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HORSE HOOF ANATOMY

Horse Hoof Anatomy: The Foot and Distal Limb Explained (PDF)

The foot and distal limb, worked from the outside in — wall, sole and frog; the bones, tendons and ligaments; the laminae that suspend the coffin bone; the coria that make the horn; and the condition each structure explains. Companion to the article at vet-ebooks.com.

Contents

The 12 sections of this guide, in order.

IN SHORT

Horse hoof anatomy only makes sense when you stop treating the hoof as a boot and start treating it as the *end of the limb*. This guide works outside-in with labelled atlas plates: the parts you can see on a picked-out foot, the three layers of the **wall**, the tendons and ligaments arriving from above, the four bones of the digit, and then the structures hidden inside the capsule — the **laminae** that suspend the **coffin bone**, the five **coria** that make the horn, the **navicular apparatus**, and the **digital cushion** that pumps blood back up the leg. Each piece of anatomy is then cashed out into the condition it explains: laminitis, navicular syndrome, abscess, thrush, corns, cracks and sidebone. Free illustrated PDF included.

KEY POINTS

1. The **coffin bone (P3) is suspended** from the inside of the wall by interlocking lamellae — it does not rest on the sole. That single fact explains laminitis.
2. The **wall has three layers**; only the middle one (tubular horn) is thick enough to hold a nail.
3. The **coronet** is the growth zone. Injure it and the defect grows all the way down.
4. The **white zone** is the wall-sole junction: the nail line for the farrier and the way in for abscesses.
5. The **deep digital flexor tendon** runs over the navicular bone to reach P3 — which is why it features in both navicular syndrome and laminitic rotation.
6. The foot has no muscle. The **frog, digital cushion and ungular cartilages** form a pump driven by loading, so movement is part of hoof health.
7. The sole **protects**; the wall **bears weight**. Reversing those roles bruises feet.

About the images

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No structure in the horse carries so much weight on so little tissue. A half-tonne animal balances on four keratin boxes, each one the size of a fist, and almost every serious lameness a horse will ever have starts inside one of them. That is why **horse hoof anatomy** is worth learning properly rather than as a list of names on a diagram.

This guide is written for two readers at once: the owner or student who wants to understand what the farrier and vet are pointing at, and the veterinary student who needs the structures named correctly. It works from the outside in — the parts you can see on a picked-out foot, then

the wall, then the limb arriving from above, then everything hidden inside the capsule — and every section ends by cashing the anatomy out into a condition. It pairs with our whole-body Horse Anatomy guide, and sits alongside the rest of our anatomy articles.

01 The parts of the hoof: what you see on a picked-out foot

Start with the ground surface, because that is what you look at every day. Pick the foot up and the whole external vocabulary is in front of you: the **wall** running round the outside and turning in at the heels to form the **bars**; the concave **sole**; the wedge-shaped **frog** in the middle with its grooves; and the pale **white zone** tracing the join between sole and wall.

Fig 1 — The parts of the hoof, solar view. The whole external map on one specimen. **1** bulbs of the heel; **2** coronet; **3** and **7** the lateral and medial **paracuneal sulci**; **4** and **6** the two **crura of the frog** either side of **5** the **central sulcus**; **12** the **apex of the frog**; **8** and **11** the **angles of the sole** (the seat of corn); **9** and **10** the lateral and medial **bars**; **13–15** the crura and central part of the **sole**; **16** the **white zone**; **17** the **hoof wall** (stratum medium).

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.72, left hoof, solar view. Reproduced for educational reference.

PART	WHERE IT IS	WHAT IT DOES
Hoof wall	The whole outer shell, from **coronet** down to the ground. Divided into **toe**, **quarters** and **heels**	Takes most of the load, grows continuously downward from the coronet, and carries the nails when the horse is shod
Coronet (coronary band)	The junction of hairy skin and hoof at the top of the wall	The growth zone. Damage here permanently scars the wall that grows down from it
Periople	A narrow soft band just below the coronet, continuing over the **bulbs of the heel**	The hoof's natural varnish — a thin outer layer limiting moisture loss from the wall
Bars	The wall turns inward at the heels and runs forward either side of the frog	Weight-bearing struts that brace the heels and stop them collapsing inward
Sole	The concave plate covering the underside, with **angles** (the seat of corn) between wall and bar	Protects the structures above. It is **not** designed as the main weight-bearer — a flat or thin sole bruises

PART	WHERE IT IS	WHAT IT DOES
Frog	The wedge in the middle, with an **apex**, two **crura**, a **central sulcus** and two **paracuneal (collateral) sulci**	Traction, shock absorption, and the trigger for the hoof's blood pump. The sulci are where **thrush** takes hold
White zone (white line)	The junction between sole and wall, visible on the trimmed foot as a pale band	Marks the safe limit for nail placement. A widened, crumbling zone is the route for **white line disease** and gravel
Bulbs of the heel	The two soft prominences at the back	The palpable back of the foot, overlying the digital cushion

One difference worth knowing before you start comparing feet: **front and hind hooves are not the same shape.** The forefoot is **rounder and wider**, with a flatter sole and a more open angle — it carries the greater share of the horse's weight — commonly put at about sixty per cent — so it is built to spread load. The hind foot is narrower, more **oval or pointed** at the toe, with a more concave sole and a steeper wall angle, suited to gripping and driving. Judging a hind foot by a front foot's proportions is a common beginner's error.

> **'White line' or 'white zone'?**
>
> Farriers and owners almost always say *white line*; anatomists write *white zone* (*zona alba*). They are the same structure — the junction between sole and wall, made of the soft terminal horn produced at the bottom of the lamellae. Whichever word you use, it is both the farrier's nail guide and the commonest route for infection into the foot.

02 The wall and its three layers

The wall looks like one solid piece of horn. It is actually three layers, made by three different parts of the sensitive foot, and they behave very differently.

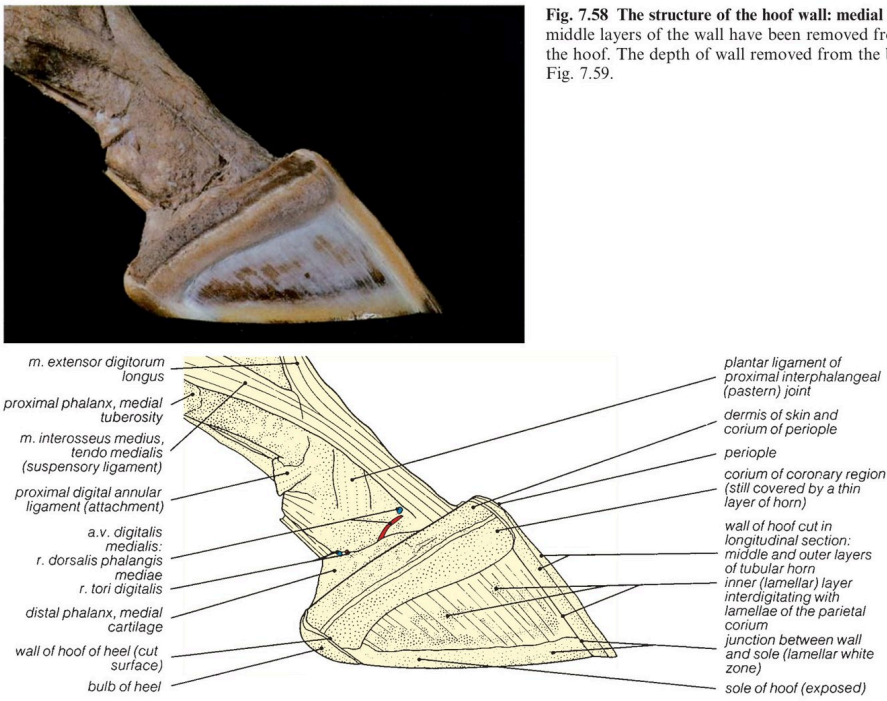

Fig. 7.58 The structure of the hoof wall: medial view (2). The outer and middle layers of the wall have been removed from the medial quarter of the hoof. The depth of wall removed from the bearing surface is shown in Fig. 7.59.

Fig 2 — The structure of the hoof wall. The outer and middle layers have been cut away from the medial quarter so the wall can be read in section. Follow the labels down the right: **periople**, then the **corium of the coronary region**, then the wall cut in longitudinal section showing the **middle and outer layers of tubular horn** and, beneath them, the **inner (lamellar) layer interdigitating with the lamellae of the parietal corium**. At the bottom, the **junction between wall and sole (lamellar white zone)** and the exposed **sole**. Note also the **distal phalanx, medial cartilage** at the back of the foot.

LAYER OF THE WALL	WHAT IT IS	WHY IT MATTERS
Outer layer stratum externum	A thin varnish-like layer produced by the **perioplic corium** just under the coronet	Waterproofing. Rasping it away at the toe dries the wall out
Middle layer stratum medium	The thick bulk of the wall — **tubular horn**, made of countless horn tubules in a cementing intertubular horn, produced by the **coronary corium**	This is the load-bearing wall and the layer that holds a nail. It carries any pigment, so a 'white' foot differs only in colour, not strength
Inner layer stratum internum / lamellatum	Several hundred **epidermal (horny) lamellae** running vertically down the inside of the wall	These interdigitate with the **dermal lamellae** of the parietal corium. That interlock is what suspends the horse inside its own hoof — and what fails in **laminitis**

Two practical consequences follow. First, the wall grows **downward from the coronet**, slowly — a hoof takes the better part of a year to replace itself at the toe, and rather less at the heel — so anything that damaged the coronary corium months ago is still marching down the wall today. Second, because the **middle layer** is the only part with real substance, thinning it by over-rasping the outer wall genuinely weakens the foot.

03 The distal limb above the hoof

Before naming anything, fix the single fact the whole region is built around: **the horse stands on the tip of one finger.** Over evolutionary time the side digits were lost, and what remains below the knee and hock is the **third digit** alone. The **cannon bone** is the third metacarpal (or metatarsal); the **splint bones** either side of it are the shrunken remains of the second and fourth. The **ergot** — the small horny lump in the tuft at the back of the fetlock — is the vestige of the **metacarpal (or metatarsal) pad**, and the **chestnut** higher up the limb the vestige of the **carpal (or tarsal) pad** — leftovers from an ancestor that met the ground with more than one toe. Everything below the fetlock is therefore one finger, doing the work of a whole foot.

