Conventional Treatment for Childhood and Adolescent Obesity

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The WHO International Obesity Task Force (IOTF) concluded that the growing worldwide prevalence of obesity in children (and adults) is today’s neglected public health problem (1). The IOTF argues that obesity management to achieve weight loss in the overweight and obese and obesity prevention to prevent weight gain in those of normal weight should not be considered separate clinical and public health issues. This approach runs counter to the manner in which conventional treatment of obesity is generally provided.

There has been an increase over the past decades in the number of publications on the treatment of childhood and adolescent obesity (Fig. 1). Most of these publications do not provide a strong evidence base for obesity management, being short term and uncontrolled.

CONVENTIONAL TREATMENT

The accepted components of obesity management in children and adolescents, as indeed for adults, are shown in Table 1 (1). Evidence supporting the efficacy of these strategies, particularly in the medium term (≥12 months), is quite limited. The 1997 systematic review of the treatment and prevention of obesity by Glenny et al. (3) identified 13 randomized controlled trials in children and adolescents with a minimum of 12 months of follow-up, including intervention time. The studies were small, usually less than 20 subjects per group, and although all were randomized, attrition rates ranged up to 56% and only one study provided an “intention-to-treat” analysis. Outcome data were almost exclusively concerned with changes in the degree of overweight, and none reported broader health outcomes.

Overall, the studies to guide evidence-based practice in the management of childhood and adolescent obesity are limited in number, scope, quality, and size. However, the work of Epstein and colleagues, spanning more than 20 years (4–7), demands attention. The children in Epstein’s studies were between 8 and 12 years of age, were at least 20% heavier than ideal body weight (IBW), and had one parent willing to attend the sessions. Main exclusions were psychiatric disturbance,
learning disability, and significant medical illness. The families recruited were predominantly white, intact families from higher socioeconomic groups. There was a cash deposit, which was returned according to the number of sessions attended.

Subjects were seen in groups, generally with children and parents separately. The intervention was between 2 and 6 months with decreasing frequency of contact, followed by a maintenance period of 12 months. The intervention was structured behavioral modification and diet, either with or without prescribed physical activity. Prescribed physical activity included programmed group aerobic exercise, lifestyle exercise, home walking programs, and reduction in sedentary activity. Attrition rates were about 20%. Follow-up weight data on children and parents exist for up to 120 months.

The main findings of Epstein’s studies are as follows:

- Better weight outcomes were achieved if parents and children were seen separately.
- The addition of physical activity improved 12-month weight outcomes.
- Children were better at maintaining weight loss in the long term than their parents.

Adolescents are generally viewed as a more difficult therapeutic group. The normal issues and tasks of adolescence, which include independence from family and conformity with peer group, detract from conventional management regimens. In

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<td>4. Modification of behaviors and habits associated with eating and activity</td>
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addition, older adolescents have lost height growth as a means of weight reduction. Puberty may already have exacerbated the degree of overweight, and medical morbidity is more prevalent. Earlier studies have identified parental participation and frequency of contact as improving weight loss (8,9).

Brownell et al. (8) treated 12- to 16-year-olds using three different therapeutic strategies—child alone, mother and child together, and mother and child separately (MCS). Although numbers were small, MCS showed both the greatest loss and the greatest maintenance of loss. MCS had a $-17.1\%$ relative overweight change at the end of the 4-month intervention, which was maintained at the 6- and 12-month follow-up, compared with the other two groups, which achieved a $-5\%$ change at these time points. Blood pressure as an index of morbidity fell with successful weight management. Weight change in children was not associated with significant weight change in mothers.

Coates et al. (9) required study subjects to attend a 1-hour group session five times a week for 10 weeks, with emphasis on reduced energy intake and behavioral modification. Subjects were followed for another 5 weeks of problem-solving sessions and then at weekly weigh-ins to week 20. The group, which had daily contact and had a monetary reward contingent on weight loss, achieved the most weight reduction: $+37.5\%$ overweight to $+25\%$ overweight at week 15, although a trend to slow regain was already apparent by week 20.

