

BASIC SCIENCES · ANATOMY · ILLUSTRATED GUIDE

HORSE ANATOMY

# Horse Anatomy: A Visual Guide to Bones, Muscles & Landmarks (PDF)

The illustrated guide to the equine body — bones, muscles, the hoof and the palpable landmarks — section by section, with labelled plates and concise clinical notes. The full companion to the online article at [vet-ebooks.com](https://vet-ebooks.com).

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## IN SHORT

This is a visual, plate-by-plate guide to **horse anatomy** for veterinary students and professionals, focused on what you actually examine and treat: the **skeleton, the skull and teeth, the fore- and hindlimbs, the hoof, the muscles, the stay apparatus and the palpable surface landmarks**. Each labelled equine plate is explained beneath it, with the clinical relevance that makes the horse the most locomotor-defined patient in the clinic.

## KEY POINTS

1. The horse is a large **cursorial herbivore** — a monogastric **hindgut fermenter** built for speed and for standing almost continuously.
2. It is **unguligrade**: each limb stands on the tip of a **single digit (the 3rd)**, capped by the hoof — the extreme of mammalian limb reduction.
3. The forelimb has **no clavicle** and no bony link to the trunk — it is slung by the **syndesmosis** (thoracic sling), which absorbs concussion.
4. The **stay apparatus** (fore) and **reciprocal apparatus** (hind) let the horse lock its limbs and **doze standing up** with almost no muscular effort.
5. Below the carpus and hock there are **no muscle bellies** — **only long tendons**; this is why distal-limb injuries are common and slow to heal.
6. Clinically horse-defining: **lameness** (the hoof and distal limb), **colic** (the long, mobile gut) and dental disease (continuously erupting cheek teeth).

## About the images

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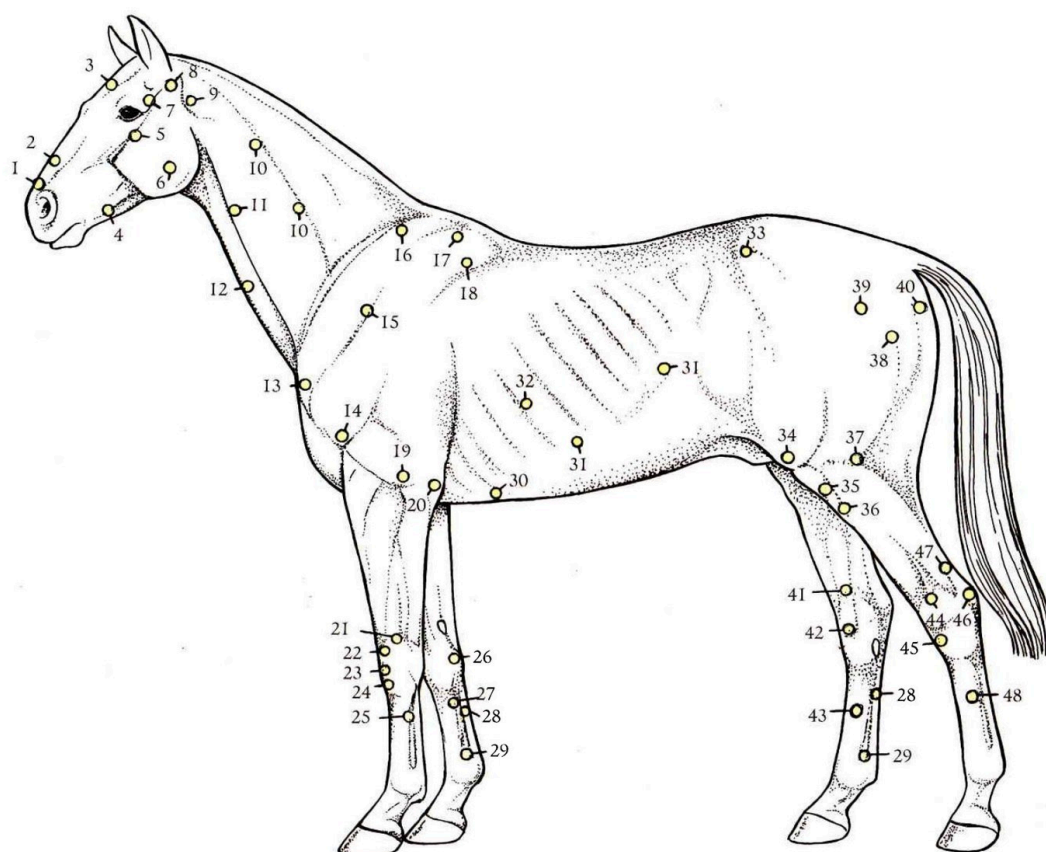
## 01 The points of the horse

Every clinical description of a horse begins with the “**points of the horse**” — the named external regions that let two people describe the same spot on the body without touching it. From the **poll** (the top of the head, between the ears) along the **crest** of the neck to the **withers**, then the back, loin and **croup** to the **dock** of the tail; and down each limb through the **shoulder, elbow, forearm, knee (carpus), cannon,**

**fetlock, pastern and coronet** in front, and the **stifle, gaskin, hock** and cannon behind. Learn this map first: it is the language of the lameness exam, the pre-purchase report and every plate that follows.

