

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

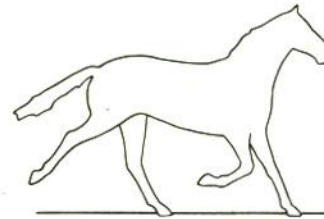
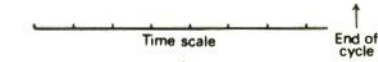
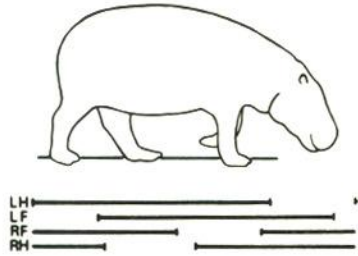
# **Locomotion: Mammalian Walking**

# SYMMETRICAL GAITS:

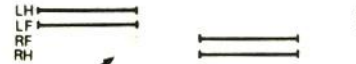
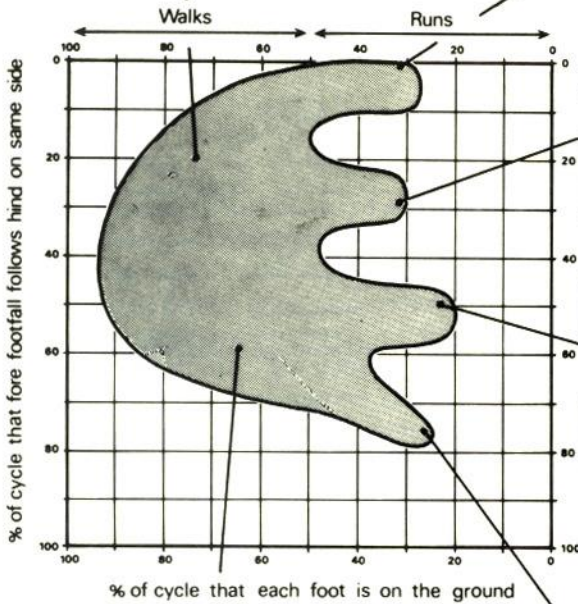
Gaits are said to be SYMMETRICAL when the foot falls of two feet of any given pair are evenly spaced in time.

Generally, natural symmetrical gaits are associated with slower speeds and when at least one or more of the four feet are on the ground at any given moment.

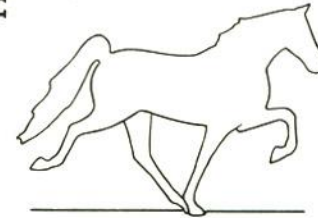
Walk



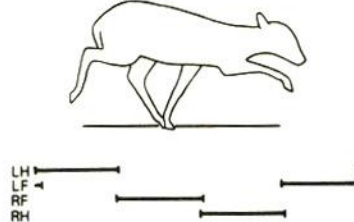
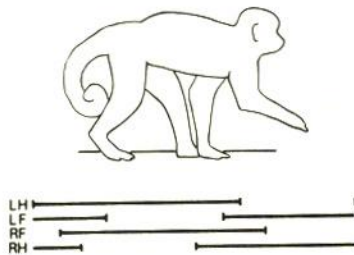
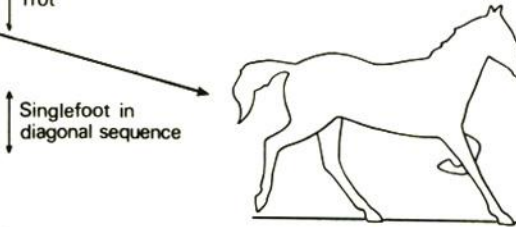
Pace

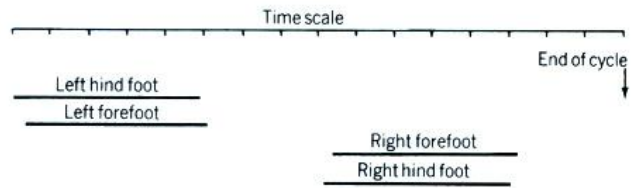
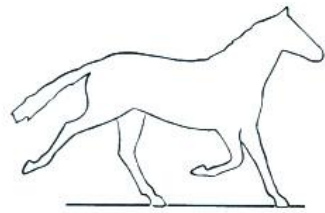


