

Supplement data

Table S1 Baseline characteristics of T2DM patients

Characteristics	Overall	Osteosarcopenia	Non- osteosarcopenia	P-value
Medication, n(%)				
Metformin	119 (80.1)	7 (63.6)	112 (82.4)	0.222 ^f
Sulfonylurea	45 (30.6)	4 (36.4)	41 (30.2)	0.737 ^f
SGLT-2i	50 (34.0)	0 (0.0)	50 (36.8)	0.016 ^{f*}
GLP1 RA	23 (15.7)	2 (18.2)	21 (15.4)	0.683 ^f
DPP-4i	52 (35.4)	6 (54.6)	46 (33.8)	0.197 ^f
Pioglitazone	16 (10.9)	1 (9.1)	15 (11.0)	1.000 ^f
Insulin	40 (27.2)	4 (36.4)	36 (26.5)	0.491 ^f
Statin	125 (85.0)	9 (81.8)	116 (85.3)	0.670 ^f
RAS inhibitor	78 (53.1)	5 (45.5)	73 (53.7)	0.599 ^x
Antiplatelet	59 (40.1)	4 (36.4)	55 (40.4)	1.000 ^f
CCB	67 (45.6)	5 (45.5)	62 (45.6)	0.993 ^x
Diuretic	10 (6.8)	1 (9.1)	9 (6.6)	0.552 ^f
Alpha blocker	5 (3.4)	0 (0.0)	5 (3.7)	1.000 ^f
Beta blocker	22 (15.0)	1 (9.1)	21 (15.4)	1.000 ^f
Vitamin D	93 (63.3)	6 (54.6)	87 (64.0)	0.533 ^f
Calcium	54 (36.7)	5 (45.5)	49 (36.0)	0.533 ^f
Denosumab	5 (3.4)	2 (18.2)	3 (2.2)	0.045 ^{f*}
Bisphosphonate	10 (6.8)	1 (9.1)	9 (6.6)	0.552 ^f
Other antihypertension	9 (6.1)	0 (0.0)	9 (6.6)	1.000 ^f
Polypharmacy	5 (3.4)	0 (0.0)	5 (3.7)	1.000 ^f
Abnormal monofilament test, n(%)	25 (17.1)	4 (36.4)	21 (15.6)	0.095 ^x
Diabetic retinopathy, n(%)	17 (11.6)	2 (18.2)	15 (11.0)	0.617 ^f

Statistical analyses were performed using the Chi-square test^x, Fisher's exact test^f, Independent t-test, and Mann-Whitney U test
T2DM type 2 diabetes mellitus, *SD* standard deviation, *IQR* interquartile range, *RAS* renin angiotensin system, *CCB* calcium channel blocker

*Statistically significant at the 0.05 level ($\alpha=0.05$).

Table S2. Laboratory and bone mineral density result of T2DM patient.

