



**Stuart S. Sumida / Kathleen Devlin
Biology 342**

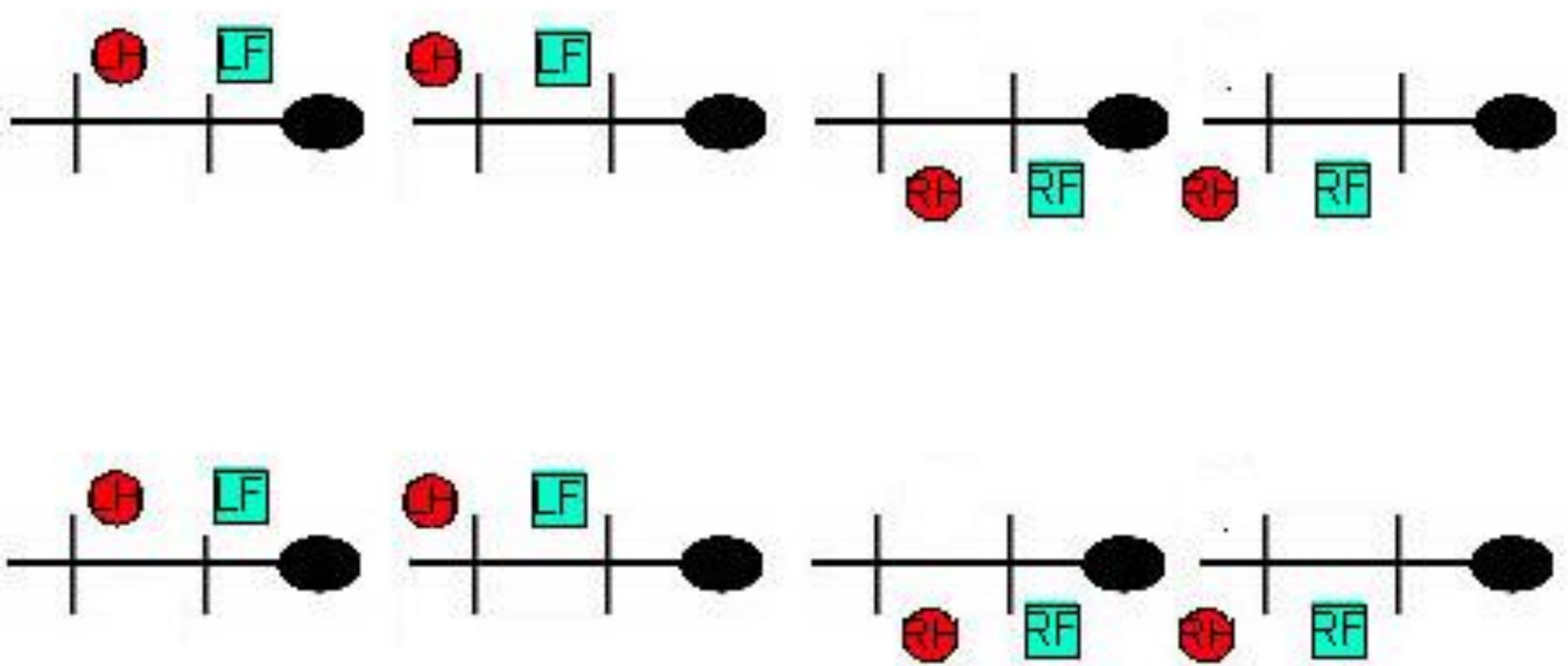
Locomotion: Mammalian Pacing and Trotting

PACING

- In four-legged mammals, a pace is characterized by the step-cycle being dominated by alternating right and left couplets with the fore- and hind limbs on each side moving in register (almost parallel) with one another.
- Pacing is considered a slow to medium speed quadrupedal gait.
- Medium to larger sized dogs often pace to avoid banging and front limbs together on the same side.
- The mammalian pace is often considered to be somewhat less stable than the diagonal support found in a typical trot.

