Decerebrate rigidity and decerebellate rigidity: Anatomic basis of clinical signs.
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INTRODUCTION

• Spasticity is due to an imbalance in the pathways of the upper motor neuron system over the extensor muscles, so that excitatory tracts prevail over inhibitory. Decerebrate rigidity and decerebellate rigidity posturing are clinical signs of these imbalances.
• Decerebrate rigidity consists of a mesencephalic lesion that yields a disconnection between cerebrum and the rest of the brain and spinal cord.
• Decerebellate rigidity consists of a rostral cerebellar lobe lesion that yields a disconnection between Purkinje cells and the rest of the brain.

PURPOSES

GENERAL PURPOSE
• To analyze the imbalance leading to overactivation or overinhibition of motor tracts in domestic animals and culminates with spasticity.

SPECIFIC PURPOSES
• To analyze the main influence of motor tracts on alpha or gamma motorneurons.
• To propose the cause of hip flexion in decerebellate rigidity.

DECEREBRATE RIGIDITY

Opisthotonus
All limbs extended
Diminished mental status

Corticoreticular tract – cerebral motor cortex
Pontine reticulospinal tract – independent
Medullary reticulospinal tract – dependent
Dorsal root – abolished by dorsal root section

DECEREBELLATE RIGIDITY

Opisthotonus
Fore limbs extended
Hip flexed
Hind limbs flexed or extended
Normal mental status

Purkinje cell - rostral lobe of cerebellum
Vestibulospinal lateral tract
Dorsal root – not abolished by dorsal root section

HIP FLEXION

Cerebellar influences may be involved in postural stabilization. To do this, they maintain the neck slightly elevated, the fore limbs extended and the hip semi-flexed, compensating forwards deviations.

An exaggerated tone of these stabilizer muscles would result in opisthotonus, extension of the fore limbs and hip flexion, that is, the decerebellate rigidity.

The cause of hip flexion must be iliopsoas muscle contraction.

However, extrapolation of cerebellar somatotopy to single muscle contraction must be made with caution.

THE SPINAL STRETCH REFLEX

Dorsal root
Interneuron
Renshaw cell
MNγ
MNα
Muscle spindle
Agnostic muscle
Antagonistic muscle

CONCLUSIONS

DECEREBRATE RIGIDITY
• Increased extensor tone in all limbs is caused by a release of motorneurons from medullary reticulospinal tract inhibition due to a lack of cortical activation.
• Reticular formation tracts acts mainly on gamma motorneurons.

DECEREBELLATE RIGIDITY
• Increased extensor tone in fore limbs is caused by an excessive lateral vestibulospinal tract discharge on motorneurons due to a lack of Purkinje cells inhibition.
• Lateral vestibular tract acts mainly on alpha motorneurons.
• The hip is flexed due to iliopsoas muscle contraction.