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# Review of the Patellar Lock Mechanism in the Equine Passive Stay Apparatus

**Mushonga<sup>1</sup> B., Mbiri<sup>1</sup>, P., Samkange<sup>1</sup> A., Bishi<sup>1</sup>, A., Chitate<sup>1</sup> F., Madzingira<sup>2</sup> O  
and Kandiwa<sup>1</sup> E.**

**<sup>1</sup>School of Veterinary Medicine**

**Faculty of Agriculture and Natural Resources**

**Neudamm Campus**

**University of Namibia**

**Namibia**

**<sup>2</sup>Department of Animal Health**

**School of Veterinary Medicine**

**Faculty of Agriculture and Natural Resources**

**Katima Mulilo Campus**

**Ngweze Township**

**Katima Mulilo**

# Objectives

- To answer the question: Is the patellar lock mechanism a completely passive process?

# Background



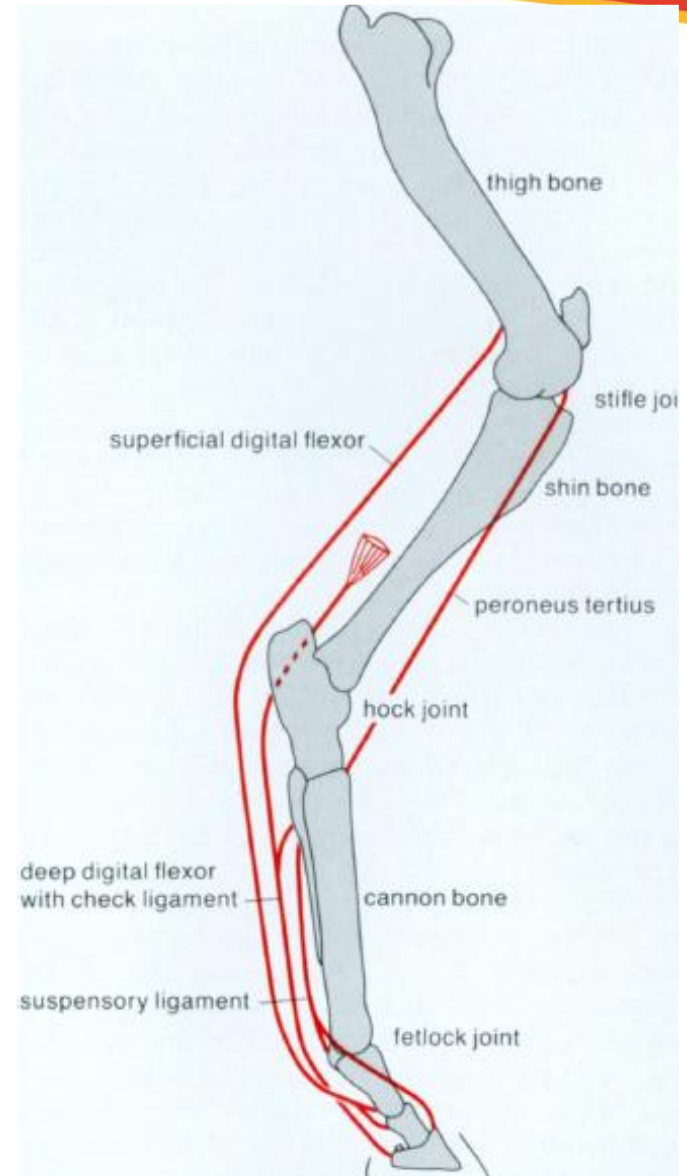
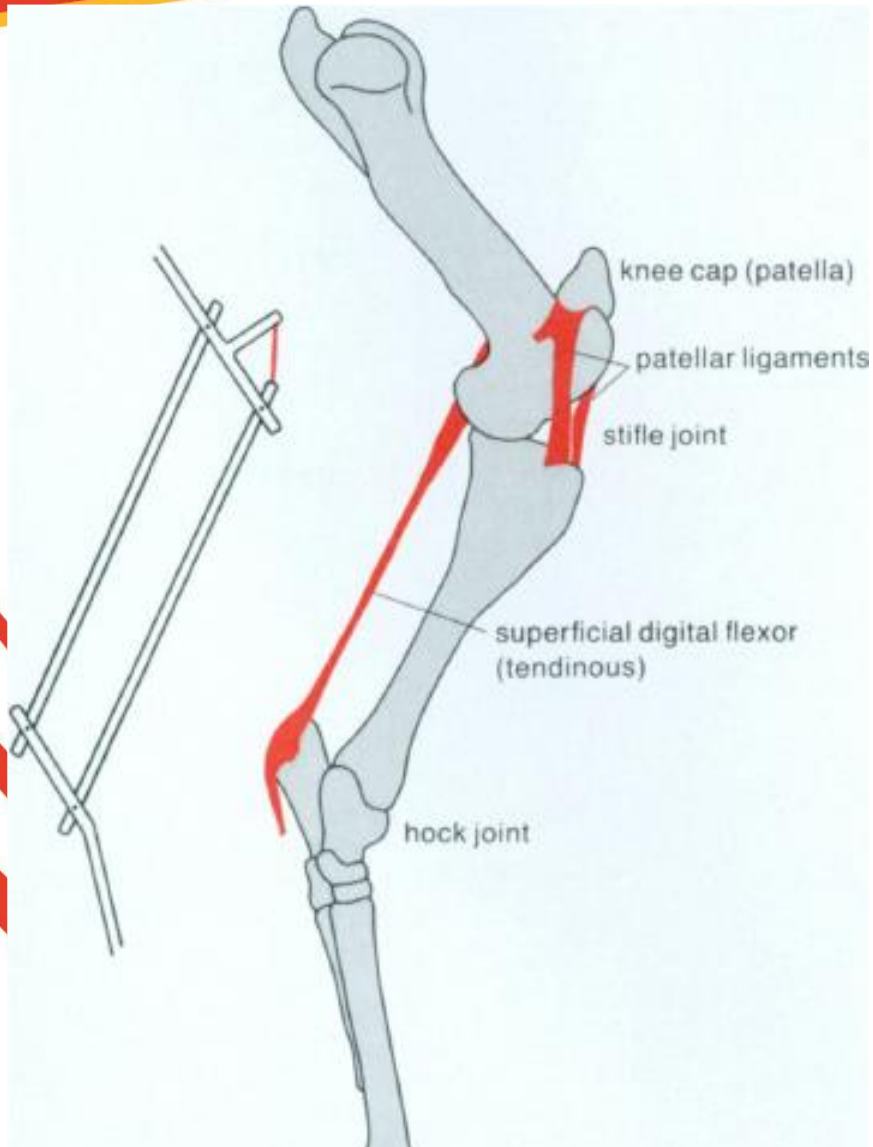
- Horses capable of standing most of the day
- They do not normally lie down to sleep
- Thanks to the passive stay apparatus
- It comprised of ligamentous elements that fixes its joints with limited muscle effort

