

# A Forty-Day-550 Calorie Diet in the Treatment of Obese Outpatients

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TREATMENT of obesity is a two-stage procedure: weight reduction and maintenance of reduced weight. This paper deals with the first stage only and presents a rapid and efficient way to achieve weight reduction.

## METHODS

All obese patients who were referred to the Endocrinological Outpatient Clinic of the Tel-Hashomer Hospital between July 1957 and July 1958 were treated according to the following plan unless they were less than eighteen years of age, or it was thought that they would not be able to follow the plan because of low intelligence. No other plan of treatment was proposed to any patient during this period.

The diet was that proposed by Simeons<sup>1</sup> and consisted of only two meals daily. Each meal consisted of: (1) 100 gm. of lean meat (veal, beef), chicken or fish, weighed raw, served grilled or boiled, (2) one normal serving of fresh seasonal vegetables, boiled or raw, (3) one rusk weighing 10 gm., (4) half a lemon, (5) an apple or orange or 60 gm. of other fresh fruit (below 15 per cent carbohydrate content).

Meals were taken at whatever time preferred by the patients, but patients were not allowed to save part of the meal for later consumption. In addition patients were allowed unlimited quantities of salt, pepper and water, as well as tea and coffee (unsweetened and without milk) during and between the meals. It was impressed upon them that strict adherence to the diet was essential. This diet furnishes about 500 to 600 calories daily. Patients were not informed of the caloric value of this diet nor

were they allowed to substitute caloric equivalents.

The diet was prescribed for forty consecutive days. Patients were told that they could expect a weight reduction of about 10 kg. (22 pounds). They were not seen during the dieting period, but were instructed to continue their usual occupations and accustomed way of life. After forty days they were re-examined. Those who were still overweight and in need of a second course were instructed to preserve the attained weight: they were told to eat three meals a day and to weigh themselves daily, regulating food intake so as to avoid weight gain. Again, patients were not told to "count calories." After two months they were put on a second course. Of the forty-five patients, five completed two or more courses; several others are now in their second course.

In accordance with Simeon's plan,<sup>1</sup> 125 units (0.25 ml.) of gonadotropin (Antuitrin S, Parke, Davis & Co.) were given daily to thirty-nine of the patients; fourteen others received daily injections of saline. Patients were told that weight reduction would be due to the diet but that injections would help to curb their appetites. The injections were given at home by a nurse.

## RESULTS

Forty-five patients started fifty-three courses. The data are summarized in Table I, arranged according to daily weight loss (column 11). Forty-seven courses (89 per cent) resulted in a loss of more than 150 gm. per day. Six patients (11 per cent of the courses and 13 per cent of the patients) lost less and were considered failures. Of the successful courses, sixteen resulted in a loss of 152 to 192 gm. daily and thirty-one in a loss of more than 200 gm. daily.

