MEASUREMENT OF BODY COMPOSITION BY DEXA: A COMPARISON OF TWO INDEPENDENT INSTRUMENTS

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Dual Energy X-ray Absorptiometry (DEXA) has been recently developed not only to assess total body and regional bone mineral densisty, but also to measure body composition. It is able to assess bone mineral content (BMC) and body fat mass (FM). Three different DEXA instruments have been developed using the same principle, in comparing the ratio of the attenuation of two low-energy X-rays, to assess these body composition components.

We have compared the LUNAR using software version 3.4, and HOLOGIC (software version 5.35) instruments in 12 healthy volunteers, as part of a larger study involving the validation of various body composition techniques within and between clinical institutions. Individual volunteers, (6 males and 6 females) were measured on the same day on both instruments. The CV for repeated measurements of bone mineral density for both instruments is < 1%, and for fat mass, 3-4% (LUNAR) or 1.2% (HOLOGIC).

The results are shown in the following table:

SUBJECT	AGE	SEX	LUNAR BMC (kg)	HOLOGIC BMC (kg)	LUNAR %FM	HOLOGIC %FM
1	58	F	2.77	2.44	37.6	29.2
2	46	F	3.35	2.80	32.8	25.8
3	27	F	2.30	2.10	35.5	29.1
4	23	M	3.38	2.74	17.0	15.2
5	23	M	3.15	2.55	11.4	12.1
6	19	M	3.71	2.87	10.5	9.7
7	53	F	3.17	2.79	33.4	29.2
8	39	F	2.96	2.28	25.9	22.5
9	32	M	2.17	1.83	22.9	19.5
10	56	F	2.21	1.79	19.0	17.6
11	40	M	2.35	2.06	28.4	24.8
12	46	M	2.70	2.16	15.3	13.9
Mean±SEM			2.88±0.18	2.37±0.16	24.14±0.39	20.72±0.34
Paired T test			P=0.25E-6		P=0.001	
Correlation			r=0.954		r=0.991	

Both instruments are highly correlated with each other, but give significantly different mean values. This may be due to the use of different calibration phantoms, or differences in the scanned area of bone and soft tissue. In the assessment of body composition using DEXA, it is currently necessary to quote the instrument and software version used. Further inter-instrument calibration and validation against other techniques is necessary.

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