

Construction and Movement in the Dog

By

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Basic StructureTypes

Movement and construction by function:-

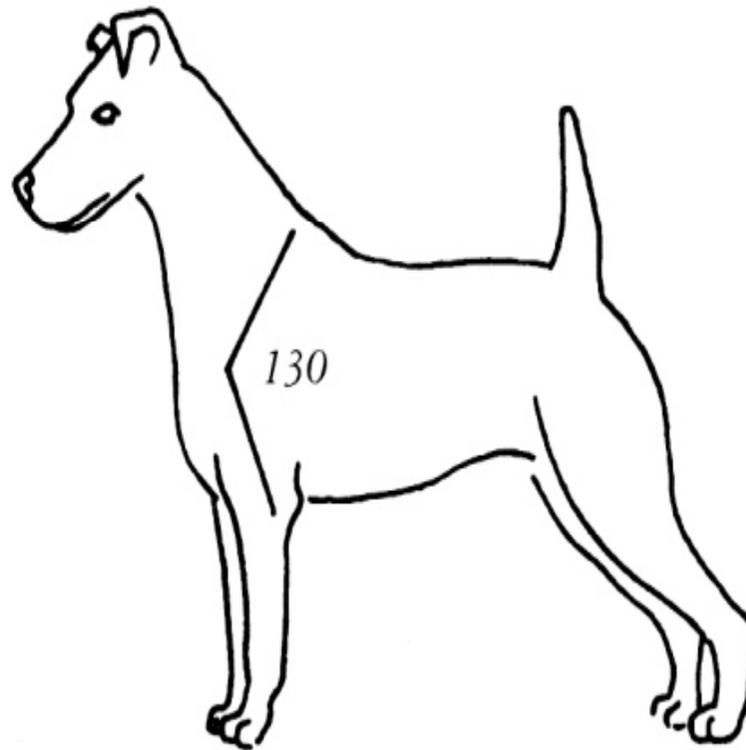
One can divide different breeds of dogs into three broad categories:-

- **1. The walking or strutting dog,**
e.g. Fox Terrier.
- **2. The trotting dog,**
e.g. the German Shepherd.
- **3. The galloping dog,**
e.g. the Greyhound.

All the breeds range between these three types depending on size, function and individual breed selection characteristics eg. the need to work in muddy conditions in the Belgian Shepherds, others are required to be exceptionally flexible and nimble eg the Kelpie.

Walking/strutting breeds

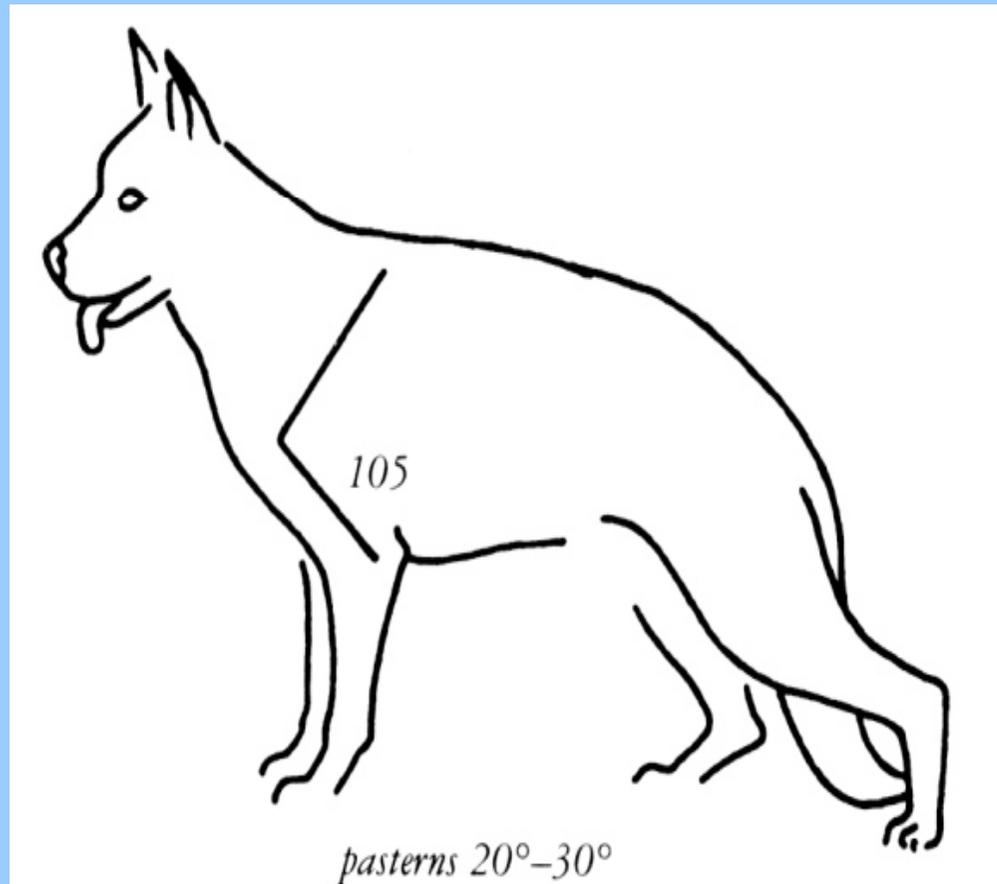
- a short bouncy action, where the forequarter assembly is often steep, they usually have short backs with a reasonable to very good turn of hindquarter for agility.
- pasterns are often short and upright, usually asking for short tight feet.