In 1987 Mellin et al. (10) published an evaluation of a practical intervention for adolescents—the Shapedown Program. The program can be used as self-instruction, individual counseling, or group program and is in a self-directed change format that encourages sustainable, successive modifications in diet, exercise, relationships, lifestyle, communications, and attitudes. There is separate parental material, which considers strategies for support, modification of the environment, and improved parenting style. There were 14 90-minute weekly adolescent sessions and two parent sessions. Subjects were between 14 and 18 years of age and most were female. The mean change for the intervention group was $-5.9\%$, $-6.2\%$, $-9.9\%$ reduction in relative overweight at 3, 6, and 15 months, respectively, compared with control figures of $-0.3\%$, $-5.2\%$, and $-0.1\%$, respectively.

**MEDIUM- TO LONG-TERM FOLLOW-UP DATA FOR WEIGHT MANAGEMENT OUTCOMES**

Though it appears that various weight management programs in children and adolescents can achieve short-term results, there is a need for evidence about interventions that achieve success in the long term. Only Epstein's group has very long-term data over 10 years (4). The mean percentage change in overweight was $-18\%$, $-5\%$, and $-5\%$ at 6, 60, and 160 months, respectively, with children stabilizing their degree of overweight at 5 years. Thirty percent of children achieved a 20% reduction in overweight at 10 years (compared with 3% of parents). The longer the loss sustained in the early postintervention period, the better the long-term outcome. No negative effects on long-term growth and development were found.
FIG. 2. The pattern of percent reduction in overweight children and adolescents subjected to conventional weight management strategies of up to 6 months' duration. This figure is a composite of five studies of varying duration of follow-up (maximum 10 years).

Gately et al. (11) reported a study in nearly 200 overweight children (mean age, 12.6 years) who attended an 8-week summer camp specifically for weight loss. Conventional strategies included increased physical activity, moderate dietary restriction, and behavior modification. Fifty percent of the original group reenrolled in 12 months, having had no formal follow-up. The mean standardized body mass index (BMI) scores for those reenrolling were +3.6, +2.4, and +2.7 at 0, 8, and 52 weeks, indicating weight loss and maintenance of that loss.

Nuutinen and Knip (12) treated 48 children between 6 and 16 years of age. Individual, group-, and school-based interventions were used, which concentrated on diet and behavioral change. The intervention was 12 months, followed by 12 months of observation and another review at 60 months. There was no difference in the success rate between the three treatment groups, with success defined as a 10% or more reduction in relative overweight. At the end of 12 months the mean change in overweight in the successful group was $-24.7\%$, and $-17.8\%$ at 5 years. At 5 years, one-third of those measured had a normal weight for height. There were no recorded predictors of success at weight loss, but those who had success in weight management achieved a more favorable lipid profile and a 30% reduction in fasting insulin.

Figure 2, taken from combined datasets, represents pictorially the expected pattern of long-term weight loss outcomes using conventional management strategies.

HOW CHILDREN REACH CONVENTIONAL TREATMENT

Not every child and adolescent who needs treatment is referred. The choice of referral is made for them. Such referral figures are not generally accessible, but the gatekeeper is often the primary care physician. Knowledge and beliefs about childhood obesity may dictate the frequency of referral.
THE PROVIDERS OF CONVENTIONAL TREATMENT

If only published data are considered, then the conventional treatment of childhood and adolescent obesity generally uses a multidisciplinary team. Physicians, dietitians, physiotherapists, nurse practitioners, and counselors may be involved. In view of the high prevalence of overweight and obesity in the community, it should be possible for weight management to be provided by a number of different types of health professionals and by those whose time does not come at high monetary cost. Given the strong genetic component of obesity, the management of childhood and adolescent obesity could also be addressed in adult weight management programs.

SETTINGS FOR CONVENTIONAL TREATMENT

Overall management strategies need to be transferable and not dependent on a particular setting for success. Many settings have been utilized (Table 2). Inpatient treatment is not strictly conventional, is high cost and short-term, but can demonstrate that weight loss is possible. A hospital clinic allows contact with multiple health professionals but may have limited access. The doctor’s office provides local access and a medical assessment, but expertise, time constraints, and cost may influence the quality of the service.

