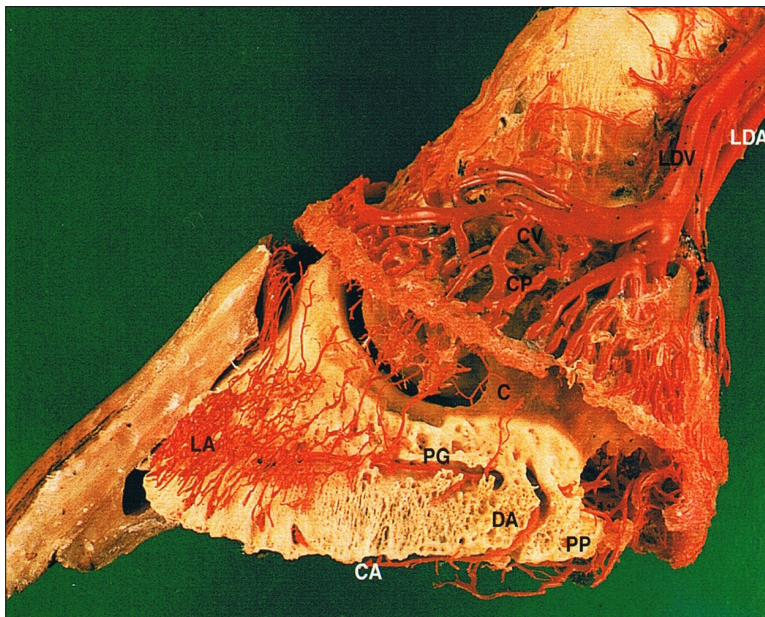




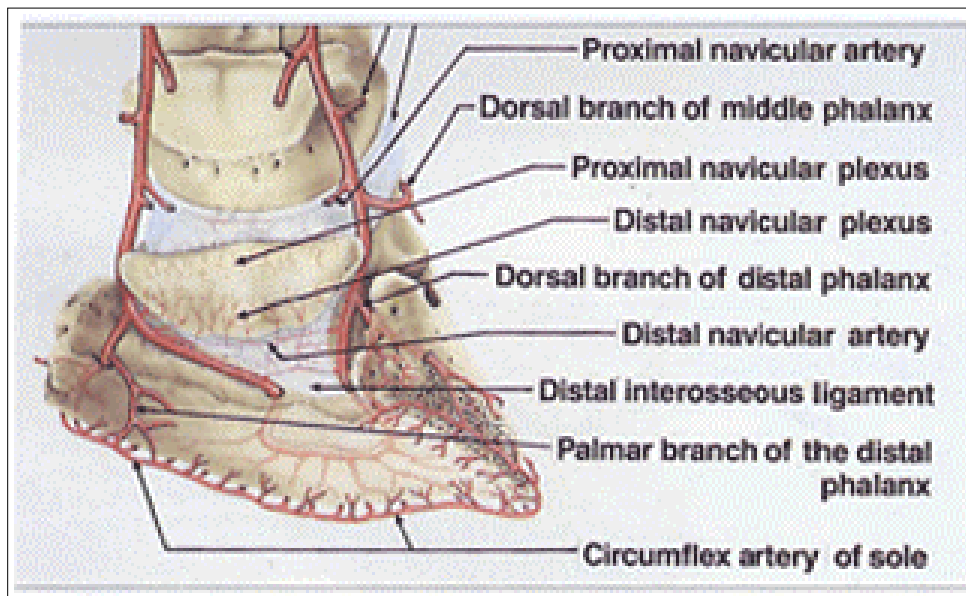
Blood Supply in the Hoof

The corium of the hoof is a layer of vascular (vascular - containing many blood vessels) tissue responsible for the production of the horn capsule. The corium in a large sized horse like the Warmblood is about 6 - 7 mm (ca. 1/4 inch) thick. The larger blood vessels exiting from the coffin bone and entering the corium become finer and finer as they branch into microscopic capillaries of the lamellae of the corium. In these microscopic capillaries cellular metabolism takes place - in this case the production of horn from proteins supplied by the blood stream.

