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DOG ANATOMY

Dog Anatomy: A Visual Guide to the Organs & Body Systems (PDF)

The complete illustrated guide to the canine body — all twelve systems, section by section, with labelled anatomical plates and concise notes. The full companion to the online article at vet-ebooks.com.

Contents

The 13 sections of this guide, in order.

IN SHORT

This is a visual, plate-by-plate guide to **dog anatomy** for veterinary students and professionals. We walk the whole body — **skeleton, muscles, the head and teeth, the limbs and paws, every organ system, the special senses and the nervous system** — using labelled canine anatomical plates, and explain the key structures and their clinical relevance under each figure. Where it matters, we flag how the dog differs from the cat.

KEY POINTS

1. The dog is a **facultative carnivore** — more omnivorous than the cat, and able to digest starch (pancreatic amylase).
2. Like the cat, the dog has a **vestigial clavicle**, so the forelimb is slung from the trunk by muscle alone.
3. **Claws are non-retractable** (blunt, for traction) — the opposite of the cat.
4. Skull conformation varies hugely by breed — **dolichocephalic, mesaticephalic, brachycephalic** (the last underlies BOAS).
5. The male has an **os penis** (a penile bone) and a bulbus glandis (the copulatory "tie"); the bitch is a **spontaneous** ovulator.
6. Clinically dog-defining: **hip dysplasia, GDV (bloat), mitral valve disease, hypothyroidism and hyperadrenocorticism (Cushing's)**.

About the images

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01 The canine body plan

Understanding **dog anatomy** starts with a body plan built for the chase. The domestic dog (*Canis lupus familiaris*) has the standard mammalian regions — head, neck, thorax, abdomen, pelvis, tail and four limbs — but is fundamentally a **cursorial** (running) predator. What makes the dog unique among domestic species is its extreme **breed variation**: the same species spans the Chihuahua and the Great Dane, so proportions differ enormously while the underlying plan stays the same. Positions on that body are described with the usual directional terms (cranial/caudal, dorsal/ventral, medial/lateral, proximal/distal) that every figure below relies on.

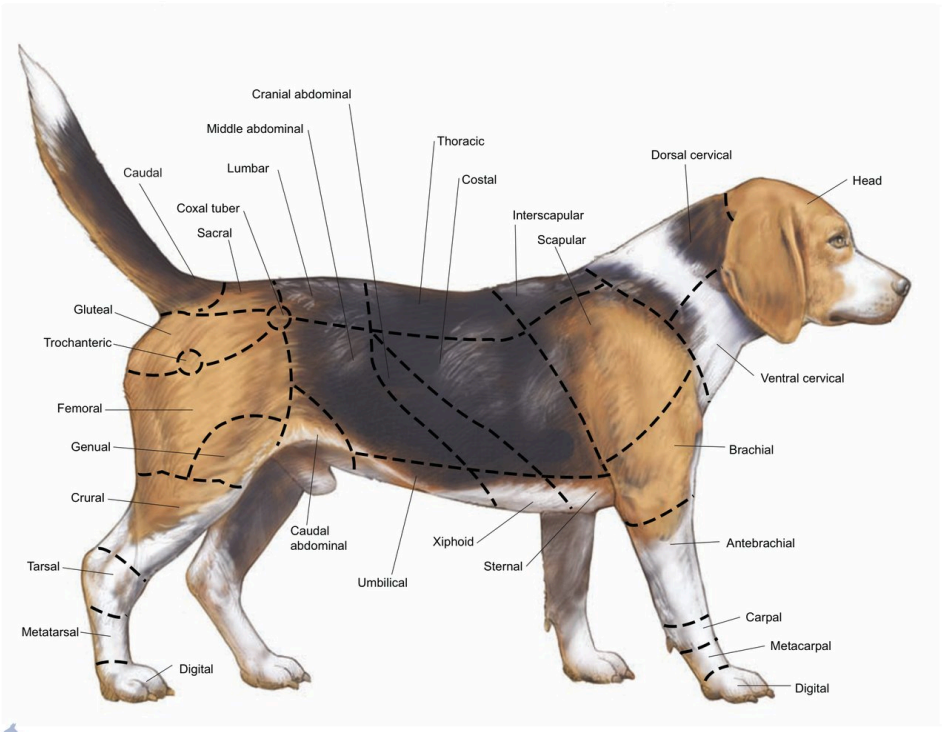

Fig 1 — Body regions and directional terms of the dog.

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Use the regions and directions here to read every later plate.

02 The skeleton

The canine skeleton has roughly **320 bones**, with the exact count varying with tail length. The vertebral formula is **C7, T13, L7, S3, Cd ~20**. As in the cat, the **clavicle is vestigial** — it does not join the skeleton, so the forelimb is suspended from the trunk by a muscular sling that absorbs the shock of running and lengthens the stride. The dog is **digitigrade** (it stands on its toes), with five digits on each forepaw (digit 1 is the raised dewclaw) and four on each hindpaw, though dewclaws vary by breed. Skeletal proportions are dramatically breed-dependent, and **chondrodystrophic** breeds (e.g. Dachshund) have deliberately shortened, curved long bones.

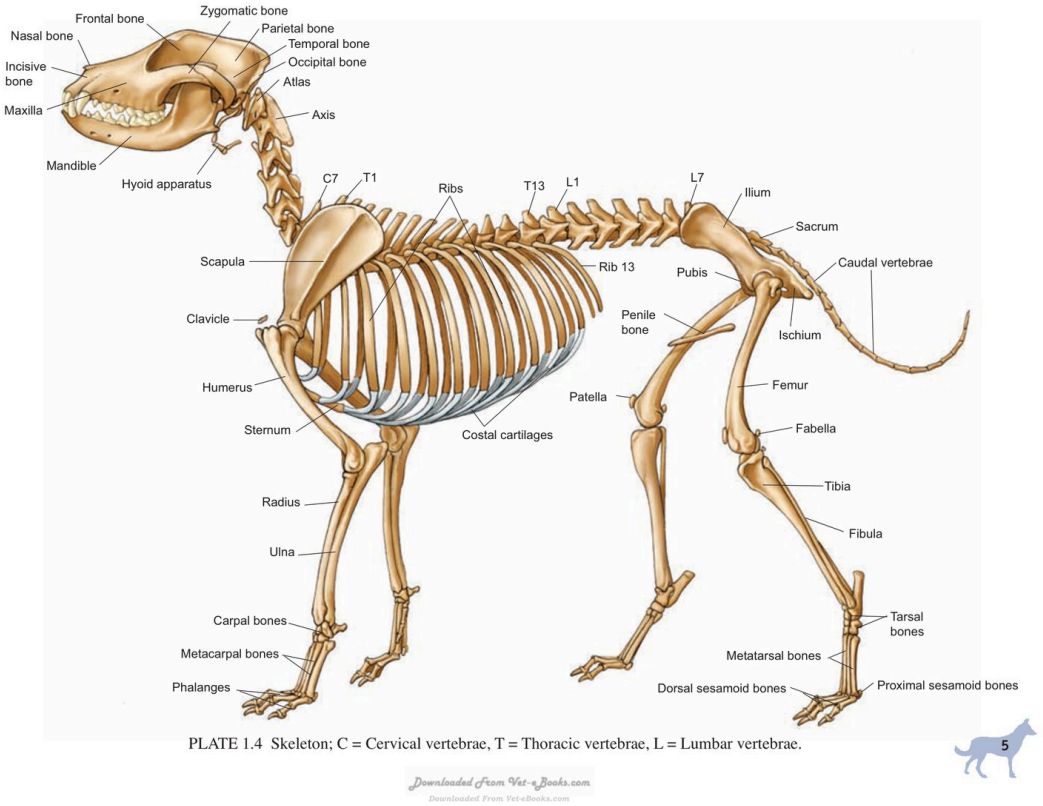

Fig 2 — The dog skeleton, lateral view.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 1.4 (p. 5). Reproduced for educational reference; copyright remains with the original authors and publisher.

The skull, the five regions of the spine, the ribcage, pelvis and limbs. Note the vestigial clavicle and the digitigrade stance.

03 The head: skull, teeth & mouth

No feature varies more between dogs than the skull. Three broad conformations are described: **dolichocephalic** (long and narrow, e.g. the Greyhound), **mesaticephalic** (medium, e.g. the Labrador), and **brachycephalic** (short and wide, e.g. the Bulldog and Pug) — the last underlying **brachycephalic obstructive airway syndrome (BOAS)**. The adult **dental formula is 2×(I3/3, C1/1, P4/4, M2/3) = 42 teeth** (28 deciduous) — more than the cat's 30 — with the shearing carnassials being the upper fourth premolar (P4) and the lower first molar (M1). The dog is intensely **macrosmatic**: an elaborate scroll-work of nasal turbinates carries a huge area of olfactory epithelium.

