

HANDS & FEET

Hand of Nine different Mammals PL. IV.



1. Man, 2. Gorilla, 3. Orang, 4. Dog, 5. Seal
6. Porpoise, 7. Bat, 8. Mole, 9. Duck-bill.

HANDS OF DIFFERENT MAMMALS

We were inspired by Ernst Haeckel's illustration of the hands of nine different mammals, which compares their osteological similarities.

We have isolated the 'hand' portion of eight corresponding Bone Clones® products and overlaid them on Haeckel's illustration.

Haeckel, a 19th century naturalist, promoted Charles Darwin's theory of biological evolution through natural selection.

Bone Clones®

1. Human hand H-01-M
2. Gorilla hand KO-208-A
3. Orangutan hand KO-202-A
4. Dog forepaw SC-344-184-D
5. Seal Forelimb KO-285
(Partial product shown. Radius, ulna, humerus included)
6. Dolphin Pectoral Fin KO-233
(Partial product shown. Radius, ulna, included)
7. Bat forelimb (Wing) KO-180
(Partial product shown. Radius, ulna, humerus included)
8. Mole (illustration only)
9. Duckbilled Platypus Skeleton SC-026-D
(Partial product shown)

Mammals, birds, reptiles and amphibians (as a group, called pentadactyl tetrapods) all derive from a prehistoric ancestor that had four limbs with five fingers and five toes.

As these vertebrates adapted to different environments and lifestyles, the form and function of their hands and feet evolved to best serve them.

While all extremities are derived from this basic osteological structure, the number, shape, and size of bones belonging to different animals reflects their specific environment and lifestyle.

The form of an animal's "hands" and "feet" depends on what the animal moves through (air, water, underground, on solid surfaces -- such as on the ground, rocks/cliffs, or trees), and how the animal moves.



This Ernst Haeckel illustration is free of known copyright restrictions and is therefore a public domain illustration.

