

# AEROBIC EXERCISE TRAINING AND QUALITY OF LIFE IN STROKE PATIENTS

HAMZAT TK, Ph.D (Neuro-physiotherapy) Ib.

Department of Physiotherapy, College of Medicine, University of Ibadan

## ABSTRACT

*There is an increasea appreciation of the need to include endurance exercise training in the overall management of stroke victims by the physio-therapist. Raising the patient's level of physical fitness through aerobic exercise would help to reduce the incidence of secondary health conditions, such as obesity, hypertension; and depression, which may result from the patients reduced mobility. This paper discusses the role of exercise in improving the quality of life of stroke victims. It also highlights the type of exercise that may be used to achieve this goal.*

---

**Key words:** stroke, quality of life, exercise training

---

## INTRODUCTION

Stroke has been defined as an acute focal or global disturbance of cerebral and other intracranial neuronal functions of presumed vascular origin, with some level of disability lasting more than 24 hours or resulting in death. It includes subarachnoid haemorrhage, intra-cerebral haemorrhage and cerebral ischaemic necrosis, but excludes transient ischaemic attack, sub-dural and extradural haematomas.<sup>1</sup> The signs and symptoms

in stroke correspond to the involvement of focal areas in the brain. Cerebrovascular accident is the third commonest neurological disease in black Africans, after infections and epilepsy in that order.<sup>2</sup> It is also the third commonest cause of death after coronary artery disease and cancer in developed countries.<sup>3</sup>

Disability in stroke patients who present with varying degrees of handicap presents a formidable challenge to the medical professionals who are involved in their management and general rehabilitation. The special project report of the WHO<sup>4</sup> predicted that stroke will continue to be a major problem demanding increased and focused attention of everyone interested in health care delivery. The overall aim in the management of a stroke victim is the complete restoration of the disabled person to his full physical, psychological and social capability. Rehabilitation should commence immediately, starting with the acute phase to sequelae.<sup>5</sup> The role of the physiotherapist is to enhance recovery by preventing complications, promoting intrinsic recovery, teaching adaptive strategies and facilitating interaction with the environment.<sup>6</sup>

During the recovery period from stroke, early intervention with emphasis on task specific treatment procedure<sup>7</sup> has been reported to enhance a more rapid recovery. This is based on the

observation that **task-specific** treatment procedures produce greater gains than merely early intervention and conventional physiotherapeutic procedures, that do not focus on specific tasks (such as ambulation) but focus on neuro-physiologic techniques.<sup>7</sup> The type of treatment procedure(s) or modalities employed in stroke management depends on the clinical findings and aims of the treatment plan. Exercise therapy, using different approaches described by Bobath, Kabat and Voss,<sup>8</sup> has remained one of the most important tools in stroke rehabilitation

### **HEALTH-RELATED QUALITY OF LIFE IN STROKE PATIENTS**

The neurologic, cognitive and behavioural sequelae of stroke can lead to a considerable degree of physical disability. This necessitates social adjustment in stroke victims, especially those who are unable to carry out the activities of daily living unaided.<sup>4</sup> The debilitating effects of stroke on the patient may lead to secondary health conditions. The secondary health conditions affecting people with disabilities, such as stroke victims, include osteoporosis; osteoarthritis; decreased balance, strength, endurance, flexibility and fitness; increased spasticity; weight problems; depression; and other health conditions.<sup>9</sup> Exercise conditioning programmes that promote health have been recognized as capable of modifying each of these medical conditions. Physical exercise has also been identified as a preventive health behaviour often employed as a strategy for good health.<sup>10</sup> Very little attention is paid, however, to promoting good health in people with physical disabilities, secondary to stroke. Rather, emphasis is usually placed on medical rehabilitation with little attempt at meeting the health care needs of such people after they are discharged from

rehabilitation centres.<sup>11</sup> This could be due to the outdated definition of health as the absence of disease. The idea of promoting healthy living was to prevent disease and disability in the healthy and did not apply to the treatment of the sick and disabled.

One of the objectives of a health-promotion programme for people with physical disabilities is to reduce secondary health problems like hypertension and pressure sores, to provide an opportunity for leisure and enjoyment, and to enhance the overall quality of life by reducing environmental barriers to good health.<sup>11</sup> Health-related quality of life issues include physical, functional, psychological, emotional and social well-being.<sup>13</sup> The more people with disabilities can do for themselves, either on their own or with a personal care assistant, and technological devices, the better their quality of life.<sup>14</sup> Only about half of stroke survivors are independent six months post-stroke, and their quality of life is diminished.<sup>15</sup> It has therefore been argued by Clark and Smith<sup>16</sup> that improving the stroke victim's awareness of and involvement in a health promotion programme, after the cerebrovascular accident, may help their prospects for recovery and improve the quality of their lives.

