



Conformation Associated with Speed in Borzoi

May 2011 - Anne Midgarden, D.V.M.

My favorite description of a Borzoi is "a winterized Greyhound". The thick coat to keep their skin warm and the overlong nasal passages to warm the air they breathe are distinct and unique features of Borzoi type. This study is going to explore the Greyhound side of that description. The word "Borzoi" means swift in Russian.

The breed Borzoi as we know it was developed over centuries by very wealthy Russian noblemen to be a dog with great speed and hunting ability. These were large dogs, expensive to hunt and maintain, thus the sole property of the rich. Their purpose was to put on an impressive show by running down prey on open terrain. Undoubtedly the different nobles bred dogs most suited to the favored prey and territory as well as their own tastes. However, speed was the essential characteristic that made a Borzoi a Borzoi.

A research project was conducted from 2005 to 2007 that was designed to help understand what physical characteristics are most essential to Borzoi speed. It was designed to be as objective as possible, so all the data collected was a measured quantity. The American and FCI (2000) Borzoi standards were used to determine what anatomical features were measured. Such descriptions as "forelegs somewhat flattened like blades with the narrower edge forward" were measured as width and depth of foreleg at 3 cm above the carpus. Some features such as "unmistakable elegance with flowing lines" did not convert well to measurement and so while undoubtedly important were not included.

The measurements taken were as follows:

Sex - Age

Height at withers

Height at elbow - taken from floor to point of elbow

Width of chest - taken at widest point

Depth of chest - taken at level of T11 (the eleventh thoracic vertebra or anticline)

Width of loin - taken at level of iliac crest

Depth of tuck up - taken at narrowest point

Width of rear - taken at widest point

Length of back - taken from spinous process of T1 (first thoracic vertebra) to sp. pr. of T11

Length of loin - taken from s.p. of T11 to iliac crest

Length of croup - iliac crest to ischiatic tuberosity

Ear set - from top of skull to the base of the auricular cartilage

Width of foreleg - taken at 3cm above the carpus

Depth of foreleg - taken at 3cm above the carpus

Length of foot - on ground - from pad to base of toenail

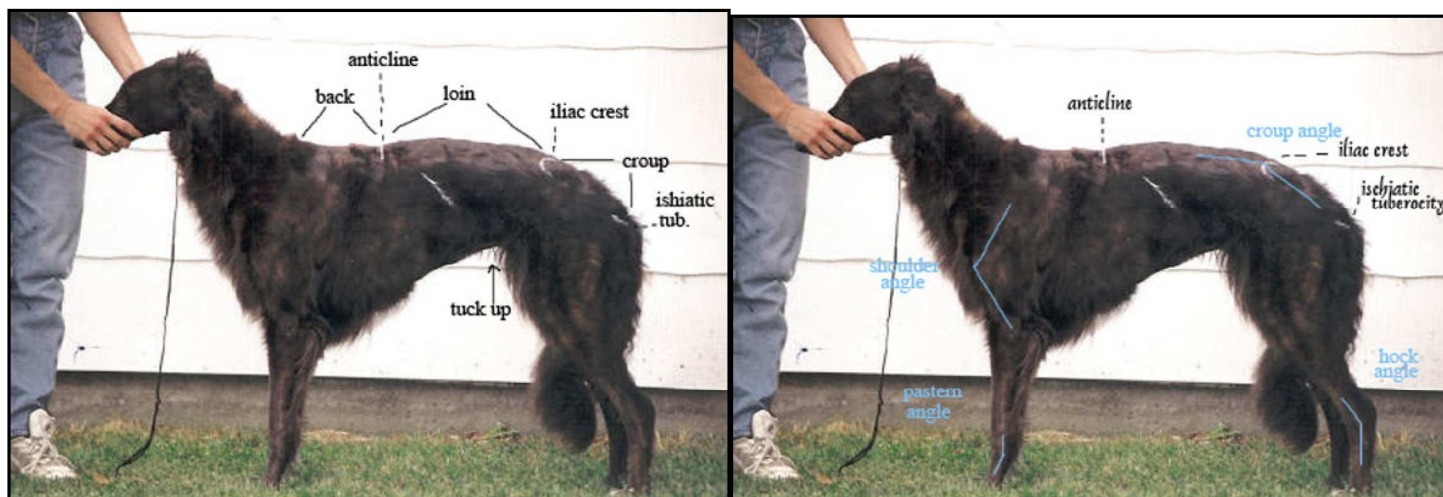
Elasticity of skin - length of skin easily pulled up from withers

Angle of croup - lumbar spine & pelvis (iliac crest to ischiatic tub.)

