# Dashboard – the Standard – selection of subjects

| | |
|---|---|
| 1. Beginning of the Breeding<br>1. Sheepdogs beats | 1. Standard<br>1. Breeding Building Strategy<br>2. Size |
| 2. Building relationships<br>2. Functions<br>2. Angulation | 3. Anatomy of the dog<br>3. Anatomy - conclusions |
| 3. Location descriptions<br>4. Passive muscoloskeletal Sytem | 4. Joints<br>4. Skeletal items<br>4. Bone segments |
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| 10. Structure<br>10. axial Skeleton<br>10. Structure | 10. Rip Cage<br>10. Sternum<br>11. Hindquarters |
| 11. Hindquarters muscular-bone<br>11. Pelvic gridle-thigh | Lower leg Hocks<br>Hindquaters outline angular position |
| 12. Hindquaters support lines<br>12. Deviation Profile | 12. Deviation from behind<br>13. Locomotion<br>13. Gravity |
| 13. Propulsion<br>13. Shift in focus<br>14. Loco.1<br>14. Loco.2 | 14. Swing<br>15. Locomotion gener.<br>15. Step<br>15. Amble |
| 15. Paßlauf<br>15. Trot 1<br>15. Trot 2<br>15. Trot 3<br>15. Shoulder | 15. Gallop 1<br>15. Gallop 2<br>15. Jump 1<br>15. Jump 2 |

Author: Lothar Quoll

# Beginning of the breed (before1890)

Herding Dogs from southern and middle Germany had a long lasting tradition.

Assessments of the anatomy or even shows and trials have not been done at that time for sure.

Selection was done based on the working value of dogs which have been known for their qualities working on the herd and therefore have been used by breeders.

In 1859 the English run the first dog shows for all breeds. From there dog sport spread throughout Europe.
In Germany the beginnings were in 1863. The first dog show was held as part of a agricultural show.
Herding dogs have been presented on dog shows much later.
Already in 1891 the founding of a Shepherd dog club named „Phylax“ failed after a few month.
Within this club breeders had agreed to breed „Luxury dogs“.
In 1899 the foundation of the „Verein für Deutsche Schäferhunde“ in 1899 was the corner stone for our breed.

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# Time of configuration

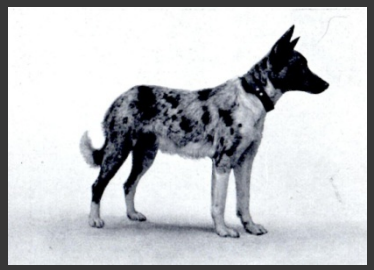
**There were many different types of figure, size and hair texture.**

**At that time the breeding pool had no unity as a breed.**

**Stick hair Shepherd,**
**“Würtemberger Gebrauchszucht”**
sables (gray color) *gewolkt*
yellow-sables marking

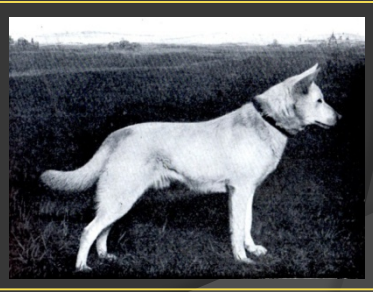
**Stick hair Shepherd,**
**“Thüringer Gebrauchszucht”**
red-yellow, *gewolkt*, yellow marking

**long hair Shepherd,**
**Herding trail dog**
**“Mitteldeutschland”**
black, yellow marking



**Stick hair Shepherd,**
**“Braunschweig”**
***Tigerscheck*,** black patch (spot) on
sables basic, white marking

***tuft hair coated* (zotthaarig) Shepherd,**
**“Süddeutschland”**
***“sogenannter Altdeutscher”***
(Ruß v. d. Krone, 241)



**Stick hair Shepherd,**
**“Norddeutschland”**
white dog
(Berno v. d. Seewiese, 43629)

**The breed‘s characteristics (standard) were laid down on September 20. 1899**

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# The breed standard

***Coat***
***The ideal dog has a double coat of medium length. The outer coat should be as dense as possible, hair straight, harsh and lying close to the body. A slightly wavy outer coat, often of wiry texture, is permissible. The head, including the inner ear and foreface, and the legs and paws are covered with short hair, and the neck with longer and thicker hair. The rear of the frontlegs and hindlegs has somewhat longer hair extending to the pastern and hock, respectively. Faults in coat include soft, silky, too long outer coat, woolly, curly and open coat.***

**For many breeds an ideal and a visionary appearance were defined.**
**For working dog breeds the body structure was configured in relation to the kind of use.**
**It was often tried to breed dogs with distinctive body characteristics.**
**Purebreeding dogs followed the model of the much older horse breeding. Here experiences had been made, which most of the dog-breeders had no idea of . The first place took anatomy, the knowledge of the animal‘s body structure. Horses, having been trained and tested through centuries in all kinds of gaits and performances, proved that only a harmonic body can show first class performance. Also, it appeared that the harmonic body always is beautiful. From such considerations, soon arose the knowledge, according to what characteristics dogs had to be bred.**

**The unifications of typical and individual body structures and propterties of temperament and character have been achieved through setting up the breed standard.**

Author: Lothar Quoll

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# The breed standard and further actions

**At that time there had not yet been much research on the mendelian law.**

**During the conformation shows the general public should be shown the breeding goal as defined in the breed standard.**

**Once a year the best male and the best female have been singled out in a special show and were awarded the title „Sieger“/“Siegerin“.**
**It was assumed that from beautiful dogs – „beautiful“ also in the sense of „good“– derive beautiful respectively good dogs.**
**This assumption was not wrong because generally, because an animal can only evolve a beautiful body, if it has the genetic disposition.**
**From this point of view awarding the title „Sieger“ was correct.**
**No doubt, the „Sieger“ title was a high non material and materialistic stimulation for the breeder.**
**Beyond dispute, the fast progress in improving the body structure can be credited to this.**
**As breeding Shepherd Dogs is not only „formbreeding“ , the different views had to be cleared.**
**The responsible persons very quickly recognized that „highlighting“ a single animal more or less leads to „formbreeding“.**
**On the other hand the „highlighted“ males had been used excessively for breeding.**
**At the time when the „Sieger“ title had been awarded to a dog, nobody knew how the dog would prove as a breeding animal.**
**Many dogs which had been awarded Sieger titles had no better breeding value than those which have not been lucky enough to be awarded the Sieger title.**

Give away Awards for Sieger first time 1900, for Herding trail dogs first time 1901, for Working dogs first time 1906.

Author: Lothar Quoll

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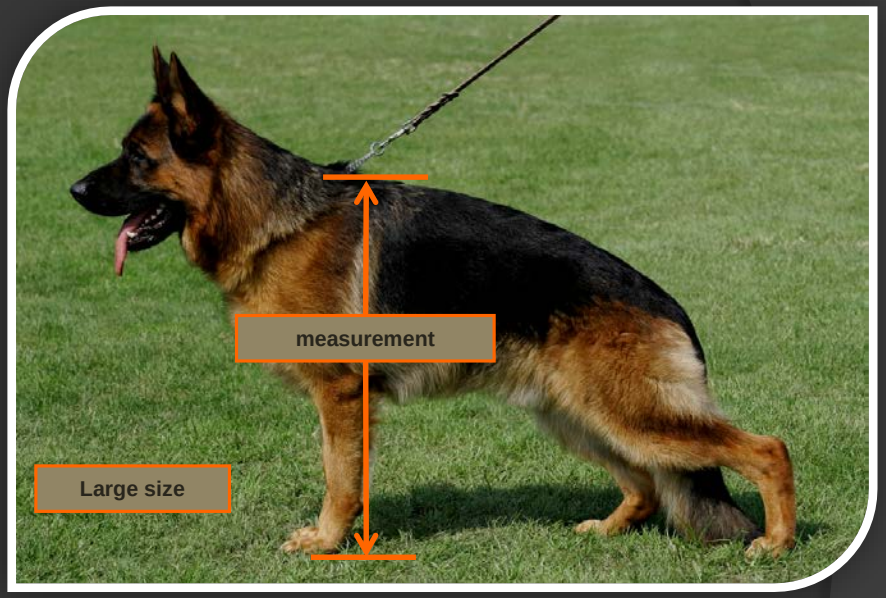
# The breed standard – Size

**The German Shepherd Dog is one of the medium size breeds.**

| Standard size | Female | Male |
|---|---|---|
| *) Deviation minimum – 1cm | 54 | 59 |
| *) Deviation maximum + 1 cm | 61 | 66 |
| Standard – Female (cm) | 55 | 60 |
| Standard Male (cm) | 60 | 65 |

*) Deviation within a range from 1 cm is allowed




**Measured the dog by the Körmaß from the withers perpendicular to the ground**
**- The elbow touching - is recognized. For correct size measure a straight and level base is a prerequisite.**

**The German Shepherd Dog is bred as a working dog and this requires being assessed towards his physical and mental working abilities.**
**The physical potential has to be understood not only in regards to working performance but also from the aspect of inner and outer organs.**
**(Der Musterhund H. Klein 1955)**

Author: Lothar Quoll

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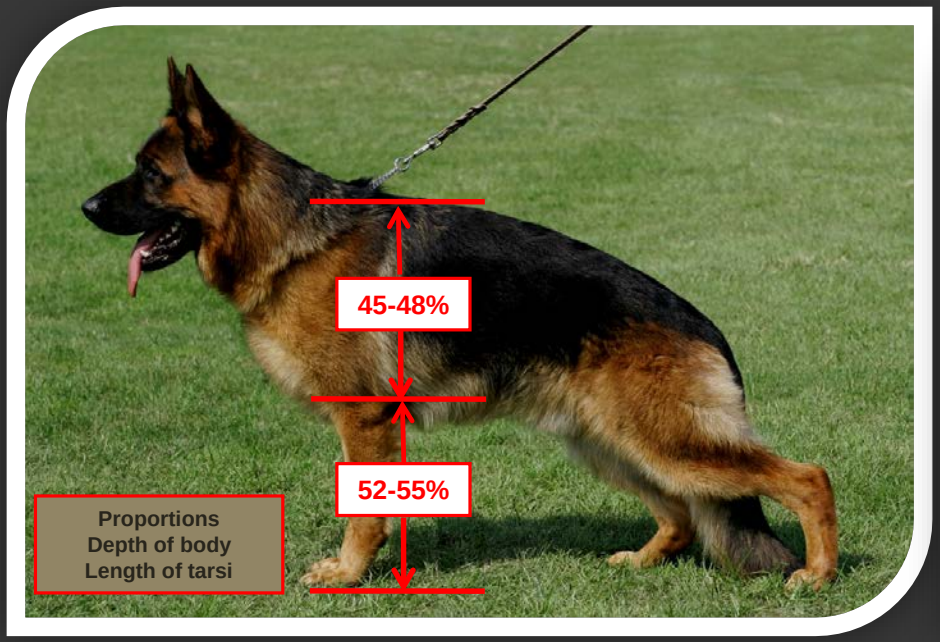
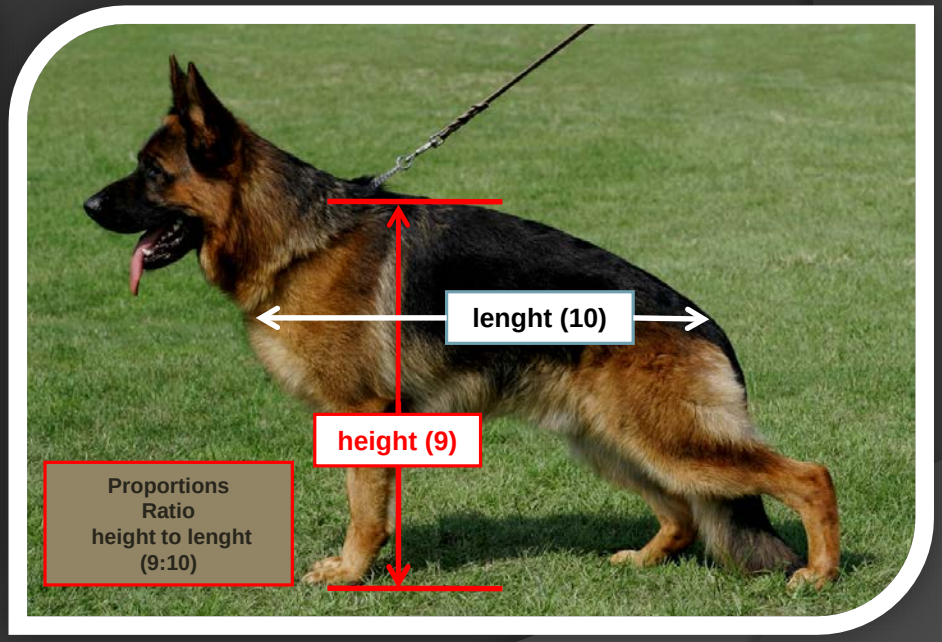
# The breed standard – Proportions

The main attributes of physical potential are endurance, strength and agility. Each of them is essential in a similar way.
We know that those requirements can be met the best with a medium sized and accordingly strong body. Falling below the standard size results in losing the required strength, however, when the measure is exceeded the endurance is affected through the maintainance of harmony.




The correct proportion of length is defined that, with a moderate length of the back, a good overall lenght of the body is reached through the depth of fore- and backhand.

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# The breed standard- ratio – body stretch

**The depth of the chest should be about 45% and the length of bones about 55% of the height at withers. A correct angulated forequarter with an angulation of almost 90° is important for the balance of anatomy . Also the deep angulation of the hindquarter , as well a long, slightly sloping croup with an angulation of about 23°. The German Shepherd Dogs as a trotter differs from many galloping breeds through characteristics like a rectangulary body, deeper angulation of fore and hindquarter and a longer, sloping croup.**

**The natural body stretch is necessary for three important functions**

***function 1***

**In the move forward the shortest distance of transmitting the power from the hindquarter to the forehand which absorbs and perputates the move.**

***function 2***

**In the move forward the shortest distance of transmitting the power from the hindquarter to the forehand which absorbs and perputates the move. On the other hand it gives the necessary requirements for firmness and agilty to the body.**

***function 3***

**Another essential function to reach the three requested characteristics and especially for endurance is fulfilled through the angulation of the extremities and the length and position of the single bones or flanks to each other. Those special angulations of the trotter body, inherent from nature, cause a elongation without increase in height i.e. the longest possible increment with retention of the necessary stability of the body.**

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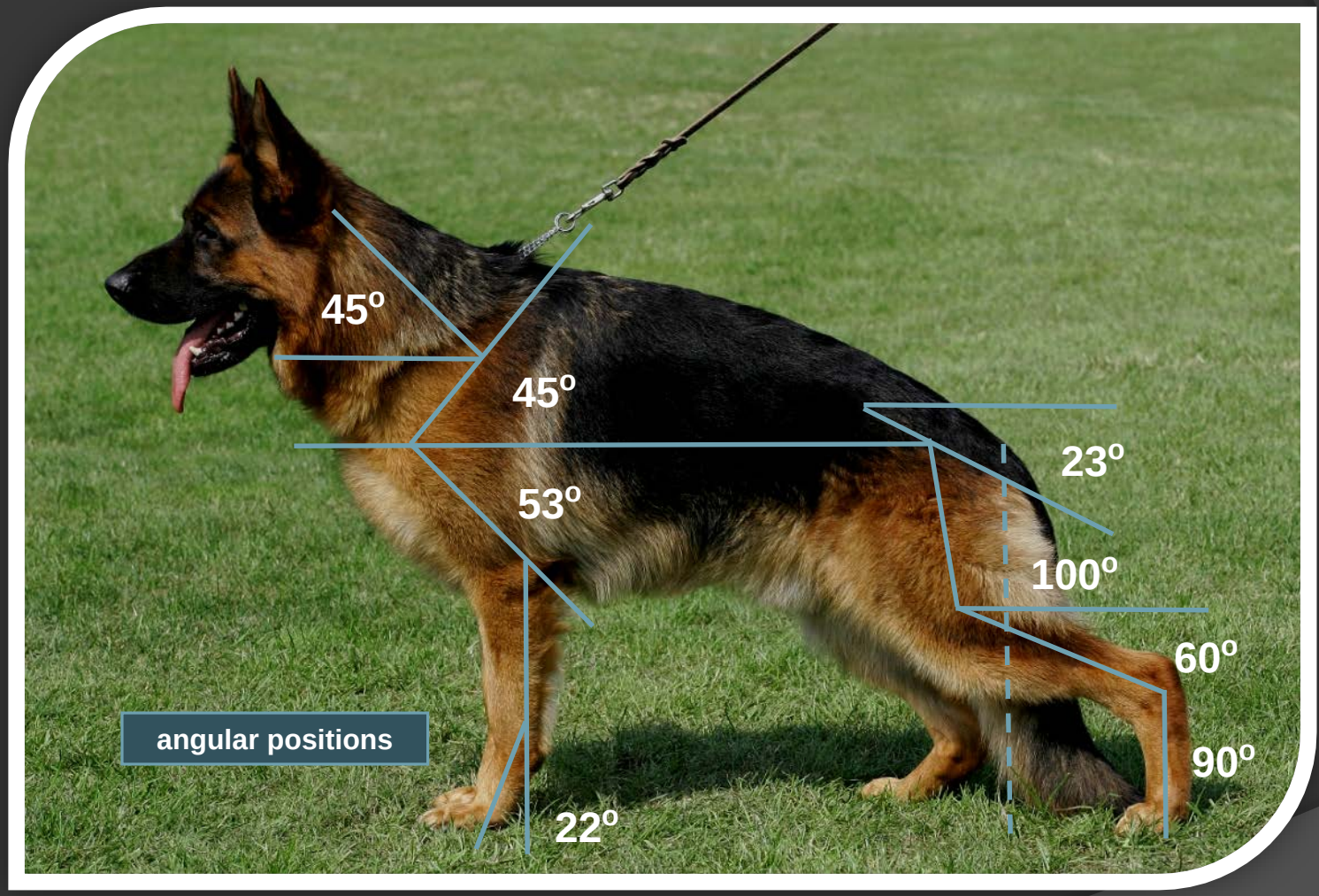
# The breed standard- body ratio, angulation




**With this the frame of the build is given. A naturally good depth of the chest as result of normally developed organs complete the harmonic picture.**

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# The breed standard – anatomy – introduction 1

The anatomy, part of the morphology, of composition and therefore also a discipline of biology, the doctrine of live itself gives information about the structure of living creatures.
Originally, anatomy, in the proper meaning of the word anatomize or also art of anatomize, was to cut, to disjoint. As time went on the targets overgrew the simple cutting of the body.
Its ambition is the exploration of form, texture and function of the living organism and his parts. This goal cannot be reached by simply cutting the dead body into pieces. However, cutting the body methodically into pieces gives information which make it possible to understand with further examination methods also the harmonic cooperation of the living organism.
By anatomizing the dead body of an animal we have the possibility to describe, to register and to systematize the single parts per position, fixation, form, size and so on.
Each cynologist knows that the skeleton is the frame of the dog and works as compendium of the body. However, it is not so well known that the skeleton of the dog is much less inelastic than, per example, the skeleton of a horse. The single skeleton parts of the horse are kept together through mostly very strong lingaments and tendons; the dogs lingaments are always weak developed and primarily the muscles keep the single bones together and give the frame its inner firmness. The muscles of the dog are relatively stronger and much more complicated than those of a horse.

Author: Lothar Quoll

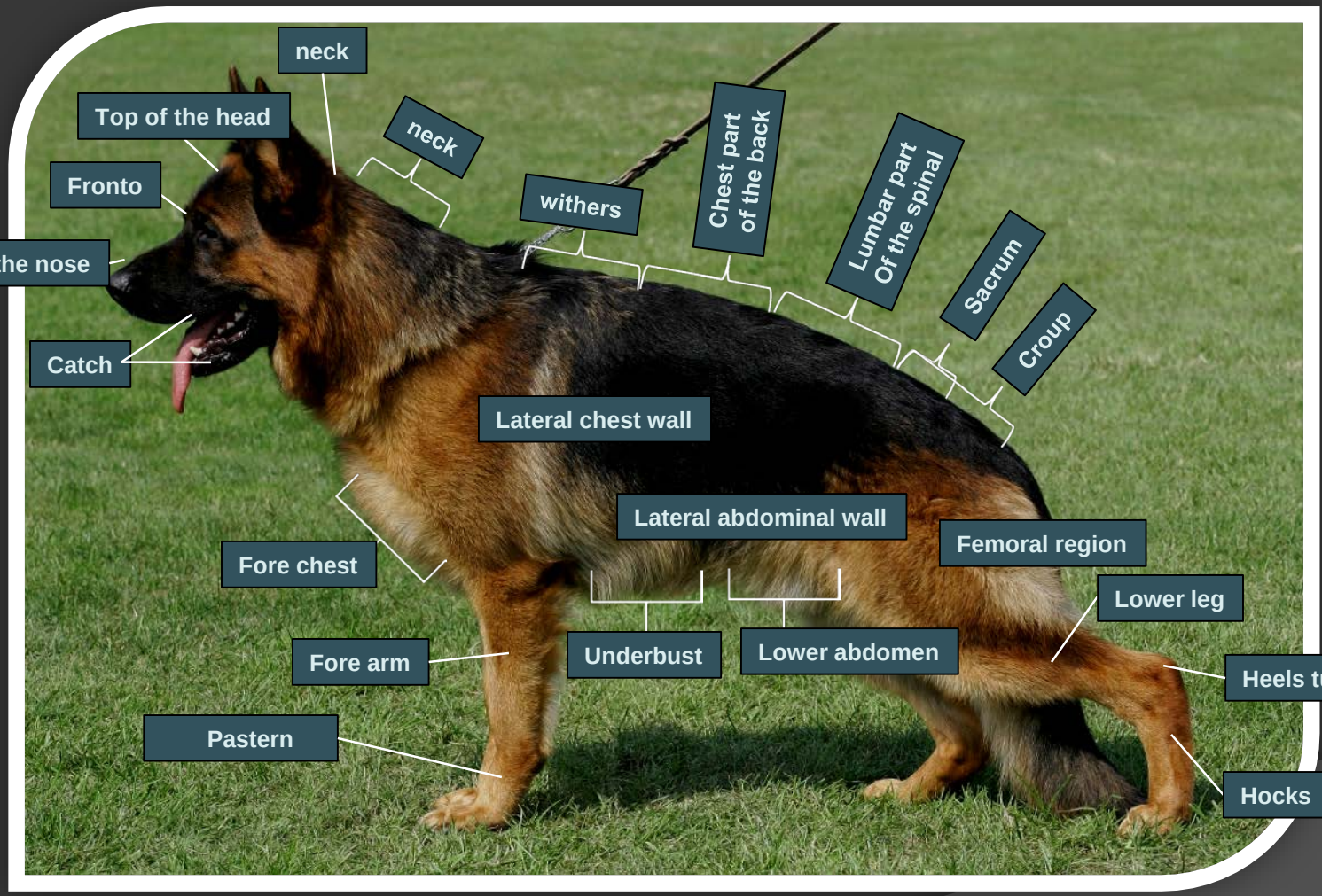
# The breed standard – anatomy - introduction 2