Everything inside the hoof is continuous with that limb, and a surprising amount of it can be identified with your hands on a standing horse. This is the single most useful figure in the article for anyone learning to examine a limb.

Fig. F.1 **Lateral and medial aspects of the equine distal limb: palpable anatomical structures.**

1- Third metacarpal bone; 2- Fourth metacarpal bone, 2a- body, 2b- distal end; 3- Second metacarpal bone, 3a- body, 3b- distal end; 4- Dorsal digital extensor tendon; 5- Lateral digital extensor tendon; 6- Third interosseous muscle (suspensory ligament), 6a- body, 6b- lateral branch, 6c- lateral extensor branch, 6d- medial branch, 6e- medial extensor branch; 7- Deep digital flexor tendon and accessory ligament; 8- Superficial digital flexor tendon, 8a- lateral branch, 8b- medial branch; 9- Lateral collateral ligament of the fetlock; 10- Medial collateral ligament of the fetlock; 11- Dorsal capsule of the fetlock; 12- Base of the lateral proximal sesamoid bone; 13- Base of the medial proximal sesamoid bone; 14- Neurovascular anastomosis; 15- Lateral proper palmar digital vessels; 16- Medial proper palmar digital vessels; 17- Ergot; 18- Proximal phalanx; 19- Middle phalanx, 19a- lateral tubercle of the flexor tuberosity; 20- Coronet; 21- Distal pastern fossa; 22- Lateral ungular cartilage; 23- Medial ungular cartilage; 24- Hoof wall, 24a- toe, 24b- lateral quarter, 24c- lateral heel, 24d- medial quarter, 24e- medial heel.

Fig 3 — The distal limb: what you can actually feel. A live horse, plain on the left and labelled on the right. Running down the back: **6** the **suspensory ligament** with its **6a** body, **6b/6d** branches and **6c/6e** extensor branches; **7** the **deep digital flexor tendon and its accessory ligament**; **8** the **superficial digital flexor tendon**. At the fetlock, **12** and **13** the bases of the **proximal sesamoid bones**, **9** and **10** the **collateral ligaments**, and **17** the **ergot**. Below: **20** the **coronet**, **22** and **23** the **ungular cartilages**, and **24** the hoof wall divided into **24a** toe, **24b/24d** quarters and **24c/24e** heels. **15** and **16** are the **palmar digital vessels** — where you feel a digital pulse.

Image — Barone R, Simoens P et al. Essentials of Clinical Anatomy of the Equine Locomotor System — Fig F.1, lateral and medial aspects of the equine distal limb: palpable anatomical structures. Reproduced for educational reference.

The digital pulse.

The **palmar (or plantar) digital arteries** run down either side of the pastern with their veins and nerves, just where labels 15 and 16 sit. In a healthy foot the pulse there is hard to find. A *bounding* digital pulse means increased blood flow or pressure inside the capsule — the classic early sign of **laminitis** or of a brewing **abscess**. It is the single most useful thing an owner can learn to palpate.

04 Tendons, ligaments and the suspensory apparatus

The horse stands on one digit, and it stands on it for most of the day. That is only possible because the fetlock is supported by a spring — the **suspensory apparatus** — that stores and returns energy without muscular effort.

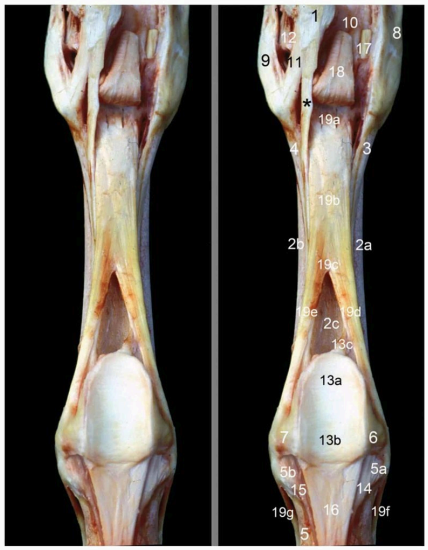

Fig. E.9 **Palmar aspect of the metacarpus after removal of the flexor tendons: left forelimb.**

Bones: 1- Accessory carpal bone; 2- Third metacarpal bone, 2a- medial aspect, 2b- lateral aspect, 2c- palmar aspect; 3- Second metacarpal bone; 4- Fourth metacarpal bone; 5- Proximal phalanx, 5a- medial palmar eminence, 5b- lateral palmar eminence; 6- Base of the medial proximal sesamoid bone; 7- Base of the lateral proximal sesamoid bone;

Joints: 8- Medial collateral ligament of the carpus; 9- Lateral collateral ligament of the carpus; 10- Common palmar ligament of the carpus; 11- Accessoriometacarpal ligament; 12- Accessoriocarpoulnar ligament; *- Flexor retinaculum (distolateral part); 13- Palmar (intersesamoidean) ligament, 13a- suprasesamoidean part, 13b- sesamoidean part, 13c- interosseopalmar ligament; 14- Medial oblique sesamoidean ligament; 15- Lateral oblique sesamoidean ligament; 16- Straight sesamoidean ligament;

Tendons: 17- Flexor carpi radialis tendon (distal part); 18- Accessory ligament of the deep digital flexor tendon (reclined proximally); 19 - Third interosseous muscle (suspensory ligament), 19a- origin, 19b- body, 19c- bifurcation, 19d- medial branch, 19e- lateral branch, 19f- medial extensor branch, 19g- lateral extensor branch.

Fig 4 — The suspensory apparatus, palmar view. The flexor tendons have been removed to expose what lies beneath. **19** is the **third interosseous muscle — the suspensory ligament** — with **19a** its origin on the proximal cannon, **19b** body, **19c** bifurcation, **19d/19e** medial and lateral branches running to the sesamoids, and **19f/19g** the extensor branches passing forward. Below the sesamoids, **16** the **straight** and **14/15** the medial and lateral **oblique sesamoidean ligaments**; **13** the **palmar (intersesamoidean) ligament**. **18** is the **accessory ligament of the deep digital flexor tendon**, reflected upward.

Image — Barone R, Simoens P et al. Essentials of Clinical Anatomy of the Equine Locomotor System — Fig E.9, palmar aspect of the metacarpus after removal of the flexor tendons. Reproduced for educational reference.

Follow those structures down past the fetlock and they resolve into the ligaments of the pastern and foot.

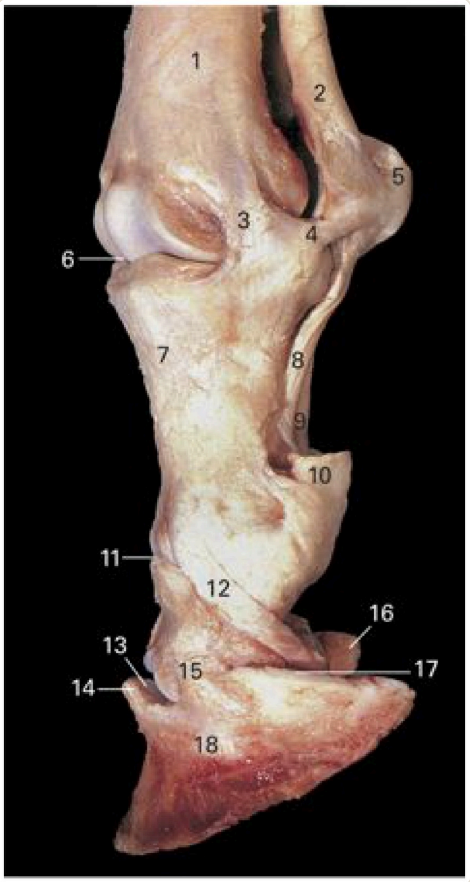

Fig 5 — Deep dissection of the digit, lateral view. The hoof capsule and flexor tendons have been removed. **2** the **suspensory ligament**; **5** the lateral **proximal sesamoid**; **8** the **oblique** and **9** the **straight sesamoidean ligaments**; **6**, **11** and **13** the three joints of the digit — **fetlock**, **pastern** and **coffin**; **12** the **collateral sesamoidean (suspensory navicular) ligament**; **15** the collateral ligament of the coffin joint; **17** the cut edge of the **lateral cartilage**; **18** the **distal phalanx**.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.57, deep dissection of digit of left forelimb, lateral view. Reproduced for educational reference.

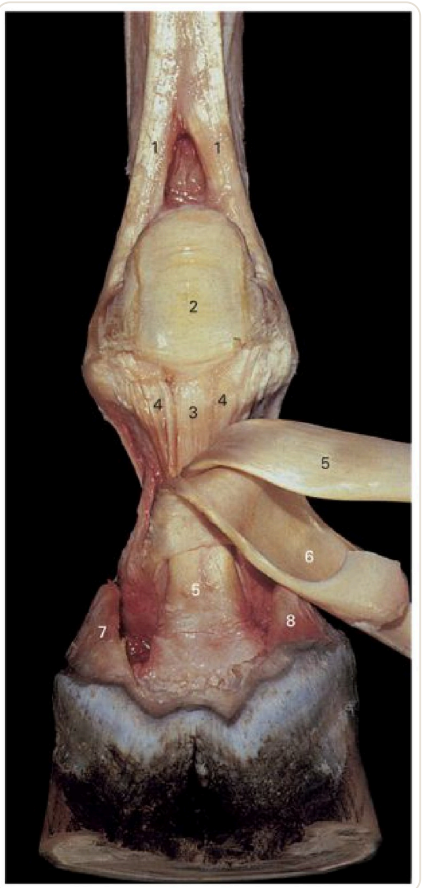

Fig 6 — The flexor tendons, palmar view. The two flexor tendons have been reflected to show their relationship. **6** is the **superficial digital flexor tendon**, which splits and inserts on P1 and P2; **5** the **deep digital flexor tendon**, which continues past it into the foot. **3** and **4** the **straight** and **oblique sesamoidean ligaments**, **2** the **palmar (intersesamoidean) ligament**, **1** the **extensor branches** of the suspensory, and **7/8** the **lateral and medial cartilages** of the distal phalanx.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.67, deep dissection of digit of left forelimb, palmar view. Reproduced for educational reference.