Community health centers provide local access, a multidisciplinary approach, and competence in group programs. Camps provide day-long intervention, with a high physical activity component, structure, and supervision, but are short term and somewhat artificial. School-based management acknowledges that children and adolescents spend a significant portion of time in school, and a weight management program can be combined with an established health syllabus. There are, however, disadvantages, which include targeting of children who may already be experiencing teasing and bullying.

Braet et al. (13) have recently reviewed their group’s experience of different settings for their basic program: group, individual, summer camp, or “advice in one session.” The basic program incorporated healthy eating combined with cognitive behavior therapy. The group and individual settings were seven 90-minute, twice-monthly sessions, followed by seven monthly family follow-up sessions. The 10-day camp included daily lifestyle exercises for 5 hours a day and then monthly follow-up. The mean weight losses for group, individual, camp, and “advice-in-one-session” settings at the end of 12 months were 13.1%, 9.8%, 14.7%, and 6.8%, respectively, with controls showing a 2.5% gain. Those children who were less than 55% overweight and less than 14 years of age showed the greatest relative weight loss. The more time-efficient options (one-session advice, group, and camp) did as well as individual management. Additionally, group-based approaches match established

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health care delivery patterns in community settings, are accessible to large numbers of overweight children and their families, foster social support, share problem solving, and provide access to successful models.

THE EVIDENCE FOR THE COMPONENTS OF CONVENTIONAL TREATMENT

Dietary Modification

Dietary intervention in children tends to reflect adult management trends. Thus older studies were rather prescriptive. More recently, low fat and healthy eating utilizing general guidelines have been employed. A low-glycemic-index diet has been suggested as useful in childhood obesity management, but the study was short term and retrospective (14).

Epidemiologic evidence suggests a positive association between dietary fat intake and obesity (15). A recent metaanalysis (16) concluded that a reduction in dietary fat without restriction of total energy intake is effective in producing weight loss in overweight adult subjects. There is some cross-sectional evidence that children who are overweight have higher fat intakes (17), but no prospective data. Thus there are no studies in obese children or adolescents that evaluate the role of low-fat diets for weight loss. There are numerous metabolic reasons why a high-fat diet may compromise the regulation of energy balance, particularly in those with a genetic predisposition to obesity and low levels of activity. Focusing on fat—and hence on eating habits, food shopping, and the type of food, rather than on quantity and dietary restriction—may also be an important strategy to support the development of the child’s capacity to self-regulate intake. The Dietary Intervention Study in Children (DISC) used a low-fat ad libitum diet in children for the primary purpose of reducing low-density lipoprotein (LDL) cholesterol (18). DISC has provided long-term evidence in a population of children between 8 and 10 years of age and not selected for obesity showing that such a diet does not compromise nutritional status or growth and development. There was also no sustained weight change over time with the intervention group.

A low-fat ad libitum diet will generally provide a daily fat intake of 55 g, which approximates to 25% of the energy intake. This level of fat intake was achieved by 10% of Australian children 6 to 10 years of age in the 1995 National Nutrition Survey, whereas an additional 20% of children had fat intakes of around 25% to 30% of dietary energy. This level of fat intake is recommended by the IOTF as necessary to minimize energy imbalance in sedentary individuals, can be readily achieved while maintaining palatability and acceptability, will principally reduce saturated fat, and will not compromise micronutrient intake (19).

Dietary intervention should follow the national nutrition guidelines, use low-fat food preparation, and choose low-fat protein foods. The quantity of animal protein often needs to be reduced and meat alternatives considered. More fruit and vegetables should be consumed and healthier snack food choices need to be available. Such an intervention thus aims for an overall reduction in energy intake by reducing both energy-dense (high-fat) foods and portion size. Low-fat ad libitum diets in the clini-
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...cal situation must be prescribed as “until you no longer feel hungry,” and do not mean “as much as you want.” Additionally, special-occasion or “treat” foods need to be limited. Healthier take-out food choices need to be encouraged, and parties and social occasions should be actively managed. Breakfast must always be eaten. Obese children tend to avoid eating in public (because of teasing) and therefore tend to overeat in the evening. As a result, they do not feel hungry at breakfast. The amount of nutrients taken as liquid should be limited, with water used for quenching thirst.