Laboratory	Overall (n=147)	Osteosarcopenia (n=11)	Non-osteosarcopenia (n=136)	P-value
Phase angle (°), mean±SD	4.05±0.65	3.25±0.50	4.11±0.62	<0.001*
Fasting plasma glucose (mg/dL), median (IQR)	116 (99, 137)	119 (100, 127)	116 (98.5, 137)	0.854
HbA1C (%), median (IQR)	6.8 (6.3, 7.5)	7.1(6.6, 7.7)	6.8(6.3, 7.5)	0.563
BUN (mg/dL), median (IQR)	16 (12.3, 20.2)	17.9 (13.4, 24.8)	15.9 (12.3, 20.2)	0.705
Cr (mg/dL), median (IQR)	0.9 (0.7, 1.2)	0.9 (0.7, 1.4)	0.9 (0.72, 1.1)	0.536
GFR (mL/min/1.73 m ²), median (IQR)	68.7 (52.7, 87.5)	64.0 (44.2, 92.5)	68.9 (53.0, 87.2)	0.854
Serum albumin (g/dL), median (IQR)	4.3 (4.1, 4.4)	4.1 (3.9, 4.5)	4.3 (4.1, 4.4)	0.242
AST (U/L), median (IQR)	26 (22, 31)	25.5 (24, 31)	26 (21, 31)	0.781
ALT (U/L), median (IQR)	20 (14, 27)	16 (12, 24)	21 (14, 27)	0.341
ALP (U/L), median (IQR)	72 (59, 90)	58 (46, 66)	72.5 (60, 91)	0.017*
Total cholesterol (mg/dL), median (IQR)	154.6 (136, 173.5)	164.6 (144.8, 189.3)	154.3 (136, 172)	0.401
Triglyceride (mg/dL), median (IQR)	107 (84.4, 146)	94.9 (60.4, 116)	108.3 (84.6, 148.5)	0.132
HDL (mg/dL), median (IQR)	58.7 (48.2,65.4)	58.4 (49.5, 63.2)	58.9 (48.2, 65.5)	0.800
LDL (mg/dL), median (IQR)	81.9 (65.5, 96.8)	89.7 (73.7, 106.8)	79.9 (63.9, 96.3)	0.300
Vitamin D level (ng/dL), median (IQR)	38 (29.1, 51.2)	38 (30.3, 56.4)	38 (28.9, 50.7)	0.519
UACR (mg/g), median (IQR)	14.5 (6.3, 44.7)	27.8 (13.4, 72.5)	13.9 (6.1, 44.5)	0.233
Hematocrit (%), mean±SD	38.63±0.44	34.37±1.44	38.95±0.45	0.007*
Hemoglobin (g/dL), mean±SD	12.59±0.14	11.09±0.49	12.7±0.15	0.004*
Lumbar spine (T-score), median (IQR)	-0.4 (-1.4, 0.5)	-1.8 (-2, -0.7)	-0.3 (-1.3, 0.6)	0.010*
Lumbar spine (g/cm ²), median (IQR)	1.1 (1.0, 1.2)	0.9 (0.8, 1.0)	1.1 (1.0, 1.2)	0.004*
Hip (T-score), median (IQR)	-0.7 (-1.3, 0.1)	-1.9 (-2.6, -1.1)	-0.7 (-1.3, 0.1)	<0.001*
Hip (g/cm ²), median (IQR)	0.9 (0.8, 1.0)	0.7 (0.6, 0.8)	0.9 (0.8, 1.0)	<0.001*
Distal 1/3 end radius (T-score), mean±SD	-1.36±0.17	-3.69±0.32	-0.98±0.15	<0.001*
Distal 1/3 end radius (g/cm ²), mean±SD	0.75±0.02	0.52±0.03	0.79±0.02	<0.001*
Femoral neck (T-score), median (IQR)	-1.3 (-1.9, -0.7)	-2.3 (-2.7, -1.4)	-1.3 (-1.8, -0.7)	0.004*
Femoral neck (g/cm ²), median (IQR)	0.8 (0.7, 0.9)	0.7 (0.6, 0.8)	0.8 (0.7, 0.9)	0.003*

Statistical analyses were performed using the Independent t-test, and Mann-Whitney U test

T2DM type 2 diabetes mellitus, *SD* standard deviation, *IQR* interquartile range, *Cr* creatinine, *BUN* blood urea nitrogen, *GFR* glomerular filtration rate, *AST* aspartate aminotransferase, *ALT* alanine transaminase, *ALP* alkaline phosphatase, *HDL* high-density lipoprotein, *LDL* low-density lipoprotein, *UACR* urine albumin-creatinine ratio

*Statistically significant at the 0.05 level ($\alpha=0.05$).

Table S3 Univariable of factors associated with osteosarcopenia

Factors	Crude OR (95%CI)	P-value
Age (increases 5 years)	1.80 (1.16, 2.78)	0.008*
Education		
Primary school	6.62 (1.80, 24.32)	0.004*
Higher primary school	Reference	
Abnormal result of monofilament test	3.19 (0.91, 11.22)	0.070
Frequency of exercise		
None	Reference	
at least 1 day/week	0.93 (0.28, 3.05)	0.911
SARC-Calf ≥ 11 score	8.95 (2.55, 31.44)	0.001*
Body mass index (decrease 1 kg/m ²)	1.64 (1.28, 2.10)	<0.001*
Weight loss in 1 year >5%	2.10 (0.58, 7.62)	0.260
Calf circumference (decreases 1 cm.)	1.13 (1.01, 1.26)	0.027*
Waist circumference (decreases 1 cm.)	1.04 (1.00, 1.08)	0.034*
Neck circumference (decreases 1 cm.)	1.55 (1.16, 2.06)	0.003*
Five-time chair stand (increases 1 sec.)	1.08 (1.00, 1.17)	0.042*
Gait speed (decreases 1 m/s)	8.78 (0.74, 104.78)	0.086
Hand grip strength (decreases 1 kg.)	1.11 (1.00, 1.24)	0.047*
Body fat mass (decreases 1 kg.)	1.19 (1.05, 1.33)	0.004*
Skeleton muscle mass index (decreases 1 kg/m ²)	7.13 (2.57, 19.77)	<0.001*
Phase angle (decreases 1°)	10.37 (2.97, 36.21)	<0.001*
ALP (decreases 1 U/L)	1.03 (0.99, 1.07)	0.059
Hematocrit (decreases 1%)	1.16 (1.04, 1.31)	0.010*
Hemoglobin (decreases 1 g/dL)	1.68 (1.15, 2.45)	0.007*

Data were analyzed with Firth's penalized logistic regression

OR odds ratio, ALP alkaline phosphatase

*Statistically significant at the 0.05 level ($\alpha=0.05$)