LA-Laminar arteries, PG – Sulcus parietalis, C – lateral cartilage, PP – palmar process, CA – circumflex artery, DA – dorsal artery, LDV – lateral digital vein, LDA – lateral digital artery, CP – coronary venous plexus, CV – coronary vein

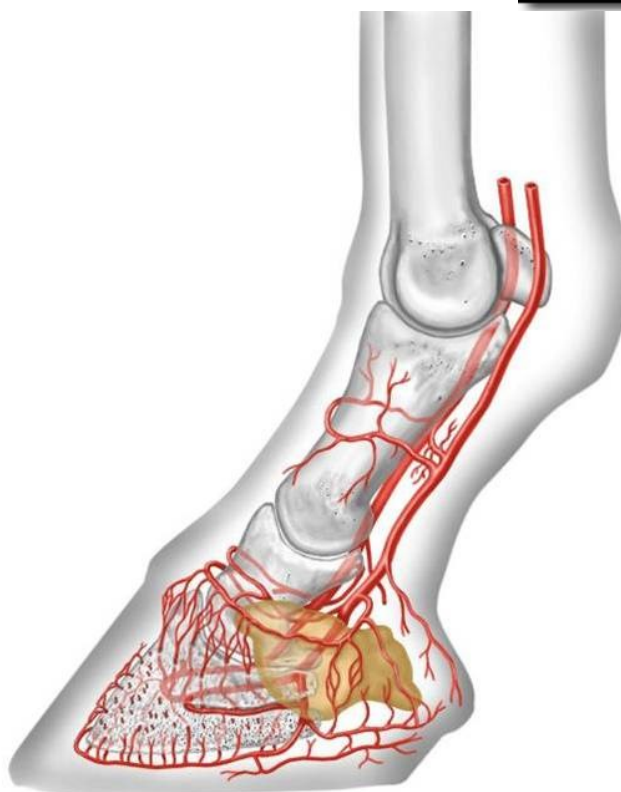
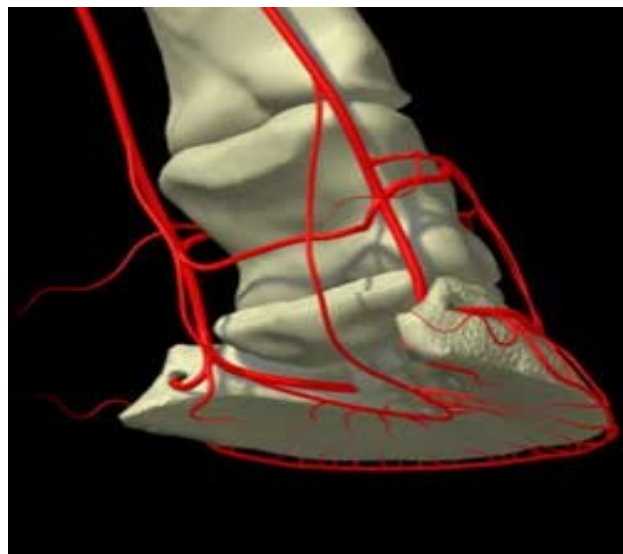


The blood comes into the hoof through the digital arteries, easily seen here coming from the top alongside the long and short pastern bone. In the region of the coffin bone joint these two arteries run towards the midline as they pass between coffin bone and navicular bone. They enter the coffin bone below the joint, but above the deep flexor tendon. In the middle of the coffin bone these two arteries join to form the terminal arch. The branches from these arteries exit the outer surface of the coffin bone and enter into the laminar corium.



