

**Disorder:** Stroke

**Essay title:** Stroke recovery

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## **Stroke**

Stroke is defined as, “rapidly developing signs of focal (or global) disturbance of cerebral function, lasting longer than 24 h (unless interrupted by death) with no apparent non-vascular cause”. It is caused by interruption of the blood supply by either occlusion (ischemic stroke) or rupture (haemorrhagic stroke) of a blood vessel in the brain<sup>1</sup>. If not restored through special clot busting drugs (ie. recombinant tissue plasminogen activator, tPA) or surgery to repair ruptured blood vessels, this interruption in blood flow can result in cells in the brain dying. These important cells called neurons communicate with other parts of our brain and nerves within our body. These neurons play a very important role in enabling our brain to work properly and ultimately allow us to move about, react to our environment and maintain fulfilling relationships with other people.

Stroke can cause serious disability and in some circumstances, death. Each year worldwide, 15 million individuals suffer strokes, from which 5 million die and 5 million survive but do so with impairments causing permanent disability<sup>2</sup>. In Australia in 2011, there were estimated to be approximately 60 000 individuals who had their first ever stroke and 17 000, a recurrent stroke<sup>3</sup>.

One in five Australians suffering their first-ever stroke die within the first month, and one third die within the first year<sup>3</sup>. In the majority of instances a stroke victim survives but is left with significant neurological impairments<sup>4</sup>. Stroke affects a wide array of body functions and structures, which can possibly limit a stroke survivor’s capacity to participate in many everyday activities (ie. housework, preparing a meal, showering and dressing), as well as leisure and social activities they enjoyed doing prior to their stroke. They can have problems (i) chewing their food and swallowing, (ii) moving their arms, hands and legs (eg. walking is often difficult after a stroke), (iii) sensing being touched on the skin, sensing hot and cold or being touched with sharp or blunt objects (iv) talking or understanding others who speak to them (v) with their eyesight and (vi) thinking clearly, problem solving or remembering things which happened recently (ie. short term memory)<sup>5</sup>.

# Stroke Rehabilitation

## *Acute management*

At the individual level, advances in the acute and recently the hyper-acute<sup>6</sup> management (eg. reducing transport time to hospital) of stroke have been shown to be highly effective in reducing the incidence and impact of stroke-related deaths and disability. One of the most influential interventions has been the use of thrombolysis in ischemic stroke. Recombinant tissue plasminogen activator (r tPA)<sup>7,8</sup>, which is an anti-clotting agent used to re-establish blood flow in an clot occluded blood vessel, is the most cost effective acute intervention for stroke. However the window of effectiveness (time post-stroke) is very narrow<sup>9,10</sup>. Unfortunately, access to this therapy is less than ideal, with only 7% of Australians presenting with ischemic stroke receiving r-tPA<sup>11</sup>.

When administered within the first 4.5 hours post-stroke, tPA has been found to reduce the level of death and disability at three to six months post-stroke<sup>12,13</sup>. Other effective stroke therapies include: stroke units<sup>14</sup>, aspirin<sup>15</sup> and hemicraniectomies<sup>16,17</sup>. Stroke units are hospital wards which are totally dedicated to the management of stroke patients in the first days following stroke. These wards are staffed with medical staff and allied health professionals experienced in delivering medical care for stroke survivors. Compared to general medical wards, only 20 stroke patients need to be treated in a stroke unit in order to prevent one survivor from failing to regain independence<sup>18</sup>. Aspirin is a drug used commonly to reduce pain, inflammation and fever, but is also effective in thinning the blood. A hemicraniectomy describes a procedure in which part of the skull is removed and is used to relieve pressure within the skull which arises from swelling of the brain. Hemicraniectomies are sometimes required after stroke due to such swelling. The number of stroke survivors needed to treat for benefit is 79 for aspirin<sup>19</sup>, 2 for a hemicraniectomy<sup>20</sup>.

Despite access to these effective therapies during the acute phase of their stroke recovery, the majority of stroke survivors still require ongoing input from health professionals to maximise their functional recovery. If health services are available, their post-stroke disability is mild to moderate and social support is adequate, they will often return home and receive their ongoing rehabilitation as an outpatient. Inadequate social supports and or high levels of dependency due to severe physical and or cognitive (thinking) impairments require a large number of these survivors to be transferred to a rehabilitation unit to undergo inpatient stroke rehabilitation. Approximately one third of those admitted to Australian hospitals for acute management of their stroke receive formal inpatient rehabilitation in either a stroke specific or mixed rehabilitation unit<sup>11</sup>. The average age of a stroke survivor undergoing rehabilitation in these units is 76 years and the average number of days spent in inpatient rehabilitation is 24<sup>21</sup>.

## *Inpatient rehabilitation*

Rehabilitation directed by the multi-disciplinary team, comprised of medical, nursing and allied health professional skill, aims to provide those with loss of function or ability due to injury or disease with the greatest possible level of functional independence. This is achieved through management and treatment based on individual assessment and regular review<sup>22</sup>. Rehabilitation specific to stroke (stroke rehabilitation) has been shown to reduce the likelihood of death and long term dependency of stroke survivors<sup>23</sup>.

Stroke rehabilitation provides the opportunity for: strengthening, improvement of co-ordination, retraining of speech and cognitive (ie. thinking) functions, prevention of secondary complications (shortened muscles and chest infections), retraining of activities of daily living and personal care such as cooking, dressing, bathing and continence and other self-care behaviours. When reacquisition of such skills is unsuccessful, compensatory strategies are taught<sup>24</sup>. It is recommended that 'rehabilitation' should commence as soon as the stroke survivor is medically stable<sup>18</sup>. For some it can continue formally in the following months in an inpatient and outpatient setting, or informally for many years after stroke onset in the home environment.

The health professionals involved in the formal process of stroke rehabilitation may include: rehabilitation physicians, nurses, physiotherapists, occupational therapists, social workers, speech therapists, dieticians and in some cases psychologists. This multi-disciplinary team works in conjunction with the stroke survivor and family in the formulation of goals aimed at facilitating independence<sup>5</sup>.

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