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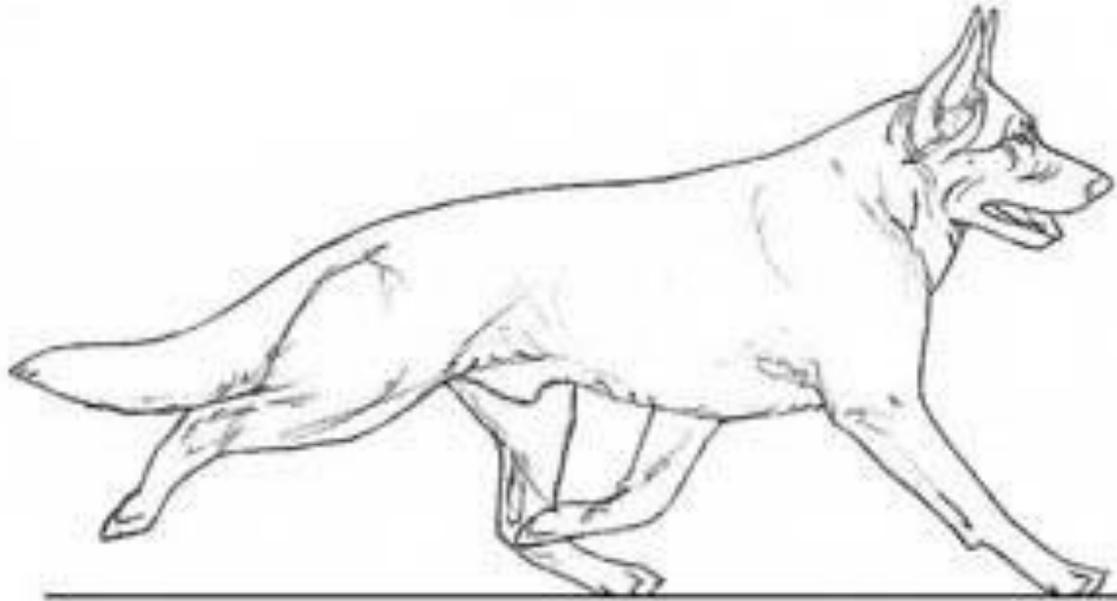


TROTting

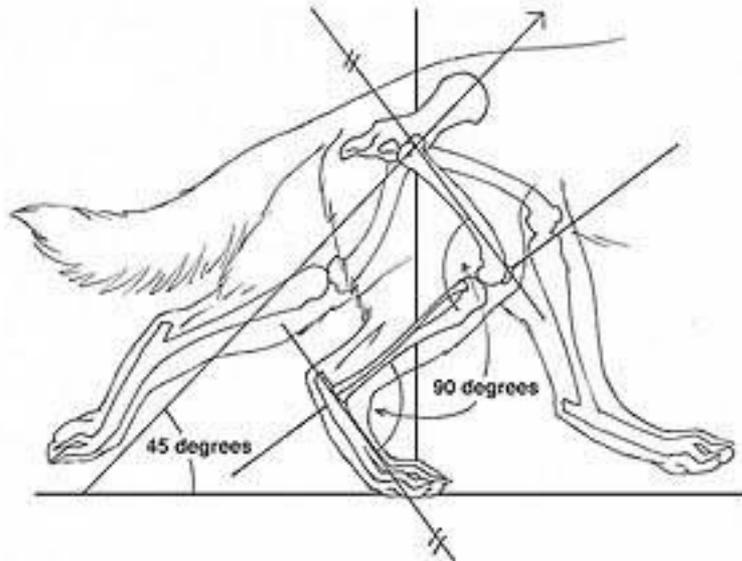
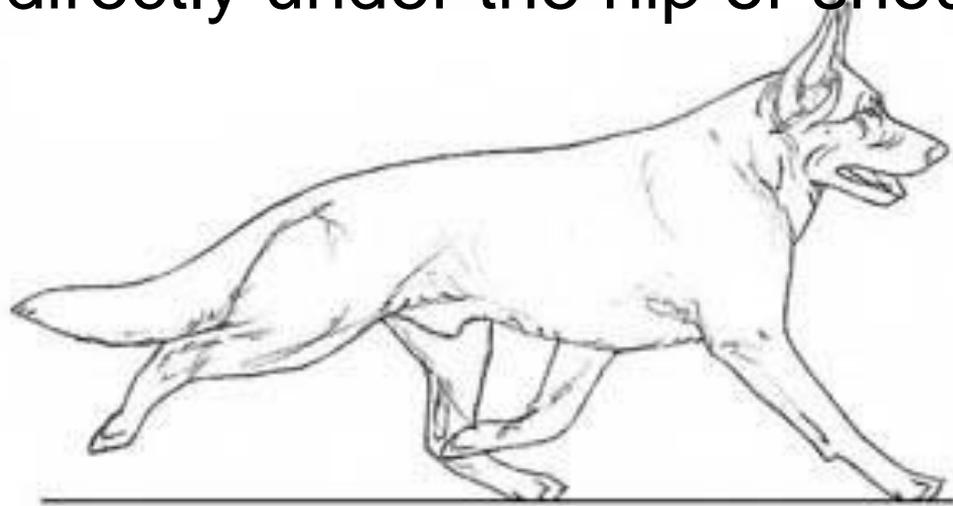
- In four-legged mammals, a trot is usually characterized by most of the step-cycle dominated by alternating diagonal under support (also known as “diagonal couplets”).
- Trotting is considered a slow to medium speed quadrupedal gait.
- Trotting is dominated by alternating contact with the ground of [right-hind+left-front] and [left-hind+right-front].
- The mammalian trot is often subdivided into a perfect “two-beat” trot and a “four-beat” trot.

