Correct Boxer Movement

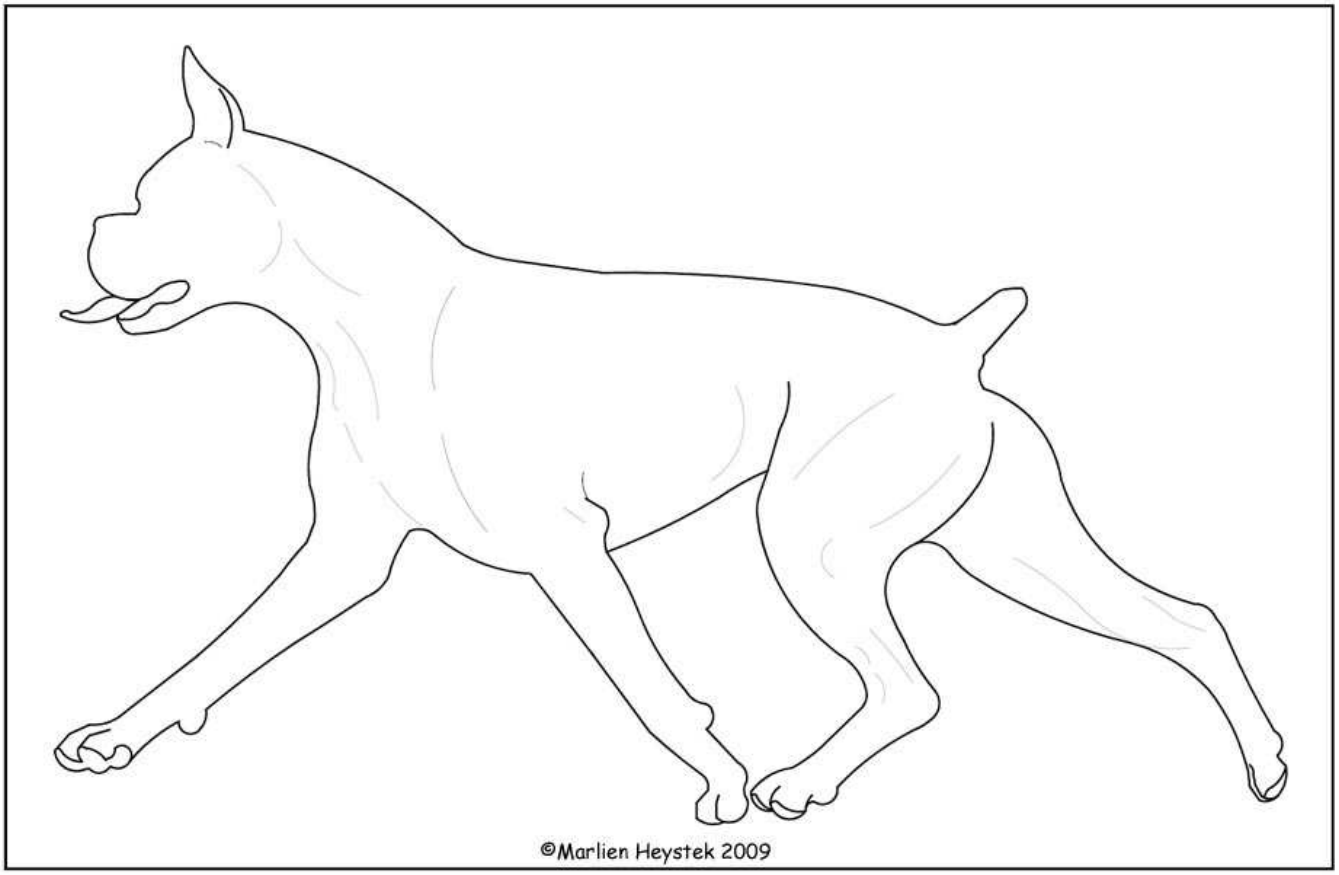


Figure 1: Tracing of an actual photograph of a Boxer moving correctly

The official FCI Boxer Standard is not very helpful when talking about the correct movement we should be aiming for in our Boxers. It very simply states "*Lively, full of strength and nobility*". This does not really give us a lot to work with! However, it does tell us enough to know that the Boxer should move energetically, with purpose while still maintaining his noble bearing.

The British Kennel Club Boxer Standard is slightly more helpful, describing the gait/movement as *"Strong, powerful, with noble bearing, reaching well forward and with driving action of the hindquarters. In profile, stride free and groundcovering."* OK, so that gives us a bit more to work with. However, the statement "*with driving action of the hindquarters"* seems to indicate that only the hindquarter contributes drive, which we know to be untrue.

Best of all is the wording of the American Kennel Club's Boxer Standard *"Viewed from the side, proper front and rear angulation is manifested in a smoothly efficient, level-backed, ground covering stride with powerful drive emanating from a freely operating rear. Although the front legs do not contribute impelling power, adequate*

'reach' should be evident to prevent interference, overlap or 'sidewinding' (crabbing). Viewed from the front, the shoulders should remain trim and the elbows not flare out. The legs are parallel until gaiting narrows the track in proportion to increasing speed, then the legs come in under the body but should never cross. The line from the shoulder down through the leg should remain straight although not necessarily perpendicular to the ground. Viewed from the rear, a Boxer's rump should not roll. The hind feet should 'dig in' and track relatively true with the front. Again, as speed increases, the normally broad rear track will become narrower."

Although appearing to describe the movement comprehensively, one major problem with this description is that it states that the front legs *do not contribute impelling power* which has been proven to be a false statement in subsequent studies on canine movement. So, from the above 3 standards we can see that we have a problem if we rely purely on their descriptions to determine how a Boxer should move.

To get a thorough understanding of the correct movement we want, we need to look further into the Standard itself at how the correct body construction is described, as this construction will help to ensure that the required movement is present. In addition we also need to use other means at our disposal to determine how the forelegs, hindlegs, topline and head should work together to ensure the most efficient and correct way of moving.

First of all, the Boxer must be square, *"which means that the horizontal line of the back is perpendicular to the vertical line passing through the point of shoulder and to the other vertical line passing through the point of buttock, thus defining a square outline".* This means that a line extended from the point of the shoulder to the ischiatic bones must be the same length as the line dropped from the height at the withers to the ground. The depth of the chest must be half the height at the withers so that *"the chest reaches to the elbows".*

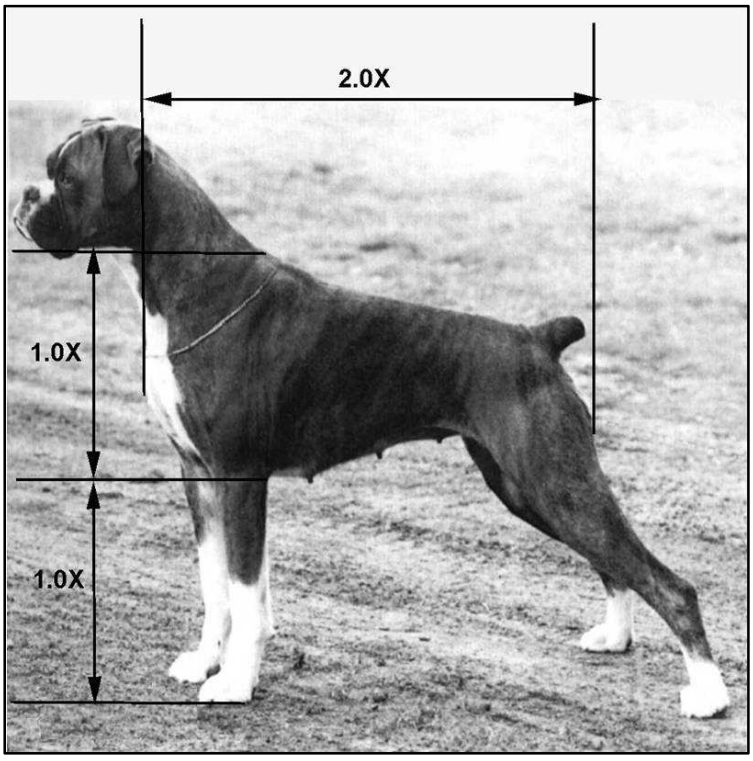


Figure 2: correct body proportions

The Boxer is required to be an endurance galloper, as the Standard states that the Boxer's task *"was to seize the game put up by chasing hounds and hold it firmly until the huntsman arrived and put an end to the prey"*. Seeing as he had to accompany the hounds chasing down the prey animal, the Boxer had to gallop for extended periods. The Boxer has a short, stable back (which does not flex as much as that of e.g. the greyhound at the gallop) to give endurance. However, the legs of a "true" endurance galloper are 1.2 to 1.25 times the depth of chest. The Boxer is a short-backed endurance galloper, but not completely typical as his forelegs are required to be equal to the depth of chest. The exact demarcation line between what is classified as a galloping dog or a trotting dog is not quite clear and the classification generally depends on the manner of moving in its service to man. This requirement for a square body and forelegs half the height at the withers does, however, pose a problem for us. 'How is that a problem for us?' you ask. Well in the normal day to day life of a Boxer it is definitely not a problem, but for the Boxer that finds itself in the showring it certainly is a problem! The gait that is used in the showring to evaluate movement is the trot… A dog designed for endurance at the trot has a body that is longer than the height at the withers. So, our poor Boxer is evaluated at a gait that is not the gait that he was designed to use. Do you see the problem now? Anyway, let's see how our endurance galloping Boxer best displays correct movement at the trot.

