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EDITORIAL

To measure growth—pediatrician's dilemma

Angelo Pietrobelli[1,2] · Franco Antoniazzi[1]

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Commentary

"The spectacle of growth is awesome to behold" said Gilbert B. Forbes the father of pediatric body composition [1]. In order to evaluate growth, it is fundamental to assess body composition that is a valuable tool of nutritional status in health and disease [2]. Both fat mass and fat free mass are increasing rapidly during infancy, but the majority of the studies have relied upon serial measurements of weight, length, and head circumference to assess growth. There is very little information regarding the composition of weight gain over time in the current literature. Leskinen et al. in their article, using Bio Impedance Analysis found body composition differences by gender and obesity status at age of 3 years [3]. Also, subjects who became or remained overweight showed an increase of lean mass accompanied by fat mass gain [3].

The first 1000 days of life—the period from conception to age of two—is the most important period for the body and brain development, and it represents the best time for obesity prevention and its adverse consequences [4]. There are many growth drivers during this phase of life, among nutrition, genetic, and epigenetic factors as well as hormonal regulation. Having precise and specific body composition tools in the area of measurements could be highly desirable.

Already at birth, girls have proportionally more adipose tissue than boys [5]. Fields et al. [6] reported normative data on body composition on subjects from birth to six months of life. It is fundamental to underline that lower-fat oxidation during this peculiar period of the greatest growth, and in the presence of positive energy balance, results in fat deposition [7]. After this initial period, there is a constant level of fat intake during the first 2 years, and ultimately increasing intake and oxidation of protein and carbohydrate [7]. Adipose tissue is an important target for nutritional, hormonal, and epigenetic signals to modulate fetal growth [8, 9].

Aneesh and Ghugre showed that birth weight and post-natal weight change predict body fat in low birth weight and normal weight children [10]. In post-natal subjects Rosario et al. [11], underlined that greater adiposity in preschool age was associated with greater tallness and that accelerated growth in childhood may in itself be a risk factor for obesity later in life. All these effects could produce infant growth acceleration that tends to drive a higher fat deposition during childhood and hence an increased risk of overweight in childhood and adulthood.

However, body composition analysis will provide a window into the complex changes that occur throughout childhood and will gives to researchers the unique opportunity for understanding metabolic and physiological correlation. It is mandatory to know adipose tissue cells composition, distribution and action, together with adipose tissue development and relationship with fat free mass and bone mineral content. Specific and precise body composition assessment could explain the body weight regulation and the dis-regulation of the homeostatic system [4, 8, 10]. Unfortunately, all the measurements of body composition are indirect and we have limitations related to the intra-individual variability as a consequence of changes in fat free mass occurring with growth, maturation, and disease statues [9]. Also, the assessment of individual compartments of the body, could give information on skeletal maturation and mineral homeostasis in relation with environmental and pathological factors correlated with fat and fat mass development.

Keeping in mind all the information, according with Leskinen et al. [3] we should conclude that the available tools for quantifying body composition in pediatrics are well developed and useful. Clearly it is fundamental to know the peculiarity of the different measurements in order

✉ Angelo Pietrobelli
angelo.pietrobelli@univr.it

[1] Pediatric Unit, Department of Surgical Sciences, Dentistry, Gynecology and Pediatrics, University of Verona, Verona, Italy

[2] Pennington Biomedical Research Center, Baton Rouge, LA, USA

to select the appropriate methods for specific body components evaluation. The applications of these tools should yield important new information and insights, in order to develop practical recommendations about how best to assess adiposity change during childhood, underlying that children are not simply little adults [12].

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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