### **HEALTH PROMOTION EXERCISE TRAINING IN STROKE PATIENTS**

The impact of physical activity on people with physical disabilities has been highlighted by Shephard.<sup>17</sup> The benefits include improvement in self-esteem and self-efficacy, perceived improved health, and ability to perform daily activities. Physical activity is an umbrella term which includes many other concepts such as fitness, exercise training and conditioning. The major components of a fitness programme for people

with disabilities are the same as for the general population and these include cardio-respiratory endurance, muscular strength and flexibility. However, the types, intensity, frequency and duration of activities<sup>18</sup> used to improve fitness may vary.

Endurance (aerobic) exercise training is increasingly recognized by some rehabilitation experts as an important component of stroke rehabilitation. Evidence is also accumulating in the literature to show the beneficial effects of aerobic exercise training for stroke victims. An average improvement in maximal oxygen consumption of 13.3% in stroke patients who participated in a 10-week aerobic exercise training programme was reported by Potempa et al.<sup>19</sup> They concluded that the potential benefits of aerobic exercise training cannot be overemphasized. Repeated physical exercise is also believed to boost the immune system, especially T-cell functions which help to prevent infectious diseases that often cause complications in patients with cerebrovascular diseases.<sup>20, 21</sup> Brown and Kautz<sup>22</sup> observed that individuals with hemiplegia increased force output by their plegic limb when pedaling against higher workloads, without exacerbation of impaired motor control. They therefore concluded that exertional pedalling exercise is a beneficial intervention for achieving gains in muscular force output without worsening motor control impairment.<sup>22</sup>

Graded treadmill exercise testing, with proper safety precautions, can be used to assess cardio-pulmonary function in paretic stroke patients and can also be used for endurance exercise training.<sup>23</sup> It was reported that six months of low-intensity treadmill endurance training produced substantial and progressive reduction in the energy expenditure and cardiovascular demands of

walking in older patients with chronic hemiparetic stroke. These findings suggest that task-oriented aerobic exercise may improve functional mobility and cardiovascular fitness profiles in stroke patients.<sup>23</sup>

A 6-week endurance training programme enhanced exercise-related release of parathyroid hormone and reduced osteocalcin levels in elderly men. Exercise training can therefore be regarded as a preventive measure against osteopaenia, which has been documented as one of the complications of stroke.<sup>21</sup> To study how the severity of hemiparesis is related to exercise training, Terai and Miake<sup>24</sup> divided clinically-stable stroke patients into two groups according to Brunstrom stage of recovery. One group comprised patients at stages III, IV and V of lower limb function and the other comprised patients at stage VI. After the treadmill exercise, the tests indicated that even low-intensity exercise increases cardiovascular responses.<sup>24</sup>

Participation in vigorous physical activity for at least 30 minutes a day is recommended for cardiorespiratory fitness, but recent studies suggest that physical activity below this level can also be beneficial in reducing the risk of cardiovascular heart disease.<sup>25</sup> A six month programme of low-intensity treadmill endurance training involving patients with chronic hemiparetic stroke was reported to produce substantial and progressive reduction in the energy expenditure and cardiovascular demands of walking in these patients.<sup>23</sup>

## CONCLUSION

The stroke patient often has a clear goal for himself in relation to the functional progress of his rehabilitation. Stroke patients often view recovery as a return to the quality of life they had before

the stroke. This is often different from the health care provider's view. While the health care provider likes to measure recovery in terms of the isolated and discrete return of movements.<sup>26</sup>

Fitness brings the glow of good health, yet a casual observation of the physical rehabilitation plan of stroke patients by physiotherapists in Nigeria shows that the inclusion of health-promoting physical exercise training programmes to enhance the cardio-respiratory conditioning of the victims and further improve their ambulatory ability and overall quality of life is uncommon. This may be due to a lack of information on the benefits of such programmes for individuals with stroke.