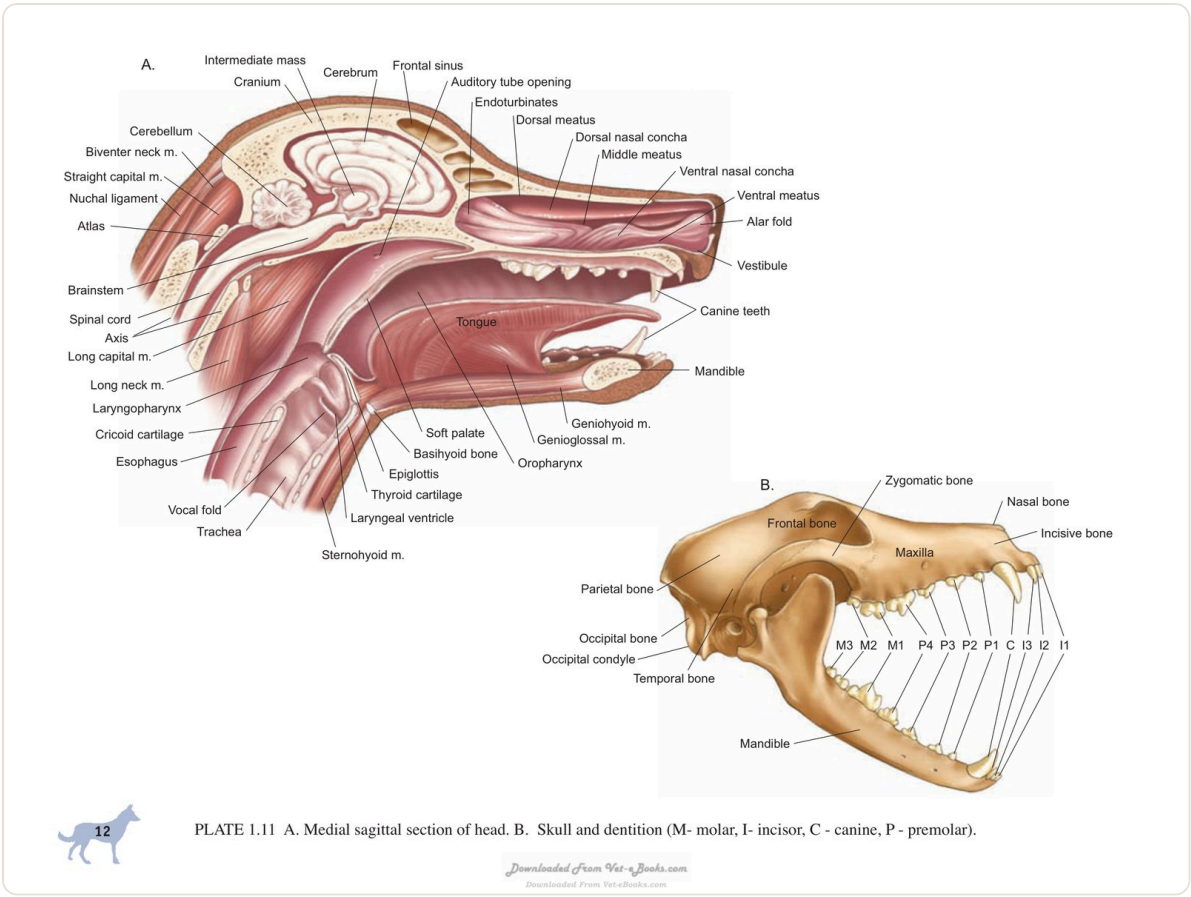

Fig 3 — Median section of the head, skull and dentition.

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The nasal cavity and turbinates, the hard and soft palate, the pharynx and larynx, and the 42-tooth carnivore dentition.

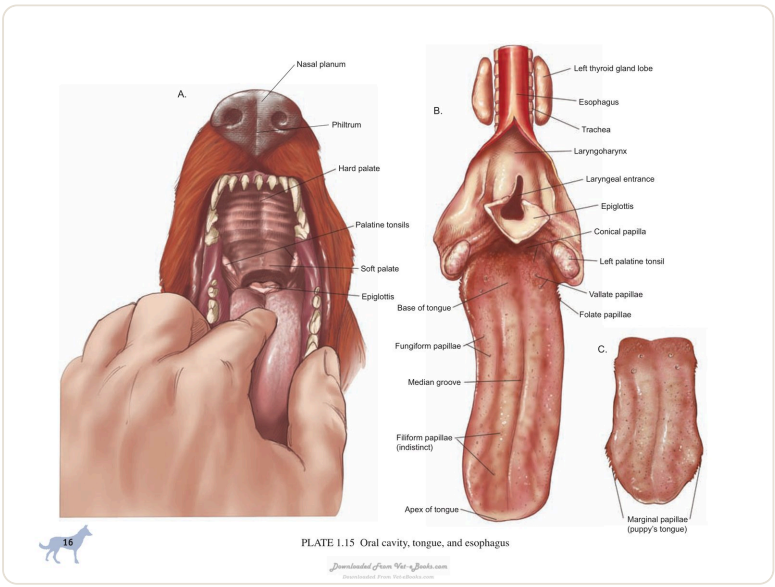

Fig 4 — The oral cavity.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 1.15 (p. 16). Reproduced for educational reference; copyright remains with the original authors and publisher.

The tongue, teeth and the openings of the salivary ducts.

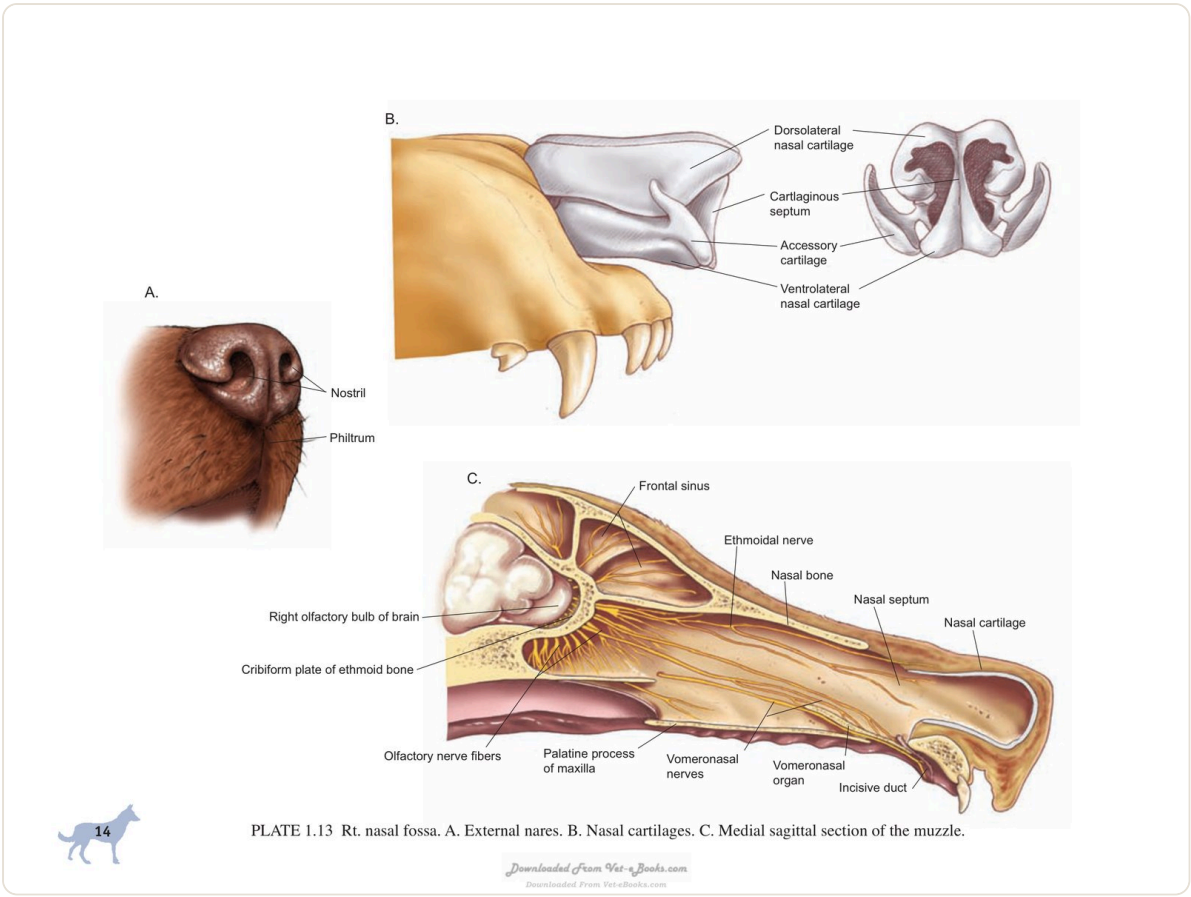

Fig 5 — The nasal fossae.

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The scrolled ethmoid and nasal turbinates that give the dog its extraordinary sense of smell.

04 The muscles

Over the skeleton lie the muscles that power endurance locomotion. The superficial layer includes the **cutaneous trunci** (the skin-twitch muscle) and the large locomotor muscles of the trunk and limbs. Beneath it, the **epaxial muscles** running along the spine extend and stabilise the back, while a **muscular sling** (serratus ventralis and its partners) suspends the trunk between the shoulder blades in place of a bony shoulder joint.

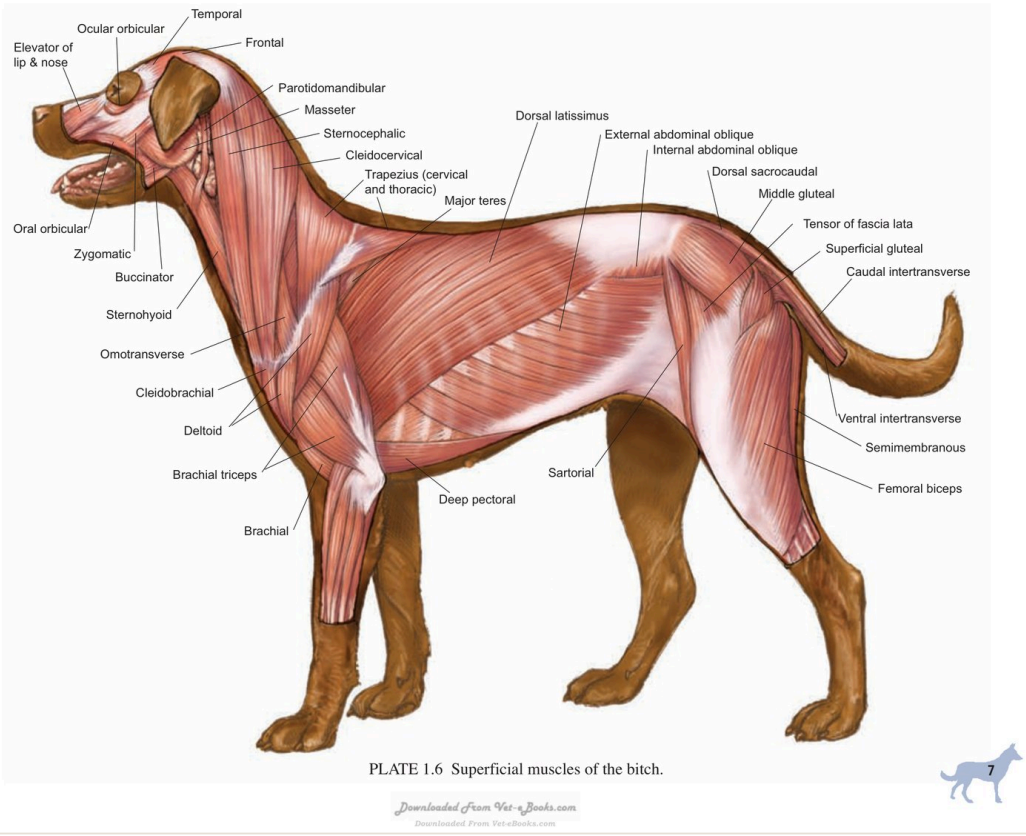

Fig 6 — Superficial muscles of the dog.

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The first muscle layer — trapezius, latissimus dorsi, deltoid, brachiocephalicus, pectorals and the limb muscles.

