

Practical Guide to Canine and Feline Neurology

3rd Edition



Curtis W. Dewey • Ronaldo C. da Costa



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PRACTICAL GUIDE TO CANINE AND FELINE NEUROLOGY

Third Edition

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Dedication



Alexander de Lahunta, DVM, PhD, DACVIM (Neurology), DACVP.

As neurologists, Ronaldo and I shudder to think where we would be professionally without the myriad and substantial contributions that Alexander (“Sandy”) de Lahunta has made to our specialty. He has—in a career spanning nearly half a century—laid the framework for our understanding of neuroanatomy and neuropathology. It is a testament to this man's legendary and iconic status in veterinary medicine overall that any veterinarian who opens this book will immediately feel respect and gratitude for “Dr. D” and know that he deserves all the accolades we can bestow upon him. And if you would like to read about the accolades

that Dr. D has earned, you should go online; they are far too numerous to fit on a textbook dedication page. Dr. D's contributions to our understanding of embryology, anatomy, neurology, and neuropathology are voluminous and ongoing. His passion has been and remains fulfilling the role of teacher. As one of his former students, I can personally attest to his unequalled skill in this arena. I can also attest to the fact that Dr. D has kept in touch with many of his students after they graduated and moved forward with further educational endeavors and careers. Years after I left Cornell as a student, I would hear of Dr. D telling his current students about something I had published in a journal. It meant a lot to know that someone I revered so highly was proud of my accomplishments. Ronaldo and I are proud of Alexander de Lahunta, as all veterinarians should be, and feel incredibly fortunate that he influenced our career paths. We dedicate this edition to someone who has positively and permanently changed the face of veterinary neurology and veterinary medicine in general—Dr. Alexander de Lahunta.

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Figure 2.25 Hypoglossal nerve function is evaluated by observing the tongue position and symmetry. This dog had a lesion in the caudal medulla that led to a focal area of atrophy at the base of the tongue and its deviation to the right (arrow).

Figure 2.26 Evaluation of extensor tone is performed by applying pressure to the plantar or palmar surfaces with the patient standing in lateral recumbency.

Figure 2.27 The patellar reflex is elicited by percussing the patellar tendon between the patella and tibial tuberosity.

Figure 2.28 The patellar reflex (as well as the other spinal reflexes) can be tested quickly in small dogs and cats with the patient positioned in a “sitting” position. Comparison of left- and right-sided limbs is also easily performed.

Figure 2.29 Cranial tibial reflex. This reflex is tested by percussing the belly of the cranial tibial muscle.

Figure 2.30 The biceps reflex is elicited by striking the examiner's finger placed over the biceps tendon just proximal to the elbow.

Figure 2.31 The triceps reflex is elicited by percussing the triceps tendon just proximal to the olecranon.

Figure 2.32 The flexor reflex is tested by pinching the skin between the digits. Normal response is flexion of the hip, stifle, and hock in the pelvic limbs, and carpus, elbow and shoulder in the thoracic limbs. This is a reflex mediated at the level of the spinal cord and does not indicate the conscious perception of pain (which happens at a cortical level).

Figure 2.33 Gently stroking or pinching the perineum tests the perineal reflex. The normal response is flexion of the tail and contraction of the external anal sphincter.

Figure 2.34 (A) The cutaneous trunci reflex is evaluated by lightly pinching the skin just lateral to the vertebral column, starting over the lumbosacral region and proceeding cranially, one vertebral level at a time. The normal response is a bilateral contraction of the cutaneous trunci muscle, resulting in a twitch of the skin over the thorax and abdomen. (B) With spinal cord lesions along the thoracolumbar region, the ascending pathway of the cutaneous trunci reflex is interrupted and the reflex is absent approximately two vertebral bodies caudal to the lesion. Testing the reflex cranial to the lesion point will elicit a response. (The Ohio State University. Reproduced with permission.)

Figure 2.35 Representation of the crossed extensor reflex. With flexion of one pelvic or thoracic limb, the

opposite limb extends. This is an upper motor neuron reflex.

