CURRENT CONCEPTS OF BODY WEIGHT AND OBESITY

In 1940, Wells published an article entitled, "Adipose Tissue, a Neglected Subject." He called attention to the failure of the medical profession to place proper emphasis on an important component of the body. Since then the situation has changed. In December 1953, Mayer began an article by saying, "Obesity has become a national obsession." He referred to the propaganda for low caloric processed foods and drinks, for so-called comfortable weight reduction programs, and for various advertised nostrums and pills purported to ease the path toward normal weight. This propaganda has resulted in large measure from the increasing interest shown by the medical profession in the serious problem of obesity, particularly in relation to the hazards of cardiovascular-renal disease and diabetes mellitus.

In the intervening years, attention has been directed toward the metabolism of adipose tissue, methods of measuring the degree of obesity, and an assessment of the factors that lead to obesity. The latter two problems have recently been well reviewed in articles appearing in Physiological Reviews.

Keys and Brozek reviewed the efforts that have been made to measure the absolute quantities of fat in the body. The body may be considered as containing two large components: the lean body mass and fat. The lean body mass has a fairly constant composition and is the metabolically most active component. Superimposed on the lean body mass are quantities of fat which may vary from 1 per cent to 40 per cent of the body weight. Obviously, measurements of the total body weight give no idea of the extent to which each of these components contributes to the composition of the body. Such information, however, is essential for accurate assessment of the role that body weight plays in the development of disease.

Direct analysis of the body composition, by its very nature, is not clinically feasible. In the past, indirect analyses have been notoriously unreliable or clinically impossible. The standard height-weight tables fail to reflect the significance of the lean body mass and may, in physically active individuals, suggest obesity when the percentage of fat may be well within the normal range. A new technic for the estimation of the fat component, clinically feasible although not popular as yet, is based upon the determination of the thickness of skin folds. Standard calipers have been devised and formulae developed by which the total body fat can be computed from the thickness of skin folds measured in certain areas, such as the mid upper arm, beneath the scapulae, and above the iliac crest. Within recent years, other technics have been developed for the determination of the lean body mass and/or the total body fat. These involve the calculation of the total body water by dilution methods, the estimation of the total body fat by use of fat-soluble indicators, or the determination of the total body density or specific gravity.

As a result of the use of such methods, alone or in combination, certain significant bits of information have been obtained. Body fat increases with age, even if the body weight remains constant. In other words, the lean body mass decreases gradually with age. The failure to recognize this and to decrease the caloric intake with age plays a definite role in the slow, steady increase in weight which is so common with increasing age. The "physiological fatness" of women has been demonstrated as occurring at all ages. The direct relationship of physical activity and the size of the lean body mass has been demonstrated and suggests the need for a reassessment of the concepts of the role played by physical activity in gain or loss of weight.

Mayer approached the problem of obesity from the
point of view of the genetic, traumatic, and environmental factors related to its development. While recognizing that, in the last analysis, an excess of caloric intake is always associated with the development of obesity, he emphasized that this alone gives little insight into the underlying disturbances. Emphasis on caloric balance has probably clouded the picture of the multiplicity of factors that may lead to an excessive intake and has resulted in a failure to evaluate properly the patient whose problem is excessive fat.

Experimental studies with the inherited obesity associated with a yellow strain in mice and with the inherited "hyperglycemic-obesity syndrome" in mice have called attention to the possibility of a genetic role in the obesity in man. The studies of Mayer with carbon-labeled acetate point to an inherited disturbance of acetate metabolism with a resultant increase in lipogenesis. No similar studies have been made in human obesity, but the possibility remains that an inherited enzymatic or hormonal defect could be present in certain instances.

The neuropsychiatric aspects of obesity are discussed. The association of obesity with experimental lesions of the autonomic nervous system, the hypothalamus, and the frontal lobes of the brain, calls attention to the possibility that disturbances in the neurovegetative system may lead to a train of events which end in overeating. The psychiatric aspects of the so-called "obesity-personality" are discussed with warning directed toward the danger of confusing causal with associated factors.

The significance of socio-economic factors is given its proper place. Food intake as a sign of prosperity and conviviality, and as a part of the celebration of important events in the life of the individual and family is emphasized. This paper also calls for a reassessment of the role of physical activities in the problem of overweight. The studies of Mayer with carbon-labeled acetate point to an inherited disturbance of acetate metabolism with a resultant increase in lipogenesis. No similar studies have been made in human obesity, but the possibility remains that an inherited enzymatic or hormonal defect could be present in certain instances.

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The importance of the problem of obesity is discussed with warning directed toward the danger of confusing causal with associated factors.

The importance of the problem of obesity in the United States cannot be overemphasized. To those who are concerned with this problem, a perusal of the papers by Keys and Brozek, and by Mayer will be helpful in evaluating the present status of the problem of determining who is fat and why. These papers cause one to wonder whether an excessive lean body mass carries the same penalty as excessive body fat. They should lead to a more careful distinction between overweight and over-fat. And, very likely, they will increase the patience of those confronted with the problem of obesity by diverting their attention from the fact that the obese individual does overeat, or has overeaten, to a consideration of the factors that lead to his overindulgence in food.

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THE PREVALENCE OF OBESITY

Every doctor knows that obesity is common, but it is surprising to find that there is little published information regarding the present-day prevalence of overweight. As stated in a report prepared by the United States Public Health Service, "There is no current information for the United States from which estimates of the prevalence of an excessive accumulation of fat in the body can be drawn."

The standard tables of heights and weights which have been most widely used are based on an investigation of the Association of Life Insurance Medical Directors and Actuarial Society of America published in 1912. For that investigation, data on height-weight relationships were collected on 221,819 men insured between 1885 and 1900 and on 136,504 women insured between 1885 and 1909. From these data, tables were prepared showing average weights for each inch of height for each five-year age group. It was not until recently that adequate attention has been given to the fact that standards based on height and weight alone are inaccurate indicators of overweight. Tables of "desirable weights" taking into consideration measurements of build and body type were developed by the Metropolitan Life Insurance Company in 1942 and 1943, and are now widely used. These tables show a range of weights for each inch of height according to the type of body frame. Consequently, the muscular man with heavy frame and sthenic build need not be compared with the slim individual of the same height but with lighter frame.

The limited data from four sources regarding the prevalence of overweight in the United States are presented in the report of the Public Health Service. These sources included a study of impairments among insurance examinees, insurance company estimates and observations made in multiple screening projects in Richmond, Virginia, and in Atlanta, Georgia.

The study conducted in 1938 by the Life Extension Institute among 10,000 life insurance policy holders (3,025 females and 6,975 males, aged ten years and over who were presumably free from illness) showed