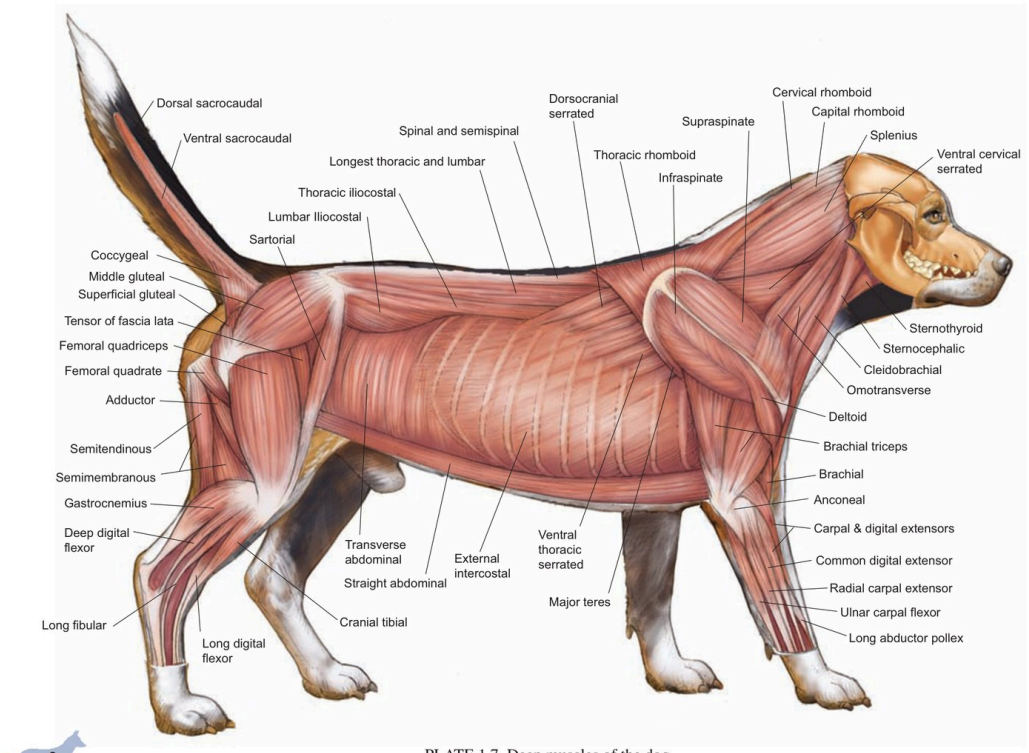

PLATE 1.7 Deep muscles of the dog.

Fig 7 — Deep muscles of the dog.

Beneath the superficial layer, the deep epaxial and limb muscles that drive the gallop.

05 The limbs, paws & joints

The dog is digitigrade, and its paws are built for **traction, not stealth**: unlike the cat, canine **claws are non-retractable** — blunt and permanently exposed for grip during running and turning. The forepaw carries five digits (digit 1 being the dewclaw) and the hindpaw four (dewclaws are breed-variable and often removed). Two joints dominate canine orthopaedics: the **hip** (a ball-and-socket joint, the site of **hip dysplasia**) and the stifle (knee), where **cranial cruciate ligament rupture** is one of the commonest lamenesses in practice.

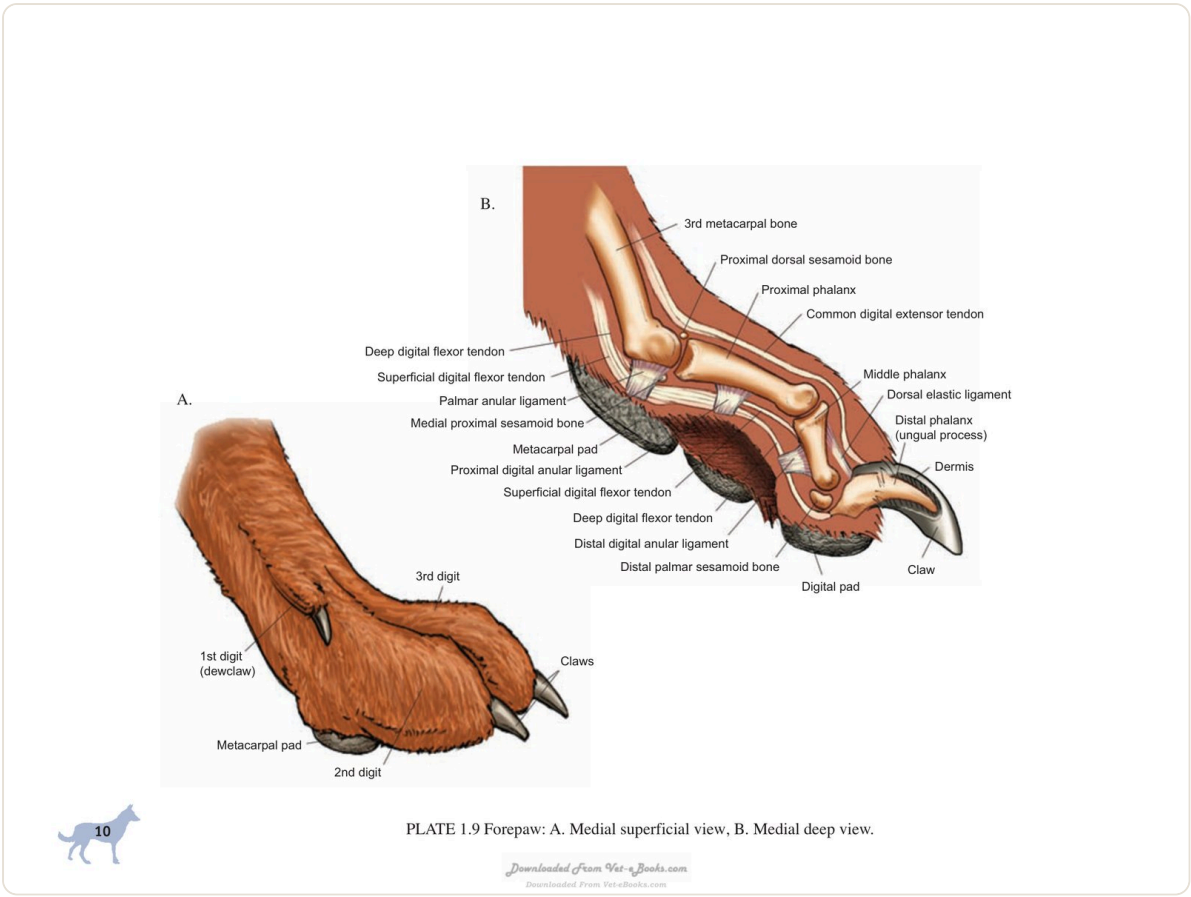

Fig 8 — Paraxial and medial view of the digit.

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The phalanges, pads and the non-retractable claw of the dog.

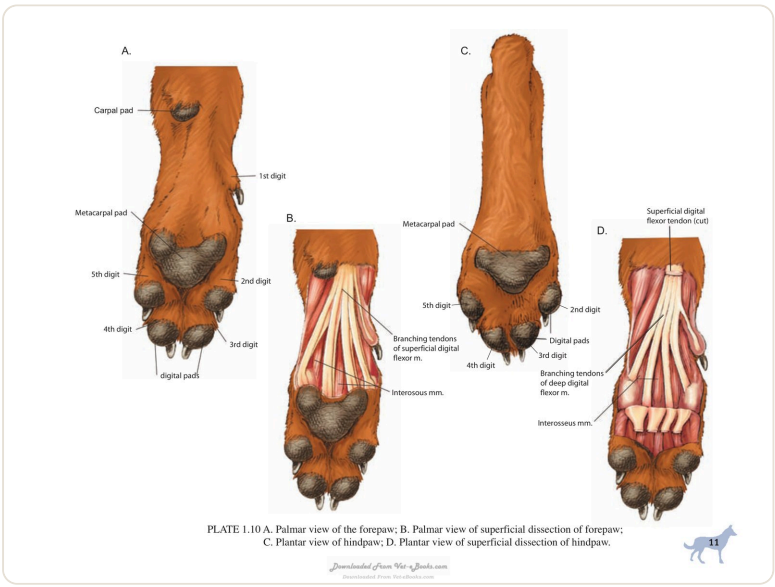

Fig 9 — Palmar structures of the forepaw.

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Metacarpal and digital pads, tendons and the digits.

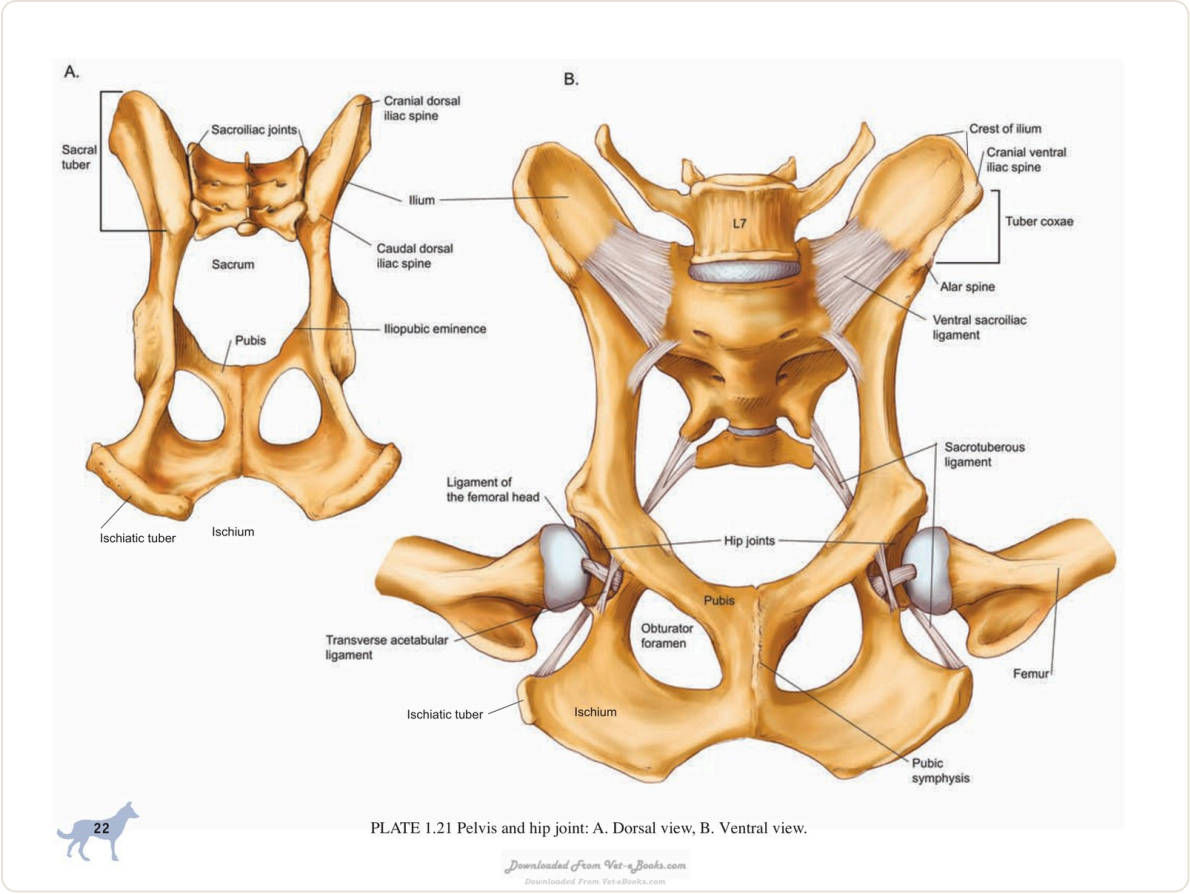

Fig 10 — The hip joint.