STRUCTURE	COURSE AND ATTACHMENT	THE INJURY IT EXPLAINS
Superficial digital flexor tendon (SDFT)	Runs down the back of the cannon, splits at the fetlock and inserts on the **proximal and middle phalanges**	The classic racehorse 'bowed tendon' — core lesions in the mid-cannon region
Deep digital flexor tendon (DDFT)	Lies deep to the SDFT, passes over the **navicular bone** and inserts on the **semilunar line** of the distal phalanx	DDFT lesions within the hoof are a major cause of **caudal heel pain** — and the tendon's pull is what rotates P3 in laminitis
Suspensory ligament m. interosseus medius, the third interosseous muscle	Origin on the proximal cannon and distal carpal row → **body** → **bifurcation** → medial and lateral **branches** to the proximal sesamoids, with **extensor branches** passing forward to join the extensor tendon	Proximal suspensory desmitis and branch injuries. It is the spring that stops the fetlock dropping to the ground
Accessory (check) ligaments	The **accessory ligament of the DDFT** ('inferior check') ties the deep flexor tendon to the back of the cannon; a superior check ligament does the same for the SDFT higher up	Check-ligament desmitis. They let the limb stay locked in the standing horse without muscular effort
Distal sesamoidean ligaments	**Straight**, **oblique** (also called middle or intermediate), **cruciate** and **short**, running from the base of the sesamoids to P1 and P2	Completes the suspensory apparatus below the fetlock
Collateral sesamoidean ligament suspensory ligament of the navicular bone	Slings the navicular bone from the sides of P1	Part of the **podotrochlear apparatus** implicated in navicular syndrome
Distal sesamoid impar ligament	A short, strong band from the distal border of the navicular bone to the flexor surface of **P3**	The other half of the podotrochlear apparatus; a common site of change on MRI
Annular ligaments	**Palmar annular** at the fetlock, plus **proximal** and **distal digital annular** ligaments	They hold the flexor tendons against the bone; constriction of the palmar annular ligament is a recognised cause of lameness

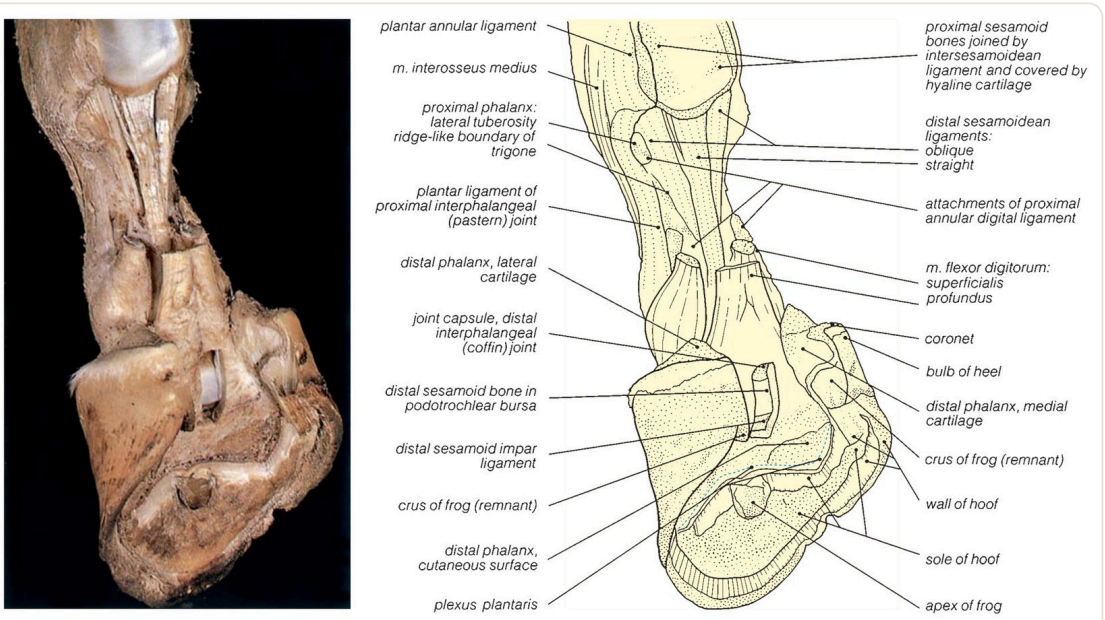

Fig. 7.55 The sesamoidean ligaments and the left distal sesamoid (navicular) bone: lateroplantar view. The dissection is at the same stage as that shown in Fig. 7.54. The cruciate and short sesamoidean ligaments are shown in Figs. 7.78 and 7.79. See also Fig. 7.77.

Fig 7 — The navicular bone and its ligaments. Photograph and matching diagram. The **distal sesamoid bone sits in the podotrochlear bursa**, slung by the **collateral sesamoidean ligament** above and tied to the distal phalanx below by the **distal sesamoid impar ligament**. Note also the **joint capsule of the distal interphalangeal (coffin) joint**, the **distal sesamoidean ligaments** (oblique and straight) higher up, the **m. interosseus medius**, and the **plantar annular ligament** holding the flexor tendons at the fetlock.

Image — Ashdown RR, Done SH. Color Atlas of Veterinary Anatomy, Vol. 2: The Horse , 2nd ed. Elsevier — Fig 7.55, the sesamoidean ligaments and the left distal sesamoid (navicular) bone. Reproduced for educational reference.

05 The bones of the digit

Four bones sit below the fetlock, and two of them are inside the hoof. Radiographs are the fastest way to fix their relationships, because that is how you will usually meet them.

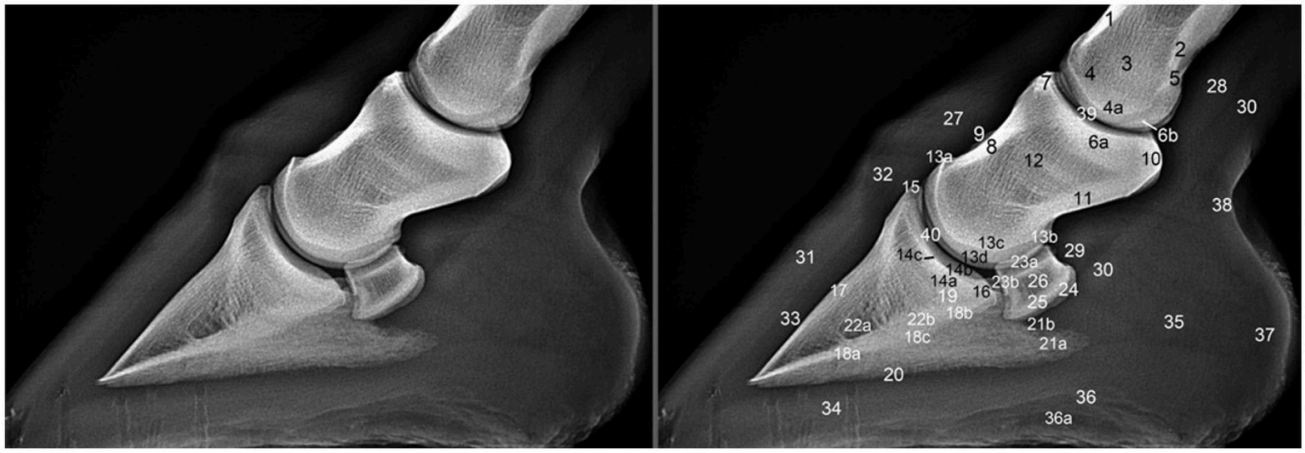

Fig. F.10 Lateromedial radiographic image of the left foot.

Fig 8 — Lateromedial radiograph of the foot. Plain on the left, labelled on the right. Reading down the column of bone: the **proximal phalanx**, the **middle phalanx** with its **extensor process** and **flexor tuberosity**, then the **distal phalanx** and, behind the coffin joint, the **distal sesamoid (navicular) bone**. Soft-tissue labels include the **dorsal hoof wall**, the **coronal** and **parietal coria**, the **frog** and the **heel** — the standard view for measuring the alignment of P3 within the capsule.

Image — Barone R, Simoens P et al. Essentials of Clinical Anatomy of the Equine Locomotor System — Fig F.10, lateromedial radiographic image of the left foot. Reproduced for educational reference.

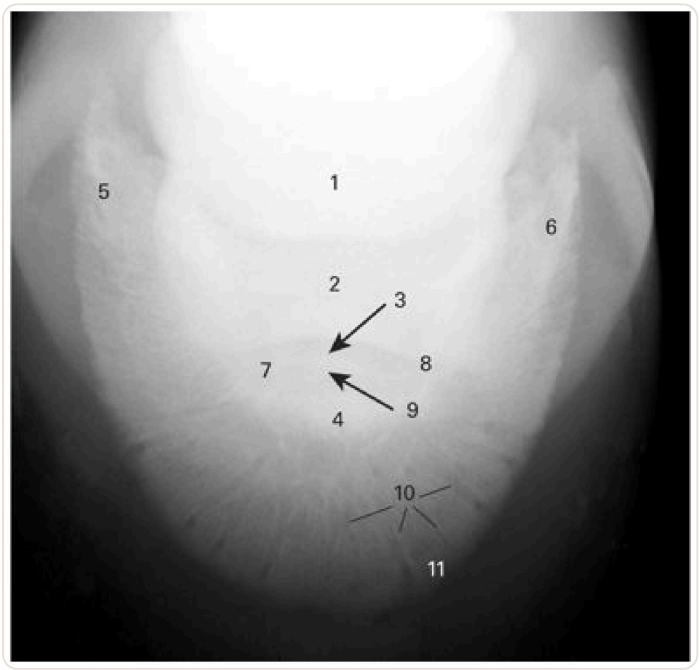

Fig 9 — Dorsopalmar radiograph of the distal phalanx. The coffin bone face-on. **1** the **navicular bone**; **2** the middle phalanx; **3** the **coffin joint**; **4** the **distal phalanx**; **5** and **6** the lateral and medial **palmar processes** that give rise to the ungular cartilages; **7** and **8** the **parietal sulci**; **9** the **extensor process**; **10** the **vascular channels**; **11** the **solar margin**. Those vascular channels are the bone's own blood supply arriving through the solar canal.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.73, dorsopalmar view radiograph of distal phalanx. Reproduced for educational reference.

