

## Chapter 37

# Nutritional Rehabilitation and Normalization of Eating Pattern

Jean Densmore-John

**T**he most important component in the initiation of a nutritional rehabilitation program is the establishment of trust and rapport with the eating disorder patient. The importance of the need for a therapeutic alliance has been discussed in the literature [1,2]. The eating disorder patient usually has her or his own views on what is "nutritious" and what can or cannot be consumed. Treatment is often difficult, being adversely influenced by (1) the pervasive goal of weight reduction and the avoidance of weight gain [3], (2) dichotomous thinking patterns [2], and (3) an overwhelming fear of losing control [4]. Working within a framework of trust, the patient and clinician create a basis for change that promotes self-assurance in the patient's own food choices as treatment progresses.

The response to nutritional restructuring, as observed by the author, may be differentiated in patients presenting with anorexia nervosa or bulimia in the following ways. In anorexia nervosa, the patient desires control of the diet plan during a rehabilitation program and generally resists dietary treatment; whereas in bulimia, the patient desires to help in planning a diet, and may want to be told specifically what and how much to eat during a rehabilitation program. The anorexic is preoccupied with the pursuit of a thinner appearance and a lower weight on the scale, while the bulimic patient is usually more intent on achieving an aesthetically "perfect" figure as well as a low weight on the scale. The an-

orexic avoids eating as a means of producing a sense of lightness and energy and will avoid food to suppress the anxiety created by choosing what to eat to prevent weight gain. Bulimics resist the urge to binge to stimulate the feeling of being in control of food intake and external pressures. However, they may commence a binge as a psychological means of coping with anxiety, depression, boredom, and/or dealing with relationships or situations.

A characteristic similarity that both groups have in common is their food preoccupation, which may become very disturbing to both restrictive anorexics and bulimics as they seek to resist the need to eat. It is frequently the food preoccupation that brings them to treatment.

Selecting what to eat when given a range of food choices becomes an overwhelmingly difficult task for the undernourished anorexic and bulimic. To restore the ability to make food choices, which will provide for the individual's nutritional requirements over time, professional guidance in the selection and planning of food intake is necessary. The patient should be encouraged to be an active participant in the process of food selection and planning. Involving the patient with her/his own diet during the course of treatment will counter the anorexic's battle to control food intake by discouraging the avoidance and diminishing the fear of certain foods. The bulimic patient will learn to trust herself/himself around

food through learned principles of selection and planning of a healthy diet.

Both anorexia and bulimia are characterized by a morbid fear of fatness [3-5]. The two conditions usually differ in respect to the desired or "idealized" body shape, as noted previously. The "fear of fat" is transferred to the food, and the food is then viewed as a source of potential fatness. The food takes on a negative connotation, which must be changed to a positive association during treatment to re-establish normal eating patterns. The dichotomous manner of thinking creates a tendency for the patient to view food as being either good or bad, making education toward a more realistic viewpoint regarding food selection challenging.

Learning about what their individual nutritional needs are and how to meet those needs through food selection and meal planning is an involved process that should start with an initial nutrition assessment. This assessment is essential for making the original diagnosis, organizing treatment plans, predicting long- and short-range goals, and in evaluating the subsequent response to treatment. Mutually agreed upon goals direct the patient from her previous single goal-oriented, weight conscious approach to life.

Rehabilitation begins at the stage of renourishment of the patient. A certain degree of nutritional rehabilitation must occur before psychotherapy can begin to be effective [6]. The nutritional restructuring of the diet involves not only renourishing the patient and achieving the desired weight gain, but also supporting and re-educating the patient toward more positive and realistic expectations regarding food and feelings about bodily needs and shape.

### HISTORY

Sir William Gull (1868) described his dietary treatment plan for anorexia nervosa as the institution of a feeding schedule of "regular intervals" during which the patient is surrounded by people who could exert the most control over the patient. The patient was not consulted during the treatment process [7]. Ryle (1936) noted the tendency for hiding and disposing of food by anorexic patients and advocated that initial control over the patient was necessary to see that food, a mixed diet, was consumed. His treatment included bed rest and warmth to conserve energy [8].

