COMPROMISED MOVEMENT

How Faulty Breeding Affects the Gait of The German Shepherd Dog

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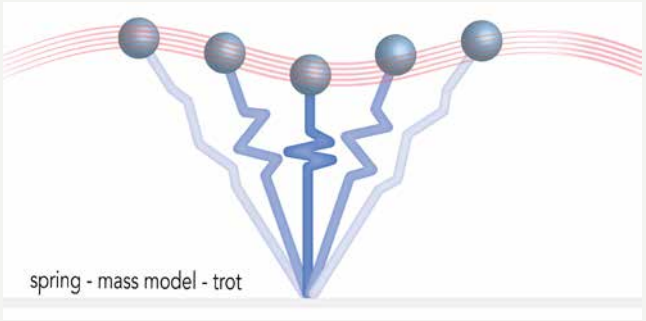
WORLD EXCLUSIVE: The GSDCA sincerely thanks Professor Dr Messler and Mr Donald for the privilege of publishing this world-exclusive article.

"The German Shepherd Dog, a breed celebrated for its intelligence, versatility, and exceptional working abilities, has undergone significant changes over the past century. Originally bred for herding and protection, these dogs have served in various roles, from police and military work to search and rescue missions, showcasing their adaptability and endurance. However, the breed's transition from a functional working dog to a show dog has brought about unintended consequences."

The German Shepherd Dog was once renowned as a working dog, excelling in herding, service work, and sports due to its versatility. However, breeding policies in recent decades have led to concerning developments, primarily manifesting in the so-called "flying trot" as a key evaluation criterion at dog shows. This misdirection has resulted in functional impairments that significantly disrupt the natural and energy-efficient movement of the German Shepherd Dog.

The Evolution of Locomotion: From Water to Land

The development of locomotion in vertebrates is deeply rooted in the evolutionary history of tetrapods. The transition from aquatic to terrestrial locomotion brought significant biomechanical adaptations, including changes in gravitational load and realignment of movement mechanisms. While early land vertebrates like Ichthyostega primarily moved through a combination of crawling and paddling, more efficient gaits such as the diagonal trot and asymmetrical gallop evolved over time.

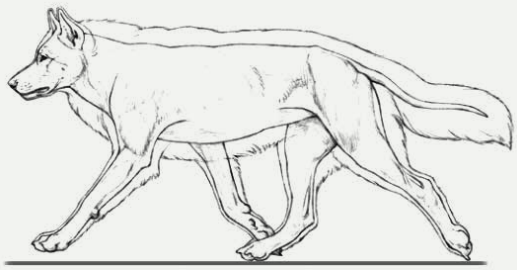


A key principle of terrestrial locomotion is energy conservation through biomechanical mechanisms like elastic energy storage in tendons and muscles.

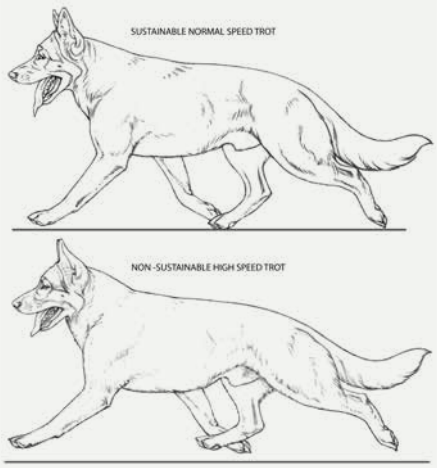
Cursorial mammals such as wolves and antelopes optimise their running efficiency by maintaining high stride frequencies in energy-efficient gaits. The diagonal trot, particularly, is the most energy-efficient gait for endurance runners. This evolutionary background provides a crucial basis for understanding the locomotion of cursorial mammals, including the German Shepherd Dog.

The Misdevelopment of the German Shepherd Dog: The "Flying Trot"

The German Shepherd Dog naturally employs the diagonal trot as its preferred gait, allowing it to move efficiently and endure long distances with minimal fatigue. This movement sequence reduces muscular effort by optimising the elastic energy stored in tendons, enabling sustained locomotion. Additionally, the diagonal trot provides stability and balance, which is particularly advantageous for working dogs navigating uneven terrain—whether in herding, sporting trials, or service duties. The steady rhythm of this gait promotes endurance while minimising the risk of injury, ensuring that the German Shepherd Dog can perform its tasks as a high-functioning working dog.