With regards the forequarter, according to the Standard, the Boxer is required to have *"long and sloping"* shoulders *"connected firmly to body".* The upper arm should be *"long, making a right angle to shoulder blade"* with elbows *"neither too close to side of chest nor turned out"*. In reality, the angle between the bones of the upper arm and the shoulder blade (*scapula*) is not the 90° specified. However, using certain points on the body as references, an angle of very close to 90° can be achieved (see Figure 3):

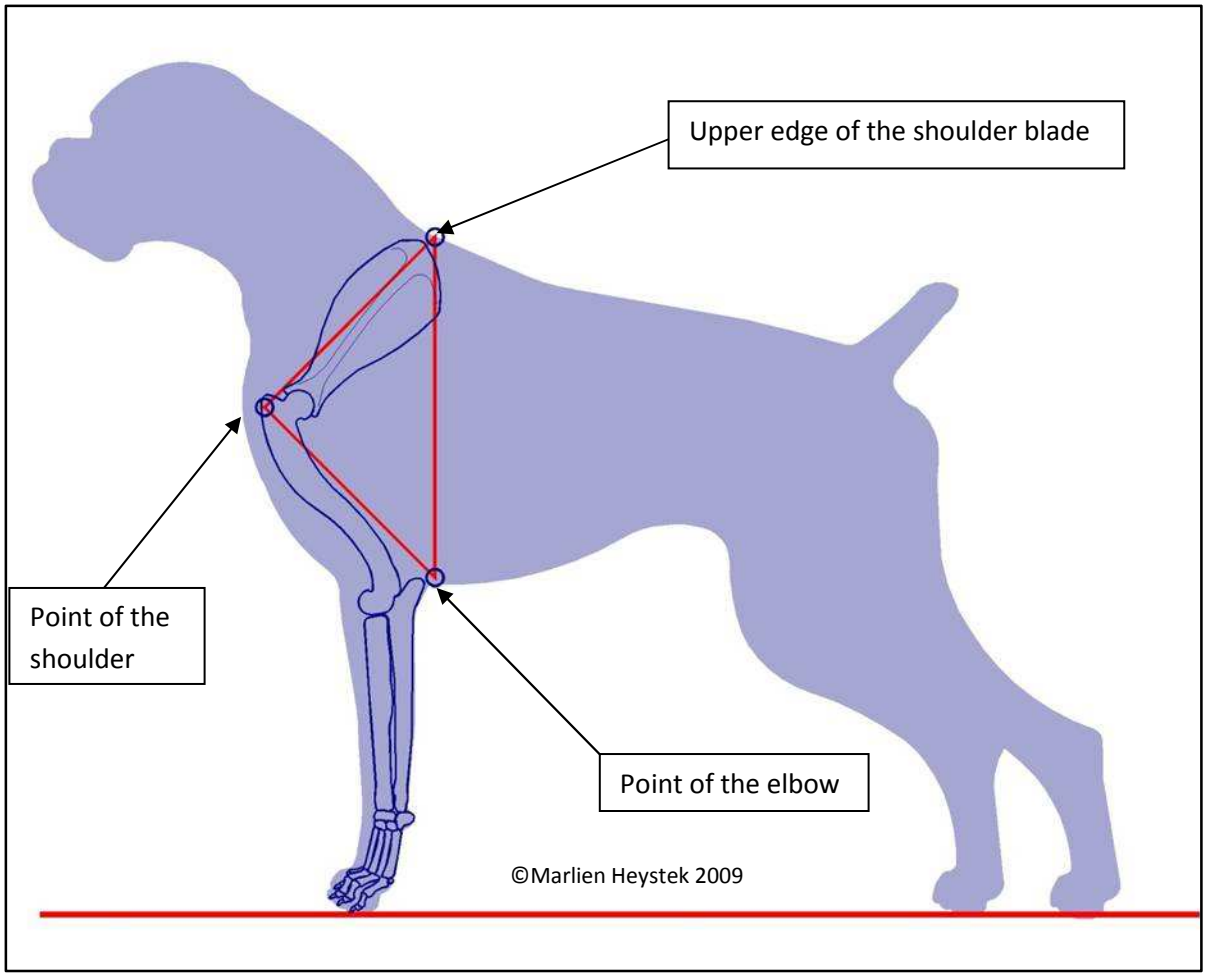


Figure 3: Showing 90° angle using reference points

The Standard asks for a hindquarter that is *"very muscular, the muscles brick hard and visible under the skin"*. It wants an upper thigh that is *"long and broad"* and the angles of the hip and knee to be "*open but as little as possible"*. This means that the Boxer must have a well angulated hindquarter. When standing, the knee (stifle) *"should reach sufficiently forward so that it would touch a perpendicular line from point of hip to ground"*. In reality a Boxer never stands like this, so if we are to try and determine this in the live dog we would have to manually place the hindquarter in this position. The lower thigh must be *"very muscular"* and the hock joint must be *"strong and well defined but not exaggerated"* with an angle of *"approximately 140 degrees"*. The rear pasterns (metatarsus) should be *"short with slight inclination, 95-100 degrees to the ground"*.

