

Strategies for Improving Maintenance of Weight Loss

Toward a continuous care model of obesity management

MICHAEL G. PERRI, PHD
SAMUEL F. SEARS, JR., MS
JUDITH E. CLARK, MS

The management of obesity represents an important objective in the care of many NIDDM patients. In recent years, progress has been made in increasing initial weight reductions, but poor long-term maintenance of weight loss remains a vital clinical concern. This article reviews the challenge of weight-loss maintenance and recommends the adoption of a continuous care model of obesity management. Strategies to improve the long-term maintenance of weight loss are described, and empirical tests of their effectiveness are reviewed. Collectively, the findings suggest that, after treatment for obesity, multifaceted programs comprised of continued professional contact, skills training, social support, and exercise, can enhance the long-term maintenance of weight loss.

Most people with NIDDM are obese, and weight loss represents a key element in the management of their disease (1). Weight reductions in obese NIDDM patients have been shown to produce improvements in blood glucose control and insulin sensitivity and decreases in hypertension and hyperlipidemia (2–5). Furthermore, weight-control strategies, such as restricting caloric intake and increasing physical activity, may represent the most important variables in the management of

NIDDM that are under the direct control of the patient.

The beneficial effects of weight reduction in the management of NIDDM are clinically meaningful only if patients sustain the behaviors necessary to maintain their weight losses over time (5). Inconsistent adherence to behavioral weight-control strategies may contribute to poor long-term outcome and repeated cycles of dieting in NIDDM patients (5,6). After treatment for obesity, most patients, whether diabetic or not, gradu-

ally abandon habit changes acquired in treatment, and regain weight. Long-term follow-up studies typically show that the majority of obese patients regain much of the weight initially lost in treatment (5,7,8).

In this paper, we recommend the adoption of a continuous care approach to the management of obesity as a means of dealing with the problem of poor weight-loss maintenance. We argue that long-term progress in weight management is closely associated with the degree of patient-therapist contact during the months and years after initial treatment. Accordingly, we describe various therapeutic strategies that have been shown to enhance the long-term maintenance of weight loss. Consistent with a biobehavioral formulation of obesity (9), the development of these maintenance strategies was guided by a social-cognitive conceptualization of the maintenance of behavioral change (10,11). In the research described, individual maintenance strategies and combinations of multiple interventions were tested to assess the effect of specific procedures and their combined influences on the long-term maintenance of weight loss.

A CONTINUOUS CARE APPROACH TO OBESITY MANAGEMENT

— Why do treatments for obesity fail? A complex interaction of biological and psychological factors may be responsible for the poor maintenance of treatment-induced weight reductions. Weight loss triggers physiological mechanisms, such as adaptive thermogenesis (12) and increased production of adipose tissue lipoprotein lipase (13), that make it difficult for the obese person to maintain weight loss, unless the individual is prepared to adopt a life-style involving sustained adherence to a regimen of decreased energy intake and/or increased energy expenditure (14). Short-term treatments of obesity often fail because the patient is not psychologically prepared to deal with re-

FROM THE DEPARTMENT OF CLINICAL AND HEALTH PSYCHOLOGY, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA.

ADDRESS CORRESPONDENCE AND REPRINT REQUESTS TO MICHAEL G. PERRI, PHD, DEPARTMENT OF CLINICAL AND HEALTH PSYCHOLOGY, UNIVERSITY OF FLORIDA, BOX 100165, HEALTH SCIENCE CENTER, GAINESVILLE, FL 32610-0165.

NIDDM, NON-INSULIN-DEPENDENT DIABETES MELLITUS.

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lentless physiological processes that counteract weight loss. When obese patients are on their own after weight-loss treatment, many become discouraged by the difficulties they encounter in trying to maintain weight loss, and attribute their lack of success to personal failings. These attributions frequently lead to feelings of depression and guilt and precipitate an abandonment of the entire weight-loss effort (10). As a consequence, many obese patients end up regaining most if not all the weight lost in treatment.