BONE	COMMON NAMES	WHAT TO KNOW
Proximal phalanx (P1)	Long pastern bone	Runs from the fetlock to the pastern joint. Fractures here are a classic racing injury
Middle phalanx (P2)	Short pastern bone	Half inside the hoof, half out. Its **flexor tuberosity** takes the superficial flexor tendon
Distal phalanx (P3)	Coffin bone, pedal bone	Sits **entirely inside** the hoof capsule and mirrors its shape. Suspended from the wall by the laminar interlock — not resting on the sole. Pierced by the **solar canal** carrying the terminal arch
Distal sesamoid	Navicular bone	A small boat-shaped bone behind the coffin joint. The deep digital flexor tendon runs over its **flexor surface**, cushioned by the **podotrochlear (navicular) bursa**
Proximal sesamoids ×2	Sesamoid bones of the fetlock	Embedded at the back of the fetlock in the suspensory apparatus; the pulley the flexor tendons run over
Ungular cartilages cartilage, not bone — part of P3	Collateral / lateral cartilages	Wing-like plates springing from the palmar processes of P3 and reaching above the coronet, where you can feel them. They **ossify** in sidebone

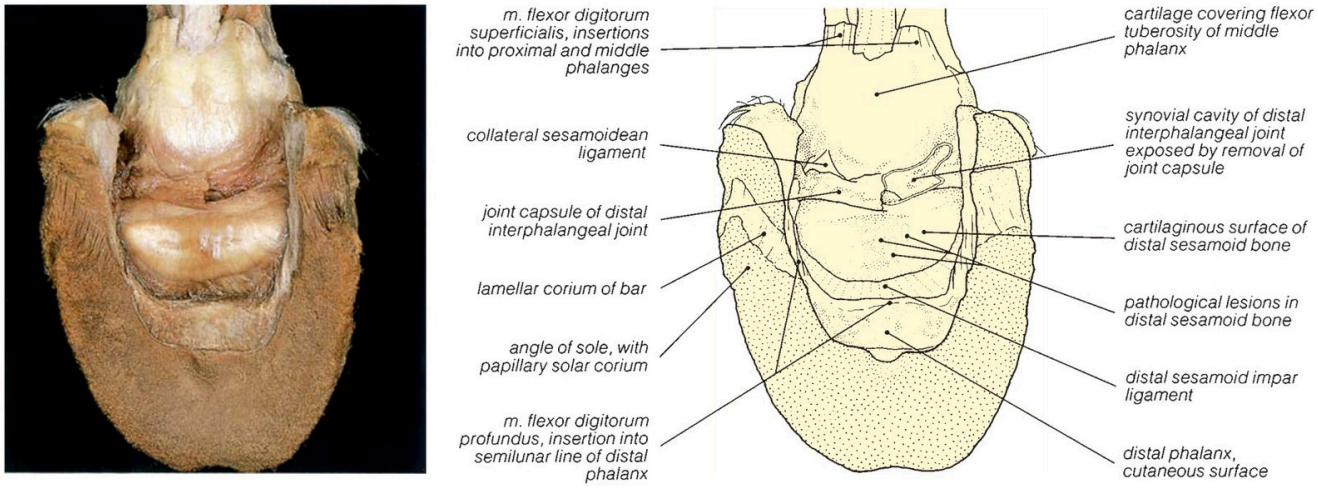

Fig. 7.80 The distal sesamoid bone: plantar and solar view. Removal of the tendon of the deep digital flexor muscle has opened up the podotrochlear bursa to reveal the distal sesamoid bone. Partial excision of the roof of the podotrochlear bursa reveals the synovial cavity of the distal interphalangeal joint. The cartilage covering the podotrochlear surface of the distal sesamoid bone shows evidence of pathological change ('navicular' disease).

Fig 10 — The distal sesamoid (navicular) bone exposed. The deep digital flexor tendon has been removed to open the **podotrochlear bursa** and reveal the navicular bone; part of the roof of the bursa has been excised to show the **synovial cavity of the coffin joint** as well. Labelled: the **cartilaginous surface of the distal sesamoid bone**, the **distal sesamoid impar ligament**, the **collateral sesamoidean ligament**, the insertions of the **superficial** and **deep** digital flexor tendons, and — on this specimen — **pathological lesions in the distal sesamoid bone**, that is, navicular disease.

Image — Ashdown RR, Done SH. Color Atlas of Veterinary Anatomy, Vol. 2: The Horse , 2nd ed. Elsevier — Fig 7.80, the distal sesamoid bone: plantar and solar view. Reproduced for educational reference.

06 Inside the hoof capsule

Now cut the foot in half. This is the reference figure of the whole subject: a median section with a matching labelled diagram, showing every structure discussed above in its true position.

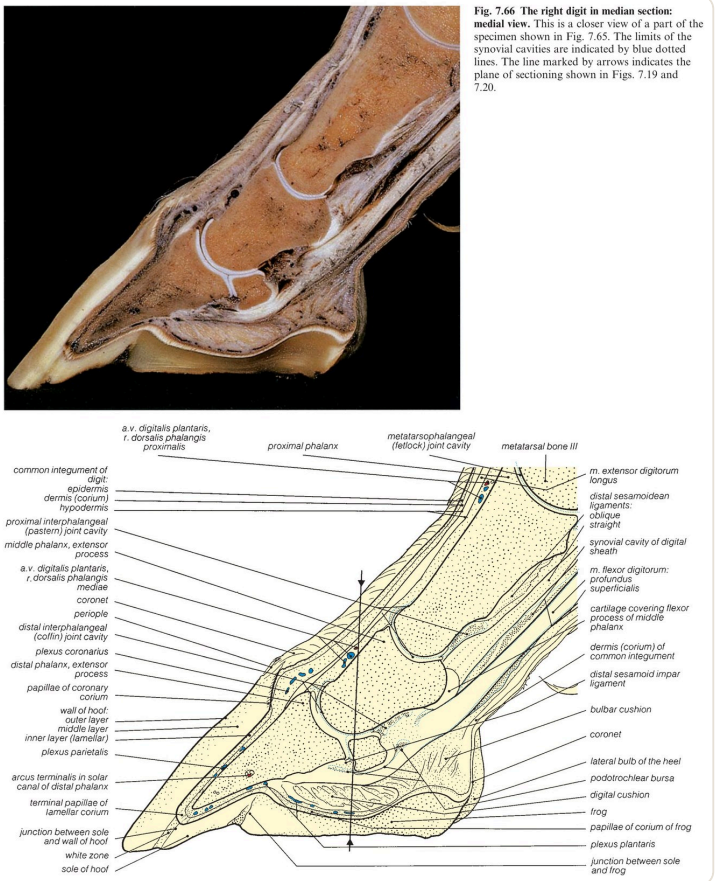

Fig. 7.66 The right digit in median section: medial view. This is a closer view of a part of the specimen shown in Fig. 7.65. The limits of the synovial cavities are indicated by blue dotted lines. The line marked by arrows indicates the plane of sectioning shown in Figs. 7.19 and 7.20.

Fig 11 — The digit in median section, with full labelling. Photograph above, diagram below. Work down the front of the foot: **coronet**, **periople**, then the **wall of hoof** in its **outer**, **middle** and **inner (lamellar)** layers, the **papillae of the coronary corium** feeding it, and at the bottom the **terminal papillae of the lamellar corium**, the **white zone** and the **sole of hoof**. Behind: the **distal phalanx** with its **extensor process**, the **coffin joint cavity**, the **podotrochlear bursa**, the **distal sesamoid impar ligament**, the **digital cushion**, the **bulbar cushion** and the **frog**. The **plexus coronarius**, **plexus parietalis** and **arcus terminalis in the solar canal** map the venous drainage.

Image — Ashdown RR, Done SH. Color Atlas of Veterinary Anatomy, Vol. 2: The Horse , 2nd ed. Elsevier — Fig 7.66, the right digit in median section: medial view. Reproduced for educational reference.

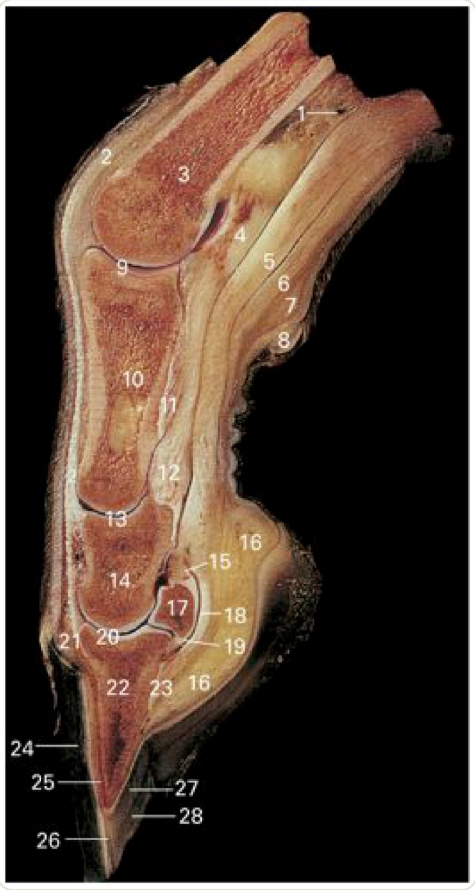

Fig 12 — Median section through the digit. The same plane on a different specimen, numbered. **5** and **6** the **deep** and **superficial digital flexor tendons**; **9**, **13** and **20** the **fetlock**, **pastern** and **coffin** joints; **16** the **digital cushion**; **17** the **navicular bone** with **18** its **bursa** and **19** the **impar ligament**; **22** the **distal phalanx**; **23** the **insertion of the deep digital flexor tendon**; **21** the **coronary corium**; **24** the **wall**, **25** the **laminae**, **26** the **white zone**, **27** the **sole corium** and **28** the **sole**.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.70, median section through digit of left forelimb. Reproduced for educational reference.