**This causes two things:**

**First, the dog is much more agile and lithe and therefore much more difficult to judge. He will never stand calm for a longer time and will hardly take the exact same position a second time. Not only physically but also mentally he is more agile and more labil than most other pets and therefore, also his appearence depends on the mood. The same dog presents itself completely different in emotion or when he is scared, refracted, without interest or tired.**

**Second, the single skeleton parts are not fixed passive as the horse skeleton but primarily through active muscle work; this causes that, as well when he is standing as while moving the weight has to be carried by muscles which can fatigue and not from passive ligaments, tendons and fascie. Because of this the dog is not able to carry heavy load or to stand for a longer time. It is well known that he will use each possibility to sit or lay down in order to relieve his muscles and to keep them always prepared for use in motion. Due to his comprehensive muscles the dog is an extraordinary quick and lithe mobile animal.**

# Parts of the body and position descriptions

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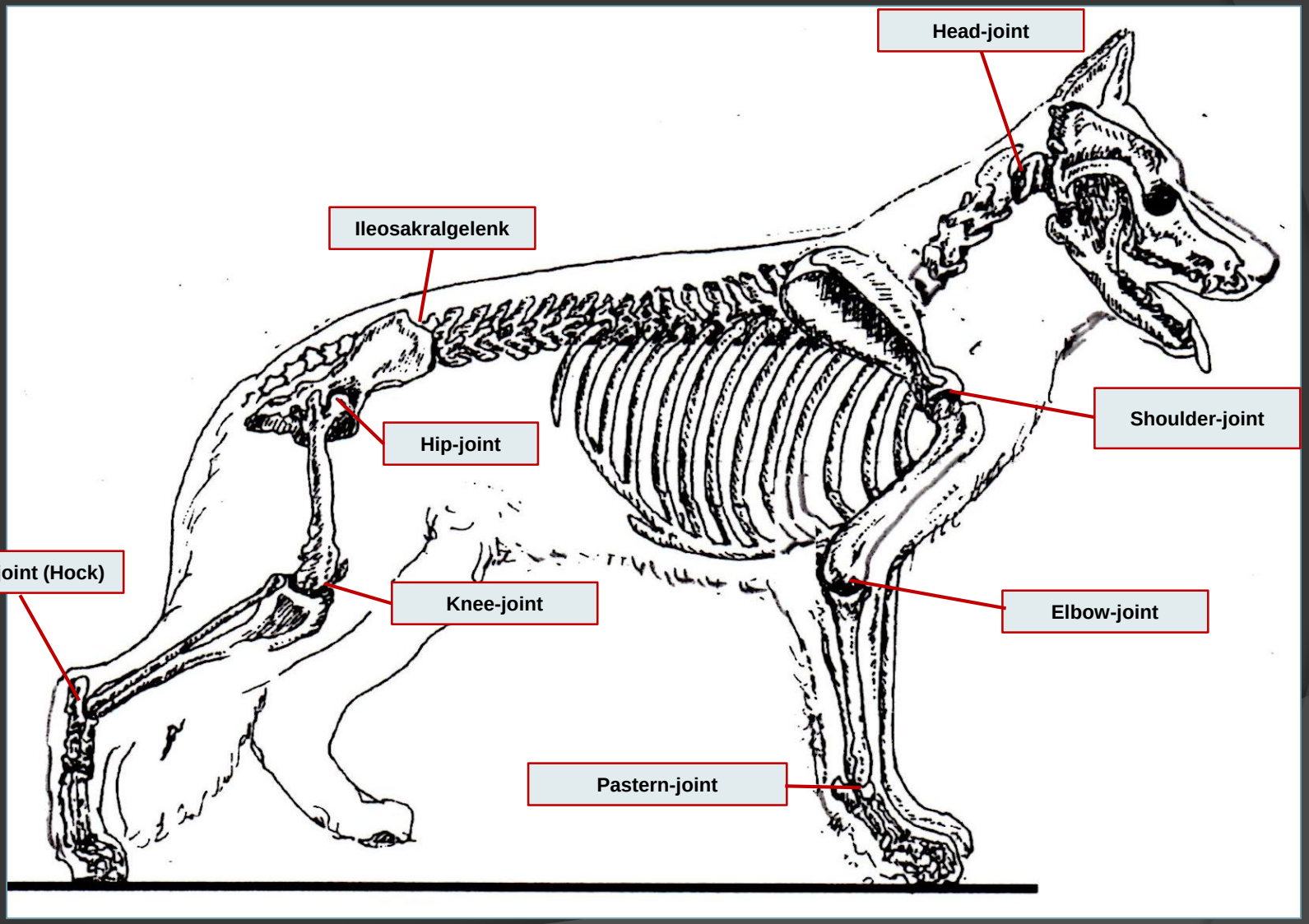
# The breed standard – the skeleton

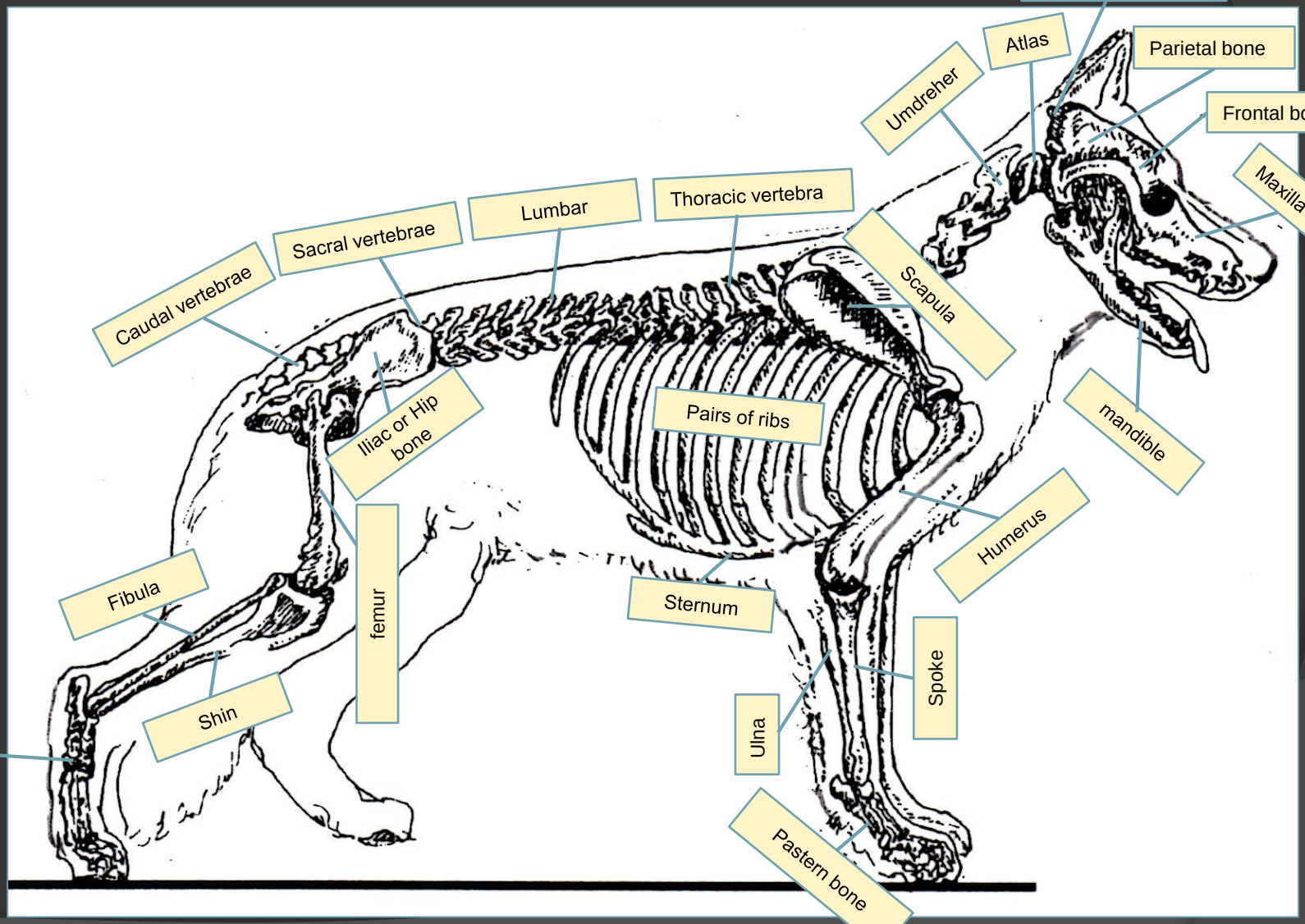
- All bones together form the skeleton. It is also called the passive muscoloskeletal system.
- The skeleton gives the body the necessary firmness and basis to perform movement in impulse.
- The skeleton is also the basis for the type- and individual specific constitution of the body.
- This weight bearing skeleton can ensure the enabling of movement by formation of flexible connection of the single bones, the joints.

Author: Lothar Quoll

# The joint articulation



# The skeleton system (vertebra and Bones)

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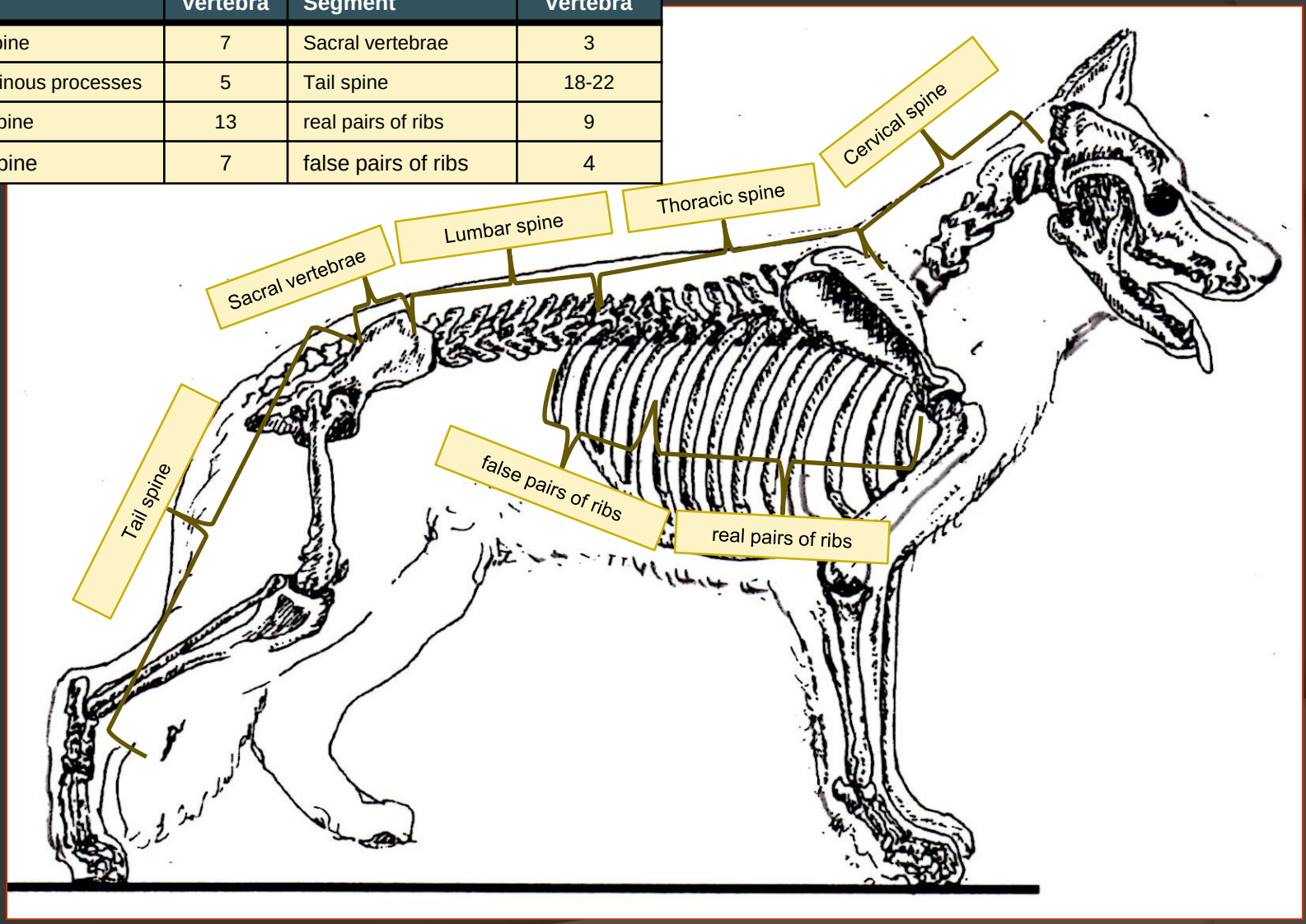
# The Skeleton segmentation (number of vertebra)

| Segment | vertebra | Segment | vertebra |
|---|---|---|---|
| Cervical spine | 7 | Sacral vertebrae | 3 |
| Withers spinous processes | 5 | Tail spine | 18-22 |
| Thoracic spine | 13 | real pairs of ribs | 9 |
| Lumbar spine | 7 | false pairs of ribs | 4 |

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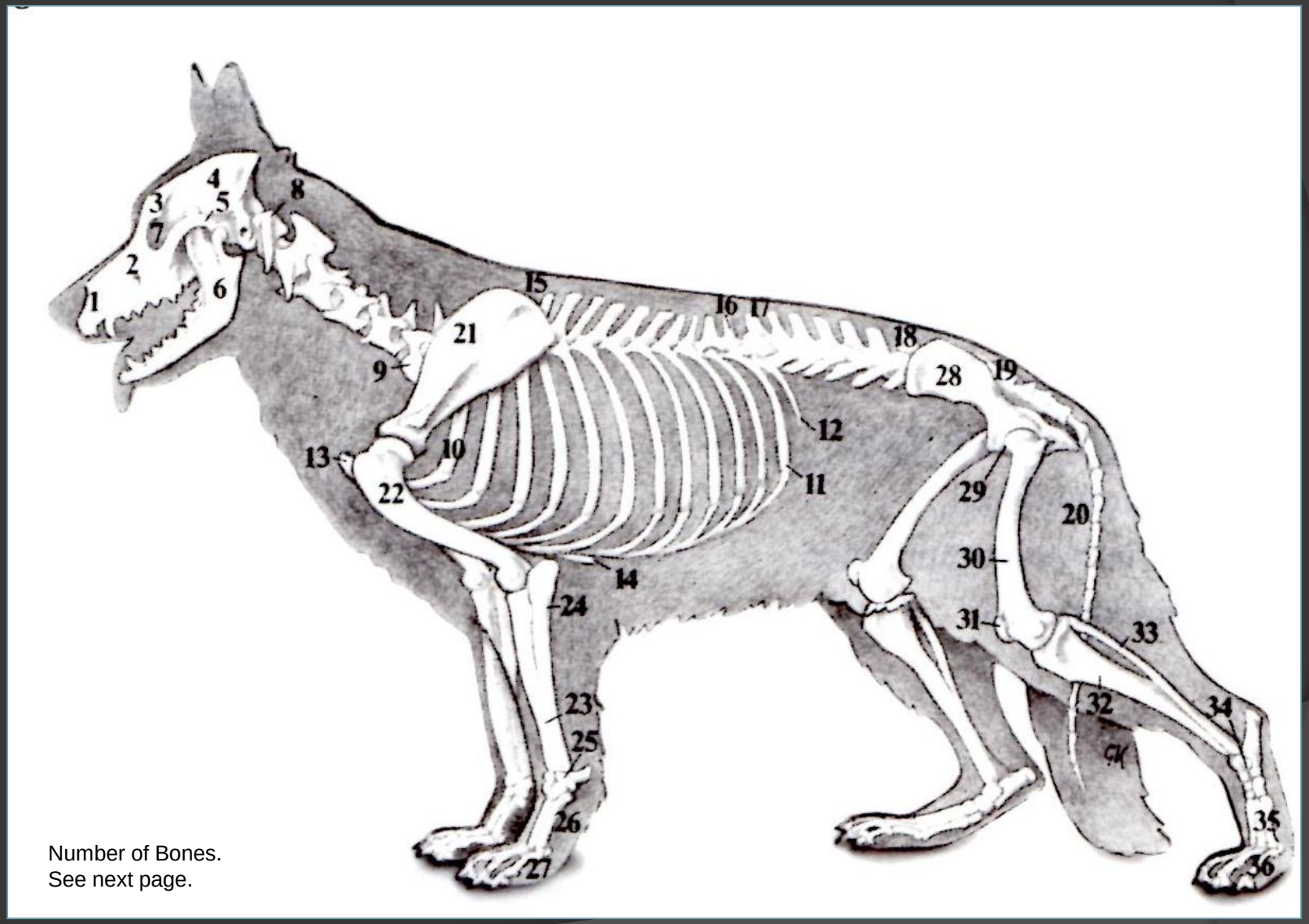
# The Skeleton – number of bones




Number of Bones.
See next page.



Dashboard

# The Skeleton - number of bones

| List of bone (see page before) | | | |
|---|---|---|---|
| 1 Incisive bone | 11 Twelfth rib | 21 shoulder blade (Scapula) | 31 Patella |
| 2 Maxillary bone | 12 Rib meat | 22 Upper arm | 32 shin (Shinbone) |
| 3 forehead (brow) | 13 Sternum top | 23 spoke (Radius) | 33 Fibula |
| 4 Braincase | 14 Sternal notch | 24 Ulna | 34 Hinterfußwurzel |
| 5 Zygomatic arch | 15 Third thoracic vertebra | 25 Vorderfußwurzel | 35 Hocks |
| 6 lower jaw (Mandible) | 16 Thirteenth thoracic vertebrae | 26 Pastern | 36 Behind toes |
| 7 orbit (eye socket) | 17 First lumbar | 27Front toes | |
| 8 First cervical vertebra | 18 Seventh lumbar | 28 Basin | |
| 9 Sixth cervical vertebra | 19 Sacrum | 29 Hip joint | |
| 10 first rib | 20 Caudal vertebrae | 30 Thigh | |

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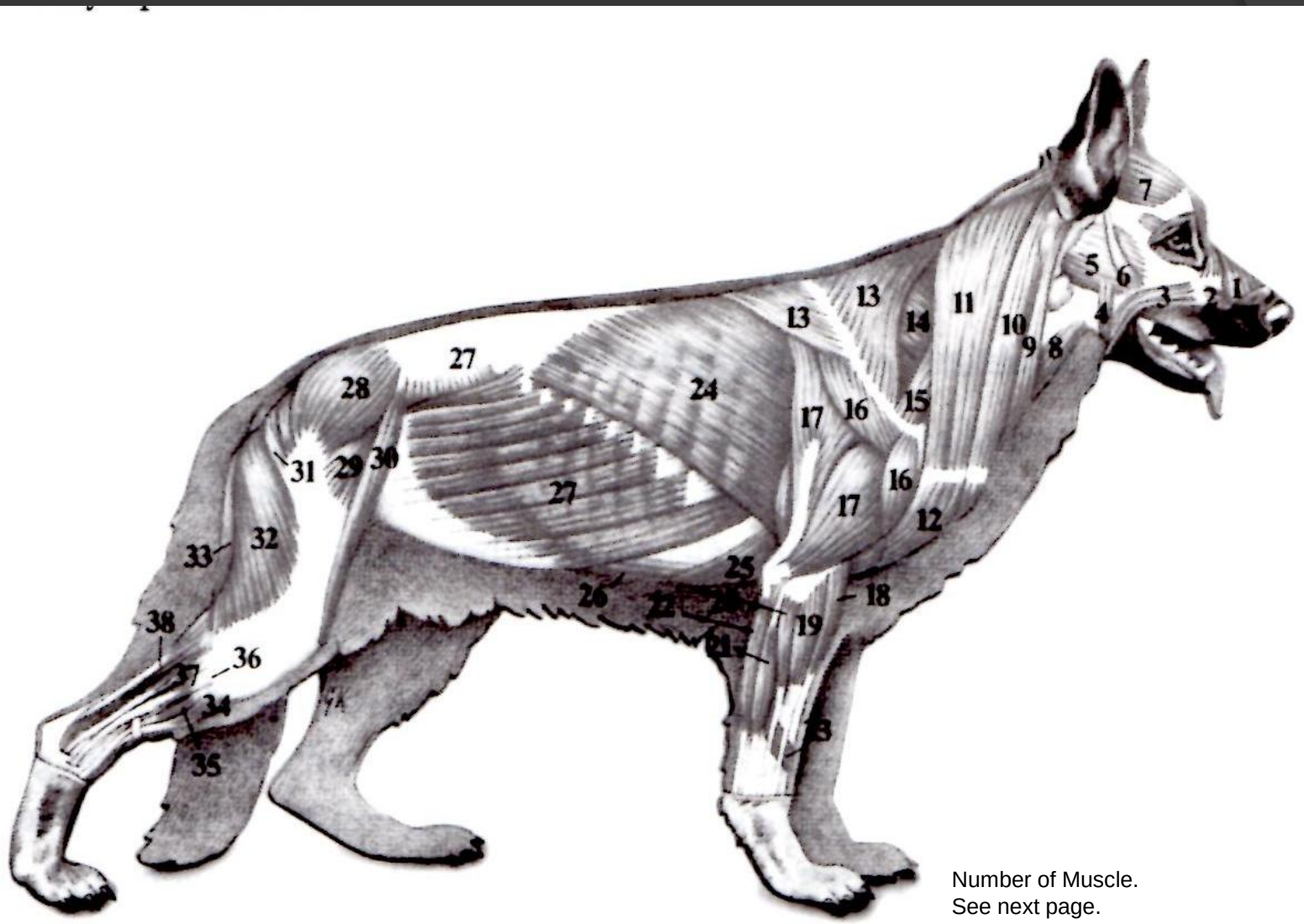
Dashboard

# The breed standard – the muscle system

- In order to realize body movement the animal needs all active muscles and passive bones which are together the muscoskeletal system.
- The bones act like intern cranks on which the muscles are adhering.
- The muscoskeletal system which is composed of many muscles realizes the work of all movement as well as of the single limbs as of the limbs of trunk and head and the complete movement of the whole body.
- The requested dynamic work for movement is realized in co-action of the active muscoskeletal system and the passive skeleton system.

# The breed standard – the muscle system




Number of Muscle.
See next page.