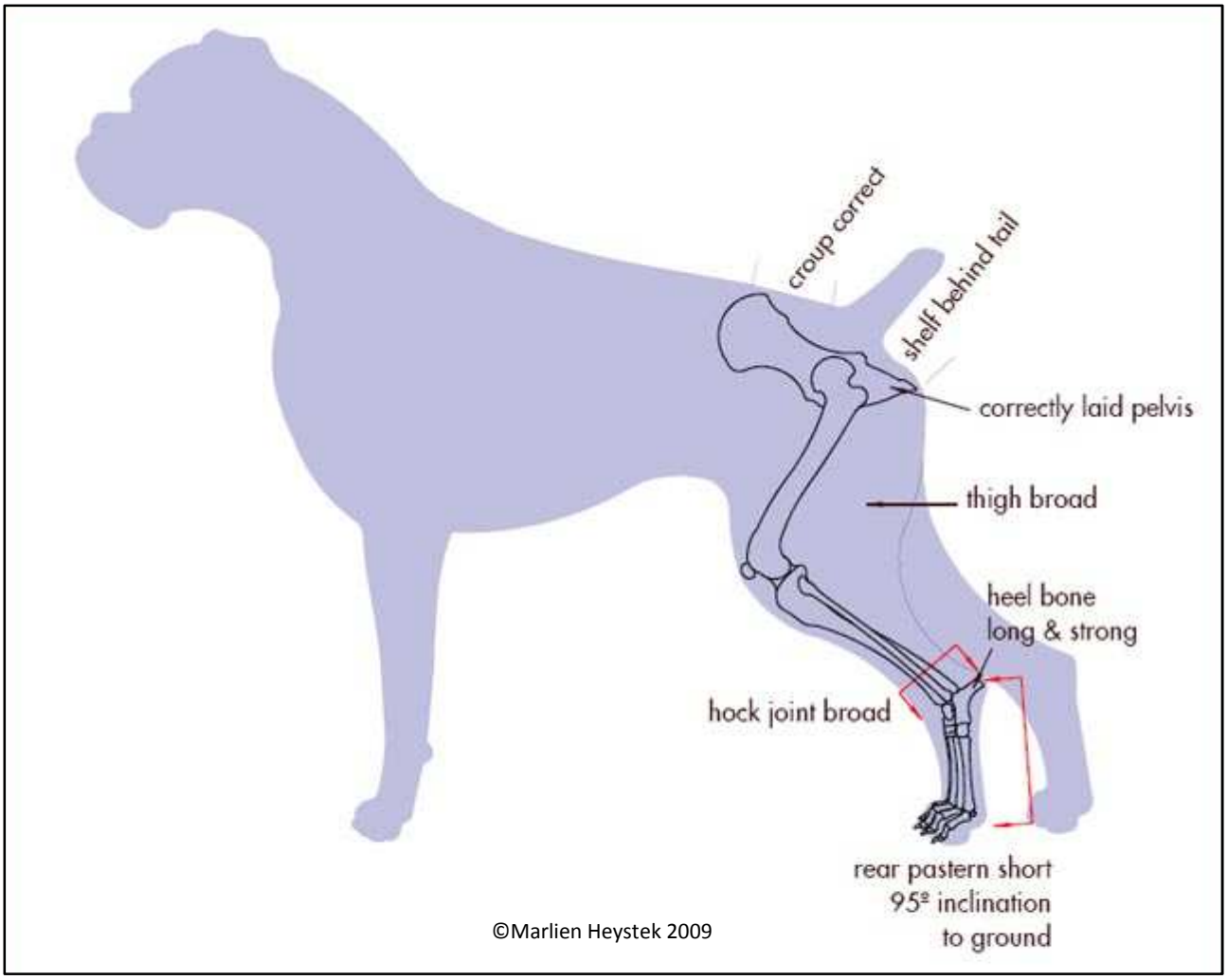


Figure 4: Correct rear assembly

If the Boxer has the forequarter and hindquarter described in the Standard, it is more than halfway to being able to move correctly. It obviously also needs to be square, as defined in the Standard, with correct length and carriage of neck with the topline running *"in an elegant arch from the clearly marked nape to the withers."* The neck must also be "*of ample length, round, strong and muscular"*. The back must be *"short, firm, straight, broad and muscular*". The croup must be *"slightly sloping, broad and only slightly arched"* while the pelvis must be *"long and broad".*

So now that we have seen what the Standard has called for with regards the conformation of the Boxer in order to allow him to move correctly, let's look at other aspects that are applicable to movement.

There are a number of myths that have, for many years, been reverently adhered to when it comes to movement in the dog. Over the past few years these myths have been dispelled with the aid of modern technology (cineradiography and pressure plate tests) that has taken the guess work out of what actually happens when a dog moves.

One of the myths was the idea that the horse was the perfect model for the working dog (see Figure 4). The shoulder construction of the horse was seen as the ideal when applied to the dog and for years breeders were trying to breed a perfect horse's shoulder onto their Boxers. One of the problems with this is that while the horse has a shoulder blade that is long as required in the Boxer, the upper arm is quite a bit shorter and certainly not the *"long"* upper arm called for in the Standard. In reality, in nature all the different species of wild dogs (wolves, hunting dogs, coyotes, jackals and so on) actually have an upper arm that is 10% - 20% LONGER than the shoulder blade. Unfortunately, in an attempt to breed the horse's shoulder onto the Boxer, the earlier breeders produced a Boxer with a short upper arm in relation to the shoulder blade and this is something that we see regularly in the Boxer breed to this day.

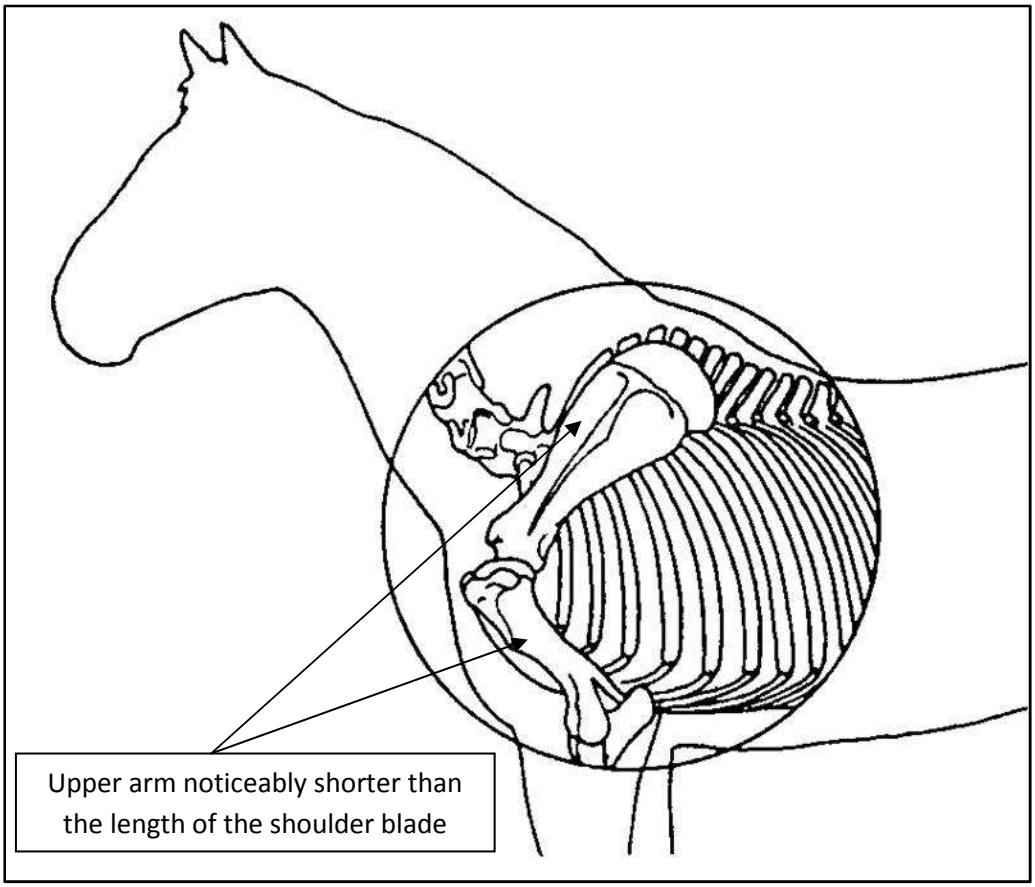


Figure 5: The horse's shoulder

Another of the myths related to movement in the dog is that the hindquarters deliver all the thrust. This myth was dispelled by using pressure plates to determine that especially at the trot, dogs drive with both the forequarters and the hindquarters.