Angle of hock - metatarsals perpendicular

Angle of shoulder - spinous process & humerus to lateral epicondyle

Angle of pastern - dorsal surface of carpal joint.



Borzoi included in the study were 2 to 6 years old, in excellent health and condition, bitches not within 30 days post a heat cycle. Borzoi were volunteered by their owners from a wide variety of kennels in England, France, Germany, and across the United States. Each Borzoi's conformation was measured standing in show position with forelegs and hocks perpendicular.

Each Borzoi was encouraged to run as fast as possible by chasing after a drag lure made of a rabbit fur squawker through two pairs of electronic eyes set exactly 150 feet apart. They had 150 foot running start and an approximate 100 foot run off. Dogs who did not appear to be running with maximum effort were excused from the study. Time was measured with a Polaris FarmTek Rodeo Sprint Timer to one-thousandth of a second.

191 Borzoi qualified to be included in the study. Over 400 Borzoi were volunteered but were not included for various reasons - most commonly for failing to run hard in a straight line.

The collected data was analyzed by John D. McGinnis, Ph.D.

The Fastest Borzoi:

Ran 150 feet in 2.866 seconds = 52.4 ft/sec = 35.7 mph = 57.4 km/hr.

Average Borzoi Speed:

Was 150 feet in 3.16 seconds = 47.48 ft/sec = 32.4 mph = 52.1 km/hr.

The Slowest Borzoi:

Ran 150 feet in 3.693 seconds = 40.6 ft/sec = 27.7 mph = 44.6 km/hr.

The data was analyzed through T test, regression analysis, and regression analysis of squares. The T test looks for broad differences in conformation between the fastest 80 dogs and the slowest 80 dogs.

Regression Analysis looks for linear associations between conformation and speed, i.e. where longer of a certain measurement is linked to more speed. Regression Analysis of the Squares looks for optimal levels i.e. where the measurement linked to speed is neither the longest nor the shortest but closest to an ideal.

The results were quite remarkable:

The three most influential conformational attributes to speed are:

1. Comparatively long loin
2. Tight elastic skin
3. High set ears

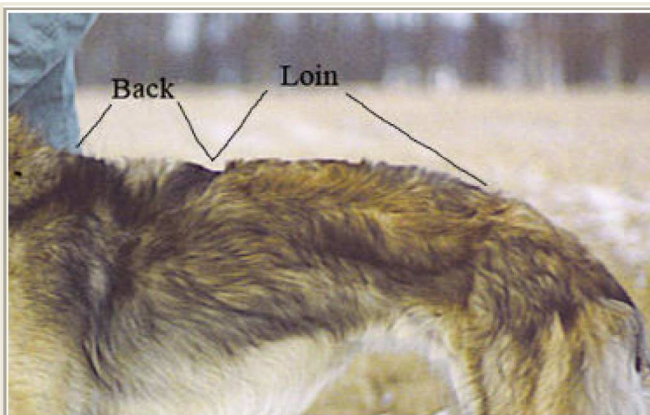
These three things have nearly infinite support statistically.

Comparatively Short Back To Long Loin

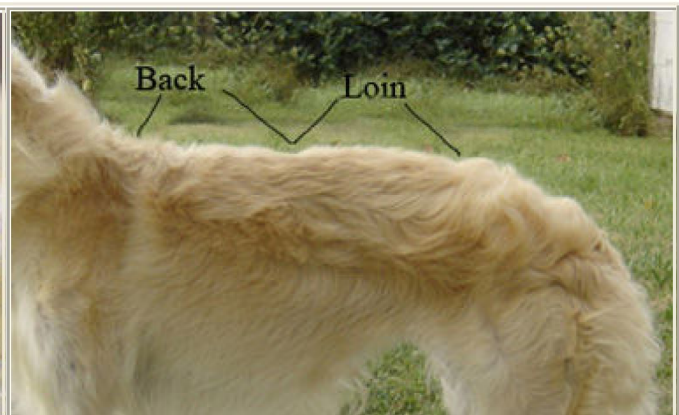
The **most important** conformational attribute to speed is having a **comparatively short back to long loin**.

The back is from T-1 to the anticline (T-11) and the loin is from the anticline to the iliac crest.