What can health-care professionals do to enhance the maintenance of weight loss? A first step is to acknowledge that obesity is a chronic condition that requires continuous care. In most cases, the successful long-term management of obesity requires multiple stages spanning long periods of time. Thus, the health-care professional's role is to serve as an active problem solver, who systematically and continuously aids the patient in identifying effective strategies to sustain the motivational and behavioral changes needed for long-term success (15). Long-term success is unlikely unless the obese patient develops a cognitive/emotional/behavioral set oriented to long-term change. The individual must make a commitment to a life-style that sustains the decreased energy intake and increased energy expenditure necessary to maintain a lower weight. To assist patients in this effort, health-care professionals must equip themselves with various psychological strategies to enhance maintenance of behavioral change. Table 1 presents various strategies that can be used in long-term management of obesity, including the following: 1) continued professional guidance through ongoing therapist contacts after initial treatment; 2) training to equip patients with more effective coping skills to meet the challenges of the posttreatment period; 3) social influence programs to provide patients with enhanced social support after treatment; 4) increased physical activity to provide patients with positive physical and psychological effects that may enhance long-term

Table 1—Maintenance strategies for long-term management of obesity

ONGOING PROFESSIONAL CONTACT	
PURPOSES	
CONTINUED VIGILANCE REGARDING KEY BEHAVIORS	
REINFORCEMENT OF ADHERENCE	
PROBLEM SOLVING OF OBSTACLES TO MAINTENANCE	
METHODS	
PERSONAL CONTACTS BETWEEN PATIENT AND PROFESSIONAL	
TELEPHONE CONTACTS	
CONTACT BY MAIL	
COMBINATIONS OF THE ABOVE	
SKILL TRAINING	
PURPOSES	
IDENTIFICATION OF HIGH-RISK SITUATIONS	
TRAINING TO AVOID LAPSES	
POSITIVE COPING WITH SLIPS AND RELAPSE	
METHODS	
REVIEW OF PAST PATTERNS OF RELAPSE	
FORMAL TRAINING IN PROBLEM SOLVING	
PRACTICE IN COPING WITH HIGH-RISK SITUATIONS	
COGNITIVE RESTRUCTURING OF A LAPSE	
SOCIAL SUPPORT	
PURPOSES	
ADDITIONAL GUIDANCE	
EMOTIONAL SUPPORT	
SOCIAL REINFORCEMENT	
METHODS	
COUPLES TRAINING	
BUDDY SYSTEMS	
SELF-HELP GROUP	
TELEPHONE NETWORKS	
PHYSICAL ACTIVITY	
PURPOSES	
ADDITIONAL CALORIC EXPENDITURE	
PRESERVATION OF LEAN TISSUE	
IMPROVED MOOD AND SELF-CONCEPT	
METHODS	
LIFE-STYLE CHANGES	
AEROBIC TRAINING	
RESISTANCE TRAINING	
MULTICOMPONENT PROGRAMS	
PURPOSES	
EFFECTIVENESS OF MULTIPLE METHODS	
LACK OF DATA FOR MATCHING STRATEGIES TO PATIENTS	
INTEREST VALUE OF MULTIPLE STRATEGIES	
METHOD	
COMBINATIONS OF STRATEGIES LISTED ABOVE	

success; and 5) multicomponent programs marshaling combinations of strategies to help patients sustain behavioral change and maintain weight loss.

In the next section, we review a series of randomized, prospective investigations that evaluated the effectiveness of weight-loss maintenance strategies. These studies, conducted by Perri et al., contain similar characteristics. The subjects were mildly or moderately obese (i.e., 20–100% over ideal body weight) nondiabetic adults, who were treated initially with a comprehensive conservative treatment program of behavioral therapy and a balanced deficit diet of 1000–1500 kcal/day. Behavioral therapy consisted of the sequential presentation of various self-control strategies, including self-monitoring, stimulus control, self-reinforcement, cognitive restructuring, and procedures to reduce the pace of eating. After initial treatment, subjects were assigned randomly to a maintenance program or a control condition. Participants in the control conditions of each study received no further instruction or contact with their therapists, except for follow-up assessments scheduled during the posttreatment period. The maintenance strategies tested in these studies and the resulting weight-loss outcomes are summarized in Table 2.

EFFECTIVENESS OF MAINTENANCE STRATEGIES

Professional contact

After completing the initial phase of weight-loss treatment, patients are faced with the challenge of maintaining behavioral changes accomplished in treatment or returning to prior patterns of eating and inactivity. Ongoing vigilance, an active awareness of critical aspects of eating and exercise behavior, is a prerequisite to facing this challenge (11). A key function of posttreatment professional contacts is to encourage patients to be continuously mindful of their progress. These contacts may enhance motivation by helping patients reframe the weight-management endeavor in a positive, constructive, and