Dashboard

# The breed standard – number of muscles

| List of muscles (previous page) | | | |
|---|---|---|---|
| 1 Upper lip lift | 11 Clavicle and neck muscle | 21 Outside elbow extensors | 31 Krupp superficial muscle |
| 2 Nose jaw muscle | 12 Collarbone upper arm muscle | 22 Inner elbow extensors | 32 two-headed top property grandson muscle |
| 3 Lip sphincter | 13 trapezius muscle | 23 Long Overcoat up (thumb) | 33 Halbsehniger muscle |
| 4 Back muscle | 14 lower toothed muscle | 24 Latissimus Dorsi | 34 Tibialis anterior |
| 5 Outside masseter | 15 Shoulder and neck muscles | 25 Deep pectoral muscle | 35 Long toe extensors |
| 6 Jochmuskel | 16 deltoid | 26 rectus abdominis muscle | 36 Long calf muscle |
| 7 temporalis muscle | 17 Three Biceps | 27 External oblique abdominal muscle | 37 deep Zehenbeuger |
| 8 Breast hyoid muscle | 18 Outer spokes muscle | 28 Middle Krupp muscle | 38 Heel tendon strand |
| 9 Depressors auricle | 19 Common toes plug | 29 Tensioners Schenkelfaszie | |
| 10 Sternal head muscle | 20 Lateral toe extensors | 30 sartorius | |

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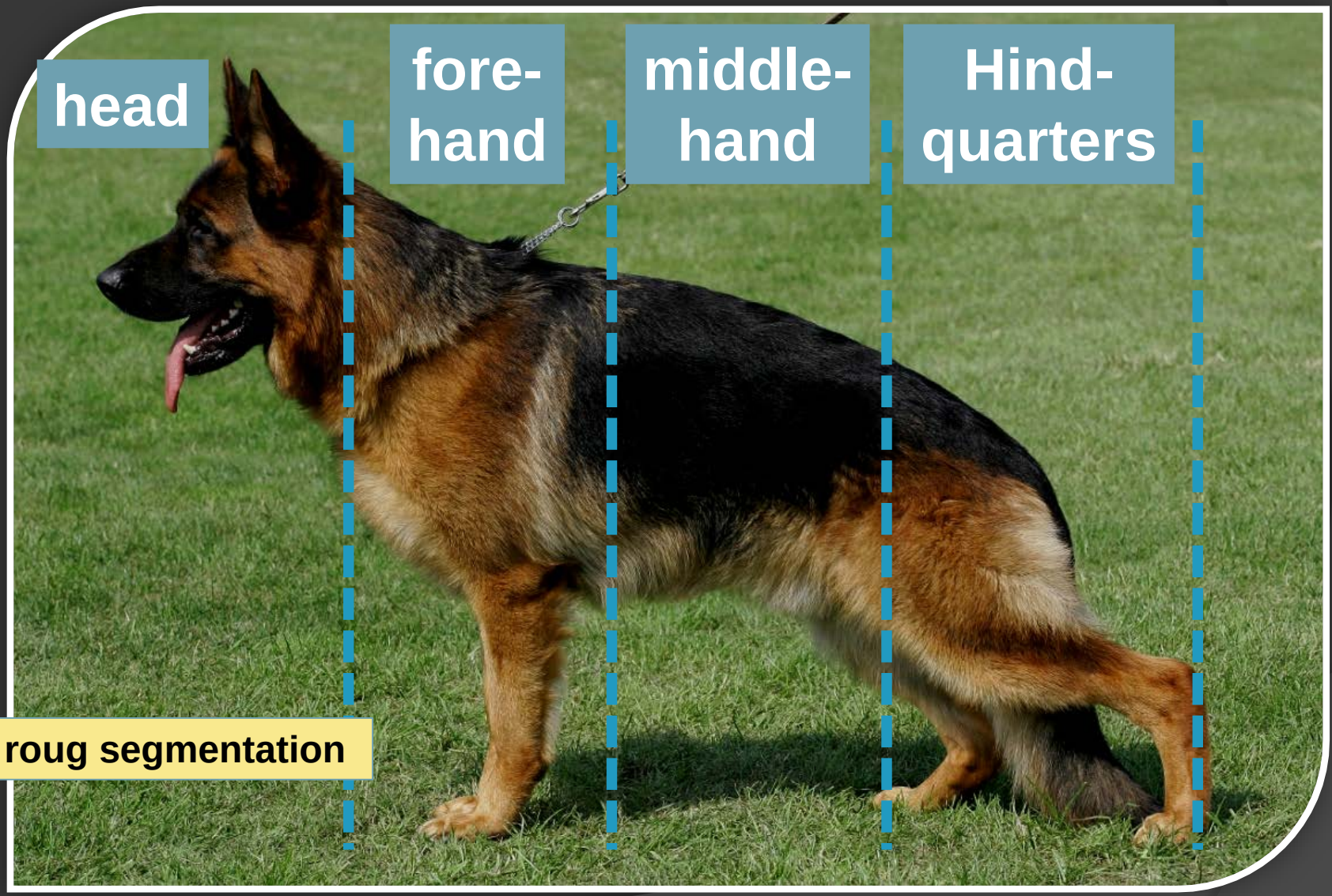
# The breed standard – rough segmentation



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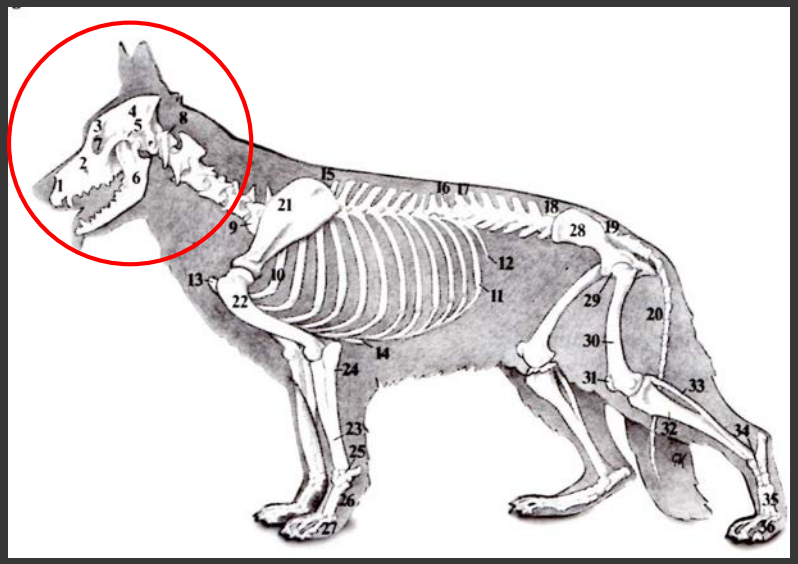
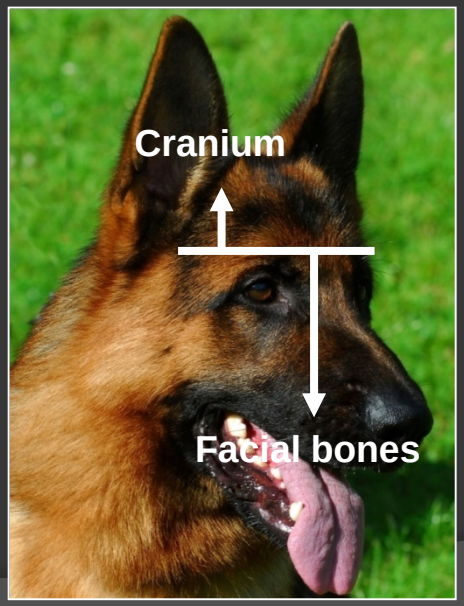
# The bred standard – the head (correct ratio)




- All descriptions start with the head as it is the beginning part of the body.
- The head marks especially the type of breed, the traits (imprint) and the expression (character) of our dog.
- The standard requests a broad cranium and a correct ratio from cranial to facial region. The ratio should be 50:50.
- Also a good depth of fang with a strong lower jaw.
- A strong jaw is the basis for enough space for strong teeth.
- When the fang is closed the lower jaw should be good visibly from the side.

Author: Lothar Quoll

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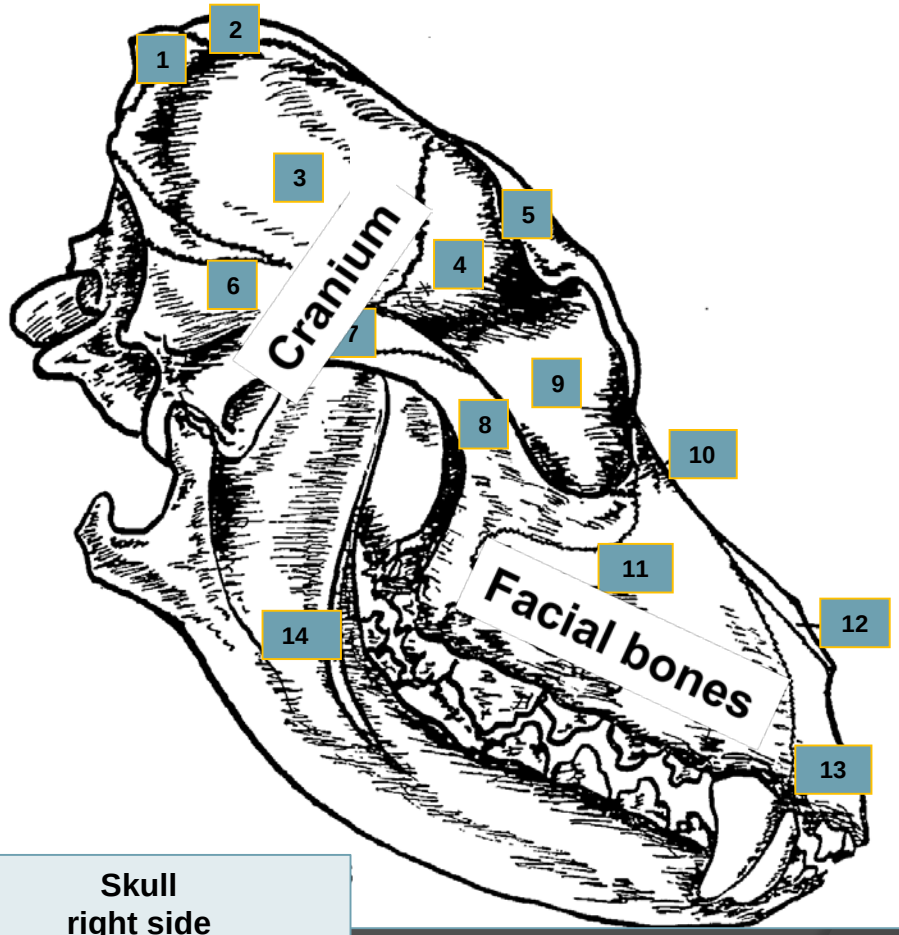
# The bred standard – the head (expression)


- Correctly carried ears give the caracteristic look to the German Shepherd Dog.
- Deep or broad adhered ears or even incorrect ears like tipped or drooping ears are imperfect.
- The slightly slooping eyes should be almond shaped and as dark as possible (dark brown).
- Light brown to yellow eyes reduce the dogs „expression“.

# The breed standard– the head- skull of the dog

**Skull of the dog**

1 occipital bone
2 medium parietal
3 parital bone
4 coronal bone
5 zygomatic process of coronal bone
6 temporal bone
7 zygomatic process of temporal bone
8 cheek bone with orbital cavity lug of cheek bone
9 orbital cavity
10 lacrimal bone
11 maxillary bone
12 nasal bone
13 intermaxillary bone
14 lower jaw




**Skull**
**right side**

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# The Breed Standard - the teeth - primary dentition

**The primary dentition has as well in the upper jaw as in the lower jaw each 6 incisiors (Inzisivi), 4 canine teeth (first canini) und 6 first molar teeth.**

| primary dentition | Number of teeth | |
|---|---|---|
| ***Upper jaw*** | ***14 teeth*** | |
| Incisiors (incisivi) – respective right – and left | 3 | 3 |
| Canine teeth – respective right – and left | 1 | 1 |
| Premolar respective right – and left | 3 | 3 |
| ***Lower jaw*** | ***14 teeth*** | |
| Incisiors (incisivi) – respective right – and left | 3 | 3 |
| Canine teeth – respective right – and left | 1 | 1 |
| Premolar respective right – and left | 3 | 3 |
| ***Complete denture (total)*** | ***28 teeth*** | |

Author: Lothar Quoll

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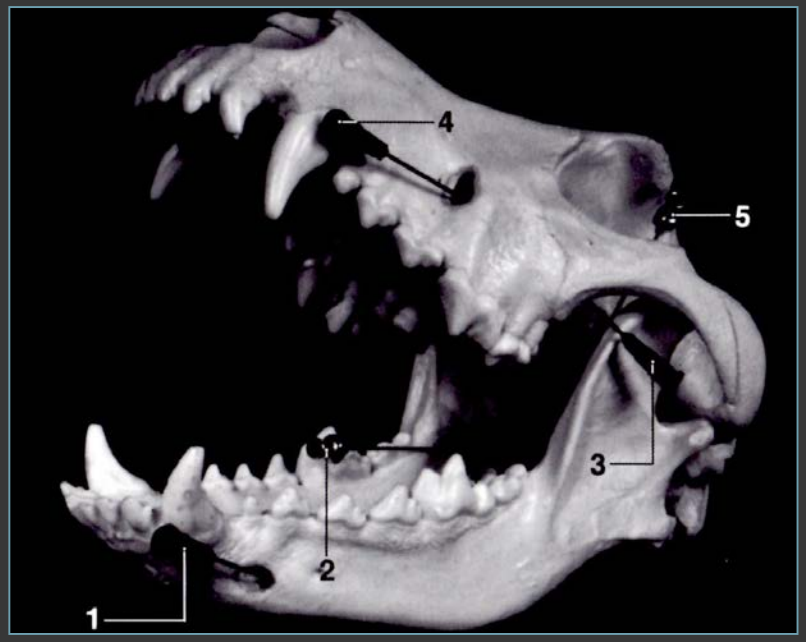
# The Teeth – permanent denture

**Also a good depth of fang with a strong lower jaw. A strong jaw is the basis for enough space for strong teeth.**
**When the fang is closed the lower jaw should be good visibly from the side.**
**A complete dentition has 42 teeth;**
**The complete dentition has as well in the upper jaw as in the lower jaw each 6 incisiors (Inzisivi), 4 canine teeth (Caninus) und 8 premolar teeth (Prämolaren), und 4 molar teeth (Molaren) in the upper jaw as well as 6 molar teeth (Molaren) in the lower jaw.**



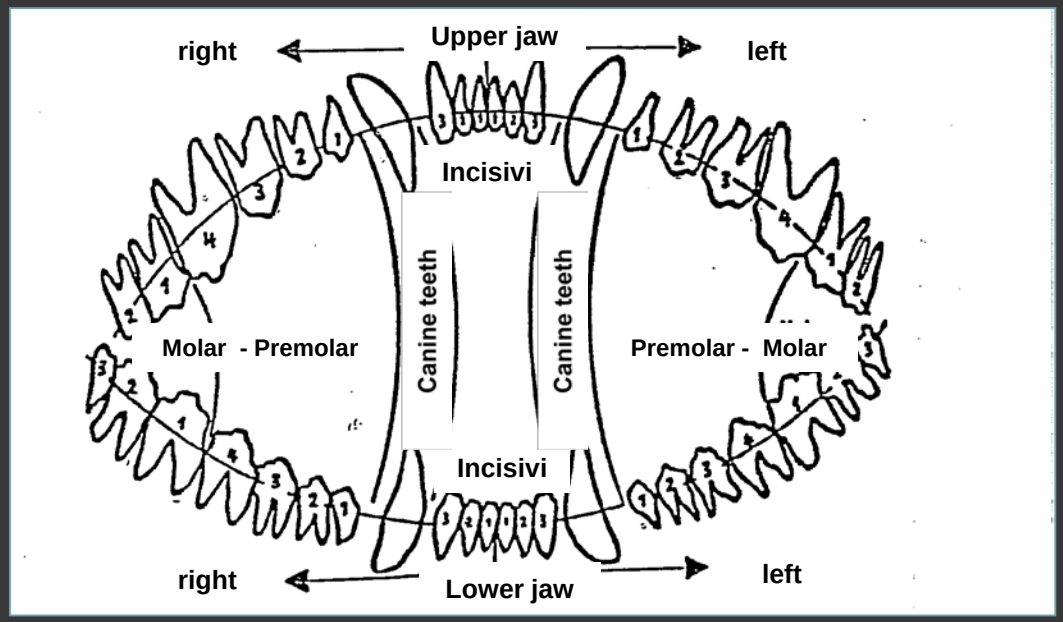

***Complete denture***

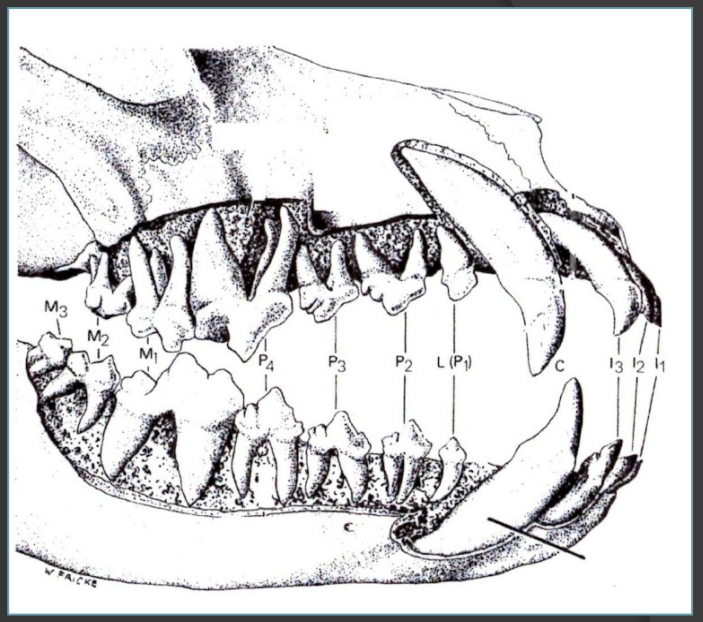
| *Permanent denture* | Number of teeth | |
|---|---|---|
| ***Upper jaw*** | ***20 teeth*** | |
| Incisiors (incisivi) – respective right – and left | 3 | 3 |
| Canine teeth – respective right – and left | 1 | 1 |
| Premolar respective right – and left | 4 | 4 |
| Molar respective right – and left | 2 | 2 |
| ***Lower jaw*** | ***22 teeth*** | |
| Incisiors (incisivi) – respective right – and left | 3 | 3 |
| Canine teeth – respective right – and left | 1 | 1 |
| Premolar respective right – and left | 4 | 4 |
| Molar respective right – and left | 3 | 3 |
| ***Permanent denture (total)*** | ***42 teeth*** | |

Author: Lothar Quoll

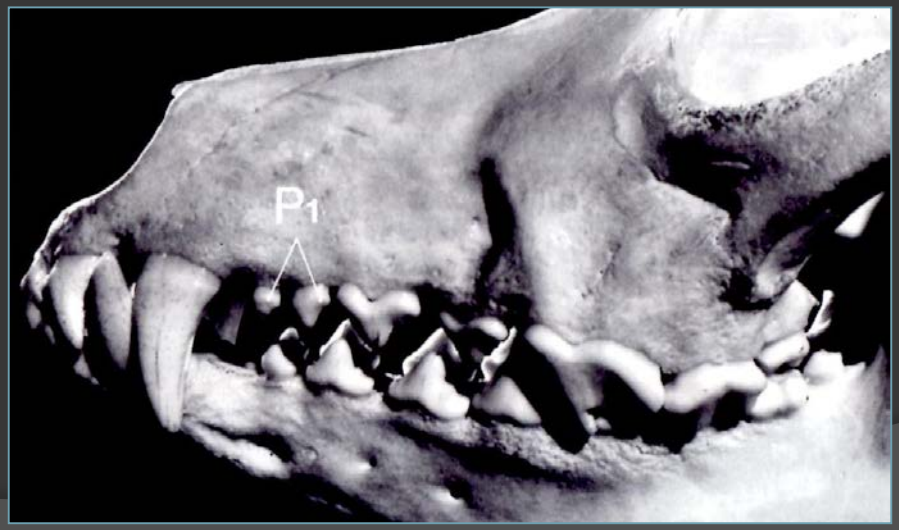
Dashboard

# The breed standard – the dentition




Dental formula




Polyodontie
(double P1
Upper jaw)

Author: Lothar Quoll

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# The Breed standard - bred survey

## Elegible for breed survey

| Rating | Teeth status |
|---|---|
| **Excellent selection** | Complete dentition without gaps,<br>No fragmentary teeth<br>No duble teeth |
| **Excellent** | Complete dentition without gaps.<br>Double Premolare1 possible |
| **Very good** | When missing:<br>1 Premolar 1 or<br>1 Incisor |
| **Good** | When m issing:<br>1 Premolar 2 or<br>2 Premolare1 or<br>1 Premolar 1 + 1 Incisor |
| **Open bite malocclusion:**<br>Slighty open bite malocclusion allows breed survey. (Former KKL 2) | |
| **Attrition and discoloration:**<br>If age-related will be considered in rating but Without significant downgrading.<br>If teeth are yellowed or browned but the dental substance is intact breed survey is possibe.<br>(Former KKL 2) | |

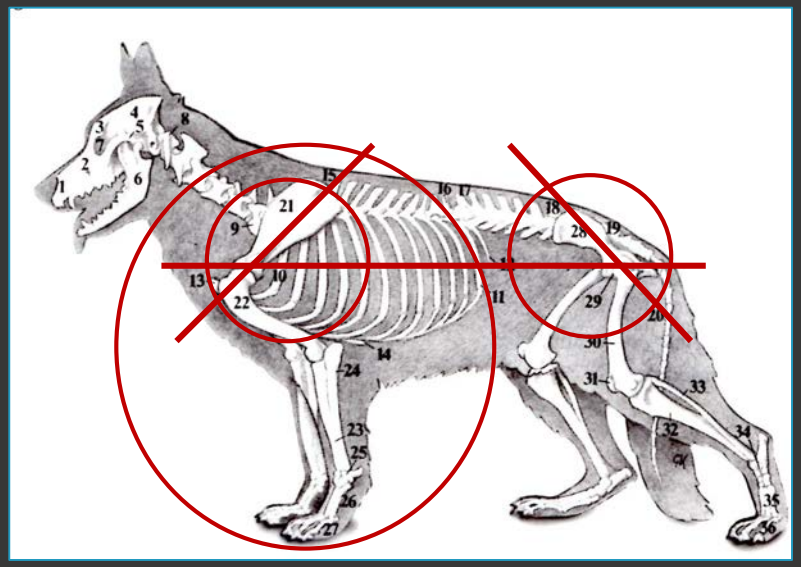
## Not elegible for breed survey

| Rating | Teeth status |
|---|---|
| **Good** | When missing:<br>1 Premolar 3 or<br>2 Premolar 2 or<br>1 Premolar 2 + 1 Premolar 1 or<br>1 Premolar 2 + 1 Incisor or<br>2 Incisors |
| **Insufficient and Breeding ban** | When missing:<br>1 Premolar 3 + 1 further tooth or<br>1 Incisor or<br>1 Premolar 4 or<br>1 Molar 1 or<br>1 Molar 2 or<br>A total of 3 teeth or more |
| **Insufficient and Breeding ban** | **Decayed teeth:**<br>Precludes breed survey |
| **Insufficient and Breeding ban** | **Other tooth or jaw faults**<br>**Over and underbite:**<br>When over and underbite is obvious (Gap between the Incisor of the upper jaw and<br>those of the lower jaw in a size like matches<br>or larger)<br>a breeding ban has to be imposed. |



Dashboard

# The breed standard– the forehand



The shoulder joint and the hip joint on one level (same height)
Both pairs of extremities are mirror inverted according to their function as well as also the initial position of their main bones (shoulder and hipbone) is mirror inverted.