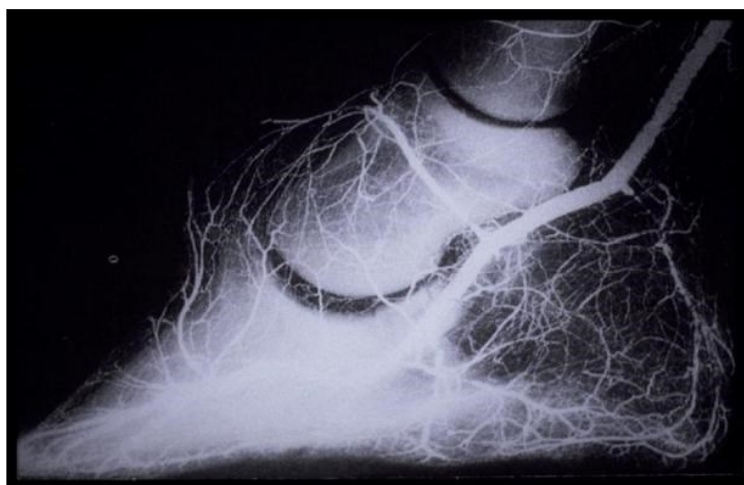


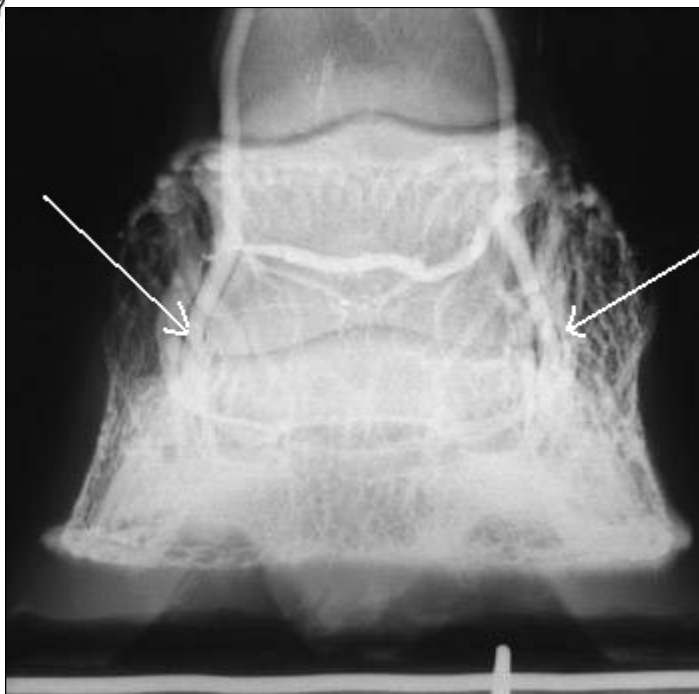
Another view of the arterial supply.
From the CD "The Glass Horse – Equine Distal Limb"



This is an excellent schematic of the blood flow in the hoof.
Courtesy Dr. Andrew Parks, University of Georgia

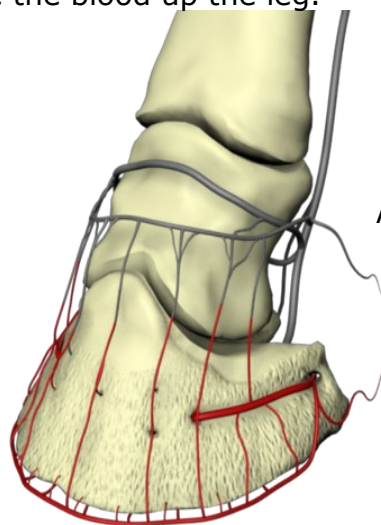
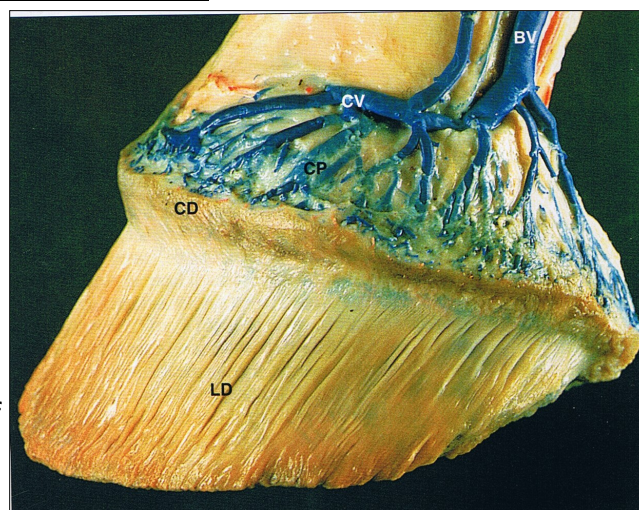
The solar edge of the bone is bordered by the circumflex artery. The circumflex artery is supplied by the arterial branches of the laminar corium.





Special arterial branches nourish the bulb and frog region of the corium as well as the periople and the coronary corium. These branch off the digital arteries in the region of the short pastern. Another branch leaves in this region and supplies the coffin bone laterally through the laminar corium. It is important to remember these alternate branches supply the coria in case the digital arteries are pinched shut in the navicular region.

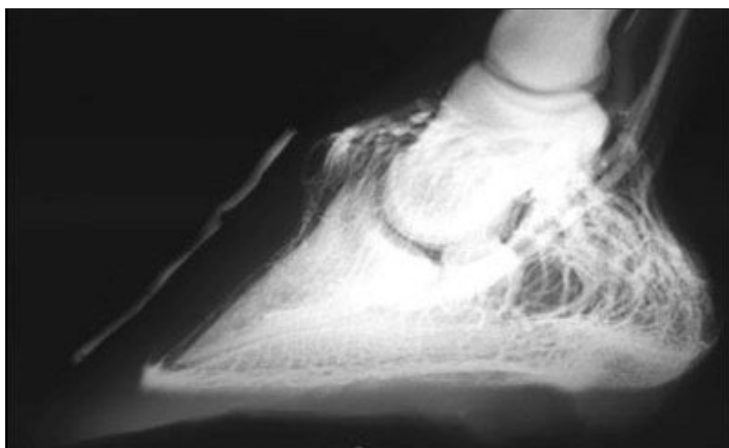
There are no veins returning into the coffin bone from the corium. The venous capillaries come together to become larger veins inside the laminar corium and from here run upward to the coronary corium inside the coronet where they form a system of veins, the coronary venous plexus. According to Bowker the horse is one of the very few species with specialized veins. The veins actually pulsate the blood up the leg.



