Personal practice

Management of obesity

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We all think we understand obesity. The layman can recognise it as readily as the specialist as severe cases are obvious, but distinction of the normally fat from the mildly obese is extremely difficult. Superficially, the explanation for obesity is also simple. Obesity results from an excess of energy intake over energy output. Consequently, reducing energy intake leads to fat reduction and cure. Ergo, the obese are either greedy or lacking in willpower—neither creditable traits.

These views are, of course, too simplistic. Overwhelming evidence that the obese eat more than the non-obese is lacking.¹⁻³ Dietary restriction is notoriously ineffective. Yet perhaps this too is a misrepresentation. Children may slim spontaneously during late infancy, male adolescence, and at other ages.⁴⁻⁶ Obesity is widely understood to be cured by dieting. Both adults and children may restrict their intakes when they notice obesity and lose weight successfully without medical advice. Success with slimming regimens has been described as inversely related to the degree of medical involvement⁷ but, given the above, this could be expected. The obese referred for help are those who have greatest predisposition to obesity or greatest resistance to slimming, or both.

What are we trying to achieve by treating obese children?

Ideally, the aims of treatment of obesity would be to achieve appropriate weight for height and age and to keep weight within the normal range, while allowing normal growth. This is possible for moderately obese young children with much growth ahead. It is probably not possible for many grossly obese adolescents, particularly severely obese girls who are postmenarche. Yet if cure is not possible any reduction in fat will still improve appearances, increase mobility, increase opportunities for buying attractive clothes, and, possibly, diminish morbidity

from the hazards of obesity that occur in adult life. I treat obesity on the assumption that some loss of fat is worth achieving, even if appropriate weight for height and age is not attained.

Where should obese children be treated?

Obesity clinics have many advantages (Table 1) but will not be available to all. Hospital management is not essential. After initial assessment obese children can probably be managed as well by any interested and knowledgeable person as by a paediatrician. Clinics held in schools may be more appropriately sited. Whoever looks after these children must understand normal childhood growth and nutrition as well as have a sincere interest in the management of obesity. Group treatment sessions may suit some organisers and some children, but long term results do not suggest that novel approaches to obesity have advantages over more traditional clinics.⁸

Assessment

The first attendance is very important. Children with pathological cause for their obesity (Table 2) must be recognised and investigated. Eating habits and the dietary likes and dislikes of the children must be determined. Details of social and family history provide insight into the environmental problems likely to affect children's ability to diet. Baseline anthropometry is obtained and dietary and general guidance provided. Inadequate assessment

Table 1 *Advantages of specialised clinics in treatment of obesity*

Time can be allotted for dietary and behavioural discussion
Concentration of patients makes dietician's attendance worth while
Precise anthropometry by same observer
Large adolescents less 'out of place' than in general paediatric clinic
Mutual support for families through attendance at one problem clinic

Table 2 *Pathological conditions predisposing to obesity*

<i>Sign</i>	<i>Cause</i>
Endocrine	Hypothyroidism Growth hormone deficiency Cushing's syndrome Craniopharyngioma
'Hypothalamic'	Prader-Willi syndrome Laurence-Moon-Biedl syndrome Carpenter's syndrome Alstrom's syndrome Pseudohypoparathyroidism
Chromosomal	Down's syndrome Klinefelter's syndrome
Drug treatment	Corticosteroids Sodium valproate
Reduced activity	Spina bifida Duchenne muscular dystrophy
Non-specific causes of mental retardation	
Skeletal causes of short stature	

or indefinite advice given on the first occasion children are seen may be difficult to overcome or correct later.

Table 3 lists particular points of importance in history and examination. Children with 'simple' obesity are often from single parent or single child and lower social class families. Eighty per cent will have at least one obese parent.⁶ A detailed dietary history is essential, although tedious to obtain. I usually ask parents and children to work backwards over 24 hours recalling the foods eaten and then ask specifically about intake of 'inbetween' foods (sweets, chocolate, crisps and similar packet items, ice cream, biscuits, cake, chips, and 'pop') and the usual intake of bread, potatoes, and milk. Whether weekend diets differ greatly also needs to be determined. Some families can give clear dietary histories. Others insist their child eats nothing. 'Nothing' is sometimes remarkably nutritious!

