



GAIT EVALUATION

Dr. Andrea Finnen
MOVEH Neurology

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Gait Analysis

- EXTREMELY IMPORTANT!
- Take adequate time
- Walk outside the exam room
 - *Hallway*
 - *In a large room without furniture off leash*
 - *Outside*
 - *Non-slip flooring*
- SLOW! Slower gait will accentuate deficits
- Walk normally and with head elevated
- Take video if possible

Gait Analysis – WHO CARES?

- Differentiate between orthopedic and neurological causes
- Affects your localization and therefore your differential diagnosis list
- Affects your treatment plan and diagnostics
- Important for follow up and sequential assessments

- Gait is the most important test of proprioception!

What is Proprioception?

- Sensory system that detects the state of the position and the movement of the limbs and trunk in muscles and joints
- Information detected by mechanoreceptors
 - *Golgi tendon organs*
 - *Muscle spindles*
 - *Joint capsule*
- Transmitted by spinal nerve to spinal cord
- Spinal cord pathways ascend to cerebellum or cortex with various synapses and decussations
- Two pathways:
 - *Unconscious to cerebellum*
 - *Conscious to cortex (parietal, somesthetic sensory cortex)*

Gait initiation

- Upper motor neuron system is responsible for:
 - *Initiation of voluntary movement*
 - *Maintenance of muscle tone for support against gravity*
 - *Regulation of posture*
- Pyramidal and Extrapyramidal systems
- Pyramidal system is MUCH more important in primates
- Extrapyramidal system predominates in gait initiation in quadrupeds
 - *Recruit spinal reflexes for the initiation of voluntary movement*
 - *Recruit reflexes via central pattern generators (CPG) in the spinal cord*
- The Spinal Cord is made for Walking!

Ataxia

- Definition – in co-ordination, lack of awareness of position of limbs/body in space
- Types
 - *Proprioceptive – spinal cord, paresis is a major component (UMN)*
 - *Vestibular – staggering, head tilt*
 - *Cerebellar – exaggerated, spastic (lack of inhibition)*

Gait Analysis - Checklist

- Is the gait Normal or Abnormal?
- Is is 1 limb/2 limbs/all 4 limbs affected?
- Is there ataxia? If so what type?
- Is there lameness?
- Is there paresis?



Non Ambulatory

- Is there movement present?
- Can the patient stand or support weight?

Paw placement test

- Not a test of Conscious proprioception!
- Support the weight of the patient
- Slowly place the paw in an abnormal position
- Replacement should be rapid and appropriate
- If inconsistencies – retest at end of exam or test hopping

- Abnormal paw placement test = ?



Knuckling?

- Abnormal paw placement test = ?
 - *Spinal cord disease and mixture conscious/unconscious proprioceptive deficits*
 - *Thalamocortical disease and conscious proprioceptive deficit*
 - *Cerebellar disease and unconscious proprioceptive deficit*
 - *Severe pain (fracture)*
 - *Peripheral neuromuscular disease (LMN)*
 - *Severe tetraparesis from systemic weakness*
 - *Severe osteoarthritis*

Conclusions

- Don't forget or overlook gait evaluation – it is VERY important!
- Your DDx list will be more accurate if you can localize the lesion
- Take video
- Please don't call knuckling a CP deficit anymore!