Lateral Trot



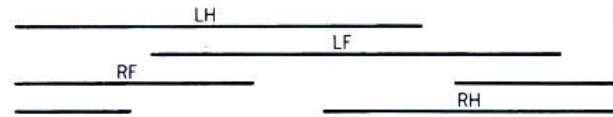
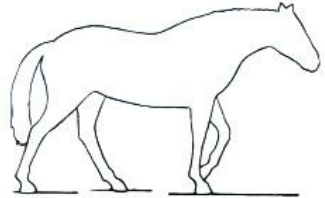
(Normal = "Diagonal" Trot)





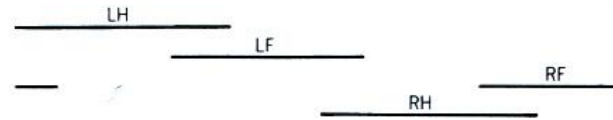
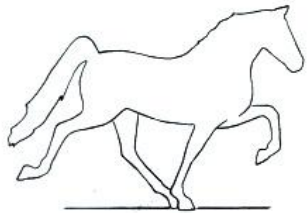
Harness pacer

MODERATE RUNNING PACE



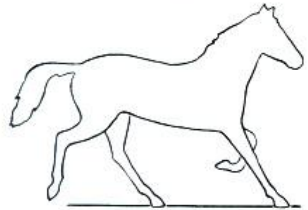
Quarter horse

MODERATE WALKING LATERAL SEQUENCE SINGLEFOOT



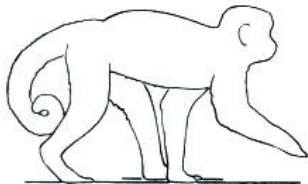
Walking horse

MODERATE RUNNING LATERAL SEQUENCE SINGLEFOOT



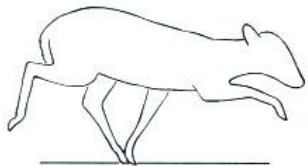
Harness trotter

FAST RUNNING TROT



Capuchin monkey

MODERATE DIAGONAL SEQUENCE WALK



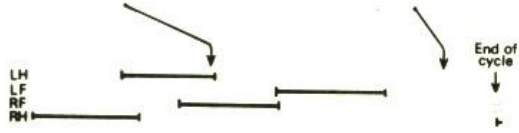
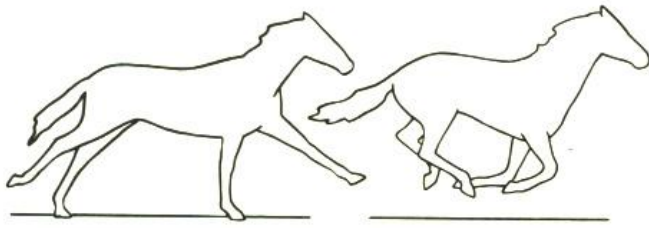
Duiker

FAST RUNNING DIAGONAL SEQUENCE SINGLEFOOT

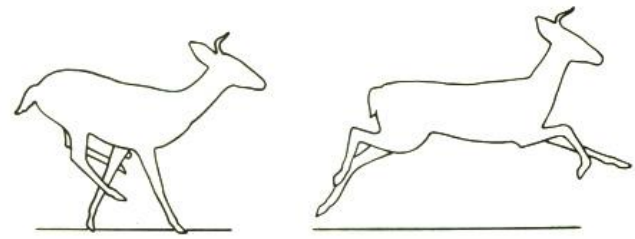
# ASYMMETRICAL GAITS:

Gaits are said to be **ASYMMETRICAL** when the foot falls of two feet of any given pair are unevenly spaced in time.