The ball-and-socket coxofemoral joint — the joint remodelled in hip dysplasia.

06 Special senses: ear & eye

The dog's senses are tuned for a social, motion-oriented hunter. The **eye** has a tapetum lucidum for night vision (less pronounced than the cat's), dichromatic (blue–yellow) colour vision, excellent motion detection and a protective third eyelid. The **ear** ranges from erect to pendulous depending on breed; the pinna is mobile, and hearing extends to around 45 kHz, above the human range.

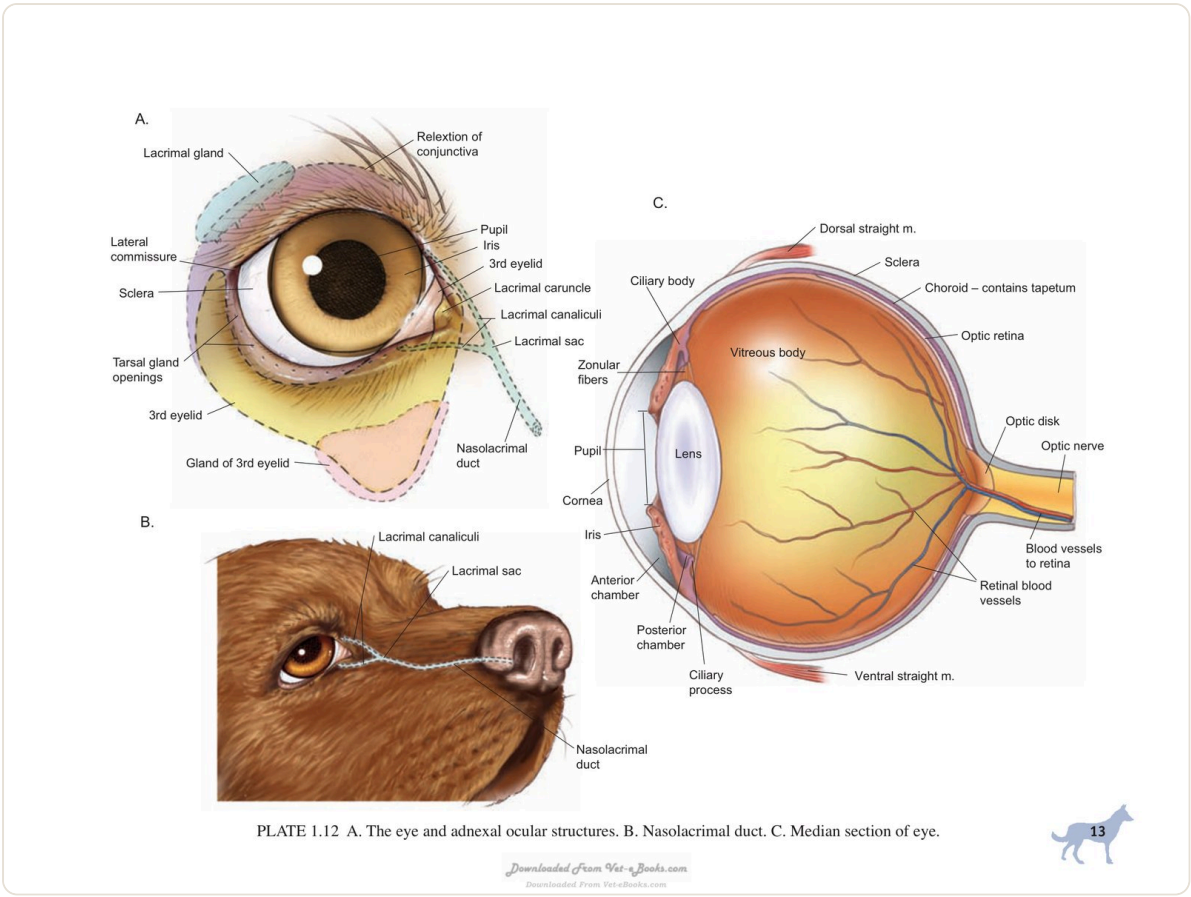

PLATE 1.12 A. The eye and adnexal ocular structures. B. Nasolacrimal duct. C. Median section of eye.

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Fig 11 — The eye and adnexal ocular structures.

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Cornea, iris and pupil, lens, retina and tapetum, with the eyelids and third eyelid.

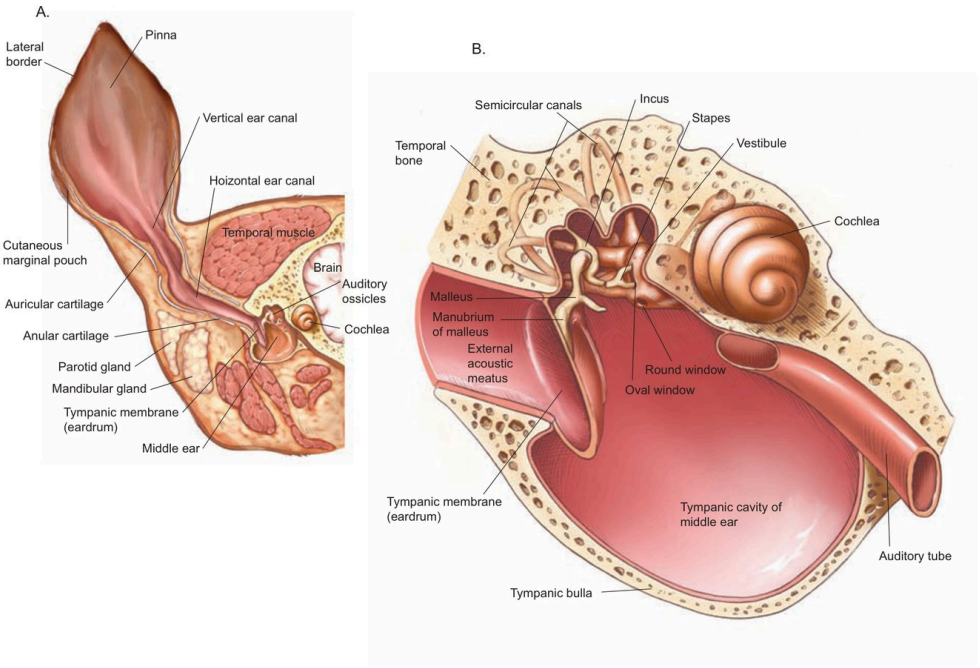

PLATE 1.14 The ear. A. Coronal section of the head and external ear. B. Middle and inner ear.

Fig 12 — The ear.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 1.14 (p. 15). Reproduced for educational reference; copyright remains with the original authors and publisher.

The pinna and ear canal, tympanic membrane and ossicles, and the cochlea and vestibular apparatus.

07 The digestive system

Compared with the strict-carnivore cat, the dog is a **facultative carnivore** and opportunistic scavenger: it tolerates a more varied, omnivorous diet and — crucially — can digest starch, because it secretes pancreatic **amylase**. The tract is a simple single-chamber stomach leading to the small intestine, a modest caecum (cecum), and the large intestine, served by the liver and pancreas. In deep-chested breeds the stomach's mobility underlies **gastric dilatation-volvulus (GDV, "bloat")**, a surgical emergency.

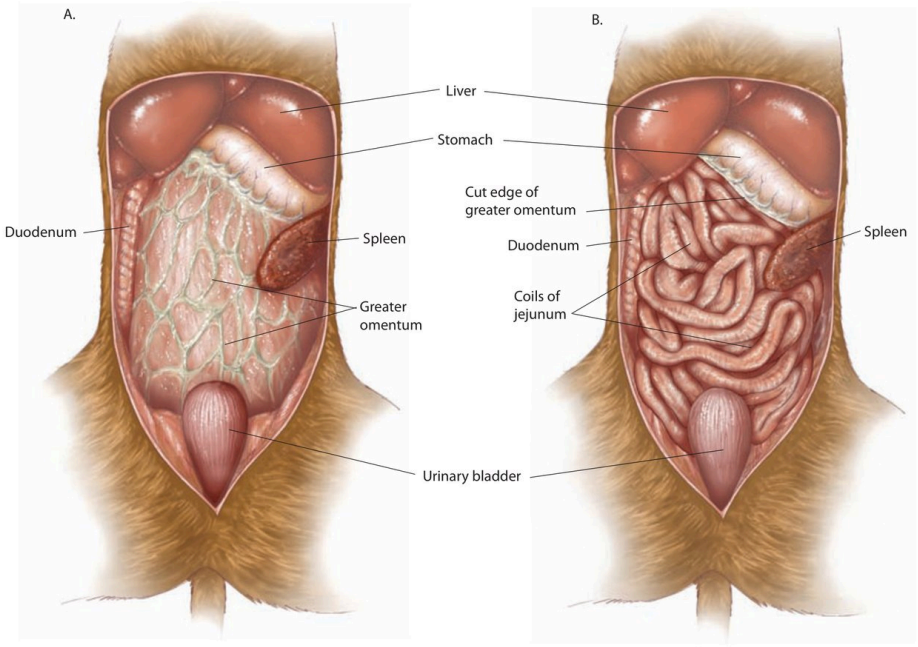

PLATE 1.16 A. Ventral view of dog abdomen with abdominal wall removed. B. View with greater omentum removed. 17

Fig 13 — Ventral view of the abdominal viscera.

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Stomach, liver, spleen, intestines and the urinary organs in their natural positions.

