Exploring the Relationship Between Greater Omenta Mass, Body Mass, and Stature: Insights from Cadaveric Data

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Introduction

- The **Greater Omentum** is a four-layered fibroadipose organ that overlies the viscera in the abdominal cavity.[2]
- Innovative applications: neoangiogenesis, tissue regeneration, and autologous grafts[2] (e.g., flap-based breast reconstruction[3], pancreatic islet transplantation[4], pain model for analgesics[5], in vivo vascular recellularization[6], and brain revascularization for Moyamoya disease[7]).
- Despite its important applications, the anatomy of the greater omentum has not been systematically characterized since initial research in the 1980s.[8]

Greater Omentum[1]

AIM Validate previous relationships between sex and greater omental mass, volume, and surface area and further characterize its relationship to estimated stature, body mass, and BMI

Methods

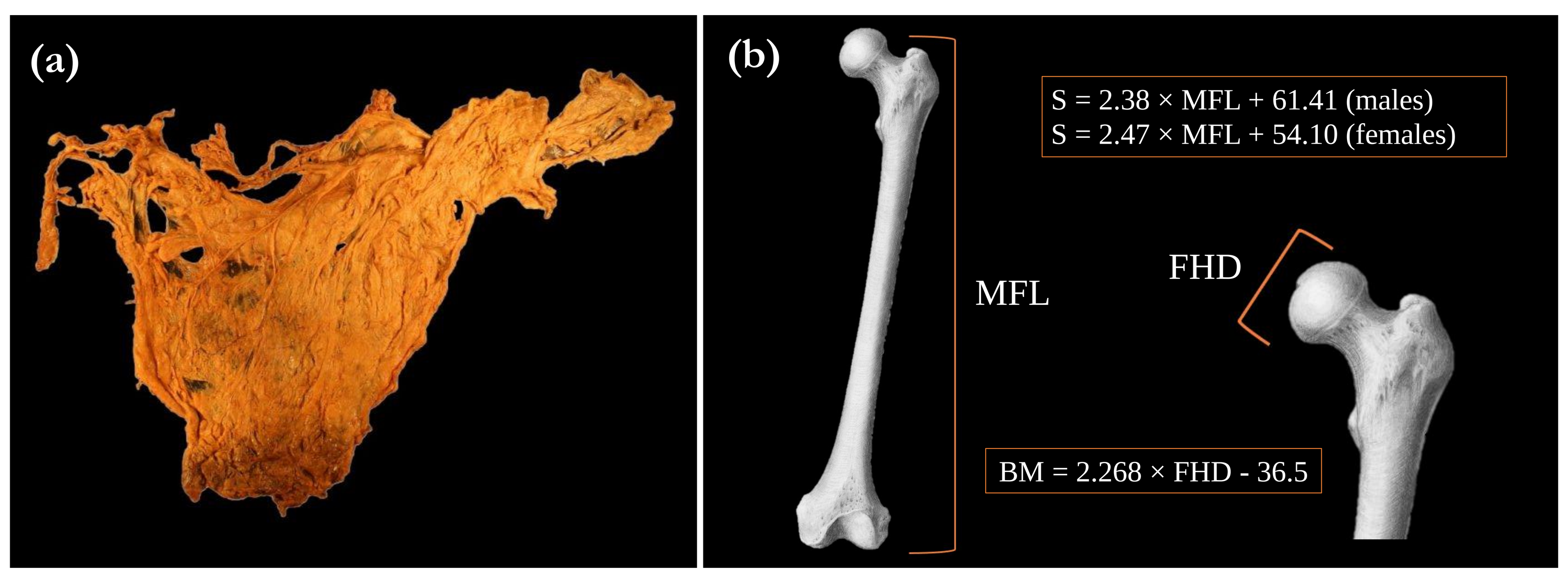

Figure 1. Greater omenta and femur bones[9]. (a) Photograph of dissected cadaveric greater omentum with signature apron-like shape. (b) Stature (S) and body mass (BM) were calculated using maximal femoral length (MFL) and femoral head diameter (FHD), respectively.

- Dissected greater omenta from embalmed cadavers (n = 30; 17 females, 13 males).
- Measured omental mass and volume, femoral head diameter (FHD) and maximum femoral length (MFL).
- Extrapolated omental surface area, length, and width using ImageJ version 1.54d.
- Calculated cadaveric stature (S) and body mass (BM) to act as a proxy measure for height and weight, respectively.[10]
- Statistical analyses using R version 4.3.1.
- Statistical significance measured using a linear regression model and Student's t-test.