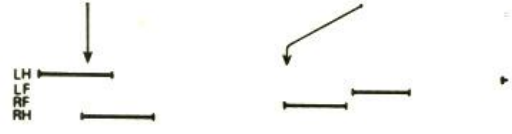
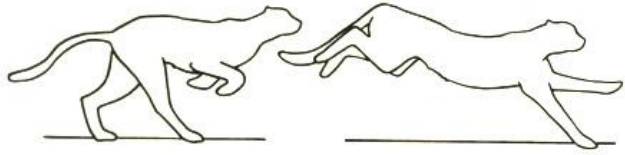
Generally, asymmetrical gaits increase the length of stride by introducing periods of suspension when all feet are off the ground.



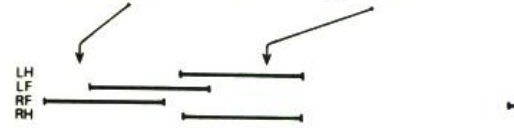
HORSE: Transverse gallop with gathered suspension



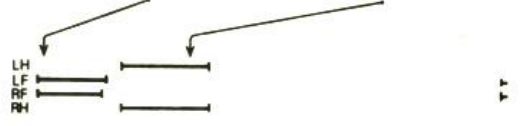
DEER: Rotary gallop with extended suspension



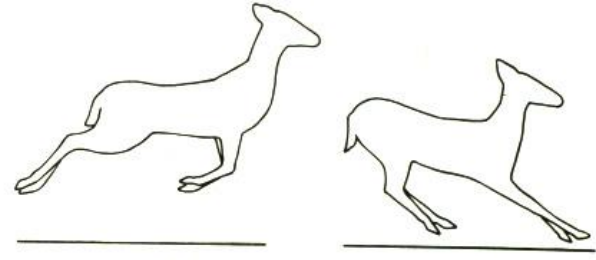
CHEETAH: Rotary gallop with both suspensions



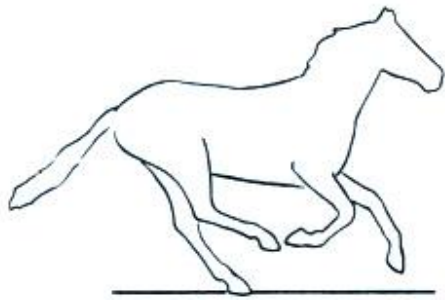
WEASEL: Half bound with extended suspension