It is advisable to refrain from calorie counting or food weighing. These practices are difficult, time-consuming, and inaccurate, and they have a low compliance. One or two dietary changes at a time should be made, and when these are well in place, the next ones should be made. The therapist must be sensitive to sociocultural issues and preferences, and should continue to emphasize that the changes are forever. It is best to avoid the word diet, which for most persons has very temporary connotations. All family members, whatever their body mass, should consume similar types of food.

Increasing Physical Activity

Energy expenditure as a result of movement is of great importance when addressing the treatment of overweight and obesity (20). Physical activity in children can be planned or incidental, and incidental activity includes spontaneous physical activity (wriggling and fidgeting), a behavior that is often actively discouraged in children.

Although the enhancement of physical activity is a component of weight management programs, studies tend not to define the relative contribution of physical activities or to quantify compliance. Only recently has this been done in adults (21), in a study that showed that if the energy deficit induced by exercise was identical to that induced by dietary intervention, then the weight loss was identical. The enhanced activity prescriptions in childhood obesity management are unlikely to induce such a large degree of energy deficit. Epstein and co-workers provide some evidence for an additional advantage of physical activity, and this group has shown that decreasing sedentary behavior is as effective in short-term weight management in children as increasing active behavior (5).

Prompting children to be active increases activity, and parental physical activity has an influence on children’s activity. It appears that the parent–child relation for inactivity is stronger than the relation for more vigorous activity, for both obese and control children (22). Thus interventions to raise energy expenditure should involve strategic targeting at both individual and family levels to increase physical activity and modify sedentary behavior (23). An emphasis on choice and a reduction in sedentary behavior are likely to be more successful in producing long-term weight control. Programs that encourage skill development can affect longer-term activity patterns and choices in children through to adulthood (24), and may be beneficial for longer-term weight maintenance.

Parental involvement is essential in a range of practical ways: encouragement, accompanying children to recreation areas, increasing their own physical involvement in the chosen activities, monitoring TV use, and providing alternatives to sedentary...
behavior. There are no pediatric data to support a specific time or intensity-based activity prescription in obesity management. A range of daily after-school activities and weekly family-based initiatives, with an emphasis on outside activities, should be prescribed, as these characteristics of activity reflect total activity patterns (25).

In summary, any activity where energy has to be used can be included, with the aim of doing more than previously. In the beginning, not too much emphasis should be placed on intensity. The duration and intensity of any chosen activity should be gradually increased. Children and adolescents should choose activities that they like and that are fun. Families need to be reminded that physical activity is not just sport or similar planned activity. There needs to be a strong emphasis on increased lifestyle or incidental activity, and a constant goal of decreasing sedentary time.

**Behavioral Modification Interventions and Habit Change**

These interventions are based on the use of cognitive strategies, behavioral strategies, education, and motivation. As most obesity studies use some type of behavioral intervention, it is difficult to isolate the individual effect of this component, and such strategies should be considered integral to any management program that seeks long-term changes in human behavior.

Parenting skills training may well facilitate behavioral change in children. Family interactions and the parents’ role in determining and responding to their children’s food choice and mealtime behavior play an important role in problem eating behavior in children, which may contribute to the development of obesity (25). There is a paucity of controlled outcome research examining the role of parenting interventions in the management of childhood obesity. The work of Golan et al. (26,27) provides some interesting evidence for parents as the sole agents of change in weight management in children. Their hypothesis is that the “focus on manipulating the environment using parents as the main agent of change and strengthening their leadership skills would help the children overcome resistance to change and take the focus off them being identified as the (obese) patient.” Children between 6 and 11 years of age, more than 20% above expected weight, with both parents living at home and agreeable to meeting all study requirements formed the study group. In the experimental intervention only the parents attended group sessions, whereas in the conventional intervention only the children attended the group sessions. Dietary instruction (centered on reduced saturated fat), alteration in sedentary behavior, and behavioral modification were the management strategies. In the parent group there was an emphasis on general parenting skills.

