THE FRONT LEGS: Zink Structure Series in Dog World

DOG WORLD: NOVEMBER ISSUE 2004
ANATOMY AND PERFORMANCE: PART III
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This issue is dedicated to the front assembly of the dog.

It starts again with an comparative anecdote, noting that, pound for pound, a Greyhound (at 37 mph) can run 15 times faster than a Thoroughbred (44 mph). And notes also that a gazehound's stride is actually the same as a horse's and, in fact, no horse can clear, proportionally, the sort of jump a dog can, in that a dog "can" jump one-and-a-half times its height at the withers. Good points to keep in mind when considering the unique athlete the dog is?

Dr. Zink goes on to say: "Much of the dog's athletic superiority is a function of the structure of the front legs, which help him to stride forward efficiently and effortlessly, yet turn quickly and accurately when necessary. The canine forelimb has the same parts as the human arm: scapula (shoulder blade), humerus (upper arm), radius and ulna (lower arm), pastern (hand), and paw (fingers). Unlike the rear legs, which are attached to the body by the relatively unyielding hip joint, the front legs are attached to the dog's neck, spine and ribs by muscles and tendons. These soft tissues give the dog the flexibility to take long strides with the front legs, to move the front legs out from the body to reduce turning radius, and to lay the front legs back against the sides of the body when necessary to clear a jump. The disadvantage of this flexible attachment is that the softer muscles and tendons can suffer straining under pressures that would have little effect on the bones."

And then: "One way to assess a dog's front limb structure is to measure its angulation, which refers to the degree of bend at the shoulder joint and the elbow joint. These angles provide levers upon which the muscles exert mechanical forces to drive the dog's body forward. Dogs with well-angulated front limbs and unfold those angles to reach far forward and push well back. Thus, the angulation of the front limb determines how much ground a dog can cover with each stride. This is important because the fewer the steps a dog takes, the less energy is required to get from point A to point B......Well-angled legs also provide more shock absorption for the dog's weight......Dogs with straight front legs tire more easily and are more susceptible to shoulder, elbow, and carpal (wrist) injuries because of the increased contusion on the joints of the leg.

She goes on to say you can eye-ball shoulder angulation using a classic show stack, and then says: "If you draw a vertical line perpendicular to the ground just brushing the front of the shoulder joint, the shoulder blade should like 30 degrees off that vertical line." And further states: "Although some older texts say that a 45 degree angle is ideal, radiographs of moving dogs by canine structure expert Pachel Paige Elliot have demonstrated that this is not possible. Jan Van Dyke, DVM, a veterinary orthopedic surgeon and director of the Canine Rehabilitation Institute...has observed that dogs with upright shoulder blades (angles of 20 degrees or less) are more susceptible to chronic shoulder problems, such as arthritis and biceps tendonitis.....

Elbow angulation, or return of upper arm, in the older parlance, is discussed next. Dr. Zink explicitly states the most important factor in this is the length of humerus. And specifies: "Ideally, when the dog is (stacked), the distance from the top of the scapula to the point of the shoulder should be equal to length from the point of the shoulder to the point of the elbow." (Ed. note: again, these are "eyeball" stats, not actually measured by bone length, but rather by appearance.) She then goes on to note that if the humerus is too short, the dog will lack return of upper arm, i.e. have a "straight" shoulder where the blade sits atop an upright humerus, leading to strain and an increased chance of injury.
She then discusses how the front assembly is what the dog uses to steer by largely (the rear being there to mostly propel). The "loose" front of the dog, that is, one not tied to bones, but made up of soft tissue connected junctures, allows the dog to make sharp and accurate turns. Horses, she notes, in contrast, have a "shortened, vestigial ulna fused to the radius," which means the horse gains stability at the expense of flexibility, so must turn the whole front of their bodies, so cannot "dodge and dart" like dogs can.

The last part talks about the wrist (carpal joint), pasterns and paw. This joint/region largely serves as a shock absorber, and allows increased flexibility as well as traction. This one note needs quoting: "Many breeders and judges of conformation dogs believe that a standing dog's front legs, when viewed from the front, should be straight from the elbow to the toes.....Yet having the toes point a little to the sides is a much more stable way to stand....The idea that toes should point straight forward while standing seems to originate with horses.....(but) dogs have that separate radius and ulna, which allows them to stand slightly east-west for stability, but rotate their limbs as they move so that the toes point straight ahead (when in motion, for efficiency." She notes many dogs bred to have a "true front" when standing are actually pigeon-toed in motion.

This last section is about various sorts of feet. Cat feet: the compact foot that is easily picked up during forward movement, which allows a dog to conserve energy, and are ideal, she says, for dogs who must move over uneven ground. She likens cat feet to the tires on off-road vehicles. The hare foot, with it's longer toes, helps a dog "dig in and get a better grip when running straight ahead," she says, and likens this foot to the slick tires on a Formula 1 race car. She notes both types provide a particular service (& neither means a flat or shelly foot BTW), and both are in contrast to the horse hoof, as a dog's foot is sensitive and flexible. There is also a short part that is a personal plea to leave dew claws on as it's her avowed belief dogs use them when in rapid motion & so, despite their admitted lack of function relative to the other toes, Dr. Zink argues the dewclaw retains functionality & so should be maintained. Assumably this applies mostly to the front feet, but it doesn't specify that. Next section is IV: The Spine; then section V: The Rear Legs

Best regards, JP Yousha

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