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COMPARATIVE MORPHOLOGICAL STUDY OF THE PELVIC LIMB BONES IN THE CHINCHILLA (*Chinchilla lanigera*) AND GUINEA PIG (*Cavia porcellus*)

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Abstract

This study aimed to compare the morphological and morphometric characteristics of the coxal bone, femur, tibia, and fibula in the chinchilla (*Chinchilla lanigera*) and guinea pig (*Cavia porcellus*). The chinchilla exhibited a proportionally larger acetabulum and a longer, more supple femur (48.2 mm versus 46.3 mm). The tibia was approximately 22% longer than the femur in the chinchilla, compared with 6% in the guinea pig. A distinctive morphological difference was observed in the fibula, which remained separate from the tibia in the chinchilla, whereas distal tibiofibular fusion was present in the guinea pig. These findings highlight interspecific differences in pelvic limb skeletal morphology and proportions.

Introduction

The pelvic limb bones of rodents exhibit interspecific differences in morphology, proportions, and anatomical landmarks. This study aimed to describe and compare the osteological and morphometric characteristics of the coxal bone, femur, tibia, and fibula.

Material and method

The study included six adult specimens (three chinchillas and three guinea pigs) that had died prior to the investigation. The coxal bones, femur, tibia, and fibula were prepared by mechanical cleaning and thermal maceration. Morphological examination and morphometric measurements were performed using a vernier caliper and a divider. Anatomical terminology followed the *Nomina Anatomica Veterinaria (2017).*

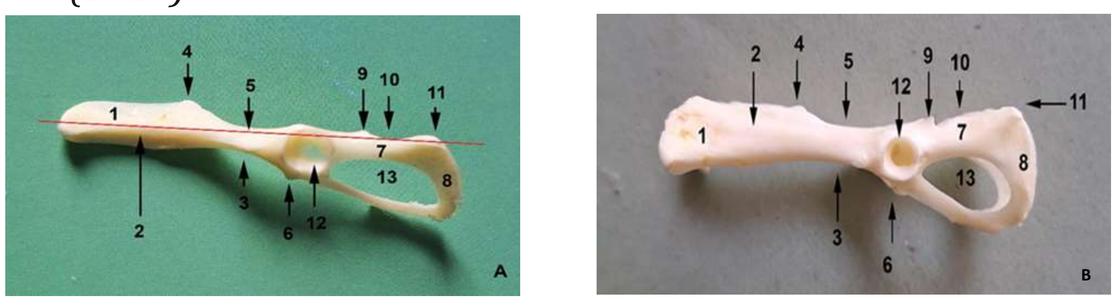


Fig. 1 Coxal bone: (A) chinchilla; (B) guinea pig

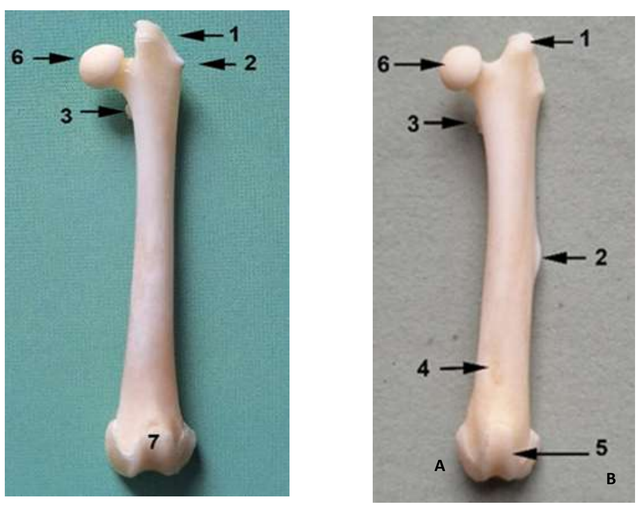


Fig. 2 Femur: (A) chinchilla; (B) guinea pig

Results and discussions

Coxal bone: The preacetabular/postacetabular length ratio was 1.90 in the chinchilla and 1.76 in the guinea pig. The coxal length-to-acetabular diameter ratio was 8.3 and 11, respectively, indicating a proportionally larger acetabulum in the chinchilla.

Femur: The femur measured 48.2 mm in the chinchilla and 46.3 mm in the guinea pig. The chinchilla exhibited a more supple femoral shaft and neck, whereas the guinea pig presented a more robust femoral conformation.

Tibia: Tibial length exceeded femoral length by approximately 22% in the chinchilla and 6% in the guinea pig. The tibial crest extended over approximately 25% and 30% of tibial length, respectively. The greater trochanter has a dorsal orientation in the chinchilla and a dorsomedial orientation in the guinea pig (Fig. 2).

Fibula: In the chinchilla, the fibula was slender and remained separate from the tibia throughout its length. In the guinea pig, the fibula was more robust and exhibited distal osseous fusion with the tibia.

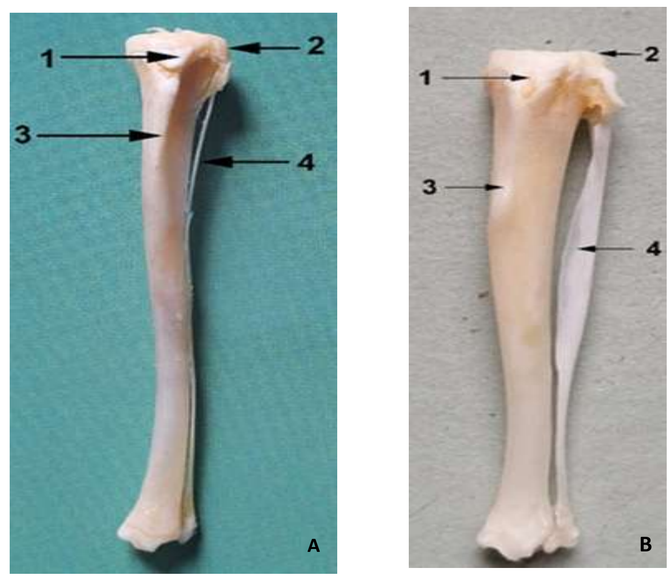


Fig. 3 Tibia and fibula: (A) chinchilla; (B) guinea pig

Conclusions

The comparative analysis revealed distinct interspecific differences in pelvic limb skeletal morphology and proportions, particularly in the relative lengths of the femur and tibia and the distal tibiofibular connection. These findings contribute to the comparative osteological characterization of the two species, although the limited sample size restricts the extent to which the results can be generalized.