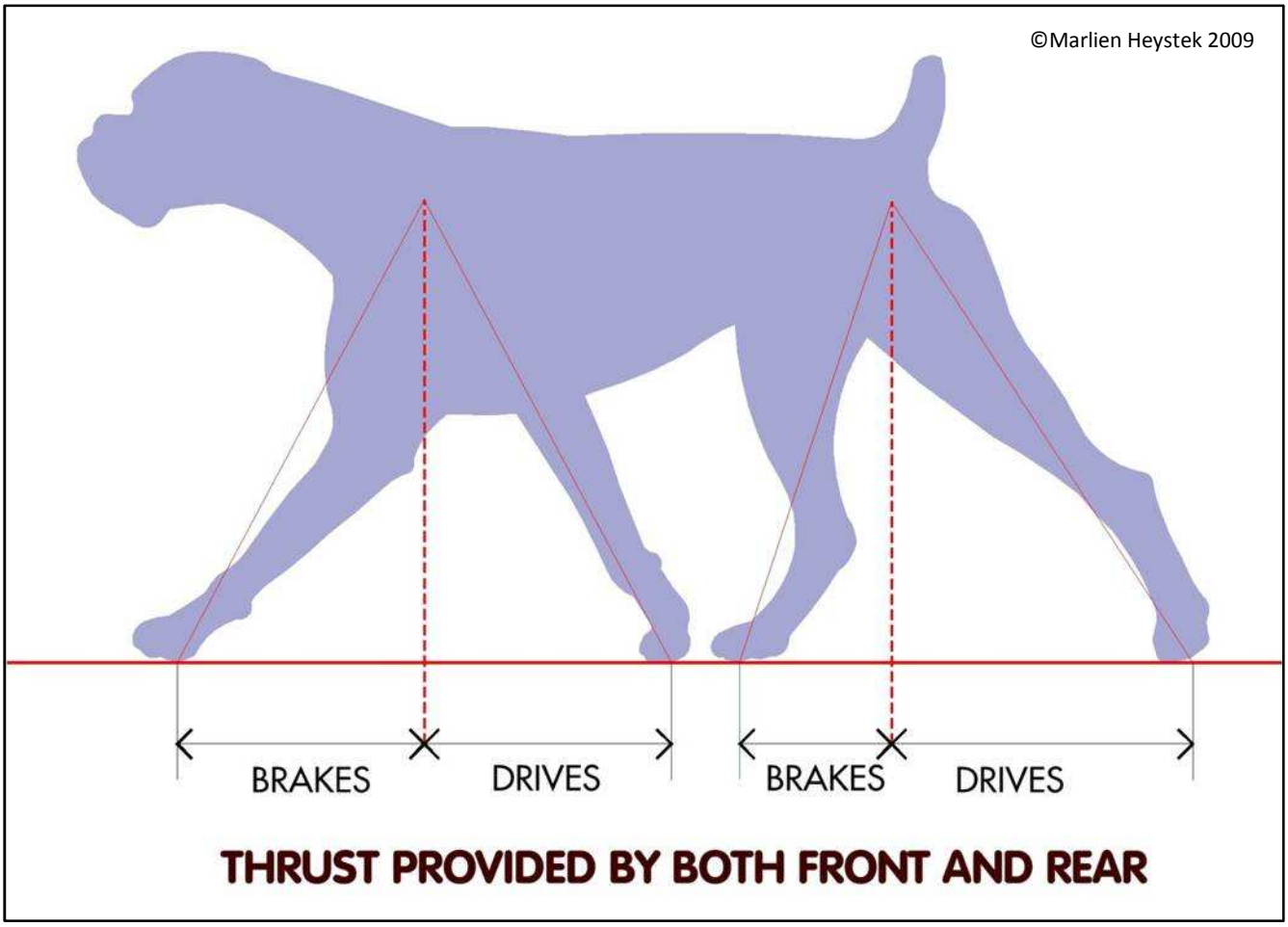


Figure 6: Driving from behind the vertical, braking from in front of the vertical

As the dog moves forward in a trot, pace or gallop the action of the foreleg ***behind*** the vertical is responsible for providing forward drive (delivering thrust) and accelerates the movement, while the action of the foreleg ***in front*** of the vertical is used as a brake and decelerates forward movement. Whenever a rear paw is on the ground in front of the hip joint at the trot and pace, and in front of the centre of gravity at the gallop, it slows forward movement.

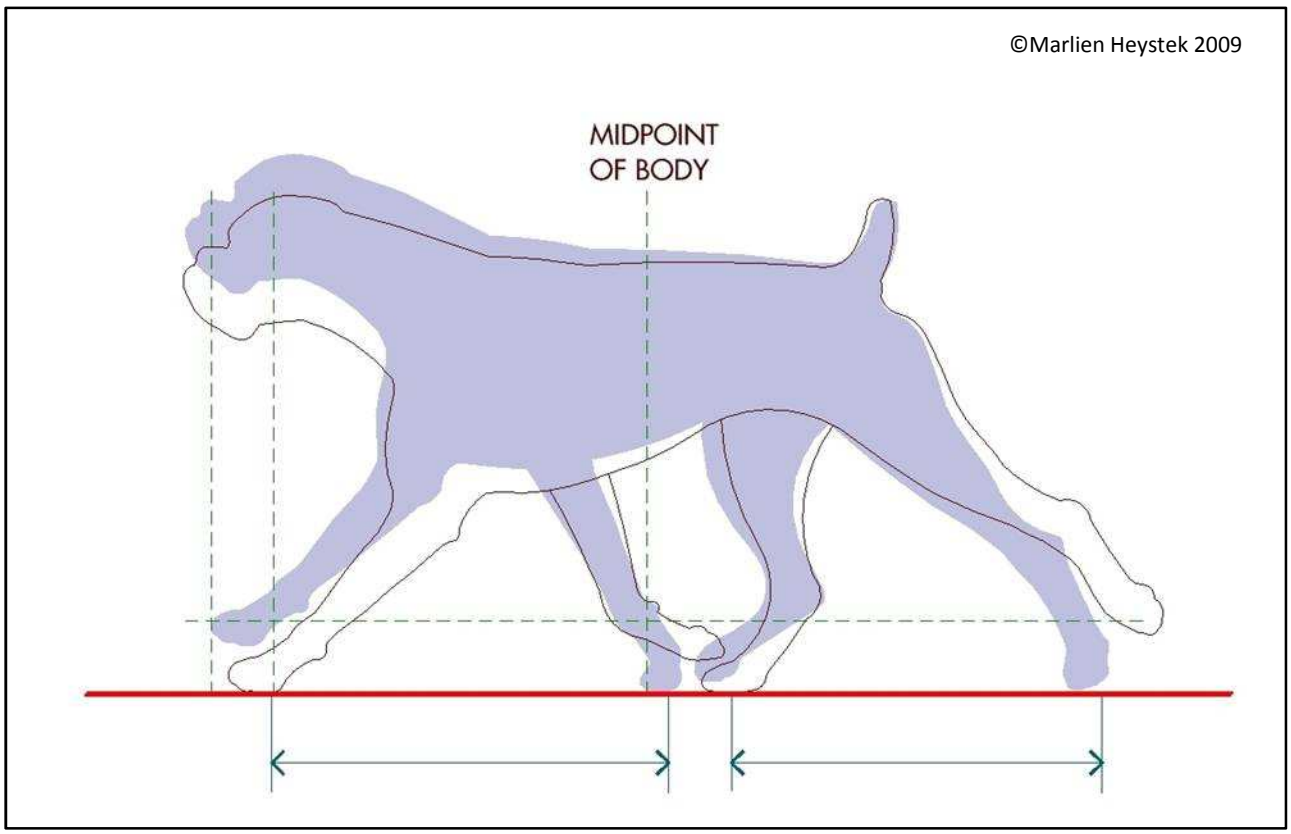


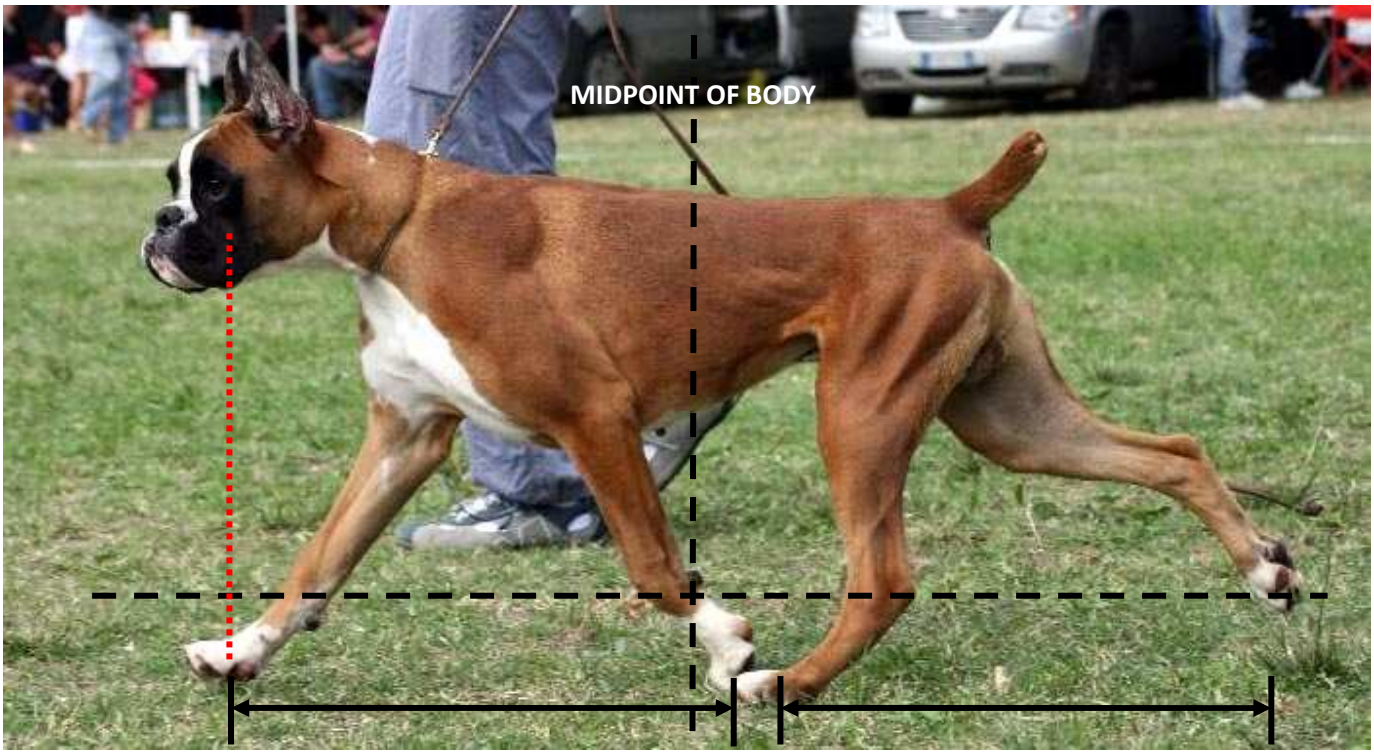
Figure 7: Correct side movement

So then, what do we see when the correctly constructed Boxer moves?