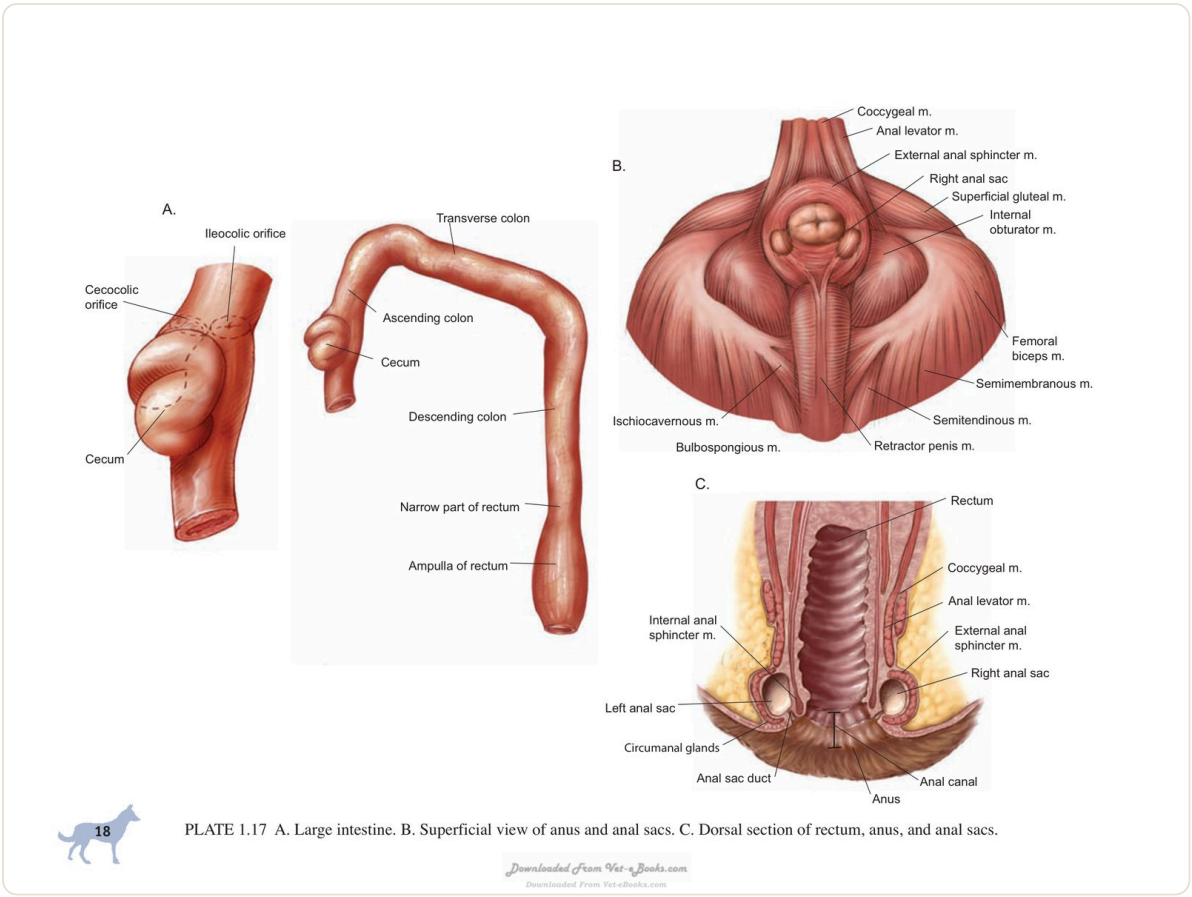

Fig 14 — The large intestine.

The caecum, colon and rectum of the dog.

08 Inside the body cavities

Seeing the organs in place — related to the skeleton and wrapped in their **serous membranes** (pleura around the lungs, pericardium around the heart, peritoneum in the abdomen) — is how you build the mental map for physical examination, imaging and surgery. The thorax holds the heart and the lungs (right lung four lobes, left lung two); the abdomen holds the liver, stomach, spleen, intestines, kidneys and bladder.

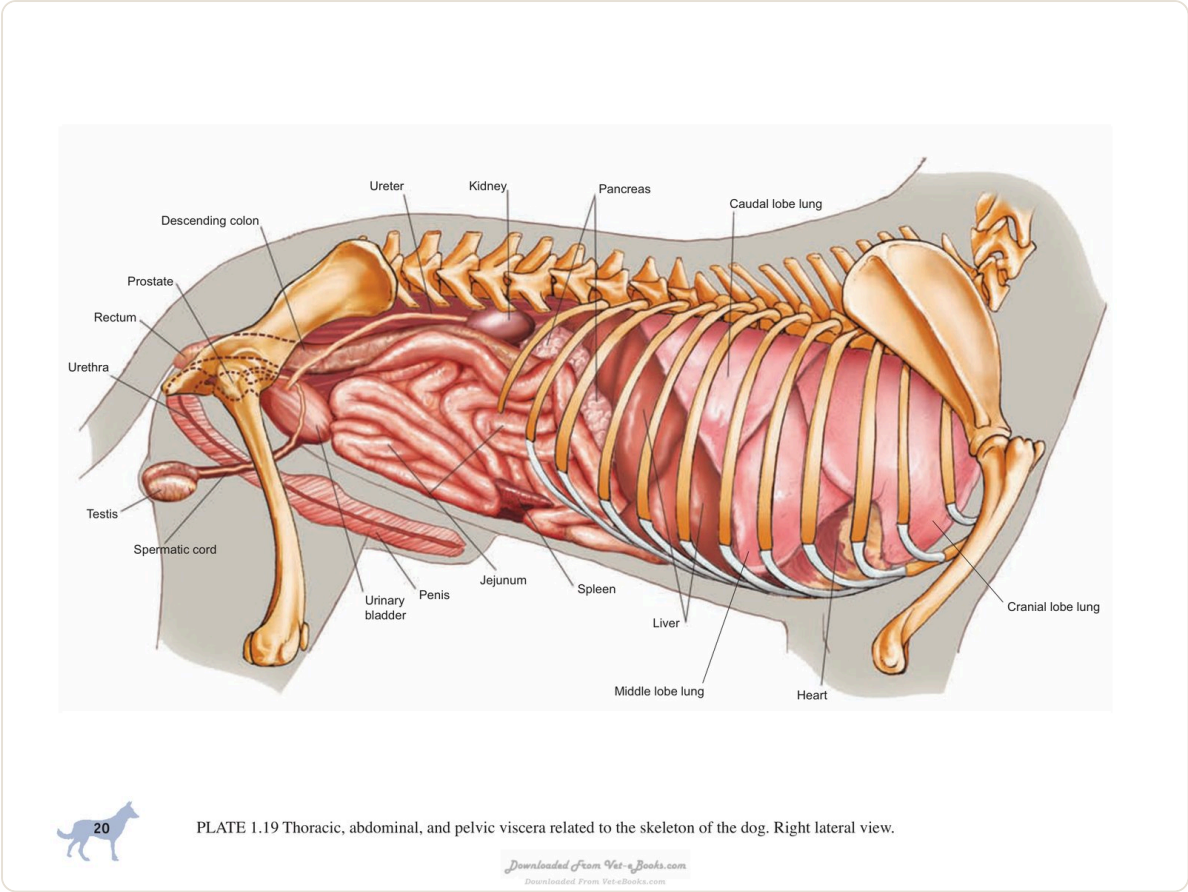

Fig 15 — Thoracic, abdominal and pelvic viscera in situ.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 1.19 (p. 20). Reproduced for educational reference; copyright remains with the original authors and publisher.

The organs against the skeleton: heart and lungs in the thorax; abdominal organs behind.

09 The respiratory and urinary systems

Two systems whose canine anatomy is dominated by one fact: the enormous range of shape between breeds.

The **respiratory system** begins at the nares, passes through the nasal chambers — vastly elaborated in the dog, with a turbinate surface area that supports a sense of smell orders of magnitude better than ours — then the nasopharynx and larynx, down the **trachea**, and into the **bronchi** and bronchioles to the alveoli. The **diaphragm** separates thorax from abdomen and drives quiet breathing. Three breed-shaped problems sit directly on this anatomy: **brachycephalic obstructive airway syndrome**, where a shortened face leaves the soft tissues too big for the skull that holds them; **tracheal collapse** in toy breeds, where the cartilage rings flatten dorsoventrally; and **laryngeal paralysis** in older large breeds, where the arytenoid cartilages fail to abduct on inspiration.

The **urinary system** runs from paired **kidneys** in the dorsal abdomen, through the **ureters** to the bladder, and out via the urethra. In the male the urethra passes through the **prostate** — the only accessory sex gland the dog has, and one that enlarges in almost every entire older male — and then through the **os penis**, a bone whose narrow groove is where urinary calculi characteristically lodge.

Two more structures worth naming because they are so often the reason a dog is presented at all. The **oesophagus** in the dog is striated muscle along its entire length, which is why **megaoesophagus** is a canine problem and why it accompanies generalised neuromuscular disease such as myasthenia gravis. And the paired **anal sacs** sit at roughly four and eight o'clock around the anus, emptying through short ducts onto the anal margin; impaction, infection and abscessation of these is routine general practice, and scooting is the sign that sends the owner in.

10 The reproductive system

Canine reproductive anatomy has two signatures. The male has an **os penis** (a bone within the penis) and a **bulbus glandis** — the erectile bulb that swells to produce the copulatory "tie" — and the **prostate is his only accessory sex gland**. The bitch has a bicornuate uterus with long horns and is a **spontaneous ovulator** (unlike the induced-ovulator cat), cycling roughly every six to seven months with a characteristically long luteal phase.