It has to be differentiated between fore- and shoulder extremities what means between forehand and hind- or pelvis extremities.

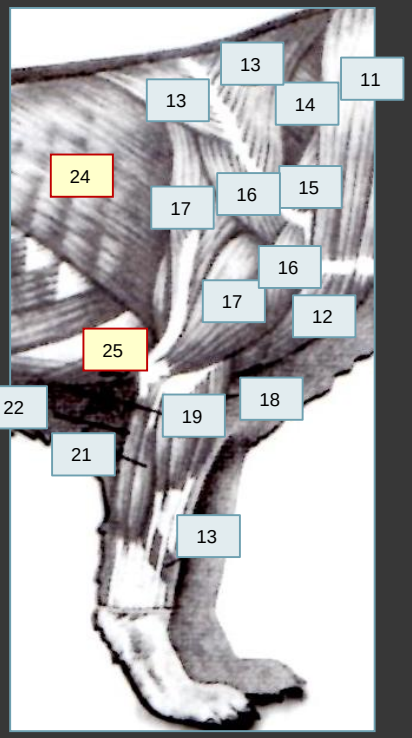
The extremities are segmented pillars and have to carry the body while standing and convey when moving.

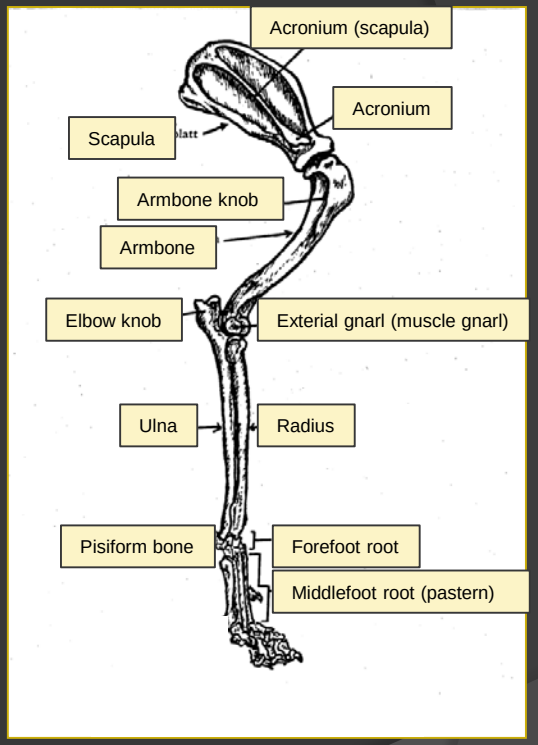


Dashboard

# The forehand – muscular and bony structure

**Unlike the hindquarter the forehand is not attended to the body with a joint but only muscular like with a carrying strap.**



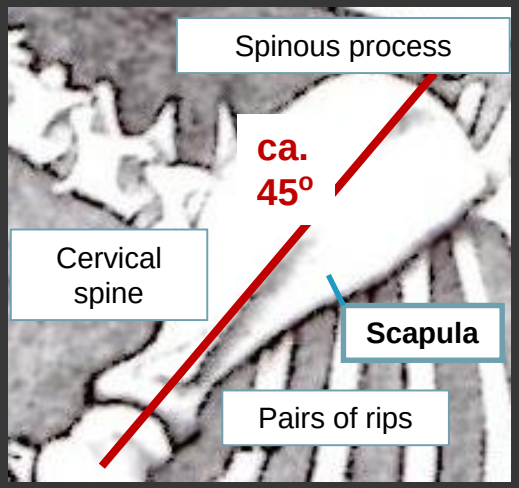

**The muscles of the forehand**

| | |
|---|---|
| 11 Collarbone-cervical muscle | 20 Collateral tow extensor |
| 12 Collarbone-upper arm muscle | 21 Exterior elbow extensor |
| 13 Trapezius muscle | 22 Inner elbow extensor |
| 14 Lower serrated muscle | 23 Thumb drawing muscle |
| 15 Shoulder-cervical muscle | |
| 16 Deltoid muscle | 24 und 25 are thorasic muscles |
| 17 Trizeps | 24 Broad back muscle |
| 18 Exterior radius muscle | 25 Low-pitched pectoral muscle |
| 19 Mutual tow extensor | |

Author: Lothar Quoll

Dashboard

# The scapula – Description – function - fixation




**Description**
**The scapula is a flat, triangular bone.**
**The undersurface towards the ribs is slightly convex.**
**The scapula is angular in an aptitude of about 45°.**
**The scapula is at the side of the chest and fits on the top flat angled on the withers which is formed of the first five thoraric vertebrae or even their spinous process. On the upper side the acronium conducts along through the basis of the scapula. It hardens the scapula and is also basic approach for the different muscles. A round cavity at the end is for the upper arm bone.**

**Function**
**The scapula can execute several moves: Flexion (to bend), Extension (to stretch), Adduktion (to pull inward), Abduktion (to pull outward) and Zirkumduktion (to turn)**

**Fixation**
**The forehand is hung up to the body between the front extremities through the shoulder girdle muscles by synsarcosis like in a carrying strap. The scapula is not connected to the body with a joint but with muscle lying over and under. Type- and individual specific the chest as well as the scapula are formed in the way to meet requirements of moving and living of the aminal.**

Synsarkose (from Greek syn, together ', sarkos' flesh') referred to in the anatomy of a compound of bone by skeletal muscles.

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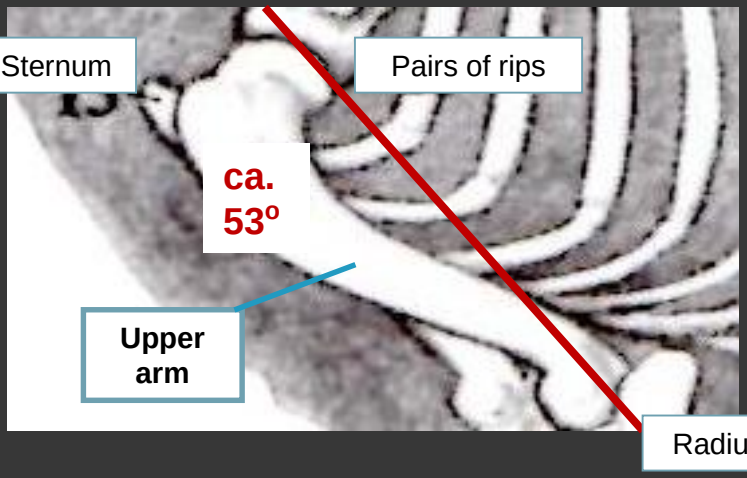
Dashboard

# The upper arm – Description – function- angle




**Description**
**The bony basis of the upper arm is an elongated bone, the upper arm bone. It is a long bone which goes angular downward to the rear. Compared to the scapula it has the opposite direction. It has different elevations and cavities for appendage of the muscles. Like all long bones he has a distal and proximal epiphysis. On the lower end of the upper arm bone, the distal end, are two articular processes which articulate with the radius.**

**Function**
**The upper arm bone can execute two moves, flexion (to deflect) and extension (to stretch)**

**Angle**
**Upper arm and scapula are the shoulder joint or point of shoulder. The flexible angle between scapula and upper arm bone is the beat seat angle.**

Distal means "further from the center of the body" or location (of an organ) "removed".
Proximal (. From Latin proximus = neighbor) is in the anatomy of a layer name that means located towards the body or towards the body running,

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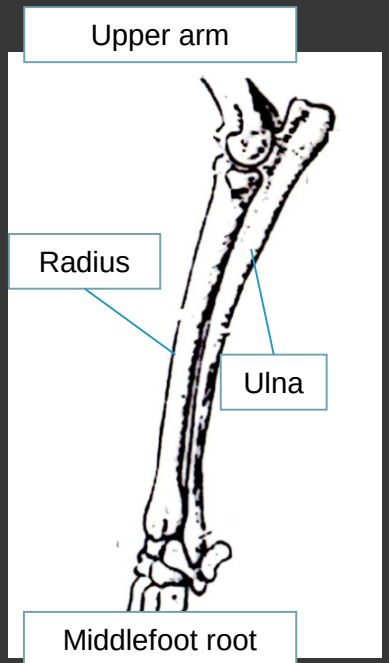
Dashboard

# The lower arm – Description – function




**Description**

**The lower armbone or even forearmbone consists of two bones; the radius and the ulna.**
**The radius is a slim, slightly ahead bend long bone proximal (in direction to the body) which means at the elbow joint thickend to the radius head and articulating with the upper arm bone.**
**At the distal end (in more distance to the center of the body) the radius broadens to the diagonally radius and builds the flexible connection with the forearmebone.**
**The ulna is added to the radius from rear and overtops it with its proximal end, the ellbow process; the free end is thickened to the olecranon.**
**Towards the radius is a contact face for the articular surface of the upper arm.**

**Function**

**This means that the upper arm bone is laid on the ratio as well as on the ulna and is locked like in a channel where it can glide to both directions but is jacked to the rear while the elbow itself is a contact face for the lever action of muscles.The olecranon is on high of the sternum. In this joint patological mutation can arise which is called elbow displasia.**

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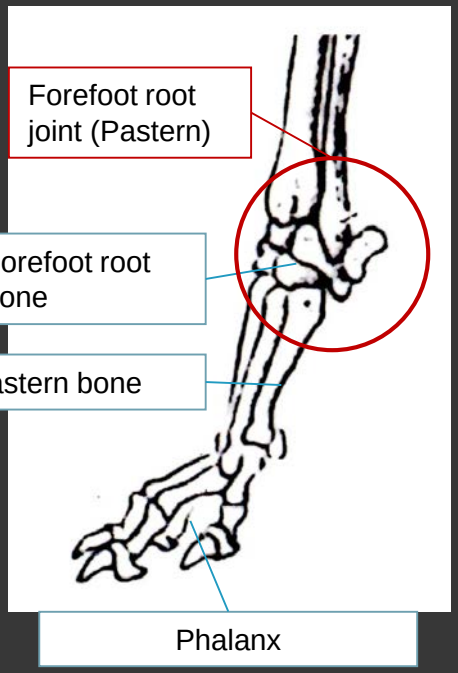
Dashboard

# The pastern – Description – function




**Description– Function**

**The pastern correlates with the hand of the human and consists of forefoot root bone, forefoot bone and forefoot toe bone.**

**The forefoot root bone is joint composed from a series of 7 little bones with three joint cavities. It is composed from the coaction of the bones of the lower arm, the forefoot root and the middle hand. Radius and ulna are rested on those bones. Also, the bones are contact faces of several muscles and tendons.**

**The middlehand bones is from 5 long slim bones (together with the forefoot root bones often named as ankle) which correspond to our palm of the hand and which we can feel clearly to the fingers.**

**Four toes follow on which the foot is placed. Each toe is of 3 phalanges at which the third is the claw bone with the claw.**

**Unlike a human, a plantigrade, the dog is a digitigrade.**

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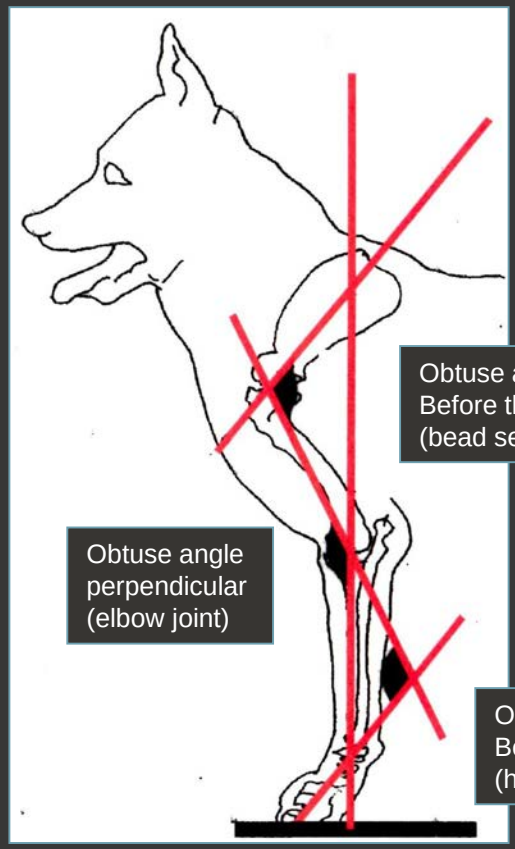
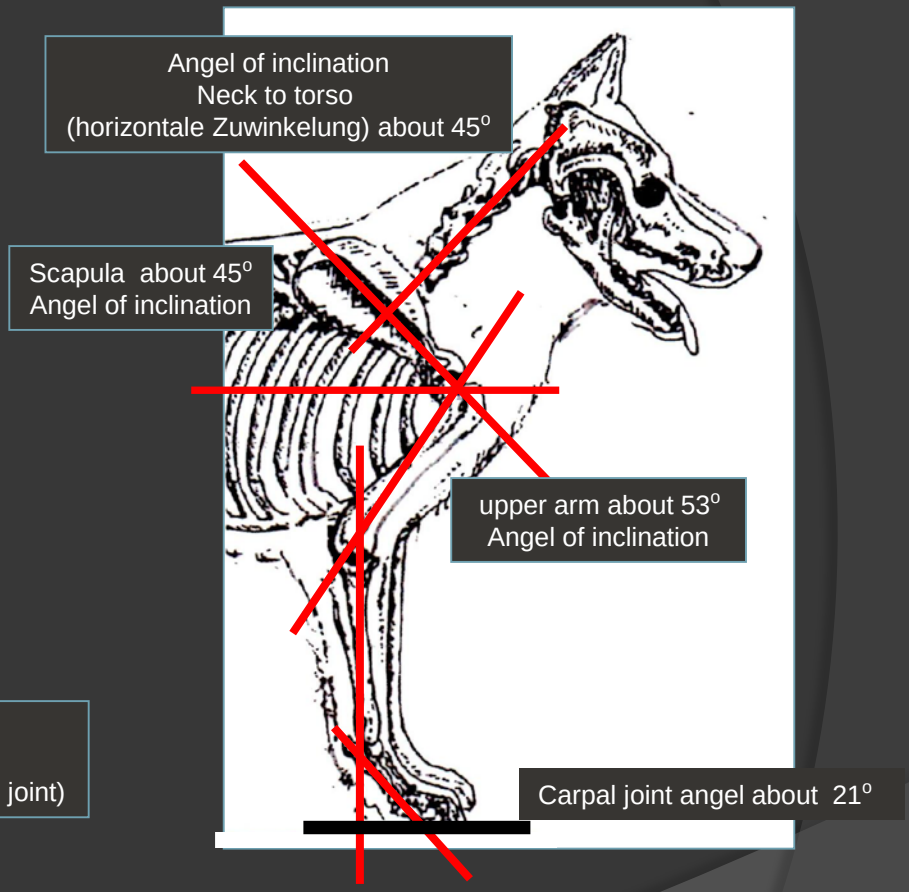
Dashboard

# The forehand - Outline – angular positions



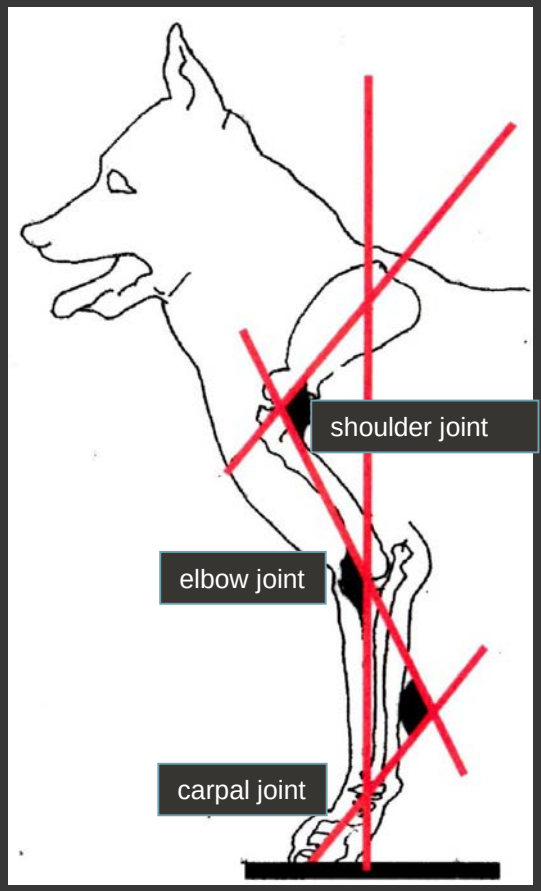




**As main bearer of the trunk the forehand is a three segmented pillar which is exactly vertically centered in the contact point of the weight (at the scapula or it‘s center of rotation) from the dog‘s bottom of the foot.**

Author: Lothar Quoll

Dashboard

# The forehand- Description of the structure




Looking at the forehand as a whole we can see, if the dog is in normal position, a three segmented pillar. However, only in cooporation with muscles, tendons and lingaments the single skeleton parts are connected to a effective leverage.
In normal position the body weight, the contact point of the weight, is effective at the scapula at a point which is also corresponding with its rotation field and is located in the middle of the of the contact face of the musculus serratus. The foot is vertically under this point. This means the perpendicular falls from the contact point through the rotation axis of the elbow joint and the proximal part of the antibrachial skeleton (forefootbone) in the middle of the foot.
The supporting pillar forms in each case a center edge angel before (bead seat angel) and one behind the perpendicular, (hyperextension of carpal joint) which clash in the elbow joint and with this form the third, the elbow angle.
In order to carry the hanged load all joint angles of this supporting pillar have to be protected from folding and have to be fixed. This is ensured through lingaments, tendons and muscles.

Author: Lothar Quoll

Dashboard

# The breed standard – the support lines

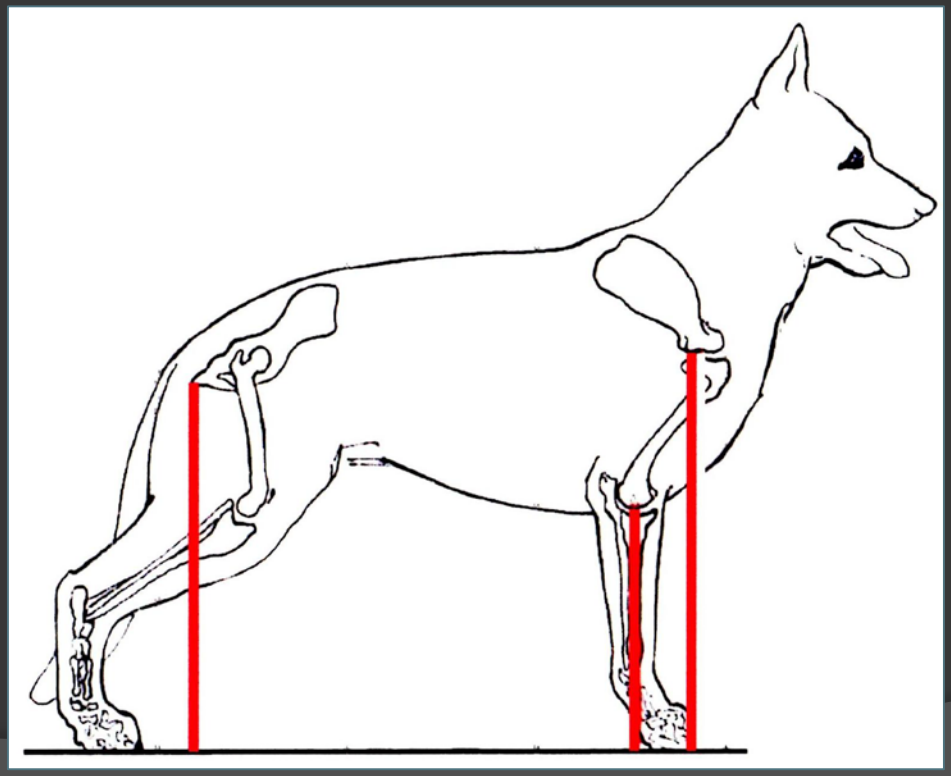
Like any moving body is also dominated by the dog to the laws of statics and dynamics.
While the static concerned with the design principles to maintain the equilibrium of the items as the whole animal body in the state of rest and in motion, dynamics deals with the motions as they take place mainly in locomotion, ie the special theory of motion of our dog.
As the solid body of the animal organism is under even the laws; its components have not only to support the body weight and obtain in equilibrium, but just as much to serve the movement.
Therefore, they are mostly the same time, both statically and dynamically stressed, the dynamic stress, depending on the intensity of muscle contraction and on the speed of the movement sequence can vary greatly.
The static design principles can be therefore in most cases not clearly justified mathematically, but usually develop only according to certain empirical facts on the basis of appropriate technical models of the anatomical conditions. (Comparative anatomy).
Since the kind of forward movement for the construction of the musculoskeletal system as a whole and in detail primarily of crucial importance, and the static structure peculiarities are fundamentally influenced by the dynamic side, what such. T. significant differences due tierartliche.
We want here once address the issue of balance and on the other with the support of the body weight through the limbs.
The optimal direction during the limbs in comparison to the ground resulting vertical support lines and even the statics are now dealing with these support lines. Support lines are imaginary, that imaginary lines, which are vertically moves at the shoulder limb and the pelvic limbs of the profile of the joints to the ground.