pasterns 0°–10°

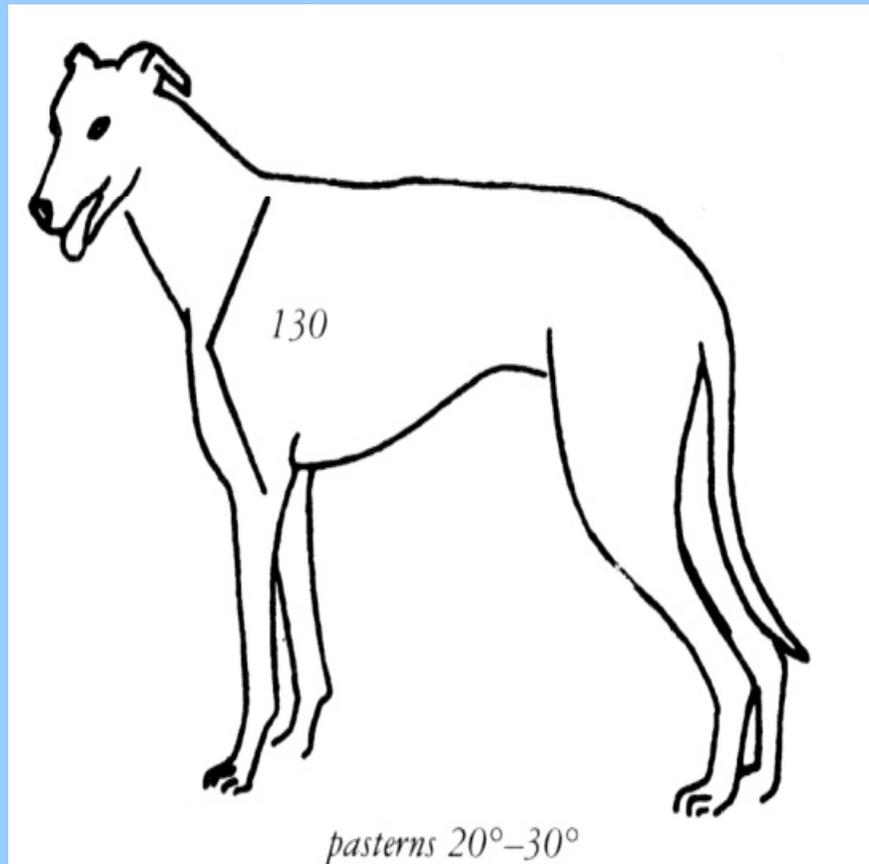
Trotting Breeds

- Usually requiring well balanced angulations front and rear.
- a tireless, preferably economical trotting action is called for- ideally should cover maximum amount of ground with minimum amount of effort, ie. fewer steps, translating to good reach and drive.
- pasterns are slightly longer and more sloping, giving better spring or flexibility, feet toe length medium to short, preferably with tight ligaments.



Galloping Breeds

- the maximum amount of thrust comes from longer, very powerful and well muscled hindquarters which push the dog up and stretch well forwards with very mobile, muscular shoulders and open angulation for galloping action.
- very flexible pasterns of good length. The feet have medium to long toes with “flatter” but still very flexible toes.



Generalizations on Construction

Across the Breeds

- Puppies as they grow, LOOSE some angulation. Therefore, ideally select slightly exaggerated angulation in a baby puppy, not a miniature adult.
- The way show dogs are exhibited favours the trotting dog in any breed. Therefore short strong hocks and good hindquarter angulation are essential in a top animal.
- One can get away with a moderately good hindquarter when very good in forequarter, but with increasing speed – no hindquarter, no show dog.

Construction by breed

Within a breed (ie. as desired by the standard)

Factors that are fairly constant for that breed:-

1. Proportions -

- Height to length proportions
- Height at wither to depth of chest relative to length of foreleg.

2. Angulations –

- Aim for the ideal relative to the breed standard.
- Balance of angulations - forequarter angulation relative to hindquarter angulation

With the correct proportions and balance of angulations as required by the standard, the dog should (ideally) produce the movement that is characteristic for the breed.

Movement - generalizations

The hindquarter construction/angulation -

- is the driving force or engine.
- is affected by the relative lengths of the upper and lower thighs, length and lay of the croup and length and stability of the hocks.
- the drive is transmitted forwards over the topline to the forequarter.

Forequarter angulation and placement -

- will affect the length and effectiveness of the reach
- is affected by the relative lengths and lay of the scapula (shoulder blade), the humerus (upper arm) and the length of foreleg – all 3 affect the 'arc of movement' that the foreleg can move through.
- stability of the forequarter is affected by the width and depth of chest formation (which can alter somewhat with maturity).

Firmness of ligamentation –

- will affect the overall effectiveness of the movement, especially with increasing speed and time.

Forequarter Angulation

Affected by –

1. Placement of shoulder/lay back of shoulder

(a) Well placed/well laid back shoulders

Good length of neck, maximum support for the elbows by the chest, less movement.

Prosternum visible from the side slightly forwards of point of shoulders.

((b) Slightly upright

Medium length of neck, good to reasonable support for the elbows ie. slightly loose elbows.

Prosternum level with point of shoulders.

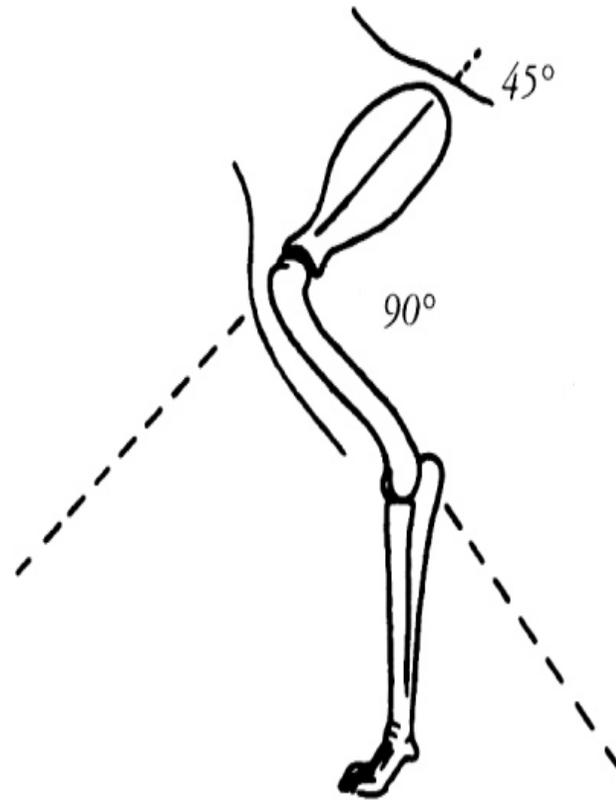
(c) Forward placed - Steep

Short neck, lack of prosternum – prosternum hidden behind point of shoulder.