Table 2—Design and outcome in treatment studies reviewed

STUDY	CONDITIONS	OUTCOMES
PERRI ET AL. (17)	B	B + R + C WAS THE ONLY CONDITION THAT DID NOT SHOW SIGNIFICANT RELAPSE DURING FOLLOW-UP
	B + R	
	B + C	
	B + R + C	
PERRI ET AL. (19)	B	B + M SHOWED SUPERIOR WEIGHT-LOSS MAINTENANCE VERSUS B
	B + M	
PERRI ET AL. (24)	B	B + A AND B + A + M SHOWED GREATER INITIAL WEIGHT LOSS; B + M AND B + A + M SHOWED SUPERIOR WEIGHT-LOSS MAINTENANCE VERSUS B
	B + A	
	B + M	
	B + A + M	
PERRI ET AL. (26)	B	B + C AND B + P SHOWED SUPERIOR WEIGHT-LOSS MAINTENANCE VERSUS B
	B + C	
	B + P	
PERRI ET AL. (28)	B	B + C AND B + R SHOWED SUPERIOR WEIGHT-LOSS MAINTENANCE VERSUS B
	B + C	
	B + R	
PERRI ET AL. (29)	B	ALL CONDITIONS WITH POSTTREATMENT CONTACT SHOWED SUPERIOR WEIGHT-LOSS MAINTENANCE VERSUS B; ONLY B + C + A + S CONDITION LOST A SIGNIFICANT ADDITIONAL AMOUNT DURING FOLLOW-UP
	B + C	
	B + C + A	
	B + C + S	
	B + C + A + S	
PERRI ET AL. (31)	E	E PRODUCED SIGNIFICANTLY GREATER WEIGHT LOSS THAN B
	B	

hopeful fashion. The contacts also can offer the opportunity for therapist-directed problem solving when difficulties in adherence arise.

Posttreatment therapist contacts

by mail and telephone represent one means of providing professional support and advice during the period after initial weight-loss treatment. Patients can mail self-monitoring data with information

about their eating, exercise, and weight to their therapists. This procedure may enhance vigilance and maintenance of weight-management behaviors. Frequent posttreatment telephone contacts be-

tween patients and therapists have proven effective as a maintenance strategy across a range of problem areas besides weight management (16).

Skills training

An effective maintenance program also may need to equip patients with the skills to anticipate and cope with those circumstances that increase the risk of their experiencing a relapse (11,12). After treatment, obese individuals face various situations in which they are tempted to exceed a prescribed calorie goal or deviate from the self-control techniques taught in treatment. If an individual lacks the skills to negotiate the high-risk situation, a slip or lapse in self-control is likely. Moreover, a sense of hopelessness and a decrease in self-efficacy will evolve if the person interprets the lapse as evidence that he or she is a failure at self-control. Thus, an initial slip can become the start of a full-blown relapse (11).

Several cognitive-behavioral strategies may help prevent or minimize relapse after treatment (11,12). Patients can be taught to recognize and identify those situations that pose a high risk for relapse, and problem-solving techniques can be used to generate potential strategies for coping with high-risk situations. Success will be more likely if patients have the opportunity to practice dealing with actual high-risk situations. Finally, patients can be taught the cognitive therapy techniques to overcome feelings of guilt and a sense of failure that often accompany lapses in self-control.

Perri et al. (17) examined whether teaching patients cognitive-behavioral relapse prevention strategies or providing posttreatment professional contacts by mail and telephone would improve the long-term management of obesity. The results showed that neither approach by itself improved posttreatment progress. However, when the two approaches were combined, significantly better maintenance of weight loss was observed ($P < 0.05$). The results re-

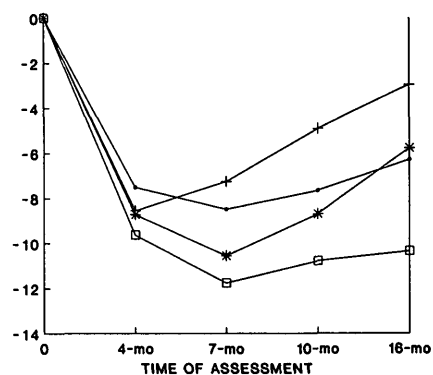


Figure 1—Mean weight losses (kg) for behavioral therapy (B, ●), behavioral therapy plus relapse-prevention training (B+R, +), behavioral therapy plus posttreatment patient-therapist contact (B+C, *), and behavioral therapy plus relapse-prevention training plus posttreatment patient-therapist contact (B+R+C, □).

vealed that the only condition that did not experience significant relapse during the year after initial treatment was the one that received the combination of relapse-prevention training and posttreatment professional contact (Fig. 1). Moreover, self-report data indicated that the significantly improved performance of participants in this condition appeared to be a result of increased use during follow-up of key behavioral strategies, including self-monitoring, stimulus control, and exercise.

The interaction of the posttreatment contact strategy with relapse-prevention training suggests that the content of patient-therapist interactions may be a crucial factor in posttreatment success. Therapists' instructions about specific coping techniques may have enabled participants to successfully negotiate high-risk situations and avoid relapses.

