Since the 1970s, tendon-transfer surgeries have been routinely performed for a variety of conditions such as stroke, paralysis, spinal atrophy, trauma, and birth defects. The surgery involves rerouting a tendon from a disabled muscle and directly suturing it to a functioning muscle in order to partially restore hand function. This direct suture between the donor muscle and the recipient tendons directly couples the movement of all the joints actuated by the recipient tendons, leading to reduced hand function in physical interaction tasks such as grasping, a key aspect for activities of daily living. The tendon-transfer surgery for high median-ulnar palsy is used as an example as a new approach to tendon-transfer surgery, where implanted passive engineering mechanisms are used to attach the donor muscle to the recipient tendons. This thesis provides evidence through cadaver studies to support the hypotheses that hand function is improved through increased adaptive finger movement, reduced donor muscle actuation force, lower required grasped object and finger forces on the object will be balanced.

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3:00pm, Rogers 226