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

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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
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 \textit{vastus medialis} and \textit{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


Thank You