Social support as part of a multicomponent program

A multifaceted set of posttreatment strategies may be required to produce effective maintenance of behavioral change. Stuart (18) suggested that the inclusion

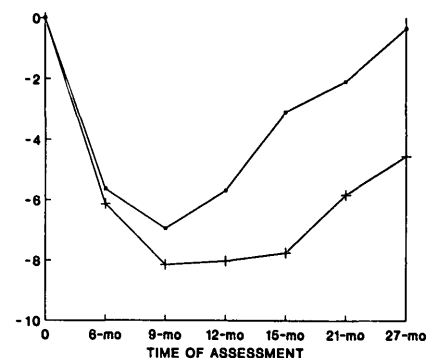


Figure 2—Mean weight losses (kg) for behavioral therapy only (B, ●) and behavioral therapy plus multicomponent maintenance program (B+M, +). Adapted from Perri et al. (15).

of social support strategies (e.g., self-help groups), along with continued self-monitoring of positive behaviors and frequent posttreatment patient-therapist contacts, would improve the long-term maintenance of weight loss. Perri et al. (19) incorporated social support into a multifaceted maintenance program by teaching patients how to form their own peer self-help groups to enhance posttreatment weight-loss progress. After initial behavioral treatment, patients were instructed to meet regularly to do the following: 1) monitor each other's weight; 2) praise and encourage weight-loss progress; and 3) implement group problem-solving when an individual was facing weight-loss difficulties. In addition, patients were asked to provide details of their weight-loss progress by mailing weekly postcards to their therapists. In turn, brief weekly phone calls were made by the therapists to provide continued guidance and support during the year after treatment.

The results of this study showed that over the course of the follow-up period, the multicomponent program of posttreatment social support and therapist contact significantly enhanced the maintenance of weight loss ($P < 0.05$; Fig. 2). This positive finding was tempered by the modest amount of weight

loss maintained and the substantial cost of therapist time to provide telephone contacts with patients for an entire year after initial treatment.

Exercise

Increased physical activity is one of the few factors consistently correlated with long-term success in weight management (20,21,22). In addition to increasing energy expenditure, exercise enhances the rate of fat loss and preserves the loss of lean body mass. Regular exercise also produces psychological benefits as well, including an increased sense of well-being and improvements in mood and self-concept (23). Perri et al. (24) examined whether the efficacy of behavioral therapy for obesity might be improved by adding an aerobic exercise regimen during treatment. An aerobic program consisting of two specific types of activity, i.e., brisk walking and stationary cycling, with fixed levels of intensity, duration, and frequency was implemented to test the contribution of exercise to weight loss. In addition, this study also examined the effects of the previously described multicomponent maintenance program, which consisted of posttreatment therapist contacts by mail and telephone and peer self-help group meetings. Thus, two initial treatment conditions, i.e., behavioral therapy or behavioral therapy plus aerobic exercise, were crossed with two posttreatment conditions, i.e., no posttreatment contact or a multicomponent posttreatment maintenance program.

The results of this study showed that participants in the groups that received the aerobic exercise program lost significantly more weight than subjects in the groups without exercise. The aerobic exercise program produced a 29% improvement in weight loss beyond the behavioral-therapy-only condition. In addition, patients in the multicomponent maintenance program demonstrated significantly better weight-loss progress at each follow-up assessment than subjects in the no posttreatment contact condition (Fig. 3). The efficacy of the mainte-

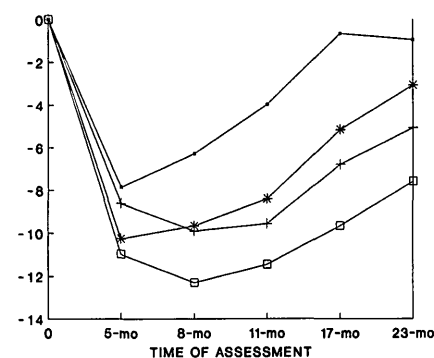


Figure 3—Mean weight losses (kg) for behavioral therapy (B, ●), behavioral therapy plus multicomponent maintenance program (B+M, +), behavioral therapy plus aerobic exercise program (B+A, *), and behavioral therapy plus aerobic exercise program plus multicomponent maintenance program (B+A+M, □). Adapted from Perri et al. (15).

nance program appeared to be related to the participants' greater adherence to behavioral self-management procedures (25). The combination of continued monitoring of key behaviors, frequent phone contacts with therapists, and peer-group support appeared to increase adherence and foster weight-loss maintenance.