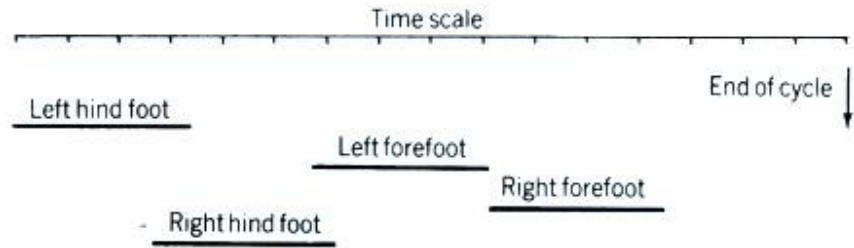
HOUSE MOUSE: Bound



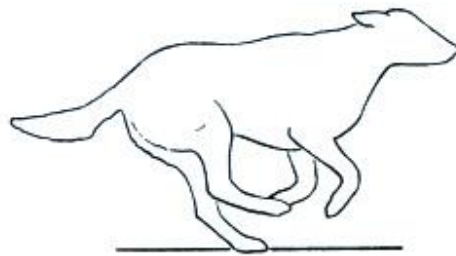
DEER: Prong



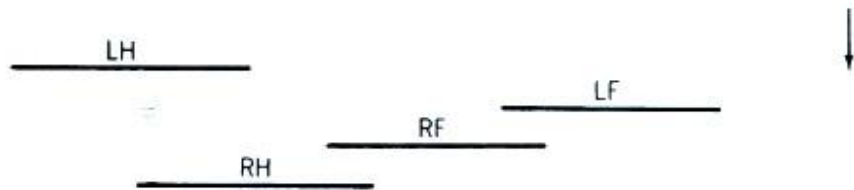
Race horse



**FAST GALLOP: SAME LEAD FORE AND HIND; SUSPENSION IN GATHERED POSITION**



Shepherd dog



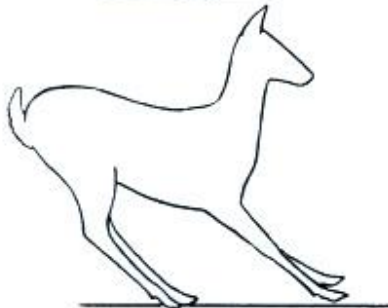
**MODERATE GALLOP: DIFFERENT LEAD FORE AND HIND; SUSPENSION IN GATHERED POSITION**



Weasel



**HALFBOUND: ONLY FOREFEET HAVE LEAD; SUSPENSION IN EXTENDED POSITION**



Mule deer



**PRONK: ALL FEET MOVE IN UNISON**

# STANDARD MAMMALIAN WALKING

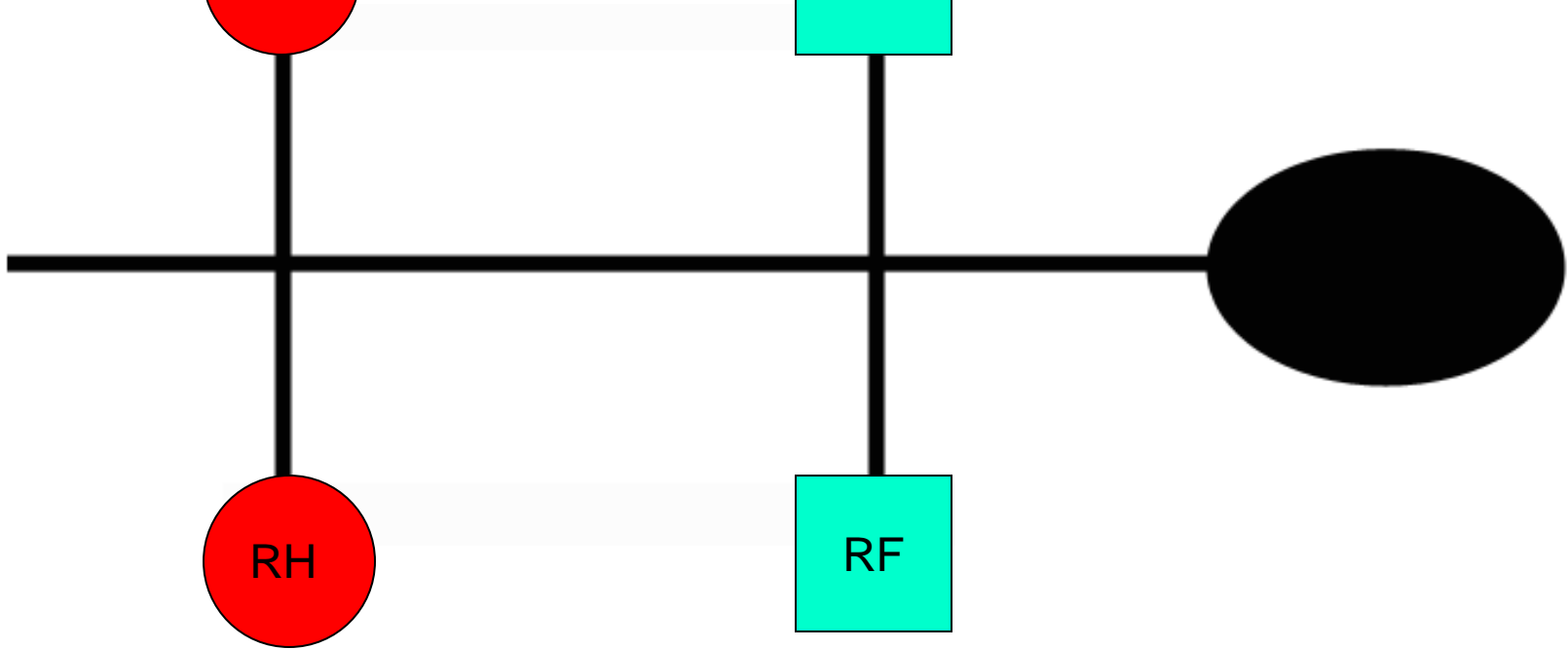
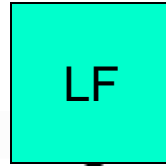
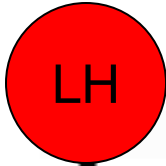
- In four-legged mammals, a walk is usually characterized by having some stage of the step-cycle including a three-point under support – or triangular under support. In other words, at some point three feet are touching the ground. (Human walking is when right and left feet are both in contact at the same time during some part of the step-cycle.)
- Walking is considered the slowest of the quadrupedal gaits.
- The standard mammalian walk is remarkably consistent from species to species – from mouse to mammoth: footfall sequence in order: Right Hind, Right Front, Left Hind, Left Front; Repeat.



