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SUPPLEMENTARY MATERIAL

A novel method of estimating pterosaur skeletal mass using computed tomography
scans

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COMPUTED TOMOGRAPHY DETAILS

Computed tomography scans were done with a scale of 1 pixel = 0.1271 mm x 0.1271 mm for NHMUK specimens (slices 0.1271 mm apart) and 1 pixel = 0.1202 mm x 0.1202 mm for UP WP1 (slices 10 mm apart). All UP WP1 sections were analyzed, but only a subset of the NHMUK slices were studied. In the proximal and distal heads where trabeculae are common, the bone was analyzed every 6.355 mm to account for the change in trabeculae density, while the shaft (where no trabeculae are found) was analyzed every 12.71 mm.

THRESHOLDING

As mentioned in the paper, the area of each slice was calculated several different ways. It was first determined by thresholding the scan by visual means, resulting in a slightly different threshold for each slice. This was done in all specimens. In order to test the per-slice manual thresholding method, UP WP1 was then analyzed using a standard threshold for the entire bone (the average of the thresholds used by visual method – minimum pixel value of 67), as well as a higher (77) and lower (57) pixel value. These results can be seen in Table S1.

Although the average threshold does not substantially change the volume estimate, it does change the structure of the length vs. area plot (Fig. S1). This method results in much higher areas (by including matrix in the calculation) in the proximal head, and lower areas (leaving out bone) in the distal head. For this reason, we deem that the per-slice method of manual thresholding is more accurate than an average threshold for the entire bone.

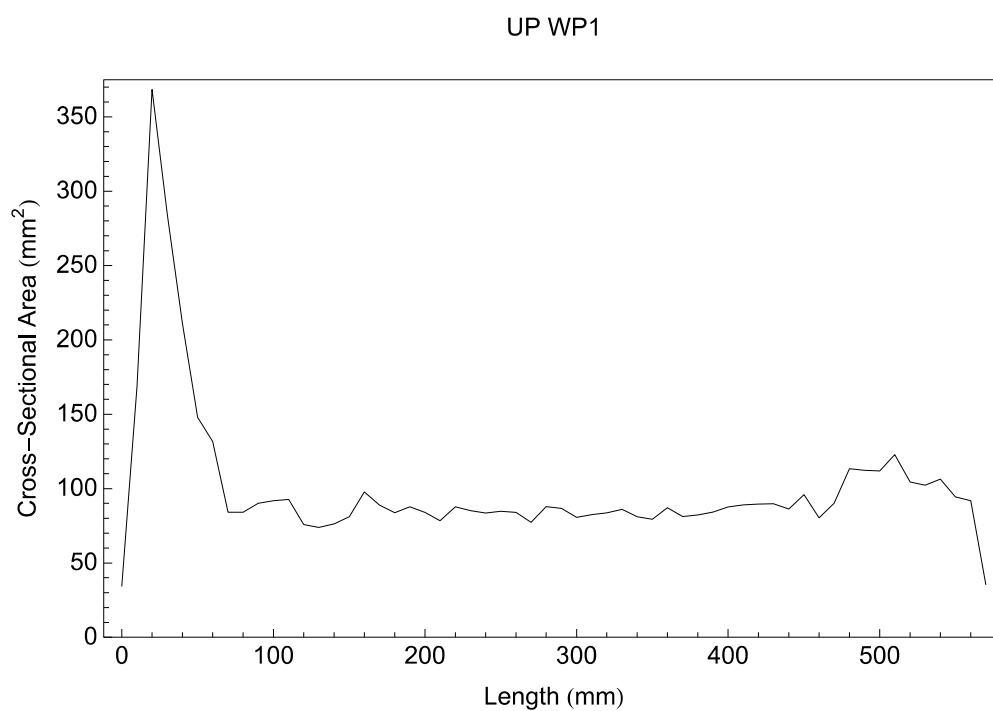


FIGURE S1. UP WP1 length vs. area plot when re-analyzed under an average threshold of 67.

TABLE S1: Mass values calculated for UP WP1 for three different threshold values.

Minimum Pixel Value (Threshold)	Mass (g)
57	141
67	120
77	106