FIGURE 3: POINTS OF THE HORSE – Surface Features

Overview 13

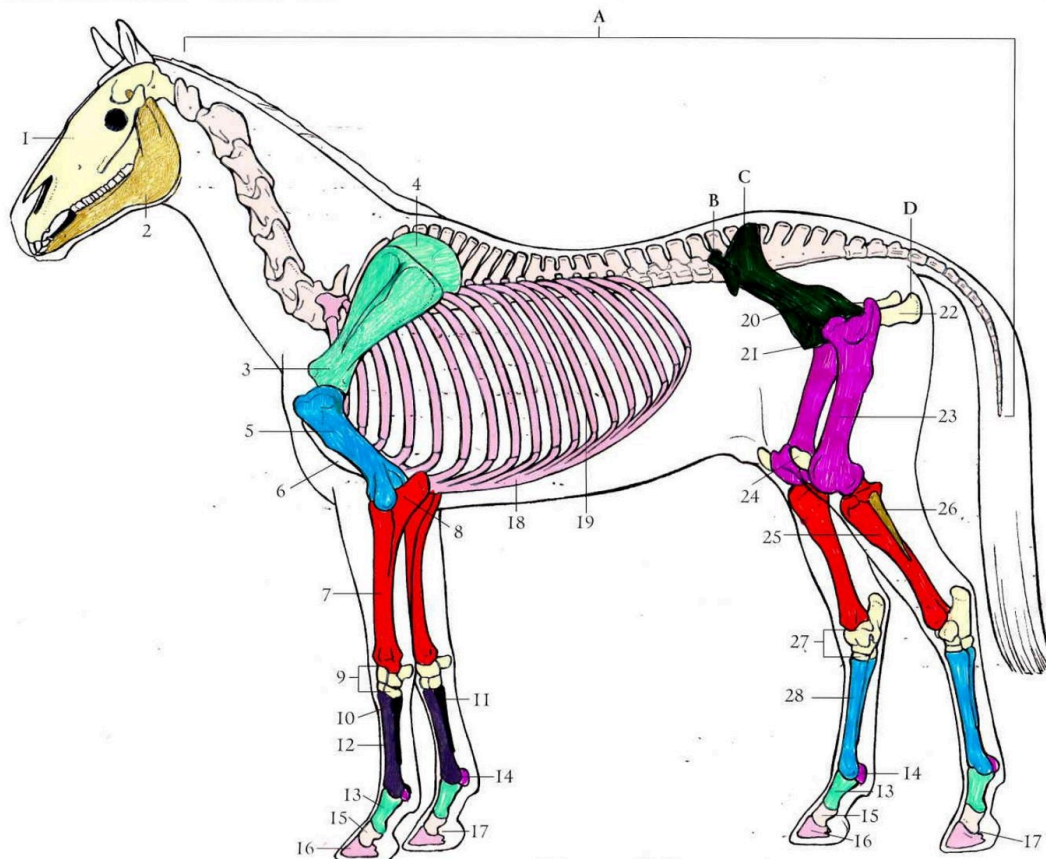


**Fig 1 — The points of the horse.** The named external regions used in every clinical description — poll, crest, withers, back, loin, croup and dock, and the regions of each limb.

Image — Raynor M. The Horse Anatomy Workbook , Figure 3, Points of the Horse. Reproduced for educational reference; copyright remains with the original author and publisher.

## 02 The skeleton

The adult horse has roughly **205 bones**. The vertebral formula is **C7, T18, L6, S5, Cd 15–21** (the Arabian is famously said to run one or two short in the last three regions). Two features dominate equine **bones**. First, there is **no clavicle**: the forelimb has no bony joint with the trunk and is suspended entirely by muscle. Second, the limbs are radically **reduced and elongated** for a long, economical stride — the horse stands **unguligrade** on the tip of its **single third digit**, with the second and fourth metacarpals/metatarsals surviving only as the slender **splint bones**. The result is a light, long lower limb that swings like a pendulum — fast and efficient, but with almost no soft-tissue cover to protect it.

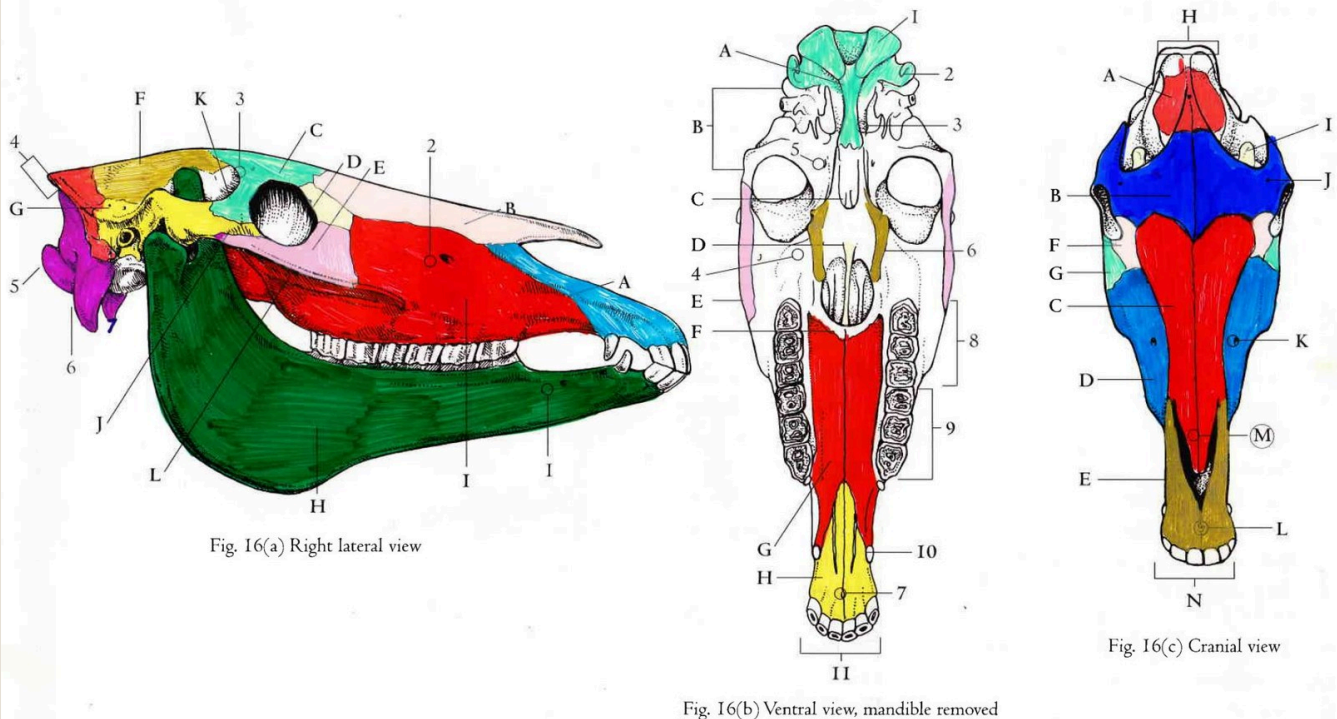


**Fig 2 — The equine skeleton, lateral view.** The skull, the seven-region spine, the rib cage, the shoulder blade and pelvis, and the long reduced limbs ending in a single digit.