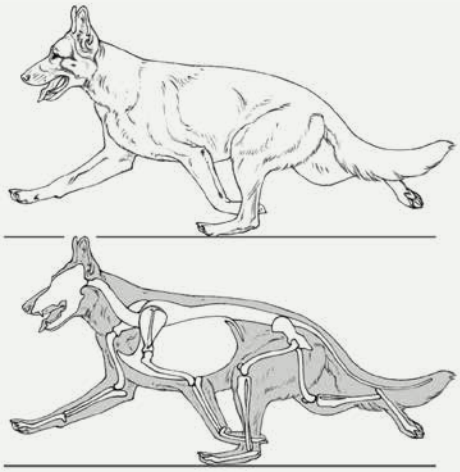
However, modern breeding selection has increasingly favored excessive angulation, leading to a pathological gait that persists as a dominant evaluation criterion, despite growing criticism from working dog experts and biomechanical studies—the so-called "flying trot." This movement is characterised by an exaggerated suspension phase, where both front and hind limbs extend beyond their natural range. Instead of prioritising horizontal efficiency, this gait increases vertical oscillation, disrupting the natural elasticity of tendons and muscles and resulting in biomechanical inefficiency.



The energy economy of locomotion is determined by the interplay between stride frequency and stride length, with an optimal balance minimising energy expenditure. Excessive stride length reduces stride frequency, leading to inefficient utilisation of elastic energy stored in tendons and ligaments, thereby increasing metabolic energy costs. Furthermore, extreme stride length forces excessive joint extension, particularly in the shoulder, hip, and hock joints, reducing biomechanical stability and increasing the risk of degenerative joint diseases. The resulting impairment of diagonal movement coordination decreases locomotor efficiency, which is particularly detrimental for cursorial breeds such as the German Shepherd Dog. Over time, these alterations heighten susceptibility to injuries and premature wear of the musculoskeletal system, ultimately compromising the breed's original working capabilities.

The Problem of Tendon Recoil and Muscle Energy Conservation

The movement of a healthy dog relies on a sophisticated biomechanical system of tendons, muscles, and bones. Tendon recoil plays a crucial role in locomotor efficiency, utilising elastic tendons to store energy during the stance phase of a stride and releasing it during the push-off phase. This mechanism minimises energy expenditure, enabling sustained movement over long distances without excessive fatigue.



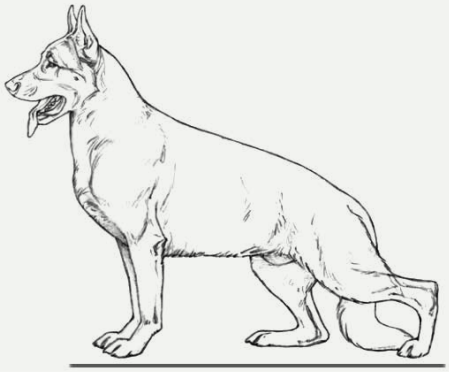
However, modern German Shepherd Dog breeding has severely impaired this natural mechanism through multiple morphological alterations over generations. Specifically, the following factors have contributed to inefficient locomotion:

1. *Excessive Limb Length and Functional Over-Extension:*

   The artificial elongation of the femur and, particularly, the tibia has led to functional overextension of the limbs. These longer bones create larger lever arms, significantly weakening the natural recoil force of tendons. The advantages of shorter, more compact limbs—where tendons function optimally—are lost. As a result, the dog must compensate with increased muscular effort, leading to higher energy consumption, premature fatigue, and long-term health deterioration.

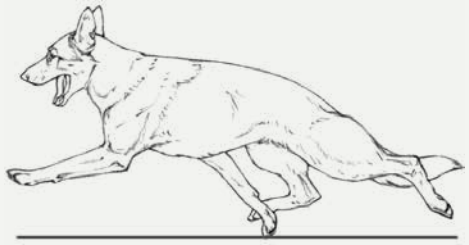
2. *Lowering of the Hind Limb Pivot Point:*

   The selective breeding for an exaggeratedly sloping topline has dramatically altered the biomechanical foundations of the German Shepherd Dog's movement. The artificially lowered pivot point of the hind limbs further reduces tendon elasticity, forcing the dog to rely more on active muscle work. This results in increased energy consumption, accelerated fatigue, and heightened vulnerability to injuries and degenerative joint diseases. Consequently, the breed's original working abilities are severely compromised.



