

Correction and Control of Intractable Obesity

Practicable Application of Intermittent Periods of Total Fasting

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Total fast periods of 4 to 14 days in the management of 50 cases of intractable obesity achieved a prompt decrease in body weight of approximately 2.5 lb. per day. Subsequent shorter fast periods served to prevent a recurrence of the obese state and, also, to achieve further reduction in weight in the ensuing weeks. Non-nutritious fluids were allowed *ad libitum* and polyvitamins were given. Exercise was interdicted. Anorexia was the rule after the first day of fasting and paralleled the degree of hyperketonemia. A sense of well-being was associated with the fast. The patient's subsequent 1- or 2-day fasts, as an outpatient promoted his reassurance that he had within his grasp a means of effectively combating what had formerly appeared to be a hopeless situation.

THE MAGNITUDE of the menace which obesity represents is indicated in its prevalence, its predisposition to cardiovascular diseases, to diabetes, and diseases of the gallbladder, and its unfavorable influence on morbidity and longevity¹ in subjects with these and other disorders.

The over-all incidence of overweight is increasing and, in the adult male, the degree of overweight has increased, significantly, in recent years.² There

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has been no effective improvement in the prevention and treatment of obesity to cope with these trends. Furthermore, the clinical management of the obese remains handicapped by the resignation of these patients to the obese state in the belief that they are "made differently" from those of normal weight, in that, no matter what measures they adopt, they either do not lose weight, or, if a reduction is achieved, it is of short duration.

To attack this composite challenge by short periods of total fasting may seem barbaric. In reality, this method of reduction is remarkably well tolerated by obese patients. Bloom,³ employing total fast periods as an introduction to the treatment of 9 obese subjects, found that this regimen was well received, and that the patients enjoyed a sense of well-being during the fast periods while achieving an average loss in weight of 2.6 lb. per day. The absence of excessive hunger during total fast periods was observed by Keys and his associates,⁴ by Cannon,⁵ and by Benedict.⁶

The readiness with which individuals, bent on achieving their objectives by dramatic means, repeatedly resort to hunger strikes is, we now believe, a good indication that they found them to be no great ordeal. Also, we have seen evidences that obese patients thoroughly enjoy the total fast periods due, probably in part, to their elation that hunger is not a problem while major reductions in weight are being accomplished.

It would seem paradoxical that periods of total fasting—that is, complete abstinence from nutrition as far as calories are concerned—should be associated with anorexia, which is usually the case; whereas diets low in calories, e.g., 900 to 1,100

calories, characteristically have no such effect. Intolerable hunger usually accounts for the failure to adhere to low-calorie diets.

This study supports this apparent paradox and supplies an explanation for it. Furthermore, in taking advantage of the anorexia and euphoria that accompany total fasts, we have a well-received and effective aid in coping with the problem of obesity in the most refractory as well as in the milder cases. It is notable that several of these patients have pleaded, at the end of a 10-day fast period, to be permitted to continue longer without food.

At the onset of this study, only the severe and refractory cases were selected. Milder, but equally refractory cases have been added, until more than 50 patients have been subjected to this regimen.

The total fast is put into effect after preliminary clinical and laboratory studies are evaluated. Water, weak tea or coffee, artificial sweetening agents, and beverages devoid of nutritional content are allowed ad libitum. Polyvitamins are given orally in therapeutic amounts twice daily. In only one instance was bulk provided in the form of thrice-cooked green vegetables. This measure may be extended and may be desirable in isolated instances but it is not necessary.

The initial fast varied from 5 to 14 days for adults and lasted not more than 7 days for juvenile subjects. In most instances, diets providing 900 to 1,500 calories were resumed abruptly following the fast; these, and diets of lower values, usually exceeded the patient's desire for food for several days after the termination of the fast. As experience has accrued, the follow-up plan of diet therapy has been modified until at present the patients on discharge from the hospital are allowed more liberal diets than formerly, e.g., 1,300 to 1,900 calories. Little decrease in weight may be accomplished by this latter program and, indeed, a small gain may ensue. This is overcorrected by 1- or 2-day fast periods at appropriate intervals, as illustrated in Figures 1 and 2. After a few weeks of adaptation, following the initial fast period, the patient may be readmitted for a repetition of the long fast or this may be tried at home. The effects of each plan are depicted in Figure 1. Fast periods exceeding 3 or 4 days are tolerated without difficulty in the hospital, whereas weakness is a feature if they are employed at home. Patients are ambulatory during the fast periods, but physical exercise is discouraged. In general, the foregoing plan of therapy in hospital and home is projected into the future until near-normal weights are achieved. Observations extending for more than 1½ years indicate that the patients enjoy the more liberal diets which are permitted when intermittent 1- or 2-day fast periods are interjected at appropriate intervals to prevent a recurrence of the former tendency to regain weight.