Image — Raynor M. The Horse Anatomy Workbook , Figure 4, The Skeleton. Reproduced for educational reference; copyright remains with the original author and publisher.

### 03 The skull, teeth & aging

The equine **skull** is long and deep to house the powerful grinding cheek teeth and the paranasal sinuses. The **teeth** are the horse's defining dental feature: they are **hypsodont** (very high-crowned) and **erupt continuously** through life to compensate for the wear of a fibrous, abrasive diet. The adult count is **36–44** — typically  $2 \times (I3/3, C1-0/1-0, P3-4/3, M3/3)$  — with canines usually present in males and often absent in mares, and a small vestigial first premolar (the “**wolf tooth**”) commonly removed. Because the teeth erupt continuously, they wear into sharp enamel points that need routine **floating (rasping)**, and the changing tables, cups and **Galvayne's groove** let clinicians estimate a horse's age from its mouth.



**Fig 3 — The skull, in lateral, ventral and dorsal views.** The long facial skeleton, the orbit, the paranasal sinuses and the arcade of high-crowned cheek teeth.

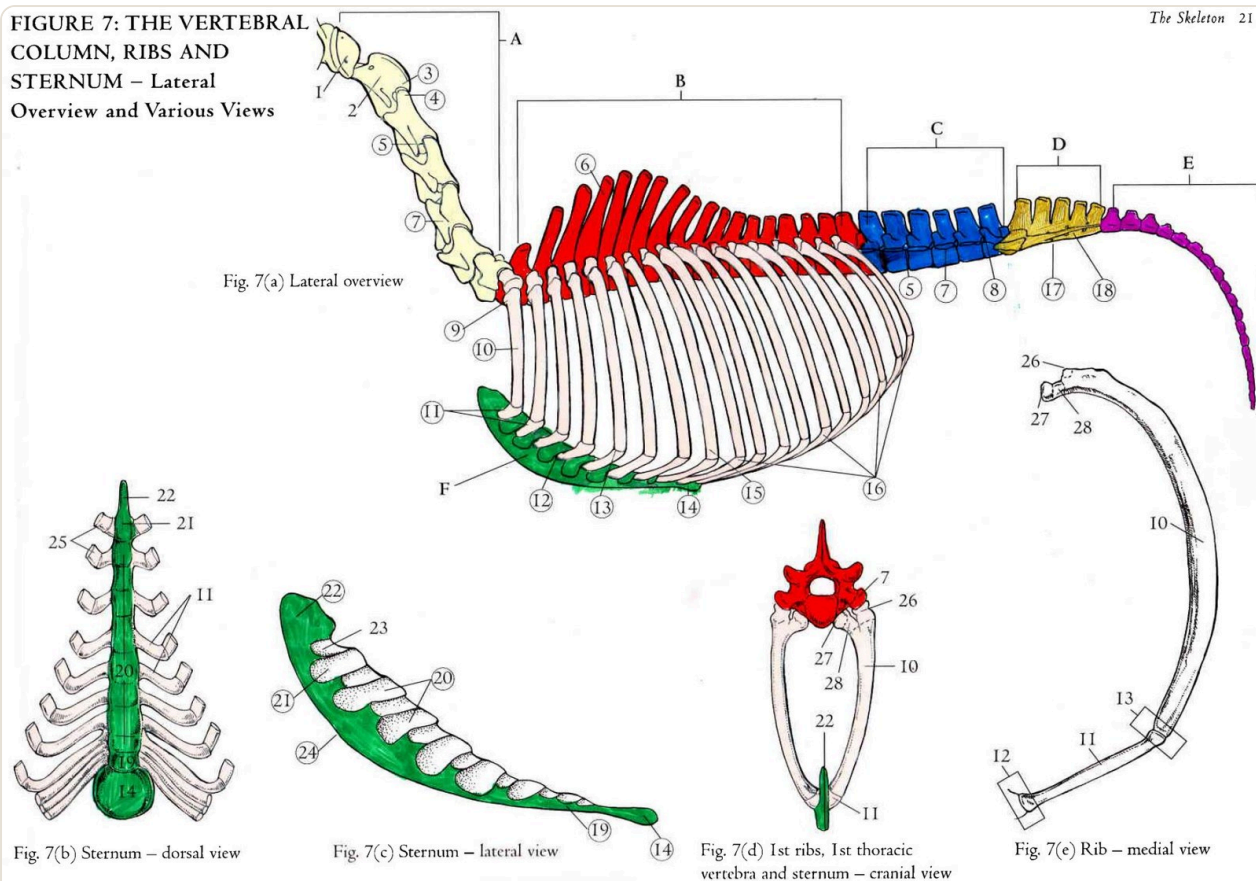
Image — Raynor M. The Horse Anatomy Workbook , Figure 16, The Skull. Reproduced for educational reference; copyright remains with the original author and publisher.

## 04 The spine, back & rib cage

The **vertebral column** turns the horse into a bridge slung between two pairs of legs. The **withers** — the tall dorsal spinous processes of the first thoracic vertebrae (about T3–T9) — anchor the powerful **nuchal ligament** and neck muscles and set the height at which a horse is measured (in **hands**). Eighteen pairs of ribs enclose the thorax; the back (thoracolumbar spine) is relatively rigid and transmits the thrust of the hindlimbs to the front of the horse. The topline's stability matters clinically: “**kissing spines**” (impinging dorsal spinous processes) and sacroiliac strain are common causes of poor performance and back pain.



**FIGURE 7: THE VERTEBRAL COLUMN, RIBS AND STERNUM – Lateral Overview and Various Views**



**Fig 4 — The vertebral column, ribs and sternum.** The cervical, thoracic, lumbar, sacral and caudal regions of the spine, the rib cage and the sternum — and a single thoracic vertebra and rib.

Image — Raynor M. The Horse Anatomy Workbook , Figure 7, The Vertebral Column, Ribs and Sternum. Reproduced for educational reference; copyright remains with the original author and publisher.