Results in loss of support for the elbows by the chest
= loose elbows, increasing instability of front assembly at speed.

Well placed shoulder

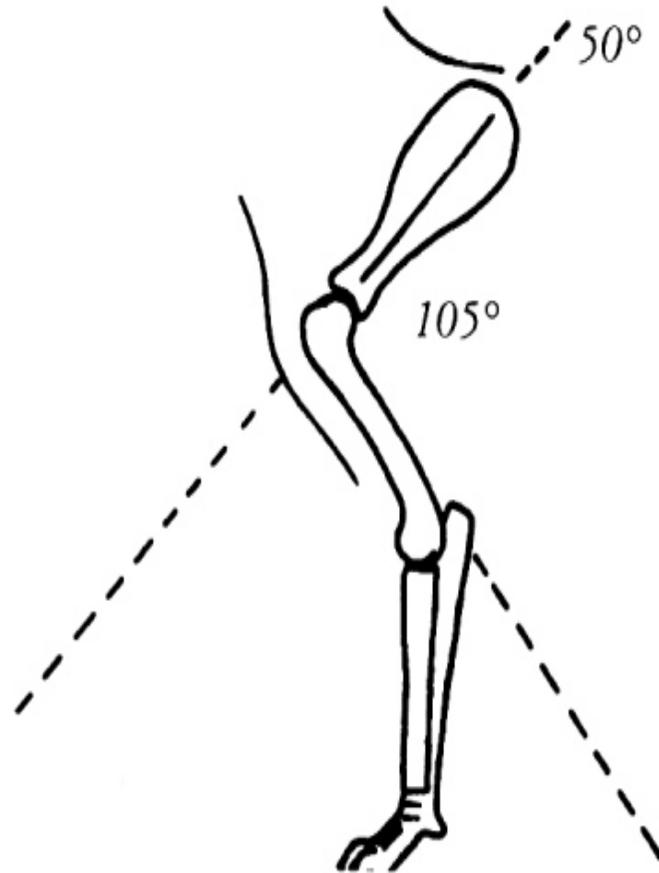
- Good length of neck, maximum support for the elbows by the chest, less movement of the elbows.
- Prosternum visible from the side slightly forwards of point of shoulders.



1. Very good forequarter angulation, with a maximum shoulder angle of 90° .
This gives very good length and reach.

Most commonly seen front

- Most commonly seen front angulation



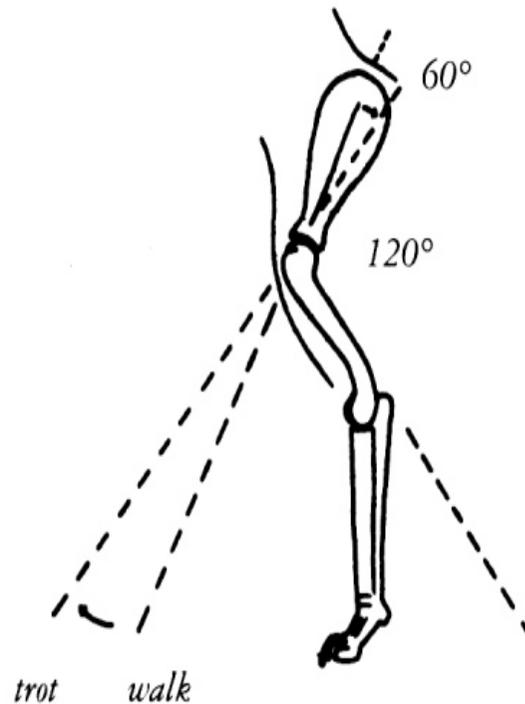
2. *Most commonly seen shoulder angulation of 105°, with good length of upper arm — typical of a trotting breed.*

Forward placed shoulder

(a) Forward placed - Steep

Short neck, lack of prosternum – prosternum hidden behind point of shoulder.

Results in loss of support for the elbows by the chest
= loose elbows, increasing instability of front assembly at speed.



4. Steeper placement of shoulder, but good length of upper arm. 120° angle is typical of galloping breeds, slightly restricted in reach during the walk, but at the trot or gallop, the shoulder blade top moves backwards allowing greater reach.

Forequarter Angulation...

2. Upper Arm – length and lay

- Lay affected primarily by the placement of the shoulder and secondarily by length.
- Increasing steepness of shoulder placement = steeper and shorter upper arm leading to reduced reach.

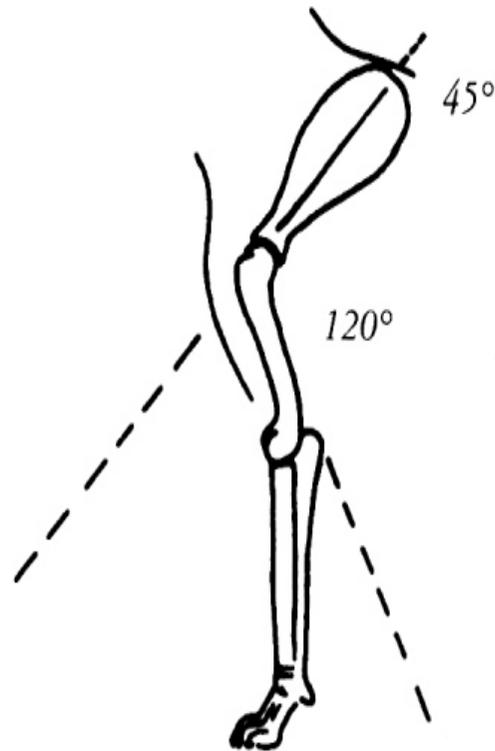
3. Withers affected by:-

- a) Placement/angle of shoulder blade
 - the more forward placed ie, steep shoulder results in increasing height of wither in relation to dorsal vertebrae (back/topline).
- b) Chest proportion (width)
 - increasing width (ie. barrelled chested) results in decreasing height of wither and decreased stability ie. increased movement over shoulders.