Ketonuria appears during the first 24 hours of the total fast, but it is not until the production of ketones is in great excess that hyperketonemia develops. Typical findings indicate the absence of hyperketonemia before and during the first day of the fast when a good appetite prevailed; hyperketonemia and anorexia on the second day of the fast and their persistence until the fast was completed; and the return of appetite with the subsidence of the ketonemia. The degree of ketonemia is detected by subjecting a drop or two of blood plasma to a modified nitroprusside test. The development of anorexia is in direct proportion to the degree of ketonemia, and the return of a desire for food parallels the subsidence of the ketonemia. This relationship, as shown in the table and in Figures 2 and 3, has been observed in each patient sub-

Relationship Between Subsidence of Ketonemia and Return of Appetite

Day	Plasma Ketones	Appetite
Before Fast	0	Good
Fast 1	0	Good
Fast 2-5	++ to +++	Anorexia
After Fast 1	++	Slight
2	Trace	Average

jected to this treatment. It has also been observed, repeatedly, that the degree of ketonuria, per se, does not necessarily parallel the degree of anorexia. Hyperketonemia, on the other hand, is invariably associated with an anorectic effect of varying degrees in obese patients.

The decrease in weight during complete fasts is out of proportion to the caloric expenditure. An associated saluresis (natruresis) and loss of water, as noted by Bloom and Mitchell,⁷ accounts for the apparent discrepancy; and their correction is responsible for the prompt gain in weight when a diet low in calories is resumed.

Report of Cases

CASE 1.—A woman, aged 63 years, height 66¾ in., had been obese since early youth, weighing 200 lb. while in high school. In the previous 15 years a variety of reducing diets, medications, and psychiatric guidance provided only temporary benefit; and, when seen by us in April, 1961, she weighed 303 lb. She was admitted to the Pennsylvania Hospital and, during the first 10-day fast, her weight decreased to 277 lb. During this period, hunger was no problem; nor did she experience the weakness she had suffered while consuming low-calorie diets previously. Her progress is depicted in Figure 1 which shows the effect of 4 different 10-day fast periods—2 of which were observed in the hospital and 2 at home. The value of intermittent 1- and 2-day fasts at appropriate intervals is indicated. They maintained the improvement gained by the longer fasts and accomplished further reduction in weight. After each long fast, an abrupt gain of several pounds ensued. This was attributed to retention of fluid, as the magnitude of the loss in weight exceeded, by a considerable degree, that which could be attributed to the deprivation of calories. The decline in weight, though interrupted at times, has been progressive from 303 lb. to 225 lb. over a 9-month period.

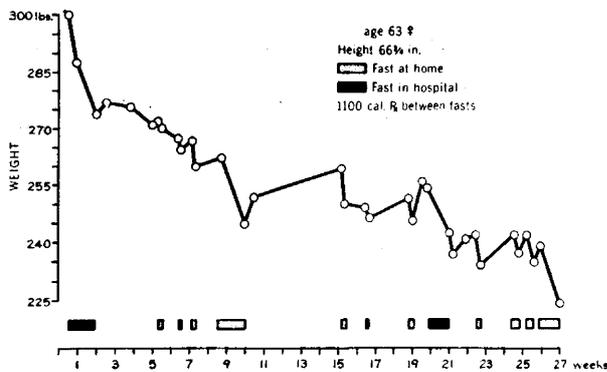


Fig. 1.—Effectiveness of periodic 10-day fast periods, with interspersed 1- and 2-day fasts, in achieving progressive, though interrupted, correction of previously intractable obesity is depicted.

