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Abstract（Yoshiaki Tsuboi）

Neonatal brain injury during gait development disrupts neural circuits and causes permanent gait dysfunction. Rehabilitation as an intervention to improve impaired gait function has been used in adults as a treatment for stroke and spinal cord injury. However, although neonates have greater neuroplasticity and regenerative capacity than adults, normal gait development and the effects of habilitation on gait function following neonatal brain injury are largely unknown. In this study, we generated cryogenic injury in mice at postnatal day 2 and subsequently performed habilitative training to promote autonomous limb movement for 4 weeks. We also quantitatively analyzed the gait acquisition process in developing mice using the Catwalk XT system. Using quantitative gait analyses, we showed that during normal gait development in mice, stance phase function matures later than swing phase function. We also demonstrated that habilitation in which active limb movements were enhanced by suspending mice with a rubber band with no floor grounding promotes motor learning, including gait function, in mice with impaired acquisition of gait function resulting from neonatal brain injury. Our findings provide a basis for research on gait development in mice and suggest new habilitation strategies for patients with impaired gait development caused by perinatal brain diseases such as hypoxic–ischemic encephalopathy and periventricular leukomalacia.