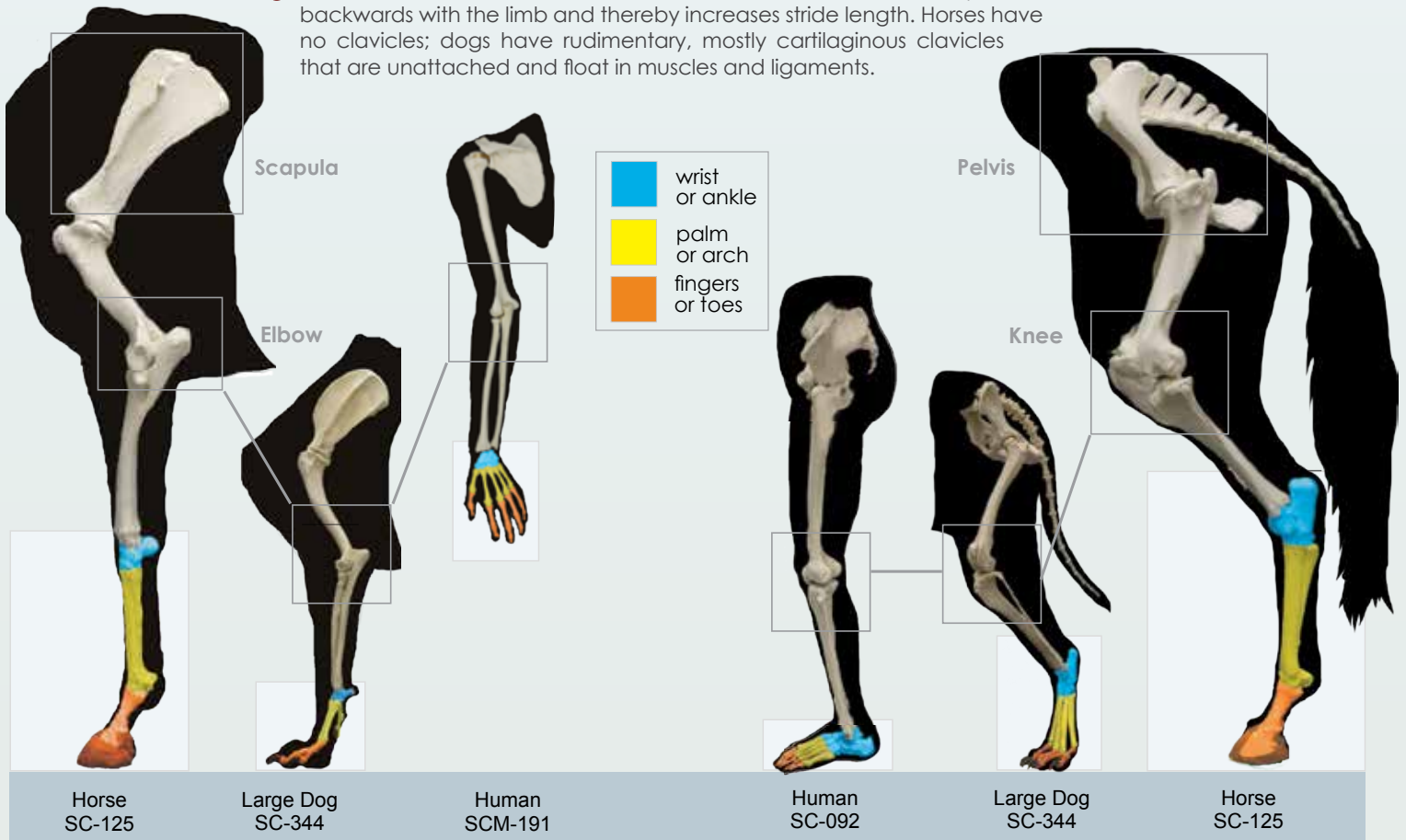
THE NEED FOR SPEED

What is the animal moving on, in, or through?
 What is the pace of moving from place to place?
 How many limbs does the animal use to get around?

These images depict the differences in length and number of bones between ambulatory and cursorial species.

Adaptations for speed over distance include:

- An increase in limb bone length, which increases stride length. In extreme cases, such as with ungulates, there is also a reduction in the number of limb bones.
- Adoption of digitigrade or unguligrade stance.
- Loss or reduction of the clavicle in mammals which allows the scapula to move forwards and backwards with the limb and thereby increases stride length. Horses have no clavicles; dogs have rudimentary, mostly cartilaginous clavicles that are unattached and float in muscles and ligaments.

