

Morpho-functional peculiarities of hind limbs of Accipitridae within Falconiformes

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The research of hindlimb morphology in Accipitridae has a long history. Bones, muscles and ligaments of this group had been under the scope of study of a number of prominent anatomists. However, no one attempted to summarize and discuss key morpho-functional peculiarities of hind limbs of Accipitridae within Falconiformes. Based on our dissections of several representatives of Accipitridae, as well as on the extensive comparative data from the literature, this research fills the gap. The undisputable monophyly of Accipitridae and their neighbors by the order Falconiformes (except for New World Vultures) was chosen to reveal mentioned key features. Secretary Bird and Osprey show two extreme poles of locomotor adaptations within Falconiformes. Both started from the stage, when the cursoriality was subsiding in ancestors of Falconiformes. Secretary Bird retained some ancestral features, which allowed it to master cursoriality again, whereas Osprey became even more arboreal, losing a number of hindlimb muscles and becoming convergent to owls due to the similar technique of prey capture. Hawks and falcons retained the more generalized hindlimb configuration. The loss of *m. flexor cruris lateralis cum parte accessorie*, *vinculum tendineum flexorum* and *m. iliofemoralis* indicate the trend of both families to arboreality. Showing basic raptorial adaptation in common, hawks and falcons differ from each other by the morphological details, related to the way of prey processing. Both use their feet to seize prey, but falcons kill primarily with their beaks, whereas hawks kill with their feet. Thus hawks have more powerful deep digital flexors. They also show a tendency to the hypertrophy of the second digit, which becomes as large as hallux and receives the reinforcement by the branch of terminal tendon of *m. flexor hallucis longus*. The absence of too rapid and abrupt movements explains the lack of ossifications in tendons of hindlimb muscles in Accipitridae, unlike in falcons and owls. Members of Accipitridae, namely Old World Vultures, which abandoned the hunting by seizing prey, lose aforementioned morphological features of the foot.