



## Body Composition in Obese Pediatric Patients

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### ABOUT THE STUDY

Body composition analysis is a useful tool for examining obese patients and assessing the effectiveness of medical therapies. Bioelectrical impedance-based approaches are simple, non-invasive, and frequently used for this purpose, but they must be validated in young obesity patients. Obesity is a global health problem with rising prevalence, and it is now considered a pandemic condition. Besides the often-perceived general reduction of quality of life, obesity is known to profoundly increase the risk for numerous diseases such as diabetes, cardiovascular diseases, cancer, and, as became recently evident, the severity of viral diseases such as COVID-19. Importantly, the enhanced prevalence of obesity is already detectable in children and adolescents and a recent study found that 90% of obese children at the age of 3 years have overweight at adolescence, and almost 60% with obesity at 2 to 19 years were predicted to be obese at an age of 35 years. Thus, the early detection of signs indicating enhanced risk of developing obesity such as unusually high body fat or body fat percentage during childhood and adolescence appears of critical importance to allow to take preventive measures or to initiate medical interventions before the development of obesity-related diseases is triggered.

Among the different methods to diagnose overweight and obesity, the determination of body fat and of total body composition is of particular relevance. Different approaches for correct classification include measurements with bioelectrical impedance, air displacement plethysmography, and dual x-ray

absorptiometry (DXA), all of which are reportedly used in clinical practice. However, while these procedures are well-established for use with adult patients, data on their application in obese children and teens is fraught with uncertainty, as various assumptions behind these methods may be applicable in adults but not in children. Body composition evaluation using bioelectrical impedance is a straightforward procedure that takes little time, is non-invasive, and does not expose the patient to radiation. As a result, it is frequently used in therapeutic practice and appears to be particularly well suited for usage with children and adolescents. However, there are different devices available using bioelectrical impedance measuring principles and limited data on young obese patients. Accordingly, we considered to evaluate different devices and to compare these with each other to obtain insight into the accuracy of the methods for the determination of body composition in obese patients during childhood and adolescence.

The evaluation of data from three independent studies in young obese patients could show that the body composition differed significantly for BFP, FM and FFM depending on the measurement with TANITA or BIA. A small-scale comparison with air displacement plethysmography and DXA indicated that TANITA shows the best agreement with DXA, widely considered a reference method. Thus, we suggest that the easily applicable and non-invasive TANITA device may be most suitable for clinical routine in obese patients in childhood and adolescence but needs to be strictly adhered to in order to receive reliable repetitive data.

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