In this study, a finger exoskeleton is designed and its operability is investigated for patients with reduced or completely lost hand functionality due to disorders such as paralysis, seizure, etc. The designed system and produced prototype is intended for the rehabilitation periods with active and passive support. An easy to shape, reshape polymer was used as the body and limb material during the design of finger exoskeleton. The design is an underactuated 3-joint finger exoskeleton driven by a single motor. A mini servo motor was used to drive the designed finger exoskeleton and the prototype was designed for the index finger. 3 different angles (20°, 27.5°, 35°) of the initial drive cable were specified for the flexion movement and angular changes of the fingers were determined during the movement for each angle. Exoskeleton was operated on 2 male and 2 female volunteers. The flexion movement provided by the prototype and the natural finger flexion movement were compared, and the angular changes during the flexion movement of fingers were measured using a camera. After the measurements the suitable drive cable angle of the exoskeleton was found as 27.5°, and the resulting flexion movement was found to converge to natural hand movement at a rate of 23% for two females, whereas the suitable drive cable angle of the exoskeleton was found as 35°, and the resulting flexion movement was found to converge to natural hand movement at a rate of 24% for two males.