Children with suspected 'pathological' obesity form a very small proportion of the total population

of obese children. Most of them have Prader-Willi or Laurence-Moon-Biedl syndromes or other obvious handicap. Children with pathological obesity usually present with short stature or other symptoms before obesity becomes a major problem. Nevertheless, children whose heights are below the 25th centile for age (obese children are commonly above average stature) deserve at least thyroid function tests, and all deserve more extensive investigation if other features suggest pathological obesity. Occasionally some investigation is necessary to reassure parents that their child does not have a 'glandular' problem and that they must pursue dieting to treat the obesity. The enthusiasm with which children pursue slimming advice is rapidly diminished by suggestions that their obesity may not relate to their food intake. Thus I try to remove concerns about disease as quickly and as definitely as possible and then proceed to advise on management.

Clinical examination must include an assessment of pubertal development as this will indicate the likely extent of future growth and present nutritional requirements for growth. During the pubertal growth spurt boys may have enormous intakes^{1 9} and lose fat readily, even on energy rich diets. Postmenarcheal girls have fairly low energy requirements and, as growth has more or less ceased, must concentrate on weight loss if they are to slim.

One of the major health risks to the obese is the second rate medical care they are liable to receive. It is easy to feel impatient or contemptuous with the grossly obese and to attribute their complaints to their size. Hence the need for a sympathetic clinic atmosphere. There is also the sheer impossibility of giving these children the same precise clinical examination given to normal children. Palpation of abdominal viscera through a carpet of subcutaneous and intraperitoneal fat may be impossible. Blood pressure is difficult to measure accurately due to the large arm circumference. I usually use a leg cuff in adolescents, folding it over so it is two thirds the length of the upper arm. The inflatable part of the cuff then encircles the arm, which is necessary for accurate sphygmomanometry.

Anthropometry must be performed carefully and preferably by the same observer on each occasion. Children are weighed in light underwear only. Weights and heights are recorded at each attendance. Beam balance and Stadiometer are advisable. Skinfold calipers are useful but not essential and should not be given too much importance. Very fat children may have skinfolds that are too thick for the gape of the calipers. Before slimming, many have skinfolds that cannot be raised or that will not pull into proper folds so the calipers gradually slip and steady readings cannot be obtained. Once some

Table 3 *Particular clinical points of importance in assessment of obesity*

	<i>Clinical point</i>
History	Birth weight Age at onset of obesity Family history of obesity Parental heights and weights Family size and structure Detailed dietary history
Examination	Distribution of fat Presence of hirsutes, striae, or Cushingoid facies Orthopaedic problems, especially slipped upper femoral epiphysis Blood pressure Visual fields Pubertal development Presence of glycosuria

Table 4 Sites for measurement of skinfolds (left side of body) in obesity

Name of site	Site
Triceps	Over triceps muscle midway between olecranon and tip of acromion with arm hanging by the side of the body
Biceps	Over the midpoint of the biceps at same level as triceps fold with arm resting supinated on thigh
Subscapular	Just below the tip of the inferior angle of the scapula at 45° to the vertical
Suprailiac	In the mid-axillary line just above the iliac crest

weight is lost, the folds are raised more easily and a big decrease in thickness recorded, giving a false impression of excessive loss of fat. Skinfolds can be compared with expected values on centile charts¹⁰ but are usually well above normal values in children referred with obesity. Skinfolds can also be used to determine total body fat from regression formulas, but these formulas^{11 12} are very imprecise. It is simpler to compare relative fatness by using log conversions of summed skinfold measurements and comparing this data. I measure triceps, biceps, and subscapular and suprailiac folds (Table 4).

Studies of obesity often use weight for height measures as indicators of obesity. These have many problems and must be regarded as only approximating to the degree of fatness. The formula chosen should be free of appreciable height bias.^{13 14} In adults Quetelet's index ($\text{weight/height}^2 = \text{body mass index}$) is commonly used. In childhood the index has limited use as it varies with age. Body mass index can be related, however, to the index of a theoretical child of the same age with weight and height on the 50th centiles of growth standards to give a % body mass index.¹³ This is useful when comparing relative weight of children of different ages or one child on different occasions. Values are usually interpreted as <90%=underweight; 90–110%=normal weight; >110–120%=overweight; >120%='obese'.

Management

Successful management of obesity depends on motivation, decreasing energy intake, and increasing energy output.

