

# Reliability, Validity, and Diagnostic Value of a Pediatric Bioelectrical Impedance Analysis Scale

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## ABSTRACT

**Background:** Accurate body composition assessment is critical to identify children who are overfat or obese. Unlike BMI measures, bioelectrical impedance analysis (BIA) differentiates between lean and fat mass. However, bioelectrical impedance analysis has historically had questionable reliability and validity in children. The aim of this study was to determine the reliability, validity, and diagnostic value of a portable BIA scale (Tanita BF-689; Tanita Corporation, Tokyo, Japan) designed specifically for use within the pediatric population.

**Methods:** Fifty-five children (males = 26; females = 29) had percent body fat (%BF) assessed twice using BIA and once using dual-energy X-ray absorptiometry (DEXA). Intraclass correlation coefficients (ICCs) were calculated for reliability. Mean difference and limits of agreement were calculated for convergent validity. Sensitivity/specificity for healthy, overfat, and obese classification were assessed.

**Results:** Test-retest ICC was 0.999 (0.999, 0.999). The ICC comparing BIA and DEXA for %BF was 0.788 (−0.167, 0.942). Mean difference between BIA and DEXA was −6.75% (limits of agreement = −0.04%; −13.46%). No gender or proportional bias was observed. Sensitivity/specificity for healthy, overfat, and obese classification were 0.67/0.65, 0.22/0.78, and 0.43/1.0, respectively.

**Conclusions:** The Tanita BF-689 demonstrates excellent test-retest reliability, moderately strong absolute agreement with DEXA, and high specificity for overfat and obese classification. Compared to DEXA, the BF-689 is an accurate, portable, and efficient means of assessing %BF in elementary school children.