

## Quantitative Behavioral Analysis of Jumping in Mice

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Movement is at the center of how organisms interact with their environments, but it is not well understood how the CNS encodes the information for these movements. We have developed a multi-dimensional, quantitative method of behavioral analysis to characterize limb movements in mice and ultimately better understand the neural basis of movements. We trained mice to jump across a gap between platforms. During this behavior, we recorded high-speed video from multiple angles to allow for 3-dimensional tracking and kinematic analysis with DeepLabCut. These kinematic parameters were used to classify the jump into different phases of movement. Concurrently, we recorded electromyography from 4 hindlimb muscles. We found that maximal extension of the hindlimb joints occurs in the propulsive phase which also showed robust and reliable activation of muscles on EMG. Additionally, the extensor muscles are active for a greater duration on average than the flexors. Finally, we found that the tibialis anterior muscle, which is involved in dorsiflexion of the foot, is activated in the later stages of the jump.