- The head carried forward but above the topline;
- Effective length of leg longer in front than in the rear. Front cross step therefore about 8% longer than rear step;
- Rear paw extends further behind hip joint than it extends in front of hip joint;
- Distance from pick up of front paw to set down of that same paw during regular trot = 90% of height at the withers;
- Front paw extends rearward to a little beyond midpoint of the body;
- Rear paw sets down a little short of the midpoint of the body;
- Paws not lifted higher than the height of pastern and hocks extended fully.

A Boxer that moves like this will have a well angulated forequarter that is balanced to a well angulated hindquarter. He will have a long elegant neck, well set on to well defined withers, a short straight strong back, a deep chest that is half the height at the withers, and a square body. All as described in the Standard.

Compare the diagram in Figure 7 above with this photo of a very young male Boxer already showing all the promise of an excellent mover.



His head is carried forward, just above the topline, his front paw is set down under his eye, his front stride is slightly longer than his rear stride, his rear paw extends further behind hip joint than it extends in front of hip joint, his front paw extends rearward to a little beyond midpoint of the body, his rear paw sets down a little short of the midpoint of the body, his foot is not lifted above the level of the pastern, his hock joint is opened at the end of the stride. Perfect!

What happens to the movement when the balance between forequarter and hindquarter is absent, with the angulation in the hindquarter being more than the angulation in the forequarter i.e. short upper arm and long lower thigh?

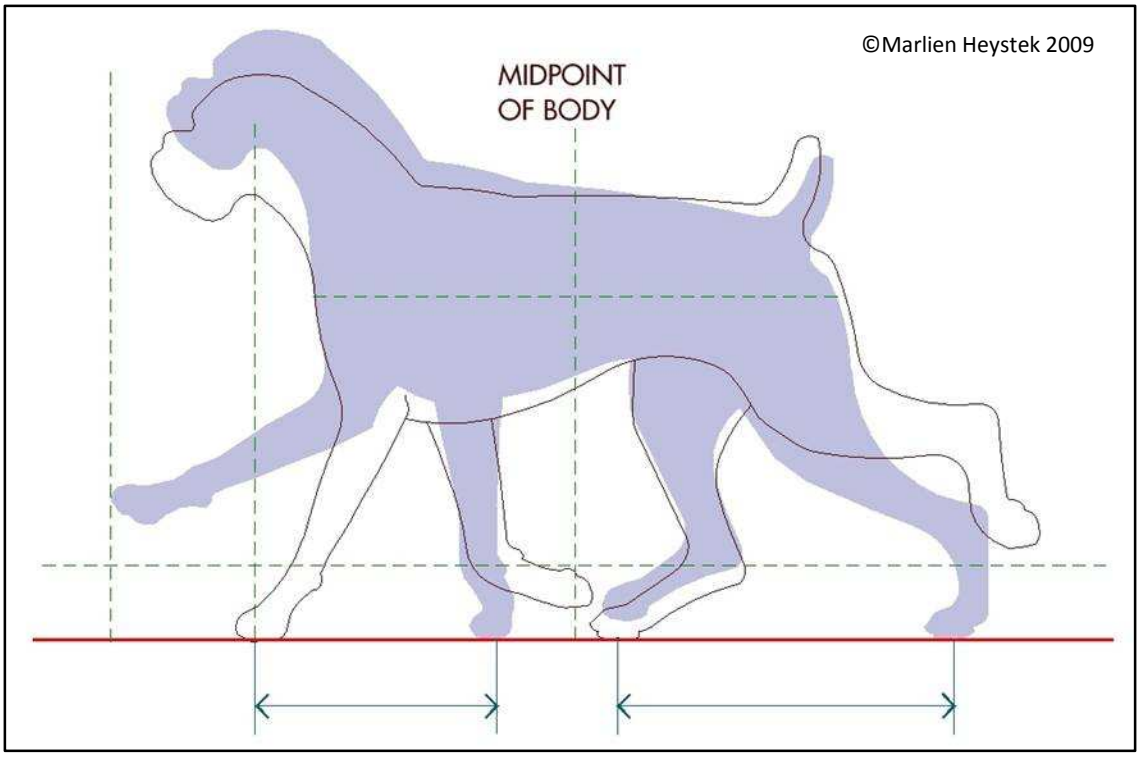


Figure 8: Incorrect movement

- The head carried high above the topline;
- Effective length of leg shorter in front than in the rear. Front cross step therefore about 25% shorter than rear step;
- Front paw lifted higher than pastern height and hocks do not extend fully – thrown up high;
- Distance from pick up of front paw to set down of that same paw during regular trot = 55% of height at withers;
- Front paw does not extend rearward to midpoint of the body;
- Rear paw sets down on the midpoint of the body.

Let us compare the series of footfalls that make a complete stride between a well constructed balanced Boxer with a Boxer that has more angle in his hindquarter than in his forequarter.

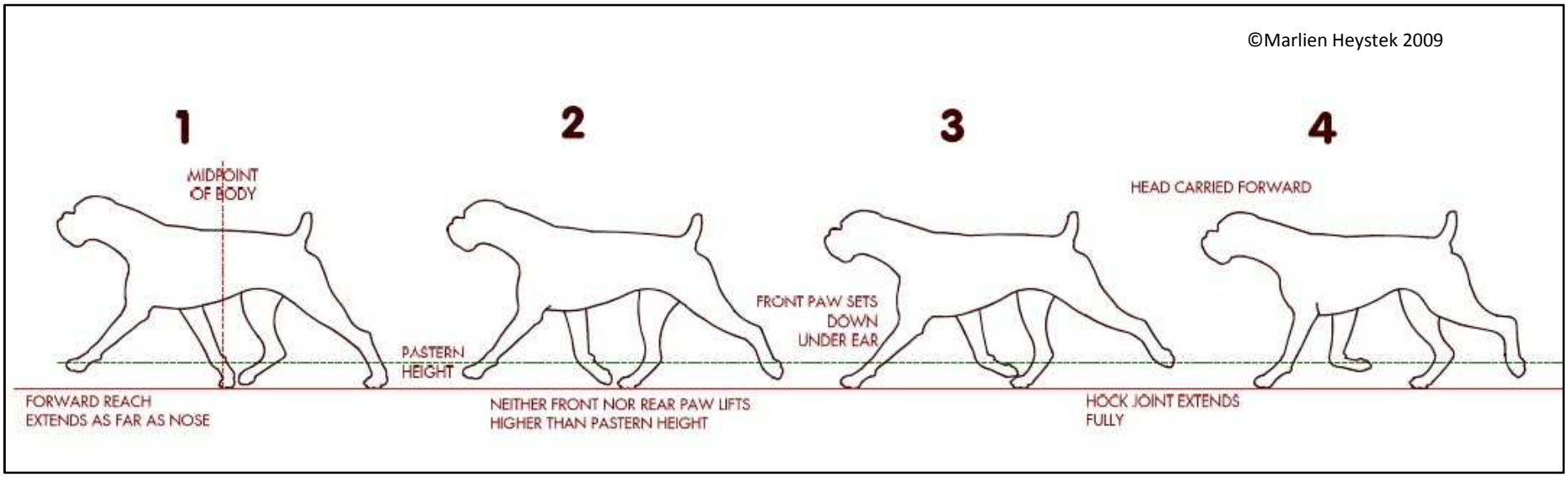


Figure 9: Correct construction - balanced angulation (series 1)

