Letter to the Editor, Journal of Clinical Densitometry.

Scan mode selection on the GE-Lunar iDXA densitometer

GE-Lunar iDXA bone and body composition scans are acquired using one of three modes - thin, standard or thick. The manufacturer's protocol states that thin mode is selected for an abdominal thickness that is less than 16 cm, standard mode is selected for a body thickness that falls within 16 to 25cm and thick mode is selected for a body thickness that is greater than 25 cm. Body thickness is automatically selected based on the subject's entered height and weight, although the algorithm used is not clear.

We evaluated the ratio of weight (kg)/height (cm) in our recent iDXA study (n=40) and it was found that if weight/height is ≥ 0.545 then thick mode is machine-selected (Table 1). To test the weight/height assumption in relation to the iDXA scan mode selection protocol, we used a measuring jig to determine abdominal body thickness. Two out of 25 machine-selected standard mode subjects were found to have a 'measured' body thickness that was greater than 25cm (26.5cm and 27.5cm). One third (n=5) of machine-selected thick mode, athletic subjects were found to have 'measured' body thickness that was less than 25cm (19.2cm, 21.8cm, 23.4cm, 24.2cm and 24.4cm).

These disparities between 'machine-selected' and 'measured' body thickness are important to note. Total body scans conducted in thick mode have a longer acquisition time of 14 minutes compared to the standard mode acquisition time of 7 minutes, and subsequently, there is a greater radiation dose of 6.0uGy compared to 3.0uGy. There are also greater doses used for bone density scans when using thick mode. Although such exposure is still relatively low compared to other X-ray based imaging methods, consideration should be given to the principle that exposures should be 'as low as reasonably achievable'. Interchanging scan mode can also impact the interpretation of bone and body composition measurements (1, 2), of particular relevance for adolescent to adult, weight management and athlete longitudinal studies where body mass and the selection of scan mode may vary. To improve the accuracy of longitudinal measurement of change in DXA parameters, the effect of varying scan modes requires further research. Additionally, the selection of scan mode for the Lunar range of densitometers needs clarification from GE.

Table 1. Physical characteristics of the study group

Scan Mode	Standard (n=25)		Thick (n=15)	
	Mean(sd)	Range	Mean(sd)	Range
Age(years)	25.6 (11.1)	18.0 – 59.9	27.7 (11.3)	18.7 – 56.7
Height (cm)	178.0 (6.4)	161.0 – 188.5	183.9 (5.4)	169.3 – 191.0
Weight (kg)	85.3 (8.6)	63.6 – 101.2	110.6 (7.9)	98.0 – 125.0
BMI (kg/m^2)	26.9 (2.0)	20.1 – 30.5	32.8 (2.8)	29.3 – 37.9
Measured **body thickness (cm)**	**21.6 (2.7)**	**15.5 – 27.5**	**26.0 (3.8)**	**19.2 – 33.5**
Weight/Height (kg/cm)	**0.479 (0.039)**	**0.357 – 0.544**	**0.602 (0.044)**	**0.545 – 0.688**

References

1. Cheng S, Nicholson PH, Kröger H, Alen M, Tylavsky F. Differences in estimates of change of bone accrual and body composition in children because of scan mode selection with the prodigy densitometer. Journal of Clinical Densitometry. 2005 31;8(1):65-73.

2. Chen W, Slattery A, Center J, Pocock N. The effect of changing scan mode on trabecular bone score using Lunar Prodigy. Journal of Clinical Densitometry. 2016 Feb 16.