TROT

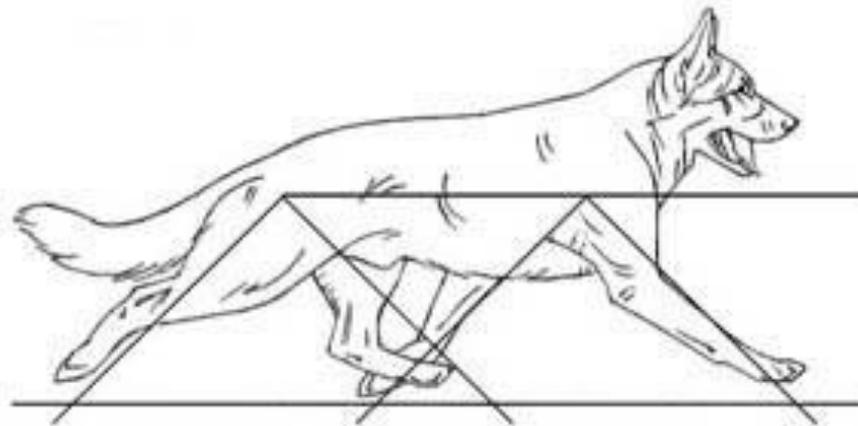
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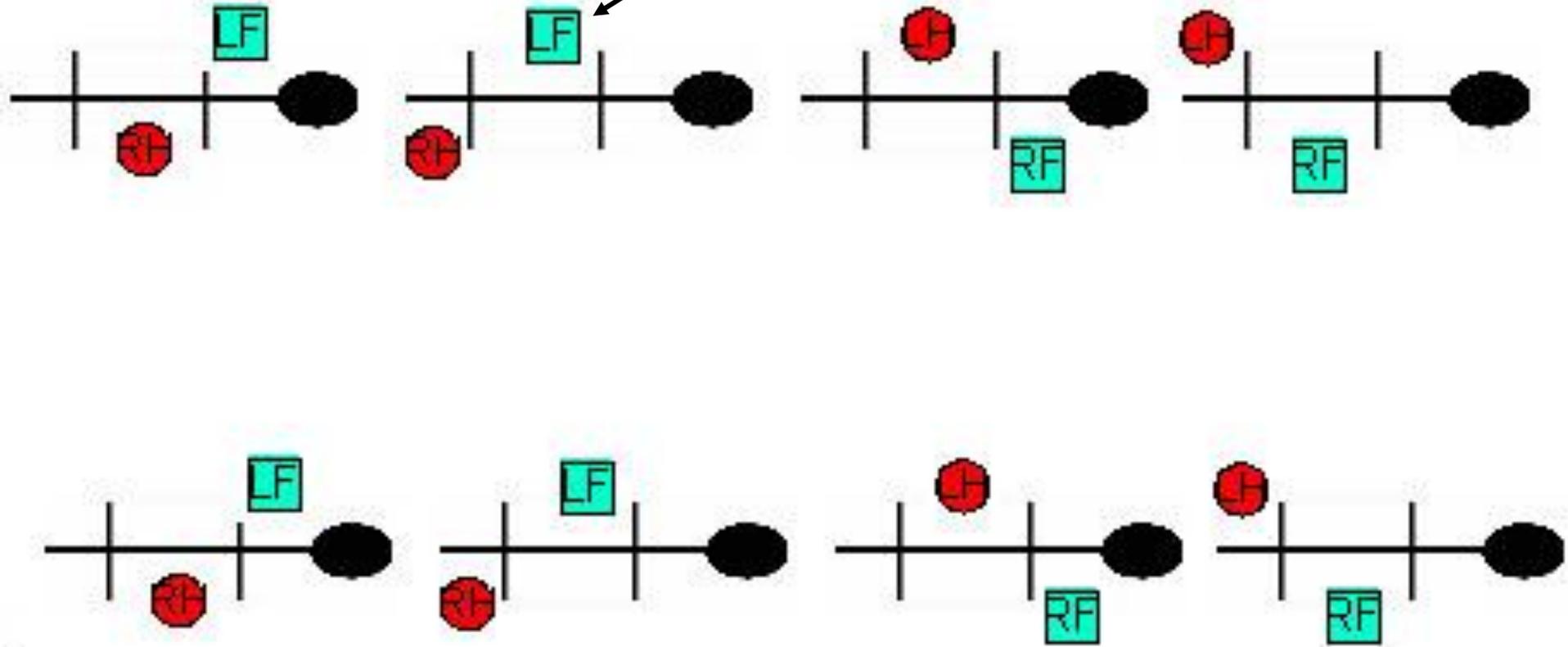
When moving at speed, each limb must overshoot the typical plane directly under the hip or shoulder joints.



Femur and foot almost (not quite, but almost parallel with one another.



Note how each couplet travels back relative to body.



The very slowest of the “trots” is a fast walk at best, with the body never leaving the ground. If there is no period when all four feet are off the ground, it’s usually referred to as a “***supported trot***”.



In faster “trots” the body/feet can leave the ground. This is usually referred to as a “***suspended trot***”. It is often a 4-beat trot.