Therapist contact versus peer support

The multicomponent maintenance programs used in the two previously described studies (19,24) included a combination of both therapist contact and peer-group support. In the next study in the series, Perri et al. (26) tested the specific effectiveness of peer support versus therapist contact as weight-loss maintenance strategies. The major question addressed was whether maintenance programs of peer support or therapist contact would improve weight-loss maintenance compared with a control condition in which patients had no contact with peers or therapists during the period after treatment.

The peer-support maintenance program was implemented over the

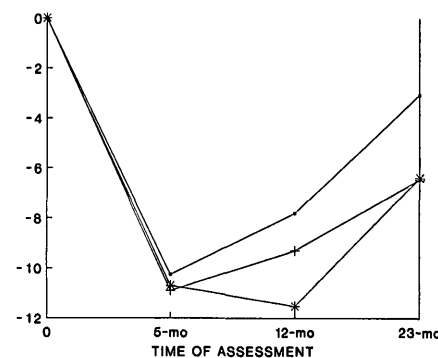


Figure 4—Mean weight losses (kg) for behavioral therapy (B, ●), behavioral therapy plus peer-support program (B+P, +), and behavioral therapy plus posttreatment patient-therapist contact (B+C, *). Adapted from Perri et al. (15).

course of 15 biweekly (i.e., every other week) sessions during the 7 mo after initial behavioral treatment, without the presence of a therapist. The peer-support program used the structure and procedures of a problem-solving treatment (27) within a self-help group format. The therapist-contact maintenance program also was implemented over 15 biweekly sessions during the 7 mo after initial behavioral treatment. In this condition, however, therapists were present to direct patients' use of problem-solving strategies as a means of coping with difficulties in weight-loss maintenance.

The results in this study indicated that at the conclusion of the maintenance programs (i.e., month 12), the therapist-contact condition demonstrated significantly better weight-loss progress than either the peer-support or control conditions (Fig. 4). During the period from month 12 to month 23, all three groups regained weight, but both the therapist-contact and peer-support programs exhibited better maintenance of weight loss than the control condition ($P < 0.05$; Fig. 4). Thus, the long-term findings suggested that posttreatment programs consisting of either peer support or therapist contact can foster improved maintenance of weight loss compared with treatment that does not

include a posttreatment maintenance program.

Therapist contact versus relapse-prevention training

Perri et al. (28) also examined whether year-long posttreatment maintenance programs involving either comprehensive relapse-prevention training or a high frequency of therapist contacts would result in better weight-loss progress compared with no-posttreatment-contact condition. During the year after initial behavioral treatment, subjects in the control condition had no further contact with their therapists except for two follow-up assessments. During the same period, patients in the relapse-prevention and therapist-contact programs were provided with 26 biweekly maintenance sessions. Participants in the relapse-prevention condition received intensive training in the various cognitive-behavioral strategies deemed crucial to avoiding or overcoming lapses in weight-loss progress (11). In the therapist-contact program, the participants were not taught any new therapy techniques, rather therapists directed group problem-solving efforts (27) aimed at maintenance of key weight-control behaviors.

At the conclusion of the initial treatment phase (month 5), participants in all three conditions had achieved equivalent weight losses. However, evaluations conducted at months 11 and 17 showed that the participants in both maintenance programs accomplished significantly better weight-loss progress than the subjects in the no-posttreatment-contact condition ($P < 0.05$), and that weight-loss differences between the relapse-prevention and therapist-contact programs were not significant (Fig. 5). These findings indicate that structured posttreatment programs can foster weight-loss maintenance, and that a high frequency of therapist contacts may prove as useful as relapse-prevention training in weight-loss maintenance.

Therapist contact, social influence, and exercise

Perri et al. (29) examined the effectiveness of four year-long maintenance programs for the management of obesity compared with a control condition that received initial behavioral treatment only (B [for short]). The four maintenance conditions were: posttreatment therapist contact (B+C); posttreatment therapist contact plus an aerobic exercise maintenance program (B+C+A); posttreatment therapist contact plus a social influence maintenance program (B+C+S); and posttreatment therapist contact plus a combination of both the aerobic exercise and social influence maintenance programs (B+C+A+S).

All four maintenance programs were conducted in 26 biweekly sessions scheduled during the year after initial treatment. Patients in the B+C condition received the initial treatment plus a year-long program of therapist contacts. These subjects were asked to maintain their aerobic exercise levels at 80 min/wk, i.e., 20 min/day, 4 days/wk.

Patients in the B+C+A condition received the initial behavioral treatment and the posttreatment therapist contact programs and also received an aerobic exercise maintenance program consisting of a new set of exercise goals for the posttreatment period and therapist-led exercise class during the biweekly posttreatment sessions. During the maintenance program, the prescribed frequency and duration of aerobic exercise were increased gradually from 80 to 180 min/wk, i.e., from 20 min/day, 4 days/wk, to 30 min/day, 6 days/wk.