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TABLE I

1	2	3	4	5	6	7	8	9	10	11	12	13
No.	Initials	Age (yr.)	Sex	Height	Weight before Treatment (Kg.)	Percentage Overweight	Days of Diet	Weight after Treatment (Kg.)	Total Weight Loss (Kg.)	Weight Loss (gm./day)	Injections*	Remarks
1	H. I.	53	M	176	113.5	54	40	90.2	23.3	582	Ant	Difficult gait, post-polio Latent diabetes
2	W. H.	36	M	174	98.5	38	40	83.2	15.3	382	Sal	
3	K. F.	43	F	151	83	68	30	72.4	10.6	353	Ant	
4	T. N.	22	F	164	99	60	40	85	14	350	Ant	
5	W. E.	18	F	169	83	25	40	69.4	13.6	340	Ant	
6	K. S.	23	M	174	101	43	40	87.5	13.5	337	Sal	
7	H. B.	41	F	163	96.5	59	40	83.5	13	325	Sal	
8	S. A.	28	F	170	109.6	61	40	97	12.6	312	Ant	
9	L. B.	22	F	163	91.5	55	40	79.5	12	300	Ant	
10	H. I.	31	F	154	111	113	40	100	11	285	Ant	
11	B. N.	36	F	162	78	30	40	67.5	10.5	262	Ant	
12	W. M.	22	M	178	108.5	55	40	98.3	10.2	255	Ant	
13	R. R.	25	F	153	97	88	40	87	10	250	Ant	
14	K. M.	28	F	156	74.5	36	40	64.5	10	250	Ant	
15	R. H.	42	M	167	87	34	40	77	10	250	Ant	
16	A. S.	22	F	157	98.5	80	36	39.8	8.7	242	Sal	
17	K. F.	34	F	151	73.3	48	28	66.7	6.6	232	Ant	
18	G. A.	27	F	149	82	71	40	73	9	225	Ant	
19	B. H.	26	F	154	84.5	66	40	75.5	9	225	Sal	
20	M. A.	25	F	153	82	59	40	73	9	225	Ant	Diabetes
21	H. I.	31	F	154	100	90	40	91	9	225	Ant	
22	K. E.	31	F	159	88	56	40	79	9	225	Sal	
23	A. R.	25	F	153	67.3	30	40	58.3	9	225	Sal	
24	G. T.	56	F	153	94	82	40	85.5	8.5	212	Ant	
25	M. D.	35	F	148	73.5	60	40	65	8.5	212	Ant	
26	R. R.	25	F	153	80	55	40	71.5	8.5	212	Ant	
27	H. I.	31	F	154	127.5	142	40	119	8.5	212	Ant	
28	B. I.	22	F	166	72.7	13	20	68.7	4	200	Sal	
29	R. R.	25	F	153	71.5	48	30	65.5	6	200	Ant	
30	H. I.	31	F	154	119	125	40	111	8	200	Ant	Hyperostosis frontal. int.
31	E. B.	32	F	160	108.5	36	40	100.5	8	200	Ant	
32	B. B.	35	F	154	87.2	66	40	79.5	7.7	192	Sal	
33	K. H.	22	F	137	67.5	75	40	59.7	7.8	192	Sal	
34	R. G.	52	M	162.5	96.7	60	40	89.2	7.5	188	Ant	
35	F. L.	31	F	157	89.5	65	40	82	7.5	188	Ant	
36	M. D.	35	F	148	81	73	40	73.5	7.5	188	Ant	
37	E. A.	20	F	155	67.5	16	40	60	7.5	188	Ant	Ankylosis of tarsal joints; congenital deformity of legs
38	S. E.	20	F	150	71.1	45	36	64.5	6.6	186	Ant	
39	S. U.	34	F	150	107.3	120	31	101.6	5.7	184	Ant	
40	L. E.	35	F	161	79	34	40	72	7	175	Ant	
41	V. H.	31	F	148.5	66	39	40	59	7	175	Ant	
42	E. R.	32	F	160	100.5	71	40	93.5	7	175	Sal	
43	D. F.	35	F	158	85	30	40	78	7	175	Ant	
44	K. Z.	30	F	147	66.7	45	40	59.5	7.2	175	Ant	

TABLE I (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13
No.	Initials	Age (yr.)	Sex	Height	Weight before Treatment (Kg.)	Percentage Overweight	Days of Diet	Weight after Treatment (Kg.)	Total Weight Loss (Kg.)	Weight Loss (gm./day)	Injections*	Remarks
45	H. B.	41	F	163	82.4	34	34	76.8	5.6	174	Sal	
46	T. E.	35	F	162	79.7	32	40	73	6.7	167	Ant	
47	S. L.	35	F	162	91.2	52	40	85.1	6.1	152	Sal	
48	L. J.	29	F	160	83.5	44	40	77.5	6	—	Ant	Not successful
49	W. H.	39	F	160	105.6	81	40	100	5.	—	Ant	Not successful
50	S. R.	34	F	155	91	73	40	85.5	5.65	—	Sal	Not successful
51	W. H.	29	F	150	82	69	40	76.5	5.5	—	Ant	Not successful
52	A. M.	51	F	151	80	62	40	75	5	—	Ant	Not successful
53	H. Z.	33	F	155	80	52	40	78	2	—	Ant	Not successful

\* Ant—Antuitrin S injection (see text). Sal—saline injections.

The patients' ages (column 3) were between eighteen and fifty-six years (mean—32.8 years). Age did not affect daily weight loss.

Six courses were completed by males (column 4). This small percentage of males is usual in dieting groups. Their mean daily weight loss was higher than the general weight loss (males—mean 332.3 gm./day, general—mean 237.8 gm./day [Table II]).