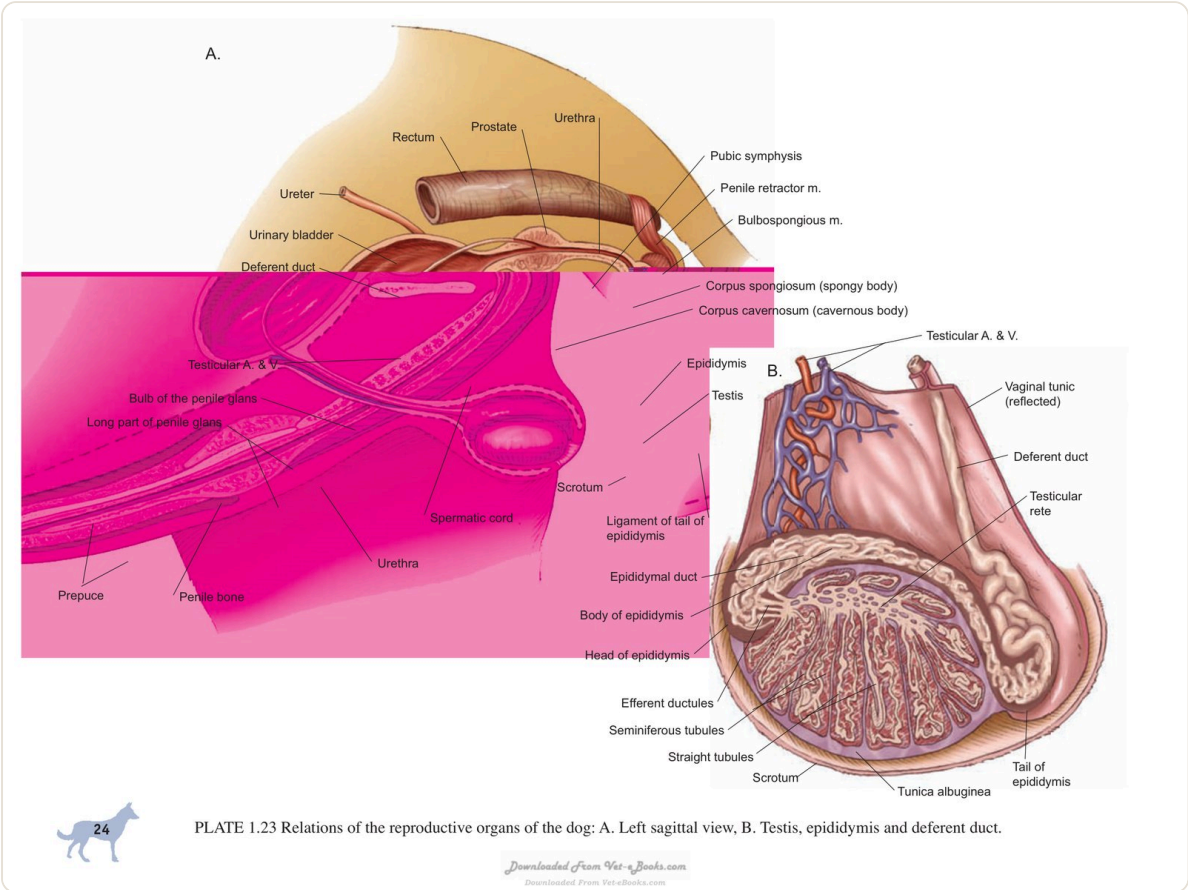

Fig 16 — Reproductive organs of the male dog.

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Testes, epididymis, ductus deferens, prostate and the penis with its os penis and bulbus glandis.

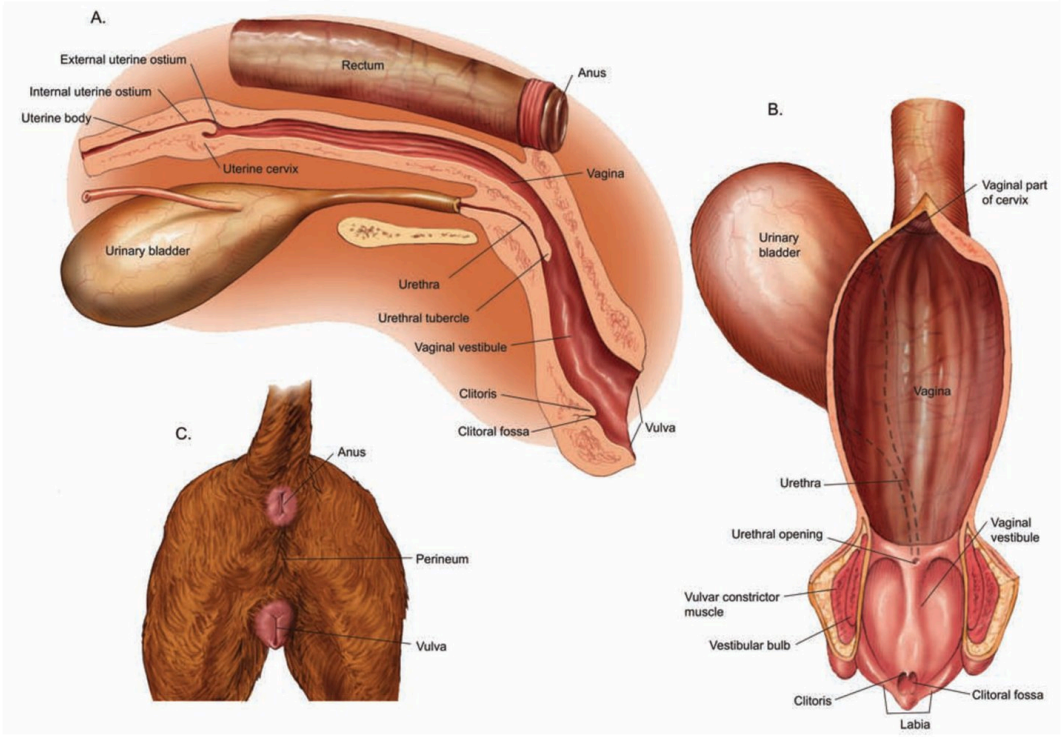

PLATE 1.24 Relations of the reproductive organs of the bitch: A. Sagittal section of uterine cervix, vagina and vulva, B. Dorsal view of female genitalia, C. Caudal view of a female.

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Fig 17 — Reproductive organs of the bitch.

Ovaries, uterine tubes and the bicornuate uterus with its long horns, cervix and vagina.

11 The cardiovascular system

The canine heart is a four-chamber double pump whose resting rate is strongly **size-dependent** — from ~60–100 beats/min in giant breeds to 100–140+ in toy breeds. Two acquired diseases dominate: **myxomatous mitral valve disease** (degenerative valve disease of small breeds, the commonest canine heart disease) and **dilated cardiomyopathy (DCM)** of large and giant breeds.

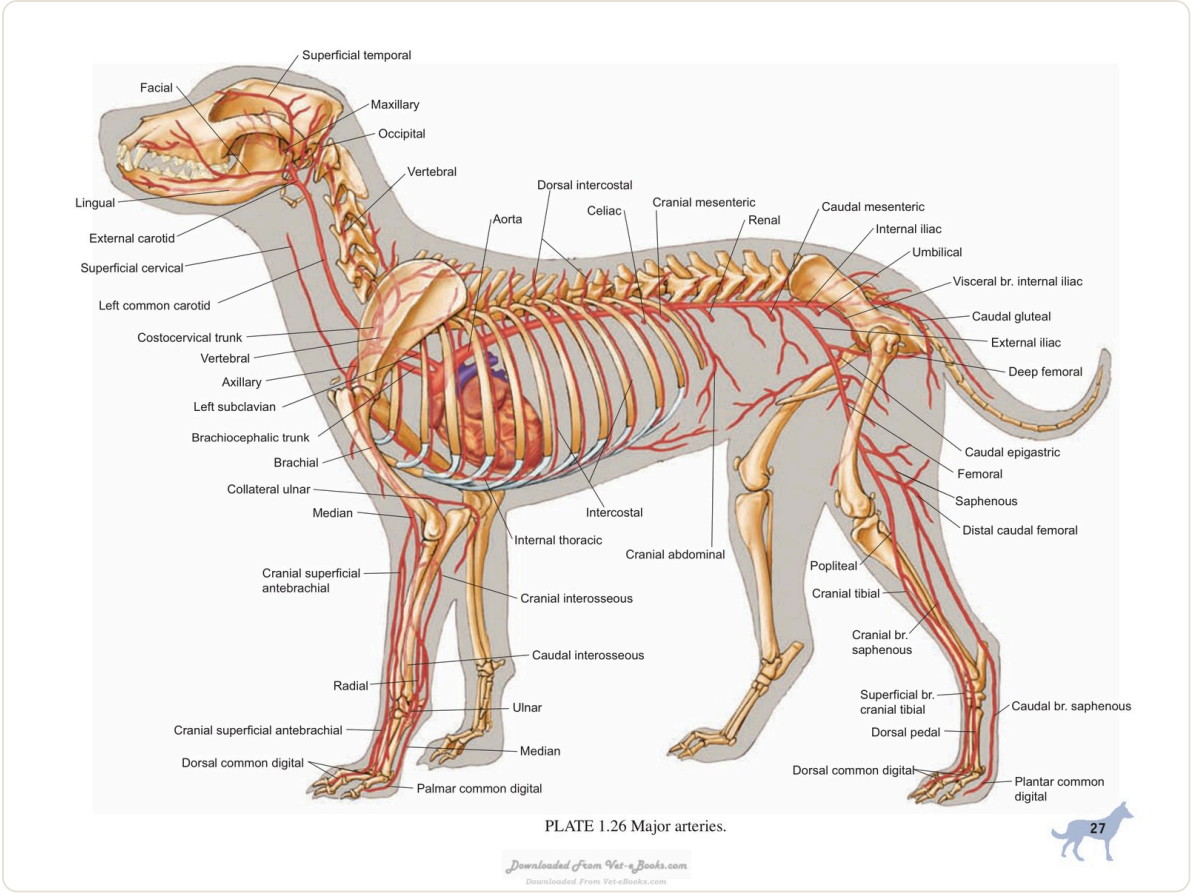

PLATE 1.26 Major arteries.

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Fig 18 — Major arteries of the dog.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 1.26 (p. 27). Reproduced for educational reference; copyright remains with the original authors and publisher.

The heart and aorta with branches to the head, limbs and viscera.