Patients in the B+C+S condition received the initial behavioral treatment and the posttreatment therapist-contact program, and they received a multifaceted program of social influence strategies designed to enhance motivation and provide incentives for continued weight-loss progress. The social influence program included monetary group contingencies for program adherence and continued weight loss, active patient par-

ticipation in preparing and delivering lectures on maintaining weight loss, and instructions on how to provide peer support for weight loss through ongoing telephone contacts and peer-group meetings during the posttreatment period.

Patients in the B+C+A+S condition received the initial behavioral treatment and the posttreatment therapist-contact programs. In addition, these participants also received both the aerobic exercise and social influence maintenance programs described previously.

At the conclusion of the initial treatment period (i.e., month 5), equivalent weight losses were accomplished across conditions. At month 11, however, all four experimental conditions demonstrated significantly better maintenance of weight loss than the behavioral-therapy-only condition ($P < 0.01$). The superiority of the four maintenance conditions was evident at evaluations conducted at months 17 and 23 (Fig. 6). Moreover, at the month 23 assessment, participants in the four experimental conditions maintained on average 82.7% of their mean posttreatment losses, whereas patients in the behavioral-therapy-only condition maintained only 33.3% of their original weight loss. No significant differences between the four experimental conditions were evident at the follow-up evaluations. However, the B+C+A+S condition was the only group that showed a significant additional weight loss during the follow-up period ($P < 0.05$). From month 5 to month 11, subjects in the B+C+A+S condition demonstrated an additional mean weight loss of 4.1 kg. Furthermore, at month 23, participants in this condition on average had maintained 99% of their mean posttreatment weight loss.

These results suggest that year-long maintenance programs can help sustain behavioral change and weight-loss progress begun during the initial treatment period. Moreover, the magnitude of long-term weight losses sustained by maintenance program participants at

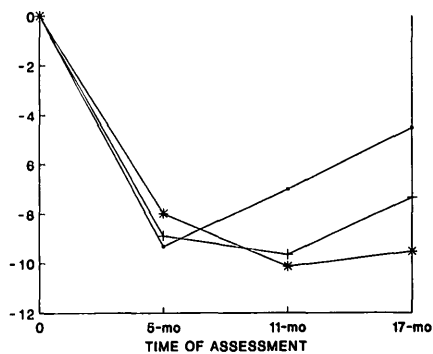


Figure 5—Mean weight losses (kg) for behavioral therapy (B, ●), behavioral therapy plus posttreatment patient-therapist contact (B+C, +), and behavioral therapy plus relapse-prevention training (B+R, *). Adapted from Perri et al. (15).

the final evaluation, i.e., $M = 10.7$ kg, compares favorably with results reported in the obesity literature. These findings indicate that an intensive therapist-led program directed toward teaching patients how to overcome specific problems of the posttreatment period can indeed enhance the long-term maintenance of weight loss. The results also suggest that the combination of high-frequency exercise coupled with intensive support from peers and therapists holds potential as a multifaceted approach to improving the long-term management of obesity.

Extended treatment and continuous care

The studies summarized herein suggest a robust association between the duration of therapist contact and continued weight-loss progress. Such findings, which support a continuous care model of obesity management, are consistent with results reported in the literature on behavioral management of obesity. For example, in a quantitative review of 105 studies, Bennett (30) found that duration of treatment was the single most important factor positively correlated with weight loss. Bennett suggested that the longer treatment continues, the longer patients adhere to the behaviors neces-

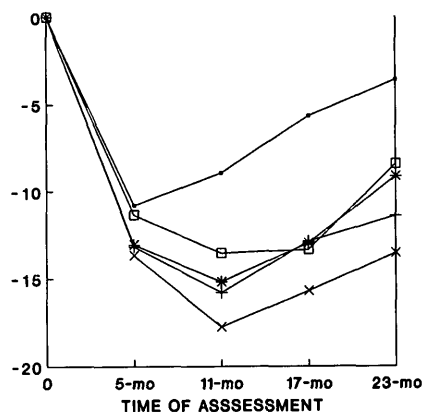


Figure 6—Mean weight losses (kg) for behavioral therapy (B, ●), behavioral therapy plus posttreatment patient-therapist contact (B+C, +), behavioral therapy plus posttreatment patient-therapist contact plus aerobic exercise program (B+C+A, *), behavioral therapy plus posttreatment patient-therapist contact plus social influence program (B+C+S, □), and behavioral therapy plus posttreatment patient-therapist contact plus aerobic exercise program plus social influence program (B+C+A+S, ×). Adapted from Perri et al. (15).

sary for weight loss. Accordingly, Perri et al. (31) conducted a prospective experimental investigation to test the effects of treatment length on weight loss and behavioral adherence to weight-control strategies.

