

# RES MEDICA

## Journal of the Royal Medical Society



## Obesity

**John F. Munro**

### Abstract

#### INTRODUCTION

During last year about a quarter of the adult population of the United Kingdom tried to lose weight, demonstrating that our society is becoming increasingly aware of the problems of obesity. This may partly be cultural and attributable to Twiggy and the miniskirt but may also reflect the relatively recent medical appreciation that not only is obesity the commonest nutritional disorder in the United Kingdom but also a major health hazard. An American male 20% in excess of ideal weight carries an increased mortality of 30% or, in other words it is as dangerous to be 10 lbs. overweight as it is to smoke 25 cigarettes a day.

#### DEFINITION & INCIDENCE

Obesity is an excessive accumulation of body fat — but unfortunately it is difficult to make easy and accurate measurements of body fat. The practised fingers are probably as accurate as calipers in measuring skin fold thickness and although weighing by total body immersion may be accurate the facilities to undertake this are not readily available at Chemists or Airports. It seems likely in the meantime that obesity will be related to Ideal Weight which is a Life Insurance Company concept whereby weight is related to optimum life expectancy. This has obvious limitations; one has only to watch the caponised caperings of modern shot-putters or even the front-row of Scotland's present scrum to appreciate that not everybody who is overweight is obese; likewise some flabby women may carry considerable excesses of fat but remain within a few pounds of their ideal. In spite of these limitations it is usually accepted that patients who are more than 10% in excess of their ideal weight are "OVERWEIGHT" and those more than 20% in excess are "OBESE".

Using these criteria it has been roughly estimated that 1 in 5 of the adult population of the United Kingdom is obese.

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ISSN: 2051-7580 (Online) ISSN: 0482-3206 (Print)

Res Medica is published by the Royal Medical Society, 5/5 Bristo Square, Edinburgh, EH8 9AL

Res Medica, Autumn 1972, 7(1): 6-9

doi:[10.2218/resmedica.v7i1.892](https://doi.org/10.2218/resmedica.v7i1.892)

# OBESITY

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has only to watch the caponised caperings of modern shot-putters or even the front-row of Scotland's present scrum to appreciate that not everybody who is overweight is obese; likewise some flabby women may carry considerable excesses of fat but remain within a few pounds of their ideal. In spite of these limitations it is usually accepted that patients who are more than 10% in excess of their ideal weight are "OVERWEIGHT" and those more than 20% in excess are "OBESE".

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## CAUSES.

There are a number of rare endocrine causes for obesity; these include Hypothyroidism, Hypogonadal eunuchism, Cushing's Syndrome and Steroid therapy, Stein-Leventhal Syndrome, and various pituitary and hypothalamic disorders. The vast majority of patients suffer from non-endocrine or "Simple" Obesity — a totally inappropriate adjective but it cannot be denied that people with simple obesity are eating or have eaten more calories than their metabolic requirements. This may arise in a number of ways.

1. *Gluttony.* A few people eat excessively because they enjoy food; I can recall one who admitted to eating 12,000 calories a day but whose problem was his alcohol consumption.

A pint of draught export contains about 200 calories. Bearing this in mind it is remarkable how few medical students are overweight.

2. *Psychological.* Many overeat in order to obtain psychological relief during periods of idleness, boredom, anxiety or depression. In some the cause of that depression may be their obesity and to others this is an additional factor. Thus a vicious circle can arise with obesity leading to depression causing overeating with further weight gain. An extreme example of psychological overeating is the rare syndrome of nocturnal gorging.

3. *Altered Homeostasis.* A normal person has a number of homeostatic mechanisms whereby he can avoid or burn off excess calorie consumption. Thus, lean subjects can accurately evaluate the nutritive content of a liquid diet and only take their daily requirements; if deliberately overfed the resultant weight gain is less than anticipated. Obese patients either lose or never possess these homeostatic mechanisms and cannot assess nutritive values nor burn off excessive calories which are inevitably converted into body fat. To eat an extra apple a day produces a theoretical weight gain of  $\frac{1}{2}$  stone a year.

### METABOLIC CONSEQUENCES

Simple obesity produces a complex chain of metabolic changes. These include increase in serum insulin but reduction in peripheral insulin activity causing reduced Glucose assimilation by muscle; growth hormone levels tend to fall but adrenal cortical activity increases. Patients are resistant to ketosis.