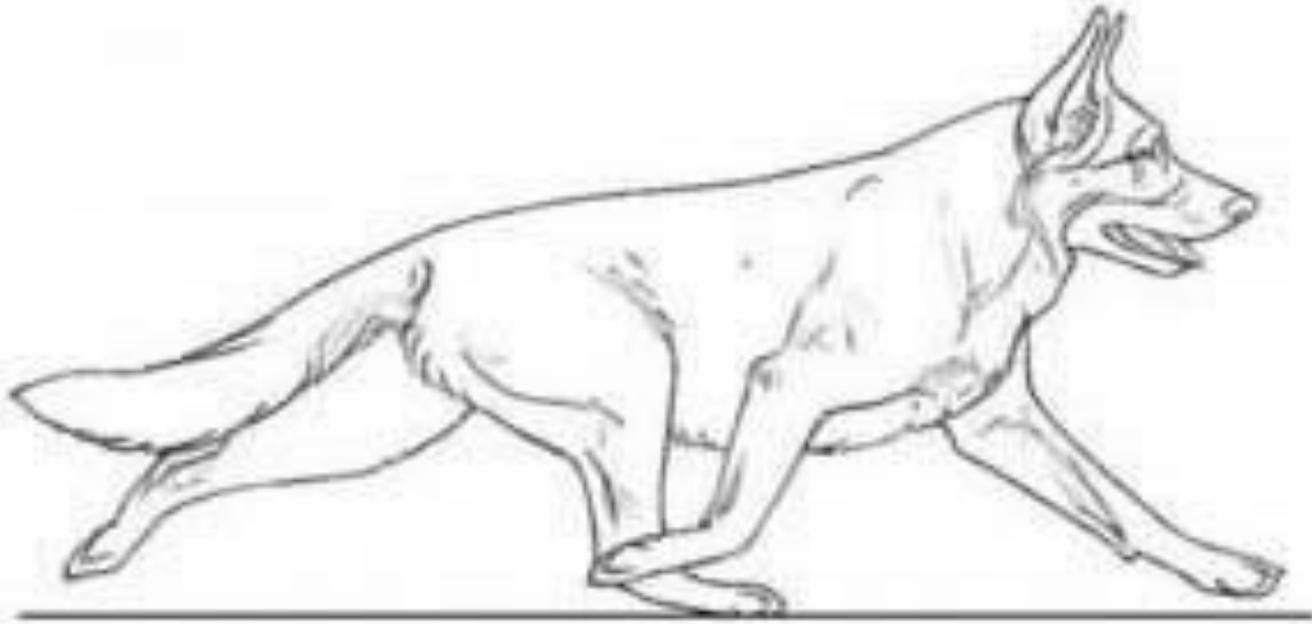


(Suspended)

THE FOUR-BEAT TROT

- It is important to note that animals are rarely **PERFECTLY** symmetrical in nature.
- The four-beat trot is indeed dominated by diagonal couplets [right-hind+left-front] and [left-hind+right-front], but not that the hind member of each couplet lands a split second **before** the fore member of each.
- Additionally, the fore member of each couplet leaves the ground a split second **after** the hind member of each.

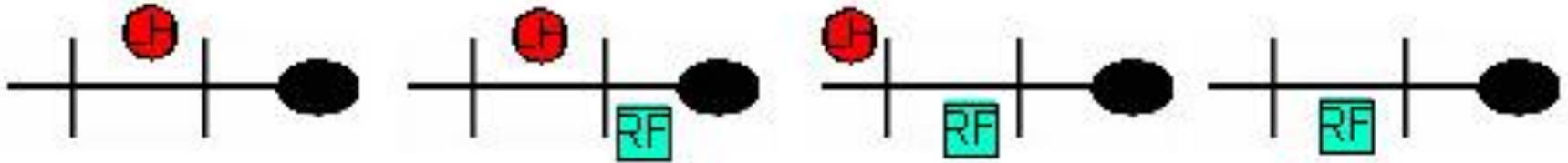
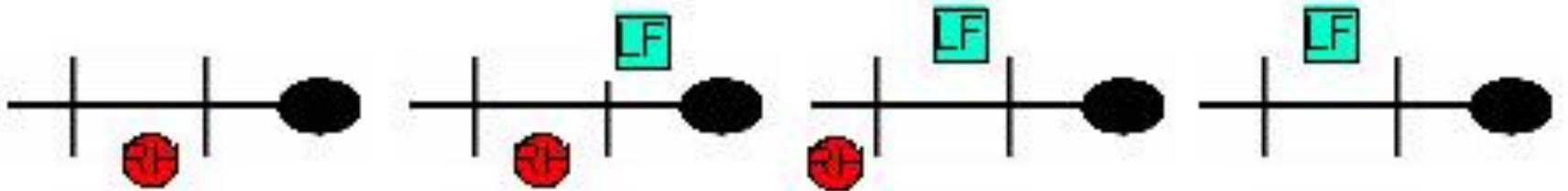
In the **FOUR-BEAT TROT** it is important to note that the hind member of each couplet lands a split second before the fore member of each.



Hind foot contact.

Forefoot almost in contact.