The patient's personality has changed from one of desperation, with abandonment of hope, to that of an eager extravert full of plans for a promising future. The most reassuring feature, from the patient's point of view, is that she has within her own power, by utilizing intermittent 1- and 2-day fasts, the means of controlling what had appeared to be a hopeless situation. This highly intellectual social worker has been returned to a full degree of exceptional usefulness.

CASE 2.—A boy, aged 13 years, was admitted to the Pennsylvania Hospital on Aug. 24, 1961, for the correction of his obese state. He gave a family history of diabetes and a history of persistent failures in his attempts to lose weight.

The physical findings were not remarkable except for his overweight—199 lb. His height was 67½ in. A glucose tolerance test revealed normal values.

A 4-day fast period achieved a decrease of 9 lb. (Fig. 2). A 1,100-calorie diet (protein, 80 gm., fat 33 gm., and carbohydrate, 120 gm.) was prescribed on discharge, and one fast day per week was adopted for 6 weeks at home. Thereafter, with diet unchanged, he continued to decrease in weight, slowly, without fasts. After 16 weeks, his weight was 183 lb.

During the initial 4-day fast, anorexia was directly proportional to the degree of ketonemia, as indicated in Figure 2.

CASE 3.—A young woman, aged 16 years, height 60½ in., weight 172 lb., who had been unsuccessful in controlling

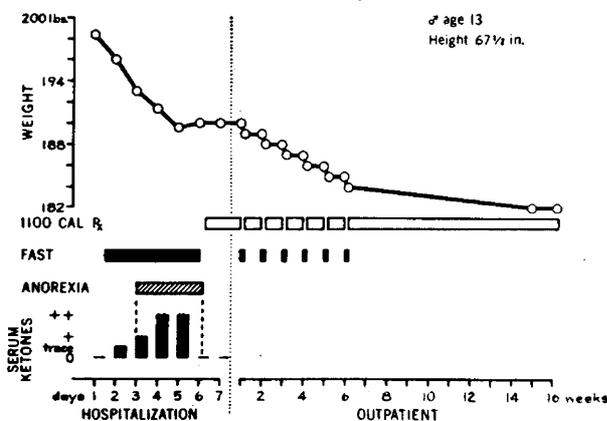


Fig. 2.—Total fast period of 4 days with subsequent weekly 1-day fasts are shown to serve as effective preliminary regimen in control of refractory obesity.

her obese state for 5 years, was admitted to the Pennsylvania Hospital on Dec. 19, 1961. Previous improvements by restrictions in diet and anorectic agents had been short-lived. She gave a family history of diabetes, and a glucose tolerance test revealed that she had a mild diabetes. The blood sugar (true glucose) values in milligrams per 100 ml. were: fasting, 76; ½-hour, 147; 1-hour, 130; 1½-hour, 155; 2-hour, 137; and 3-hour, 103. There was no glycosuria.

During the total fast of 7 days, she became anorectic on the second day and remained so, thereafter, until the fast was completed. The degree of anorexia paralleled the appearance and degree of hyperketonemia, as indicated in Figure 3. A loss from 172½ lb. to 159 lb. was accomplished. A diet of 1,500 calories (protein, 80 gm., fat, 33 gm., and carbohydrate, 220 gm.) was allowed on discharge and, as of Feb. 7, a weight of 158 lb. was reported. A 2-day fast period, twice per month, is the current plan of therapy. The improvement in morale has been striking.

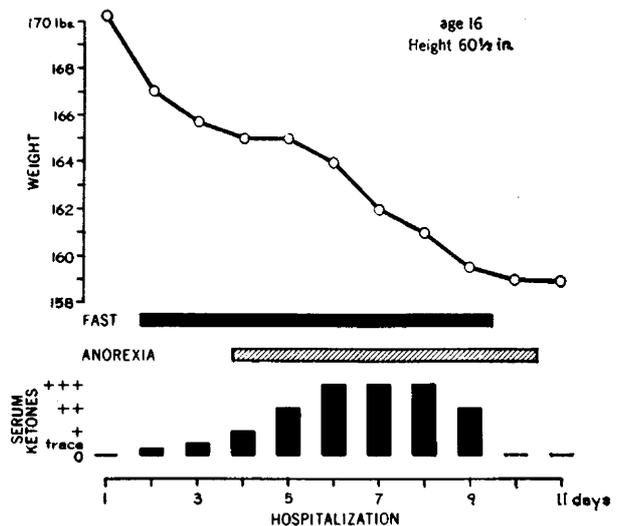


Fig. 3.—Favorable response of previously refractory obesity to total fast of 7 days is shown in case of juvenile diabetic.

