



LOCOMOTION IN THE EXTINCT NOTOUNGULATE *PROTYPOTHERIUM*

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ABSTRACT

This study characterizes the primary locomotor habit of *Protypotherium*, an interatheriid notoungulate from the early Miocene of Santa Cruz, Argentina. Locomotor habit was assessed both qualitatively (i.e., by noting osteological features correlated with specific locomotor habits in extant mammals) and quantitatively (i.e., by using multivariate analyses to compare limb element lengths, widths, and ratios to those of extant mammals). Because the body mass of *Protypotherium* has been estimated at 5–10 kg, its locomotor habit was evaluated relative to mammals of similar size and known locomotor habit; the comparative dataset included 39 genera of artiodactyls, carnivorans, caviomorph rodents, hyraxes, and lagomorphs. For each genus, 11 limb bone variables and eight indices (ratios) were measured; these were analyzed using principal components analysis and discriminant function analysis. Qualitative and quantitative analyses indicate that *Protypotherium* was most likely a generalized terrestrial mammal tending toward cursoriality. Proximal and distal limb elements of *Protypotherium* mostly resemble those of cursorial mammals in qualitative characters, but intermediate elements are more similar to those of arboreal and semifossorial mammals. Multivariate analyses generally group *Protypotherium* with arboreal and/or semifossorial mammals, but this is likely a phylogenetic effect, possibly attributable to fossorial habits in ancestral interatheriids and/or notoungulates. The postcranial adaptations of *Protypotherium* are intermediate between those of more basal interatheriids and the middle Miocene interatheriid *Miocochilius*. In conjunction with this study, investigations of other interatheriids would permit a detailed analysis of the evolution of locomotor habits within this highly successful clade.

KEY WORDS: locomotion; Mammalia; morphology, functional; Notoungulata; paleoecology; South America