All dietary programs seem to meet with difficulties with the resistant patient. With the onset of tube-feeding and later parenteral hyperalimentation in 1968 [9], even the most resistant patient could be force-fed and made to achieve the "goal" weight. Infection and metabolic complications associated with the use of hyperali-

mentation [10,11] and the rapid weight gain deter its use as a preferred means of therapy today. Psychological adjustment to changes in body shape do not have time to occur with the rapid weight gain produced by force-feeding techniques, and weight loss may follow after force-feedings are discontinued [12]. When hyperalimentation is used as a life-saving procedure in anorexia nervosa, it should be instituted along with psychiatric therapy.

More recently, Huse and Lucas [12] have recommended basing the initial kilocalorie allowance on the estimated basal or resting energy expenditure (BEE or REE) of the individual and then gradually increasing the level of kilocalories as the patient's energy requirements and physical and psychological acceptance of food increases. As the metabolic alterations and the anorexic psyche become more clearly understood, the dietary program may be more individualized.

The recognition of bulimia as a clinical entity has occurred within the past decade [5,13]. Treatment programs that include nutritional counseling have recently been reported in the literature [14-17].

### DEVELOPMENTS IN THE FIELD OF NUTRITIONAL REHABILITATION

Classic studies by Keys et al [18] on the behavioral response to starvation have given insight to the importance of the nutritional adequacy of the diet. In these studies, the following changes in behavior were observed in normal male subjects starved to 25% of normal body weight: social isolation, decreased verbalization, depressed affect, food preoccupation, compliance, apathy, and unusual eating behavior when re-fed. Two of the observed behaviors from this study—food preoccupation and unusual eating behavior when re-fed—are of particular importance to anorexia nervosa patients and poorly nourished bulimic patients. It is not clear whether these behaviors are due to the effect of starvation or perhaps more primary to the problem. Normalization of both behavior characteristics is benefited by nutritional rehabilitation.

Maloney et al [19] used 18 adolescent anorexic patients on total parenteral nutrition to assess changes in behavior with weight gain. It was found that a weight increase of three to four kg was necessary for behavioral change, and that this increase also allowed the patients to benefit more from psychotherapy.

The therapeutic alliance is enhanced by establishing a weight range, rather than a single specific weight goal for a patient to achieve [20]. A weight range gives a more realistic view of weight, as daily fluctuations do occur, even under normal conditions. The thought of striving

for a weight range is more acceptable to the anorexic who is in fear of gaining beyond a specific point [20].

The charts prepared by Frisch [21] are useful in establishing a weight range for female patients. These charts can be used to estimate the minimal weight for height necessary for the onset of menstrual cycles in primary amenorrhea or the minimal weight for height necessary to restore menstrual cycles in secondary amenorrhea due to weight loss. Frisch [21] reports that women of 16 or older with amenorrhea secondary to weight loss will require a weight about 10% heavier than the observed minimal weight for the same height at menarche. Using the Frisch chart, the 25th percentile for weight to height  $\pm 3$  lb is recommended as being the most acceptable to the patient, as well as effective in re-establishing menstruation [21]. A loss of body weight of 10% to 15% of normal weight for height will stop menstrual function and represents a loss of one third body fat [21].

Depletion of adipose tissue can be assessed indirectly with standardized procedures [22,23] using a caliper to measure triceps skinfold. It has been estimated [22] that 75% to 80% of anorexia nervosa patients are in less than the fifth percentile for body fat (reference standards based on triceps skinfold, age- and sex-specific) indicating severe depletion and that another 10% to 15% are in less than the 15th percentile, indicating depleted reserves of body fat. Bulimics seem to vary widely in changes in body fat although body composition studies have not been specifically performed on this population group. Bulimic patients may have triceps skinfold measurements that range over the 50th percentile for age and sex, despite consistent vomiting episodes.

Tables of percentiles for upper arm circumference, arm muscle circumference, and triceps skinfold, age- and sex-specific, have been reported in the literature [24]. The arm muscle circumference (AMC) may be determined from the triceps skinfold and the arm circumference (AC) indices using a nomogram for arm anthropometry [25], or estimated using the formula [22,24]:

$$\text{AMC (cm)} = (\text{AC (cm)} - (\text{triceps skinfold (mm)}) \times .314$$

Arm muscle circumference is below the fifth percentile (reference standards based on age and sex) for more than 80% of patients with anorexia nervosa, while 90% are lower than the 15th percentile [22]. This represents a loss of somatic protein. The extent of the loss of lean body mass (LBM) or adipose tissue is a factor of age, nutritional state prior to weight loss, the rate of weight loss, and the amount of physical activity in which the patient has engaged [22,26].