Comment

Of more than 50 obese subjects studied, there were adults with uncomplicated exogenous obesity, nondiabetics in their teens, juvenile patients with controlled diabetes, and adult diabetics. In one instance only was the fast terminated prematurely. In this case, the patient had an ulterior motive in using her obese state as a means of retaining the attention of her over-solicitous husband.

The initial study and treatment were carried out, without exception, in the hospital. The periods of total fasting varied from 4 to 14 days. Subsequent shorter periods of fasting were utilized successfully, on an outpatient basis, to prevent a gain in weight and to carry the reduction further. When total fast periods of 1 to 10 days (Fig. 1) were added at suitable intervals, a progressive decrease in weight was accomplished.

The total fast was begun after samples of blood were taken for determination of sugar, ketones, CO₂-combining power, electrolytes, lipids, and fibri-

nolytic activities. These determinations, except those pertaining to ketonemia, having failed to reveal significant deviations from normal, are considered unnecessary in the clinical management of these patients, i.e., if the fasting periods do not exceed those employed in this study. It is known that an excessive loss of sodium occurs during a complete fast⁷ but, as hyponatremia was not found in any case at the end of a 10-day fast, serum sodium determinations were discontinued. There was no increase in the excretion of 17-hydroxycorticosteroids during total fast periods similar to those we employed.³ We found no significant changes in the fibrinolytic activities.

An interruption of the fast, sufficient to eradicate the detectable hyperketonemia, is associated with a return of the appetite. Though small diets, 900 to 1,300 calories, are particularly well tolerated for varying lengths of time following the period of fasting, it seems preferable to allow, at this time, a diet which will maintain a stationary weight for a few weeks of adaptation, after which the fast may be repeated as shown in Figure 1.

Pregnancy, peptic ulcer, hepatic insufficiency, infection, and uncontrolled labile diabetes are contraindications to a total fast.

Outstanding is the improved morale which has occurred. This is attributed to the immediate and dramatic success in alleviating the obese state, but

equally important is that the outpatient plan of utilizing suitably spaced 1- or 2-day fasts give the patient reassurance that he has an acceptable method within his grasp to effectively continue to reduce and to prevent a recurrence of the obese state.

Complete fasts, though remarkably effective in dealing with problem cases of obesity, are not to be used indiscriminately. Like major surgery or the use of potent drugs, they are to be employed with a high degree of selection and never without close and qualified supervision.

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Where there is a population there must be people—like you and me and the Jones's next door. That is the way we old-timers see it. That is the way it used to be till the statisticians came along. They had taken over from classical logic the term "universe of discourse" and—making it simply "universe"—had redefined it as "the total number of a particular entity present in a particular space." But they grew tired of having all these universes around and rechristened them "populations." As a result we now run into the strangest kinds of population, and no longer only in statistics. There is, to quote at random, "the problem of isolating anaerobic organisms from a mixed population, especially in the presence of a rapidly spreading aerobic population component." On second thought, this is really quite nice. It makes life in an anaerobic society seem cozier. Similarly, when I read that "the erythroblastic population of the bone marrow remained unchanged," my healthy sense of metaphor is put under no undue strain. But the statisticians insist that their populations are not necessarily collections of living organisms. Hence there can be a population of calcium phosphate crystals in the synovial fluid of an arthritic patient. There can be—though this is not quoted—a population of holes in a Swiss cheese or of empty beer cans along a particular highway. Here the umbilical cord of metaphor is clearly broken, and even an old-timer like myself is aware that he is dealing with a new technical term. I suppose there is nothing we can do about this sort of linguistic development. As a matter of fact, I suppose there is nothing we would want to do about it, except perhaps ask the statisticians' permission to think it mildly amusing when they talk about the population of hearses in Greater New York.

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