## 05 The forelimb

The forelimbs carry roughly **60 % of the horse's weight** and take the brunt of concussion, so they are the seat of most lameness. With no clavicle, the whole limb hangs from the trunk by the **syndesmosis** or **thoracic sling** (serratus ventralis, the pectorals and associated muscles) — a muscular hammock that lets the shoulder blade glide and absorbs shock. From the obliquely set **scapula**, the limb runs through the **shoulder joint**, the **humerus**, the **elbow**, and the fused **radius and ulna** (the ulna reduced to the olecranon, the point of the elbow) down to the carpus. The **point of the shoulder** (greater tubercle of the humerus) and the **point of the elbow** are key palpable landmarks.

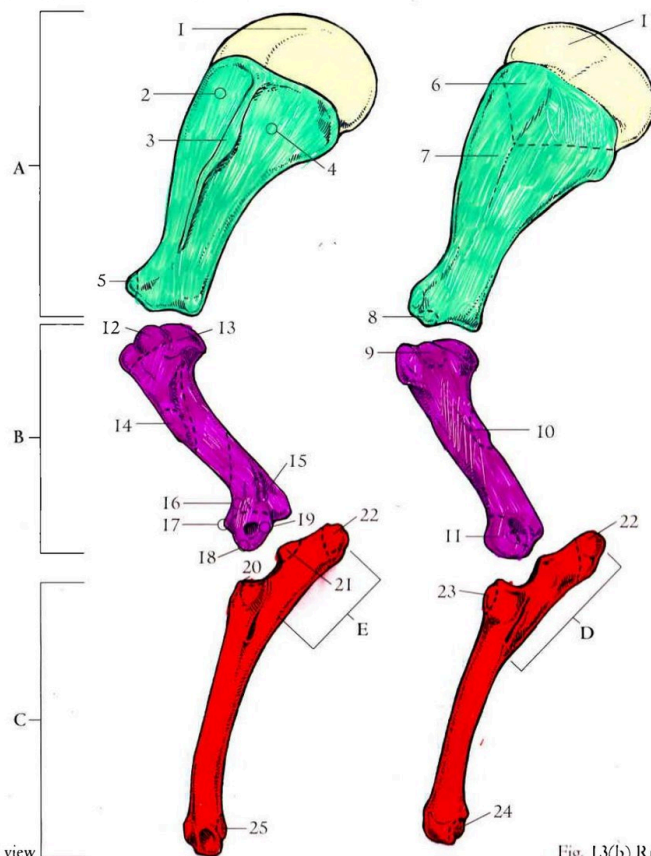


Fig. 13(a) Left shoulder – lateral view

Fig. 13(b) Right shoulder – medial view

**Fig 5 — The shoulder and forearm.** The scapula, humerus and the radius with its reduced ulna — the upper forelimb, shown in lateral and medial views.

Image — Raynor M. The Horse Anatomy Workbook , Figure 13, The Shoulder and Forearm. Reproduced for educational reference; copyright remains with the original author and publisher.

## 06 The cannon, fetlock & digit

Below the carpus (the “knee”) the limb narrows to its unique single-digit design. The **cannon bone** (third metacarpal) is flanked by the vestigial **splint bones** (MC2 and MC4); it meets the long pastern at the **fetlock joint**, behind which sit the paired **proximal sesamoid bones** that act as a pulley for the flexor tendons. The digit itself is three bones — the **proximal (long) pastern (P1)**, **middle (short) pastern (P2)** and **distal phalanx or coffin bone (P3)** — plus the small **navicular bone** behind the coffin joint. Critically, **there are no muscle bellies below the knee and hock**: movement here is driven entirely by long tendons running down from muscles higher up, which is why bowed tendons, suspensory injuries and fractures of this region are so common and so slow to heal.

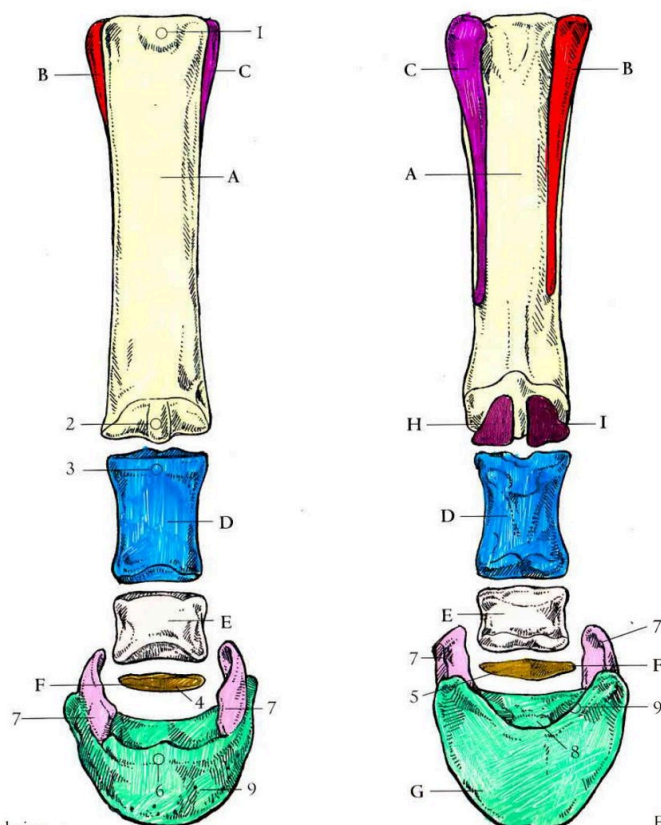


Fig. 15(a) Dorsal view

Fig. 15(b) Palmar view

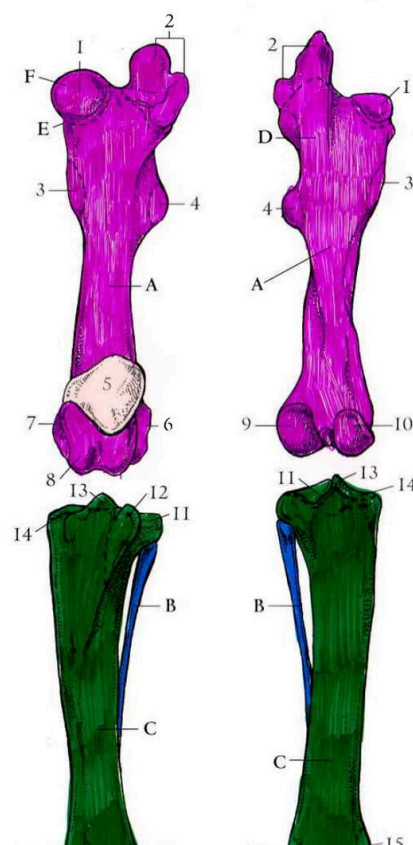
**Fig 6 — The cannon and digital bones.** The cannon (third metacarpal) and splint bones, the proximal sesamoids, and the three phalanges ending in the coffin bone — dorsal and palmar views.