Ideally – very good lay back of shoulder plus very good length and lay of upper arm = maximum stability of forequarter and maximum reach.

Length and lay of upper arm

- a. Lay affected primarily by the placement of the shoulder and secondarily by length.
- b. Increasing steepness of shoulder placement = steeper and shorter upper arm leading to reduced reach.

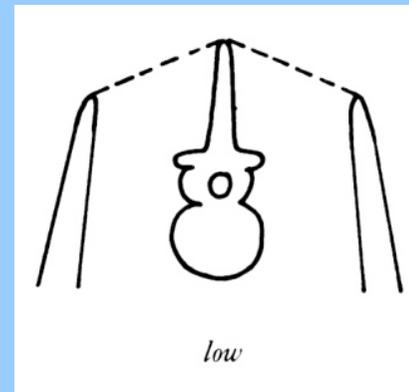
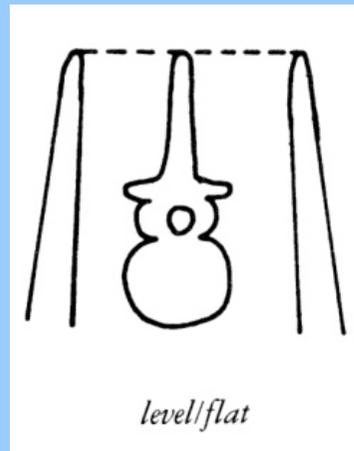
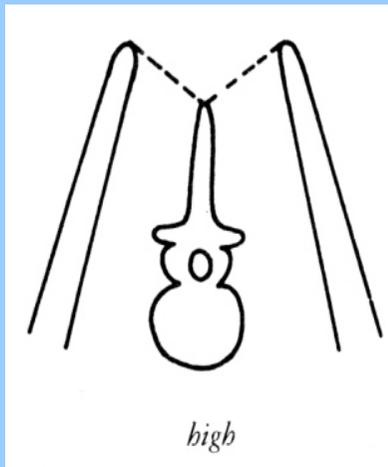


3. *Good layback of shoulder blade, but short steep upper arm, giving a restricted reach. Angle 120°.*

Withers - height

a. Placement/angle of shoulder blade

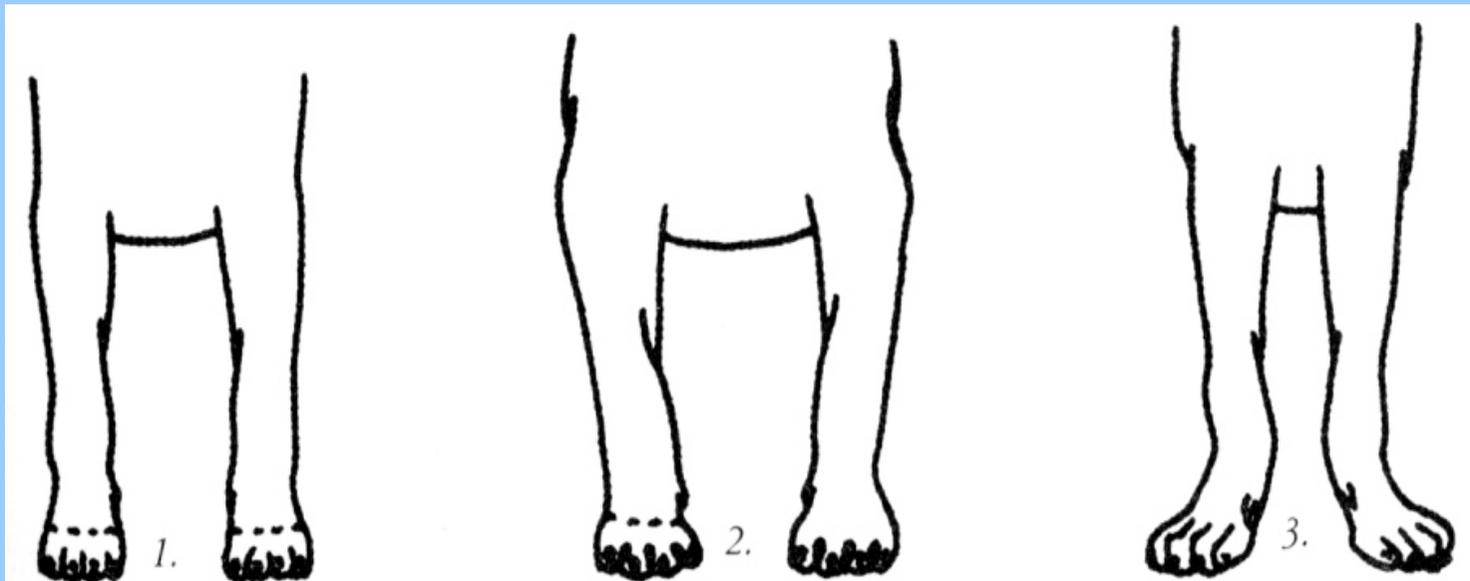
– the more forward placed ie, steep shoulder results in increasing height of wither in relation to dorsal vertebrae (back/topline).



Chest – spring of ribs

Chest width

– increasing width (ie. barrelled chested) results in decreasing height of wither and decreased stability ie. increased movement over shoulders (more rolling action).



1. *Correct — the legs drop straight to the ground.*
2. *Barrel ribbed — too wide — wide front movement — elbows out, feet in, paddling effect, 'loose at elbows'.*
3. *Slab sided — too narrow, elbows in, feet out, looseness of pastern.*

Chest Proportions

Depth

- the deeper the chest (beyond 50% of height), the more the forequarter has to work around the chest and the quicker the dog will tire.

Length

- generally call for good length of chest for increased lung capacity and endurance

Short underchest

- lack of length of ribcage – decreased lung capacity.
- often tend to be very narrow at the base of the chest and have loose elbows as a result.

Width of chest (especially underchest)

- affects width of stance in front and stability of elbows
- Underchest width can improve with age and maturity – elbow stability improves in line with this.