Motivation. Motivation is achieved through education, advice, and support. Children and their families need an explanation of obesity other than the interpretation that they must be greedy or feeble because they are obese and cannot slim. I usually suggest that obesity occurs because obese individuals eat more than they need, although this may not necessarily be more than that eaten by their slim

friends next door. To slim they need to eat considerably less than at present. Exercise, while helpful, is unlikely alone to be sufficient to slim children who are more than slightly overweight.

Parents and children also need to understand the nature of slimming in childhood. Almost without exception, slimming in adult life involves loss of excess weight. In rapidly growing children slimming may take place even with slight weight gain. Weight loss adds a bonus of weight not gained as well as weight loss. Indeed, it is sometimes recommended that children should not be encouraged to lose weight when slimming because of the risks of affecting linear growth and lean body mass. Children should be allowed to 'grow into their height'. This may be reasonable for mildly overweight children, but it is not practical for most children referred for slimming advice. Many of these children are above expected adult weight at the time of referral. Others would have to maintain the same weight for four or five years before achieving appropriate weight for height. Thus in most cases some weight loss is advisable, although families must appreciate that as growth proceeds, weight gain will ultimately occur, although fat loss, and therefore slimming, may continue.

Motivation is also helped by frequent clinic attendances. I aim to review children three weeks after first being seen. Longer periods usually mean that children delay beginning dieting until, or give up their diet before, review.

Reducing energy intake. Dieting is basically disciplined eating. Children who are dieting need to learn to have their mouths empty most of the day.

I do not prescribe particular 'calorie' diets. Children come in many shapes and sizes, and within one age group the range of normal intakes even for the normal weight is enormous. Published data provide only broad outlines of the energy requirements of individuals. Therefore I find out in as much detail as possible what the children eat and then adapt this so that eating is at regular mealtimes and snack periods and total energy intake is greatly reduced. This is achieved largely by eliminating snack foods, which are high in energy, low in satiety, and of poor nutrient quality. Energy intakes between 4.2 and 6.3 MJ/day (1000–1500 kcal/day) are the usual result, although very small children may only eat in the lower ranges anyway and teenage boys at the peak of their growth spurt require more than this if they are to both slim and grow rapidly.

The general principles for prescribing diets are outlined in Table 5. The amount of bread allowed depends largely on previous intake, but I usually advise no more than three rounds, except for boys at

Table 5 *General principles for dietary management of obesity*

Confine eating to mealtimes and recognised snack periods
Cut out low satiety, high energy, snack foods altogether—that is, no sweets, chocolate, crisps and similar packet items, biscuits, nuts, ice cream, or cakes
No sugar free chewing gum—children must learn to keep their mouths empty
Avoid fried foods, chips, and adding fat during cooking or serving
Grill, boil, or steam roast instead
No sugar added to cereals, to drinks, or during cooking
'Low calorie' fruit squash and carbonised drinks only
Regulated bread, potato, and milk intake
Consume whole foods where possible as they are often slower to eat and have greater satiety
Modify school meals (Table 7)

their growth spurt. Teenage girls who are post-menarche may require less, as may preschool children. Bread is a useful food, which is quite satisfying and by itself not tremendously fattening. But we rarely eat bread by itself and the butter, margarine, cheese, or jam that go with it greatly increase the energy intake involved with eating bread. Wholemeal bread is no less energy dense but may be more filling and thus more satisfying. It also provides fibre, which is helpful for occasional children who find restricted diets constipating. Milk is another food that should be encouraged in limited amounts. It is a useful source of calcium. I recommend three quarters to one pint a day and no more. Some obese children drink several pints of milk a day. Potatoes similarly provide a source of both energy and other nutrients. One small helping per day of boiled, mashed (with milk but no butter), or baked (without added butter) will make a meal much more filling. Chips should be avoided. Table 6 outlines a typical result of this dietary approach.

Most diet foods and low energy products should be avoided. Many are expensive. Soft margarines, however, are preferable to butter as they can be spread thinly even when taken straight out of the refrigerator. Margarines are also supplemented with vitamins A and D, unlike butter. 'Low calorie'

margarines help further as fats are so energy dense that even small quantities on bread may amount to substantial energy intakes. Low energy breads may be useful, but children are likely to eat two slices of low energy bread (or two crispbreads) for every slice of normal bread allowed. This is not helpful as almost the same amount of butter, margarine, jam, or cheese goes on to one slice of low energy bread as on to one of normal bread. Skimmed milk can be used, but in preschool children vitamin intake and growth must be followed carefully. Sugar free and 'low calorie' fruit squash and 'pop' are essential for many children who are dieting as many refuse to drink water. Sugar free whole fruit juices (usually sold in cartons) are a good source of vitamin C and a small glass at breakfast, for example, is acceptable. These juices should not be used as drink instead of squash, as although free from added sugar, the number of compressed fruits in each carton makes them more energy dense than many sweetened drinks.