Image — Raynor M. The Horse Anatomy Workbook , Figure 15, Metacarpal and Digital Bones. Reproduced for educational reference; copyright remains with the original author and publisher.

## 07 The hindlimb

The hindlimbs are the **engine**: they generate the propulsion that the rigid back transmits forwards. Power runs from the **pelvis** through the **femur** and the **stifle** (the horse's knee, homologous to ours, complete with a patella) to the **tibia** and the reduced **fibula**, then to the **hock (tarsus)** — whose **point of the hock** (tuber calcanei) is the lever for the powerful common calcanean ("Achilles") tendon. Below the hock the hindlimb mirrors the front: one cannon, one fetlock, one digit. The stifle carries a remarkable trick — the horse can hook its **patella over the medial trochlear ridge of the femur** to lock the joint and rest the limb; when this **upward fixation of the patella** jams intermittently, the limb catches or locks in extension.



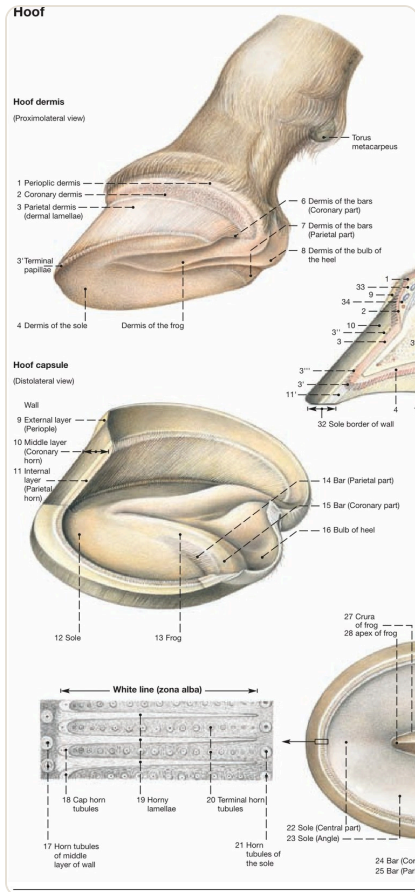


**Fig 7 — The thigh and leg.** The femur, the patella, and the tibia with its reduced fibula — the powered upper hindlimb, in cranial and caudal views.

Image — Raynor M. The Horse Anatomy Workbook , Figure 11, The Thigh and Leg. Reproduced for educational reference; copyright remains with the original author and publisher.

## 08 The hoof

“No foot, no horse.” The **hoof** is a modified digital skin that encases the coffin bone and bears the horse’s entire weight on the tip of one toe. Its **wall** grows down from the **coronary band**; the ground surface shows the **sole**, the wedge-shaped **frog**, the **bars** and the **white line (zona alba)** where wall meets sole. Inside, the sensitive **dermal laminae** interlock with the insensitive horny laminae of the wall to suspend the coffin bone within the capsule — a bond that fails catastrophically in **laminitis**, allowing the bone to rotate or sink. Behind and below sit the **digital cushion** and lateral cartilages, which spread load and pump blood back up the limb with every stride. The **navicular** region within the hoof is the seat of chronic heel pain (navicular syndrome).

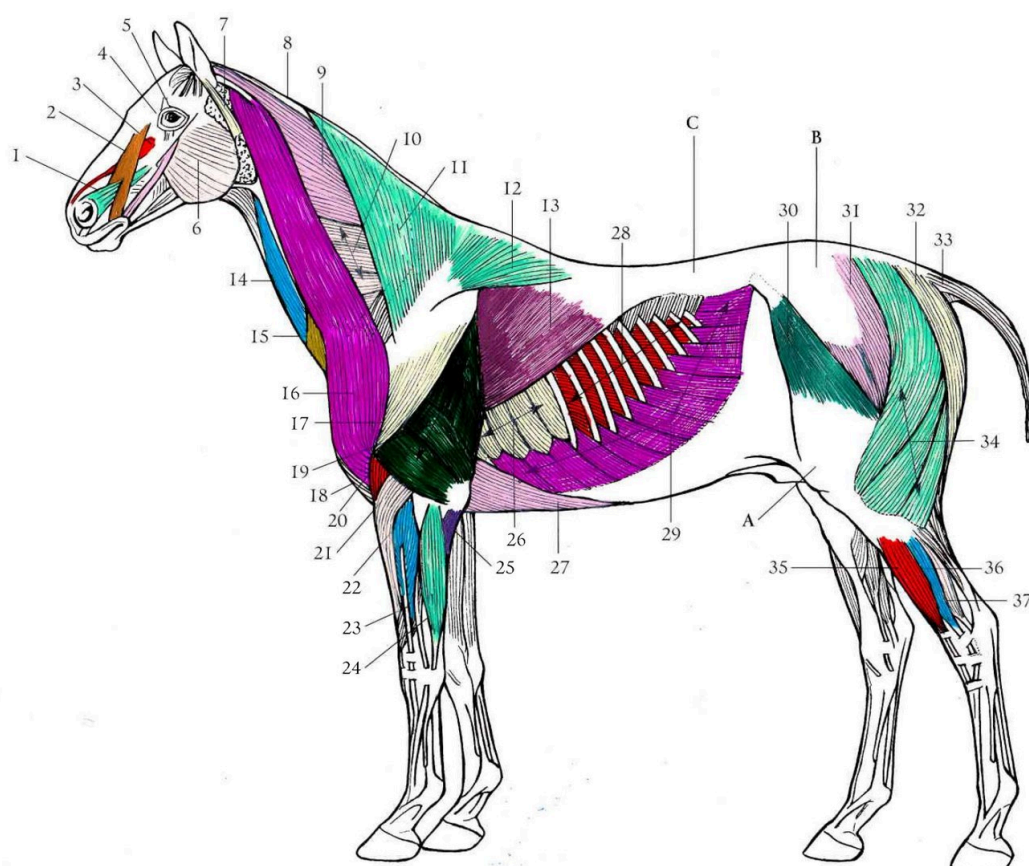


**Fig 8 — The hoof: dermis, sagittal section, capsule and ground surface.** The wall, sole, frog, bars and white line; the sensitive laminae; and the coffin bone and digital cushion within the capsule.

