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Deformed claws in a rabbit, after traumatic fractures

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Rabbits have a total of 18 digits. Each front (thoracic) foot has 5 digits, of which the inward facing is the vestigial dewclaw that grows higher on the leg and does not reach the ground. Each hind (pelvic) foot has 4 digits.

All digits end in a hard, non-retractable nail that has a blunt end (Figure 1, 2). Their growth is life-long. Rabbit claws are dorsally concave and ventrally convex (Gerhardt,

1909). These keratinized appendages cover and protect the distal phalanges against shock and pressure from body weight. The nails' rounded shape provides grip when the



Figure 1: Kaspi, a castrated blue tan male, here at the age of 2 years, showing the bottom of its paw with a turned-up nail. Picture: A. van Praag.

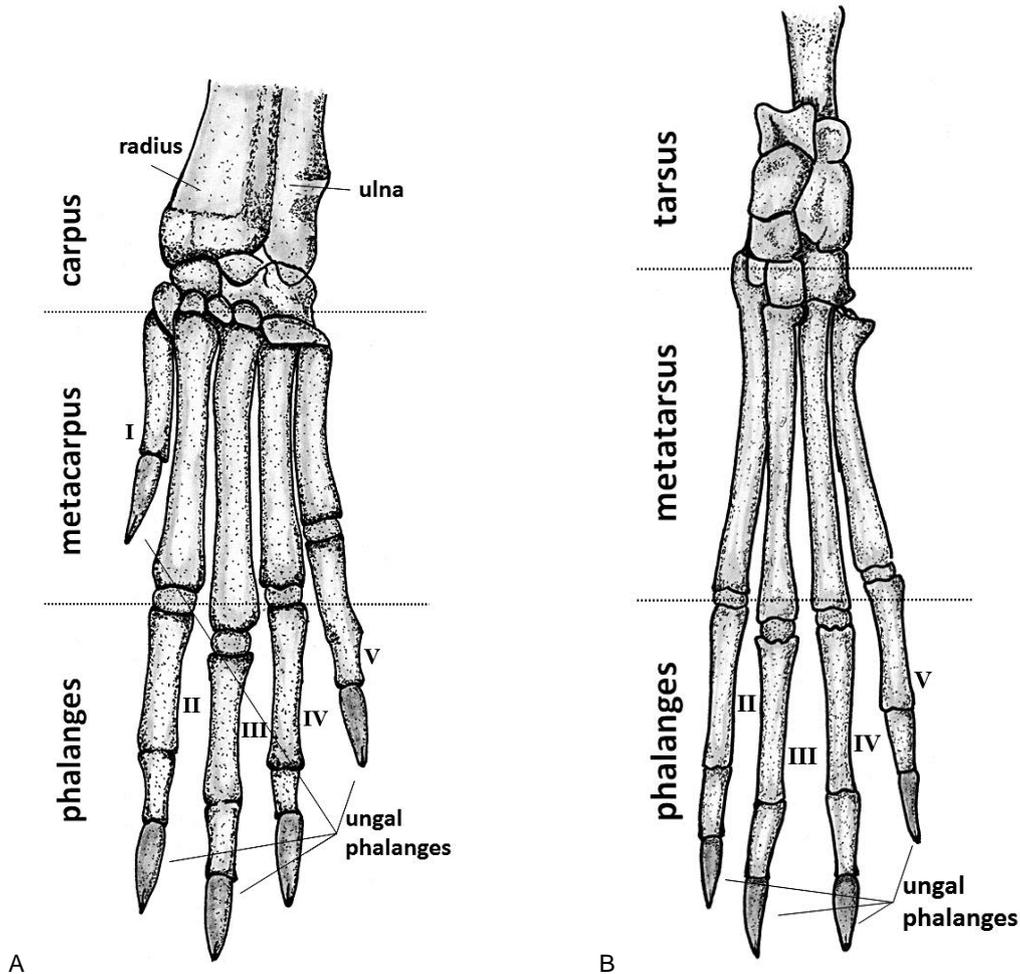


Figure 2: Dorsal view of the bone anatomy of rabbit feet: left front (A) and hind (B), showing 5 and 4 digits respectively. Drawings of feet after illustrations by Bensley, 1944.

rabbit moves and allows digging in soil.

The dorsal plate of the nail (*unguis*), consists of a hard, horny epidermis (*stratum corneum*), while the bottom (ventral) surface (*subunguis*) – where soft horn is produced, contains, in addition, a granular layer (*stratum granulosum*). The higher growth rate of the basal layer of the epidermis (*stratum basale*) on the dorsal ridge and its circular growth pattern generate the curvature of the nail (Aspinall and O'Reilly, 2004). The central part (quick), formed of dermal tissue, is sensitive and vascularized (Figure 3, 4).

