Development of Subcutaneous Fat in Infancy
Standards for Tricipital, Subscapular, and Suprailiacal Skinfolds in German Infants

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Abstract. In order to assess the nutritional status of healthy infants in Berlin, the tricipital (TRI), subscapular (SCA), and suprailiacal (SIL) skinfolds were measured at several instances (2–14 times) during regular presentations at the well baby clinic offices in 265 infants of normal gestation, 140 boys and 125 girls, using the Holtain skinfold caliper.

The characteristic pattern of skinfold development in infancy includes a rapid increase in width of all diameters until 3–5 months of age, and a gradual decrease thereafter. This diminution of skinfold thickness is more pronounced at the trunk (SIL and SCA) than at the limbs (TRI), indicating a change in distribution of subcutaneous tissue during infancy. Compared to the present study, previous investigations in Great Britain and Sweden have shown a maintenance of maximal skinfold values rather than a decrease during the second half of the first year. It is suggested that differences of feeding habits and calorie intake may be responsible for these discrepancies.

The results of this mixed longitudinal study, performed in 1974/1975, were computed to calculate centile curves of the skinfold development in infancy, which may serve as standards for infants living under similar socioeconomic and nutritional conditions.

Key words: Infancy — Skinfold thickness — Centiles of normal development.
Introduction

Physicians, who are concerned with constitutional and nutritional disorders, are aware of the fact that the nutritional status of a person is only insufficiently reflected by weight measurements alone. Therefore, one of the most frequent disorders in medical practice, obesity, can hardly be correctly defined by weight or weight-for-height indices which do not take body build and muscular development into consideration. For scientific studies, the assessment of the “lean (fat-free) body mass”, using, for instance, measurements of the total potassium (40K-isotope method [5, 11, 26]) or water content of the body [2] and their relations to total body weight represent valuable tools for a more exact definition of the individual’s body constitution. For practical purposes, however, skinfold measurements with special calipers are better suited and can provide sufficiently reliable information about the volume of the subcutaneous storage organ. Statistical correlations to total body fat seem to be good [11].

In recent years, skinfold values for normal children have been reported from different countries, e.g., Great Britain [13, 30, 31], France [22], Sweden [16], Czechoslovakia [23], the United States [7, 11], and Germany [12, 20]. Only few of these studies include values for children below 1 year of age.

Obesity, however, can often be traced back to early infancy [1, 3, 4, 18, 27, 28]. Rapid weight gain during this period has been suspected to favor the onset of lasting obesity [10] and the permanent increase of the number of subcutaneous fat cells [3, 4, 17, 25]. Therefore, it seems desirable to obtain normal values of skinfold measurements in infancy, in order to provide standards for the definition of overnutrition in this life period. Recently, several authors published longitudinal studies of skinfold development in infancy [14—16, 31], which fulfill these criteria. However, since different feeding habits can possibly change the rate of the physiologic development of subcutaneous tissue, further studies at different places appear to be necessary.

This investigation, of which the results presented are only a part, was planned to correlate the development of height, weight, and skinfold thickness of healthy infants in Berlin with the 24-hour calorie intake, calculated as exactly as possible from the mothers’ recall of the infants’ food intake during the week preceding each examination. Mean values and centile curves for the development of three skinfolds and the sum of these folds during infancy are presented in this paper. Since the total group of infants studied was heterogeneous and selected at random in different well baby clinics in Berlin, it may be considered representative for the population of this city. Consequently, these centiles may serve as standards for infants with comparable genetic, constitutional, nutritional, and socioeconomic histories. The correlations of these data with the calorie intake will be presented elsewhere.

Subjects and Methods

During 1974 and 1975, 265 healthy infants, 140 boys and 125 girls, were examined by two of the authors (K. S. and W. F.) in different well baby clinics (Säuglings-Fürsorgen) in West Berlin\(^1\). The only criterion for selection of the babies was the willingness of the

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