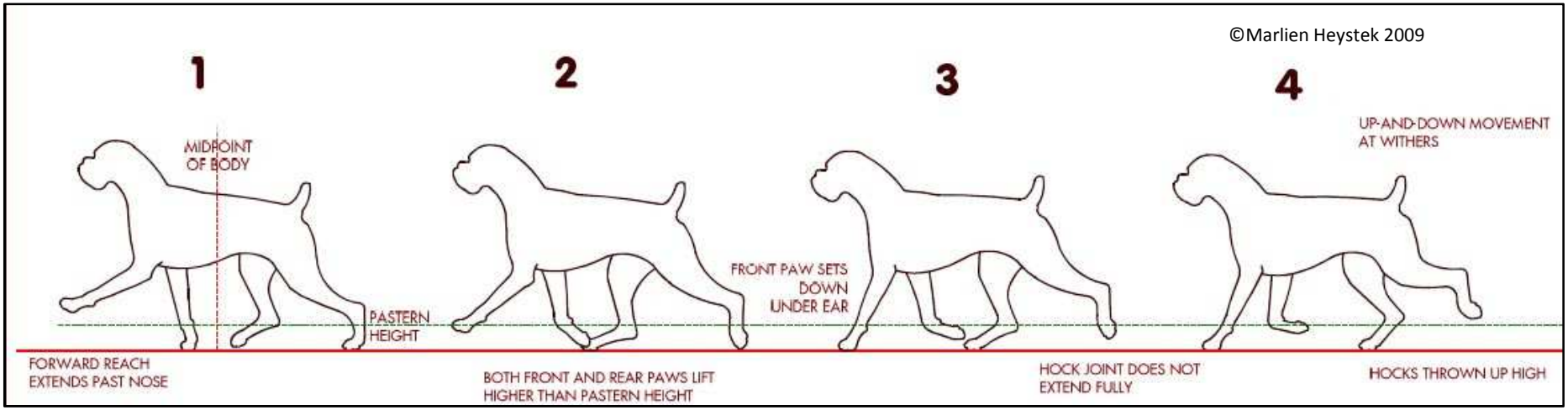


Figure 10: Incorrect construction - unbalanced angulation (series 1)

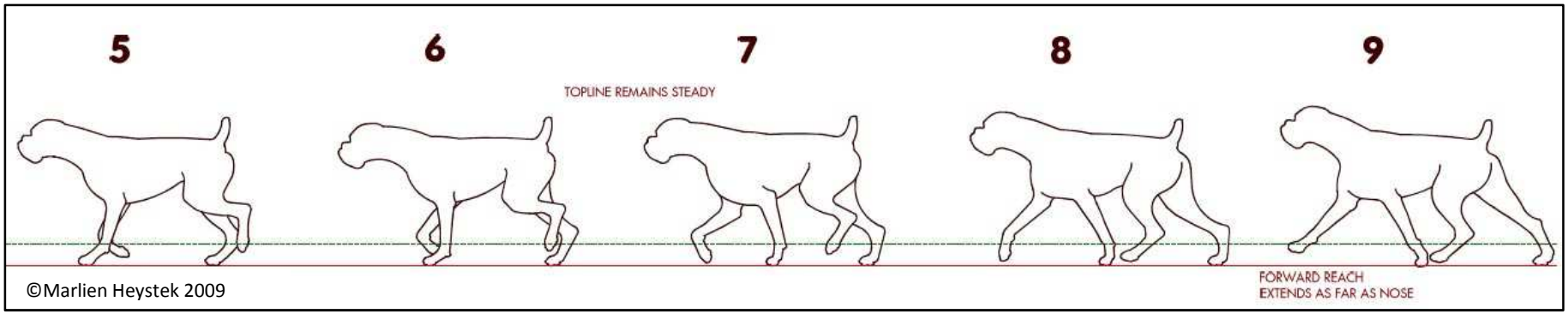


Figure 11: Correct construction - balanced angulation (series 2)

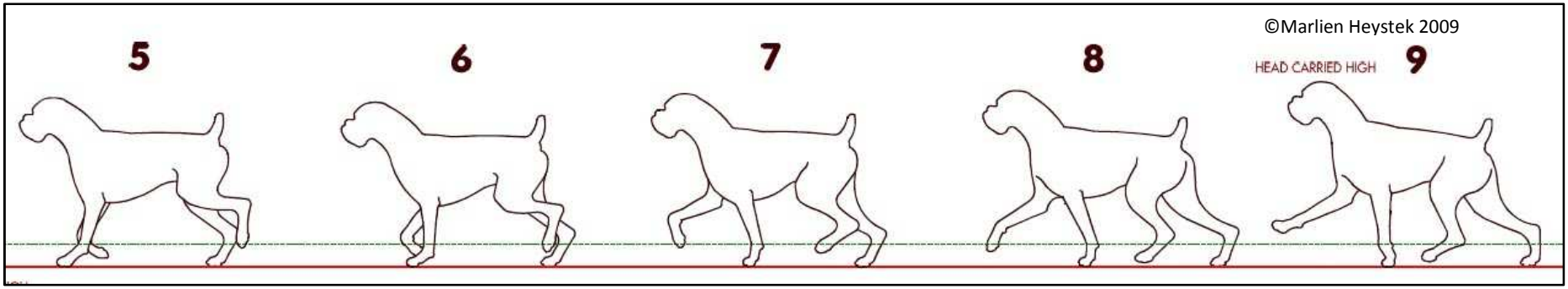


Figure 12: Incorrect construction - unbalanced angulation (series 2)

Having explored the movement we are looking for in the Boxer viewed from the side, let's now look at what we want to see when the Boxer moves towards us. Again, going back to the standard, we are told that the shoulders must be *"connected firmly to body"* and the elbows must be *"neither too close to side of chest nor turned out"*. So what should we see in a correctly moving Boxer coming straight towards us?

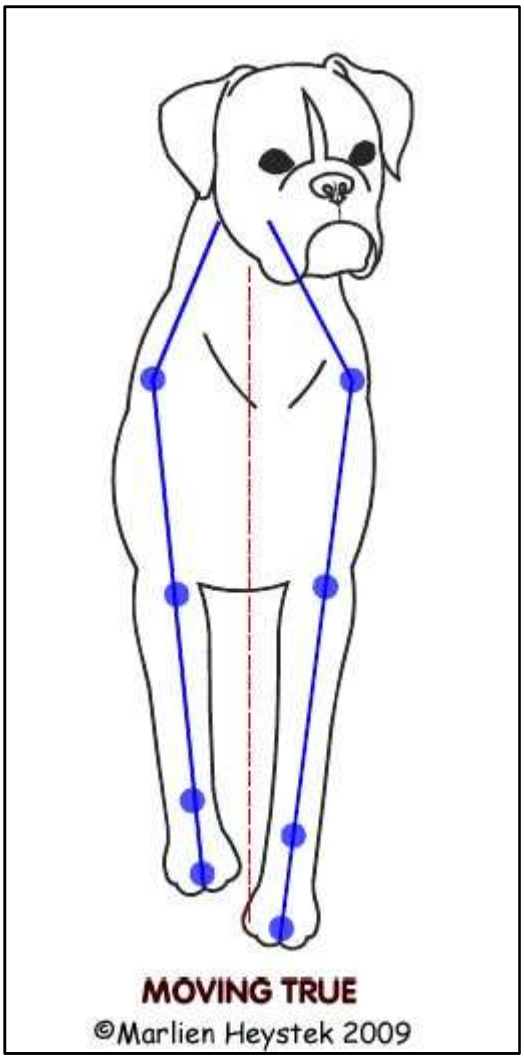


Figure 13: Correct movement coming

We want to see a straight line from the shoulder, through the elbow, down the foreleg, through the carpel and into the paw. The elbows must remain trim against the chest wall, and must not flare out or show any signs of looseness. As the speed of the Boxer increases the paws will converge under the body, but this straight line from the shoulder to the paw must be maintained at all times.

What do we NOT want to see?

