



## PHYSICAL ACTIVITY AFTER STROKE

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### Abstract

*Exercise and physical activity are useful tools in the rehabilitation and the functional recovery of patients who have suffered a stroke.*

*Physical activity goals and exercise prescription for stroke survivors need to be customized for the individual to maximize long-term adherence. Physical inactivity after stroke is highly prevalent. The assessed body of evidence clearly supports the use of exercise training (both aerobic and strength training) for stroke survivors. Exercise training improves functional capacity, the ability to perform activities of daily living, and quality of life, and it reduces the risk for subsequent cardiovascular events or another stroke.*

**Keywords:** *physical activity, stroke.*

**JEL classification:** I0, Z20

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### 1. Introduction

Stroke is a leading cause of mortality and morbidity worldwide. „ROMANIA ranks 3rd in Europe, after Bulgaria and Macedonia, both in the incidence of stroke and secondary cerebrovascular disease mortality.

Concerned is the fact that the incidence of stroke increased among the age category under 30 years of age. Currently, over 31% of all stroke patients aged 20-64 years compared to 25% in 1990. In Romania, cerebrovascular mortality cause in people over 65 years is 1276 patients / 100,000 inhabitants compared to other European countries where it is less than 300 patients / 100,000 inhabitants”<sup>2</sup>.

In addition to widely applicable pharmacological treatment for acute stroke, effective prevention and rehabilitation strategies are crucial. The development of such strategies is a major challenge for the 21st century medicine. Stroke remains a leading cause of long-term disability. Consequently, stroke survivors are often deconditioned and predisposed to a sedentary lifestyle that adversely impacts performance of activities of daily living, increases the risk for falls and may contribute to a heightened risk for recurrent stroke.

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<sup>2</sup> Serb, Daniela, 2014



## 2. Content

A stroke is when poor *blood flow* to the *brain* results in *cell death*. There are two main types of stroke: *ischemic*, due to lack of blood flow, and *hemorrhagic*, due to bleeding. They result in part of the brain not functioning properly. Signs and symptoms of a stroke may include an *inability to move or feel* on one side of the body, *problems understanding or speaking*, *feeling like the world is spinning*, or *loss of vision to one side*. The main risk factor for stroke is *high blood pressure*.<sup>[4]</sup> Other risk factors include *tobacco smoking*, *obesity*, *high blood cholesterol*, *diabetes mellitus*, previous TIA, and *atrial fibrillation*. An ischemic stroke is typically caused by blockage of a blood vessel, though there are also less common causes. A hemorrhagic stroke is caused by either *bleeding directly into the brain* or into the *space between the brain's membranes*.<sup>3</sup>

### *PHISYCAL ACTIVITY and STROKE*

He role of physical activity in the prevention of stroke is of great interest due to the high mortality and significant impact of stroke-related morbidity on the individual and on healthcare resources. The use of physical activity as a therapeutic strategy to maximise functional recovery in the rehabilitation of stroke survivors has a growing evidence base.

„Exercise and physical activity have an increasing evidence base in the primary and secondary prevention of stroke and in stroke rehabilitation. The interface between physical activity and cerebrovascular disease is complex and of broad interest to clinicians, therapists, and epidemiologists. The importance of the relationship is becoming clearer: physical inactivity has been implicated by the INTERSTROKE study as one of the 5 key risk factors which account for more than 80% of the global burden of stroke. Physical fitness training is increasingly being recommended as a component of stroke rehabilitation programmes due to the emerging body of evidence surrounding the benefits in improving the function after stroke”<sup>3,4</sup>

Hypertension is recognised as the most important modifiable risk factor for both ischaemic and haemorrhagic stroke. A strong and well-recognised relationship exists between blood pressure and stroke risk. Physical activity is associated with reductions in blood pressure and in the risk of developing hypertension in healthy normotensive individuals, thus positively altering a major contributor to stroke risk. Also exercise helps to prevent obesity, hypertension, dyslipidaemia, and the development of type 2 diabetes, all of which are implicated in the pathogenesis of stroke.

„ Stroke is a preventable disease, and control of modifiable risk factors plays the major role in prevention strategies. There is substantial, consistent evidence from numerous, high quality studies that higher physical activity levels

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<sup>3</sup> Wikipedia, Stroke

<sup>4</sup> [Gallagher](#), 2011



are associated with significantly lower risk of stroke, and this evidence suggests that physical activity has a protective benefit in stroke prevention beyond the traditional stroke risk factors. With the high prevalence of physical inactivity in the general population, increasing physical activity levels could have a significant effect on reducing stroke incidence”<sup>5</sup>

„Approximately 30% of strokes are recurrent in nature. Stroke and acute cardiac events have a higher incidence in patients with previous stroke than in the general population. The specialists recommendations encourage targeting modifiable risk factors, such as physical inactivity, to decrease the frequency of recurrent events. At present there is very limited long-term followup available examining physical activity levels and recurrent events in stroke survivors”<sup>6</sup> There is a general consensus that a potential stroke risk reduction may exist for stroke survivors who participate in regular physical activity.