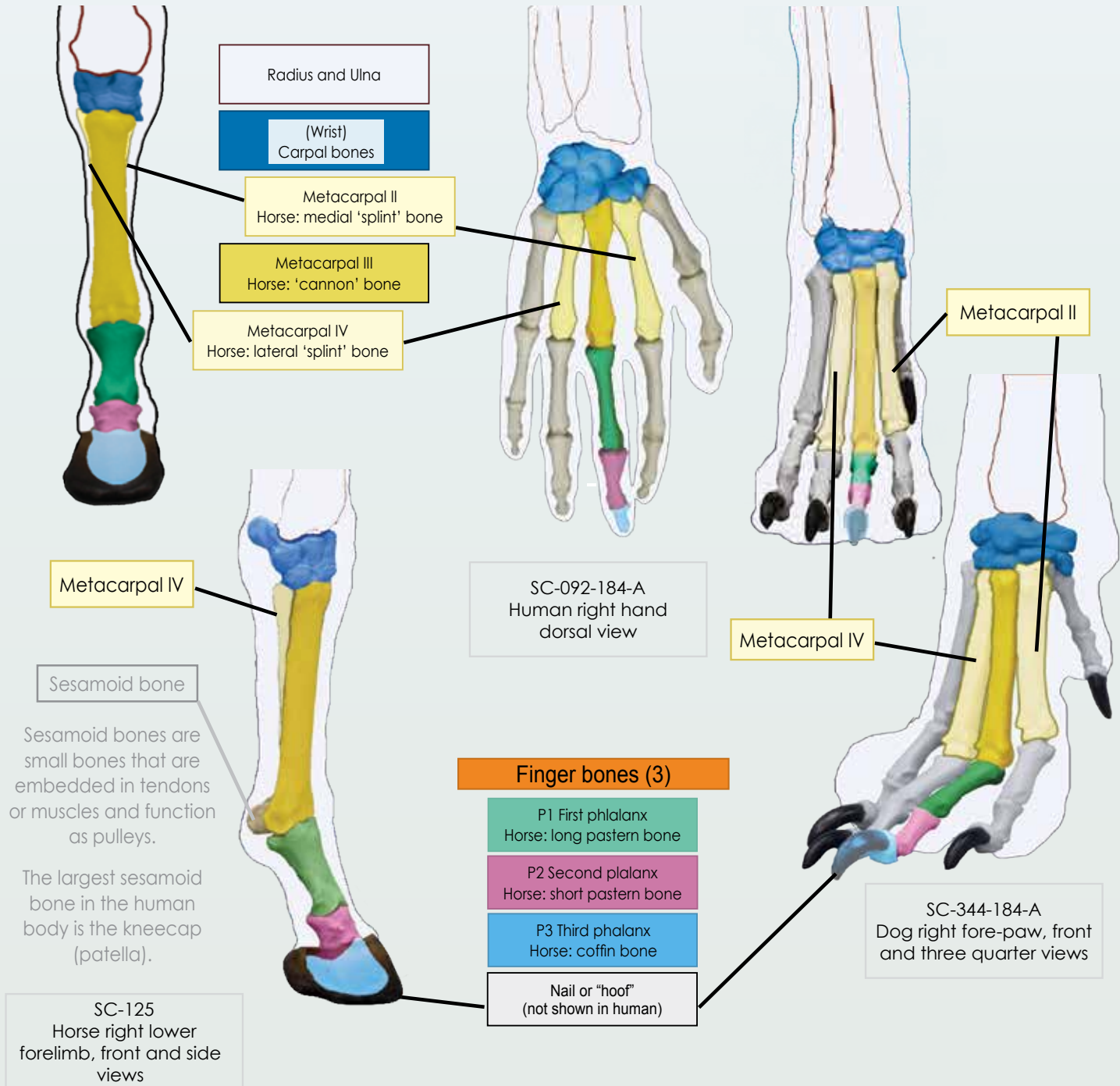


Hoof	Paw	Hand	Plantigrade	Digitigrade	Unguligrade
An enlarged, weight bearing toenail.	An animal's foot having cushioning pads and claws.	An end of a primate's arm having multiple fingers and, usually, an opposable thumb which allows for grasping and manipulating.	Walking on the sole of the foot. The front, middle and back of the foot touches (is "planted on") the ground.	Walking on toes. The three bones of the finger and/or toe digits touch the ground.	Walking on tip-toe. The tip of the extremity, usually the nail (hoof), touches the ground.
<p>Horses and Dogs: are cursorial terrestrial quadrupeds, meaning they walk and run on the ground using four feet, and they are adapted to moving over vast distances at high speed.</p> <p>Humans: are ambulatory terrestrial bipeds, meaning they walk and run on the ground using two feet, but are not specifically adapted to running over vast distances at high speed. Opposable thumbs allow for grasping and manipulating.</p>					

Colors depicted are for visualization purposes only. Products are produced in a natural bone color. Bone Clones® produces entire skeletons, articulated or disarticulated, as well as limbs, hands, feet, an individual bones. Human skeleton products include examples of age, sex and ancestry. Human half skeletons, disarticulated, also available. Please see our website for up-to-date product lists and pricing, or email us at info@boneclones.com.

Hands and feet have evolved in many ways to meet their owners' needs. Most terrestrial vertebrates are able to move quickly for short distances. Animals that are adapted to run for long distances or duration to survive (to catch prey or avoid predation), are called "cursorial." Primate hands that possess opposable thumbs enable their owners to grasp and manipulate.

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Nails, claws, and hooves are homologous, meaning they evolved from the same structure into different forms. All are composed of keratin.