TABLE II  
Average Daily Weight Loss

Over-all (47 successful courses)	237.8 gm./day
With saline injections (13 courses)	234.3 gm./day
With Antuitrin S (34 courses)	239.2 gm./day
Males (6 courses)	332.3 gm./day

Patients' weights before the course was started are recorded in column 6. Column 7 gives an idea on the degree of overweight in per cent. The normal weight was approximated as the patient's height in centimeters above 1 meter, less 5 per cent. It is evident that the amount of overweight had no influence on daily weight loss. This is clearly brought out by patient I. H. (Courses No. 10, 21, 27, 30) who started her first course weighing 127.5 kg. and lost 212 gm. daily. At the start of her second course she weighed 119 kg. and lost 200 gm. daily. Third course, weight 111 kg., loss 285 gm. daily; fourth course, weight 100 kg., loss 225 gm. daily. Column 9 lists the total weight loss in kilograms. It should be considered to-

gether with column 8, which shows the duration of the diets (some lasted less than forty days). Average total weight loss for forty days was 9.51 kg. (21 pounds).

Of the forty-seven successful courses, thirty-four were combined with Antuitrin S and thirteen with saline injections (column 12). There was no significant difference in the mean daily weight loss between the two groups (239.2 gm./day mean for the hormone-treated group, as compared with 234.3 gm./day mean for the saline group [Table II]). Of six unsuccessful patients, five took Antuitrin S and one saline.

Two patients had latent diabetes and one had overt diabetes. Three patients had hyperostosis frontalis interna. In two patients movements were limited by orthopedic conditions.

Patients reported that they felt hungry during the first few days of the diet; later hunger was not very strong, but a certain weakness took its place.

Most patients were constipated throughout the course of the diet. No other ill effects of the diet were reported.

#### COMMENTS

We assumed from the start that the success of Simeon's<sup>1</sup> regimen was in no way related to gonadotropin. This was clearly borne out by the results of the present series in which patients receiving 125 units of Antuitrin S showed the same daily weight loss as those

receiving saline. Injections, although given for psychologic reasons only, may well have served as an important psychotherapeutic agent, especially considering that the patient was reassured that they would curb his appetite, in determining the high percentage of courses completed. Obviously, neither the patient nor the family physician could be informed that the Antuitrin S was being given as a placebo. In the six patients who did not complete the forty-day course the diet was stopped by the family physician, since the supply of hormone ran out. One course was scheduled for and terminated in twenty days when the patient reached the desired weight (Table I).

The present series, as well as that reported by Simeon,<sup>1</sup> proves that obese patients can lead a normal life performing moderate work on 500 to 600 calories a day. Although none of the patients was engaged in heavy manual labor, many of the women engaged actively in the chores of farming in addition to household duties and their daily routine was far from an easy one.

As previously mentioned the only factor in the exclusion of patients from this series was that of limited intelligence. No patient with serious diseases presented himself for weight reduction. Since the completion of this series, however, one sixty-five year old man with arteriosclerotic heart disease and congestive failure completed the regimen successfully with no adverse effects. Our experience is still too limited to speak of medical counterindications.

Comparison of our results with those obtained by others is difficult since most authors do not take the time element into consideration. Most papers state the total weight loss in pounds or kilograms, whereas our results are most meaningfully expressed in weight loss of grams per day. We could not make use of the criteria of Trulson et al.<sup>2</sup> or other criteria found in the literature. It is well known, however, that the first month of dieting is most difficult and that the vast majority of patients abandon the diet before the first month is over. In a conference on therapy Melchionna<sup>3</sup> states that success is achieved in not more than 15 per cent of obese patients. In our regimen, when one course lasts forty days, forty-seven of fifty-

three courses were completed successfully.

Recently, Feinstein, Dole and Schwartz<sup>4</sup> presented a table which summarized the experience of eight different groups in the ambulatory treatment of obesity. These series are representative of the usual dietary regimen,<sup>5-12</sup> and the duration of therapy, although usually not stated exactly, was prolonged. In spite of this it is apparent that the number of patients losing less than 10 pounds (4.5 kg.) varied from 35 to 71 per cent in the different series, while an additional 20 to 36 percent lost 10 to 19 pounds (4.5 to 8.6 kg.). All of our patients who completed the forty-day trial lost more than 10 pounds and the majority more than 19 pounds.