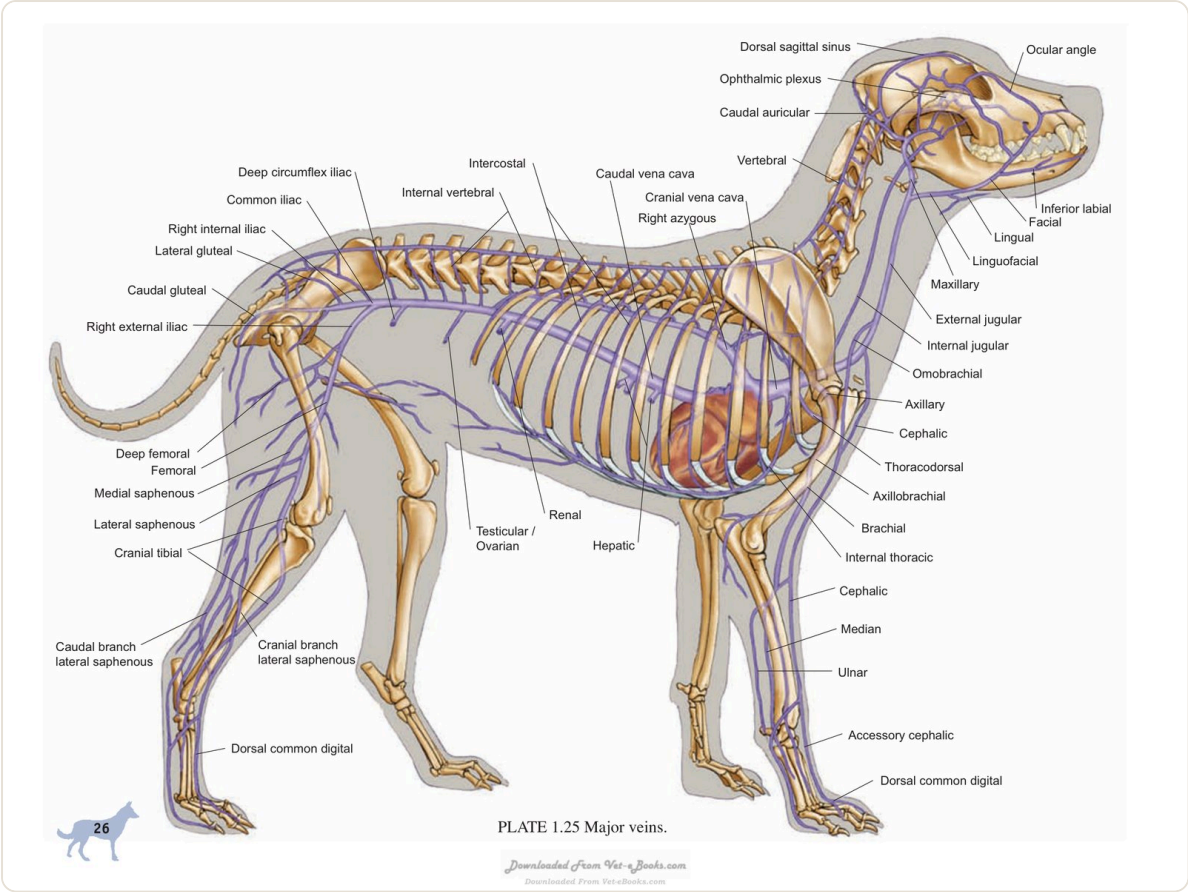

Fig 19 — Major veins of the dog.

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The cranial and caudal venae cavae and the portal system returning blood to the heart and liver.

12 Endocrine & lymphatic systems

The endocrine picture differs from the cat: in the dog, **hypothyroidism** (an under-active thyroid) is common, as is **hyperadrenocorticism (Cushing's disease)** and its mirror image, **hypoadrenocorticism (Addison's)**; the pancreatic islets are the seat of diabetes mellitus. Alongside them, the lymphoid organs — spleen, thymus and the peripheral node chains you palpate on examination — are central to canine lymphoma, one of the commonest canine cancers.

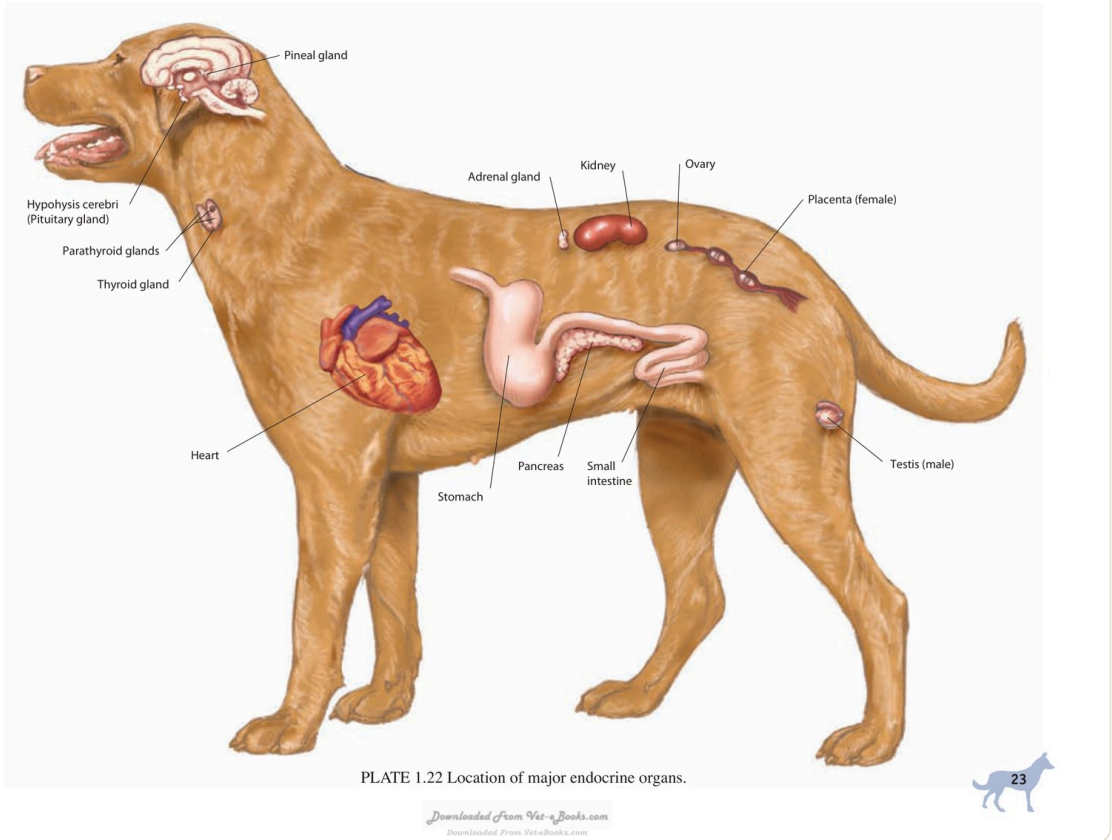

Fig 20 — Location of the major endocrine organs.

Pituitary, thyroid, adrenals and pancreatic islets, with the gonads.

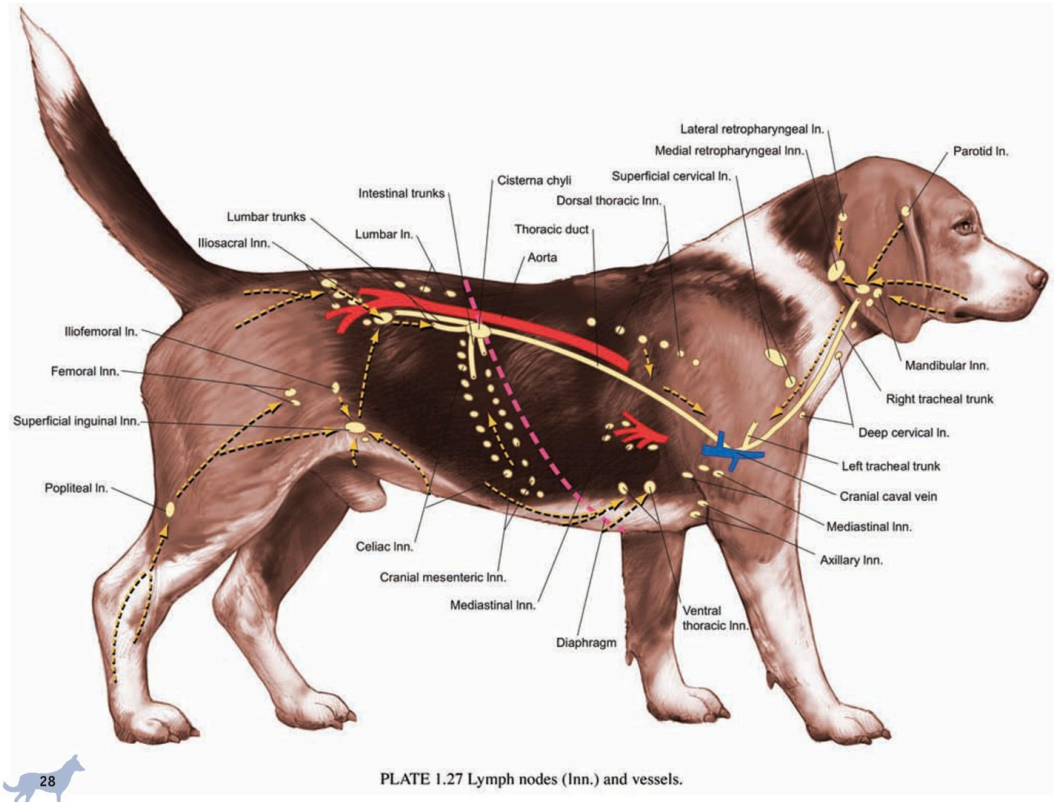

Fig 21 — Lymph nodes and vessels.

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The peripheral lymph-node chains and lymphatic drainage used in the physical exam.

13 The nervous system

The canine brain and spinal cord follow the mammalian pattern, with the prominent olfactory bulbs of a scent hunter. The spinal cord gives off the **brachial and lumbosacral plexuses** that supply the limbs, and the **autonomic nervous system** balances fight-or-flight against rest-and-digest control of the heart, gut, pupil and bladder. Intervertebral disc disease — especially in chondrodystrophic breeds — makes spinal-cord and nerve-root anatomy central to canine neurology.