The main outcomes were:

- Children in the experimental group decreased overweight by 14.6% (compared with 8.4% in the conventional intervention).
- Neither intervention resulted in an increase in physical activity time for children.
- There was a positive relation between reduction in overweight and changes in eating styles, particularly a decrease in eating between meals and in eating with accompanied activity.
Golan’s work accords with clinical experience and the recognition that a developmentally appropriate approach to management of obesity in childhood is important. Behavioral interventions focus on dietary and activity change. Such behavioral modification has to be addressed in an age-appropriate manner. In the preschool years a wide range of foods should be encouraged and children must ask for and not just take food. Continuous grazing should be avoided, as should manipulative battles over food. Play must be taught and encouraged and television limited. Walking should be encouraged so that endurance is increased, even though the obese child may initially complain of discomfort. Habits start at this age, so parents need to work on those habits that they do not wish continued.

For primary school-age children, parents should still be in control of foods coming into the house, but they are not totally in control of what their children eat outside the house. Parents should ensure that breakfast is eaten and still encourage children to ask for rather than take food. Encouraging play and playmates, and limiting computer and video games as well as television are still important strategies. Involving the child in physical household tasks is an effective means of increasing physical activity and spending time with the child. Children of this age will respond well to self-monitoring of behavior change, using star or sticker charts.

During adolescence eating is often independent of family and home, but families can still set healthy eating examples. Adolescents need involvement in both meal choice and food preparation. Healthy food choices should be praised, but families should avoid making a big issue of less healthy choices. Weight maintenance may have to be accepted if progress to weight loss is too difficult. Parents and therapists should recognize the adolescent’s emerging maturity, but continue to set limits and define boundaries. The overweight adolescent is likely to have already experienced personal failure at weight loss and observed similar failures in other family members. Adolescents need to gain confidence in managing other aspects of their life before they have enough confidence to manage their weight.

Active parenting is a specific aspect of family behavioral change, where behavior modeling is as important as instruction. An assertive parenting style is necessary, rather than being too aggressive or too passive. Discipline is a way of setting controls or boundaries and is required by all children and adolescents. Discipline can be achieved by modeling, using various and positive rewards and having realistic expectations.

**BARRIERS TO CONVENTIONAL TREATMENT**

In any conventional management of obesity in children and adolescents it is important to address beliefs that are likely to interfere with effective management.

*Obesity will reduce or disappear during puberty.* Tracking data clearly do not support this belief.

*Restrictive food practices in childhood will induce an eating disorder.* This concern emphasizes the importance of physical activity as a weight management strategy, because attention is deflected from food and eating. Data show that obese children and adolescents are at risk of, or already have, disordered eating (28).
Dietary restriction will impair normal growth and development. Approximately 2% to 4% of daily energy requirements are used for growth. Obese children are overnourished, and a slowing of excessive growth velocity (in response to overnourishment) is a normal phenomenon in successful management.

Obesity equates with health. This belief is more prevalent in cultures where deprivation and poor childhood health are within parental memory. Obese children have well-documented morbidity.

OUTCOME INDICATORS IN THE CONVENTIONAL MANAGEMENT OF CHILDHOOD AND ADOLESCENT OBESITY

Outcome indicators are shown in Table 3. Weight change remains the primary outcome, but there are no data to indicate how much is enough or optimal. Children and adolescents are generally still growing. It may be necessary only to halt weight gain and to allow the child or adolescent to grow into their current body weight. This observation does not apply to the older adolescent or the extremely obese child.

In children and adolescents there must be standardization of fatness measures. BMI must be age adjusted. The BMI SD score is excellent for statistical manipulation but is clinically impractical. Monitoring of height and weight on a growth centile chart has practical clinical value. This is particularly so if weight maintenance is the agreed goal. As children continue to attain height, their weight centiles come closer to matching their height centiles. Waist circumference can be used as an indirect measure of reducing truncal adiposity (29). Skinfold measurements are not clinically useful owing to measurement difficulties, including subject acceptability and intra- and intertester reliability.