Image — Budras KD, Sack WO, Röck S. Anatomy of the Horse, 6th ed. , "The Hoof (Ungula)". Reproduced for educational reference; copyright remains with the original authors and publisher.

## 09 The superficial muscles

Over the skeleton lies the muscle that gives the horse its shape and its power. The **superficial layer** includes the great locomotor muscles you can see and palpate: the **brachiocephalicus** (swinging the forelimb forward), the **trapezius** and **latissimus dorsi** over the shoulder and back, the **triceps** at the point of the elbow, the **pectorals** of the chest, and behind, the massive hindquarter muscles — the **gluteals** and the "hamstring" group (**biceps femoris**, **semitendinosus**, **semimembranosus**). The **cutaneous muscles** of the skin produce the fly-twitch, and the **external abdominal oblique** sheets the flank. This is the muscle that conditioning builds and that wasting (from disease or lameness) visibly melts away.



**Fig 9 — The superficial muscles, lateral view.** The first muscle layer — brachiocephalicus, trapezius, latissimus dorsi, triceps, pectorals, the abdominal wall and the hindquarter muscles.

Image — Raynor M. The Horse Anatomy Workbook , Figure 24, Superficial Muscles. Reproduced for educational reference; copyright remains with the original author and publisher.

## 10 The deep muscles

Beneath the superficial sheet lie the deep muscles that stabilise the joints and drive the gait. Along the spine, the **epaxial muscles** — chiefly the great **longissimus dorsi** — form the topline and **extend and stabilise the back**, carrying the saddle and rider and coupling hindlimb thrust to the trunk. Deep to the shoulder, the muscles of the sling and the **sublumbar muscles** (iliopsoas) flex the hip, while short deep muscles fine-tune each limb joint. Understanding which layer you are looking at is what lets you interpret muscle wastage, **epaxial pain** and the deep gluteal and stifle muscles involved in hindlimb lameness.

FIGURE 25: DEEP MUSCLES PART 1 – Lateral Overview and Medial Views of Shoulder and Hindquarter

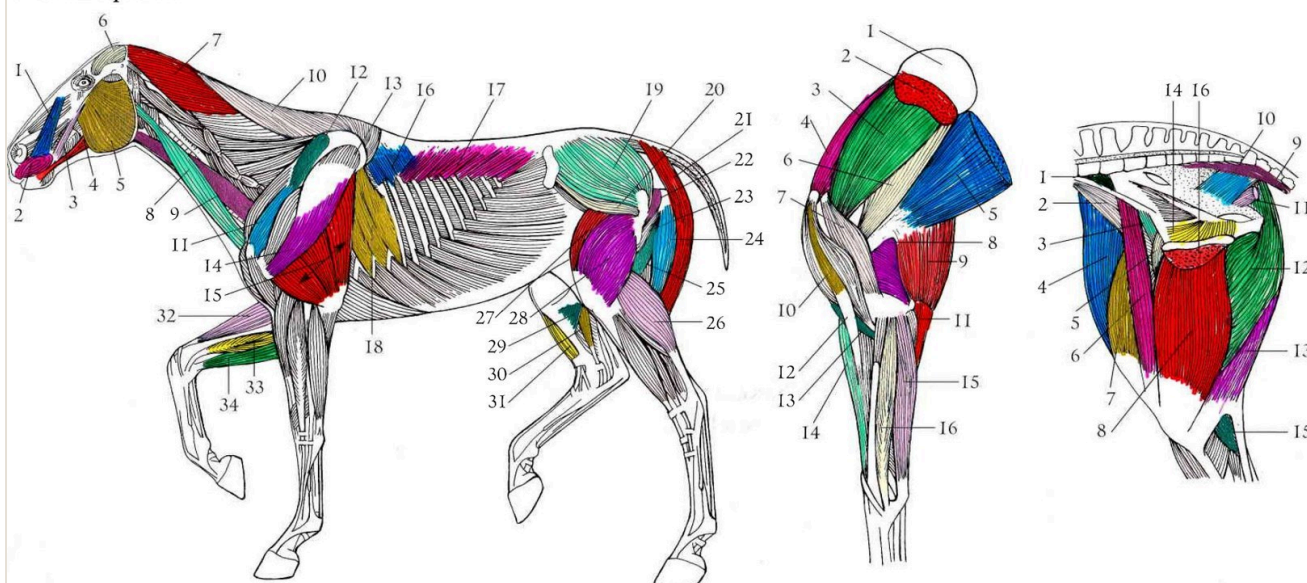


Fig. 25(a) Lateral overview

Fig. 25(b) Right shoulder and forearm (removed from body) – medial view

Fig. 25(c) Hindquarter – medial view

**Fig 10 — The deep muscles.** Beneath the superficial layer — the epaxial back muscles, the deep muscles of the shoulder and hindquarter, and the sublumbar muscles.

Image — Raynor M. The Horse Anatomy Workbook , Figure 25, Deep Muscles. Reproduced for educational reference; copyright remains with the original author and publisher.

## 11 Ligaments & the stay apparatus

The horse's most elegant adaptation is the ability to **stand — and doze — with almost no muscular effort**, sparing energy and keeping it ready to flee. In the forelimb, a passive **stay apparatus** of ligaments and tendons (the **suspensory ligament**, the check ligaments and the digital flexor tendons, with the **lacertus fibrosus**) locks the column of the leg. In the hindlimb, the **reciprocal apparatus** (the peroneus tertius and superficial digital flexor) mechanically links the stifle and hock so they always flex and extend together, and the **patella locks over the femur** to fix the limb. The same suspensory apparatus that supports the fetlock at rest is, under galloping load, the structure that most often breaks down — making it central to equine lameness.