Another indirect measure of somatic protein stores is the creatinine height index (CHI). As creatinine is a

normal waste product of muscle metabolism, the amount of creatinine excreted in the urine is a reflection of lean body tissue. Thus, as LBM decreases, the amount of creatinine excreted in the urine also decreases. CHI is the ratio of actual 24-hour creatinine excretion to ideal creatinine excretion, with ideal levels of creatinine excretion being 18 mg per kg of ideal body weight (IBW) per day for females, and 23 mg per kg of IBW per day for males [22]. A CHI less than 75% indicates a depletion of somatic protein.

Laboratory values for serum albumin and serum transferrin are indicators of visceral protein [22]. Serum albumin values are usually within normal range but may be elevated with dehydration or depressed with edema. Rehydration of the dehydrated patient is suggested for an accurate assessment of serum albumin. Serum transferrin values are normal to mildly depleted in the patient with anorexia nervosa. Visceral protein status provides evidence of the body's ability to endure and manage with physical stress. Depressed serum albumin and transferrin measurements are a good indicator of generalized malnutrition, rather than protein malnutrition specifically [27].

The degree of depletion of total body mass should be assessed by considering not only the percentage of usual or predicted weight, but also the percentage of IBW. The percentage of usual or predicted weight is calculated as

$$\frac{\text{current weight} \times 100}{\text{predicted or usual weight}}$$

where predicted weight is determined using past weight-for-height records if the patient is under 18 years of age, and usual weight is used if the patient is 18 or over. The percentage of IBW is calculated as:

$$\frac{\text{current weight} \times 100}{\text{IBW}}$$

where the IBW is obtained by use of standardized pediatric growth grids for patients under 18 years of age and standard reference tables of desired weight-for-height-and-sex for patients 18 years and older.

The percentage of usual or predicted weight is an indication of the amount of actual weight lost, while the percentage IBW indicates the degree of underweight compared with the reference standard. Thus, by comparing the two calculated values, an overall picture of body depletion may be established. This is of great importance, as the premorbid weight may have been initially unsatisfactory or consistently undesirable for a period of time. Severe depletion of total body mass is commonly noted in anorexic patients [22], but not necessarily in bulimic patients, who are generally within an ac-

ceptable range of body weight-for-height [23].

Weight gain during therapy is dependent on the consumption and absorption of a kilocalorie intake greater than energy requirements over a period of time. The composition of body tissue formed during this period will influence the rate of weight gain [28].

Pertschuk et al [29] examined weight change in five anorexia nervosa subjects in relation to kilocalorie intake and energy requirement on a day-to-day and a long-term basis. Actual REE and total body potassium were used as measures to assess the change in body cell mass or lean body mass in the subjects. An important finding of this study was that, for all subjects, the actual REE was unusually low compared with the calculated REE based on the Harris and Benedict formula [30]. The REE (or BEE as it is often referred to) is calculated as:

$$\text{Male REE} = 66 + (13.7 \times W) + (5 \times H) - (6.8 \times A)$$

$$\text{Female REE} = 655 + (9.6 \times W) - (1.7 \times H) - (4.7 \times A)$$

where W = current weight in kg; H = height in cm; and A = age in years.

The number of kilocalories in excess was determined from energy intake from oral and parenteral feedings minus the 24-hour energy expenditure (estimated as 1.1 x REE). On a daily basis there was no significant correlation between excess kilocalories and weight gain. However, long-term assessment showed a highly significant correlation between total weight gained and total kilocalorie excess. The authors found that a mean excess of  $10,918 \pm 5,634$  kilocalories was required to achieve a 1-kg body weight gain. Intake and weight gain data also indicated that weight plateauing for a period of five days or more may occur several times during the rehabilitation process [29].

Use of the Harris and Benedict formula [30] to calculate REE is likely to overestimate the actual REE, at least during the initial stage of treatment. However, use of the calculated REE to determine kilocalorie requirements should stop further weight loss and will not overwhelm the patient with large amounts of food to consume [12]. As weight gain increases, the REE will need to be recalculated for accurate determination of the energy intake required to promote weight gain.