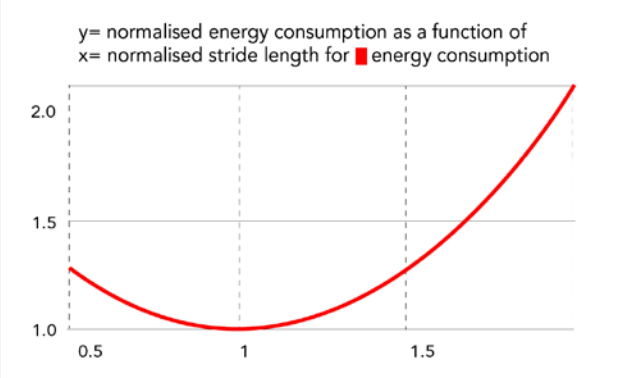
3. *Increased Stride Length and Its Energetic Consequences:*

   Extreme angulation and elongated limbs contribute to an unnaturally large stride length. This manifests in overreach or pacing, movement patterns tolerated—and encouraged - over decades. Only recently have concerns regarding their detrimental impact on health and movement efficiency gained attention within breeding organisations. In a natural trot, tendons act as passive springs, but when the hind limbs are overextended, the entire forward propulsion must come from active muscle contraction. This significantly increases energy demands as the muscles must constantly counteract unnatural biomechanics.



4. *Replacing Tendon Mechanics with Muscle Work:*

In an extreme trot with excessive stride length, elastic recoil forces are nearly eliminated. While in a natural diagonal trot, up to 70–80% of locomotion energy is recovered through tendon elasticity; this efficiency drops drastically in dogs with exaggerated movement patterns, forcing a shift to metabolically costly muscle work. Additional energy is required to compensate for excessive movement dynamics. The absence of passive energy storage forces the dog to expend significantly more metabolic energy, leading to premature fatigue and inefficient movement.



Modern German Shepherd Dog breeding has resulted in severe anatomical alterations that impair the natural tendon mechanism. Elongated bones, a lowered hindquarter pivot point, and excessive stride length eliminate elastic energy storage and increase the need for active muscle work. This places an energetic burden on the dog and significantly affects its long-term health and working capacity.

DOG TYPE	GAIT	STRIDE LENGTH	ENERGY EFFICIENCY	REMARKS
Wolf and Sheepdog	Trot	Moderate	High	Optimal combination for long distances
Greyhound	Gallop	Very Long	Moderate	For speed, not for long distances
Bulldogs and Dachshunds	Trot	Short	Low	Less efficient because more steps are needed

The Role of Judges and the Mismanagement of Breeding

The primary responsibility for this misdevelopment lies with German Shepherd Dog Association (SV) judges. Decades of favoring dogs with exaggerated angulation and sloping toplines have reinforced a trend that directly contradicts the breed's original function. Instead of evaluating dogs based on natural, energy-efficient movement, an artificial aesthetic ideal has been promoted—one that is biomechanically unsound.

This shift has long-term consequences for the breed's working ability.

The rigid, aesthetics-driven interpretation of the breed standard has led to a decline in working performance, with noticeable deficits in endurance and resilience.

Extreme angulation, while aesthetically preferred, has contributed to an increased discussion of hip and elbow dysplasia—an issue widely debated but lacking definitive causal evidence in scientific literature.

Once a universally capable working dog, the German Shepherd Dog now struggles to meet the demands of high-level canine sports.

If this trend continues, the German Shepherd Dog risks losing its status as a functional and versatile working breed, raising urgent concerns about its future viability.

Conclusion and Recommendations

The deterioration of the German Shepherd Dog due to the prioritisation of the flying trot exemplifies the damaging impact of misguided breeding policies. Fundamental locomotion mechanics clearly demonstrate that energy-efficient movement depends on functional anatomy, not excessive angulation.

Restoring the breed's original functionality requires decisive action. Breeding and evaluation standards must shift away from the exaggerated "flying trot" and instead prioritise the natural diagonal trot, which supports working ability. Stricter health selection should prevent extreme angulation in top-ranking dogs and promote structurally balanced breeding pairs. Additionally, judge and breeder education on locomotion biomechanics is crucial to fostering sustainable breeding practices.

Only by realigning breeding goals with functional soundness can the German Shepherd Dog preserve its versatility as a working dog and prevent further health decline.

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