A reduction in BMI has been associated with improved metabolic indicators in adults. There is no Level One (high quality) evidence from trials in children. The study by Sasaki et al. (30) focused on cardiovascular risk reduction in 41 children. This was a school-based program, and the obese children had an extra 300-kcal daily deficit of aerobic activity, but with no dietary intervention. There was a 50% reduction in the degree of overweight at 12 months, with a slight further change at 24 months. There was a significant increase in high-density lipoprotein cholesterol and a less marked change in triglycerides over the same period.

The Nuutinen and Knip study (12) discussed earlier also shows the value of improvements in metabolic profile in a conventional treatment program. Even in the

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absence of significant weight change, such results would be regarded as clinically important, but their effects on long-term macrovascular morbidity associated with childhood obesity are unknown.

Habit change in weight management is important but does not always translate into weight change. Measuring dietary intake or physical activity is difficult, subject to reporting bias, and of uncertain reliability and validity. Self-monitoring of simple behavior change is, however, often incorporated, as children are familiar with this type of monitoring in other behavioral change settings.

As concerns have been raised about the effect on psychosocial well-being of weight management in obese children, it may be a fruitful area of research to use selected validated measures to assess the impact of interventions on child well-being and body image, parenting capacity, confidence, and satisfaction.

RESEARCH QUESTIONS AND POLICY DIRECTION

Suggestions for research questions and policy direction are outlined in Table 4. The prevalence of childhood and adolescent obesity demands that management occurs at a community level. Community intervention embodies principles of equity of access, knowledge of local needs, and reduced costs. Research is not a tradition at this point of care and needs to be fostered and supported by tertiary institutions. Research needs to be directed at the replication of studies such as Epstein’s in primary care settings.

There is sound evidence over two decades that parental involvement is important in weight management. The relevant studies have primarily been in intact families, and the challenge is to adjust delivery to all family situations.

The messages for management should be consistent and congruent with the messages for prevention of overweight and obesity. Such messages include low-fat eating, portion size according to age, physical activity, and behavioral change. Management of established obesity could also be integrated with prevention initiatives. Evidence suggests that management has better results if the child is not excessively overweight and is younger, whereas the practice is often to adopt a “wait-and-see” approach. Increasing activity as a management focus still lags behind diet prescription and behavioral change. It is difficult both to increase physical activity consistently and to prescribe physical activity in an effective and suitably directive manner. Input from professionals, such as exercise physiologists, who traditionally have not focused on childhood and adolescent obesity, would be valuable.

TABLE 4. Future directions in the conventional management of childhood and adolescent obesity

| 1. Replication of weight management studies in children and adolescents in community settings. |
| 3. Health professional education around obesity management in children and adolescents. |
| 5. Integration of obesity treatment with obesity prevention in children and adolescents. |
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There should be the development of national guidelines for the management of overweight and obesity in children and adolescents, in order to address specific local requirements. The evidence base will not at present be great, but further evidence cannot be awaited before guidelines are developed. Rather, the production of evidence should occur in parallel with well-designed demonstration studies.

Guidelines will allow for the education of health and other professionals. Obesity and overweight are not yet seen as the business of many sectors other than health. Obesity is a socially engineered problem with medical ramifications, and the responsibility for its management cannot remain exclusively in the health sector.

Therapists who treat obesity in children and adolescents need to evaluate their programs and to allow for outcome indicators other than weight change. There is little knowledge of what happens to those children and adolescents who drop out of treatment early. It is assumed that their outcomes are poor, but there is no proof of this. Evidence has been provided for short to medium-length interventions that induce a sustainable weight change. The optimum times for program delivery, review, and reinforcement to avoid significant relapse are unknown.

CONCLUSIONS

The conventional management of childhood and adolescent obesity has been addressed in the medical literature for decades. There is good evidence that children do better than adults in conventional weight management programs. There is strong evidence for the important role of parents in conventional management of childhood and adolescent obesity. Appropriate accessible management settings and long-term evaluation of the outcomes in these settings should be part of management in the twenty-first century.

REFERENCES


**DISCUSSION**

**Dr. Srivastava:** There are situations where the whole family is obese. It's difficult to tackle these situations. What is your approach in such cases?