Metabolic requirements are further increased by anabolism, physical exercise, fever, and stress. Ambulation will increase the patient's metabolic rate by about 20%. Recommendations have been reported for the calculation of anabolic and maintenance requirements with regard to kilocalories, nitrogen, and protein, for both parenteral and enteral feeding [31,32].

Knowledge of the factors influencing weight gain will relieve some of the frustration and anxiety associated

with eating meals and snacks. Upon refeeding eating disorder patients, an initial rapid weight gain may occur as a result of water retention in extracellular spaces, retention of electrolytes, and/or repletion of liver and muscle glycogen reserves [12]. Patients need to be informed of the possibility of an initial short-term rapid weight gain due to these factors. If the patient does not understand that this is due to the body's response to the original starvation state, the weight gain and uncomfortable "feeling" of fatness may stimulate the urge to purge and/or refuse food intake. Reassurance must be given to the patient that the rapid rate of weight gain will not continue. The assurance that the gain in weight is not a gain in fat alone will benefit compliance to the dietary program. Due to the inconsistency in the rate of weight gain, it is prudent to reinforce food intake rather than weight gain.

Reduced gastric emptying may occur in starvation [33]. Dehydration and reduced gastrointestinal (GI) motility can cause constipation in anorexics and bulimics. GI bloating is a frequent complaint on refeeding and may be due to stomach atrophy [3,34]. Normally the feeling of stomach distention will subside as the stomach capacity for more food returns [12]. The bulk content of meals may precipitate bloating and should be monitored. Constipation and motility problems should resolve as the patient begins to consume greater amounts of food at more regular intervals [12].

Dogs, rabbits, and rats maintained on total parenteral nutrition (TPN) are observed to exhibit small bowel hypoplasia, changes in gastrointestinal hormone secretion, and decreased intestinal enzyme activity [32]. It was concluded that direct contact with food may be necessary to maintain the normal morphologic and functional ability of the GI tract [32]. Thus, careful planning of refeeding after periods of starvation, restrictive eating, or vomiting is essential to reduce physiologic stress and optimize the restoration of normal function and absorptive efficiency of the GI tract.

To ease GI complaints during refeeding, a gradual increase in kilocalories and amount and types of food is recommended. Fat and milk products should be given with care to anorexics, as they may have lost some digestive capacity to handle these types of foods [20].

Anorexics never actually lose their hunger drive [4]. The characteristic behavior patterns are similar to those of starving people [34] and can inevitably lead a restrictive anorexic into a food binge, which is estimated to occur in 40% of reported cases of anorexia nervosa [35].

A study of the psychological effects of TPN on 30 patients failed to reveal depression secondary to the loss of the capacity to eat [10]. However, 6 of the 30 patients went on intermittent eating binges, even though they

were aware that illness and GI problems would result [10]. This suggests that in some people, the urge to eat will lead to a binge rather than eating small or normal amounts of food. Many anorexics and bulimics report feeling that they have lost the ability to determine what is a normal amount to eat in respect to specific portion sizes and the amount of total food consumed/meal/day.

Fairburn [36] notes that it is not the quantity of food eaten that is critical in defining a binge, but instead the subject's experience of the eating. He contends a binge should meet two criteria: (1) that the subject regards the food intake as excessive, and (2) that the episode is experienced by the patient as being outside her control [36]. Fairburn [37] uses the diet diary recording method and a prescribed eating pattern emphasizing meal and snack regularity, rather than what to eat, as part of a comprehensive three-stage treatment program for bulimia.

Lacey [17] studied 30 bulimic subjects to assess improvement based on a specific treatment approach using a diet diary recording method. A prescribed diet was structured into meals, specifying the type and amount of carbohydrate to eat. All other foods could be eaten freely. Contracts between patient and therapist were established and individual and group therapy were also part of the treatment program. The treatment program had positive results on patient outcome as measured by long-term follow-up. The diet diary was assessed as an important tool, as it became a highly personal record, which provided control and discipline as well as an emotional outlet [17].

