

## Neural Control of Dexterous Manipulation

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Sensorimotor hand function can be described as a multidimensional space where mechanical, neural, and cognitive factors interact to enable a rich repertoire of actions – from skilled manipulation and playing musical instruments, to perceiving properties of our environment through exploratory procedures. Within this repertoire of actions, dexterous object manipulation is a hallmark of human evolution. Co-adaptation of anatomical features and sensorimotor control mechanisms have made dexterous manipulation an effective means of interacting with the environment. Humans' ability to perform dexterous manipulation has also inspired research efforts aiming at building dexterous robotic and prosthetic hands, and devices for rehabilitation of hand function. I will review insights gained by combining multiple research approaches – e.g., biomechanics, electrophysiology and neuromodulation – to understand sensorimotor control of dexterous manipulation and underlying neural mechanisms. This work has led to a revised conceptual framework accounting for humans' ability to manipulate objects by integrating high-level task representations and flexible modulation of digit forces to variable position.