The effectiveness of a 20-session obesity treatment program was compared with an extended program consisting of 40 weekly sessions. The behavioral techniques taught in the 20- and 40-session programs were identical, but the procedures were introduced in a more gradual manner in the extended treatment condition. Changes in weight were assessed at weeks 20, 40, and 72. At each assessment, patients also completed questionnaires rating the degree to which they adhered to nine weight-control strategies (e.g., self-monitoring, exercise, etc.) on a 7-point Likert-type scale (i.e., 1 = nonadherence; 7 = full adherence).

From pretreatment to week 20, participants in both conditions achieved

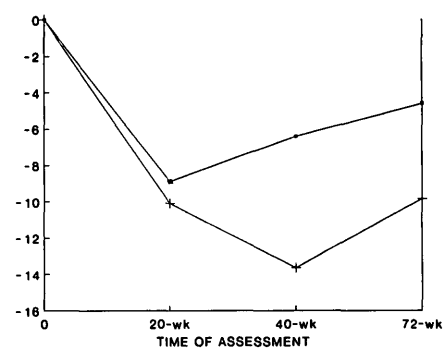


Figure 7—Mean weight losses (kg) for behavioral therapy (B, ●) and for extended behavioral therapy (E, +).

equivalent weight losses (Fig. 7). However, from week 20 to week 40, the extended treatment group lost a significant additional amount of weight ($M = 3.6$ kg lost, $P < 0.05$), whereas the standard condition showed a nonsignificant weight gain ($M = 2.5$ kg gained). From week 40 to week 72, the interval in which neither group had contact with their therapists, significant weight gains were observed in both conditions. Nonetheless, at week 72, the extended treatment maintained a significantly greater mean net loss than the standard treatment did (Fig. 7).

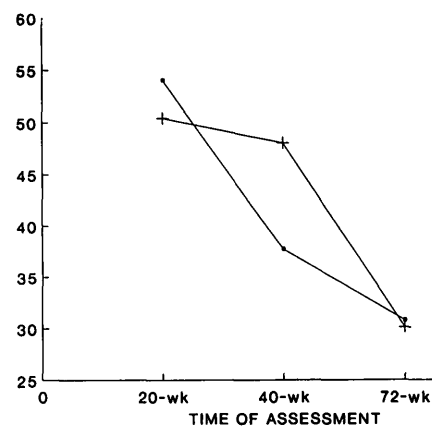


Figure 8—Mean behavioral adherence scores for behavioral therapy (B, ●) and extended behavioral therapy (E, +).

Figure 8 presents the mean behavioral adherence results for the standard and extended treatments at weeks 20, 40, and 72. As the figure illustrates, the degree of adherence to weight-control strategies was equivalent for both conditions at week 20. From week 20 to week 40, subjects in the standard treatment condition showed a significant drop in adherence, whereas the participants in the extended treatment maintained their level of adherence to the weight-control strategies. The between-group difference in behavioral adherence at week 40 was significant ($P < 0.01$). However, after the conclusion of the extended treatment, its participants also showed a significant decrease in adherence; and at week 72, both groups showed equivalent low levels of adherence to weight-control procedures.

The major finding of this study was that increasing the length of treatment significantly improved weight loss. Participants in the extended-treatment condition on average increased their weight losses by 35% during the period from week 20 to week 40. Furthermore, both the weight-loss and behavioral-adherence data supported the hypothesis that the longer obese patients are in treatment, the longer they adhere to the behaviors necessary for weight loss. The results also showed that the progress accomplished by patients in the extended-treatment condition was limited to the interval in which they were under the direct care of their therapists. When the extended treatment program concluded, its participants decreased adherence and regained weight.

Collectively, these findings, and those from the other studies in this series, strongly favor conceptualizing and treating obesity as a chronic condition that requires long-term care. One may question, however, whether obese patients will require life-long treatment for successful weight management or whether they eventually may become capable of effectively managing their weight on their own. Bjorvell and Ross-

ner (32) provided obese patients with an intensive, 4-yr program that included weekly maintenance sessions, therapist contacts by telephone and mail, and refresher courses for patients who experienced relapses. Six years after the active treatment was concluded, the women in this project reported that on average they had succeeded in maintaining ~66% of their peak weight losses (33). Thus, for some obese patients, intensive involvement in long-term treatment eventually may produce overlearning and successful self-management of weight loss.

