and increased energy. Support the child's reason for losing weight. Watch for and respond to signs of depression.

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