The patients reported by Feinstein et al.<sup>4</sup> were treated on a 900 calorie formula diet. Those who stayed on the diet for a month or more lost about 240 gm. daily during the first month, which is about the same as in our series. However, the daily weight loss in their series decreased progressively<sup>6</sup> and settled at about 130 gm. daily (2 pounds weekly), which is considerably less than our average. A major objection to the use of formula diet in treatment is that there is no attempt to re-educate the patients' eating habits.

We believe the following advantages inherent in the diet program proposed by Simeon<sup>1</sup> and prescribed for our patients to be responsible for its success:

(1) *Time limitation combined with high daily weight loss:* Most reducing diets contain 1,000 to 1,400 calories. Average daily weight loss is very small and sometimes two or more weeks pass before patients can appreciate even inconsiderable results. They perceive dieting as an indefinite process dragging on for months or years. Small wonder that most patients despair and abandon treatment. In prescribing the 550 calorie diet, a definite time limit of forty days is set. The results of weight loss are apparent after a few days. The vast majority of patients are willing to suffer forty days for the reward of losing the predicted and attainable amount of 20 pounds (9.5 kg.).

(2) *Food is prescribed, not calories:* It is our experience that the caloric conceptions of hungry, dieting patients are substantially different from the ones recorded on calorie charts.



Most patients who are allowed to substitute caloric equivalents in their diets do not weigh their food, nor do they know exactly its composition. The translation of calories into meals is done by broad approximations which can easily increase the caloric intake by 50 per cent or more. We find it advantageous, therefore, not to advise patients in terms of calories, but to prescribe meals in detail.

(3) *Two meals per day:* Patients were instructed to eat only twice daily, thus minimizing contact with food.

(4) *Unrestricted normal activity:* No hospitalization or restriction of normal activity is necessary, enabling all obese people, most of whom are housewives, to reduce.

#### CONCLUSIONS AND SUMMARY

The purpose of this paper was to present a method, attractive to the obese patient, of producing rapid weight reduction. We do not intend to discuss the complex problem of maintaining the reduced weight at this time. There is little doubt, however, that the proposed reducing program will substantially increase the number of patients reaching the stage at which maintenance of the new weight becomes the problem.

Forty-five ambulant patients started fifty-three forty-day courses of a 550 calorie diet, consisting of two meals prescribed in detail. For psychologic reasons, intramuscular injections of 0.25 ml. placebo were given daily. Forty-seven courses (89 per cent) were terminated successfully, with an average daily weight loss of 237 gm. (about 20 pounds in

forty days). This series surpasses the results reported by other authors.

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#### REFERENCES

1. SIMMONS, A. T. W. The action of chorionic gonadotropin in the obese. *Lancet*, 2: 946, 1954.
2. TRULSON, M., WALSH, E. D. and CASO, E. K. A study of obese patients in a nutrition clinic. *J. Am. Dietet. A.*, 23: 941, 1947.
3. MELCHIONNA, R. In: Conference on therapy: treatment of obesity. *Am. J. Med.*, 13: 478, 1952.
4. FEINSTEIN, A. R., DOLE, P. V. and SCHWARTZ, I. L. The use of formula diet for weight reduction of obese outpatients. *Ann. Int. Med.*, 48: 330, 1958.
5. JOLLIFFE, N. and ALPERT, E. The "performance index" as a method for estimating effectiveness of reducing regimens. *Postgrad. Med.*, 9: 106, 1951.
6. YOUNG, C. M., MOORE, N. S., BERRESFORD, K., EINSET, B. M. and WALDNER, B. G. The problem of the obese patient. *J. Am. Dietet. A.*, 31: 1111, 1955.
7. BAUMANN, L. Obesity. *J. A. M. A.*, 90: 22, 1928.
8. FELLONS, H. H. Studies of relatively normal obese individuals during and after dietary restrictions. *Am. J. M. Sc.*, 181: 301, 1947.
9. GRAY, A. and KALTENBACH, D. E. Obesity treatment. *J. Am. Dietet. A.*, 15: 239, 1939.
10. OSSERMAN, K. E. and DOLGER, H. Obesity in diabetes. *Ann. Int. Med.*, 34: 72, 1951.
11. MUNVES, E. D. Dietetic interview or group discussion-decision in reducing. *J. Am. Dietet. A.*, 29: 1197, 1953.
12. HARVEY, H. I. and SIMMONS, W. D. Weight reduction. *Am. J. M. Sc.*, 227: 521, 1954.