Results

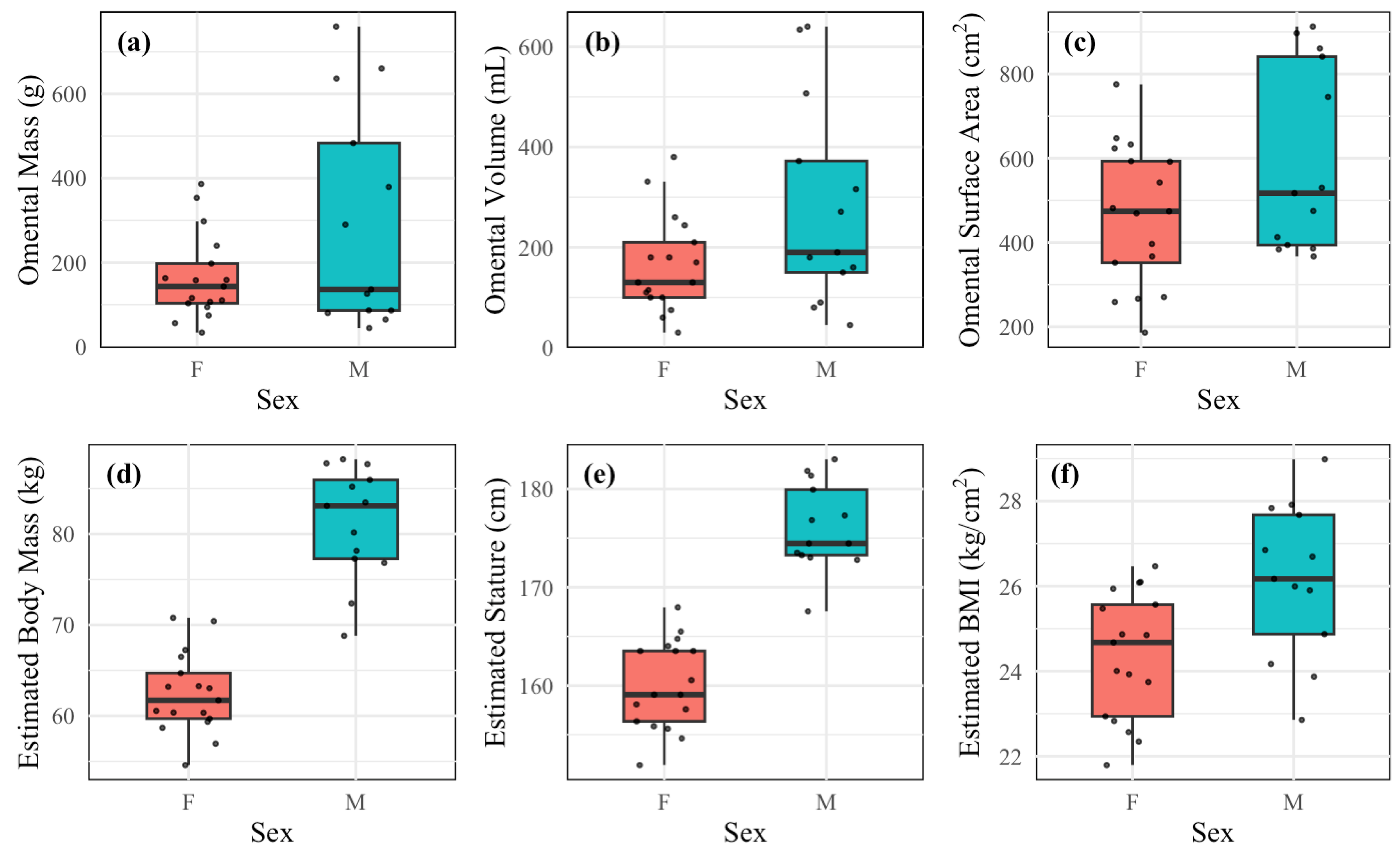

Figure 2. Comparison of omental biometrics and calculated anthropometrics between sexes. (a) Omental mass (g). (b) Omental volume (mL). (c) Omental surface area (cm²). (d) Estimated body mass (kg). (e) Estimated stature (cm). (f) Estimated BMI (kg/cm²).

Sex differences in omental mass, volume, and surface area $P < 0.05$

Sex differences in estimated body mass, stature, and BMI $P < 0.01$

Age **negatively** correlated with estimated BMI, stature, and body mass $P < 0.001$

Age **negatively** correlated with omental length $P < 0.05$

Estimated stature **positively** correlated with omental biometrics, body mass, and BMI $P < 0.001$

