Comparative Anatomical Study of the Thoracic Limb Skeleton in the Chinchilla (*C. Lanigera*) and in the Domestic Rabbit (*O. Cuniculus*)

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Abstract

Chinchillas, currently growing in popularity as pets, lack detailed anatomical descriptions of their skeleton. The advanced anatomic knowledge of Domestic Rabbits offers a good reference point. Thus, we performed a detailed assessment of the Chinchilla's thoracic limb skeleton features, compared to the Rabbit's, in order to provide basic data for clinicians and researchers in the orthopedic field. 10 thoracic limb skeletons of Chinchillas and Domestic Rabbit, respectively, were examined and compared. The Chinchilla's thoracic girdle notably includes a clavicle, which is absent in Rabbits. Its scapula presents a similar frame, but a tighter supraspinous/infraspinous fossa ratio (1:1) and a shorter metacromion. The distal epiphysis of the humerus distinctly presents only one condyle in the Chinchilla. Its ulna and radius are equally well developed. The autopodium of both species is similar in shape and bone composition, counting five digits. In conclusion, although thoracic limb skeleton similarities between the Chinchilla and of the Domestic Rabbit suggest that clinicians can use the latter as reference species when confronted with orthopedic pathology of the former, the underlined differences in the thoracic girdle and humerus between the two species must be taken in consideration when imaging diagnostic and treatments of these bones are required.

Keywords: *thoracic limb skeleton, Chinchilla lanigera, Oryctolagus cuniculus*

Introduction. The Chinchilla (*Chinchilla lanigera*) is a South American rodent species with a highly appreciated fur, currently growing in popularity as a house pet. Although imaging descriptions are available (Silverman and Tell, 2005), raw anatomical data on this species is scarce, placing it under current scrutiny for extended descriptions (Stan *et al.*, 2014). The detailed anatomic knowledge on Domestic Rabbits (Barone, 1986; Damian *et al.*, 2001) offers a good starting point for comparison, as this is the most extensively described in anatomic literature species that is also taxonomically related to Chinchillas.

Aims and objectives. Our study aimed to deliver a detailed description of the Chinchilla's thoracic limb skeleton features, using the Domestic Rabbit as reference, in order to advance the anatomical knowledge on this species and to offer data for clinicians.

Materials and methods. 10 thoracic limbs of Chinchillas were obtained following commercial slaughter of adult specimens of both sexes. The skeletons were cleaned by maceration. 10 thoracic limb skeletons of adult Domestic Rabbit (*Oryctolagus cuniculus*), both sexes, belonging to our ossuary, were used for comparison.

Results and Discussion. The thoracic girdle of the Chinchilla is composed of two bones: a scapula and a clavicle. The clavicle, which is absent in Rabbits (Damian *et al.*, 2001), has an elongated "S" shaped profile, and presents two articular surfaces: one for the sternum and one

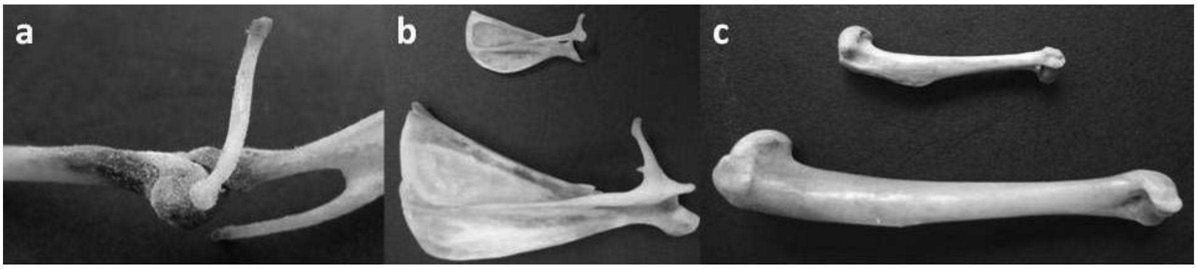

Fig. 2. (a) distal epiphysis of the humerus in the Rabbit (left) and in the Chinchilla (right); (b) radius and ulna in the Rabbit (down) and in the Chinchilla (up); (c) partial autopodium in the Rabbit (down) and in the Chinchilla (up).

Fig. 1. (a) clavicle and scapula articulated to the humerus in the Chinchilla; (b) lateral view of the scapula in the Rabbit (down) and in the Chinchilla (up); (c) lateral view of the humerus in the Rabbit (down) and in the Chinchilla (up).

for the proximal epiphysis of the humerus (Fig. 1a). The scapula has a very similar outline to that of the Rabbit, except for a tighter supraspinous/ infraspinous fossa ratio (1:1 in the Chinchilla vs. 1:2 in the Rabbit) and a shorter metacromion (Fig. 1b). The humerus of both species presents a well developed articular head and reduced greater and lesser tuberosities. The deltoid tuberosity is confounded with a deltoid crest, which has a slightly incurved profile in the Chinchilla's humerus (Fig. 1c). The distal epiphysis of the humerus distinctly presents a larger trochlea and only one lateral condyle in the Chinchilla (Fig. 2a). The ulna and radius of the Chinchilla are equally developed, with the ulnar styloid process slightly longer than the radius' epiphysis (Fig. 2b). The olecranon, smaller than that of the Rabbit, presents small sharp tubercles for muscular insertions. These bones have an incurved profile, resembling the letter S, in both species. Their diaphyses are coalescent on the two distal thirds of their length, while the proximal third presents a narrow but elongated interosseous space. The autopodium of both species is similarly formed, including the presence of proximal sesamoid bones. While the carpal and metacarpal bones are similar in proportion (Fig. 2c), the phalanges in the Chinchilla are shorter than those of the Rabbit. Our findings support imaging descriptions present in literature (Silverman and Tell, 2005), but underline certain detail features that can only be viewed by direct examination.

Conclusion. The thoracic limb skeletons of the two species, while similar, present differences in the thoracic girdle and humerus relevant for the Chinchilla. These need to be considered in practice, when imaging diagnostic and orthopedic treatments are required. Details such as epiphysal features of the humerus can help further elaborate on articular mechanics and muscle insertions, complementing imaging data.

References

1. Barone R (1986). Anatomie comparée des mammifères domestiques – Tome 1 : Ostéologie – 3ème ed., Ed. Vigot, Paris.
2. Damian R, Popovici N, Chirilean Ioana (2001). Anatomie comparată sistemul de susținere și mişcare, Ed. AcademicPres, Cluj-Napoca.
3. Silverman S, Tell LA (2005). Rodents, Rabbits and Ferrets: An Atlas of Normal Anatomy and Positioning, Ed. Elsevier Saunders, St. Louis, Missouri.
4. Stan F, Damian A, Gudea A, Dezdrobitu C, Bob Delia, Martonos C, Bochiş Ileana, Pogana B (2014). Comparative Anatomical Study of the Large Intestine in Rabbit and Chinchilla, Bulletin UASVM Veterinary Medicine 71 (1) / 2014, 208-212.