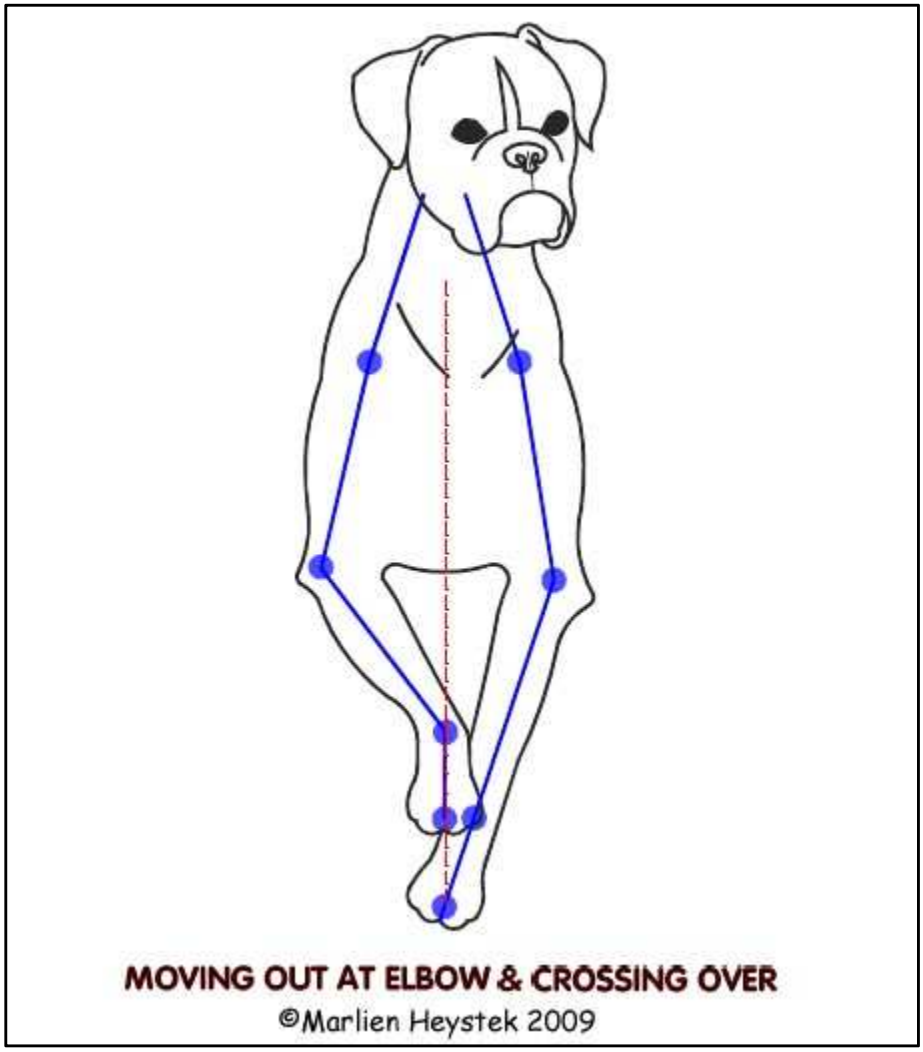


Figure 14: Moving out at the elbow

Here we can see the straight line we want is completely absent! This Boxer is moving out at the elbow and crossing his paws in front of each other. This is most often seen in a Boxer that has a short upper arm. It is also a sign that the ligaments in the shoulder and elbows lack strength and their laxity allows the elbows to flare out on the move. The crossing over of the paws is caused by the elbows flying out to the sides. This is a complete waste of energy and greatly affects efficiency. Altogether this picture is one of looseness and discomfort and would certainly make the Boxer's original task of following a pack of hounds on the chase most uncomfortable, if not downright impossible.

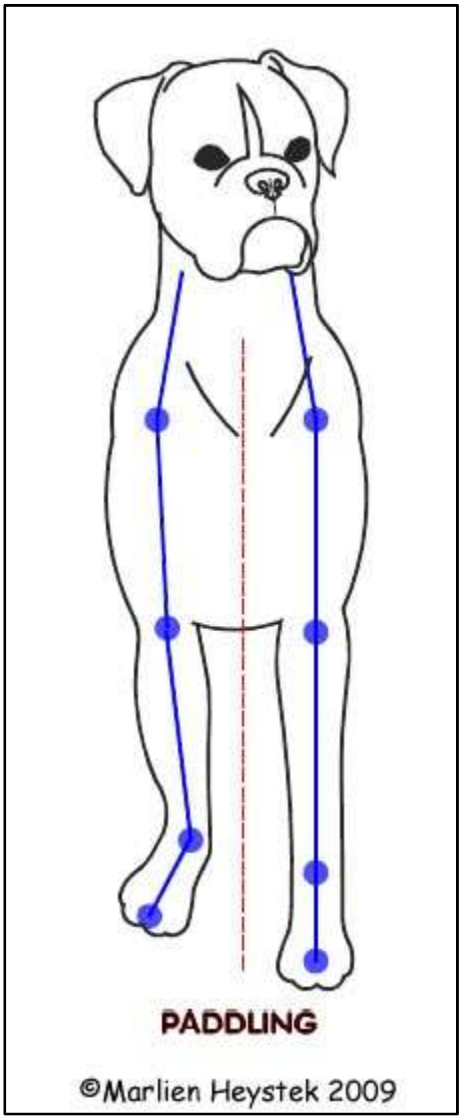


Figure 15: Paddling

This Boxer is managing to maintain the straight line through the shoulder to the paw while its foot is on the ground, but as it lifts its paw it flips the paw to the outside which is a waste of energy and affects the efficiency of the movement. It is also quite likely to be flipping its paw inwards just before it places it on the ground as well. Not as serious as the dog that is flying out at the elbow and crossing over in front, but this paddling will tire the dog out much quicker than a Boxer that is moving correctly and not wasting energy.

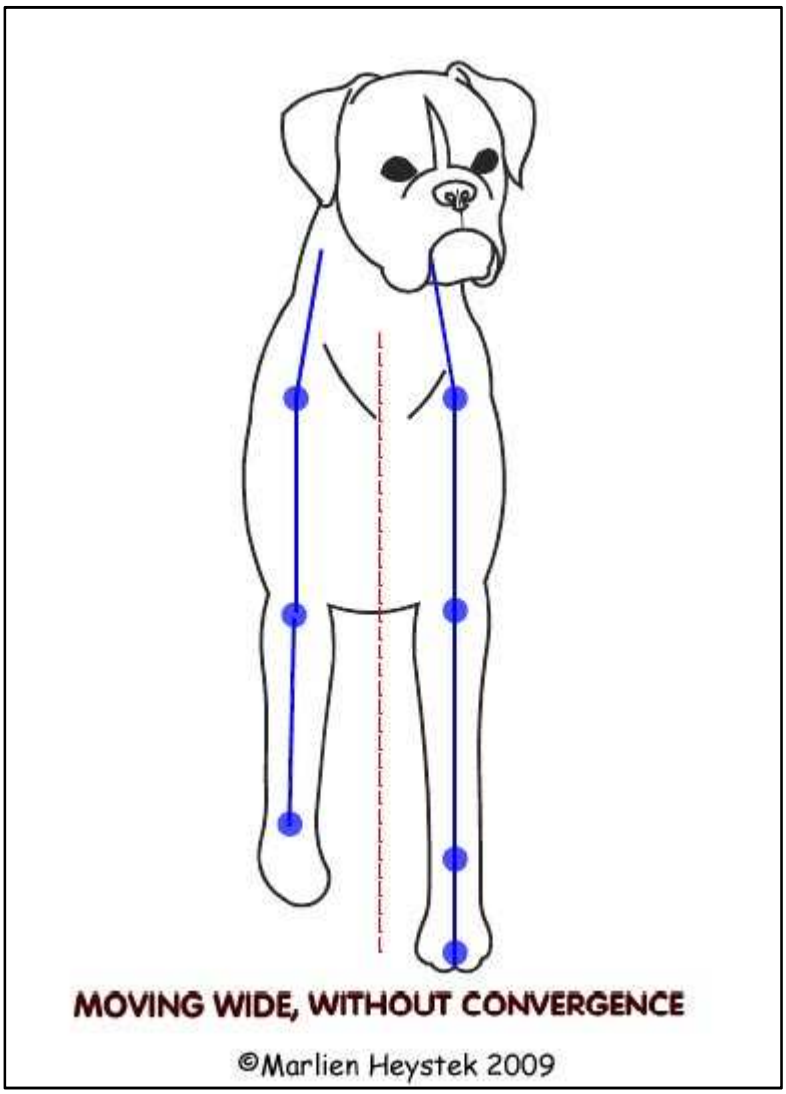


Figure 16: Moving wide

This dog is moving with his legs straight but showing no sign of convergence as the pace increases. Often associated with a loaded shoulder, and/or a short upper arm and/or a low flat wither. Often the chest is too broad in comparison to what it should be and dogs like this often look as if they are 'hanging' between their shoulders. This type of stride will cause the dog to rock from side to side with each footfall and this is a waste of energy and will greatly affect efficiency.

Moving on to viewing the Boxer as it moves away from us, we first look at what we should be seeing in the correctly moving dog.