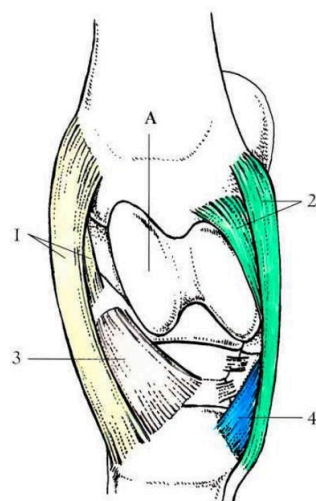


Fig. 23(a) Cranial view

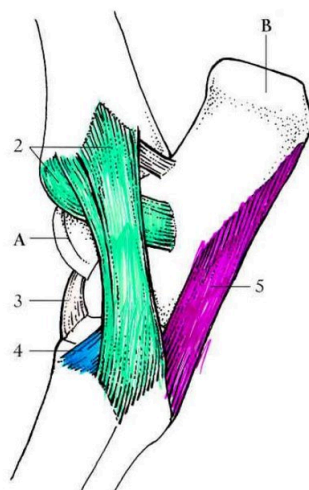


Fig. 23(b) Lateral view

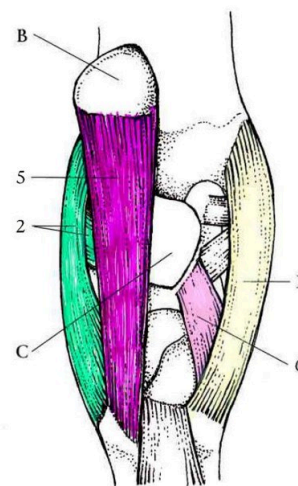


Fig. 23(c) Caudal view

**Fig 11 — Ligaments of the hock (cranial, lateral and caudal views).** The dense ligaments that bind the tarsus — part of the passive apparatus that lets the horse lock its limbs and rest standing up.

Image — Raynor M. The Horse Anatomy Workbook , Figure 23, Ligaments of the Hock. Reproduced for educational reference; copyright remains with the original author and publisher.

## 12 The internal organs: hindgut, airway and guttural pouch

Everything above is the horse as a running machine. Two internal systems complete the picture, and both explain conditions you will meet long before you meet a lameness.

**The horse is a hindgut fermenter, and the anatomy is the disease.** The stomach is small for the animal's size — roughly 8–15 litres — and its cardiac sphincter is so strong that **a horse essentially cannot vomit**; gastric distension therefore ends in rupture rather than relief, which is why nasogastric intubation is a first move in colic rather than a later one. Beyond a long small intestine the fibre (fiber) reaches the **caecum** (cecum) and the **large colon**, together holding well over a hundred litres, where a microbial population ferments cellulose to volatile fatty acids. That huge, heavy, largely unattached organ is free to move: it can displace, it can twist, and at the **pelvic flexure** — where the colon narrows sharply and doubles back on itself — it impacts. Most colic is that anatomy behaving predictably.

**The airway is built around obligate nasal breathing.** The equine soft palate seals below the epiglottis, so a horse breathes through its nose and cannot switch to its mouth — displacement of that palate is itself a performance problem. Air passes the larynx, whose left arytenoid cartilage is abducted by a muscle supplied by the **recurrent laryngeal nerve**. The left nerve is far longer than the right because it loops around the aortic arch, and its length is why left-sided **laryngeal hemiplegia** — "roaring" — is common and right-sided is rare.

**The guttural pouches are unique.** Each is a large air-filled diverticulum of the auditory tube, holding around 300 ml, sitting between the base of the skull and the pharynx. What makes them matter is what runs in their walls: the **internal carotid artery**, and cranial nerves IX to XII. A fungal plaque on that wall — **guttural pouch mycosis** — therefore causes two catastrophic signs that make no sense until you know the anatomy: sudden, severe, often fatal **epistaxis** from arterial erosion, and **dysphagia** from damage to the nerves of swallowing.

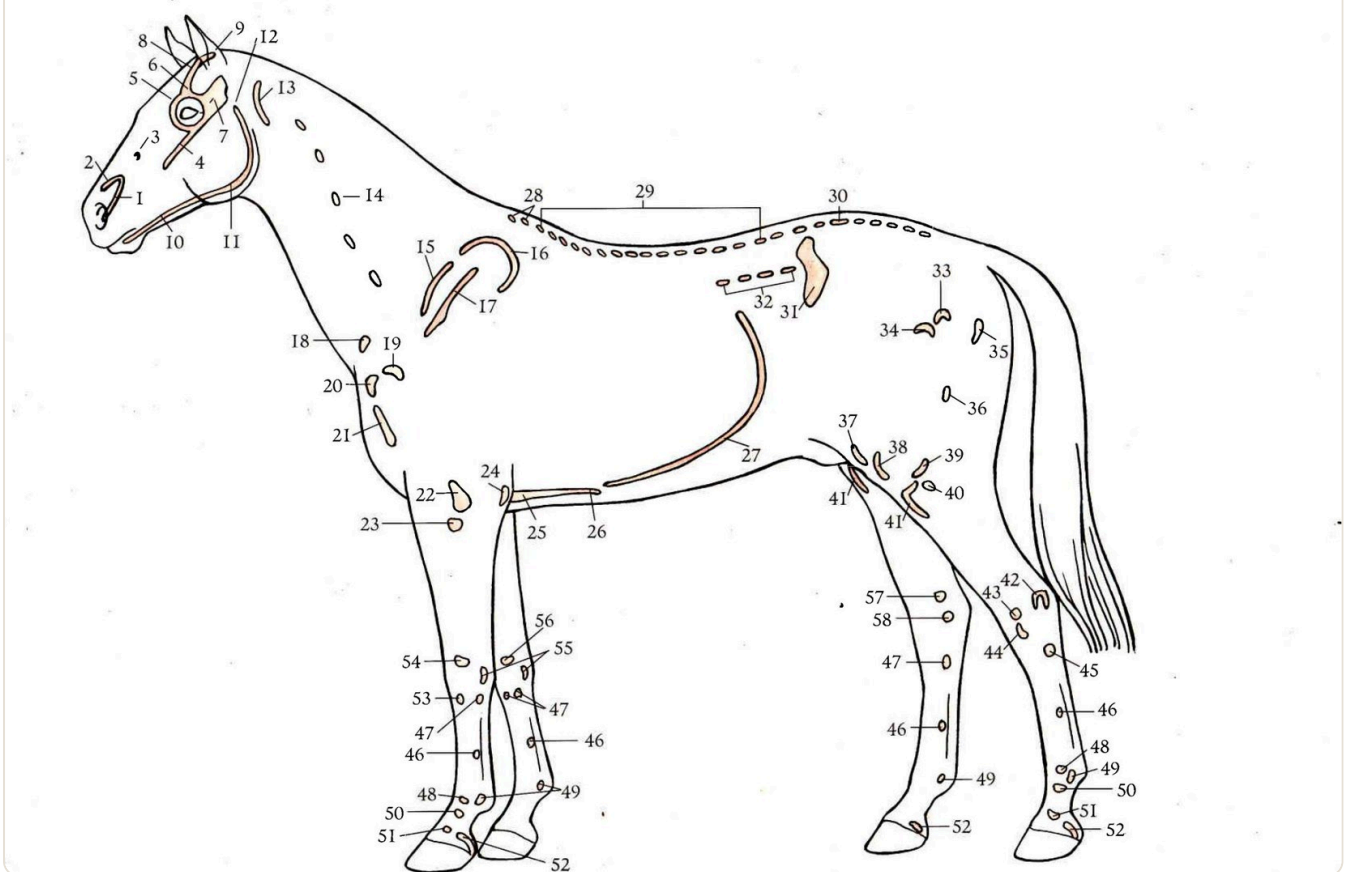
**Two more you can see** The **chestnut** on the medial forearm and the **ergot** at the back of the fetlock are vestigial structures — remnants of the pads and digits of ancestral, multi-toed horses. The chestnut is individual enough to have been used for identification.