Dashboard

# The forehand - support lines

**The correct direction of the fulcrum line is of greatest importance for correct course of movement. Incorrect fulcrum lines displace the balance point of the dog; this causes a bad distribution of the body weight. When the fulcrum lines are not straight, the spring suspension of the extremities would be influenced badly. As one can see the fulcrum lines run vertically through the joints. A straight bone formation is a pre-condition for a reliable stand and a correct movement of the dog. In order to be able to stand for a long time and to trot persistant the Shepherd Dog should have correct fulcrum lines.**



**This is the correct course of the support lines of the page, or as indicated by the profile, as viewed.**

Author: Lothar Quoll

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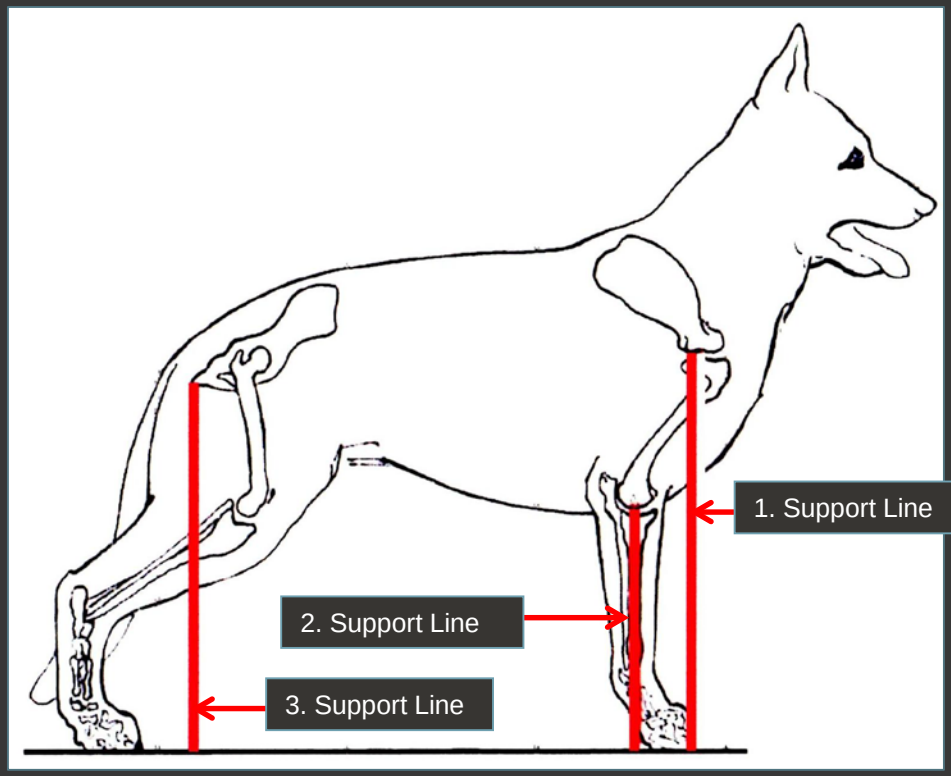
# Support lines seen from profile (from the side)

**On the forehand, the support lines are examined from the front and from the side. From the side two are imaginary lines in the assessment of importance:**




**The first support line goes from the shoulder joint and runs perpendicular to the ground by touching her toes when hitting the ground.**

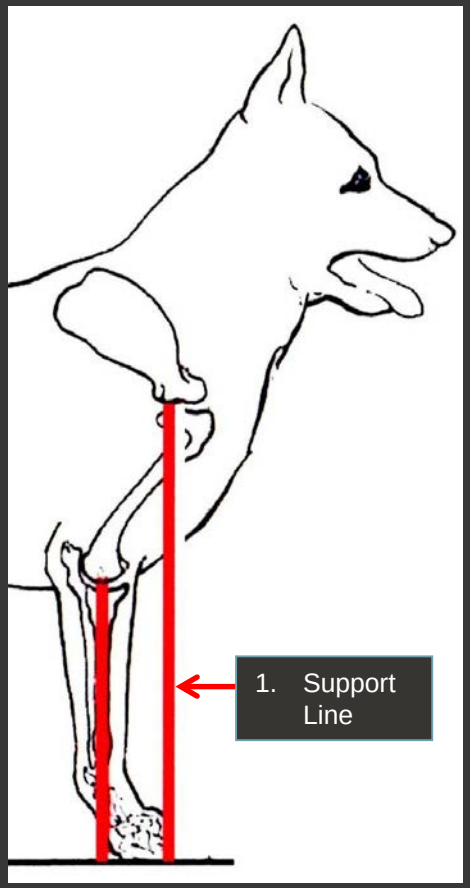
**The second line of pressure rises in the center of the elbow joint and also extends vertically through the middle of the forearm. It cuts through the middle Pastern and cuts the pasterns halfway until it again just before the impingement on the bottom comes to the fore.**

**The third line of thrust is treated at the pelvic limb.**

Author: Lothar Quoll

Dashboard

# Seen deviation of the support lines on the profile of 




***Support Line 1***
***1. Unterständigkeit:***
**In one striking the front line on the floor in front of the toes is called Unterständigkeit.**

***Causes:*** **The shoulder extends to straight (horizontal), or Fetlock joint flexes too far.**
***Result:*** **The dog lifts his feet while walking only slightly from the ground (d. h. He drags on the ground)**

***2. Vorständigkeit***
**Exceeds the front line, however, behind the foot on the ground is called Vorständigkeit.**
***Causes:*** **The shoulder is too steep (or upstream)**
***Consequences:*** **overloading the lumbar region and the pelvic limbs center of gravity to the rear. The foot - Sole bale is more stressed. Vorständigkeit leads to an increase of the equilibrium, but result from the fact sacrificing speed.**

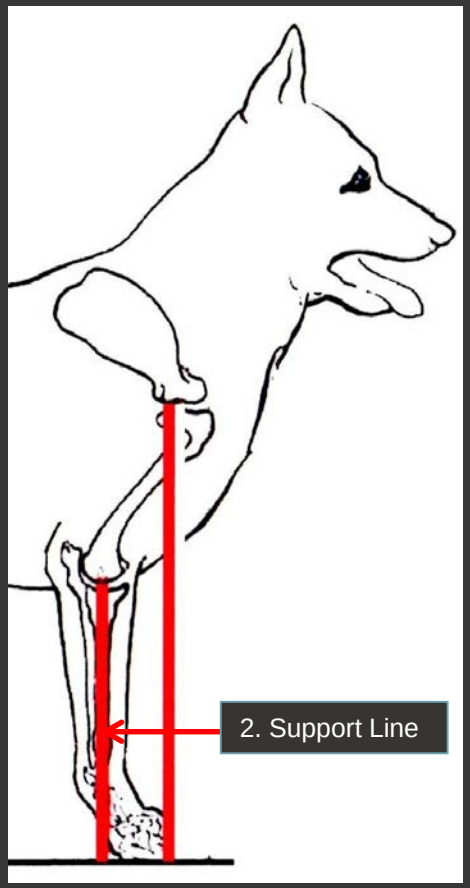
**Deviations of the first line of pressure resulting from an incorrect position of the shoulder, which is attached to steeply as Unterständigkeit to horizontally or at the Vorständigkeit.**

**Deviations from these imaginary (imaginary) lines are serious operational error and lead to deterioration in the state of rest and in motion.**

Author: Lothar Quoll

Dashboard

# Seen deviation of the support lines on the profile of 




***Support Line 2***
**The correct course to the front leg, starting from the elbow joint through the middle and halfway up the front midfoot reappear and strike the ground. Deviations from the straight path caused by a curvature of the Vorderfußwurzelknochen forward or backward. Even the forearm can assume quite a convex shape and affect the straight course.**

***Vorbiegigkeit***
**Runs the forward curvature is called Vorbiegigkeit.**
**That is, the line is too early to light, outside of the toe pads.**
***Cause:*** **The pasterns are too flat or depressed.**

***Rückbiegigkeit***
**Running is a back bow is called Rückbiegigkeit.**
**The line comes later to light and make the toe pads in the middle.**
***Cause:*** **The pasterns are too steep.**

**Deviations of the second line of pressure resulting from an incorrect pasterns, the late comes to the fore in the Vorbiegigkeit too early, or at Rückbiegigkeit.**

Author: Lothar Quoll

Dashboard

# The support lines seen from the front

Figure 1
correct front

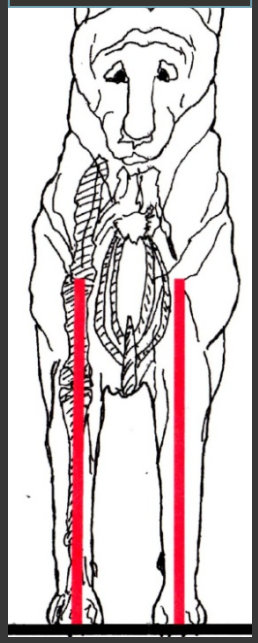


Figure 2
toes further
transition

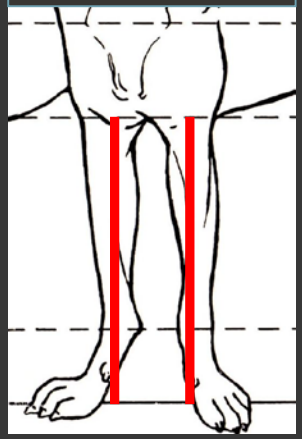
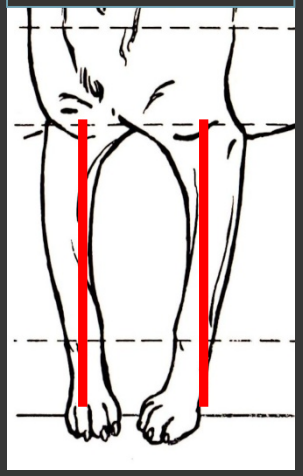


Figure 3
bodeneng going



**From the front, when assessing only a single line of thrust into account, of course, on both sides, that runs to the right and left analog. This line goes from the shoulder tip through the forearm, the tarsus and metatarsus, going through them all exactly in the middle and at the bottom is revealed.**

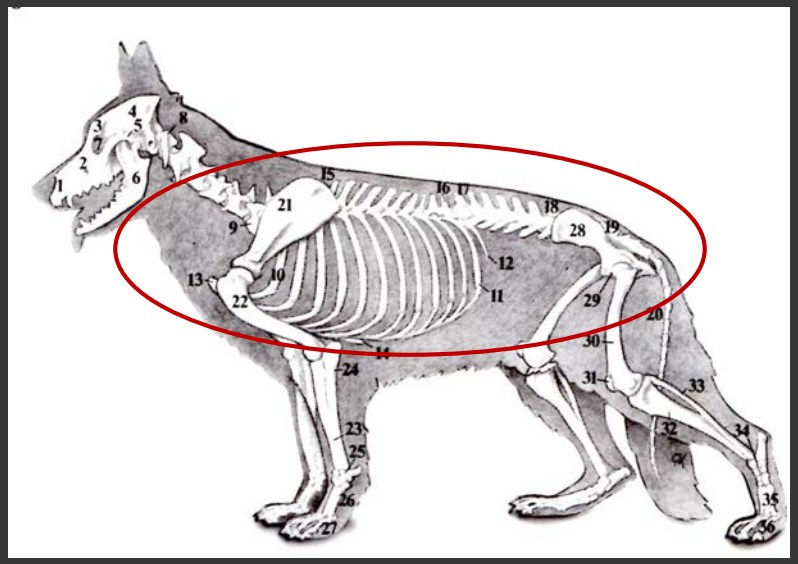
**In case of deviations from the straight line support (front position Figure 1), the following misalignments (Figure 2 and 3) yield:**

1. **The limbs are too far outside this vertical line. Here we are talking about a wide or a bottomless well kicking. (No sketch available)**
2. **If the limbs too far within this vertical line, we speak from narrow or bodeneng going. (Figure 3)**
1. **If the limbs follow the course of the thrust lines only to the pastern bone and then deviate inward so it is tight toe transition**
2. **If the front legs are parallel to the support lines and differ in the amount of the pastern bone outward, this is called toe-wide transition. (French dancing master position or position). This error can occur on both sides or on one leg. (Figure 2)**

Author: Lothar Quoll

Dashboard

# The breed standard– the middle hand



**The skeleton of the trunk – spine**

**The axial skeleton is divided into the skeleton of the neck, torso and the tail skeleton.**
**The hull form the bones of the thorax, the lumbar and sacral vertebrae as well as the skeleton of the extremities (hind) to be treated pool.**

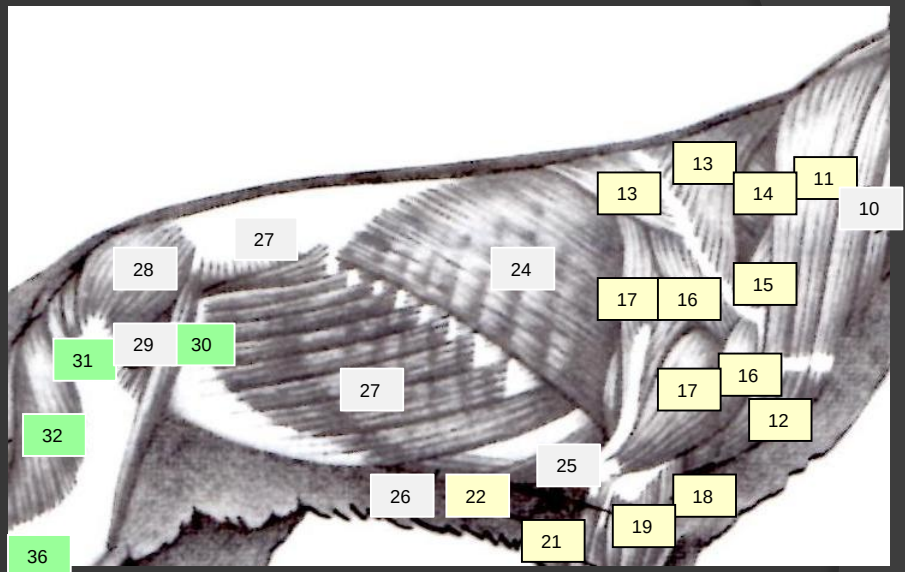
**The skeleton of the trunk contains the spine (axial skeleton), the ribs and the sternum and therefore shows a structure typical for segmentation. The pairs of ribs are the bony basis of the thoracic wall with their dorsal (to the back) end and the ventral (to the stomach) end and are connected directly or indirectly with the sternum. Those agnimated bones are forming the thorax which contains the chest cavity.**
**The skeleton of the trunk is partitioned into the skeleton of the neck, of the trunk and skeleton of the caudal.**
**The trunk is built by the bones of the chest, the lumbar and sacral vertebrae as well as the pelvis which will be described together with the skeleton of the hind quater.**

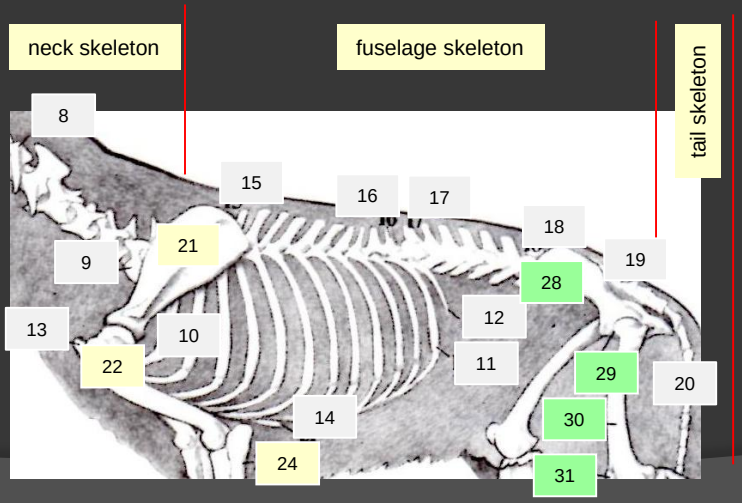
Author: Lothar Quoll

Dashboard

# Metacarpal muscular and bony structures

Subdivision skeleton of the trunk: cervical trunk and tail skeleton. The hull form the bones of the thorax, lumbar and sacral vertebrae and pelvis.




Author: Lothar Quoll

Muscles of the trunk
**10** Sternal head muscle
**24** Latissimus Dorsi
**25** Deep pectoral muscle
**26** Rectus abdominis
**27** external oblique abdominal muscle
**28** Middle Krupp muscle
**29** Tensioners Schenkelfasie

The muscles of the forehand
**11 to 22** have already been described in the forehand

Muscles of the hindquarters
**30** sartorius
**31** Krupp superficial muscle
**32** two-headed thigh muscle
**36** long peroneal muscle

Skeleton of the trunk
**8** first cervical vertebra
**9** sixth cervical vertebra
**10** first rib
**11** twelfth rib, (rib meat 12)
**13-14** Sternum Start to Finish
**15** third thoracic vertebrae
**16** thirteenth thoracic vertebra
**17** first lumbar
**18** seventh lumbar vertebra,
**19** Sacrum
**20** caudal vertebrae

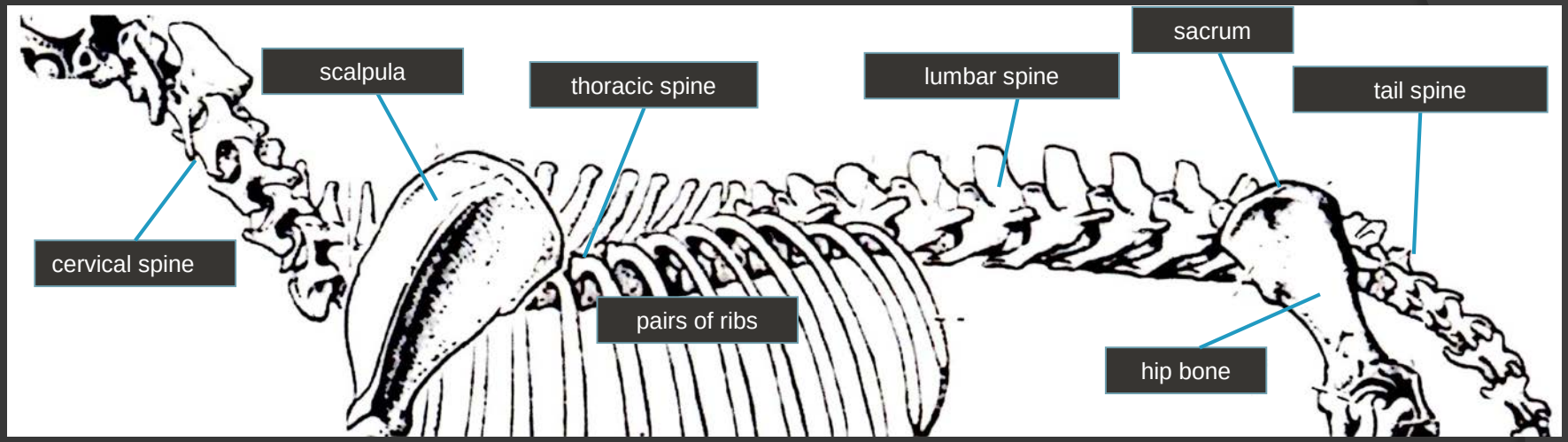
Skeleton of the forehand
**21** scapula
**22** upper arm
**24** Forearm (ulna)

Skeleton of the hindquarters
**28 *)** basin
**29 *)** hip joint
**30** thigh
**31** Knee (patella)

*) The description of the pelvis takes place in the hindquarters

Dashboard

# The skeleton of the trunk - the spine

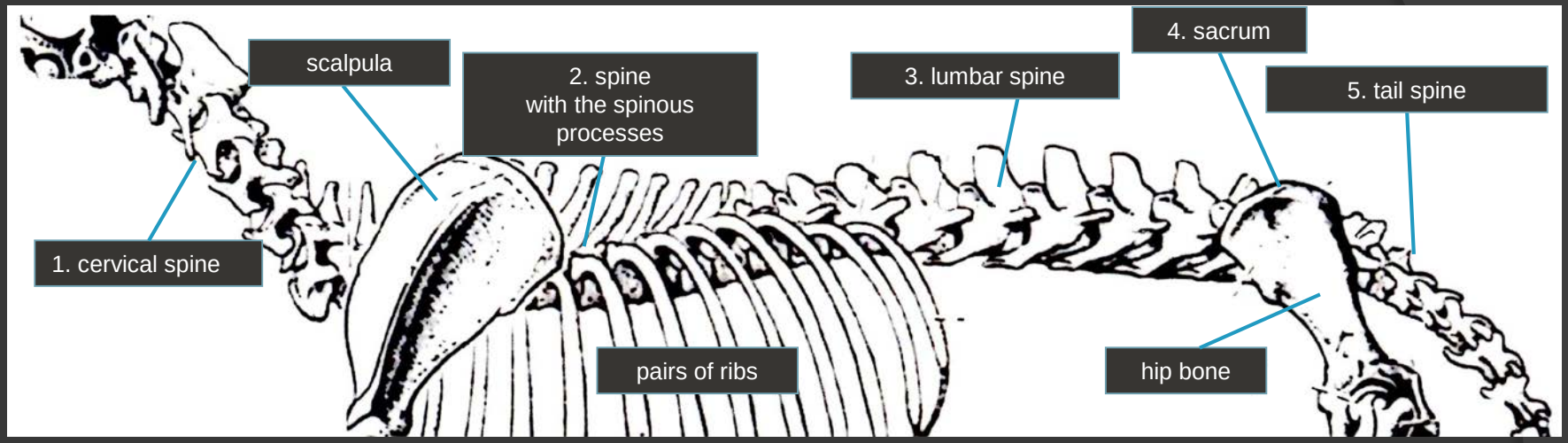



**The spine is build of vertebrae which protect the spinal cord and the nerve fiber in the vertebral foramen. The spine is in the center of the body which arises from the pelvis and carries the head on the upper end.  On the caudal end of the pelvis (in direction of the tail) the caudal bony basis starts. All vertebrae have a mutual base form; however, in the different regions of the body they are adjusted according to their function.**

Author: Lothar Quoll

Dashboard

# Outline - skeleton of the trunk



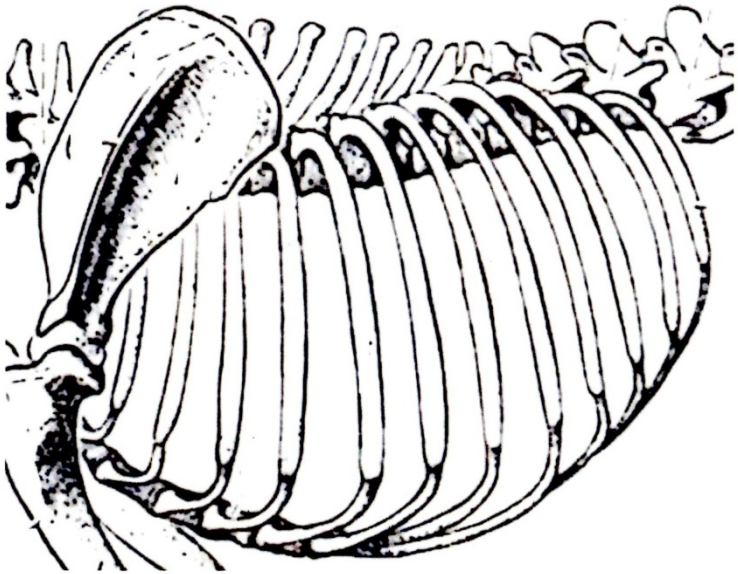

**The skeleton of the trunk is classified as follows**

1. **Neck section with 7 cervical vertebrae where the first, the Atlas, carries the head. The second cervical vertebra ist the „turner“ on which the Atlas rotates.**
2. **The chest- or spinal segment is of 13 vertebrae; the first 5 thoraric vertebrae with their acanthae build the withers; the last 8 vertebrae are the anatomical basis for the back. The above placed acanthae tend from ahead to rear.**
3. **The lumbar segment is of 7 vertebrae; their acanthae are triangular and tend from the rear to ahead. The different inclination in comparision with the thoraric vertebrae arises because of the spinal static.**
4. **Three sacral vertebrae which are conjoined build a homogeneous bone, the sacral bone. This adhesion has an useful reason because the sacral bone is the only segment of the caudal skeleton which is carried from below.**
5. **The tail consits of several caudal vertebrae (18-22). The caudal vertebrae are connected firmly and have no articular processes.**

Author: Lothar Quoll

Dashboard

# The chest - Description - function



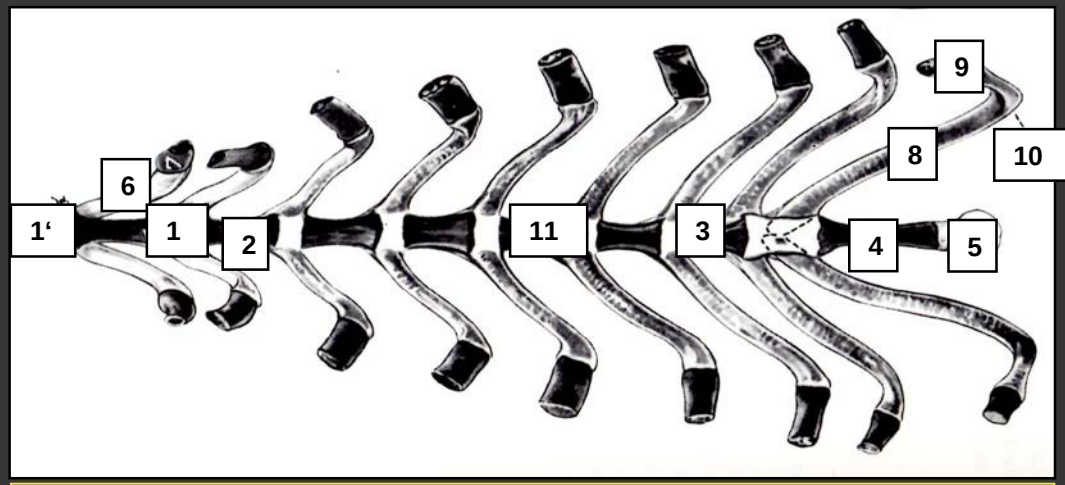
The little curved strenalen ribs are steep at the spine and this is firmly attached to the sternum, grant the thoracic limb with her shoulder blade the basis for connective tissue - muscular attachment. They are used as so-called support ribs become carriers of the fuselage between the shoulder limbs. In contrast to these both on the surface as well as on their edges sharply curved aster-dimensional ribs are arranged obliquely to the spine and very mobile, thus creating favorable conditions for the movement of the chest during respiration occur (respiration ribs).