Depth of Chest to length of foreleg proportions

Each breed has a desired depth of chest to length of foreleg ratio. (*Average breed – chest should reach to point of elbow*).

- the average breed ideal is around 50% chest to 50% foreleg as the desired proportions in the *adult (mature)* dog.
- most adults get slightly deeper in chest (particularly bitches) as they mature.

Increasing depth of chest (below point of elbow) or too short in foreleg – both result in restrictions in the forequarter and the dog has to work harder around the chest to cover the ground efficiently – dog tires easily.

Pasterns and feet

- Pasterns
 - are a cushioning device to help the body cope with the concussive impact on to the forehand during movement.
 - too short – less force is absorbed, creating a bouncy, jarring effect
 - too long (and or too loose in ligament) - forward transmission power is lost, increased strain on the ligaments, often a paddling effect in front.
- Feet – *can vary depending on the task to breed was developed for – eg. herding, sledding, ratting, and on the overall tightness of ligamentation of the breed.*
 - generally need to be tight and compact.
 - terrier breeds are generally very tight, cat like feet.
 - galloping breeds the toes are longer and more flexible.

Height to Length Proportions

Each breed has a desired height to length ratio.

- Most breeds are around 10-15% (maximum) longer in body relative to the height at the wither
- The next most common group of breeds are those that are square (bitches in these breeds are usually allowed to be just slightly longer and still be acceptable).

Length of body

- is measured (usually) from the front of the prosternum to the end of the pelvis (the ischium).
- Body length covers the entire length of the rib cage, the loin and the width of the hindquarter.
- Most increased length of body comes from increased length of loin.
- Body length can '**appear**' longer when the forequarter is forward placed, giving a shorter neck and apparent longer rib cage – these dogs lack in prosternum.

Back and Coupling

Overall length of back and coupling

- **Too Long** – loss of transmission; increasing looseness of ligamentation.
- **Too short** – (ie. of the coupling)
 - = unable to fully extend at the fast gait.
 - = unable to get the hindquarter sufficiently under the body to drive effectively.
- **Short coupled breeds (or individuals) ie. square in proportions** often have a greater tendency to pace.

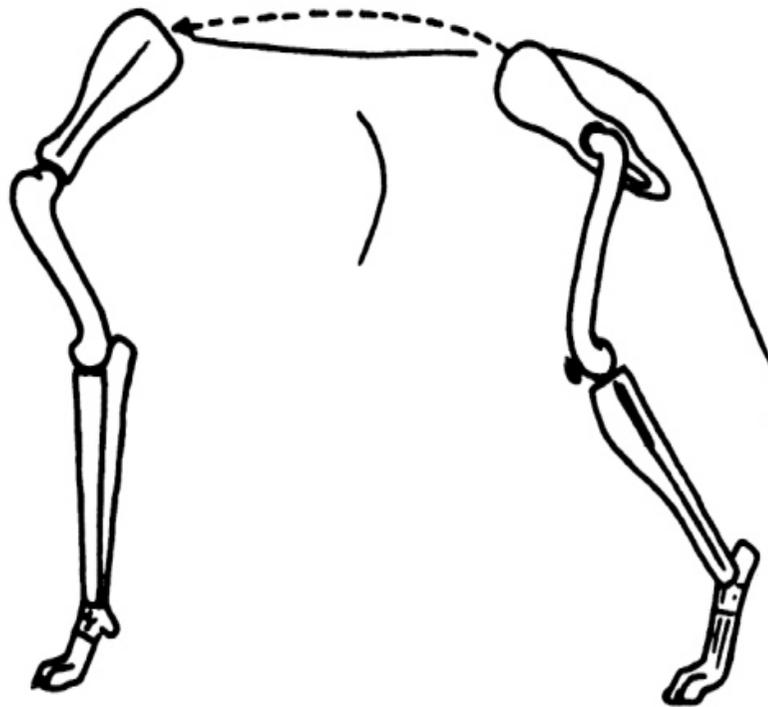
Mid point of the back – pivot point (around T10-12)

- “Ether dog effect”
- If balanced angulation and movement (reach and drive) - the topline should remain level to slightly higher forwards (depending on shoulder placement)
- If unbalanced angulation – the dog will generally fall on the forehand.

Good length of back and coupling

- Good length of back and coupling

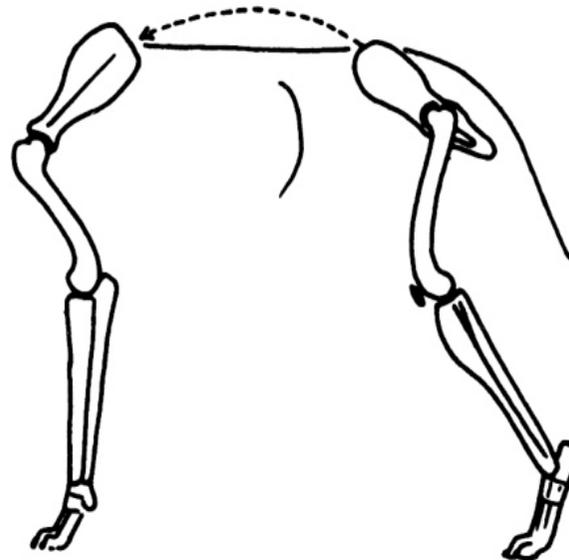
1. Good length of coupling - the drive is transmitted without loss along the back.



Back and coupling too short

- . Too short – (ie. of the coupling)
 - = unable to fully extend at the fast gait.
 - = unable to get the hindquarter sufficiently under the body to drive effectively.
- Short coupled breeds (or individuals) ie. square in proportions – often have a greater tendency to pace.

