

VII. SUMMARY

On the development of the cat claw

The pre- and perinatal development of the cat claw was studied on 22 feline fetuses with a crown-rump-length (CRL) ranging from 40 to 160 mm and on six kittens up to 22 days of age. Light microscopical, histochemical, immunohistochemical and transmission-electronmicroscopical methods were used.

The pre- and perinatal development of the feline claw is divided into four phases:

1. In the first part of claw development, the end of the digit develops the characteristic claw shape: The bilaterally flattened claw is separated from the common skin dorsally by a shallow groove and ventrally by a skin fold. Additionally the anlage of the claw starts cornification.
2. In the second part – the CRL of the fetuses ranges between 75 mm and 104 mm - the dorsal ridge of the distal phalanx and the segments of the claw – except of the periople – will develop: Segment-specific modifications of dermis define the various segments; especially the characteristic dorsal ridge will develop; its proximal third belongs to the coronet, while its distal two thirds are part of the wall segment.
3. The development of the perioplic segment takes place in the third section of claw development: This part of claw development starts in fetuses with a crown-rump-length of 109 mm and is completed in fetuses with a CRL of 145 mm.
4. In the fourth part of development, growth and differentiation of the segments proceed: Cats are nidicolous, so that the development of the feline claw is not completed at birth. Modifications of the papillary body take place postnatally; the distal phalanx is not yet totally ossified at birth and its characteristic crest is still absent.

The results of this study show, that there are significant structural differences between the claws of dogs and cats, therefore it is not justified to speak of a uniform „carnivore claw“. One of these significant differences is the shape of the dorsal ridge, which in feline claws is so clearly separated from other dermal parts that the epidermis, resting on this dorsal ridge, will produce horny coverings, which the adolescent or adult cat either removes by whetting its front paws using appropriate objects, or by gnawing them off at the hind legs.

Different criteria indicate that in phylogeny the cat claw is the basic form of digital organs, and that the feline claw is phylogenetically older than the dog claw.

In the cat, the deciduous claw capsule is incomplete, because it is only formed by the distal part of the wall segment and by the sole epidermis, while it is absent in the other segments. In other animals, like horse and cow, wall and sole segment give rise to the main parts of the hoof capsule. The deciduous claw capsule is keratinized, but – in contrast to the hoof capsule – does not cornify.