# CONVENTIONS

Left Hind

Left Front



LH

LF

RH

RF

Right Hind

Right Front

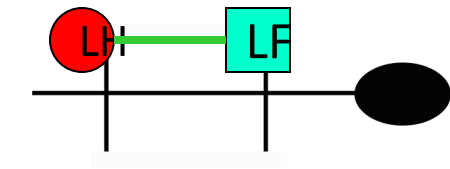
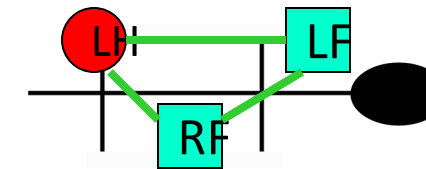
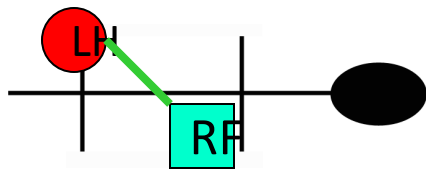
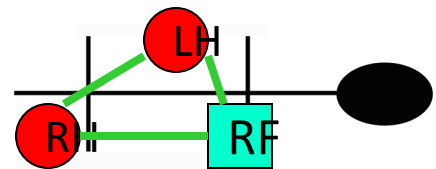
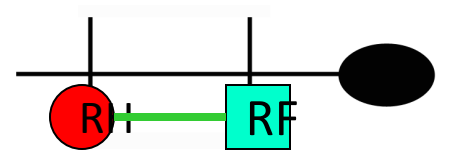
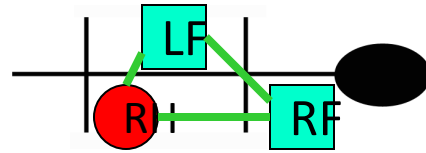
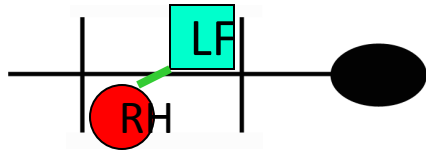
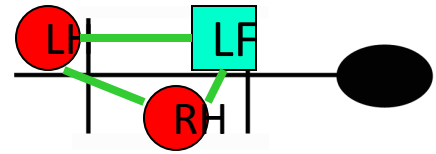
# NORMAL/STANDARD WALK