Physical activity and exercise have the potential to positively influence multiple physical and psychosocial domains after stroke.

Physical activity is defined as all human movement produced by the action of skeletal muscle that substantially increases energy expenditure. Physical activity is essential for improving and maintaining physical fitness. Exercise is a subset of physical activity that is planned, structured, and repetitive and is performed deliberately with the intention of improving physical fitness. Key indices of physical fitness include cardiorespiratory fitness and muscle strength and power; these determine our capacity to perform and tolerate physical activity.<sup>7</sup>

Immediately after an acute stroke, the first goals during poststroke rehabilitation relevant to physical activity and exercise are aimed at preventing complications of prolonged inactivity, regaining voluntary movement, and recovering basic activities of daily living. Recovery can be initiated 48 hours after stroke, as long as the patient is in a stable condition. Under careful medical supervision, he is encouraged to get out of bed and even take some steps.

„Once the patient is medically stable, the next goal is to initiate an exercise training regimen designed to regain (or exceed) prestroke levels of activity as early and as much as possible. Such activities typically occur within inpatient rehabilitation units or supervised community or home settings. Physical and occupational therapy is initiated to improve motor recovery (ie, gait, upper extremity function, balance, and muscle strength), motor skills, efficiency in self-care, and occupational and leisure-time activities.”<sup>8</sup>

The third set of goals after stroke rehabilitation is designed to facilitate the stroke survivor to develop and maintain an active lifestyle that meets recommended physical activity and exercise guidelines for prevention of recurrent stroke and cardiac events, as well as to maintain or improve physical function.

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<sup>5</sup> Howard, 2015

<sup>6</sup> [Gallanagh](#), 2011

<sup>7</sup> Saunders, 2014

<sup>8</sup> Billinger, 2014



Aerobic training modes for stroke survivors may include leg, arm, or combined arm-leg ergometry at the appropriate intensity. The recommended frequency of training is  $\geq 3$  days per week, with a duration of 20 to 60 minutes per session depending on the patient's functional capacity. Structured exercise interventions should be complemented by an increase in daily lifestyle activities (eg, walking breaks at work, gardening, household chores) to improve fitness and move patients out of the least fit.

Upper limb motor impairments are common and persistent. Upper limb rehabilitation interventions may be delivered by combining a range of treatment modalities. These include active, repetitive interventions involving voluntary movement. Balance and mobility are affected, so, exercise involving walking, with or without resistance training, improves walking speed and also indices of balance.

Type of physical activity

It is good to choose an activity that increases the heart rate, for example:

Gentle activities like:

- walking to the shops
- taking the stairs instead of the lift
- walking the dog
- doing some gardening or housework
- taking a walk at lunchtime
- getting off the bus a stop early and walking the rest of the way
- yoga, tai chi or pilates.

Active exercise like:

- ✓ jogging
- ✓ swimming
- ✓ cycling
- ✓ going to the gym
- ✓ playing a team sport
- ✓ joining an aerobics class
- ✓ dancing.

Age, general health, and current level of activity will affect the type of exercise.

Physical activity improves heart function and lipid profile by lowering total cholesterol. It lowers blood pressure and resting heart rate. Being active reduces the risk and severity of diabetes by increasing insulin sensitivity, and it improves strength, balance, endurance and *long-term brain health*. For stroke survivors, these benefits can spell the difference between dependence and independence.

In addition to those physical benefits, exercise can enhance self-confidence and independence and reduce depression and anxiety.



## Conclusions

- Current stroke rehabilitation guidelines are generally centred around physiotherapy and occupational therapy regimens and are often focused on decreasing disability from stroke-induced impairment, to encourage patient independence as much as possible. The extent these programmes improve aerobic fitness is unclear, and experimental data have been inconsistent.
- Participation in regular physical activity can be beneficial to patients who have had a stroke. Aerobic training has been shown to enhance physical fitness and reduce cardiovascular risk factors in stroke patients who are generally less physically active than age-matched counterparts, and physical activity guidelines now recommend dedicating more time to aerobic activity as part of stroke rehabilitation programmes to optimise cardiovascular and cerebrovascular benefits and reduce the risk of recurrent events.
- In order to maintain the cardiovascular benefits and stroke risk reduction associated with exercising, patients must continue to participate in regular physical activity.
- Exercise is a very valuable yet underused component of poststroke care. The evidence strongly supports the benefits of physical activity exercise for stroke survivors. With education in and encouragement for the benefits and safety of exercise after stroke, and with development of appropriate programs in hospitals and in communities, the ability to recruit patients to these programs should increase

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