Studies of not selected stroke patients have demonstrated that within 1 week of stroke 68-88% are dependent in some aspects of ADLs and mobility. At 6 months the percentage of survivors needing some help is 40.53% and at 1 year 33%. (Kotila, Waltimo et al. 1984; Dombovy, Basford et al. 1987); (Wade and Hewer 1987).

Although rehabilitation intervention is important during the acute phase of care, it is secondary to the activities involved in diagnosis and acute medical treatment. However, when a patient has a persisting major continuing impairment such as hemiplegia with disabilities, the rehabilitation components of care quickly become the main focus of management.

The rehabilitation program may be offered in different settings, such as an acute impatient rehabilitation unit, a subacute rehabilitation inpatient unit, outpatient centre or home care. Patients who require only minor degrees of assistance in self-care and mobility would be suitable for outpatient therapy or a home care program. As the saying goes, “there’s no place like home”.

The recovery of upper limb is the more severe problem for ictus involving the 85% of patients. After 6 months the percent of patients with problem for upper limb accont for 55 to 75% (Wade, Langton-Hewer et al. 1983), Parker 1986, (Olsen 1990). An analitical study of Nakayama, in over 100 patients the group with partial damage of upper limb had a good functionality in 56% of patients at discharge from the rehabilitation setting (Nakayama, Jorgensen et al. 1994). For the patient with a complete paresis only the 16% recovered. In another paper Wilkinson, showed that the 56% of patients showed a paresis after 5 years (Wilkinson, Wolfe et al. 1997).

The neurological recovery after stroke is in two different, but related, ways.

- A reduction of neurologic impairment can result from spontaneous natural neurologic recovery, from the effects of treatments that limit the extent of the stroke, or from other interventions that enhance neurologic functioning.
- Improved ability to perform daily functions within the limitations of their physical impairments. A patient may regain the capacity to do the activities of daily living (ADL) such as feeding, dressing, bathing, and toileting, even if some degree of residual physical impairment remains. The ability to perform these tasks can improve through adaptation and training in the presence or absence of natural neurologic recovery, thought to be the element of recovery on which rehabilitation exerts the greatest effect.

The normal pattern of recovery of upper limb pass through the movement synergies:
Firstly appear the flexor synergy :

- Shoulder flexion > elbow flexion > finger and wrist flexion > shoulder adduction/internal rotation
- Clinically, flexor synergy also can present as scapula retraction/elevation, shoulder abduction (90°)/external rotation, elbow flexion (acute angle), and forearm supination (full range).

Later on apper the upper limb extensor synergy:

- Shoulder > elbow > wrist/finger extension
- Clinically, extensor synergy presents as scapula protraction, humerus flexion/internal rotation, elbow extension, and forearm pronation.

A key aspect of neuroplasticity that has important implications for rehabilitation is that the modifications in neuronal networks are use dependent. Animal experimental studies and clinical trials in humans have shown that forced use and functional training contribute to improved function (Liepert, Miltner et al. 1998; Miltner, Bauder et al. 1999; Taub, Uswatte et al. 1999; Liepert, Bauder et al. 2000).
Recent advances in the control of movement demonstrate that there is a strong between the perceptive and motor systems. Rizzolatti defines these connection fronto-parietal functional units basis for motor control (Rizzolatti and Luppino 2001). The system is characterized by specific circuits codified for different modality. There are groups of neurons responsible for force and for direction correlated with ocular movement (Rizzolatti, Fadiga et al. 1997; Fogassi, Gallese et al. 2001).
Some systems are involved in the three-dimensional transformation of the movement of upper limb and another system that transforms “mirror movement” observed in other subjects (Fadiga, Fogassi et al. 2000).
This sensitive-motor integration suggests that the movement is not generically facilitated but it is particularly induced also from the contextual condition.