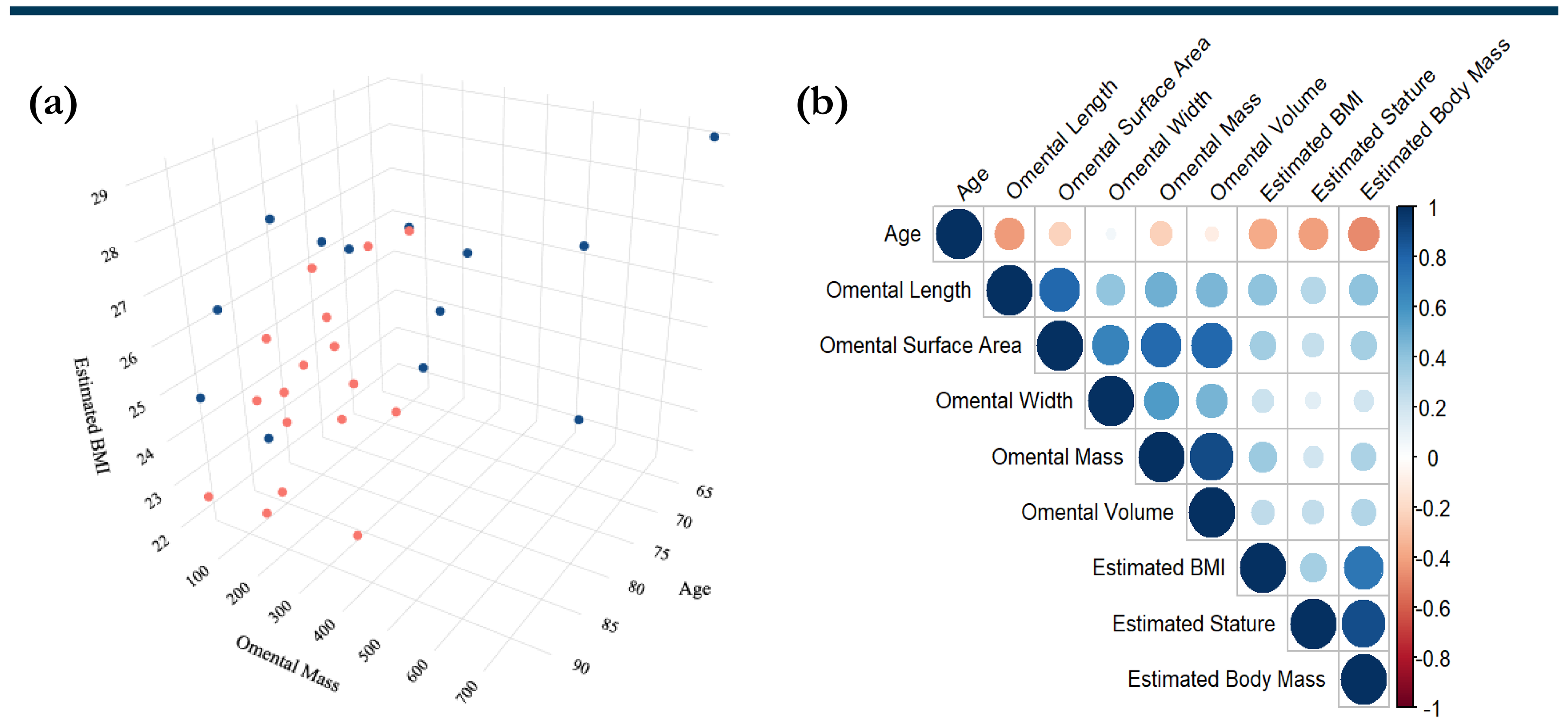

Figure 3. Comparisons between omental parameters and cadaveric anthropometrics. (a) 3D scatter plot comparing age, omental mass, and estimated BMI. (b) Correlation matrix heatmap comparing age, omental biometrics, and estimated anthropometrics.

Data Summary

Table 1. Omenta, Bone, and Anthropometric Parameters

Parameter	Mean ± SD	Range
Age (years)	80.9 ± 8.6	63 - 93
Omental Mass (g)	220.9 ± 194.8	33.9 - 759.4
Omental Volume (mL)	215 ± 160	30 - 640
Omental Surface Area (cm²)	521.8 ± 199.2	186 - 912
Femur Length (cm)	45.2 ± 3.2	39.6 - 51.1
Femoral Head Diameter (mm)	47.2 ± 4.7	40.2 - 55.0
Estimated Stature (cm)	167.0 ± 9.2	151.9 - 183.0
Estimated Body Mass (kg)	70.5 ± 10.7	54.6 - 88.2
Estimated BMI (kg/m²)	25.1 ± 1.8	21.8 - 29.0

Conclusions

- Omental mass, volume, and surface area demonstrated significant differences between males and females, correlating well with the significant differences between anthropometrics between sexes.
- Omental mass and volumes were positively correlated with estimated cadaver height.
- Omental length, estimated stature, body mass, and BMI decrease with increased age.
- Potential confounding variables encompass but are not limited to:
  - Cadaveric age and fixation
  - Unknown abdominal medical or surgical history
  - Unknown living anthropometrics
  - Small sample size
  - Differing sample populations

Future Directions

Validate current findings with increased sample size

Identify key factors involved in predicting omental parameters

Develop a method for predicting omental size

Compare live subject and cadaveric omental metrics

Citations & Acknowledgements

Citations:

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