The chest is made from 13 pairs of ribs. The ribs are plain bones which are placed in pairs along the thoraric spine. It is distincted between real and false ribs. The ribs are the bony basis for the „side wall“ of the thorax.  It is distincted between the proximal (in direction of the body and the distal (more away from the center of the body) rib cartilage. The cranial (in direction the head) rips are connected to the sternum with their cartilage and are called real or sternal ribs. The cartilage of the caudal (in direction to the tail) false (asternal) ribs reach the sternum only indirect by forming the costal arch. Usually, the last two rips are ending freely in the „body wall“. Ribs which are ending free with their cartilage in the „body wall“ are called flesh ribs.

Author: Lothar Quoll

Dashboard

# The sternum




Dorsal Sternum (breastbone) with distal ends of the ribs
(distal = away from the center of the body)

1 / 1‘ The sternum
(Manubrium sterni)
first segment
2 / 3 Beginning and end of the
the middle segment
4 Xiphoid (3rd segment)
5 shovel cartilage
and the third section of the sternum,
6 Cartilage of the rib
8 cartilage
9 Body of the ninth rib
10 costal cartilage
11 Joint, fibrocartilage

The sternum consists of more pieces of bones (8) which are placed one to another cranial (in direction of the head) to caudal (in direction to the tail) and by time mostly merge because of ossification of the cartilage gaps between. The cartilage of the real ribs are placed at the side of the sternum. The sternum is differed in 3 segments.

Author: Lothar Quoll

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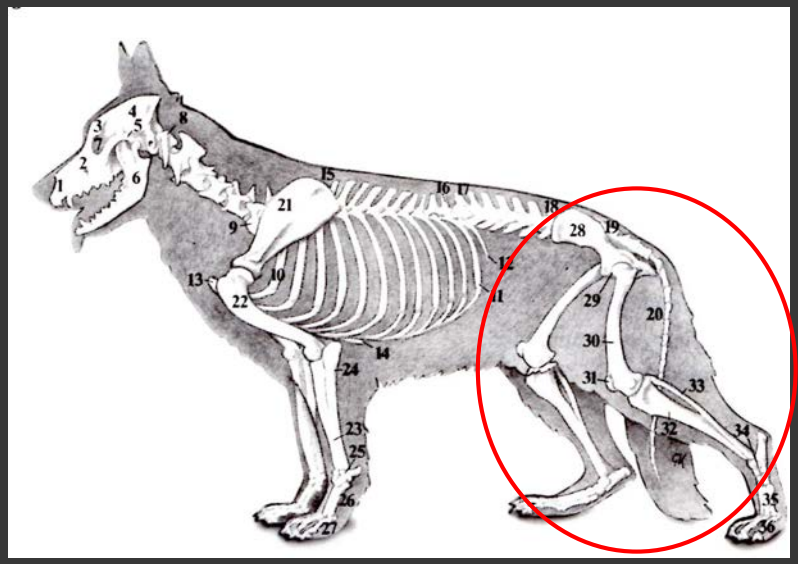
# The hindquarters

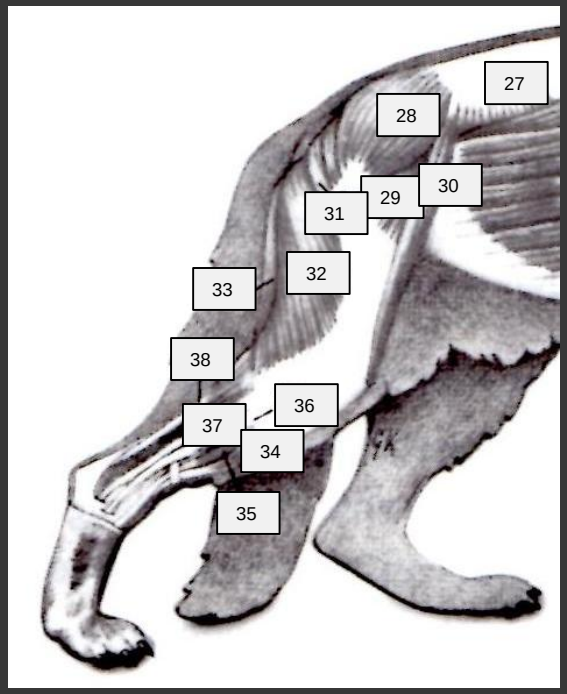


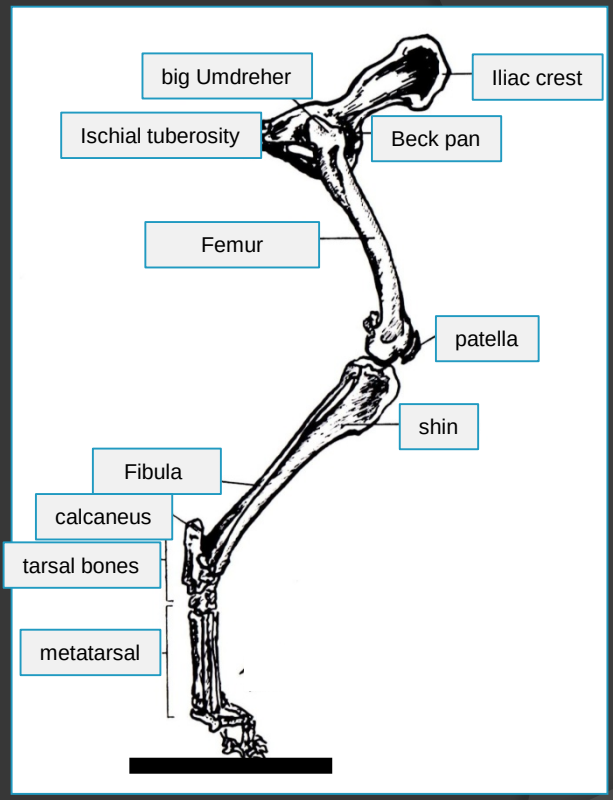
From the hindlimb skeletal pelvis is still very involved in the hull construction, muscled very strong and therefore hardly visible. It underlies, together with the sacrum and the first caudal vertebrae, the croup and offers the very strong croup- thighs and rear jaw muscles the most important points of origin and stands by the abdominal muscles but also with the thorax in conjunction.

Noticeably only the hip and ischium are enabling us an idea of the pelvic area - are able to make and pelvic length. The ischial tuberosity provides the benchmark for determining the rear fuselage length. The hip joint is not easily locatable due to the strong muscles. By accurately scanning may be set at least the great Umdreher of the femur and thus also approximately the center of rotation of the hip joint. But in the rest of the femur is in the depths of a powerful muscle mass and occurs only in the area of the knee joint to the surface again. The location of the knee joint can only approximately by eye, by palpation (touch) the patella, patellar ligament of the straight rail Being councils and the outer condyle of femur and tibia but determined very accurately. This means that the fixed points for the determination of the hip and knee angle are then added. In the area of the lower leg, ankle, mid-foot and toe the skeletal parts are again very superficial, said Sprunggelnk is especially well marked by the calcaneal tubercle.

Author: Lothar Quoll

# Hindquarters Muscular and bony structures




**Muscles of the hindquarters**
**28 moderate croup muscles**
**29 Tensioners Schenkelfaszie**
**30 sartorius**
**31 Krupp superficial muscle**
**32 two-headed thigh muscle**
**33 Halbsehniger muscle**
**34 tibialis anterior**
**35 long toe extensors**
**36 long peroneal muscle**
**37 Deep muscle toes**
**38 Heel tendon strand**

Author: Lothar Quoll

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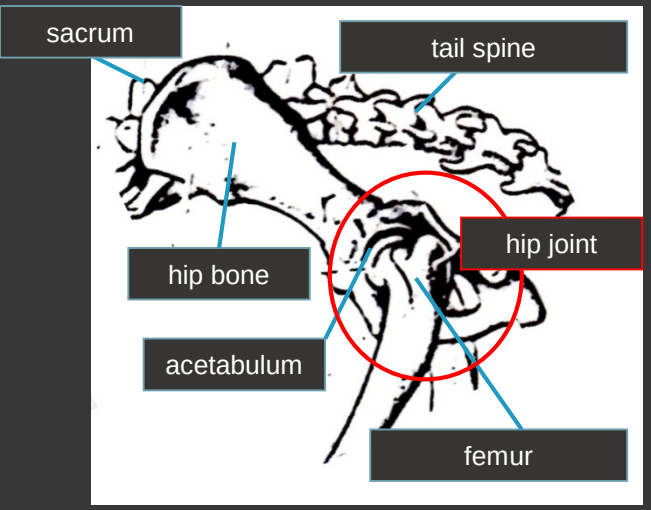
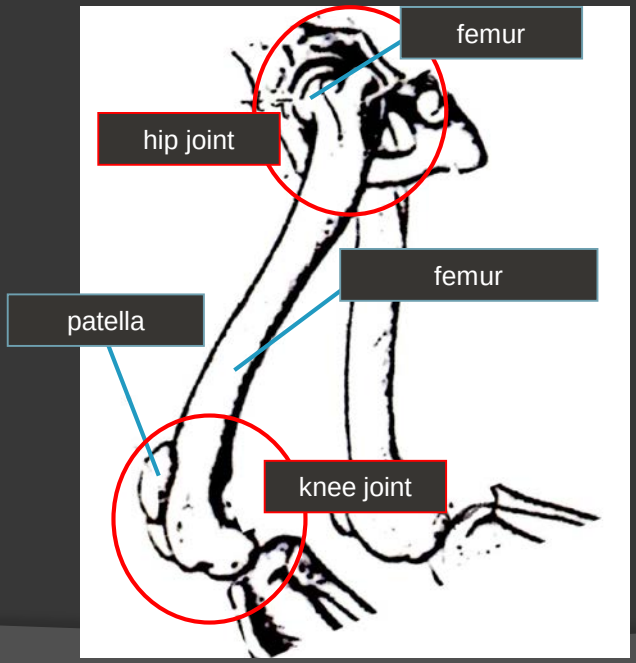
# Pelvic girdle - thigh




The pelvic girdle is used to connect the pelvic limbs to the trunk. The pelvic girdle consists of the hip bone, in which the youth the division into 3 individual bones can still be seen. The ilium, pubis and ischium. This 3 Bone encounter with her body in the pelvic socket (acetabulum) together. The youth in the remaining joint cartilage ossify later. In adult dogs they ultimately became the single hipbone.




The skeleton of the thigh is formed from a bone of the thigh bone. He also represents the bony link to the pelvis. The femur is the strongest bone of the skeleton. It outperforms the humerus because in addition to the support function and particularly the forward thrust must be accomplished. It outperforms the humerus because in addition to the support function and particularly the forward thrust must be accomplished. The proximal femur, forms the articulated connection with the hip joint, the knee joint is located distally with the patella.

Author: Lothar Quoll

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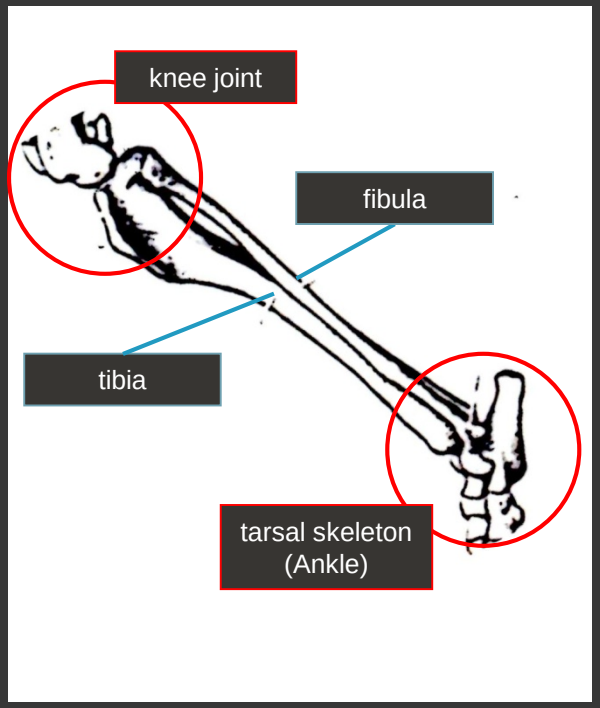
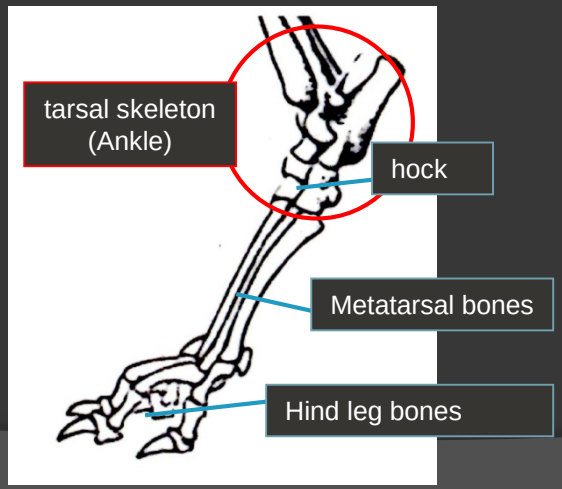
# Lower leg - Hocks




**The skeleton of the lower leg is the distal limb of the hind pillar of extremities; two long bones – medial the stronger tibia and lateral the weaker fibula.**
**Those two lower leg bones are so far different from the lower arm bones as the are not able – like radius and ulna – to turn against each other; so they are also not crossing. They are nearly parallel to each other where the fibula does not completely reach the knee joint (the knee joint is incongruent). The somewhat longer tibia carries the body weight. The proximal end is grown together with the tibia. At the distal end a two-parted fulcrum screw absorbs the flexible apposition of the tibia with the tarsal skeleton (ankle).**




**The skeleton of the hind leg (autopodium) consists, like the forefoot, three identical segments; the hind foot root bone (three lines of bone), the hindmiddlefoot bone (five bones) and the 4 hind toe bones.**

Author: Lothar Quoll

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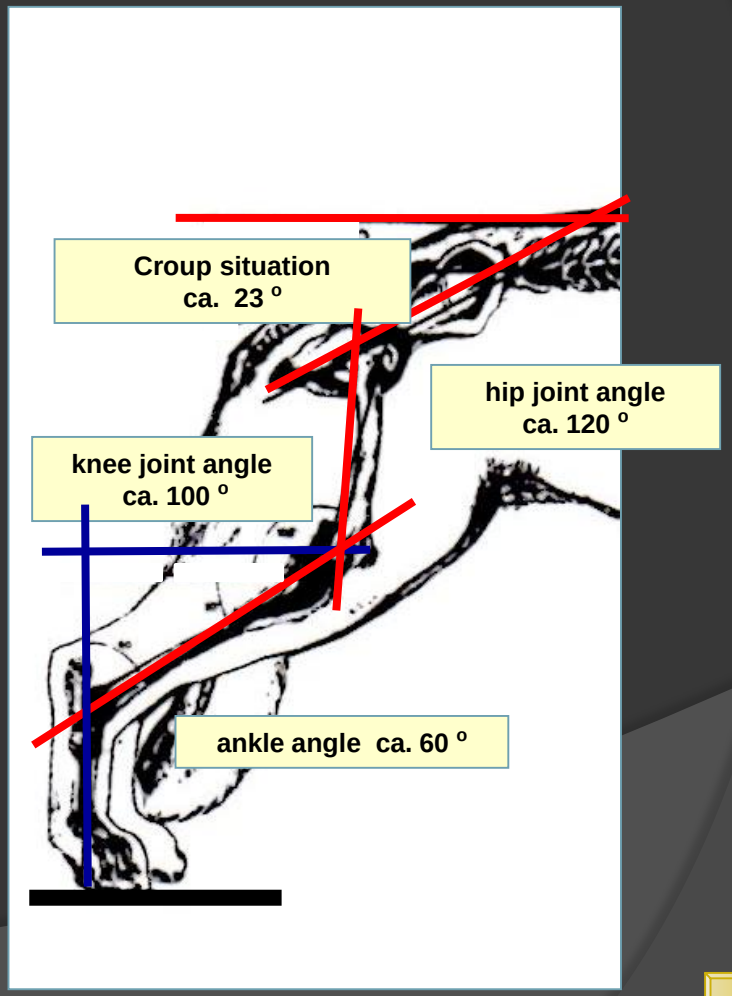
# The hindquarters - Outline - angular positions

The back extremities show more than the picture of a stronger angeled mortise- or throwing system. The lower leg, consisting of tibia and fibula is not vertical like the lower arm, but aslope to the rear - downwards.

Hip and knee angles behave similarly to the corresponding angle of the front limb, ie they vary from breed specific angle. During the pelvis (hip angle) is still within the hull area, the thigh part (knee angle) already for free limb.
A horizontal imaginary line extending from the knee joint center (blue) which forms with the perpendicular Hocks a right angle of about 90 °




The open front ankle angle of about 60 ° is formed from the forearm and the composite of 7 smaller bones (ankle angle).

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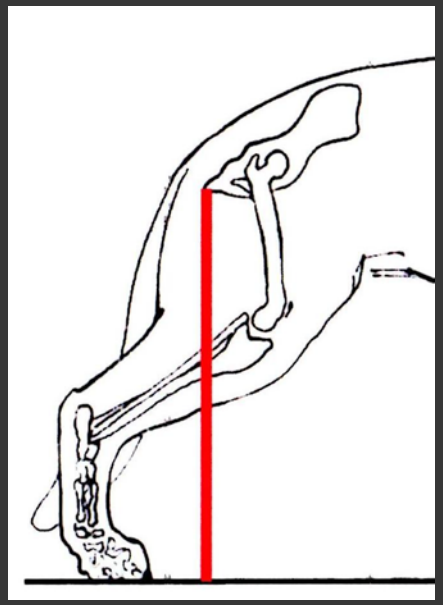
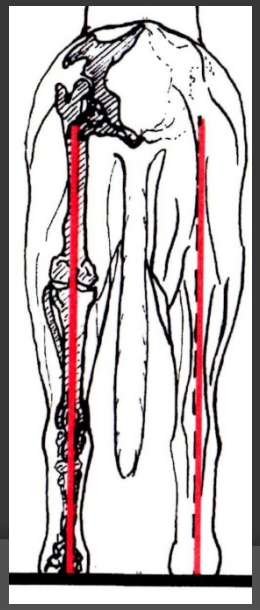
# Fulcrum lines of the pelvis extremities



The fulcrum lines of the pelvis extremities are analyzed from side and back view.

1. Side view (profile): In profile the hind legs have only one fulcrum line. It starts at the bottom knot and has to touch the ground directly in front of the tiptoes while forming a vertical line which is parallel to the hind middle foot which always and in every case stands in vertical position on the ground. When a Breed has very long bone segments like the German Shepherd Dog the fulcrum line touches the ground in front of the paws in a distance according to the length of the foot seen in side view. The German Shepherd Dog is standing slightly backward.

Meets the supporting line behind or nearly behind the foot on the ground, so is it to Unterständigkeit. In the case of Unterständigkeit is the center of gravity shifted too far to the rear, the Pelvic limbs are so heavily loaded and cumbersome, what has a negative effect on speed.



2. From the back view is only one fulcrum line starting at the bottom knot and dividing the complete hind leg sagittal; it has a vertical line to the ground which goes through the upper leg, the lower leg, the hindmiddle foot and the foot.

Author: Lothar Quoll

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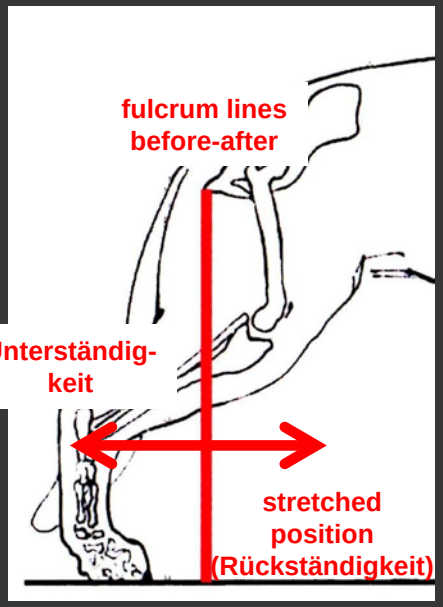
# Fulcrum line seen from profile




Meets the supporting line behind or nearly behind the foot on the ground, so is it to Unterständigkeit. In the case of Unterständigkeit is the center of gravity shifted too far to the rear, the Pelvic limbs are so heavily loaded and cumbersome, what has a negative effect on speed.