Onychoclasia is not uncommon in rabbits (Figure 4), occurring when nails are

overgrown or badly trimmed, as a result of a rabbit's misjudged jump or a panicked escape, or when a toenail is caught in the small apertures of a wire grid or other uneven surfaces. Claw fracture may also be indicative of nutritional deficiencies. Although bleeding can be massive, healing prognosis is good and secondary problems rare.

Nail biting (onychophagia) is occasional in rabbits. Chewing and mutilation of the nails can relate to boredom or lack of attention, but more frequently they are the result of discomfort due to overgrown nails, the presence of bacterial or fungal infection of the terminal digit portion or the nail bed, or

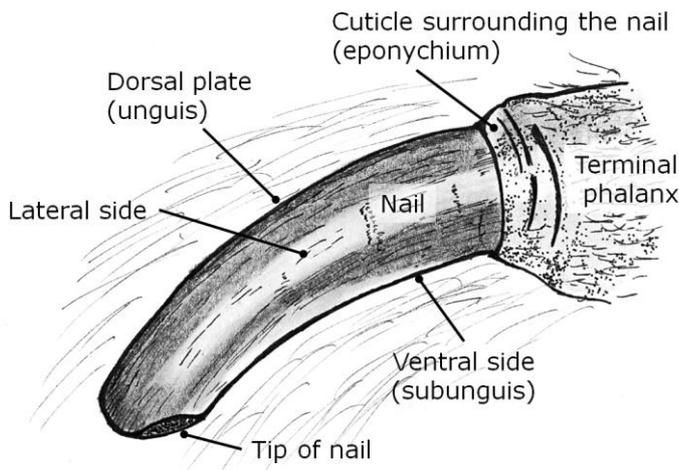


Figure 3: Side view of rabbit nail and its different structures.

the presence of skin parasites, e.g., *Demodex* sp. or *Sarcoptes scabiei*.

Diagnosis

It is difficult to identify the causes of nail diseases. A detailed history of the rabbit is, thus, important: husbandry, environmental hygiene, exercise possibilities, diet, secondary nail diseases related to an internal disorder, metabolic failure, or intestinal parasites.

Even if only one paw is affected, it is important to check all others to rule out the presence of skin parasites and bacterial or fungal dermatitis.

If bacterial infection and/or osteomyelitis are suspected, radiography will help assess the extent of the damage.



Figure 4: Detail of a torn nail (middle), compared with two healthy ones. The epidermal layer of the torn nail severed, exposing the outer papillary layer of the internal vascularized part of the nail (quick). Inset picture: A. van Praag.



Figure 5: Sideway growth of two claws of the front foot of Kaspi, here at the age of almost 9 years old. The deformed upper claw growth sideways and over the three digits of the paw.



Figure 6: A torn nail will grow back after some time. Usually growth is normal, but rarely, following damage to the nail bed and/or a broken quick, the new nail will show abnormal curvature, malformation, or absence of quick and ventral surface as here in a Rex female rabbit.

Treatment

The digit is examined in order to determine if the nail is still present. If so, the broken part is carefully trimmed with appropriated nail clippers (never use nail clippers with flat cutting sides or with blunt cutting blades) to avoid pain and onset of lameness.

A soiled foot should be washed with povidone-iodine diluted in water (1:3).

Injury or accidental clipping of the quick will result in active bleeding. Firm pressure with a clean cloth, a cotton ball (cotton wool is to be avoided as it leaves threads in the wound, that are difficult to remove), or gauze for up to 5 minutes or dabbing the nail with a coagulant or styptic powder, will help stop the bleeding. Baking flour or

cornstarch (corn flour) can be used instead; the powder will adhere to the bleeding nail and forms a hard mass that efficiently stops bleeding when drying.

If the front limb is affected and, if the rabbit accepts to be held without struggling, keeping the injured limb above the heart level will help decrease and stop the bleeding faster.

The rabbit must be seen by a veterinarian if bleeding has not ceased after 15 minutes.

The foot should be carefully examined when the affected toe becomes swollen. Infection is rare, but not impossible. If present, it requires aggressive antibiotic therapy to prevent spreading to the bone and onset of osteomyelitis.

Administration of analgesics helps relieve pain related to a broken nail, particularly when the break is near the nail bed or includes the sensitive quick.

Regrowth of a torn nail is a slow process that takes several months or longer. In most cases the new nail will grow back normal. If, however, the nail root has been damaged, the new nail will be irregular, twisted, or thin (Figure 1, 5, 6).

References

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