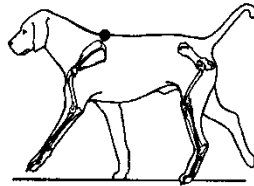
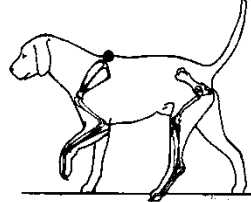
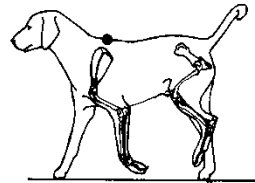
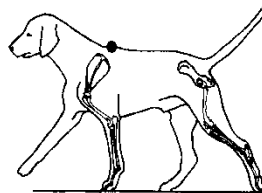
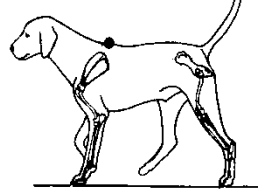
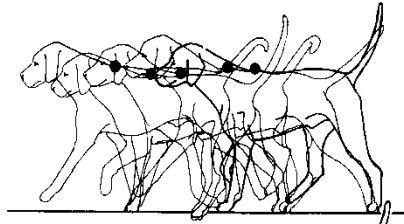
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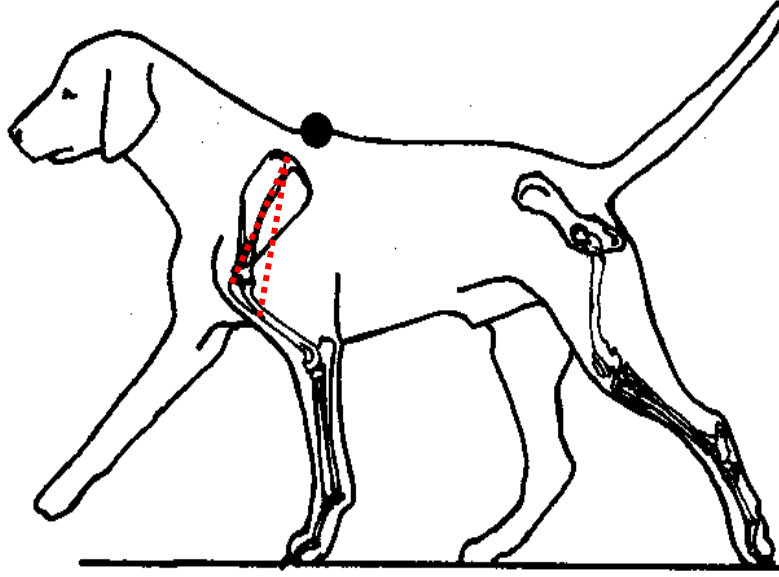
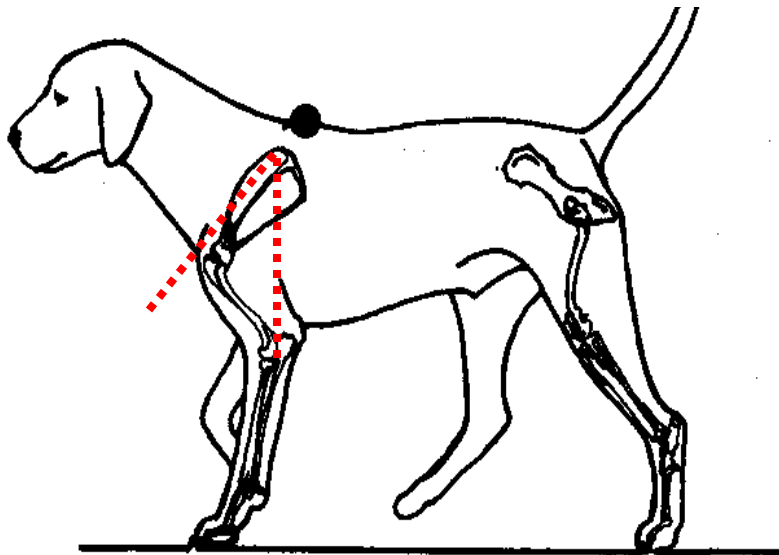