If the opposite is the case, and take the line in front of the foot to the ground, so one speaks of backwardness or extended position, corresponding to a incorrect mounting of the rear midfoot corresponds to the place vertically, as required, extends obliquely rearward. In the case of Backwardness is the center of mass moves forward, Shoulder limbs and the back are more heavily loaded.

Author: Lothar Quoll

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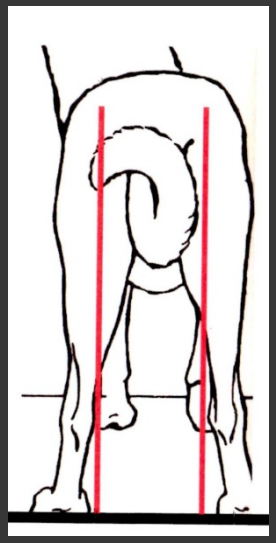
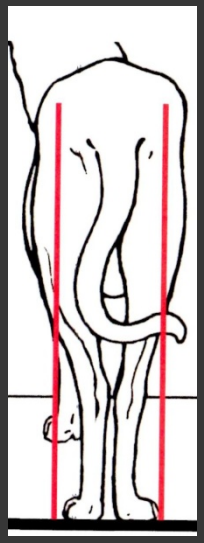
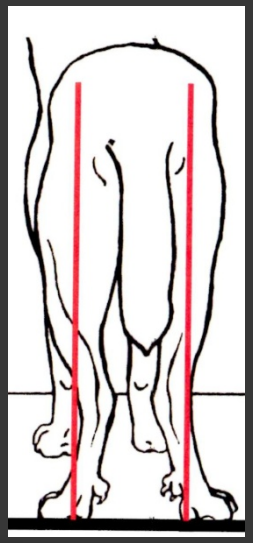
# fulcrum lines seen from behind - deviations



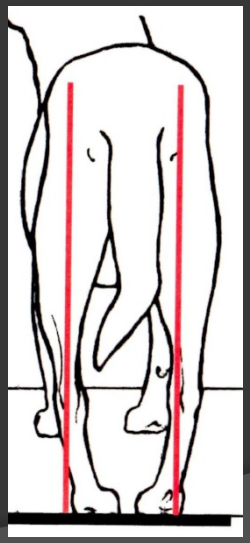
At large distance between the hind legs when the Pelvic limbs outside extend the fulcrum lines produces a wide themselves enter into the hindquarters.



Extend the pelvic limbs Within this line is referred to as closely kicking referred.



Extend the legs within, the feet but outside the Thrust line, then one speaks from cow hocks.



Are the legs outside and feet within the Support lines, so it is to “Faßbeinigkeit”.



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# Movement – Locomotion - Gravity – center of mass

In order to understand the mechanism of dog‘s movement some items which are important for the animal mechanism have to be cleared. It is often heard that muscle power would be the most important for mechanism. However, it is unimaginable that moving the body (which in fact is heavy weight for some breeds) forward is based only on the action of the muscles. No muscle mass which is in accordance to a dog‘s dimension could be able to do such work for a longer time.

From this reflection results a rule which is important for movement but is not observed as it would deserve it. It is the first law of mechanical pyhsics which describes gravity and explaines its effect to the anatomy and movement of an animal. This means, everything moving or standing in balance is under the law of gravity. It is the law of gravity that causes problems for movement, because gravity gives weight to each body. However, gravity also solves this problem.

Author: Lothar Quoll

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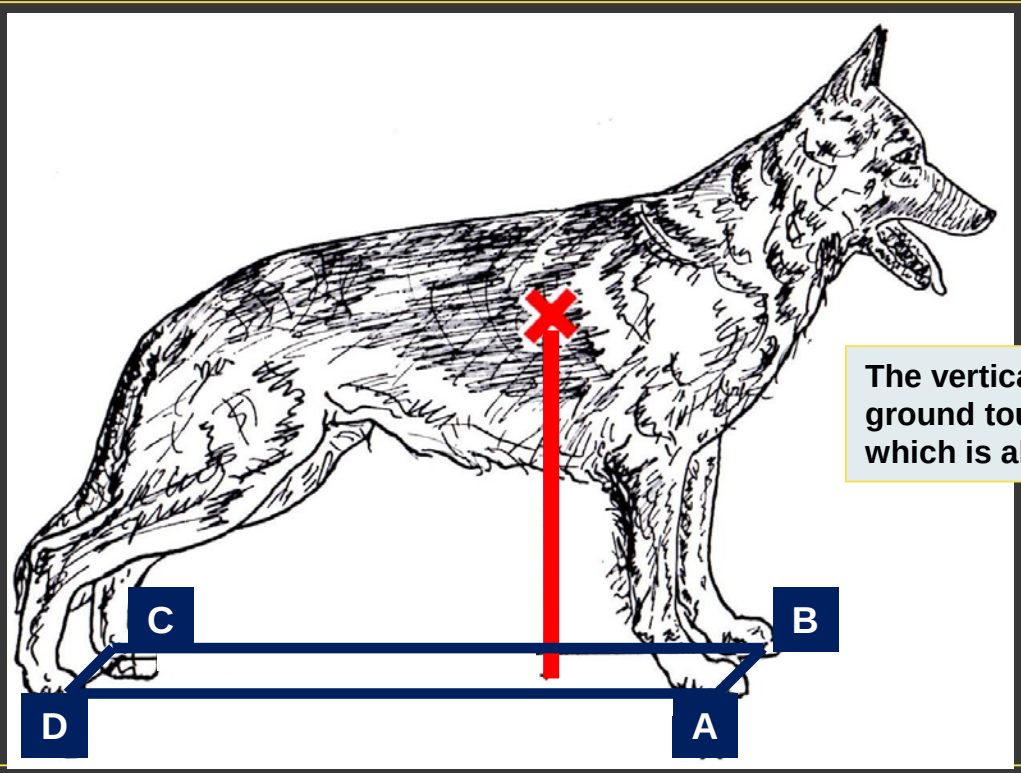
# Center of gravity

As can be seen from the picture a rectangle can be drawn with the ends at the points where the dog stabilized its extremities on the ground. The four corners are named A, B, C and D.




The vertical from point X to the ground touches this rectangle which is also called bearing surface.

It is important to know that each body has a center of gravity or balance point. At this point (X) all gravitation lines, the gravity lines of the body itself meet. This point is located centrally in the animals trunk. However, the position of the center of gravity is not constantly. For example when the head is lifted or the tail stretched it moves forward or to the rear. The balance and accordingly the statical position is only possible as long as the line touches the ground within the bearing surface.

Author: Lothar Quoll

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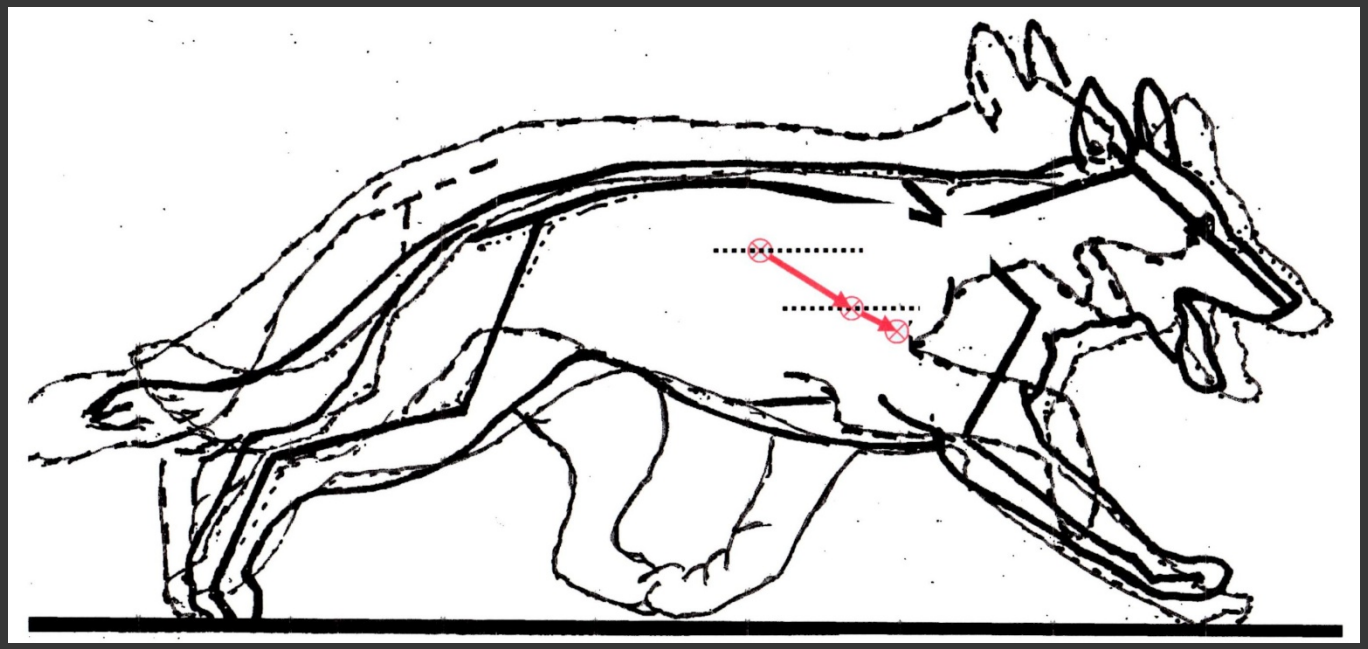
# Forward motion (propulsion)

**When the dog slides his body mass forward by stretching his neck on a horizontal line and sliding the head which acts as rocker arm to front and down he displaces his own center of gravity outside of the bearing surface in front of the line A-B from the foregoing picture. The power which initializes the move at first is the muscle energy of the hind hand; the animal moves his own body first to above and then forward.**

**Action of the hind hand in 4 following phases**

# Dislocation of the center of gravity

As from this moment the forward moving of the body is executed mainly because of gravity because the center of mass reaches a aslant sloping line and the body wins speed. The dog reacts at once and places first one and then the second foreleg in the front in order to place the center of gravity inside the bearing surface.



From this it is clearly apparent that the dislocatoin of the center of gravity causes the forward move of the dog; for sure with a propulsive power of the hind hand in the beginning but mainly the dislocation of the center of gravity causes moving the body mass forward.

Author: Lothar Quoll

# The locomotion general- placing

Moving of all four footed animal bases on the same principal. In each case all four legs will be placed on the ground or lifted from the ground in a special sequence. But also the course of motion of one extremity follows a special rhythm. The hind extremities have a special meaning for the impulse to move the body. The course of motion is regulated through nervous centers; they are built hierarchically and coordinate the movement on several levels by having controlled and integrated the minor centers by the major centers. The orders are send from the main movement center via some minor centers to the single muscles of trunk, extremities, tail a.s.o.

The single movement is composed from two moving parts, the placing and the swinging phase.

The placing is the point when extremities touch the ground. Functional the placing is divided in placing, bearing, mortising and lifting.

When the dog places his feet he touches the ground first with the toetips, which means claws, then with the pads of the toes and at last with the pads of the sole; when the foot leaves the ground the process is reversed.

The placing is followed by the bearing or changeover which one can see from the percolation. (Spread the tows and place pressure on pads of toes and sole).

Author: Lothar Quoll

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# The locomotion placing – bearing – swinging - phas

When in the course of moving forward the perpendicular touches the ground from the shoulder- or hip-joint in front of the toetips, the mortising connected with stretching the extremities starts. Then follows the lifting. In the placing phase the paw is a fixpoint for moving the extremities forward.

The swinging phase is the point in which the extremities do not touch the ground. The analysis gives space-time and territorial data. Whithin a movement the speed of the body is constantly. In this time the speed of a placing extremity is zero. (Remains on one point). In order to settle the loss of speed the average speed in the swinging phase has to outperform the total average speed remarkably. Regarding the speed in the process of the swinging phase as well as the form of the swinging curves of the paws you can differ three sections.

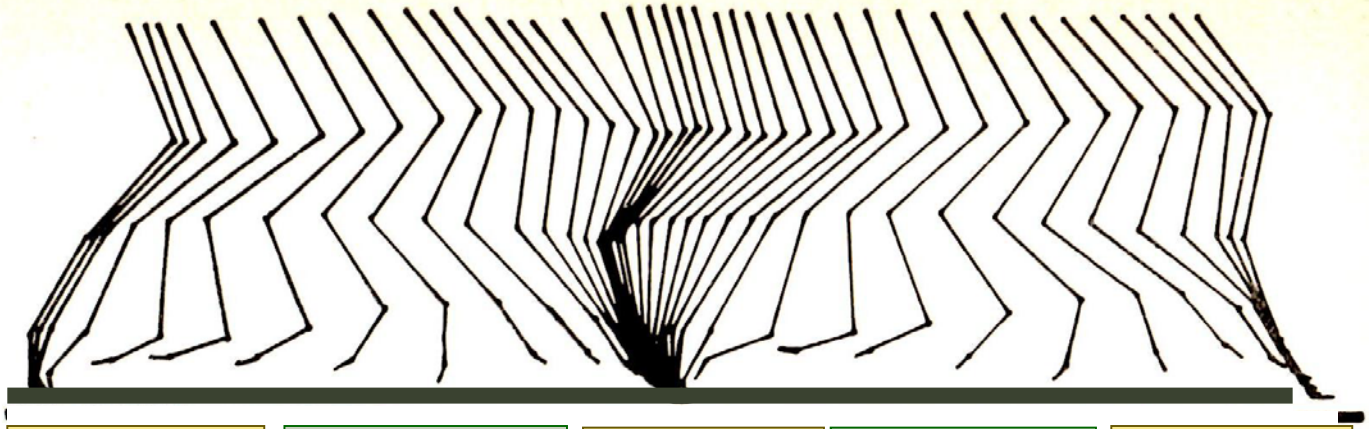
First the extremities swing in the early swinging phase when leaving the ground with a high speeding up and a different bow; in the middle section, the actual swinging phase they swing more or less constantly and with a slightly concave bow; when the move is broken in a characteristic bow as well the movement of the fore extremity as of the back extremity the swinging phase is settled and the next placing is prepared.

When the dog is galopping each extremity describes an own bow; the form is not completely identically with one of the other extremities. Also the length of the swinging bows is a characteristic figure for each movement. The spread is different when walking, pacing, trotting or galopping.

Author: Lothar Quoll

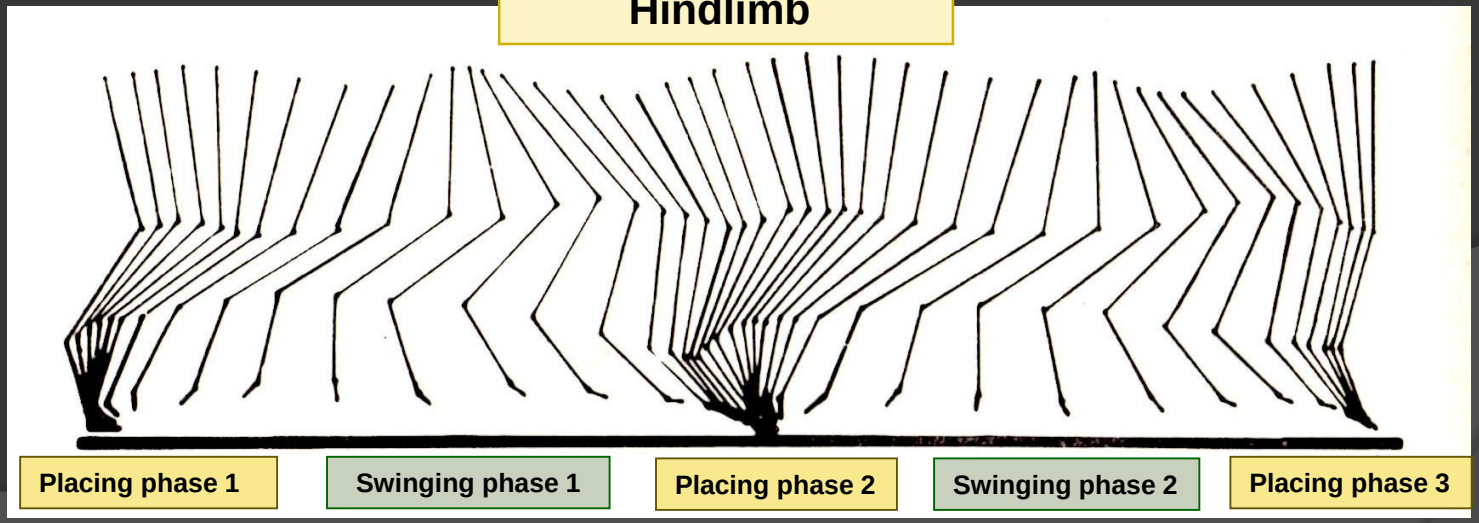
# Placing – Swinging phases walk

## Forelimb Modified joint angle demonstration



Placing phase 1 | Swinging phase 1 | Placing phase 2 | Swinging phase 2 | Placing phase 3

## Hindlimb



Placing phase 1 | Swinging phase 1 | Placing phase 2 | Swinging phase 2 | Placing phase 3

Author: Lothar Quoll

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# The locomotion - General

**While we are at the subject „movement“ we want to talk about the different gaits. The five different gaits are:**

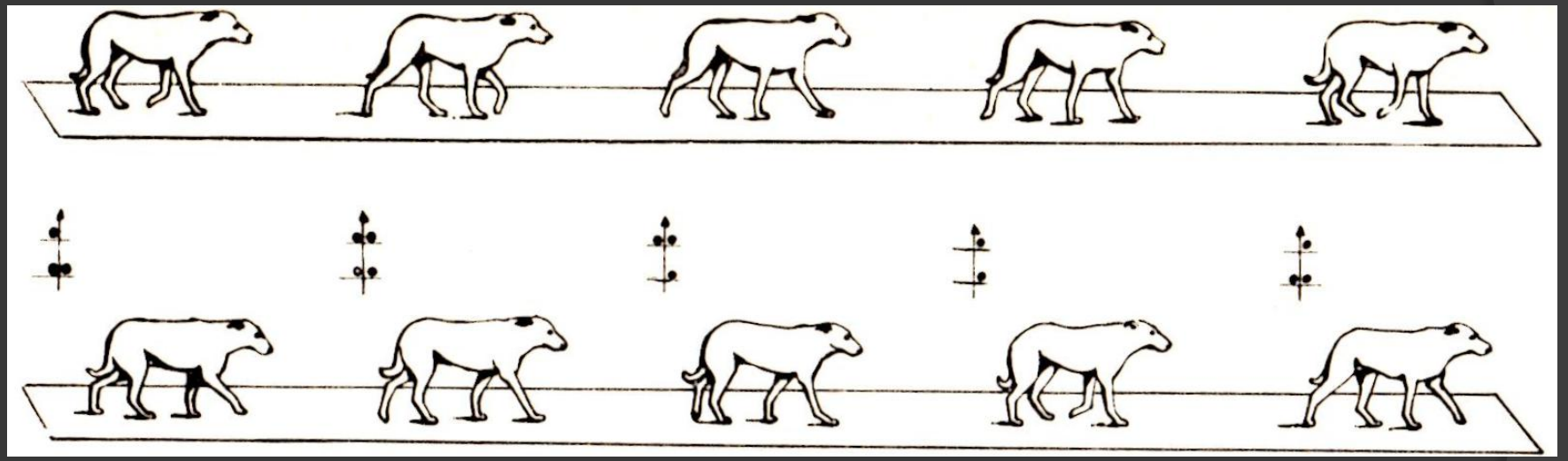
1. **Walk**
2. **Pace**
3. **Trot**
4. **Gallop**
5. **Jump**

**The complete body of the dog is made for moving forward. This impulse, also known as propulsion starts from the hind end and is forwarded via croup and spine. This impulse is always the first act to an effective drive of all forward motion.**

**The walk is a equilateral sequence, following from the rear to ahead alternately on both sides. When the dog walks the move which absorbs is truly the reduction of the bearing surface; the dog lifts one foot from the ground and with this the former quarangular bearing surface with one foot at each corner becomes a triangular and therefore half as big . Because of the one-sided front brace the balance of the dog is disturbed and a little move is enough to displace the balance outside of the bearing surface. This impulse is activated when the dog reduces the bearing surface by lifting the extremity which is done through contraction of some muscles (triceps surae, middle foot extensor and footrood which switches the heel to the front). The leg is stretched so that the pelvis extremity becomes nearly straight. This causes the displacing of the center of balance to the front which affects also the trunk. So the trunk is pushed to the front and the body mass point is transferred further to the front. In order to not fall on the ground the dog has to move his before lifted foreleg further in front so that the center of balance is transferred back into the bearing surface. When walking the dog stays nearest to the ground. The four extremities move, one after the other; in doing so two if not three extremities support the body. Because of this the walk is the less exhausting gait of the dog.**

# The walk

**The walk is an autonomous kind of movement with different submoves; slowly, middlefast and fast walk.**



**In the phases with differently quick movements where f.e. the foreleg is lifted before the concurrent hind leg are two instead of three legs on the ground. Within this time the body slides for some moments to the side or diagonal to the front until the third leg supports the triangle.**

Author: Lothar Quoll

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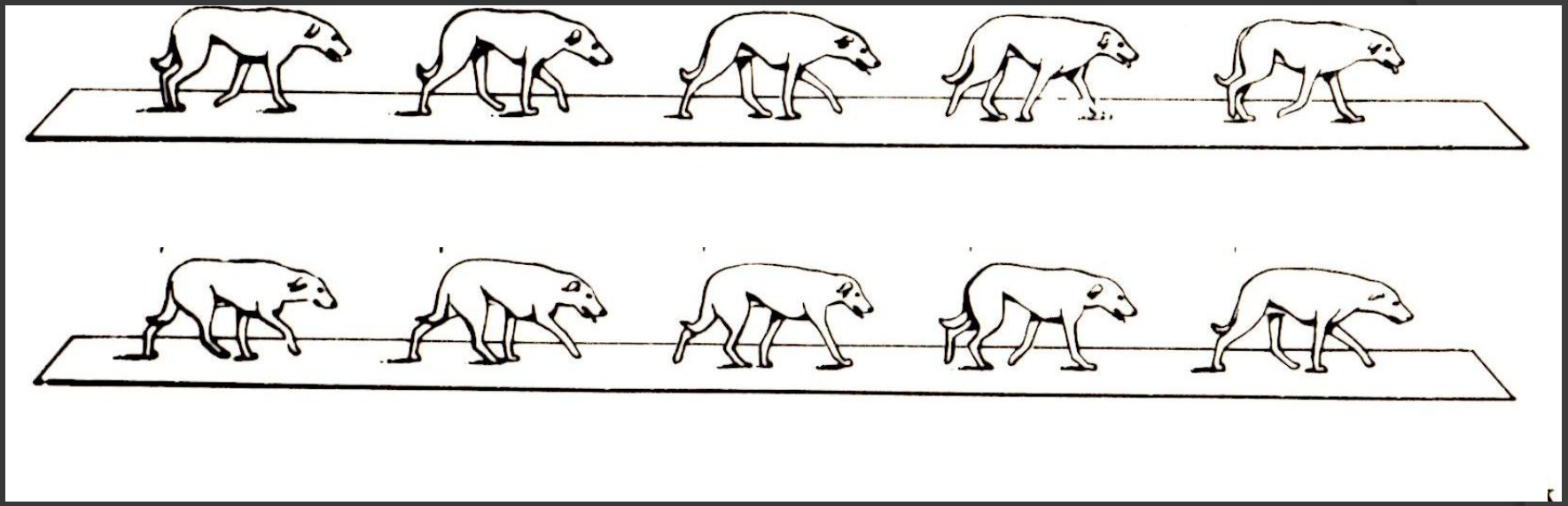
# Gaits – pace, the pace walk



