Following a stroke many people have a complex and varied pattern of motor and functional impairment in the hemiplegic upper extremity. Weakness of the anterior deltoid or triceps brachii often impairs ability to reach away from the body in order to position the hand to grasp and manipulate objects. The aim or rehabilitation is to promote functional recovery through the facilitation of motor control and skill acquisition. The importance of upper limb function to independence is reflected in measures such as the Barthel ADL Index where the ability to reach is required for over 50% of the activity of daily living tasks. Despite this recognised importance, the current prognosis for upper limb recovery following stroke remains poor. Roughly half of all acute stroke participants starting rehabilitation will have a marked impairment of function of one arm, of whom only about 14 percent will regain useful upper limb function. Consequently there is a clear need to improve the effectiveness of treatments. Research into conventional therapy and motor learning theory provides evidence that intensity of practice of a task, variety and feedback are important. This knowledge is being applied in novel treatments such as robotic therapy which provide the opportunity for repetitive movement practice. This lecture will describe recent research at Southampton that has shown how iterative learning control can be used in this area. This will include the design of the robotic system, the modelling of the human arm required for control law design together with some conclusions from trials with stroke patients. Finally, some areas for future research will be briefly discussed.