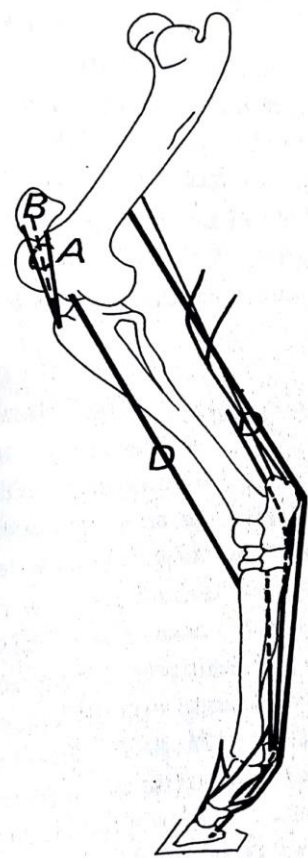
# Components of the passive stay Apparatus

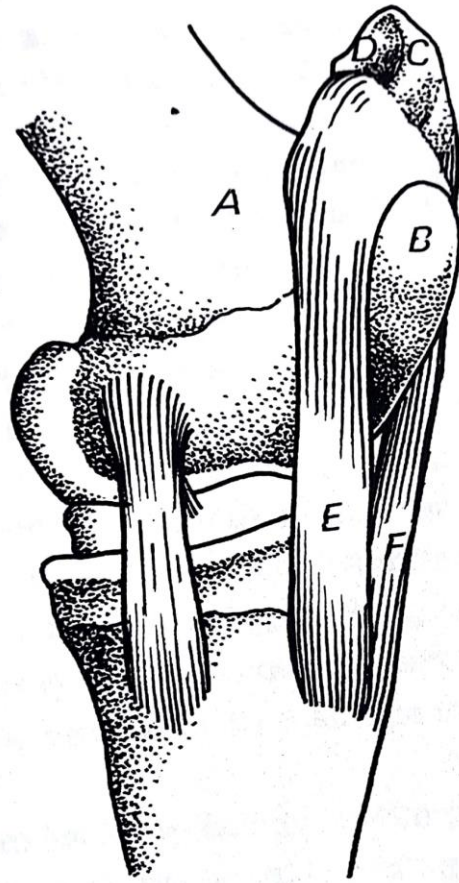
- Forelimb 60% of the weight
- Hindlimb 40% of the weight

# Hindlimb passive stay apparatus

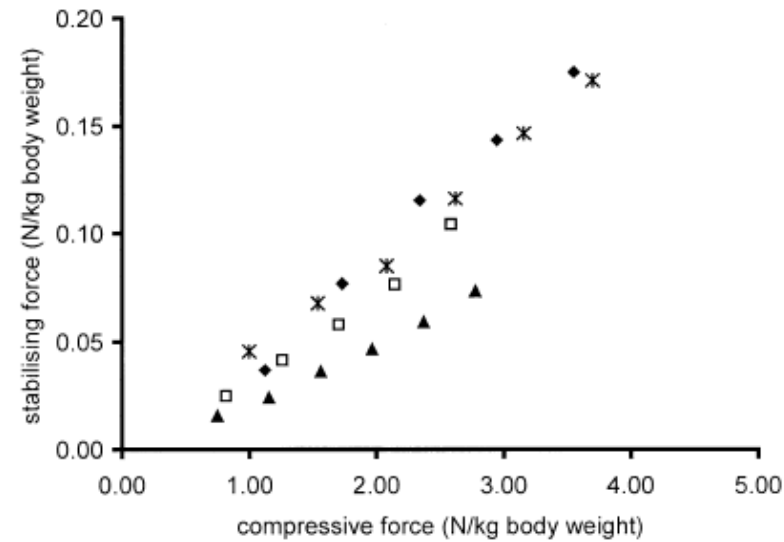
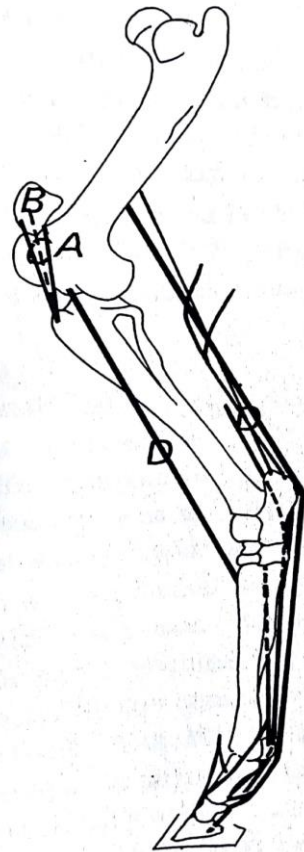
- Patellar lock mechanism
- Reciprocal mechanism







# Loading Experiments





L

R + L



# Discussions


- Loading experiments with Isolated hindlimbs shows a mathematical relationship between load and effort required to keep patella in locked position
- The general direction of loading force fits that of the *rectus medialis*
- There is limited tonal EMG activity in the *rectus femoris*, *vastus intermedius* and *vastus lateralis* muscles during the patellar lock phase
- There is EMG activity in the *vastus medialis* during the lock phase

# Conclusions

- The patellar lock mechanism is not a passive process
- Muscle effort is required to keep the patellar in the locked position
- There is EMG activity in the *vastus medialis* and *sartorius* during quiet standing
- Contraction of these muscles is responsible for patellar lock

# Conclusions



- The patellar lock mechanism is definitely an active process utilizing much less energy than the horse would without it
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Thank You