# STANDARD MAMMALIAN QUADRUPEDAL WALK





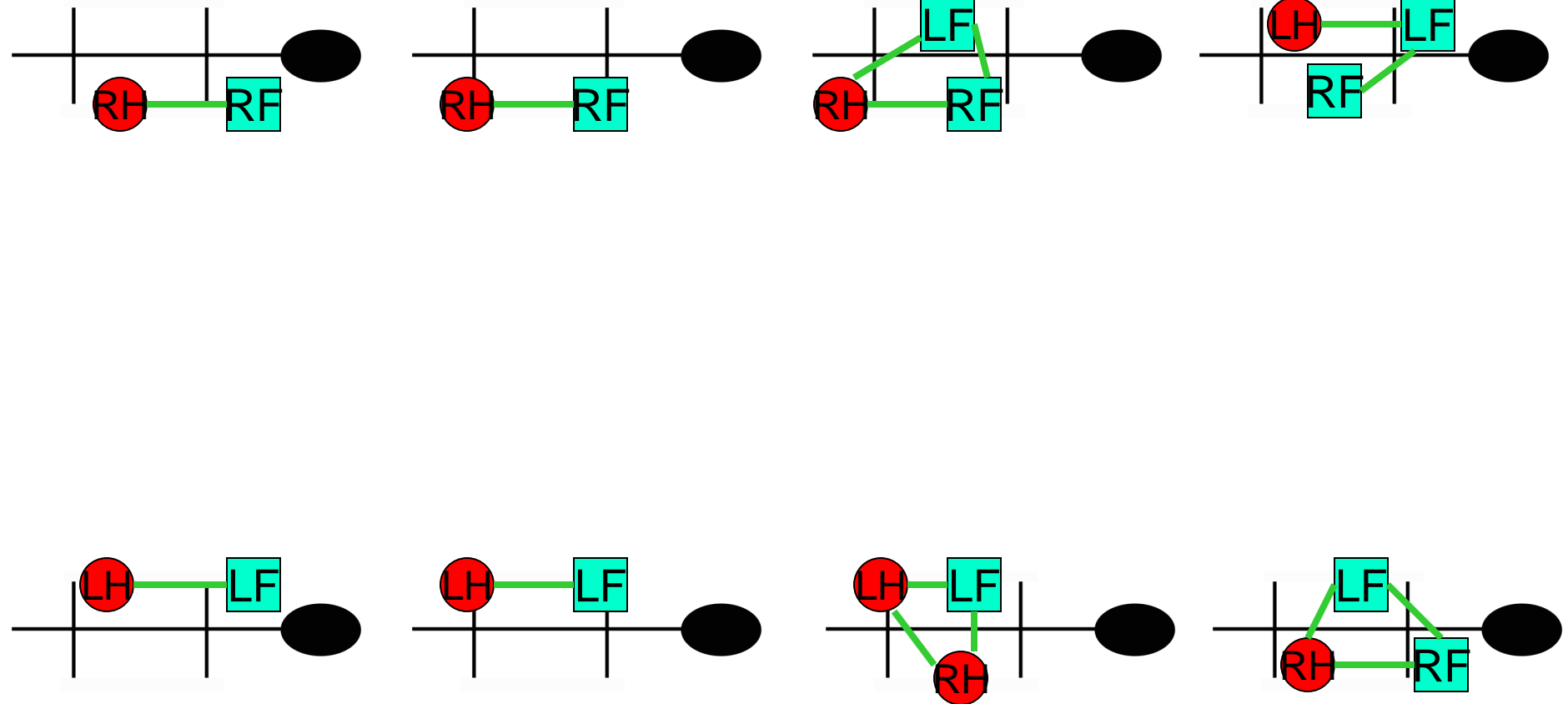


# THE AMBLE

- The AMBLE is essentially a “sped-up” walk.
- It is a gait that is usually transitional between a normal walk and a trot.
- This sped up walk is what animals do when constrained to walking but when they want to move fast.
- This sped up walk is what animals do when they are very large (e.g. elephants) and can't truly trot.



# THE AMBLE



# THE HIGH LEAD AMBLE

- The HIGH LEAD AMBLE is more common in large animals (e.g. horses, but is occasionally seen in medium to larger dogs)
- The walking gait is still a succession of hind-front couplets that alternate sides, but done at a higher speed – a high enough speed so that the animal doesn't tip from one side to the other.
- This gait has only a very brief and smaller triangular under support.

# THE HIGH LEAD AMBLE

