

**Supplemental Materials: For Online Publication Only**

**Supplemental Table 1.** Comparisons of BMD Z-scores in anorexia nervosa (AN) participants and healthy controls (C) across weight parameters and cut-offs

BMD Z-scores	Column A	Column B	Column C	P values			
	Anorexia nervosa		Controls	ANOVA	A vs. B	B vs. C	A vs. C
	<b>BMI ≤17.5</b>	<b>BMI &gt;17.5</b>					
<b>WBLH</b>	-1.02±0.08 (131)	-1.03±0.09 (107)	-0.41±0.10 (87)	<0.0001	1.00	<0.0001	<0.0001
<b>Spine</b>	-0.99±0.08 (139)	-0.99±0.09 (119)	-0.04±0.10 (90)	<0.0001	1.00	<0.0001	<0.0001
<b>Hip</b>	-0.91±0.09 (119)	-0.74±0.09 (115)	0.13±0.12 (68)	<0.0001	0.43	<0.0001	<0.0001
	<b>BMI ≤18.5</b>	<b>BMI &gt;18.5</b>					
<b>WBLH</b>	-1.03±0.06 (195)	-1.02±0.14 (43)	-0.41±0.10	<0.0001	1.00	0.0015	<0.0001
<b>Spine</b>	-0.98±0.07 (214)	-0.98±0.15 (44)	-0.04±0.10	<0.0001	1.00	<0.0001	<0.0001
<b>Hip</b>	-0.86±0.07 (190)	-0.80±0.15 (44)	0.13±0.12	<0.0001	0.62	<0.0001	<0.0001
	<b>BMI ≤5 %ile</b>	<b>BMI &gt;5%ile</b>					
<b>WBLH</b>	-1.09±0.0 (100)	-0.98±0.08 (138)	-0.41±0.10	<0.0001	0.67	<0.0001	<0.0001
<b>Spine</b>	-1.16±0.09 (109)	-0.87±0.08 (149)	-0.04±0.10	<0.0001	0.07	<0.0001	<0.0001
<b>Hip</b>	-1.00±0.10 (194)	-0.71±0.08 (140)	0.13±0.12	<0.0001	0.08	<0.0001	<0.0001
	<b>BMI ≤10 %ile</b>	<b>BMI &gt;10%ile</b>					
<b>WBLH</b>	-1.12±0.07 (148)	-0.87±0.09 (90)	-0.41±0.10	<0.0001	0.11	<0.0001	<0.0001
<b>Spine</b>	-1.10±0.08 (165)	-0.80±0.10 (93)	-0.04±0.10	<0.0001	0.07	<0.0001	<0.0001
<b>Hip</b>	-0.95±0.08 (146)	-0.63±0.10 (88)	0.13±0.12	<0.0001	0.047	<0.0001	<0.0001

BMD Z-scores	Column A	Column B	Column C	P values			
	Anorexia nervosa		Controls	ANOVA	A vs. B	B vs. C	A vs. C
	$\leq 85\%$ mBMI	$> 85\%$ mBMI					
<b>WBLH</b>	-1.12±0.07 (141)	-0.89±0.09 (97)	- 0.41±0.10	<0.0001	0.16	0.0015	<0.0001
<b>Spine</b>	-1.12±0.08 (158)	-0.79±0.10 (100)	- 0.04±0.10	<0.0001	0.03	<0.0001	<0.0001
<b>Hip</b>	-0.97±0.08 (139)	-0.62±0.10 (95)	0.13±0.12	<0.0001	0.03	<0.0001	<0.0001
	$\leq 90\%$ mBMI	$> 90\%$ mBMI					
<b>WBLH</b>	-1.03±0.06 (225)	-0.98±0.26 (13)	- 0.41±0.10	<0.0001	0.98	0.1056	<0.0001
<b>Spine</b>	-0.98±0.06 (245)	-1.11±0.28 (13)	- 0.04±0.10	<0.0001	0.91	<0.0001	0.0017
<b>Hip</b>	-0.83±0.06 (221)	-0.71±0.28 (13)	0.13±0.12	<0.0001	0.90	0.0167	<0.0001
	$\leq 85\%$ EBW-Ht	$> 85\%$ EBW-Ht					
<b>WBLH</b>	-1.21±0.06 (171)	-0.56±0.10 (68)	- 0.41±0.10	<0.0001	<0.0001	0.55	<0.0001
<b>Spine</b>	-1.24±0.07 (183)	-0.38±0.11 (76)	- 0.04±0.10	<0.0001	<0.0001	0.06	<0.0001
<b>Hip</b>	-1.08±0.07 (164)	-0.27±0.11 (71)	0.13±0.12	<0.0001	<0.0001	0.03	<0.0001
	$\leq 90\%$ EBW-Ht	$> 90\%$ EBW-Ht					
<b>WBLH</b>	-1.09±0.06 (211)	-0.52±0.17 (28)	- 0.41±0.10	<0.0001	<0.0001	0.83	<0.0001
<b>Spine</b>	-1.07±0.06 (228)	-0.43±0.18 (31)	- 0.04±0.10	<0.0001	0.0034	0.17	<0.0001
<b>Hip</b>	-0.91±0.06 (204)	-0.30±0.17 (31)	0.13±0.12	<0.0001	0.0041	0.11	<0.0001

WBLH: Whole body less head  
 %mBMI: Percent median BMI  
 EBW-Ht: Expected body weight for height