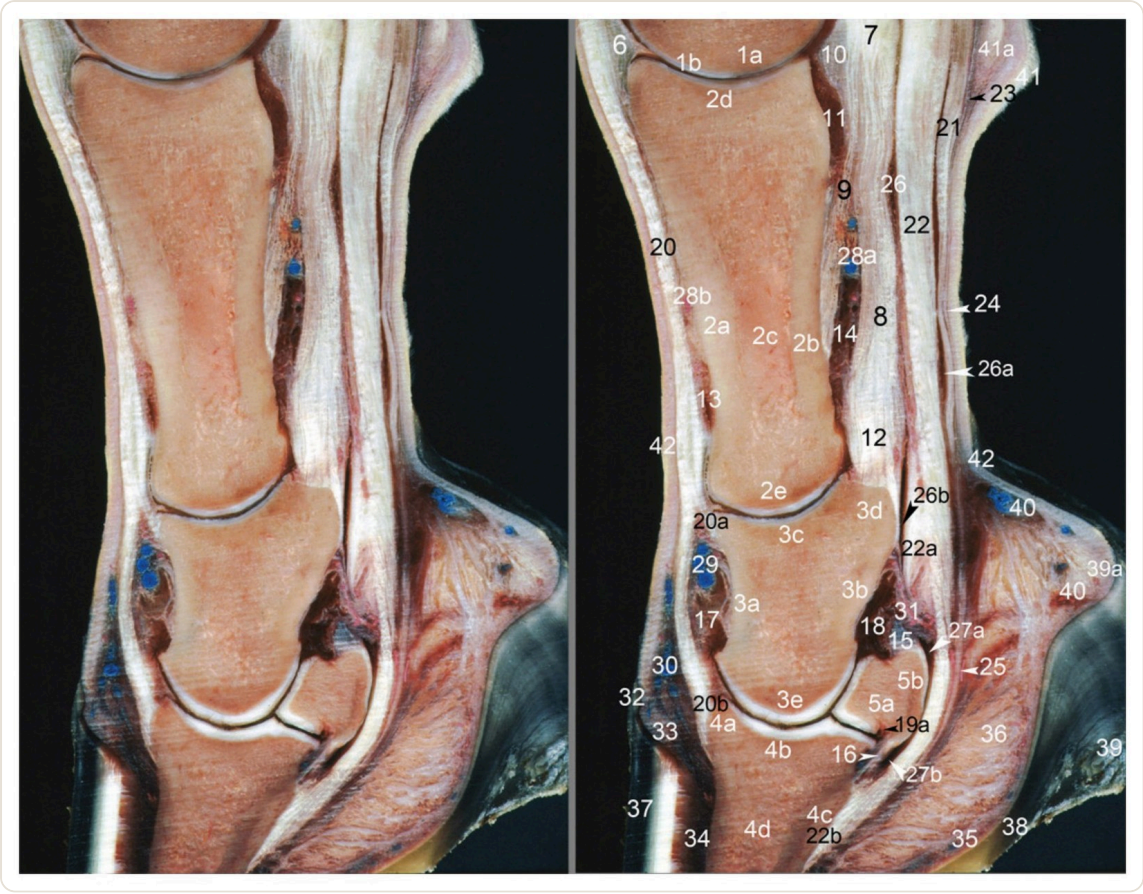

Fig 13 — Sagittal section of the pastern and foot. A third view of the same plane, this time mapping the **synovial spaces** that matter when you inject or tap a joint. Numbers on the right panel identify the **dorsal and palmar recesses** of the pastern and coffin joints, the **digital sheath cavity** with its distopalmar and distodorsal recesses, and the **podotrochlear bursa** with its proximal and distal recesses. The superficial numbers run through the **perioplic**, **coronal** and **parietal coria**, the **corium of the frog**, the **digital cushion**, **hoof wall**, **frog** and **heel bulb**.

Image — Barone R, Simoens P et al. Essentials of Clinical Anatomy of the Equine Locomotor System — Fig F.27, sagittal section of the pastern and foot. Reproduced for educational reference.

07 The laminar bond: how a horse hangs inside its own hoof

Here is the fact that surprises people most: **the coffin bone does not sit on the sole.** It is slung from the inside of the wall. The wall's inner layer is thrown into several hundred vertical **horny (epidermal) lamellae**, and the **parietal corium** covering the face of P3 carries a matching set of **dermal lamellae**. The two sets interleave like the fingers of two clasped hands, and each primary lamella is itself subdivided into many secondary lamellae, multiplying the contact area enormously.

You will meet these under two sets of names, and they mean the same thing. The horn-side lamellae, being dead keratin, are the **insensitive laminae**; the corium-side lamellae, carrying the blood supply and nerves, are the **sensitive laminae**. Farriers and owners generally use those terms; anatomists write **epidermal** and **dermal** lamellae. *Laminae* and *lamellae* are likewise the same structure — which is why the disease is called *laminitis* even though the modern anatomical spelling is *lamellae*.

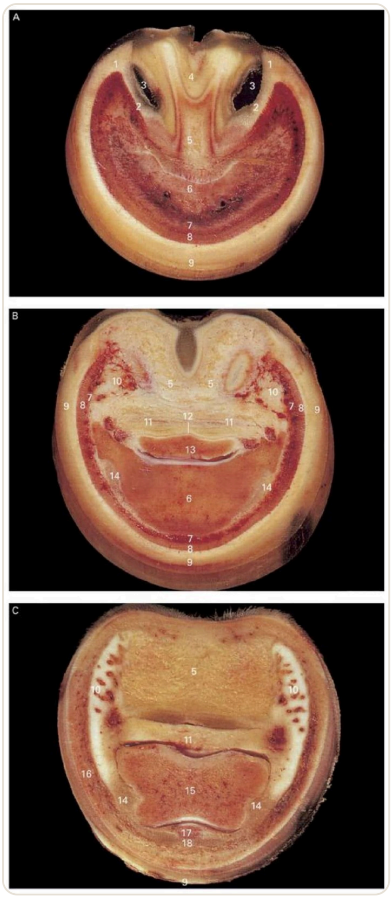

Fig 14 — Three transverse sections through the foot. Cut parallel to the coronary border, from just below the coronet (**C**) to near the ground (**A**). The interlock is labelled in section **B**: **7** the **lamellar corium (dermal lamellae)** meeting **8** the **lamellae of the wall (epidermal lamellae)**, with **9** the **wall** outside them. Also shown: **6** the **distal phalanx**, **4** the **frog**, **5** the **digital cushion**, **10** the **cartilage of the distal phalanx with its vascular plexus**, **11** the **deep digital flexor tendon**, **12** the **navicular bursa** and **13** the **navicular bone**.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.74, transverse section through foot, distal view. Reproduced for educational reference.

Why this is the whole story of laminitis.

The interlock is the horse's entire suspension. Damage it — through endocrine disease, grain overload, sepsis, or excessive load on one limb — and the bond begins to fail. The **deep digital flexor tendon**, pulling constantly on the back of P3, then rotates the bone away from the wall; if enough lamellae fail the bone *sinks* instead. Either way the corium is crushed between bone and sole. That is why laminitis is so painful, why the digital pulse bounds, and why treatment is aimed at unloading the tendon and supporting the back of the foot.

08 The corium: the sensitive foot

Horn is dead. Everything that *makes* horn is the **corium** (dermis) beneath it — richly vascular, richly innervated, and the reason a hoof injury hurts. Strip the capsule off and the corium underneath is a precise negative of it.

Fig. 7.75 The corium of the hoof: right lateral view. The keratinised hoof (epidermis) has been removed after cold water maceration, exposing the corium (dermis). Most of the hair has been lost in this method of preparation but the papillary and lamellar structure of the corium has been preserved.

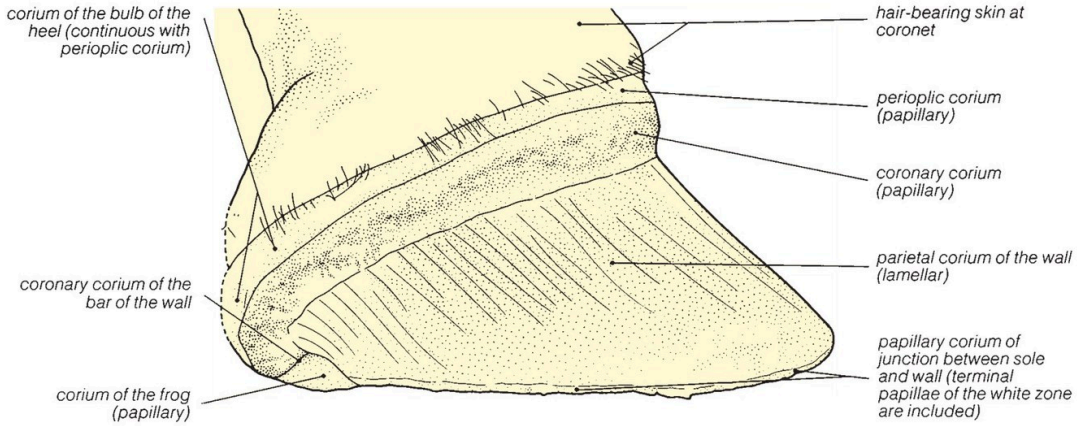

Fig 15 — The corium of the hoof, lateral view. The keratinised capsule has been removed, leaving the sensitive foot. From the top: **perioplic corium (papillary)**, **coronary corium (papillary)** — the dense band of papillae that grows the wall — and below it the **parietal corium of the wall (lamellar)**, the sheet of dermal lamellae that suspends P3. At the bottom, the **papillary corium of the junction between sole and wall**, which includes the terminal papillae producing the white zone; and behind, the **corium of the frog** and the **corium of the bulb of the heel**.

Image — Ashdown RR, Done SH. Color Atlas of Veterinary Anatomy, Vol. 2: The Horse , 2nd ed. Elsevier — Fig 7.75, the corium of the hoof: right lateral view. Reproduced for educational reference.