The net effect of these changes is that the patient becomes metabolically more efficient and thus a second vicious circle situation develops, obesity itself tending to perpetuate the obese state. Although it seems probable that complex enzyme mechanisms are involved one simple minded way of explaining the situation to a patient is to say that subcutaneous fat acts like double-glazing and by retaining body heat reduces the daily caloric requirements. Although these changes may be responsible for aggravating and perpetuating obesity they are not the direct cause and are corrected by successful weight reduction. Recently, however, it has been demonstrated in obese children that those who were overweight as infants possess more adipose cells than those who subsequently gain weight. It is possible that this is of long-term prognostic significance in that the number of fat cells is related

to eating habit in infancy, and the more fat cells one possesses the more difficult it is to reduce. Puppyfat is not 'benign' and the vast majority of obese children become obese adults. In view of the rarity of mal- or sub-nutrition and the hazards of childhood obesity the recent fuss about free school milk appears totally inappropriate.

### SIGNIFICANCE

In addition to the very considerable increase in mortality almost exclusively due to ischaemic heart disease, obesity is also associated with considerable morbidity. Examining from the toes upwards it may cause flat feet, ankle oedema, varicose veins, knock knees, osteoarthritis of the hips and other weight bearing joints, genital prolapse, menstrual irregularities, possibly urinary tract infections, gallstones, hiatus hernia, Pickwickian Syndrome, and a liability to respiratory infections in childhood. It also aggravates the symptoms of any co-existing respiratory or cardiac disease, is associated with diabetes and increases the incidence of post-operative and obstetric complications.

In addition the grossly obese are invariably psychologically disturbed and the cheerful ever-smiling "fatty" is wearing a mask to protect himself from his feeling of inadequacy which may be the product of years of inappropriate ridicule.

### TREATMENT

#### *General Considerations.*

The treatment of obesity comprises two phases, an initial period of weight loss and subsequent prevention of weight regain. The second phase is often neglected but temporary weight loss is only of temporary benefit and many find it even more difficult to reduce a second time. It is thus very important to explain to patients that once they have reached an acceptable weight they will have "to watch their diet" and this usually involves a basic alteration in eating habit. Some patients will lose weight remarkably easily but others, particularly those with psychological problems, will require considerable encouragement and support. Unsuccessful attempts at weight loss may harm the more severely disturbed and it is essential to ensure that the patient is appropriately motivated before commencing treatment. Patients should also have a realistic concept of the rate of weight reduction. Many anticipate a 2 week miracle but Magic Wands are not available on the N.H.S. To gain

weight at the rate of 1 stone per year is disastrous but to reduce at 1 lb. per week may appear unacceptably slow yet it produces a weight loss of nearly 4 st. a year. Many give up because they expect too much and become disheartened by perfectly acceptable progress. Body fat stores will only be reduced when calorie expenditure exceeds calorie intake.

#### Exercise.

The exercise required to burn off one pound of fat is equivalent to playing 20 sets of tennis or walking from Glasgow to Edinburgh. Such activities are often associated with increased calorie consumption, but in spite of this, physical exercise is an important if subsidiary and somewhat neglected adjunct to weight reduction. It is noteworthy that obese adolescents tend to take much less exercise than their lean counterparts.

#### Diet.

The sheet anchor of treatment must be dietary restriction. Numerous different dietary regimens have been fashionable but a calorie is a calorie and the dramatic early weight losses associated with high protein, or high fat diets merely reflect the initial water diuresis that follows restriction of carbohydrate. This medical fact has been converted into financial gain by the exponents of the "Grapefruit Diet" and other off-beat regimens.

For a diet to be effective it must be reasonably cheap, easy to follow and provide flexibility and variety. The normal intake in the United Kingdom is such that these aims and total calorie restriction can be achieved most easily by carbohydrate restriction, the simplest of which comprises 3 groups of food, one forbidden, one to be taken in unlimited quantities and the third in restricted quantities — the number of portions permitted depending upon age, occupation, etc.