The fastest Borzoi measured had a loin length approximately twice the length of the back. The loin is the arched part of the Borzoi topline that when continuing its flow into the pelvis (or croup) is the graceful curve described in the AKC standard.



The loin is twice the length of the back (faster)



The loin is nearly the same length as the back (slower)

Russian Standard: BACK is broad, muscled, elastic, forming with the loin and croup a curve which is more pronounced in the males. The highest point of this curve is situated in the region of the first or second lumbar vertebra. LOIN Long prominent, muscled, moderately broad.

AKC Standard: BACK: Rising a little at the loins in a graceful curve. LOINS: Extremely muscular, but rather tucked up, owing to the great depth of chest and comparative shortness of back and ribs.

FCI Standard ('06) Back: Broad, muscled, elastic, forming with the loin and croup a curve which is more pronounced in the males. The highest point of this curve is situated ahead of the middle of the loin or in the region of the 1st or 2nd lumbar vertebra. Loin: Long, prominent, muscled, moderately broad.

Tight, Elastic Skin

The next important factor to speed is tight elastic skin. Tighter skin is correlated with increased speed in a linear manner. This is a Sighthound feature that is rarely discussed, but it is critical to speed and type. Once you start looking for skin tightness you will be amazed at both the variation in the breed and also how much it affects the overall fitness of the dog. Probably it is not the skin itself that correlates to speed but that ligaments & tendons are formed of the same collagen and connective tissue that that dog has in its skin.



Russian Standard: SKIN Supple, elastic Faults: insufficiently supple and elastic Serious faults: loose skin

AKC Standard: NECK Clean free from throatiness

FCI Standard ('06): SKIN Supple, elastic

High Set Ears

Another most important factor to increased speed is high set ears. The closer the ears are set to the top of the skull directly correlates to speed.

Again this is a strong Sighthound characteristic that probably reflects overall tight construction and connective tissue. Interestingly it is expressed separately from skin tightness, i.e. individual Borzoi can have both very tight skin and quite low set ears and vice versa.



Higher set ears (faster)



Lower set ears (slower)

Russian Standard: EARS Small, supple, mobile, set on or above eye level and backwards...

AKC Standard: EARS: Small and fine in quality, lying back on the neck when in repose with the tips when thrown back almost touching behind the occiput; raised when at attention

FCI Standard ('06) Ears: Small, thin, mobile, set on above the eye level and backwards.

Another very important contributor to speed is having **rear symmetry** with a proportionally larger croup angle (flatter) to a smaller hock angle (more bend). Another way of describing this is that the faster dog's rear legs are set further behind the pelvis and less under the pelvis. This also makes the hind legs appear longer in the faster dogs. This variable is already a proportion, so optimal levels are not calculated from this data. This is an area that could use further study. There is some thought that a moderately steeper croup angle is an advantage in sharp turns, while the more open croup angle promotes faster straight out speed; but no known research has been done on this theory.



**Croup angle bigger than hock angle
(faster)**



**Croup angle smaller than hock angle
(slower)**

Russian Standard: CROUP Long, broad, slightly sloping. The width of the croup measured between the two hip bones must not be less than 8 cm.

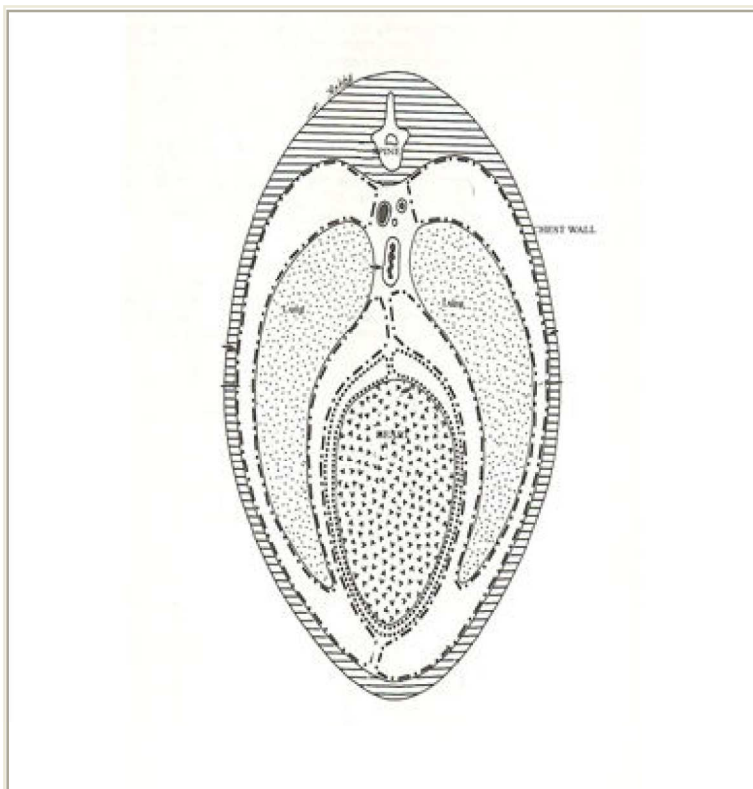
Faults: Narrow, short, steep. **Serious Faults:** Very narrow, very short excessively steep (goose rump) **HINDQUARTERS** ... When the dog is standing true, the vertical line dropping from the ischiatic tubercity must pass in front of the center of the hock joint and of the metatarsals. Upper thigh well-muscled, long, placed obliquely. Lower thigh long, muscled, placed obliquely....

