

Abstract Submitted  
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**Extremely high paw accelerations during paw shake in the cat:  
A mechanism revealed by computer simulations** ALEXANDER KLISHKO,  
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RATION — Paw shake response is a reflex aimed at removing an irritating stimulus  
from the paw by imparting to it high periodic accelerations ( $\geq 10$  g). These values  
seem too high to be produced by distal muscles exclusively. According to Prilutsky  
et al. (2005), resultant hip moments during paw shake are much greater than distal  
joint moments, whereas distal joint velocities and accelerations exceed those of the  
proximal joints. The goal of this study was to examine how proximal hip muscles  
could contribute to high paw accelerations. Using software AnimatLab, we devel-  
oped a 2D model of the cat hindlimb consisting of 5 rigid segments with 4 hinge  
joints and 11 muscles spanning all joints. The muscles were assumed passive except  
for those crossing the hip. When in simulations the hip muscles were reciprocally  
activated to periodically flex and extend the hip joint with a typical paw shake  
frequency of 10 Hz, the hindlimb segments demonstrated motion resembling exper-  
imental observations: linear and angular velocities and accelerations of the distal  
segments exceeded several fold the values of the proximal segments. Simulated paw  
shake revealed features of a whip-like motion.

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