## 13 Palpable landmarks & the exam

Because you cannot see inside a horse, the **bony surface landmarks** are the map for every physical examination, nerve block and injection. On the head, the **facial crest** guides the transverse facial venous sinus, and the **jugular groove** carries the jugular vein used for almost every blood sample and IV injection. Along the body you palpate the **point of the shoulder**, **point of the elbow**, **accessory carpal bone**, **point of the hip (tuber coxae)**, **tuber sacrale**, **point of the buttock (tuber ischii)** and the **point of the hock**. Down the limb, feeling the **digital pulse** at the fetlock — and finding it **bounding** — is one of the single most useful signs in equine practice, pointing to laminitis, an abscess or infection in the foot. These landmarks turn the plates above into a working clinical exam.

FIGURE 5: MAJOR PALPABLE SKELETAL FEATURES — LATERAL VIEW



**Fig 12 — Major palpable skeletal landmarks.** The bony points felt through the skin — withers, point of shoulder and elbow, tuber coxae and tuber ischii, point of hock — that guide the clinical exam.

Image — Raynor M. The Horse Anatomy Workbook, Figure 5, Major Palpable Skeletal Features. Reproduced for educational reference; copyright remains with the original author and publisher.

## 14 Horse anatomy — frequently asked questions

### How many bones does a horse have?

About 205 in the adult, though the exact number varies with the tail. That is fewer than the dog (~320), largely because the horse's limbs are reduced to a single functional digit.

### How many toes does a horse have?

Functionally one per limb — the horse walks on the tip of its third digit, capped by the hoof. The second and fourth digits survive only as the vestigial splint bones.

### Why can a horse sleep standing up?

Because of the passive **stay apparatus** (forelimb) and **reciprocal apparatus** plus patellar locking (hindlimb), which let it lock its limbs and rest with almost no muscular effort.

### Why are there no muscles below the knee and hock?

To keep the lower limb light for a long, fast stride, the muscle bellies stay high up and only their long tendons run down the cannon. The trade-off is that these tendons and ligaments are injury-prone and slow to heal.

### How many teeth does a horse have?

Between 36 and 44. The high-crowned cheek teeth erupt continuously to counter wear, which is why horses need routine dental floating and why the teeth can be used to estimate age.

### Why can't a horse vomit?

Anatomy, in three parts: the cardiac sphincter where the oesophagus meets the stomach is exceptionally strong, the oesophagus enters the stomach at an acute angle that acts as a one-way flap, and the equine soft palate seals the oral cavity from the pharynx. The consequence is clinical rather than academic — gas and fluid that cannot come back up will distend the stomach until it ruptures, which is why passing a nasogastric tube is an early step in any colic and not a last resort.

### What is the guttural pouch, and why does it matter?

A large air-filled sac — about 300 ml — that is an outpouching of the auditory tube, sitting under the base of the skull. Horses have them and most other domestic species do not. They matter because the **internal carotid artery** and cranial nerves IX–XII lie in their walls, so disease inside the pouch reaches structures of enormous consequence: **guttural pouch mycosis** classically presents as sudden severe nosebleed, or as difficulty swallowing, and empyema follows strangles infection.

### Is horse anatomy like dog or cat anatomy?

The mammalian body plan is shared, but the horse is radically specialised for running and grazing — a single weight-bearing digit, no clavicle, continuously erupting teeth and a hindgut-fermenting gut. For the small-animal versions, see our Dog Anatomy and Cat Anatomy visual guides.

#### When to refer

- **The lame horse** — most lameness lives in the hoof and distal limb, where long tendons and the suspensory apparatus bear enormous load.
- **The horse with a bounding digital pulse** — think laminitis or foot infection, read straight off the palpable pulse at the fetlock.
- **The colicky horse** — the long, mobile hindgut is prone to displacement, impaction and torsion.
- **The “locking” hindlimb** — intermittent upward fixation of the patella, the stay apparatus caught mid-lock.

## Sources

1. Raynor M. *The Horse Anatomy Workbook*. Source of the labelled skeletal, muscular and landmark plates (Figures 3–25), reproduced for educational reference.
2. Budras KD, Sack WO, Röck S. *Anatomy of the Horse, 6th ed.*. Schlütersche — source of the hoof plate and equine clinical-functional anatomy.
3. Baker GJ, Easley J. Equine Dentistry; and König HE, Liebich HG. Veterinary Anatomy of Domestic Animals — equine dentition, systemic and clinical anatomy.

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