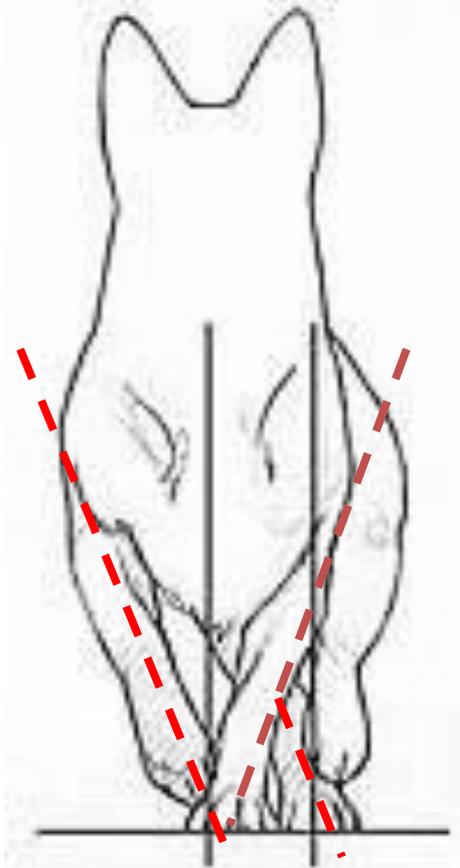
The four-beat trot is dominated by diagonal couplets [right-hind+left-front] and [left-hind+right-front], but not that the hind member of each couplet lands a split second **before** the fore member of each. Additionally, the fore member of each couplet leaves the ground a split second **after** the hind member of each.



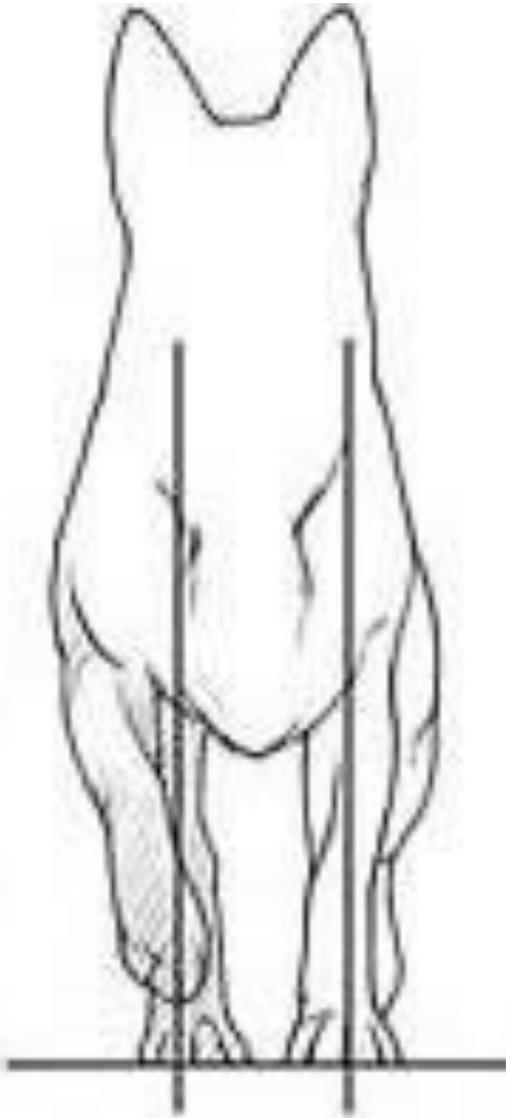
In faster “trots” the body/feet can leave the ground. This is usually referred to as a “***suspended trot***”. It is often a 4-beat trot. Canids and felines do this more readily than horses, and it can be done to achieve a more “cartoony” look.



(Suspended)



Single tracking requires moderate adduction of the limbs to the midline under the animal's body.



Double tracking occurs in medium speed trots.

All four limbs project approximately straight down to the ground, perpendicular to ground.



Triple tracking is done at the higher trotting speeds so that limbs don't bump into one another.

Some animals keep one couplet central, others the other couplet.

Again, all four limbs project approximately straight down to the ground, perpendicular to ground.