**Dr. Steinbeck:** I agree this is very difficult, especially because in our experience not every family member will identify themselves as obese. We first ask them to state whether they consider themselves to be underweight, of normal weight, or overweight, and it's surprising how often only one child is identified as overweight. I think that by and large those families do poorly unless you can change their outlook. What we generally do under those circumstances
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is to aim for weight management in the family. We also work with a family therapist who is often useful in reframing the family’s outlook.

Dr. Moore: I have a comment on the failure to recognize obesity. We have recently completed a study in obese and overweight children where we used two scales: a visual scale and a verbal scale. Both the children and the parents did much better on visual analog scale recognition of obesity than on the verbal scale. Using the visual scale, only one-third of the parents and children weren’t prepared to acknowledge that the child was obese, whereas on the verbal scale, two-thirds of the children and two-thirds of the parents did not acknowledge that the child was overweight or obese. I think that has implications with regard to motivation. Do you have any comment about that?

Dr. Steinbeck: That’s congruent with other observations. It is quite difficult to know how to address this issue without losing your patient before you’ve even started. If there seems to be a degree of “fat blindness” in our patients, we initially choose not to do too much about it and simply try to work with the presenting child, and through that child with the rest of the family. But this does raise a question about how we identify obese children, because I’m not certain that all members of the health profession are as eager as we are to do something about obesity. If the patients are not interested, then they are unlikely to raise the topic, and that’s an important concept.

Dr. Birch: We have been presented with a lot of evidence about sex differences in relation to prevalence and so on. Do you have any comments about sex differences with respect to treatment?

Dr. Steinbeck: I have no comments at the pediatric level, but we run sex-specific programs for male and female adult patients and that is certainly effective. We haven’t at this stage introduced pediatric sex-specific programs, though I think it would be desirable if resource intensive. Mixed groups are probably suitable for primary school children, but in adolescents one does need separate agendas—girls need more talking and boys need more action.

Dr. Rüthihauser: In obese adolescents, what is the benefit of counseling both the adolescent and the parents? Is there any evidence about whether it is better to counsel them separately or to have joint sessions?

Dr. Steinbeck: I think the evidence is that you don’t actually counsel them together. In my own view, weight management in adolescents is almost too late! It is an extremely difficult time for young people to lose weight—you need a degree of psychological energy for this that most adolescents don’t have. I would go for separate counseling, and we try to have one person for the adolescent and one for the parents, so that there is a perception of confidentiality. One also needs to do what one can to support parenting skills.

Dr. Bar-Or: I would like to reemphasize two points that you made. One is regarding the studies of Epstein about long-term adherence to weight reduction programs and their benefits (1,2). I think we need to be very careful when interpreting these studies because of Epstein’s approach to selecting the subjects. They excluded a priori children who seemed likely not to be compliant. Thus this was obviously a very highly selected group. I think it is important that other investigators repeat these studies. My other comment is regarding the possible danger of generating eating disorders when treating obese children. In our experience of nearly 2,000 children going through our program in the last 15 years, we had only two girls who became anorexic within 2 years. Thus I agree with you that the risk of this happening is really quite minuscule.

Dr. Steinbeck: Thank you for those two comments. I agree there are a lot of exclusions in Epstein’s study groups, but I think it would be unwise to dismiss those studies. As you say, we need to try and replicate them in other settings. In relation to eating disorders, we have never
had a patient develop anorexia nervosa. On testing, at least 20% of our children and adolescents have some form of binge eating, or secretive eating, and this starts quite young, from about 8 years onward.

_Dr. Maffei:_ Do you have any information about techniques to improve motivation in children and adolescents? How can one maintain motivation to continue with treatment?

_Dr. Steinbeck:_ I don’t have a magic answer and I don’t think there is one. There are several things to consider. First, you need to have the involvement of somebody who is truly interested in being with adolescents. Second, as health professionals, we tend to try to do everything at once to solve the issue. Motivation appears to be greater in adolescents if you take time to find out what is most important and meaningful to them. This may not be what is most important and meaningful to you. You then need to tackle one goal or objective at a time. Nevertheless, this does not stop our dropout rate for adolescents being close to 50% at 12 months.

