Stroke is the second leading cause of death and a leading cause of adult disability worldwide. The stroke survivors require post-stroke rehabilitation. However, the increasing number of stroke survivors causes therapists to experience a heavy workload and provide poor quality rehabilitation. This study aims to develop a wearable hand rehabilitation robotic hand to assist hemiplegic patients to achieve task-oriented training specifically for grasping objects. In order to ensure safety training procedures, the interaction between human and robot is necessary. We design a lightly hand exoskeleton structure and use impedance control to achieve the safety training procedure.