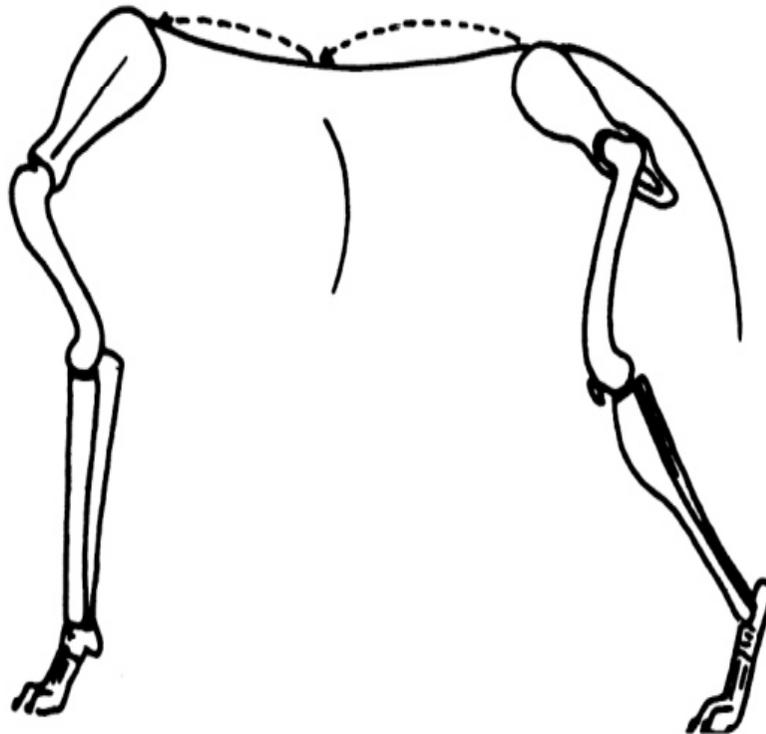
2. Too short in coupling, resulting in a restricted reach and drive, as much of the drive is transmitted up and over the back.



Back and length of coupling too long

Too Long – loss of transmission; increasing looseness of ligamentation.

3. Too long in the coupling, where the drive is lost in the centre of the back due to the length, causing a bouncing movement.



Roached Backs

Midpoint of the back is higher than the wither.

- **shorten the back**
- **are stronger in ligamentation**
- **if too strong ie. roached in *movement* – results in loss of power upwards and forces the forequarter to drop ie. falls on the forehand.**

Croups

The croup forms the last section of the topline – *it affects the length of stride of the hindquarter and thus the force of the drive forwards.*

The *length of croup* affects the width of muscle of the upper thigh.

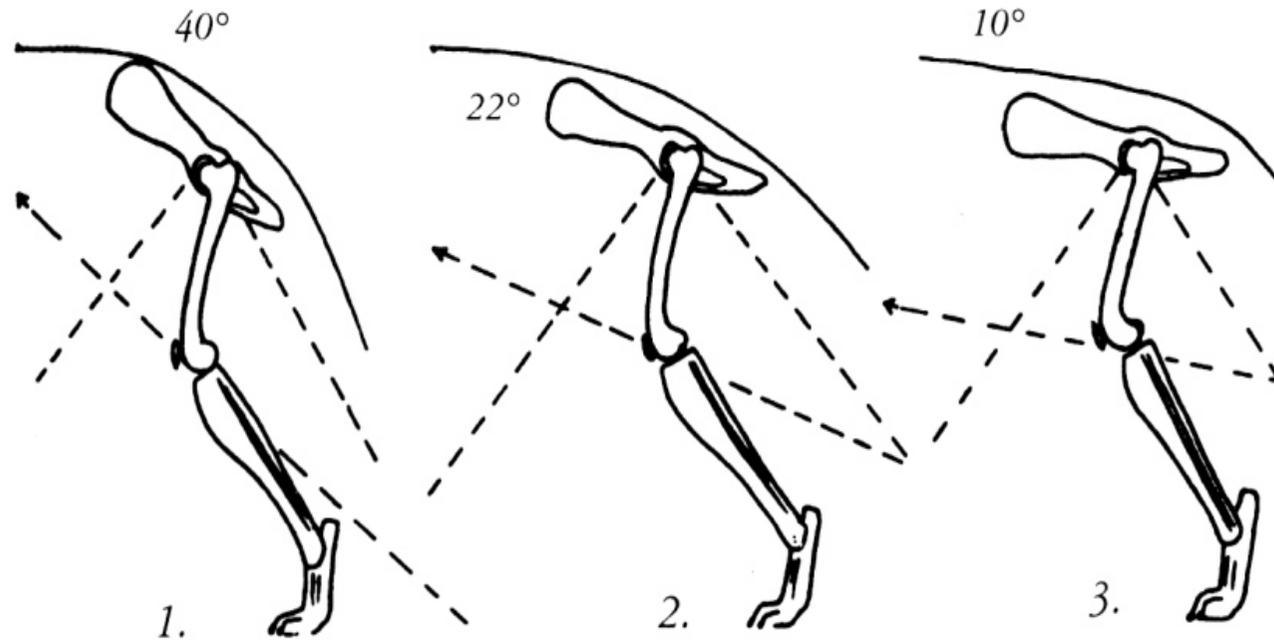
The *angle of the croup* affects the effectiveness of the drive by :-

- reducing the power of the follow through thrust if too steep.
- limiting the forward reach (if steep)

Good length and lay of croup – gives maximum transmission of the drive forwards. Most breeds call for a moderate gently sloping croup of good length.

Set of tail – can affect the “length” of croup. High set tails will shorten the perceived length of croup and can detract from the flow of the topline in some breeds.

Length and lay of Croup



1. At 40° — too steep, where the angle of drive is too high, causing the back to rise during movement. Restricted in rear swing of the hindquarter due to the steep croup.

2. At 22° — croup good, the angle of drive is not too steep, where the thrust is forwards along the back. Good swing of the hindquarter (both forwards and backwards) is allowed by the croup.

3. At 10° — croup too flat, angle of drive is lower than the back, and considerable thrust is lost as it is not transmitted forwards. The forward reach of the hindquarter is slightly restricted.

Hindquarter Angulation

Angulation of the hindquarter usually refers to the relative lengths of the upper and lower thigh, length of hock and the resultant turn of stifle.

Balance comes from equal lengths of upper and lower thigh.

Stability - comes with short strong hocks combined with equal lengths of upper and lower thigh.