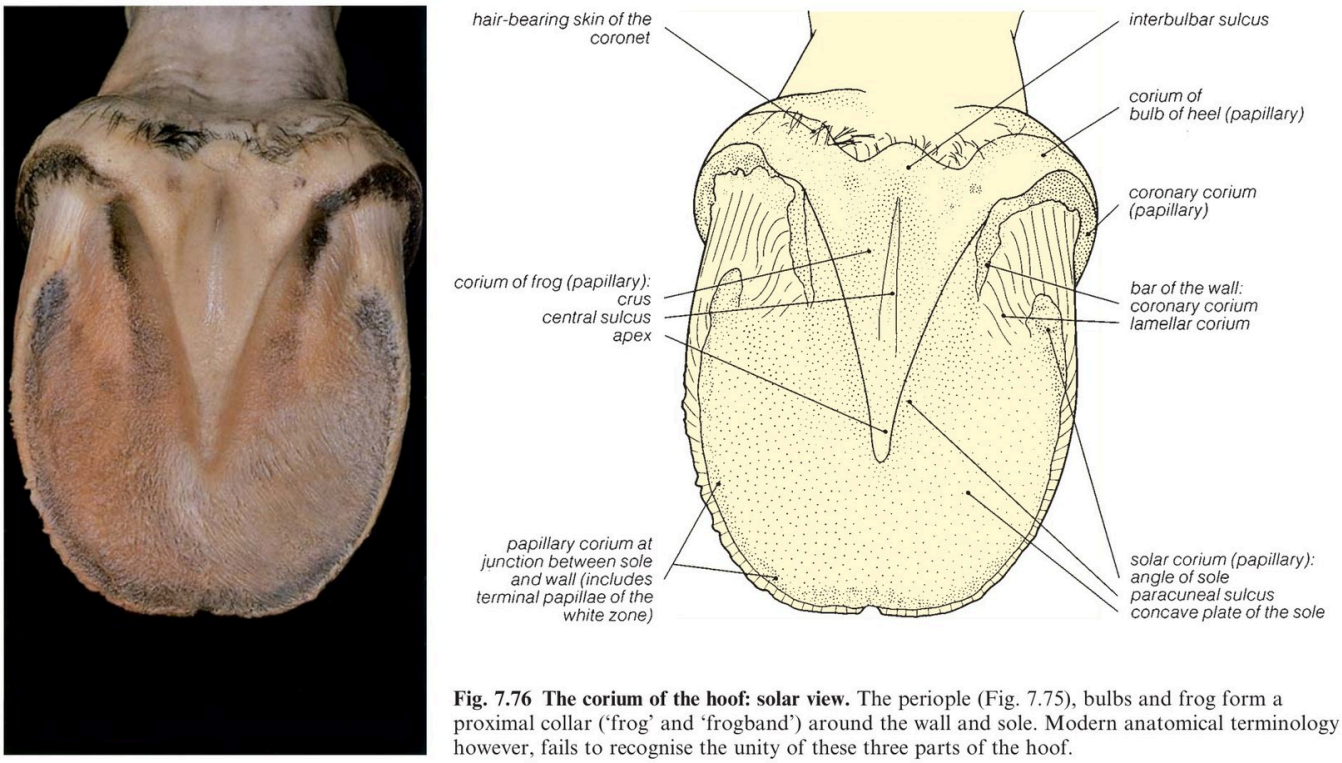

Fig. 7.76 The corium of the hoof: solar view. The periople (Fig. 7.75), bulbs and frog form a proximal collar ('frog' and 'frogband') around the wall and sole. Modern anatomical terminology however, fails to recognise the unity of these three parts of the hoof.

Fig 16 — The corium of the hoof, solar view. The same preparation from below. The **solar corium (papillary)** covers the whole ground surface, with the **corium of the frog** — **crus**, **central sulcus** and **apex** — in the middle. Note how the **bar of the wall** carries both **coronary** and **lamellar corium** of its own, and how the **papillary corium at the junction between sole and wall** rings the whole margin.

Image — Ashdown RR, Done SH. Color Atlas of Veterinary Anatomy, Vol. 2: The Horse , 2nd ed. Elsevier — Fig 7.76, the corium of the hoof: solar view. Reproduced for educational reference.

CORIUM	WHERE IT SITS	THE HORN IT MAKES
Perioplic corium	A narrow band just above the coronary corium	The thin outer layer (periople) that waterproofs the wall
Coronary corium	The thick papillary band under the coronet	The **tubular horn** of the wall's middle layer — the bulk of the hoof
Parietal (laminar) corium	Covers the front and sides of P3 as **dermal lamellae**	Makes no tubular horn. Instead it **interlocks** with the wall's horny lamellae — the suspension
Solar corium	Over the bottom of P3	The horn of the sole
Corium of the frog	Over the digital cushion	The soft, elastic horn of the frog

Fig 17 — The foot with the horn reflected. The epidermal tissues have been peeled back and the wall and horny lamellae removed. **1** the dorsal surface of the sole; **3** the **spine of the frog** (the 'frog stay') projecting up into the digital cushion; **5** the **lamellae of the bar**; **6** the **lamellar corium**; **7** the **corium of the frog** and **8** the **corium of the sole**. The deep red of the exposed corium is a fair warning of how vascular the inside of a hoof is.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.78, foot, solar view, epidermal tissues reflected. Reproduced for educational reference.

09 The digital cushion and the hoof as a pump

There is no muscle below the carpus and hock. Blood arrives at the foot easily enough under arterial pressure, but getting it *back* against gravity needs help — and the foot provides it mechanically.

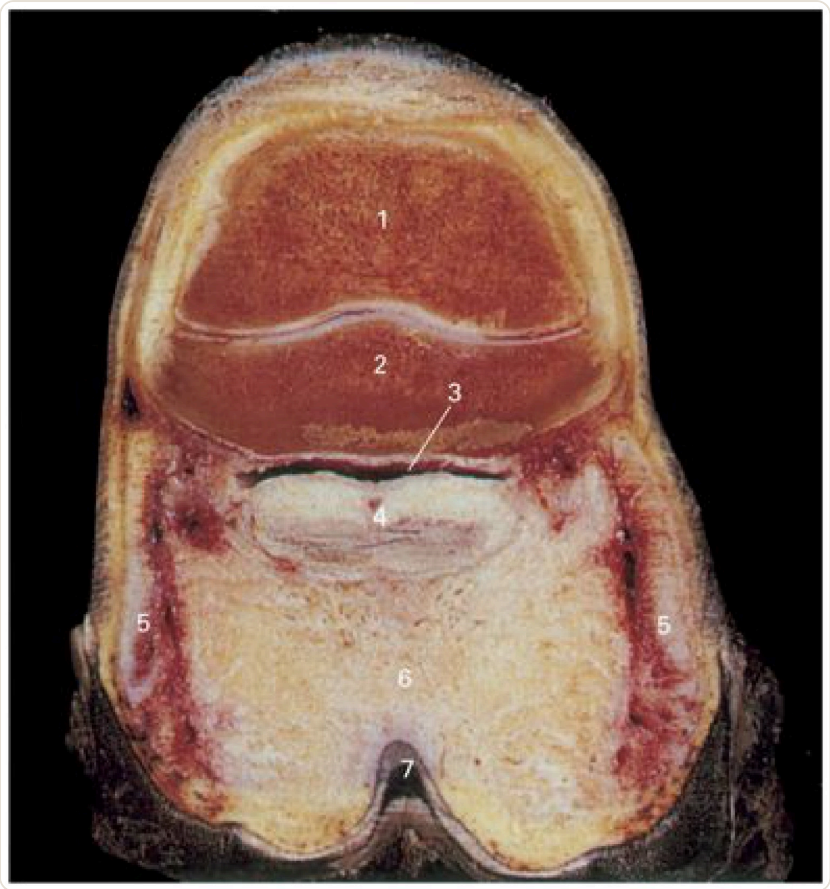

Fig 18 — Frontal section through the heels. Cut through the back of the foot. **1** the middle phalanx and **2** the **navicular bone**, with **3** the **podotrochlear bursa** and **4** the **deep digital flexor tendon** beneath them. Filling the back of the foot is **6** the **digital cushion**, flanked by **5** the **cartilages of the distal phalanx with their associated vascular plexus**; **7** is the **cleft of the frog**. The paired venous plexuses beside the cartilages are the reservoir that the cushion squeezes on every stride.

Image — Ashdown RR, Done SH. Clinical Anatomy of the Horse . Mosby/Elsevier — Fig 4.77, frontal section of left hoof, palmar view. Reproduced for educational reference.

The mechanism is simple. As the foot loads, the frog and heels contact the ground and the hoof capsule flexes very slightly outward. The **digital cushion** — a wedge of fibro-fatty tissue occupying the back of the foot, pushed up by the **frog stay** from below — is compressed between frog and bone, and squeezes the venous plexuses lying against the **ungular cartilages**. Blood is driven proximally, where valves stop it falling back. Unload the foot and the plexuses refill.

Why this matters in practice.

The digital cushion is not a fixed structure — it *responds to loading*. In a foot that regularly loads its heels and frog, the cushion matures into dense **fibrocartilage**; in a foot that does not, it stays **fatty and poorly developed**, and is a much weaker shock absorber. A horse with long toes and underrun heels, a painful or wasted frog, or long-term box rest therefore loses both part of its venous return and, over time, the quality of the cushion itself. That is the anatomical argument behind encouraging heel-first landing, adequate movement, and not letting the frog waste away under a shoe.

10 Blood supply and nerves of the foot

Two neurovascular bundles serve the foot, one down each side of the pastern. In each, an **artery, vein and nerve** run together against the edge of the deep flexor tendon — close enough to the surface that all three can be reached with a needle, which is what makes the foot so accessible to diagnostic anaesthesia (anesthesia).