Failure to lose weight implies lack of dietary adherence but sometimes this is unintentional as occurred with the patient who was seduced by T.V. into thinking that Lucozade was good for her. Those who cannot adhere are either "nibbling" between meals or "gorging" at meals or doing both. Some find it easier to adhere to more rigid regimes. These include "Two meals per day" which reduces opportunities of temptation and the "Five meals per day" diet which makes use of the increased calorie expenditure that occurs after meals.

Others may respond to formula diets using Metarcal or Limmits, Trimmets etc. though it

must be emphasised that these replace rather than supplement meals.

#### Drug Therapy.

Various drugs have been advocated; but should only be administered in combination with dietary control and only when this is failing to produce weight loss. They include Thyroxine which is contra-indicated except in hypothyroidism and the bulk agents such as Methyl Cellulose — a substance remarkably free from side — and therapeutic effects. Amphetamine and the amphetamine derivatives are C.N.S. stimulants with definite weight reducing properties. Their potential danger as drugs of addiction is reflected by the price they command on the Black Market, and there is considerable pressure to ban their use. This appears extreme but they should only be prescribed under close medical control. They lose their weight reducing effect after 6 to 8 weeks, should be avoided in the psychologically disturbed and are contra-indicated in patients with hypertension or cardiac disease. Intermittent therapy with courses of not more than 4 weeks duration is preferred as it is as effective as continuous therapy, cheaper, and presumably less likely to cause addiction.

Although chemically related to amphetamine fenfluramine does not produce C.N.S. stimulation and indeed often causes sedation. If injected intra-arterially it has a fat mobilising effect and produces metabolic changes comparable to exercise. Its mode of action when given orally remains uncertain. It may be more valuable administered continuously but its weight reducing effect though sometimes dramatic is very variable and a significant proportion of patients either fail to respond or develop troublesome side-effects. The Diguanydes are another group of drugs which may be of value. In obese diabetics they abolish Glycosuria without producing the weight gain which occurs with Sulphonylureas. In some non-diabetics they cause weight loss, though whether this is secondary to an anorectic effect or alteration in body metabolism is debatable.

#### DRASTIC METHODS OF WEIGHT REDUCTION.

In spite of these various methods some patients will fail to lose weight or stop losing weight while still grossly obese. Previous experience has shown that once "Refractory Obesity" develops it is extremely difficult to achieve further sustained weight loss without

resorting to drastic measures.

(a) *Total Starvation.* Although practised since biblical times starvation has only recently become medically acceptable. It is not without risk and the complications include sudden death, cardiac arrhythmias, electrolyte and in particular Potassium imbalance, muscle catabolism, various nutritional deficiencies, hyperuricaemia, menstrual irregularities, alopecia, alteration in libido and psychological stress. With a appropriate selection and replacement therapy the major complications can be avoided. There is, however, no evidence to suggest that the long-term results of starvation are superior to more conventional therapy when undertaken for relatively short periods (i.e. up to 3 weeks) in patients without Refractory Obesity and in those with Refractory Obesity the weight lost during such treatment is almost invariably regained following discharge. However, a proportion of patients with gross refractory obesity starved to within 20% of their ideal will not regain weight but at best it seems probable that starvation is only indicated in a small proportion of grossly obese patients with Refractory Obesity.

(b) *Surgery.* Enthusiasm for bypass surgery has been rekindled by the reported successes of the 14/4 operation in which 14 inches of proximal jejunum are anastomosed to the

terminal 4" of ileum. The operation produces severe steatorrhoea and may lead to hepatic insufficiency. Experience in Edinburgh is limited and disappointing but further evaluation is probably justified. Surgery is also indicated to remove unsightly skin folds that sometimes develop following massive weight loss.

#### TREATMENT POLICY

It is important to try and prevent the development of Refractory Obesity by altering therapy whenever a patients stops losing weight. Although each patient must be treated individually one possible treatment scheme is summarised below, each step being continued until weight loss stops.

1. Establish rapport, assess motivation, give the patient realistic objectives, and prescribe low carbohydrate diet.
2. Add in either fenfluramine or intermittent therapy with an amphetamine derivative, (e.g. Phentermine) or accept the status quo.
3. Try one or more of the following in turn.
  - (a) Special dietary regimes
  - (b) Diguanydes
  - (c) High Dosage fenfluramine or accept the status quo.
4. Consider total starvation or bypass surgery or repeat anorectic Therapy or accept the status quo.

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