Instability comes from increasing length of lower thigh in relation to upper thigh, particularly if combined with long hocks.

Croup – length and lay of croup affects the transmission of power forwards.

Good angulation – equal lengths of upper to lower thigh, ideally with short strong hocks, good turn of stifle.

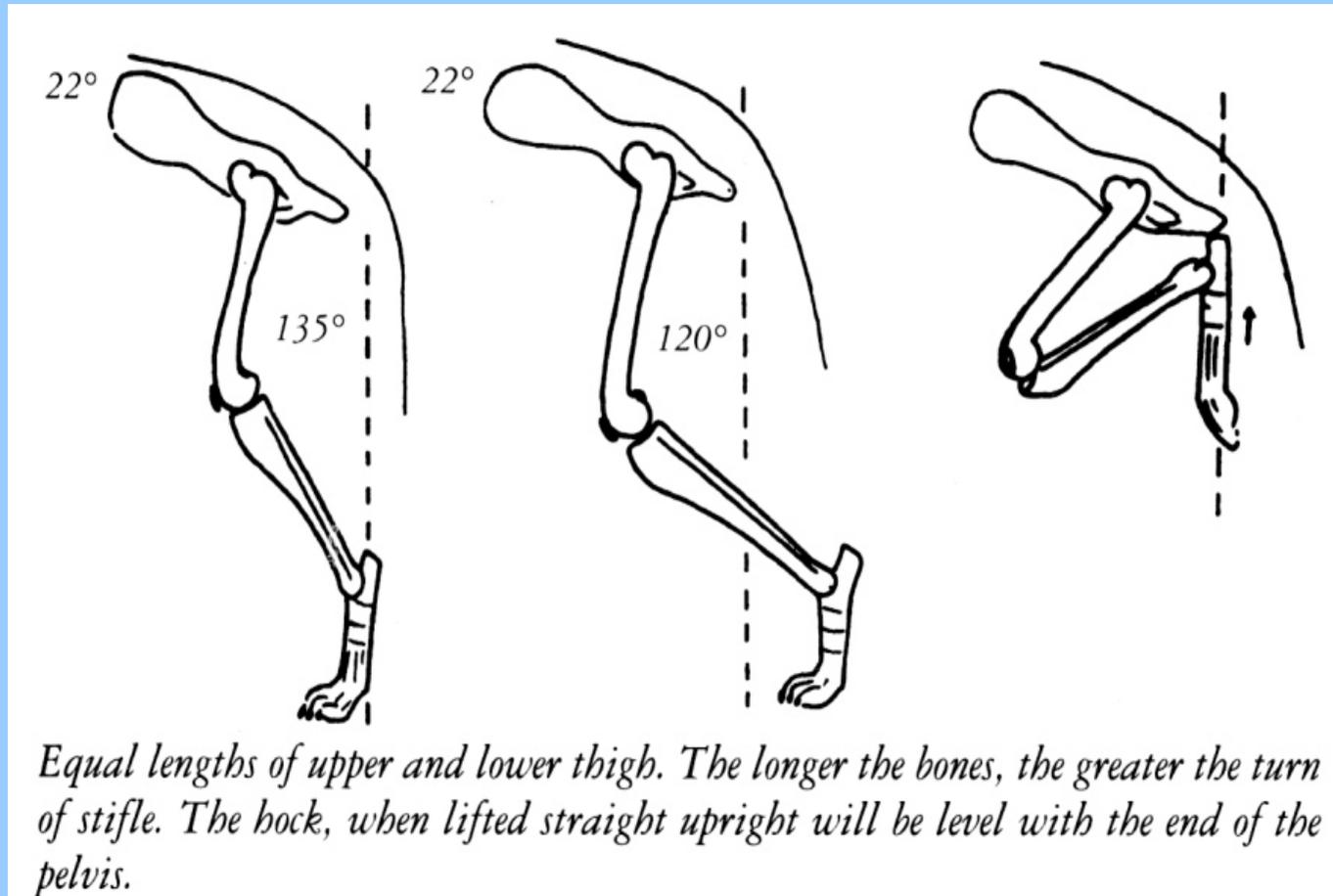
Over angulation (deep) – too long in lower thigh relative to upper thigh, often with long hocks, excessive turn of stifle.

Lacking angulation - short upper thigh, longer lower thigh, slight to moderate turn of stifle; usually combined with long hocks and short steep croups.

Straight – very short upper and lower thigh, straight stifle, hocks short and very little deviation from the line of the hindquarter. May occasionally see double jointed hocks, giving forward instability of the hock.

Equal lengths of upper and lower thigh

- Balance comes from equal length of upper and lower thigh



Hindquarter problems arise -

Hindquarter -

- too deep – ie. too long in lower thigh versus length of upper thigh. Deep turn of stifle.
- steep – short upper thigh, often with short steep croup and long hocks – reduced drive, moderate to lacking turn of stifle.
- too straight- very short upper and lower thigh, short occasionally double jointed hocks – reduced length of stride and greatly reduced drive. Straight stifle.