In keeping a diet diary, the patient records the date, time, type of food eaten, the amount (in household measures), mood state, and situation at the time of the eating activity. A diet diary may be useful in assessing dietary patterns and habits such as: the length of time between each eating experience; the tendency to restrict eating prior to a binge; the patient's concept of the amount of food that constitutes a binge; the patient's experience of the binge and degree of hunger awareness; the type, variety, and palatability of food sources; the basic nutritional composition of the diet; and the situation, circumstance, place, and time a binge is likely to occur.

A diet diary may be most useful in evaluating the variability of food sources in the diet. The best way to ensure nutritional adequacy in a diet is to maintain variety in the types of food consumed over a period of time. The problem incurred by the eating disorder patient, by nature of their restrictive food selection pattern, is a general lack of variety of foods in the diet. Therapeutic supplementation of vitamins and minerals is suggested.

All patients have their own specific food avoidances; usually whatever the individual considers to be "fatten-

ing." It is important to note that no one food is "fattening" unless too much of it is eaten and total kilocalorie intake exceeds energy expenditure. What makes a specific food considered "fattening" needs to be understood, as the results may indicate how attitudes toward food are established and can be altered.

Investigations by Rolls et al [38] indicate that in normal subjects food is eaten until it no longer tastes pleasant so that eating food never becomes aversive. This "mechanism" of control appears not to be operating in binge eating where eating beyond the point of enjoyment leads to aversions toward the food, the eating experience, their own body, and self-conception. Feelings of being out of control emerge and often become associated with particular foods. The food or foods are avoided unless a binge period arises, which breaks down the controls against eating the "avoided" foods.

Food aversions, due to bingeing experiences and preconceived ideas about certain foods, need to be separated from normal food dislikes when planning a program for introducing the "avoided" foods back into the diet. Gradual and consistent additions of "avoided" foods need to be reintroduced into the diet. The patient needs to be positively reinforced when a previously avoided food is eaten. Positive reinforcement has been used to encourage the patient's acceptance of the food and stimulate eating enjoyment [15].

In normalizing eating patterns, regular meals (snacks if necessary) are advocated. The meal plan may be easier for the eating disorder patient to accept if it is slightly lower in fat, about 25% to 30% of the total kilocalories; with 50% to 60% of the total kilocalories from complex carbohydrates and 10% to 20% from protein. A balance of carbohydrate, protein, and fat should be provided at each meal. "Diet food" or special low-calorie products should not be allowed in the diet plan. High-bulk, low-calorie foods should not be eaten in large amounts, because they act to satiate the hunger urge while minimizing caloric intake. Drinking large amounts of water or other fluid should also be discouraged because this reduces appetite and aids vomiting.

Unusual food habits should be discouraged such as excessive use of condiments, prepared mustard, and cinnamon. In food preparation, cooking with moderate amounts of certain herbs and spices may help to stimulate the appetite. This effect is likely to depend on individual taste preferences. In normal subjects, Rolls et al [38,39] found that the palatability and satiety of the meal are affected by the order in which food is presented and also by the sensory properties of foods such as flavor, color, and shape. It may be of interest to experiment with eating disorder patients to see whether an increase or decrease in food intake is effected by manipulation of these factors. Such investigations could prove

enlightening and beneficial to dietary treatment programs.

Rigid diet plans should be avoided. The patient should adjust to and learn portion sizes. This may be done by confrontation with various sizes of food containers or service and types of service (such as individual trays, family style, or cafeteria style). A guide to eating, such as the food group plan or the American Dietetic Association food exchange plans, may be useful for estimating the portion size to be consumed for a particular type of food. Calorie counting should be discouraged. Knowledge of how many servings to consume from each group per day may be useful to replace or de-emphasize preoccupation with counting calories.

Once the goal weight range is achieved, it should be emphasized that diet variety, portion size, and regularity of eating are the important factors in maintaining weight and emotional stability. As the patient gains more trust in the dietary treatment and in her own ability to make food choices and accept normal fluctuations in body weight, a more spontaneous manner of choosing what to eat will ensue.