A simplified view of the venous return



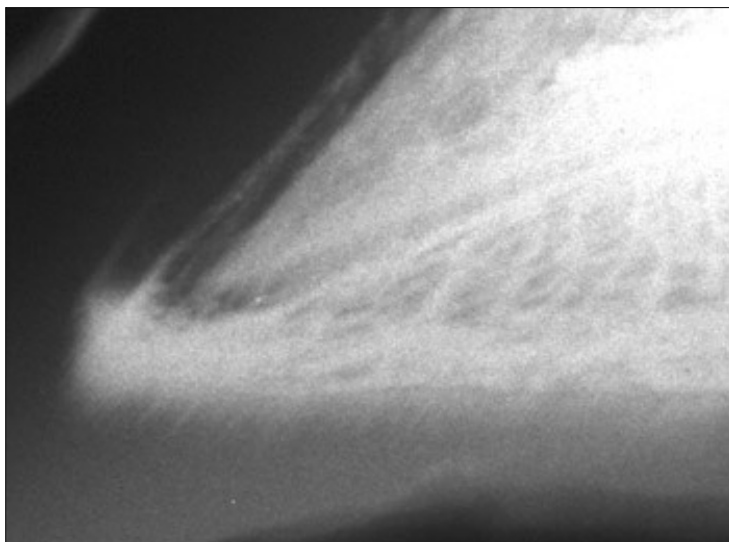
Lateral, normal venogram
(radiograph of foot with
contrast media injected into
the blood vessels) 5-year-
old Arabian mare.



Close-up of normal tip of P3.

Dorsal vasculature (blood
supply in the forward, or
toe, aspect of the foot) is 3
mm from dorsal P3 (same
as in the cross-section);

Papillae (small projections)
that perfuse (supply with
blood) the sole are evident.
Vasculature of the sole is 10
mm distal to (further from
the body than) P3.



Injecting the blood vessels with polymer and
removing all other parts of the hoof shows
again how vascular the hoof is (Dr. Chris
Pollitt study)

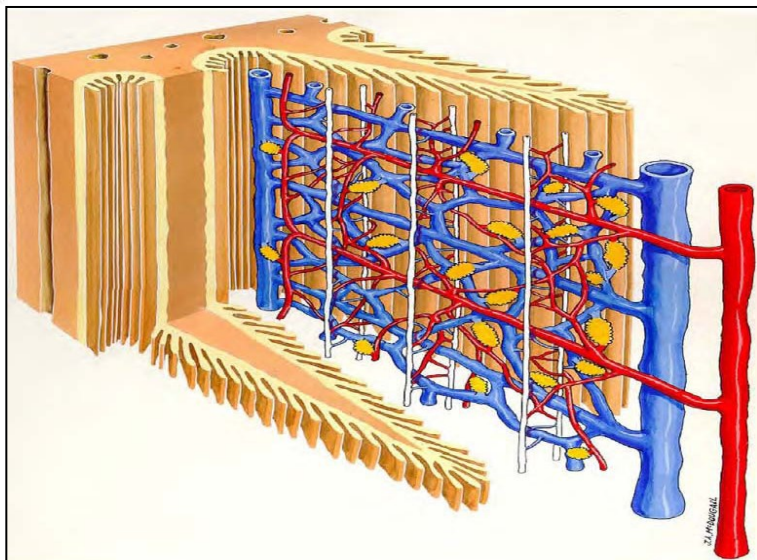


Diagram showing the dermal microcirculation. Arteriovenous anastomoses (short yellow vessels) are numerous and more concentrated near the bases of primary dermal lamellae. The capillaries (white) of the secondary dermal lamellae are shown reduced in number for diagrammatic reasons. (Dr. Chris Pollitt)

There is a school of thought that the digital arteries are pinched shut during weight bearing. In the following pictures from Dr. Bowker this theory does not hold up to the anatomical evidence. There is a channel in which the digital artery runs, and in this channel it is very protected from being squeezed shut.