**When the dog shows pure pacewalk the fore- and hindleg of the same side are moved synchronal. The pace is a connecting passage from the slower walk- to the faster running move. According to the reached speed one can differ a slow and unpure pace from a quick, nearly pure pace; the first can also be seen as pace walk-like movements and the second to the running moves.**
**The hind extremity is based earlier than the forefoot when a pace walk-like move is shown. This causes that between two longer pace phases with one sided support one very short hind and front three-leg-bear is done between.**

Author: Lothar Quoll

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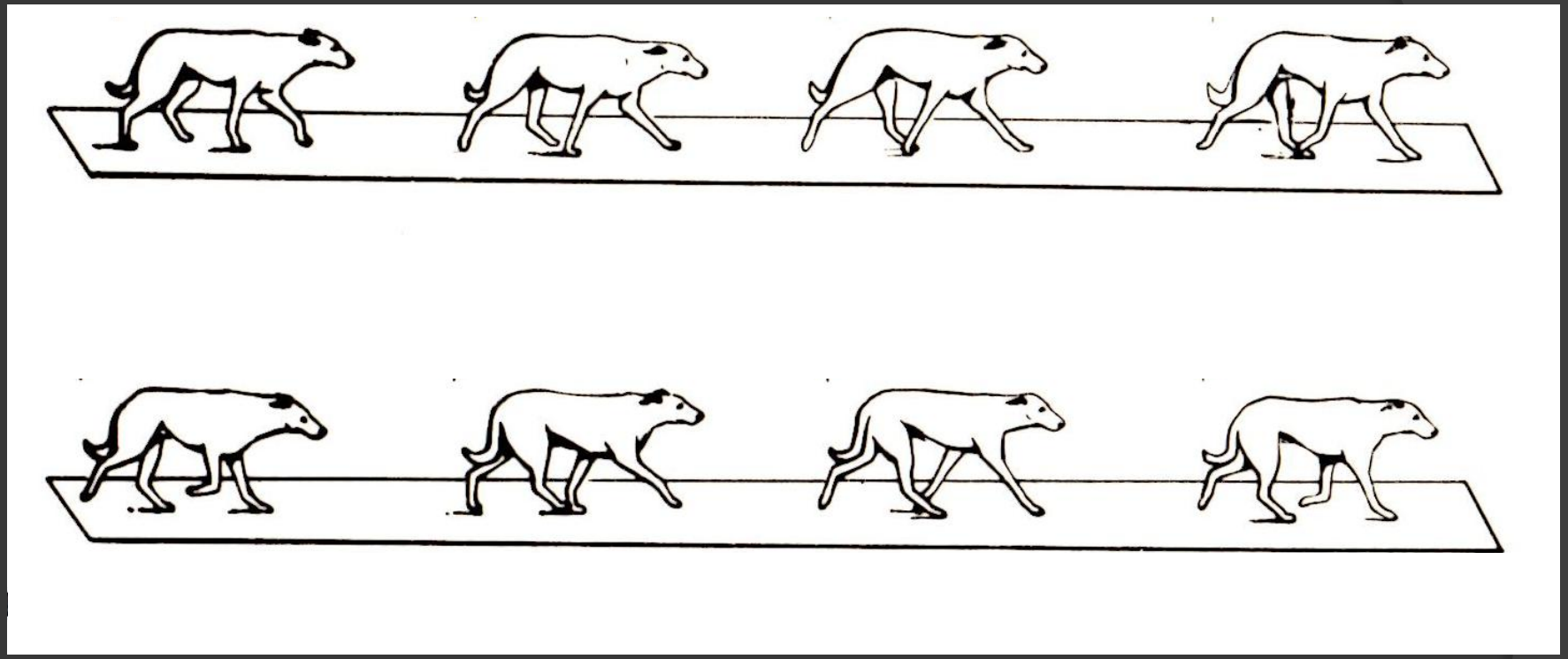
# The Pace run



The walk moves differ from the running moves thereby that the swinging phases of the running moves are longer than the base phases and therefore the change of the phases coincide over and a longer or shorter levitation phase is performed. Because of this we can count the quick pace to the running moves. The motion sequence starts with a hind extremity which is followed from the front extremity of the same side. Instead of a levitation phase a slight touch of the ground by diagonal legs is shown. Compared with the walk the displacing of the center of mass increases mainly in horizontal direction because the body weight has to be moved two times from one side to the other within one sequence of movement.

Author: Lothar Quoll

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# Gaits - trot

The German Shepherd Dog is a trotter. He has to be able to trot longer distances with less efforts. A prerequisite for this is an anatomy according to the breed standard in combination with firm and strong muscles. The middle trot is the most natural kind of movement for the German Shepherd Dog.
The characteristic of the trotter is his ability for far reaching steps so that in motion the imprint of the hind foot is in the imprint of the fore foot or, even better, before it.
When you keep in mind that the animal is built rectangular and therefore the fore legs compared with the hind legs are even further away you can conclude that only a stronger angulation of the pelvis extremities in the stretching phase allows them to meet the imprints of the fore foot or even to top them. A stronger angulation allows longer bone segments of upper leg bones and under leg bones.
Therefore, the trotter is characterized from a more narrow angulation of the hind leg. A direct consequence is that also the croup has to be more bowed. The reason is that the gluteal muscle and the tibial muscle can develop the necessary power. A further characteristic is the length of the croup because this is the lever arm of the power when moving forward.

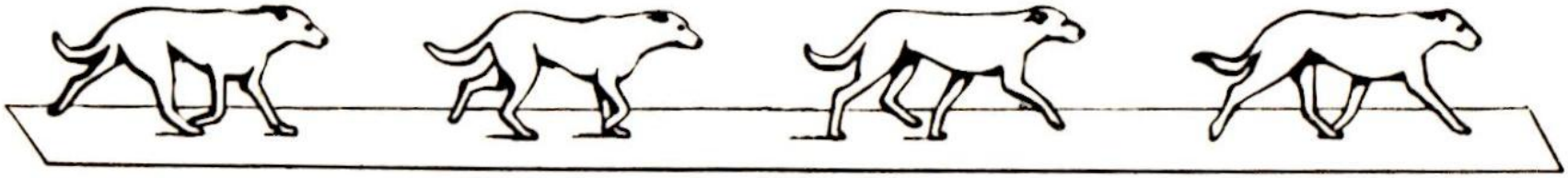
A direct consequence of the more narrow angulation of the hind extremities is the more closed angulation of the front extremity pillar. If this would not be the case the outreach of the pelvis extremities would not correspond with the outreach of the shoulder extremities. The trot is a harmonical gait and it would be completely impossible that the hind legs would make a certain number of steps and the fore legs would have to make more steps.
The trotter has a nearly horizontal position while moving. The foreward move is initialized from the hind hand and is forwarded via the croup and the back to the fore hand.

Author: Lothar Quoll

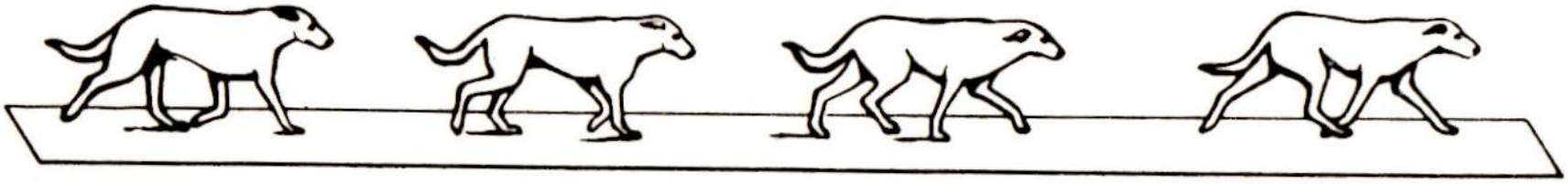
Dashboard

# Gaits - trot

**Therefore, good length and position of the croup are very important for a good trotter. The trot is a quicker gait than the walk. When the dog trots the motion sequence can be followed by the eye without effort because it is a simple diagonal syncronism which means that the diagonal pairs of extremities are working together so exactly that they are in the nearly same phase through the complete motion sequence. The center of gravity is covered only from diagonal two-leg pillars which change from hind left to front right and from hind right to front left.**

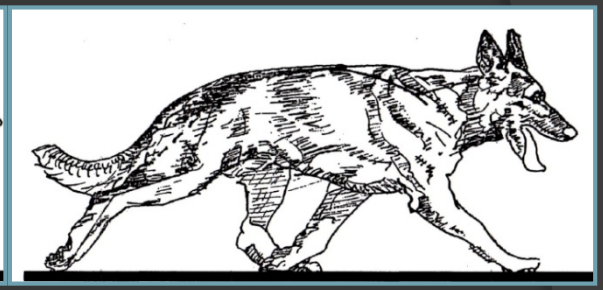


**The trot is an independent and sharply defined running motion with synchronous diagonally back left - front right and rear right - front left and regularly alternating footfall is.**



# Step sequence trot

On those three pictures the three positions of the trotter are shown. This explains the mechanics and the lines on which the impulse of the hind hand is given to the fore hand when trotting and is carried on by the base move.



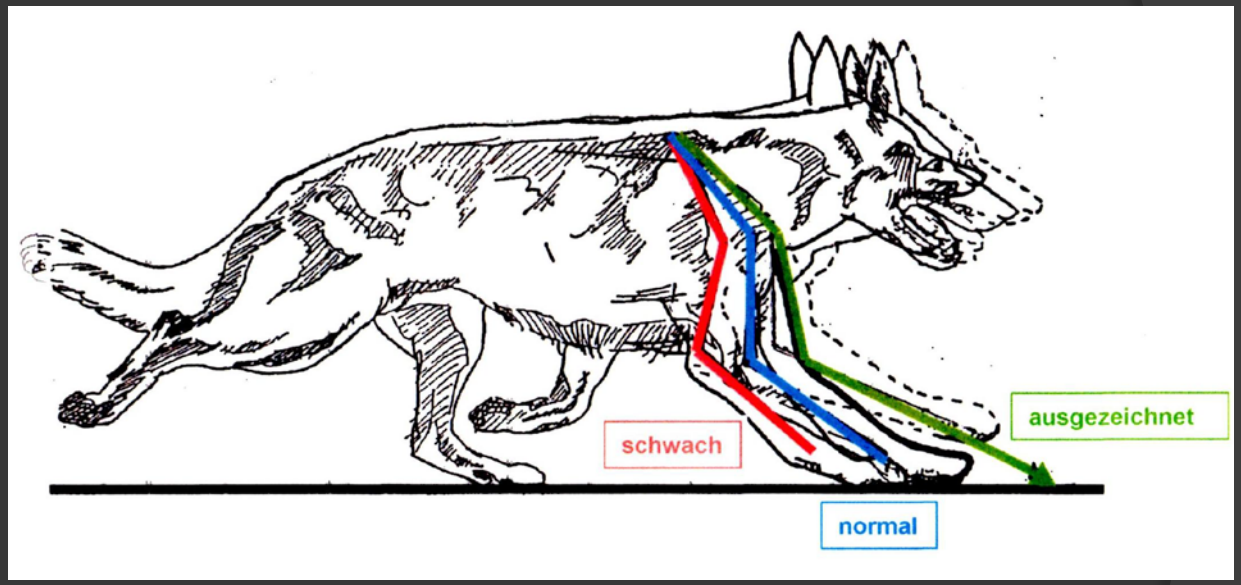
| Push | Stretching phase | Base move |
|---|---|---|
| This picture shows the position of the dog in the phase where the propulsive power gives a strong push to the hind hand. | The dog is pushed to above as shown before and then reaches the stretching phase through displacing the center of gravity on a vertical line. | The picture shows the beginning stadium of the given push forward. |

Author: Lothar Quoll

Dashboard

# Different shoulder plies

The preferable wide step can be performrd from the dog with the fore hand when the bones are long and the scapula and the upper arm are connected angular. The scapula turns while moving around a point somewhat in the middle. This means the longer the bones and the more angulated they are connected the larger is the room for the shoulder.




The passing red line shows an open bead seat angle. The scapula is placed too high, angled at the side of the thorax. The following upper arm shows a too high angled angulation with little room for the shoulder and short step forward. The step forward is short.

The blue colored line shows the possibility to move in the same motion phase when the shoulder is good.

The green line shows the result of an excellent angulation of the fore hand which allows the shoulder extremities a wide step.

Author: Lothar Quoll

Dashboard

# Gaits – gallop

The gallop, the fourth of the main movements, differs signifcantly from the three foregoing. While at all other kinds of gait the movement of both body halves is synchronous they are asymmetrical while galloping. The single function of the four extremities and the levitation phases are added to a complete figure of movement.
Like the walk also the gallop according to the speed shows three submoves: the slow, the middle quick and the quick gallop.
According also the kinds of gallop can be differed by the foot sequences; however, partly they overlay in their speeding. Therefore, they are not listed as seperate group but they help to further classify the grading per speed.

The slow gallop has two variations:

1. The Canter ( a slight, casual gallop which is to aerate and relax) is a transition form at which after the levitation phase first one hind extremity touches the ground, then the second hind extremity and the diagonal front extremity bases simultaneously and finally the second front extremity bases.
2. The slow right side gallop where the diagonal front leg bases later.

The middle quick gallop can also be presented in two ways:

1. The left side gallop with the constant change of the supporting side, f.e. HL, HR, FL, FR and again HL, with alternation foot sequence.
2. The right side gallop with cyclic foot sequence, HL, HR, FR, FL and again hind left.

The quick gallop is only performed as left side gallop with cyclic foot sequence. HR, HL, FL, FR and again HR.

Author: Lothar Quoll

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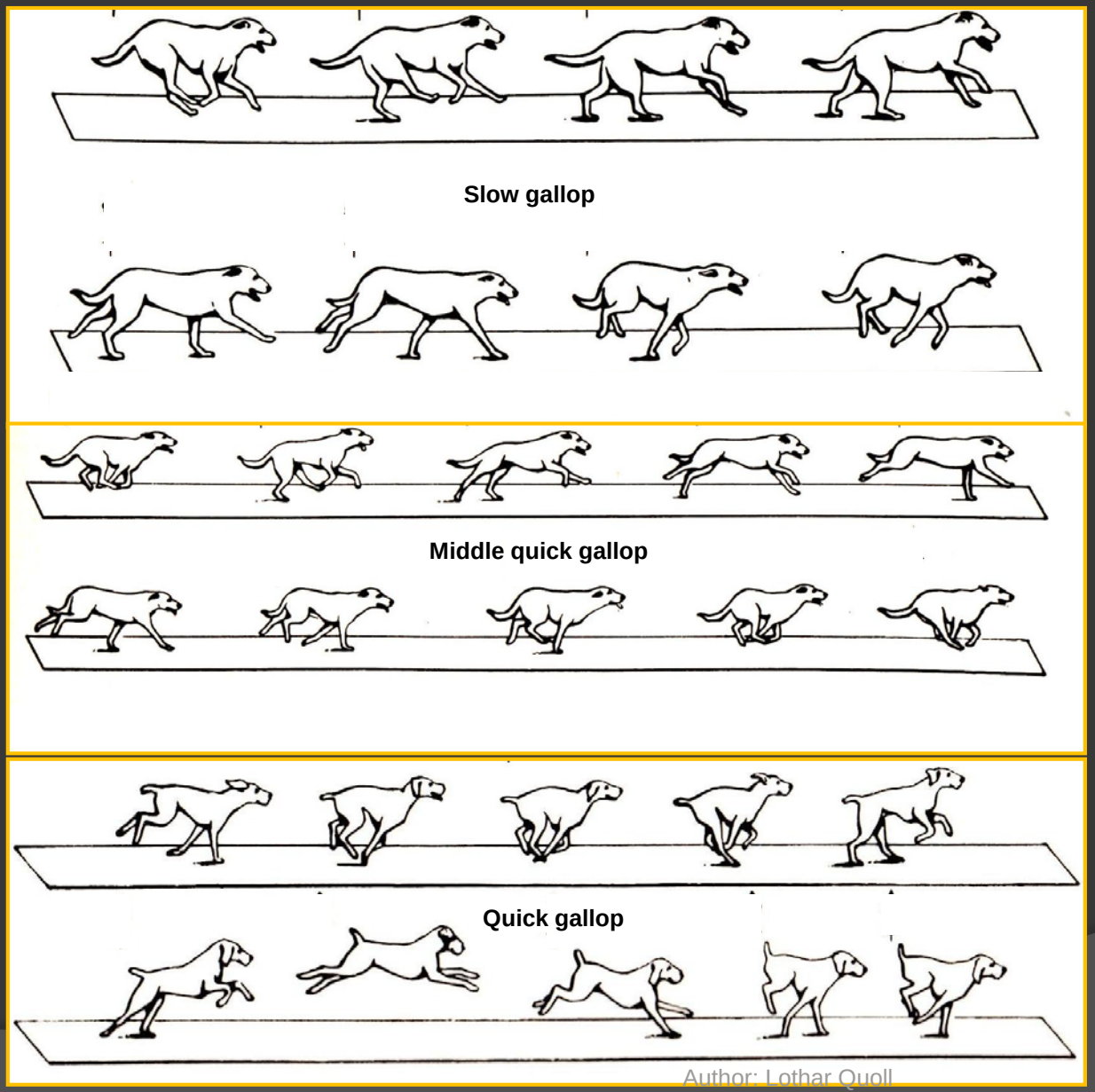
# Gaits – gallop




**For a dog the foot sequence for a cyclic gallop, p.e. a right side gallop is, different to the horse, beginning hind left and ending front left. Regarding this foot sequence it is assumed that, with such a high speed, a change of support via the medium diagonal is not necessary or would even block the forward move.**



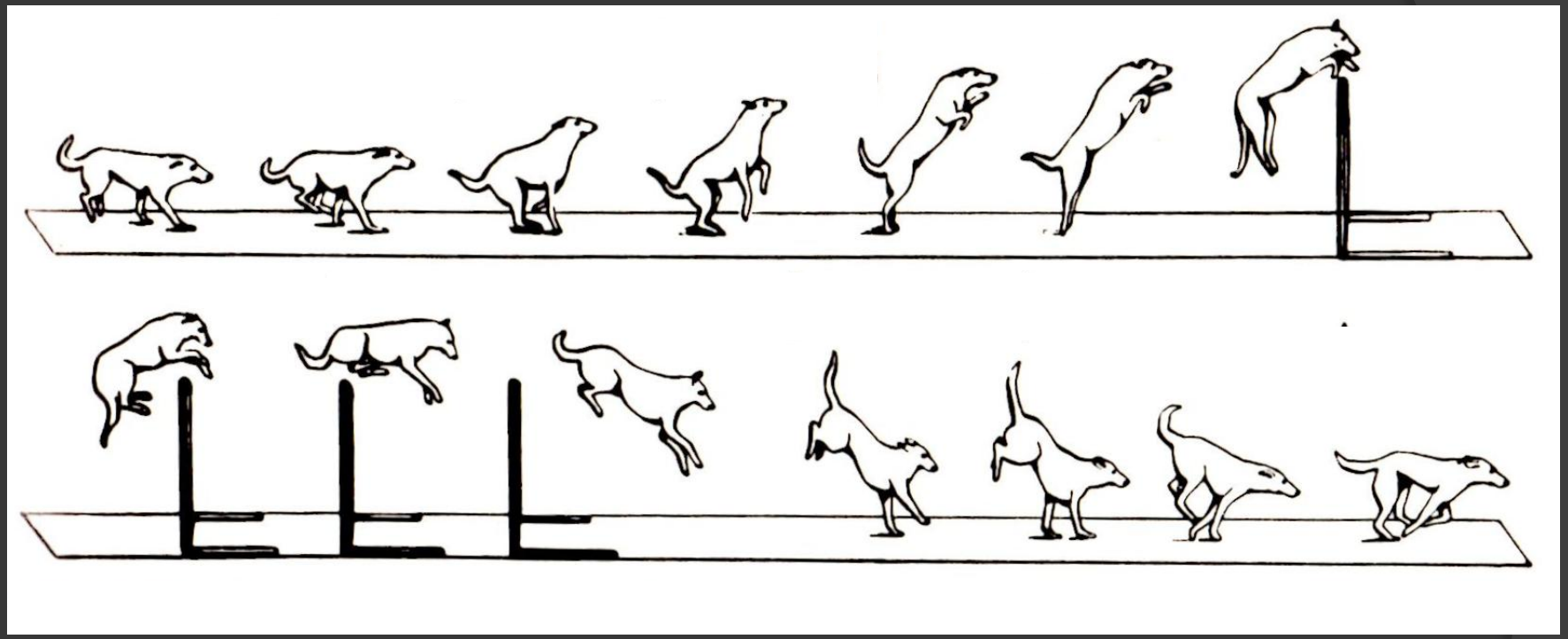
Dashboard

# Gaits - jump

The jump can be performed out of the stand or, easier, out of the gallop; the moves are a little modified gallop jump.  It integrates into the slow and medium quick gallop to the middle diagonal and disrupts it.  In a quick gallop the jump is performed instead of the second levitation phase. The normally in slow and medium quick gallop performed levitation phase is disrupted through a further displacing of the hind extremities under the trunk and taking over the body weight. Meanwhile, the head and the complete fore body have been stretched aloft by pushing with the front extremities and by help of the strongly stretched muscles of the back; with this also the speed is a little reduced. By quick and strong stretching the strong bowed hind extremities the body is, as soon as it is straightend up enough, to shoot to the front and aloft. While the body is flying in direction of the barrier his axis is diagonal to above. The forelegs are taken to the widly craned neck as far as possible; assumedly, in order to minimize the air resistance. Above the barrier the axis is in a horizontal line in order to be strongly leaned forward and to the ground. Thereby, the forelegs are brought down in order to absorb the body weight while landing. In contrast the head is lifted; assumedly, in order to minimize the speed and to displace the heavy weight to the rear. The hind extremities base after the jump closely behind the front extremities and continue, after touching the ground, the gallop which has been performed before the jump. The position while jumping, especially of the hind extremities seems to be different according to the breed.

Author: Lothar Quoll

# The jump





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