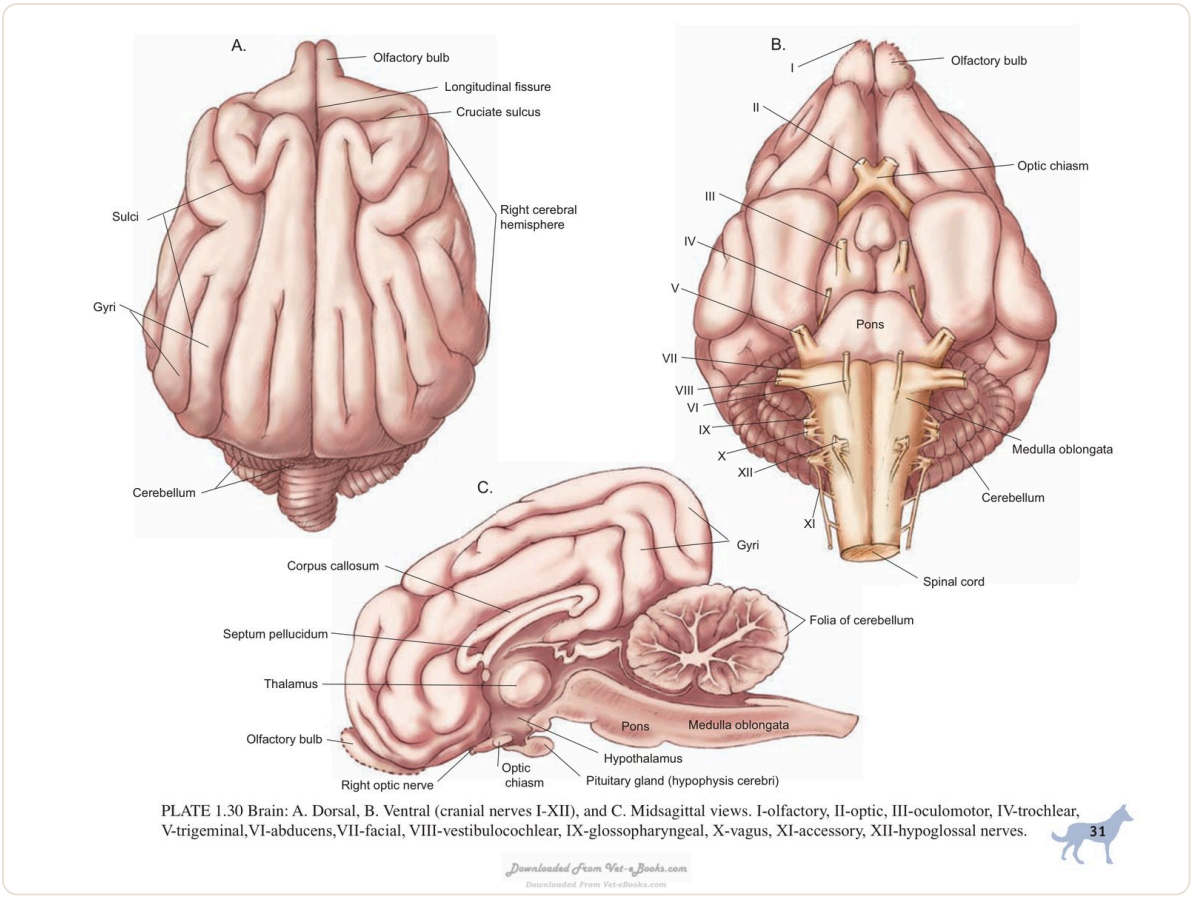

Fig 22 — The brain.

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Cerebral hemispheres, cerebellum and brainstem, the olfactory bulbs, and the roots of the cranial nerves.

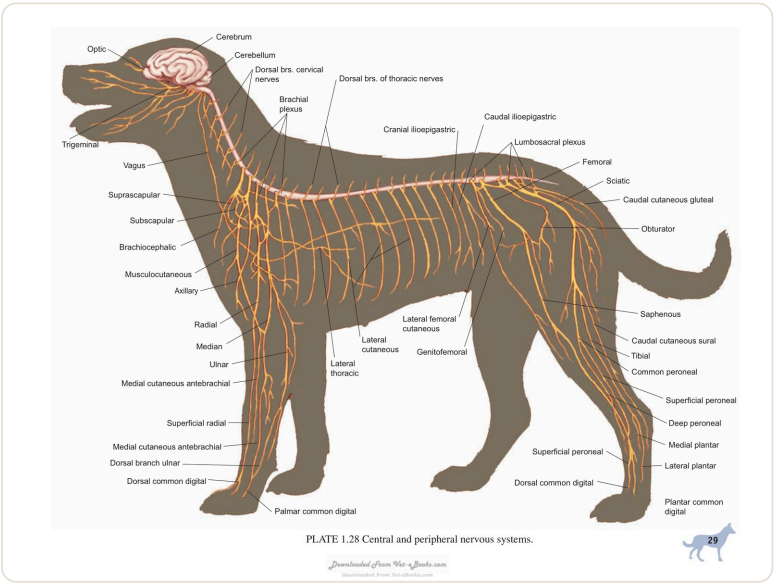

Fig 23 — Central nervous system and spinal nerves.

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The brain and spinal cord with the segmental spinal nerves and the limb plexuses.

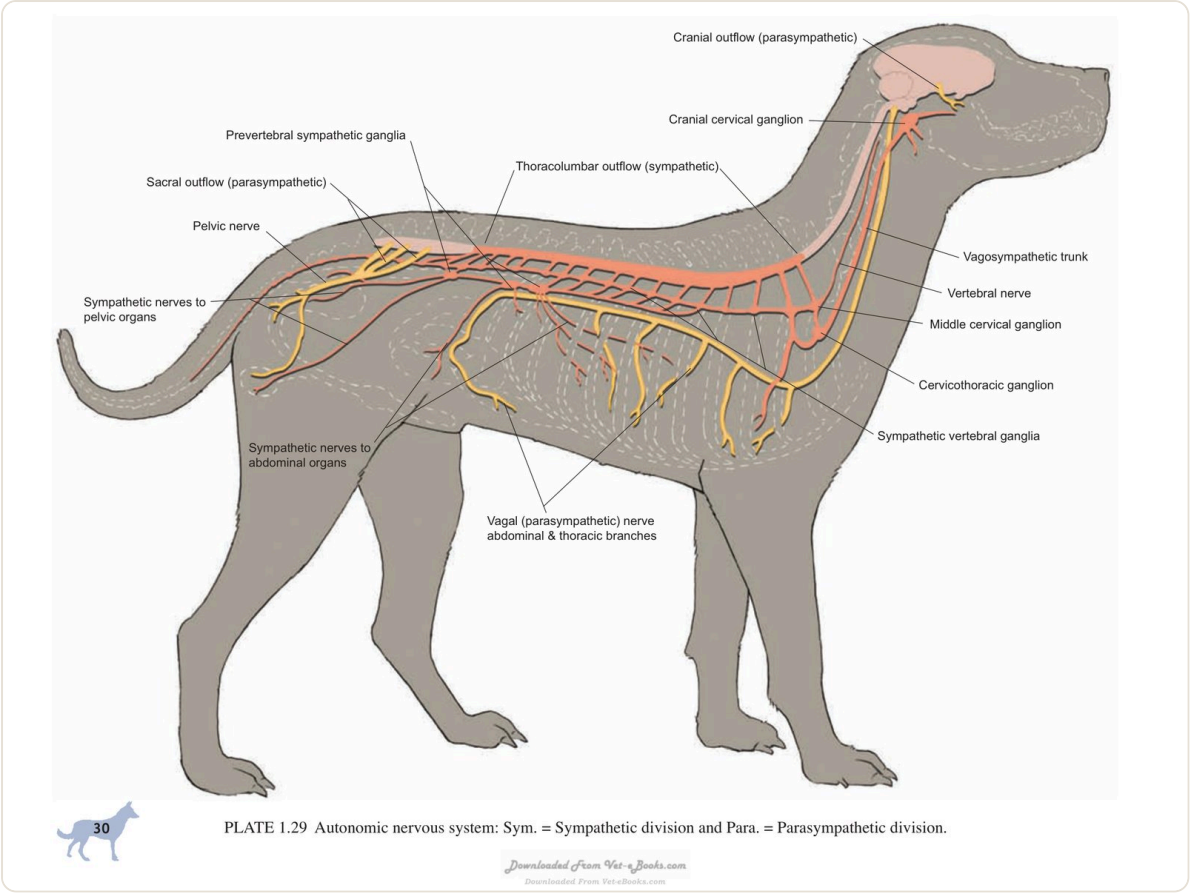

Fig 24 — The autonomic nervous system.

Sympathetic and parasympathetic outflow to the heart, gut, pupil and bladder.

14 Dog anatomy — frequently asked questions

How many bones does a dog have?

About 320, with the exact number depending mainly on tail length — more than the ~230–240 in a cat and the 206 in a human.

Do dogs have retractable claws?

No. Unlike the cat, a dog's claws are non-retractable — blunt and permanently exposed for traction when running and turning.

How many teeth does an adult dog have?

42 permanent teeth (28 deciduous): 2×(I3/3, C1/1, P4/4, M2/3). The shearing carnassials are the upper P4 and lower M1.

What is the os penis?

A bone inside the dog's penis (a baculum). Together with the bulbus glandis — the bulb that swells to form the copulatory "tie" — it is a defining feature of canine male anatomy.

What are the main bones in a dog's skeleton?

In the forelimb: the **scapula** (which in the dog has no bony attachment to the trunk at all — there is no functional clavicle, so the limb is slung in muscle), then the **humerus**, the radius and ulna, and the carpal, metacarpal and phalangeal bones of the paw. In the hindlimb: the pelvis, the **femur**, the patella, the tibia and fibula, and then the tarsus, metatarsals and phalanges. The vertebral column runs 7 cervical, 13 thoracic, 7 lumbar, 3 fused sacral and a variable number of caudal vertebrae, with 13 pairs of ribs.

Why do dogs get anal sac problems?

Anatomy and use. The two **anal sacs** lie at about four and eight o'clock beside the anus and empty through narrow ducts, normally squeezed out by a firm stool passing over them. Soft or small stools do not provide that pressure, so the secretion thickens and the duct blocks — first impaction, then infection, and if it is left, an abscess that ruptures through the skin. Scooting, licking and a sudden turn to the tail base are the signs, and consistently firm faeces are much of the prevention.

Is dog anatomy the same as cat anatomy?

The overall plan is similar, but the clinically important differences are large: 42 vs 30 teeth, non-retractable vs retractable claws, an os penis, spontaneous vs induced ovulation, a more omnivorous gut, and enormous breed variation. For the feline version, see our Cat Anatomy visual guide.

> **When to refer**
>
> - **The bloated, retching large-breed dog** — gastric dilatation-volvulus (GDV), a surgical emergency driven by stomach mobility.
> - **The lame young large-breed dog** — think hip dysplasia (coxofemoral joint) or cranial cruciate ligament rupture (stifle).
> - **The noisy brachycephalic breather** — BOAS, rooted in the shortened skull and soft-tissue crowding.
> - **The small-breed dog with a new murmur** — degenerative mitral valve disease until proven otherwise.

Sources

1. McCracken TO, Kainer RA. *Color Atlas of Small Animal Anatomy: The Essentials*. Wiley-Blackwell — Section 1 (The Dog), Plates 1.3–1.30. Source of the labelled anatomical illustrations, reproduced for educational reference.
2. Evans HE, de Lahunta A. Miller's Anatomy of the Dog. 4th ed. St Louis: Elsevier Saunders — canine systemic and clinical anatomy.
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