Some children have undisciplined eating habits and very restricted tastes, with refusal to eat meat, vegetables, salad, or fruit. Such children are a dietitians's nightmare. It may be impossible to design balanced diets that are both slimming and acceptable to them. Sadly, few of them, although miserable because of their obesity, make any effort to learn to like new foods.

School dinners. Until obese children modify their intake at school dinner they are unlikely to slim successfully. Obese children do not require two full cooked meals (dinner and evening meal) each day. There are therefore several alternatives to school dinners (Table 7). All require liaison between parents and school so that schools help, rather than hinder, children's dieting efforts. Problems arise when children are entitled to free school meals and parents resent so little food being provided. If the solution is for the school dinner to become the main meal the evening meal must be light. Children who have potatoes (*not* chips) at school dinner do not need them in the evening. School puddings should be avoided unless fresh fruit or low energy yoghurt can be provided.

Table 6 *Outline of possible diet on suggest regimen (roughly 4.2 MJ (1000 kcal))*

Mealtime	Intake
Breakfast	Cereal, milk, no sugar and/or one piece of toast, thin scrape of low energy margarine Tea, coffee, no sugar, or glass of milk
Break	Apple/orange
Dinner	Meat, salad, no potatoes Fresh fruit
Home	Cup of tea, piece of toast, or fruit
Teatime	Meat, vegetables, small portion of boiled potato. Fruit or low energy yoghurt
Supper	Tea, coffee, low energy squash, or glass of milk
Supper	Piece of toast and scrape of low energy margarine. Tea or glass of milk

Table 7 *School dinners for obese children*

Meat, no pastry, vegetables, no potato, no chips, and fresh fruit or no pudding
or
Salad, no bread, preferably no salad dressing, no potato, and fresh fruit or no pudding
or
Lunch in a box brought from home with salad (cold meat/cheese/hardboiled egg and lettuce, tomato, cucumber, etc) and fresh fruit
Low energy soup in thermos if insist on hot meal

Children who go home for lunch can be given salad or a light snack. Meals such as spaghetti or beans on unbuttered toast are acceptable if quantities provided are modest.

I have not found appetite suppressants any use whatever in the management of childhood obesity and do not use them. I have no experience of novel surgical approaches either, although occasionally there may be older adolescents for whom these procedures are the only hope for appreciable weight loss.

Increasing energy output. I always recommend obese children to increase their output of energy through activity. Most make little attempt to do this until they have lost some weight and feel more mobile. Simple changes in activity include walking to school rather than taking the bus or car; using stairs rather than lifts; and taking up cycling, swimming, or gymnastics in addition to formal games. Jogging is a useful way of keeping weight in control, but grossly obese children are often too self-conscious to jog to an effective extent. Success with dieting involves a change in lifestyle, and without increased output of energy in activity children are going to have difficulty maintaining fat loss. Some children change their attitude and demeanour completely with the onset of fat loss and become more positive and extrovert.

In addition to exercise, I encourage children to take up hobbies. The difficulties many children have keeping to a diet are due to feeling 'bored' at home. Boredom becomes hunger and they eat. If their minds are occupied, particularly outside home in the evenings and at weekends, the amount of food consumed may be less.

Follow up

I review children within three weeks of first being seen. Stimulus to diet follows the knowledge that the situation will be reviewed in the near future. At follow up anthropometry is repeated and detailed dietary history obtained with specific enquiries about the 'forbidden' items. I take this dietary history before I have informed the children of weight progress as I find when children do not lose weight they are tempted to confabulate over food intake. If the dietary history is incorrect or incomplete it may be difficult to advise appropriately on further action.