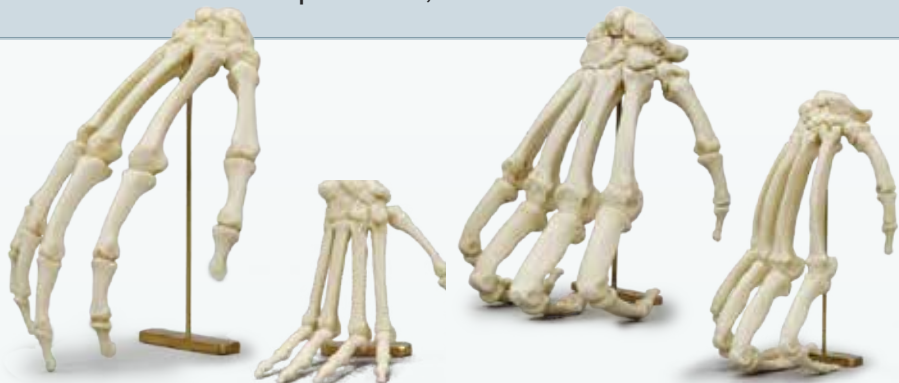
In humans and horses the nail is not attached to the third phalanx (third finger bone).
In dogs (and cats) the claw is the end (and a part of) of the third phalanx.



PRIMATE HANDS

Primates have adapted to a number of environments, and may live on the ground, in trees, or a combination of both. We offer hands in natural positions that demonstrate diverse adaptations. Additional lifecasts available, see our website.

In natural positions; includes brass stand



SC-092-184-LOC
Human
Resting

SC-010-184-LOC
Mandrill Baboon
Digitigrade

SC-028-184-LOC
Gorilla
Knuckle-walking

SC-003-184-LOC
Chimp
Knuckle-walking

Life casts



LC-33-PR
Aye-aye Hand and
Foot Set

LC-13
Gibbon Hand

SKELETONS

Bone Clones® Skeletons are durable and accurate, presenting 'hands-on' learning opportunities for subjects such as evolution, predator/prey relationships, environmental niches, and locomotion. At upper levels, many indicators of human age, sex, or geographic ancestry may be felt and observed. For art curricula, a vertebrate's internal scaffolding - its skeleton - can be observed, felt, and measured in three-dimensions to provide an understanding of the relationship between a vertebrate's internal structure and its external, fleshed-out, form.

Partial list of available skeletons

Zoological Non-primate:

SC-125 Horse
SC-344 Large Dog (Bullmastiff)
SC-026 Duck-Billed Platypus
SC-027 Komodo Dragon
SC-033 Atlantic Bottlenose Dolphin
SC-034 Giraffe (Head/Neck only)
SC-046 Florida Manatee
SC-049 Flying Lemur (Colugo)
SC-094 Goliath Frog
SC-312 Greater Flying Fox (Bat)
SC-074 Raven
SC-068 Bald Eagle
SC-073 Golden Eagle
SC-043 Harpy Eagle
SC-332 Black-footed Albatross
SC-165 Kiwi

Non-human primate:

SC-003 Chimpanzee
SC-028 Gorilla
SC-002 Orangutan
SC-123 Bonobo
SC-047 Siamang
SC-010 Mandrill Baboon
SC-069 Vervet
SC-137 Rhesus Macaque
SC-263 Weeping Capuchin
SC-265 Black Spider Monkey
SC-282 Indri Lemur
SC-353 Aye-aye

From the zoological fossil record:

SC-018 Sabertooth Cat (*Smilodon*)
SC-321 Fossil Dugong
SC-114 Short-faced Bear

Human:

Adult

SCM-192 European Male
SC-092 Asian Male
SCM-191 European Female
SC-211 Asian Female

Adolescent Child

SC-183 Modern 5-year-old
SC-116 Archaic 5-year-old
SC-187 14-month-old

Fetal

SC-226 32-Week Flexible
SC-186 Full Term

From the hominin fossil record:

SC-019 Neanderthal
SC-012 *H. ergaster*
SC-036 *A. afarensis* "Lucy"

Our skeletons are available articulated or disarticulated. Human half skeletons, disarticulated, may be ordered. Additional hands, feet, joints, limbs, life-casts, and bone sets are also available. Human hands may be ordered in several configurations: premium flexible, rigid, semi-articulated and disarticulated. Magnetic and beauchene hands are also available.

Please see our website for complete listings and pricing, or contact info@boneclones.com