Supportive counseling as a follow-up to maintain treatment results is necessary. Fairburn [16,37] notes bulimic patients may experience binge-vomiting urges again, and they should be prepared that this may occur, especially under stressful conditions. Relaxation exercises or other techniques to reduce the feeling of tension and anxiety associated with the act of eating and digestion may be beneficial. Similarly, the effect of a relaxed pleasant atmosphere on eating attitudes and hedonic enjoyment of foods is an area for further experimentation. Many eating disorder programs feed patients under controlled, disciplined, and pressured situations without any emphasis on the encouragement of food appreciation and enjoyment. It is the author's view that a more positive approach to ensuring a conducive feeding environment may influence long-term success in treatment outcome.

### CONCLUSION

The escape into a binge-purge cycle and the self-denial of food will cease to occur as the patient becomes able to deal directly with uncomfortable moods and trust in her own decision-making ability. The patient needs to deal with food appropriately through the following learned techniques: (1) planning nutritionally balanced diets; (2) identifying standard portion sizes for foods; (3) knowledge of nutritional needs for health and body weight maintenance; (4) food sources to meet nutritional needs; (5) self-confidence in making food selections to satisfy taste desires, as well as emotional

and nutritional needs; and (6) an understanding of the factors influencing normal fluctuation in body weight, growth, and composition.

A diet diary will aid patient awareness of her food intake and behavior. It is beneficial to refeed the eating disorder patient gradually with a diet composition at each meal which includes carbohydrate, protein, and fat in order to ease physical complications and psychological stress. Specific food avoidances need to be reintroduced into the diet to relieve the "fear" associated with those foods which contribute to the fear of body fatness. Patient understanding of bodily needs will contribute to willing participation in the dietary treatment program and greater self-assurance in making appropriate food choices.

### REFERENCES

1. Russell GFM. General management of anorexia nervosa and difficulties in assessing the efficacy of treatment. In: Vigersky RA, ed. *Anorexia nervosa*. New York: Raven Press, 1977: 277-90.
2. Garner DM, Garfinkel PE, Bemis KM. A multidimensional psychotherapy for anorexia nervosa. *Int J Eating Disorders* 1981; 2:3-45.
3. Crisp AH. The differential diagnosis of anorexia nervosa. *Proc R Soc Med* 1977; 70:686-90.
4. Bruch H. Obesity and eating disorders. In: Sholevar P, Benson R, Blinder BJ, eds. *Treatment of emotional disorders in children and adolescents*. New York: Spectrum, 1980: 353-61.
5. Russell GFM. Bulimia nervosa: an ominous variant of anorexia nervosa. *Psychol Med* 1979; 9:429-48.
6. Bruch H. *The golden cage: The enigma of anorexia nervosa*. Cambridge MA: Harvard University Press, 1978.
7. Gull WW. The address in medicine. *Lancet* 1868; 2:171.
8. Ryle J. Anorexia nervosa. *Lancet* 1936; 2:893-9.
9. Dudrick SJ, Wilmore DW, Vars HM, et al. Long-term total parenteral nutrition with growth, development, and positive nitrogen balance. *Surgery* 1968; 64:134-42.
10. Hall RC, Stickney SK, Gardner ER, et al. Psychiatric reactions to long-term intravenous hyperalimentation. *Psychosomatics* 1981; 22:428-43.
11. Chiulli R, Grover M, Steiger E. Total parenteral nutrition in anorexia nervosa. In: Gross M, ed. *Anorexia nervosa*. Indianapolis: Collamore Press, 1982: 141-52.
12. Huse DM, Lucas AR. Dietary treatment of anorexia nervosa. *J Am Diet Assoc* 1983; 83:687-90.
13. Spitzer RL, ed. *Diagnostic and statistical manual of mental disorders*, Third edition. Washington DC: American Psychiatric Association, 1980: 69-71.
14. Willkard SG, Anding RH, Winstead DK. Nutritional counseling as an adjunct to psychotherapy in bulimia treatment. *Psychosomatics* 1983; 24:545-51.
15. Long CG, Cordle CJ. Psychological treatment of binge