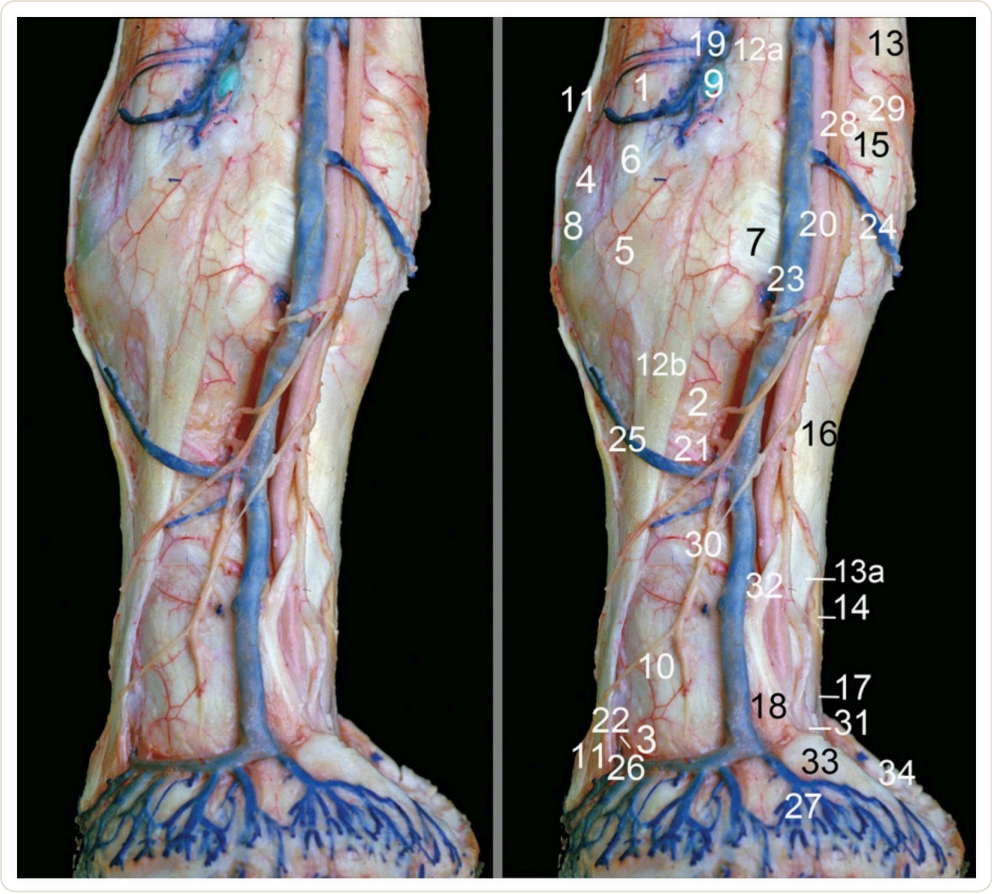

Fig 19 — The vessels and nerves of the digit, medial view. A vascular-injected specimen, plain and labelled. **20** is the **medial proper digital artery** (injected red), **23** the **medial proper digital vein** (blue) and **28** the **medial proper digital nerve** — the three running together as one bundle. Branching off them are the **dorsal rami of the proximal phalanx** (**21**, **25**) and **of the middle phalanx** (**22**, **26**), and the **ergot rami** (**24**, **29**). At the bottom, **27** is the **superficial ungular plexus** — the dense venous network over the cartilage and coronet that the digital cushion squeezes on every stride. **33** and **34** are the medial and lateral **ungular cartilages**.

Image — Barone R, Simoens P et al. Essentials of Clinical Anatomy of the Equine Locomotor System — Fig F.19, medial aspect of the right thoracic limb digital area. Reproduced for educational reference.

Arterial supply. The medial and lateral **palmar digital arteries** descend past the pastern, giving dorsal branches to each phalanx, and then enter the distal phalanx through the foramina on its palmar surface. Inside the bone they join to form the **terminal arch** (*arcus terminalis*) within the **solar canal** — labelled on the median-section diagram above. From that arch, branches radiate back out through the bone to supply the **parietal corium** (and so the laminae), the **solar corium**, and the **circumflex artery** running round the solar margin. The practical point is that **the entire blood supply of the hoof runs through and around one small bone**, and much of it is enclosed in rigid tissue — which is why swelling inside the capsule is so damaging.

Venous drainage. The return side is a set of large, valveless **venous plexuses** — the **coronary**, **parietal** and **palmar (plantar)** plexuses named on the median-section diagram, together with the **ungular plexus** over the collateral cartilages labelled on the dissection above. Being valveless, they fill and empty passively as the capsule is loaded and unloaded, which is precisely what makes the digital cushion pump work.

The clinical payoff: nerve blocks.

Because the **palmar digital nerves** run superficially and predictably beside the flexor tendon, local anaesthetic (anesthetic) deposited over them abolishes sensation from the structures they supply. Two blocks matter most:

- A **palmar digital (PD) block**, placed low over the neurovascular bundle at the level of the collateral cartilages, desensitises the **caudal (palmar) third of the foot** — navicular bone and bursa, the impar and collateral sesamoidean ligaments, the insertion of the deep flexor tendon, and much of the coffin joint. A horse that goes sound to a PD block has its pain *in the foot*, most often in the podotrochlear region.
- An **abaxial sesamoid block**, placed higher at the base of the proximal sesamoids, catches the same nerves before they have branched and so desensitises **essentially the whole foot and pastern**.

Working up the limb block by block is how a lameness is localised before a single radiograph is taken — and it works only because this anatomy is so consistent.

11 What goes wrong — and why

Almost every common foot problem is one of the structures above failing in a predictable way. Read this table against the figures and the conditions stop being a list to memorise.

CONDITION	THE ANATOMY BEHIND IT
Laminitis	Failure of the **laminar interlock** between the wall's horny lamellae and the dermal lamellae of the parietal corium. Because P3 is *suspended* from the wall rather than resting on the sole, losing that bond lets the pull of the **deep digital flexor tendon** rotate P3 — or, if enough lamellae fail, let the whole bone sink. The corium is crushed between bone and sole, which is why it is so painful and why the pulses bound
Navicular syndrome podotrochlosis	Disease of the **podotrochlear apparatus**: the navicular bone, its **collateral sesamoidean** and **impar** ligaments, the **podotrochlear bursa** and the overlying **DDFT**. The deep flexor tendon presses on the navicular bone at every stride, so pain here shortens the stride and lands the horse toe-first
Hoof abscess	Bacteria track up the **white zone** — the weakest point of the wall—sole junction — and pus collects under the horn. Because the capsule cannot expand, pressure rises fast: a sudden, severe, often non-weight-bearing lameness that resolves dramatically once the abscess is drained or bursts at the coronet
Thrush	Degeneration of the frog horn in the **central and paracuneal sulci**, where dirt and moisture are trapped. Black, foul discharge. It is a disease of the environment and of a deep, contracted frog rather than of the horse
Bruised sole and corns	The **sole** is a protective plate, not a load-bearing one. Excess pressure damages the **solar corium** beneath it, and the bruise appears in the horn weeks later as it grows out. A bruise at the **angle of the sole** (between wall and bar) is a **corn**
Hoof cracks	Splits in the **stratum medium**. Those starting at the coronet reflect damage to the **coronary corium** and will keep recurring until the growth zone recovers; those starting at the ground usually reflect imbalance or poor horn quality
White line disease	Separation and crumbling of the **white zone**, invaded by opportunistic bacteria and fungi, undermining the wall from below
Sidebone	Ossification of the **ungular (collateral) cartilages** of P3. Common, often incidental, and usually far less significant than it appears on a radiograph
Sheared heels and contracted heels	Uneven loading of the two **heel bulbs** and collapse of the **bars** and frog, usually from imbalance or long-term shoeing that unloads the back of the foot
Quittor	Chronic infection of an **ungular cartilage**, typically after a wound to the coronet, discharging above the coronary band

12 Growth, trimming and balance

The hoof is a structure in constant replacement. Horn is produced at the coronet and migrates down the wall, so the foot you see today was made months ago. Growth is commonly quoted at roughly **6–10 mm a month** — meaning a toe takes something close to a year to be completely replaced, and a heel rather less — and it is slower in winter, in the older horse, and in a foot with poor circulation.

That timescale explains most of farriery. A trim every **four to eight weeks** keeps the foot in the same shape it was left in, because in that time the wall will have grown a few millimetres and the balance will have drifted. Leave it longer and the toe runs forward, the breakover moves, the heels run under, and the leverage on the laminae and the deep digital flexor tendon rises. Three principles follow directly from the anatomy in this article:

- **The wall bears the weight, the sole protects.** Trimming should leave the wall proud enough to carry load without paring the sole thin.
- **The white zone is the nail line.** Nails driven inside it enter sensitive laminar tissue — a nail bind or a prick.
- **The back of the foot needs to work.** Heel and frog contact drives the digital cushion pump; a foot shod or trimmed so that only the toe loads loses that.

The reference most often used to judge all of this is the **hoof–pastern axis**: viewed from the side, the dorsal wall of the hoof should run *parallel* to the front of the pastern, so that P1, P2 and P3 line up in a straight column. When the toe runs forward and the heels collapse, that axis is **broken back**, and the leverage on the laminae and on the deep digital flexor tendon rises with every stride — the mechanical common ground between long-toe/low-heel conformation, caudal heel pain and laminitic rotation. A **broken-forward** axis, as in an upright or club foot, loads the toe and the coffin joint instead. Balance also has to be right side to side (**mediolateral**), which is judged from in front and from the solar surface.

A note on scope.

This is an anatomy guide, not a treatment guide. Lameness, laminitis and hoof infection are veterinary problems — if a horse has a bounding digital pulse, heat in the foot, or sudden severe lameness, that is a call to your vet, not a reason to keep reading. For the clinical side see Adams and Stashak's Lameness in Horses.

13 Quiz: test yourself

Seventeen questions across the capsule, the coria, the bones, the soft tissues and the neurovascular anatomy. Answers are beneath each question — cover them and work down.