As far as possible I try to be fairly positive so that even when children have not lost fat and not dieted well they are encouraged to continue making efforts. Where children have gained weight and yet slimmed due to rapid linear growth it is important to

explain this achievement to parents and children. Despair and sense of failure develop rapidly and discourage children from persisting with dieting. Where children are consistently making no effort to slim they are presented with an ultimatum: either they make an effort or they are discharged.

When children seem to be established on their diet I lengthen out attendances. I rarely leave appointments longer than every two months unless normal weight for height has been reached. It would be more effective to see children more often, but the number who can be seen at one clinic is not infinite.

Children who fail to slim

Children who fail to slim are, almost invariably, not keeping to the diet described or are dieting for short periods only. There are often good reasons why children fail to diet successfully, although families may have difficulty acknowledging these reasons. Far too many fairly young children are expected to discipline and control themselves irrespective of what the rest of the family (often equally obese) eat around them. Sometimes mothers make no attempt to modify their methods of cooking to produce less fattening diets. Often parents are not strictly honest in the clinic about what the children are eating and children learn that there is no particular reason to be truthful about their intake. Sometimes children do not cooperate with parental efforts to provide a suitable diet. This may be a minor behavioural disturbance but when it becomes sufficient to upset family equanimity or to cause a real rift between child and parents it is doubtful whether it is worth persisting with the slimming regimen. Under such circumstances it is unlikely that efforts to slim the child will be effective anyway.

Some children are embarrassed or miserable because they are overweight. Many of these children develop much more positive approaches to school, activity, and relationships with others when they lose weight. Some have major behavioural problems and their obesity is secondary to these. These latter children may benefit from psychiatric help if they and their parents are prepared to accept such help—which is not often. But in management of routine cases of childhood obesity I do not feel psychiatric involvement has particular advantages.

Achievements

The diet I prescribe may seem too rigid and puritanical. Normal active children who follow the general principles, however, will lose weight. Many lose weight satisfactorily, despite some dietary lapses. When this is so absolute adherence to the

diet is unnecessary, although guidance should be given over where lapses are occurring so that, should slimming cease, action can be taken to modify the diet. I explain to parents and children before they start dieting that dieting is difficult and initially children will feel hungry—but, provided hunger is not sated, that indicates fat is being metabolised. Most children find after a few days of sticking to the diet that their appetite lessens.

Sadly, many children referred are so overweight that even if they lose weight at the rate of 500 g a week (a typical initial rate in an adolescent, which generally slows after the first weeks) they may have to diet for a year to lose all their excess weight. Thus, whereas most children who follow the diet initially do lose weight, few manage to persist sufficiently to lose all excess weight. Attitudes to exercise and food change over time, however, and rebound does not necessarily occur—or at least not immediately. Lapses and rebound are common during school holidays and over Christmas. It may be difficult to get children back onto strict diets once major dietary lapses occur.

Strict dieting of obese children can lead to slowing of linear growth.¹⁴ This is difficult to assess in children who are in the pubertal age group and consequently crossing height centiles at different ages. It is not a phenomenon I have observed to a great extent.

It is often stated that dieting in childhood should not be encouraged because of the risks of inducing anorexia nervosa. Almost regrettably, none of my obese patients has shown the slightest tendency towards anorexia nervosa. There is, however, a risk that excessive encouragement of slimming programmes for mildly overweight children may induce slimming obsessions among their normal weight peers. It is these latter children who are at real risk of anorexia nervosa.

Prader-Willi syndrome

Children with this syndrome present a desperate problem for which I have no effective answer. Their low intelligence, often negative behaviour, hyperphagia, and low resting metabolic requirements make dietary management extremely difficult. Energy intakes have to be very low (50% or less than expected for age) to achieve weight loss.¹⁵ Relatives, and even parents, may regard such strict dieting as 'cruel' and fail to cooperate with the regimen. As with other children who are uncooperative over dieting there is little point in pursuing diets that precipitate major behavioural disorders or

introduce conflict within the family, particularly when, as with Prader-Willi syndrome, long term achievements are so disappointing.

Conclusion

The treatment of obesity is basically a salvage procedure. We are trying to correct a situation that should never have arisen. Prevention is more important than treatment. Somehow we need to prevent obesity before it occurs or, at least, treat it before it gets severe. Recommendations on prevention abound, but so far there is little evidence of the long term effectiveness of any of these recommendations. Without effective means of prevention or novel means of treatment, the alleviation of obesity by exercise and dieting remains the only effective form of management. And its success is limited.

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