_Dr. Koletzko:_ I thank the organizers for the opportunity to present a concept we developed in Munich in response to the large numbers of obese children there—some 12% in primary schools and 15% to 16% in secondary schools. It is very difficult to have physician-based treatment for such large numbers of children. We therefore developed a child-based behavioral intervention with attractive modern media, the Power Kids program. It is like a game—played like Monopoly if you like—and the emphasis is on children learning self-control to moderate their fat intake and physical activity, using token economy concepts. There are points for fat consumption, called Fatsy points (the child does not really need to understand that this is about fat consumption), there are points for physical activity, and points for inactivity, and there are reinforcement points (Winnie points). Of importance, there are no external (parental or physician) restrictions, and we have placed a lot of emphasis on building self-confidence and achieving success.

It is a structured program lasting 12 weeks. It looks difficult to the parents, but the children find it easy because it’s already part of their way of life—a gamelike concept designed for children 8 to 12 years of age in which they need to read and calculate. The emphasis is on behavior and not on cognition, and participating children are selected by the recommendation of a pediatrician, GP, or other health professional. The program is actively performed by the child alone and there is no involvement of external people. It is described in detail on the Internet.

The child gets a box which is worth about 30 Euros or $US30. That is the price the family pays for it, and it’s also the price of the game. The box contains a lot of media, including a videotape with 12 short clips that introduces the program, showing each task for the week, and various other program details that I cannot explain in the time available. Basically, the children learn, using with cards and games, which foods high or low fat contents, and then they monitor their own fat consumption using a food frequency questionnaire. They can modulate this and have Fatsy points to spend each day.

We evaluated the program in a group of 141 obese children recruited from newspaper advertisements. Their weight-for-height was at least 120% of normal. The program was presented in a 30-minute group session, and the children were sent home without any further support. With conventional treatment we would not expect many children to return, but with this program 70% of the children returned after 3 months, again without any further support. We also tried out the program in a pediatric practice, where a pediatrician motivated the child, and there we had an even greater success rate of 84%.

Body mass index decreased over the 3 months of this very nonintense program by almost half a standard deviation score, and on follow-up 1 year after the end of the program, there was a further 0.5-SD reduction in BMI. About 90% of the children completed the program and were followed up after another year.
Our conclusion is that this self-directed behavioral program is effective in a large portion of schoolchildren with uncomplicated overweight. It is unlikely to be adequate for children with severe psychosocial or other problems. It is low in cost and economical of personnel, so it can be widely applied. Nine thousand children are already using it in Germany.

**Dr. Endres:** Does the Power Kids program aim to increase knowledge about food or nutrition?

**Dr. Koletzko:** There is no real increase in knowledge. In the material we provided there was a little booklet with questions and answers on nutrition, but in the questionnaires we got back from the children who used the program it appeared that most of them did not read it, though their parents did. The concept of the program doesn’t really involve cognition, because we feel that knowledge of nutrition does not translate into behavior. Many children tell their parents that they mustn’t buy all these foods that are high in Fatsies, that these are not good; they need foods that are low in Fatsies. But they had not understood that a Fatsie is 3 grams of fat, and in the younger age group of around 8 years they did not have much understanding of what fat really is. However, the program still worked because it involved a positive selection of foods.

**Dr. Freedman:** In the small amount of data you showed there was no control group, and I wonder to what extent a simple regression to the mean could explain the results you found?

**Dr. Koletzko:** I don’t think it is a reasonable assumption that in 8- to 12-year-old overweight children with a mean weight-for-height standard deviation of 4 there would be a 1 SD regression to the mean in the course of 1 year. We had some difficulties with a control group. We had applied to our ethics committee to randomize the children to intervention and nonintervention, but the ethical review board said that as it was our practice to intervene in overweight children of more than 120% weight-for-height, we should not have a control group without intervention. We therefore compared the data with our other interventions, which were intensely physician based, and even if we were not doing any better with Power Kids, we certainly weren’t doing any worse!

**REFERENCES**