Hocks too long

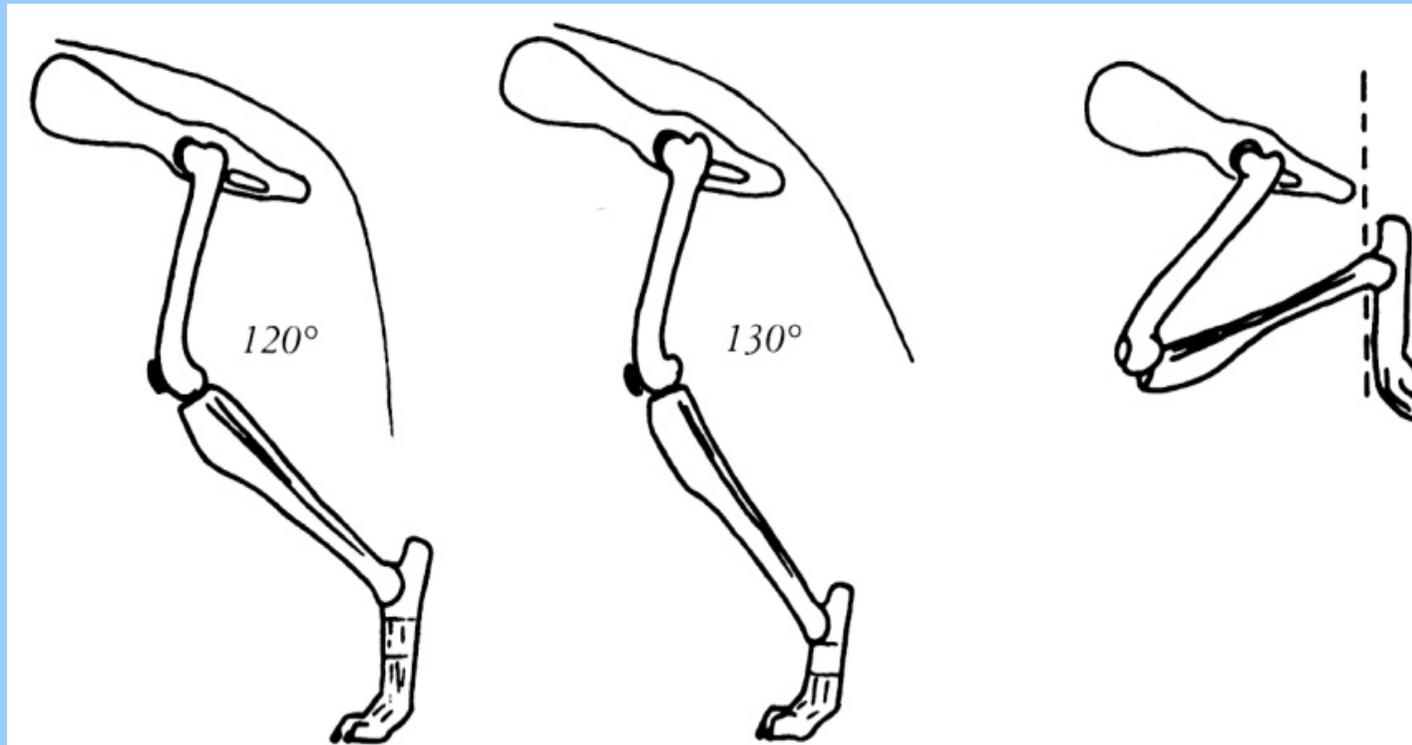
- trouble getting the hocks under the body to drive effectively.
- deep hindquarter plus long hocks result in an increasing *instability* of the hocks.

Croups

- short - narrow thighs, some restriction of drive
- steep - decreased transmission ie. reduced effectiveness of the drive, particularly behind.
 - short steep croups (fairly common) - often occur in hindquarters with short upper thighs and long hocks which results in reduced ability of the whole hindquarter assembly to effectively drive forwards with any power.
- flat (and usually short) croups – decreased length of stride forwards to generate the hindquarter drive.

Steep hindquarter

- Short steep upper thigh, long lower thigh.



1. *Short femur, long lower thigh, long hock.*
2. *Short femur, long lower thigh, short hock.*
3. *Short femur, longer lower thigh, where the point of the hock is behind the end of the pelvis when raised perpendicular from the ground.*

Straight hindquarter

- Short and steep upper and lower thigh



Hindquarter too steep, e.g. the Chow Chow

Ligamentation

Firm ligaments -

Minimal loss of power (reach and drive).

Maximum amount of power transmitted forwards though the back to the forequarter.

Maximum effectiveness of angulation

Loose Ligaments -

Loss of power

Reduced effectiveness of angulation

Reduced reach and drive

Rapidly tires

Age

Young puppies generally are loose in ligamentation, made worse by excessive weight.

Fit adults usually have very good ligamentation.

Old dogs usually start losing the desired *flexibility* of ligamentation, and with increasing weight, become loose in ligamentation.

Transmission

Transmission

- is the force generated from the hindquarter thrust (or drive), which transmits along the back allowing the forequarter to reach forwards as far as possible.
- the forequarter movement is more of a reaching, grabbing movement; and the hindquarter thrust allows maximum use of the forequarter construction.
- if the back and the croup are good, then the transmission of the drive from the hindquarter through the back into the forequarter, will be transmitted smoothly and without loss of power.

Transmission continued -

Problems in transmission –

- If the croup is short and steep (or conversely too flat), there is a restriction in the amount of thrust transmitted forwards.
- If the back is too soft or too long and then the transmission forward is somewhat dissipated and the overall picture is one of a reduced 'flow', ie. the back will bounce around losing much of its power.
- Dogs with backs that are too short or too roached are similarly affected by a reduced transmission of power.

Balance

- With balanced angulation both front and rear, and moving with a firm back; a dog of moderately good construction can generally out move a dog with just a good front, or just a good rear end.
- Ideally both fore and hindquarter angulation and construction should be such that the reach and drive are of equal power and effectiveness
- A balanced dog should maintain a good topline when moving freely on a loose lead.

Lack of balance

Imbalance

- will result in restrictions of reach or drive**
- a failure to maintain an even flowing gait.**
- the dog will fail to maintain a good topline and will generally fall on the forehand.**

Summary

With good hindquarter construction and poor forequarter construction, the hindquarter drive tends to overrun the forequarter and so create the impression of 'running down hill' or falling on the forehand. The transmission is up through the back, then down, ie. a pounding effect, as the drive is excessive in relation to what the front can achieve.

With good forequarter construction and poor hindquarter construction, the hindquarter drive is insufficient to move the forequarter properly and consequently movement is restricted both front and rear and the hocks do not reach under the dog sufficiently to achieve a good drive. More noticeable at the fast gait.

With balanced fore and hindquarter angulation, with good proportions and firm ligaments, the well constructed dog should approach the ideal movement for that breed.

A well constructed dog that has balanced movement is a joy to watch, the reach and drive are equally effective, and the dog seems to flow effortlessly around the ring with minimal effort and maximum ground cover. Unfortunately, it can be a rare event as well!!!