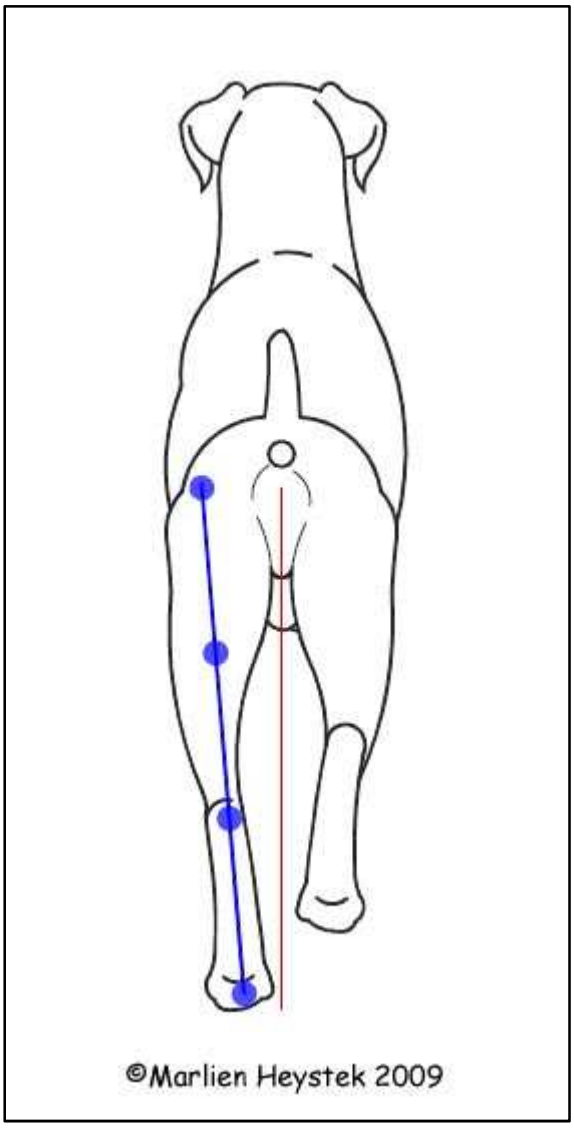


Figure 17: correct rear movement

Just as in the movement from the front, we also want a straight line in the hindquarter as the dog moves away from us. This line must run from the hip, through the stifle, into the hock joint and down through the paw. As the speed of the trot increases the back paws will converge under the body, but the straight line will be maintained. We do not want to see any rolling movement of the rump.

What do we not want to see?

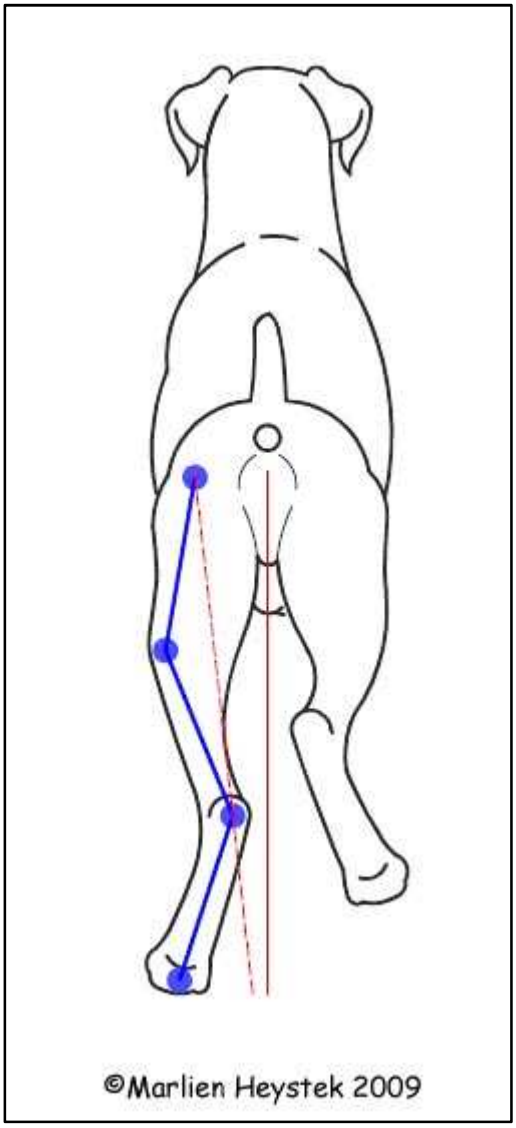


Figure 18: cow hocks

When viewed from behind a dog with cow hocks will not display the straight line that is required. Its stifle will turn out, while its hocks will turn in and the paws will then turn out as a result, forming a zigzag. Movement like this is also very often related to weak ligaments and tendons.

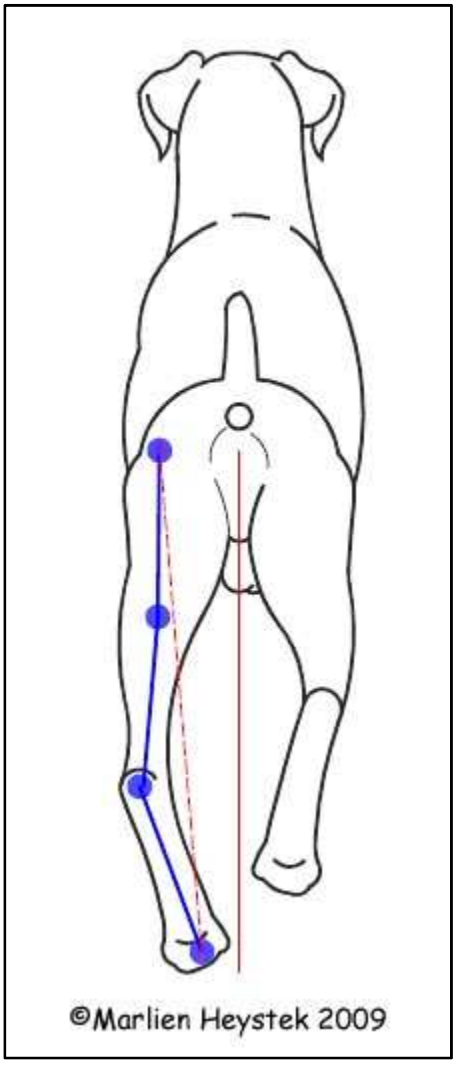


Figure 19: Hocks turning out

The opposite of moving cow hocked is moving with the hocks turned out. Very often associated with a dog that is bow legged and the Standard is specific in that it says that the hindlegs when *"seen from rear"* must be *"straight"*. Again the straight line is absent and while not as exaggerated as with the dog that is cow hocked there is quite a bit of deviation from the straight line. Very often the hock joints will totter, or rock from side to side as each leg is placed on the ground and then lifted again. This is very wasteful movement and will greatly affect efficiency.

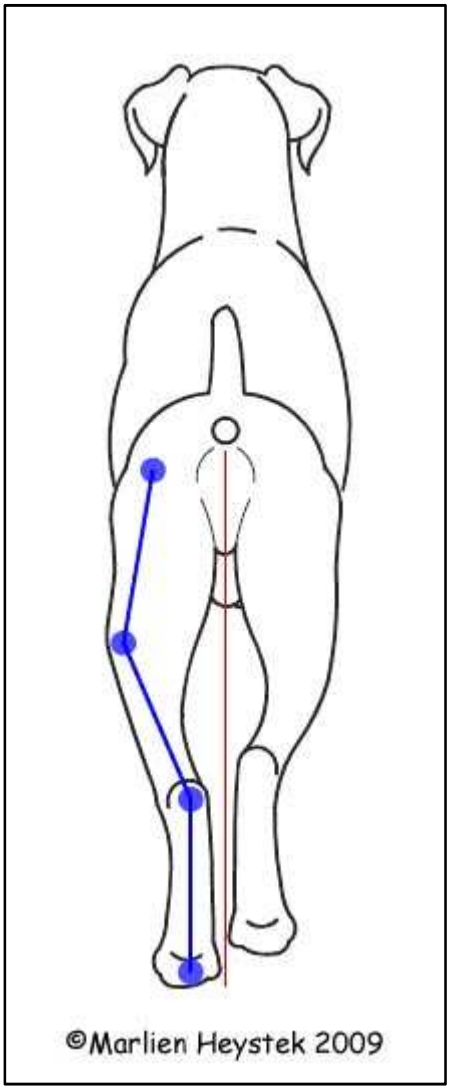


Figure 20: moving close

Here the hock joints are too close to each other. As with all the other rear movement faults there is no straight line from the hip through the stifle to the hock and down to the paw.

Sources:

Marlien Heystek *Form Follows Function* - first published 1992, revised by author February 2003
Brown C M (1986) *Dog Locomotion and Gait Analysis*. Wheat Ridge Colorado: Hofflin Publishing