Figure 2.36 Palpation of the thoracolumbar vertebral column is performed applying direct pressure ventrally, starting in the cranial thoracic region and moving caudally until reaching the lumbosacral region.

Figure 2.37 Diagram illustrating the position of the fingers in relation to the spinous processes for palpation. The fingers should be kept relatively close to each other and pressure should be performed between the spinous processes because most disease processes involve the intervertebral discs. (The Ohio State University. Reproduced with permission.)

Figure 2.38 Great Dane dog demonstrating a guarded neck posture indicative of cervical pain.

Figure 2.39 Direct application of pressure to the ventral aspect of the vertebrae or the intervertebral spaces is a sensitive method of detecting and localizing cervical hyperesthesia in dogs and cats.

Figure 2.40 Testing nociception can be performed manually (A) or with a hemostat (B). If the patient does not respond to manual pressure, a hemostat must be used before calling the nociception absent. In the pelvic limbs it is recommended to test the lateral and medial digits as the sensory innervation is mediated by the sciatic and femoral nerves, respectively. A conscious response, such as crying or turning the head, indicates that nociception is present. Simple flexion of the limb without a conscious response means that the flexor reflex is present but nociception is absent.

Figure 2.41 Example of a neurologic examination form.

Chapter 3

Figure 3.1 Schematic midsagittal illustration of the brain, depicting major anatomical landmarks. (The Ohio State University. Reproduced with permission.)

Figure 3.2 Schematic representation of the association between the upper motor neuron and the lower motor neuron. (The Ohio State University. Reproduced with permission.)

Figure 3.3 The cerebrum (blue), depicted in (A) lateral, (B) sagittal, and (C) cross-sectional (transverse) views. (The Ohio State University. Reproduced with permission.)

Figure 3.4 Schematic representation of functional “lobes” of the cerebrum. (The Ohio State University. Reproduced with permission.)

Figure 3.5 Schematic representation of the corticospinal pathway motor tracts to the limbs traversing via the lateral corticospinal tract. The majority of these axonal processes (75%) cross in the medulla (myelencephalon) in the pyramidal decussation. (The Ohio State University. Reproduced with permission.)

Figure 3.6 Conscious proprioceptive pathways from thoracic (fasciculus cuneatus) and pelvic (spinomedullary tract and fasciculus gracilis) pathways. (The Ohio State University. Reproduced with permission.)

Figure 3.7 The diencephalon, depicted in (A) lateral (covered by the cerebrum), (B) sagittal (blue), and (C)

cross-sectional (transverse) views. (The Ohio State University. Reproduced with permission.)

Figure 3.8 Neuroanatomic pathways for vision and pupillary constriction. Pretectal nucleus, parasympathetic nucleus of CN III, oculomotor nerve (CN III). (The Ohio State University. Reproduced with permission.)

Figure 3.9 The mesencephalon (midbrain), depicted in (A) lateral (covered by the cerebrum), (B) sagittal (blue), and (C) cross-sectional (transverse) views. (The Ohio State University. Reproduced with permission.)

Figure 3.10 The rubrospinal tract, an important pathway for gait generation in dogs and cats. (The Ohio State University. Reproduced with permission.)

Figure 3.11 The metencephalon (pons and cerebellum), depicted in (A) lateral (blue), (B) sagittal (blue), and (C) cross-sectional (transverse) views. (The Ohio State University. Reproduced with permission.)

Figure 3.12 Pontine and medullary reticulospinal tracts, important pathways for gait generation in dogs and cats. (The Ohio State University. Reproduced with permission.)

Figure 3.13 Neuroanatomic pathway for facial sensation. Spinal tract of trigeminal nerve (red); nucleus of spinal tract of trigeminal nerve (orange). The inset represents a cross-sectional view of the nuclei and tract at the indicated level. (The Ohio State University. Reproduced with permission.)

Figure 3.14 The myelencephalon (medulla), depicted in (A) lateral (blue), (B) sagittal (blue), and (C) cross-