- eating and self-induced vomiting. *J Med Psychol* 1982; 55:139-45.
16. Fairburn C. A cognitive behavioral approach to treatment of bulimia. *Psychol Med* 1981; 11:707-11.
  17. Lacey HJ. Bulimia nervosa, binge-eating and psychogenic vomiting: a controlled treatment study and long term outcome. *Br Med J* 1983; 286:1609-13.
  18. Keys A, Brozek J, Henschel A, et al. The biology of human starvation, vol 2. Minneapolis: University of Minnesota Press, 1950: 819-53.
  19. Maloney MJ, Brunner R, Winget C, et al. Hyperalimination as a research model for studying the cognitive, behavioral and emotional effects of starvation and nutrition rehabilitation. In: Barby PL, Garfinkel PE, Garner DM, Coscina DV, eds. *Anorexia nervosa: Recent developments in research*. New York: Alan R Liss, Inc, 1983: 311-21.
  20. Paige DM, ed. *Anorexia nervosa*. In: *Manual of clinical nutrition*. John Hopkins University, Pleasantville, NJ: Nutrition Publications, Inc, 1983; 26:6.
  21. Frisch RE. Menstrual cycles: fatness as a determinant of minimum weight for height necessary for their maintenance or onset. *Science* 1974; 185:949-52.
  22. Kovach KM. The assessment of nutritional status in anorexia nervosa. In Gross M, ed. *Anorexia nervosa*. Indianapolis: Collamore Press, 1982: 69-79.
  23. Fairburn CG, Cooper PJ. The clinical features of bulimia nervosa. *Br J Psychiatry* 1984; 144:238-46.
  24. Frisancho AR. Triceps skinfold and upper arm muscle size norms for assessment of nutritional status. *Am J Clin Nutr* 1974; 27:1052-8.
  25. Gurney JM, Jelliffe DB. Arm anthropometry in nutritional assessment: nomogram for rapid calculation muscle circumference and cross-sectional muscle and fat areas. *Am J Clin Nutr* 1973; 26:912-5.
  26. Silverman JA. Medical consequences of starvation; the malnutrition of anorexia nervosa: caveat medicus. In: Barby PL, Garfinkel PE, Garner DM, Coscina DV, eds. *Anorexia nervosa: Recent developments in research*. New York: Alan R Liss, Inc, 1983: 293-9.
  27. Harper AE, Simopoulos AP. Summary, conclusions, recommendations. *Am J Clin Nutr* 1982; 35:1098-107.
  28. Russell GFM, Mezey AG. An analysis of weight gain in patients with anorexia nervosa treated with high calorie diets. *Clin Sci* 1962; 23:449-61.
  29. Pertschuk MJ, Crosby LO, Mullen JL. Nonlinearity of weight gain and nutrition intake in anorexia nervosa. In: Barby PL, Garfinkel PE, Garner DM, Coscina DV, eds. *Anorexia nervosa: Recent developments in research*. New York: Alan R Liss, Inc, 1983: 301-10.
  30. Harris J, Benedict F. Biometric studies of basal metabolism in man. Carnegie Institute of Washington DC: Publication No 279, 1919.
  31. Blackburn GL, Hopkins BS, Bistrrian BR. The nutrition support service in hospital practice. In: Schneider H, Anderson C, Coursin D, eds. *Nutrition support of medical practice*. Philadelphia: Harper and Row, 1983: 111-39.
  32. Meng HC. Parenteral nutrition—principles, nutrient requirements, techniques and clinical applications. Philadelphia: Harper and Row, 1983: 184-224.
  33. Dally P, Gomez J. *Anorexia nervosa*. London: Wm Heinemann, 1979: 54-5.
  34. Crisp AH. Disturbances of neurotransmitter metabolism in anorexia nervosa. *Proc Nutr Soc* 1978; 37:201-9.
  35. Crisp AH, Hsu KG, Harding B. The starving hoarder and voracious spender stealing in anorexia nervosa. *J Psychosom Res* 1980; 24:225-31.
  36. Fairburn CG. *Bulimia nervosa*. *Br J Hosp Med* 1983; 29:537-42.
  37. Fairburn CG. *Bulimia: its epidemiology and management*. In: Stunkard AJ, Stellar E, eds. *Eating disorders*. New York: Raven Press, 1984: 235-58.
  38. Rolls BJ, Rolls ET, Rowe EA, et al. Sensory specific satiety in man. *Physiol Beh* 1981; 27:137-42.
  39. Rolls BJ. Palatability and food preference. In Gioffi LA, James WPT, Van Itallie TE, eds. *The body weight regulatory system: Normal and disturbed mechanisms*. New York: Raven Press, 1981: 271-8.

