

Estimating body mass from the astragalus in mammals

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Astragalar fossils have been intensively studied as an indicator of the functional morphology and phylogenetic relationships of mammals. However, relatively few studies have investigated the relationship between astragalar size and body mass, usually with a focus on a particular taxonomic group. Here, univariate and multiple regression models are used to analyze the relationship between astragalar size and body mass based on an extensive sample of extant land mammals (11 orders, 48 species, 80 individuals; body mass ranging from 18 g to 3.4 t). The analyses revealed the size of the tibial trochlea to be a better predictor of body mass than the total size of the astragalus. Based on these results, estimates of the body mass of several Paleogene land mammals were calculated and compared to those of previous studies. Thus, for example, the body mass of “*Baluchitherium*”, the largest terrestrial mammal known to date, was estimated at about 10–15 t.

Key words: Mammalia, astragalus, talus, regression analysis, body mass estimate, Paleogene.

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