#### REFERENCES

1. Osuntokun BO. Undernutrition and infectious disorders as risk factors in stroke (with special reference to Africans). In: *Advances in Neurology*. WI 21 M. Goldstein et al., eds. New York: Raven Press. 1979. pp 161-174.
2. Osuntokun BO. Stroke in the African. *African Journal of Medicine Medical Sciences* 1997; **6**: 64-76.
3. Osuntokun BO and Ogunniyi AO. *Epidemiology of Neurologic Illness in Africa*. Ibadan: Wemilore Press. 1994.
4. World Health Organisation. Stroke -1989: Recommendations on stroke prevention, diagnosis and therapy. *Stroke* 1989; **20(10)**: 1407-1431.
5. Ramires I. Rehabilitation in cerebrovascular stroke from hospital to the community. *Acta Medica Portuguesa* 1997; **10(8-9)**: 557-62.
6. Hardie RJ. Principle of management of neurological disability. In: *Neurology in Clinical Practise*. Vol I. Bradley WG, Daroff RB, Fenichel GM and Marsden CD, eds. Boston: Butterworth-Heinemann. 1991.
7. Richards CL, Malouin F, Wood-Dauphine S, Williams JI et al. Task-specific physical therapy for optimisation of gait recovery in acute stroke patients. *Archives of Physical Medicine and Rehabilitation* 1993; **74**: 612-621.
8. Bobath B. *Adult Hemiplegia Evaluation and Treatment*. London: Heinemann. 1990.
9. Brandt EN and Pope AM. *Enabling America: Assessing the role of rehabilitation science and engineering*. Washington DC: National Academy Press. 1997.
10. Li A and Yoshida K. Women with physical disabilities and their health implications for health promotion and physical therapy. *Physiotherapy Canada*. 1998; (Fall): 309-31.
11. Hamzat TK. Cardiovascular responses to exercise tests in subjects with poliomyelitis: A pilot study. *South African Journal of Physiotherapy* 2000; **56(3)**: 39-41.
12. Rimmer JH. Health promotion for people with disabilities The emerging paradigm shift from disability prevention to prevention of secondary conditions. *Physical Therapy* 1999; **79(5)**: 495-502.
13. Courneya KS and Friendenreich CK. Physical exercise and quality of life following cancer diagnosis. A literature review. *Annals of Behavioural Medicine*. 1999; **21(2)**: 171-9.
14. Abresch RT, Seyden NK and Wineinger MA. Quality of life. Issues for persons with neuromuscular disease. *Physical Medicine Rehabilitation Clinics of North America*

- 1998; **9(1)**: 233-48.
15. Sacco RL, Wolf PA and Gorelick PB. Risk factors and their management for stroke prevention: Outlook for 1999 and beyond. *Neurology* 1999; **53 (7 support 4)** 515-24.
16. Clarke MS and Smith DS. Knowledge of stroke in rehabilitation and community samples. *Disability and Rehabilitation* 1998; **21(3)**: 116-23.
17. Shephard RJ. Benefits of sport and physical activity for the disabled: Implications for the individual and for society. *Scandinavian Journal of Rehabilitation Medicine* 1991; **23**: 21-29.
18. Pollock M and Wilmore JH. *Exercise in Health and Disease*. 2<sup>nd</sup> ed. Philadelphia: WB Saunders. 1990.
19. Potempa K, Braun LT, Tinkell T and Poporvich J. Benefits of aerobic exercise after stroke. *Sports Medicine* 1996; **21(5)**: 337-46.
20. Kurabayashi H, Kubota K, Machida I, Tamura K, et al. Effects of physical therapy on immunological parameters in patients with cerebrovascular diseases. *Journal of Medicine* 1996; **27(3-4)**: 171-5.
21. Zerath E Holy, Douce P, Guezennec CY and Chatard JC. Effect of endurance training on post exercise parathyroid hormone levels in elderly men. *Medicine and Science in Sports and Exercise* 1997; **29(9)**: 1139-1145.
22. Brown DA, Kautz SA and Dairaghi CA. Muscle activity adapts to anti-gravity posture during pedalling in persons with post-strokes hemiplegia. *Brain* 1997; **120 (pt 5)**: 825-37.
23. Macko RF, Desouza CA and Tretter LD. Treadmill aerobic exercise training reduces the energy expenditure and cardiovascular demands of hemiparetic gait in chronic stroke patients. A preliminary report. *Stroke* 1997; **28(2)**: 326-30.
24. Terai S and Miake S. Exercise capacity and cardiovascular responses to exercise in hemiplegic patients. *Japanese Journal of Geriatrics* 1997; **34(7)**: 533-9.
25. Francis K. Physical activity in the prevention of cardiovascular disease. *Physical Therapy* 1996; **76(5)**: 456-68.
26. Hafsteinsdottir TB and Grypdonck M. Being a stroke patients. A review of the literature. *Journal of Advanced Nursing* 1997; **26(3)**: 580-8.