**Supplemental Table 2.** Comparisons of BMD Z-scores across anorexia nervosa (AN) participants based on absolute BMI values (mild, moderate, severe, and extreme malnutrition) and controls

BMD Z-scores	AN participants				Controls	P
	Absolute BMI (kg/m <sup>2</sup> )					
	<15 Extreme	15-15.99 Severe	16-16.99 Moderate	≥17 Mild		
<b>WBLH</b>	-1.46±0.25 (13)	-1.32±0.17 (28)	-0.88±0.12 (59)	-0.99±0.07 (138)	-0.41±0.10 (87)	<0.0001 <sup>c,d,g,h</sup>
<b>Spine</b>	-1.37±0.27 (14)	-1.16±0.19 (28)	-0.92±0.12 (64)	-0.95±0.08 (152)	-0.04±0.10 (90)	<0.0001 <sup>a,b,c,d</sup>
<b>Hip</b>	-1.30±0.27 (13)	-1.43±0.20 (24)	-0.70±0.13 (53)	-0.73±0.08 (144)	0.13±0.12 (68)	<0.0001 <sup>a,b,c,d,e,f</sup>

WBLH: Whole body less head

P≤0.0001 for

<sup>a</sup>AN with BMI <15 vs. Controls

<sup>b</sup>AN with BMI between 15-15.99 vs. Controls

<sup>c</sup>AN with BMI between 16-16.99 vs. Controls; and

<sup>d</sup>AN with BMI ≥17 vs. Controls

P<0.05 for

<sup>e</sup>AN with BMI between 15-15.99 vs. AN with BMI ≥17;

<sup>f</sup>AN with BMI between 15-15.99 vs. AN with BMI between 16-16.99;

<sup>g</sup>AN with BMI between 15-15.99 vs. Controls;

<sup>h</sup>AN with BMI <15 vs. Controls

**Supplemental Table 3.** Comparisons of BMD Z-scores across anorexia nervosa (AN) participants based on percent median BMI [moderate/severe (<80% mBMI) and mild (80-90% mBMI) malnutrition, and >90% mBMI] and controls

BMD Z-scores	AN participants			Controls	P
	Percent median BMI				
	<80 Moderate and severe*	80-90 Mild	>90		
<b>WBLH</b>	-1.15±0.10 (80)	-0.96±0.07 (145)	-0.98±0.26 (13)	-0.41±0.10 (87)	<0.0001 <sup>a, b</sup>
<b>Spine</b>	-1.25±0.10 (88)	-0.84±0.08 (157)	-1.11±0.28 (13)	-0.04±0.10 (90)	<0.0001 <sup>a, b, c, d</sup>
<b>Hip</b>	-1.06±0.11 (79)	-0.71±0.08 (142)	-0.71±0.27 (13)	0.13±0.12 (68)	<0.0001 <sup>a, b, c</sup>

WBLH: Whole body less head

p<0.0001 for

<sup>a</sup>AN <80% vs. Controls;

<sup>b</sup>AN 80-90% vs Controls

p<0.05 for

<sup>c</sup>AN>90% vs. Controls;

<sup>d</sup>AN <80% vs. AN 80-90%

\*Please note that eliminating the AN girls with severe weight loss (%mBMI<70% (n=8) did not change our overall findings

**Supplemental Table 4.** Comparisons of BMD Z-scores across anorexia nervosa (AN) participants based on BMI Z-scores [severe ( $\leq -3$ ), moderate (-2 to -2.9) and mild (-1 to -1.9) malnutrition] and controls

BMD Z-scores	AN participants				Controls	P
	BMI Z-scores					
	$\leq -3$ Severe	-2 to -2.9 Moderate	-1 to -1.9 Mild	$> -1$		
<b>WBLH</b>	-1.45 $\pm$ 0.19 (23)	-1.16 $\pm$ 0.13 (44)	-1.0 $\pm$ 0.08 (125)	-0.85 $\pm$ 0.15 (38)	-0.41 $\pm$ 0.10 (87)	<0.0001 <sup>a,b,c</sup>
<b>Spine</b>	-1.52 $\pm$ 0.20 (24)	-1.24 $\pm$ 0.14 (50)	-0.88 $\pm$ 0.08 (137)	-0.73 $\pm$ 0.16 (39)	-0.04 $\pm$ 0.10 (90)	<0.0001 <sup>a,b,c,d,e,f</sup>
<b>Hip</b>	-1.52 $\pm$ 0.21 (22)	-0.93 $\pm$ 0.14 (46)	-0.78 $\pm$ 0.08 (121)	-0.52 $\pm$ 0.16 (37)	0.13 $\pm$ 0.12 (68)	<0.0001 <sup>a,b,c,d,e,f</sup>

WBLH: Whole body less head

p $\leq$  0.0002 for

<sup>a</sup>AN with BMI Z-scores  $\leq -3$  vs. Controls

<sup>b</sup>AN with BMI Z-scores between -2 to -2.99 vs. Controls

<sup>c</sup>AN with BMI Z-scores between -1 to -1.9 vs. Controls

p<0.05 for

<sup>d</sup>AN with BMI Z-scores  $> -1$  vs. Controls

<sup>e</sup>AN with BMI Z-scores  $\leq -3$  vs. AN with BMI Z-scores between -1 to -1.9

<sup>f</sup>AN with BMI Z-scores  $\leq -3$  vs. AN with BMI Z-scores  $> -1$