CONCLUDING REMARKS— The studies summarized herein were conducted with nondiabetic patients, and the successful management of obesity in such individuals may help prevent the development of NIDDM. However, several factors may make successful long-term management of obesity more challenging in the diabetic versus the nondiabetic obese patient. Wing et al. (4–6,34–36), who have extensively researched the treatment of obesity in NIDDM patients, have noted that diabetic patients who present for obesity treatment often are older and sicker than nondiabetic patients treated for obesity (5). Moreover, the physiological abnormalities associated with diabetes may make weight loss more difficult to achieve initially and harder to maintain over the long run (5,37,38). High circulating levels of insulin and impairments in insulin secretion may increase appetite and may make caloric restriction more difficult to sustain (38). Many diabetic patients must monitor their blood glucose levels, make adjustments in hypoglycemic medications, and modify the timing of meals and types of foods consumed. These factors complicate adherence, as does the need for many patients to follow treatment regimens for related illnesses, such as hypertension, hyperlipidemia, and gout. Furthermore, the difficulties in behavioral adherence imposed by complex medical conditions may be compounded by diabetic pa-

tients' experience of depressive symptoms that can lower motivation to sustain efforts at behavioral change (39). Yet, despite the many impediments facing the obese diabetic patient, weight loss offers tangible benefits that can serve as powerful incentives for behavioral change, including a decreased need for medication, improved physical and mental health, and improved quality of life (4,5,36).

In this paper, we have argued that health-care professionals must orient obese patients, diabetic and nondiabetic alike, to understand the long-term implications regarding the management of obesity. Obesity should be viewed as a disease that, similar to diabetes or essential hypertension, may never be cured. Rather, obese individuals must seek to keep their condition under control through active efforts at self-management for the rest of their lives. Once the patient and health-care professional accept the chronic nature of obesity, they can work together to structure treatments that will provide patients with long-term assistance in managing their weight.

The results from the studies summarized herein, and those reported in the literature, indicate that without a posttreatment program, obese patients generally abandon the self-management strategies taught in treatment, and gradually regain weight. In contrast, when initial therapy is supplemented with posttreatment maintenance strategies, patients exhibit greater adherence to weight-control techniques and better maintenance of weight loss. The most consistent finding in our series of studies was that structured programs of post-treatment therapist contacts successfully helped patients maintain weight-loss progress. Thus, the longer obese patients remain in contact with their therapists, the longer they adhere to the eating and exercise habits needed to sustain weight loss.

Effective maintenance programs most likely will require a multifaceted set of strategies. Continued self-monitoring

of eating and exercise behaviors appears to be a prerequisite for continued weight loss progress. A problem-solving approach within posttreatment contacts can provide a basic structure for therapists to assist patients in coping with the challenges of maintenance (15). Skills training and social support strategies by themselves may not be sufficient to help patients sustain maintenance on their own, yet these strategies may be useful as components of multifaceted maintenance programs. Exercise can play a key role in the management of obesity, and Wing et al. (34) have demonstrated that the combination of diet and exercise improves both weight loss and glycemic control compared with diet alone in NIDDM patients. Moreover, the results in the Perri et al. (29) study showed that a maintenance program that included therapist contact, combined with high-frequency exercise and social support, produced significant additional weight loss during the posttreatment period.

Effective regimens for the management of obesity may require multiple stages spanning extremely long periods of time. Initial treatments need to incorporate strategies to increase the amount of weight lost by patients. Lengthening initial treatments from 20 to 40 wk can increase the amount of weight loss achieved by patients (31). The use of increased physical activity, particularly supervised exercise, also may play a productive role in this regard (24,29,34). The middle stages of long-term programs should be tailored to help patients maintain weight loss by coping with the array of obstacles that arise in the posttreatment period (17,29). Finally, tertiary phases of long-term obesity-management programs need to provide for continuous follow-up care. For some patients, groups such as Weight Watchers or Overeaters Anonymous may be appropriate for long-term support. In many cases, however, health-care professionals may need to develop specific programs of follow-up care that not only allow checks on progress several times per

year, but also provide the patient with an opportunity to restart a weight-management effort. For the diabetic patient, these check-ups may be coupled with the established visits for monitoring glycemic control. This dual emphasis of treatment would further reinforce for the patient the significance of weight management as a critical element in diabetes care. Finally, obese patients need to be provided with a way to get help when problems arise or a relapse occurs. The availability of telephone hotlines, ready access to additional therapy sessions, and annual refresher courses in weight management may serve as beneficial components in a comprehensive program for the long-term management of obesity.

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