AKC Standard: **HINDQUARTERS:** Long...; strong first and second thigh....

FCI Standard : **HINDQUARTERS** ... When the dog is standing true, the vertical line dropping from the ischiatic tubercity must pass in front of the center of the hock joint and of the metatarsals. Upper thigh: well muscled, long, placed obliquely. Lower thigh: long, muscled, placed obliquely.

The next grouping of attributes contributes to speed, but have **optimal levels**. There is no advantage to having greater or lesser values than the optimal.

A significant contributor to speed is the chest. For optimal speed the chest should be slightly wider than half its depth.



This chest is a drawing showing the thorax at T8 approximating a chest proportion of 6.25 to 12.

Russian Standard: CHEST Of oval cross-section, not narrow, yet not wider than the croup, spacious, reaching down almost to elbow level. The region of the shoulder blades being flatter, the chest gets gradually wider toward the false ribs, which are short; seen in profile it forms a change in slope.....

Faults: Chest narrow, flat, not deep, sternal line much higher than the level of the elbows. Serious faults: Chest hollow in its front part, barrel -ribbed.

AKC Standard: CHEST: Rather narrow, with great depth of brisket.

FCI Standard ('06): Chest: Of oval cross-section, not narrow, yet not wider than the croup, spacious, reaching down almost to elbow level. The region of the shoulder blades being flatter, the chest gets gradually wider toward the false ribs, which are short; seen in profile it forms a change in slope.

Another significant contributor to speed is bladed bone. When measured at 3 cm above the carpus the fastest borzoi are 1.5 to 1.6 times deeper than wide (when viewed from the front).



Bladed bone (faster)



Bladed bone



Rounder bone
(slower)



Rounder bone

Russian Standard: FOREQUARTERS Forearm is clean, long, of oval cross section; seen from the front, narrow; seen in profile, broad..... Serious faults: ...forearm of round cross section.

AKC Standard: FORELEGS: Bones straight and somewhat flattened like blades, with the narrower edge forward....

FCI Standard ('06): FOREARM: Clean, long, of oval cross section: seen from the front narrow, seen in profile, broad.

There are other conformational attributes that are associated with speed – with about 95% correlation. These are: Longer croups - Higher tuck ups - Wider rears.

Also in this category is pastern angle. Optimal pastern angle is 165 degrees.



165 degrees

The conformational attributes that did not correlate to speed in this study are age, sex, height at withers, length of leg, and length of foot. Shoulder angle did not contribute significantly, but there was a tendency for the ideal angle to be 120 degrees.

These things may not be important to speed, or they may just have all been in reasonable range in the population studied, i.e. all were Borzoi who ran hard, no couch potatoes and no Dachshunds 😊.

The results of this study overwhelmingly supported the descriptions of ideal Borzoi conformation written in the AKC, FCI and Russian Standards. It is extremely important as Borzoi fanciers that we continue to educate and remind ourselves of ideal Borzoi conformation so we can preserve the beautiful swift hunters that are only temporarily in our custody.

The complete study including raw data, analyses, and additional explanatory photographs including photos of the fastest borzoi in the study can be found at: <http://www.nktelco.net/teine/speed2.htm>

CH Paradise Spirit Torch Song Enchante



Owner: Mary Sue Marcyn

Breeder: Susan M. Motisi & Kristi J. Arnquist

CH Hundale Akasha Spirit Magick



Owner: Glennis Hunter

Breeder: Glennis Hunter

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