1. Name the three main parts of the ground surface of the hoof.**Answer:** The **wall** (with its inturned **bars**), the **sole**, and the **frog**. The **white zone** marks the junction of wall and sole.2. What is the coronet, and why does damage there matter?**Answer:** The **coronary band** is the junction of hairy skin and hoof at the top of the wall, and it is where the wall is produced. Injure the coronary corium and every millimetre of wall grown from that point carries the defect down with it.3. Name the three layers of the hoof wall from outside in.**Answer: Outer layer** (stratum externum, the periople's thin varnish), **middle layer** (stratum medium, the thick tubular horn), and **inner lamellar layer** (stratum internum) that interdigitates with the dermal lamellae.4. Which bone sits entirely inside the hoof capsule?**Answer:** The **distal phalanx (P3)** — the coffin or pedal bone. It mirrors the shape of the capsule around it.5. How is the distal phalanx held in place inside the hoof?**Answer:** It is **suspended** from the inside of the wall by the interlock between the wall's **horny lamellae** and the **dermal lamellae** of the parietal corium. It does not simply rest on the sole — which is exactly why laminitis is catastrophic.6. What is the navicular bone and what runs across it?**Answer:** The **distal sesamoid bone**, lying behind the coffin joint. The **deep digital flexor tendon** runs across its flexor surface, separated from it by the **podotrochlear (navicular) bursa**.7. Where does the deep digital flexor tendon insert?**Answer:** On the **semilunar line** of the flexor surface of the **distal phalanx**, after passing over the navicular bone.8. Where does the superficial digital flexor tendon insert?**Answer:** It divides at the fetlock and inserts on the **proximal and middle phalanges** — it never reaches P3.9. What is the suspensory ligament, anatomically speaking? **Answer:** The **third interosseous muscle** (m. interosseus medius) — a largely tendinous structure running down the back of the cannon that divides into two **branches** attaching to the proximal sesamoid bones, with **extensor branches** passing forward to the extensor tendon.10. Name the five coria of the foot.**Answer: Perioplic**, **coronary**, **parietal (laminar)**, **solar** and **frog** coria. All but the parietal corium are **papillary** and make horn; the parietal corium is **lamellar** and makes the suspension.11. What is the white line, and why does it matter to a farrier?**Answer:** Properly the **white zone** — the junction between sole and wall. It marks how far inside the wall a nail can safely be driven, and it is the route by which an **abscess** or **white line disease** gets in.12. What are the ungular cartilages and what happens to them?**Answer:** The **collateral (lateral) cartilages** of the distal phalanx — plates springing from the palmar processes of P3 up above the coronet, where they can be palpated. They may **ossify**, which is called **sidebone**.13. What structures make up the podotrochlear apparatus?**Answer:** The **navicular bone**, its **collateral sesamoidean (suspensory) ligaments**, the **distal sesamoid impar ligament**, the **podotrochlear bursa**, and the part of the **DDFT** that crosses it.14. Name the three synovial joints of the digit.**Answer:** The **metacarpophalangeal (fetlock)**, **proximal interphalangeal (pastern)** and **distal interphalangeal (coffin)** joints.15. Why does the frog matter to circulation?**Answer:** The foot has no muscle to pump blood back up the limb. Loading the frog and heels compresses the **digital cushion** and the venous plexuses beside the **ungular cartilages**, driving blood proximally — the reason movement and heel contact matter for hoof health.16. What is the terminal arch?**Answer:** The **arcus terminalis** — where the medial and lateral **palmar digital arteries** meet inside the **solar canal** of the distal phalanx. Branches radiate out from it through the bone to the parietal and solar coria and to the **circumflex artery** at the solar margin. Effectively the whole blood supply of the hoof passes through one small bone.17. Which structures does a palmar digital nerve block desensitise?**Answer:** The **caudal (palmar) third of the foot**: the navicular bone and its bursa, the impar and collateral sesamoidean ligaments, the insertion of the deep digital flexor tendon and much of the coffin joint. A horse that improves to a PD block has its pain in the foot — most often in the podotrochlear region.

14 Horse hoof anatomy — frequently asked questions

What are the parts of a horse's hoof?

Externally: the **wall** (toe, quarters and heels), the inturned **bars**, the **sole**, the **frog** with its central and paracuneal sulci, the **white zone** where sole meets wall, the **coronet** at the top and the **bulbs of the heel** behind. Internally: the **distal phalanx (coffin bone)**, the **navicular bone**, part of the **middle phalanx**, the **digital cushion**, the **ungular cartilages**, the **laminae** and the five **coria**.

What is a horse's hoof made of?

Keratin — the same family of proteins as hair, horn and your own fingernails. The wall's bulk is **tubular horn**: countless horn tubules running down the wall, embedded in cementing intertubular horn. It is dead tissue, which is why trimming does not hurt; the living, sensitive part is the **corium** beneath it.

How fast do horse hooves grow?

Commonly quoted at about **6–10 mm per month**, growing downward from the coronary band, so a full toe takes close to a year to be replaced and a heel considerably less. Growth slows in winter, in older horses and where circulation to the foot is poor — which is also why a coronary band injury shows in the wall for many months afterwards.

Does the coffin bone rest on the sole?

No — and this is the most important idea in hoof anatomy. The **distal phalanx is suspended** from the inner face of the wall by the interlock between the wall's horny lamellae and the dermal lamellae of the parietal corium. The sole is a protective plate, not a plinth. When the laminar bond fails, that suspension is what is lost.

What is the frog for?

Three things: **traction**, **shock absorption**, and driving the foot's **venous pump**. Loading the frog compresses the digital cushion above it, which squeezes the venous plexuses beside the ungular cartilages and pushes blood back up the limb. Its grooves are also where **thrush** establishes.

What is the white line and why do farriers care about it?

The **white zone** is the junction between sole and wall, made of soft terminal horn produced at the bottom of the lamellae. It tells the farrier exactly how far inside the wall a nail can go: outside it is dead horn, inside it is sensitive tissue. It is also the commonest route for an **abscess** or **white line disease** to enter the foot.

Where is the navicular bone and why does it cause trouble?

It is the **distal sesamoid bone**, lying behind the coffin joint deep within the hoof. The **deep digital flexor tendon** runs across its flexor surface at every stride, separated only by the **podotrochlear bursa**. Disease of that whole apparatus — bone, bursa, tendon and the collateral and impar ligaments — is **navicular syndrome**, and it is common because the structure is heavily loaded and poorly placed to heal.

Can you feel a horse's hoof problems from outside?

Often, yes. Heat in the wall, a **bounding digital pulse** at the back of the pastern, and pain on hoof-testers over a particular spot are the classic external signs. The **ungular cartilages** can be felt above the coronet, and the **flexor tendons** and **suspensory ligament** can all be palpated separately up the back of the cannon — see the labelled live-horse figure above.

Why does the vet 'block' the nerves in the foot?

To find out *where* the pain is. The **palmar digital nerves** run in a predictable, superficial position beside the flexor tendon, so local anaesthetic placed over them switches off sensation from a known set of structures. If the horse trots sound after a **palmar digital block**, the problem is in the back of the foot; if it needs an **abaxial sesamoid block** higher up, the problem may be anywhere in the foot or pastern. Working up the limb this way localises a lameness before any imaging is done, and it is only reliable because the anatomy is so consistent from horse to horse.

What is founder in horses, and is it the same as laminitis?

Effectively yes — **founder** is the older lay word for **laminitis**, and it is usually reserved for the chronic, structural end of it. Laminitis is failure of the interlocking laminae that suspend the distal phalanx inside the hoof capsule; once that suspension gives way, the deep digital flexor tendon pulling on the back of the coffin bone rotates its tip downward, or the whole bone sinks within the capsule. That displacement is what horse owners mean by a foundered horse, and it is why the condition is assessed on **radiographs** rather than by how lame the animal looks. A bounding digital pulse and a reluctance to turn are the early warnings; rotation is the late one.

What are seedy toe and quarter cracks?

Both are failures of the hoof wall, and both follow the anatomy. **Seedy toe** (white line disease) is separation and crumbling along the **white line** at the toe, where wall meets sole; because the white line is the junction between insensitive wall and sensitive structures, a separation there becomes a channel for dirt and infection to track upward. A **quarter crack** is a vertical split in the wall at the quarter, usually starting at the coronary band and running down, and it recurs unless the underlying cause — an imbalanced foot, a sheared heel, or previous coronary band damage — is corrected. Both are farrier work as much as veterinary work, and neither resolves while the foot is still loading unevenly.

Are the front and hind hooves the same?

No. The **forefoot is rounder and wider** with a flatter sole — it carries the greater share of the horse's weight, commonly put at about sixty per cent, and is built to spread load. The **hind foot is narrower and more oval**, with a more concave sole and a steeper wall, built to grip and drive. They should be trimmed and assessed on their own terms.

What is the difference between sensitive and insensitive laminae?

They are the two halves of the same interlock. The **insensitive (epidermal) laminae** are dead keratin on the inner face of the hoof wall; the **sensitive (dermal) laminae** belong to the parietal corium covering the coffin bone and carry its blood supply and nerves. They interleave to suspend the bone — and it is the sensitive side that inflames in **laminitis**, which is why it hurts so much.

How does the horse's single hoof compare with a cow's foot?

The horse stands on **one digit** per limb, with everything — wall, sole, frog, coffin bone — devoted to that third digit. Cattle stand on **two**, with a claw on each of digits three and four, so the load is shared, the interdigital space becomes a site of disease in its own right, and the anatomy of lameness is quite different. A dog is different again, walking on **four** digits with claws rather than hooves and with a footpad taking the load. See our Bovine Anatomy guide for the ruminant version and Dog Anatomy for the carnivore one; Dog Muscle Anatomy covers limb tendons in a species that still has muscle bellies low down — something the horse has given up entirely below the knee.

When to refer

- **Laminitis** — failure of the laminar interlock; the DDFT then rotates P3.
- **Navicular syndrome** — the podotrochlear apparatus: bone, bursa, DDFT, collateral and impar ligaments.
- **Hoof abscess** — tracks in via the white zone; pressure has nowhere to go.
- **Digital pulse** — palmar digital vessels at the pastern; bounding means trouble inside the capsule.
- **Shoeing** — nails outside the white zone, in the stratum medium.
- **Thrush** — the central and paracuneal sulci of the frog.
- **Sidebone and quittor** — the ungular cartilages.
- **Corns** — the angle of the sole, between wall and bar.
- **Nerve blocks** — palmar digital for the back of the foot, abaxial sesamoid for the whole foot.
- **Hoof–pastern axis** — broken back means leverage on the laminae and the deep flexor tendon.

Sources

1. Ashdown RR, Done SH. *Clinical Anatomy of the Horse*. Mosby/Elsevier — source of the solar view, median section, transverse and frontal sections, the corium preparations and the radiographs of the digit.
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3. *Essentials of Clinical Anatomy of the Equine Locomotor System* — source of the palpable-structures figure, the suspensory apparatus, the sagittal section and the foot radiograph, with their numbered keys.
4. Floyd AE, Mansmann RA (eds). *Equine Podiatry* — hoof structure, function and disorders.
5. Baxter GM (ed). *Adams and Stashak's Lameness in Horses*, 7th ed. Wiley — the clinical reference for the conditions summarised here.
6. The British Horse Society — Hoof anatomy — open, owner-facing reference on hoof structure and care.

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