

# Understanding Stroke & Reducing Your Risk

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# About Me

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- Doctorate of Physical Therapy from Springfield College
- Advanced Manual Therapy Trained (McKenzie)
- Adaptive and Inclusive Trainer
- Program Director of Exercise for Life Program



# Overview

- What is a Stroke
  - Types of stroke
- Warning Signs
  - What to look for
  - What to do
- Risk Factors
- How to Decrease Risk
  - Lifestyle changes
    - Diet
    - Exercise
    - Working with a healthcare team
- Exercise safety

# What is a Stroke and Types of Strokes

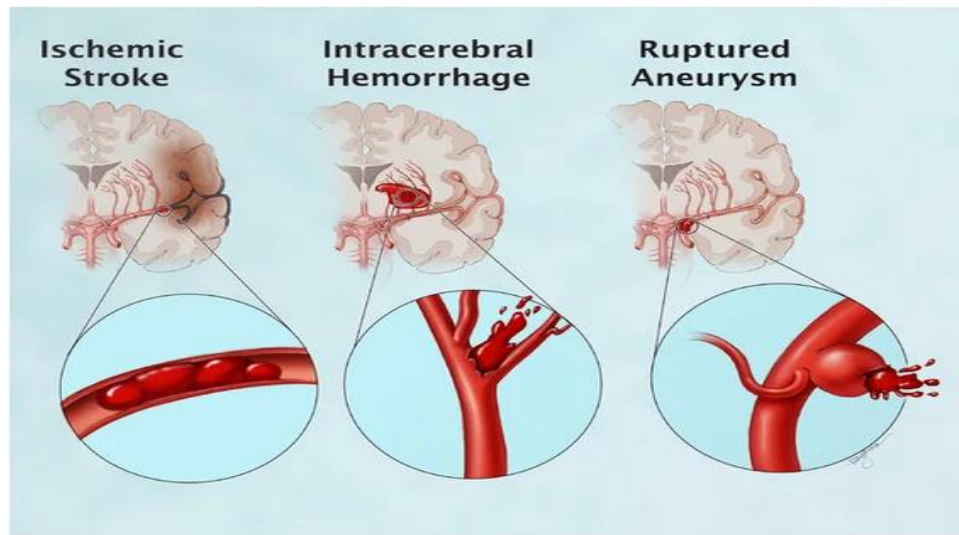
# Stroke Facts

Clinical syndrome of rapid onset of cerebral deficit (loss of brain function), lasting more than 24 hours or death, ruling out any other cause other than vascular and disturbance in blood supply

- Can be called a “brain attack”
- 5th leading cause of death
- Approximately 800,000 people experience a stroke each year
- It is a medical emergency and treatment must be sought as quickly as possible
- Most common cause of severe physical disability

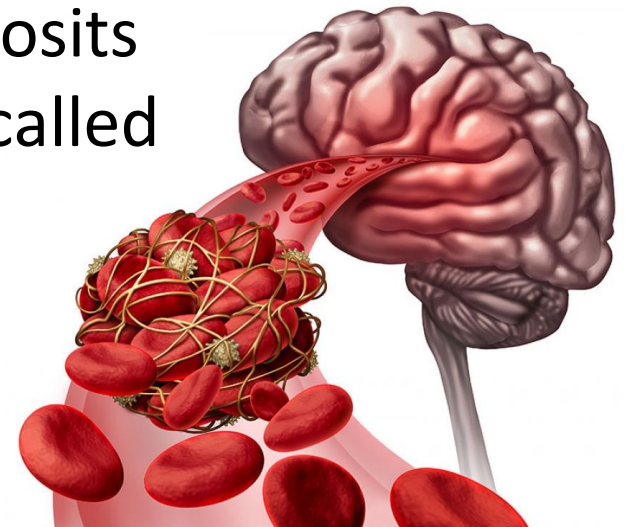


# Types of Strokes



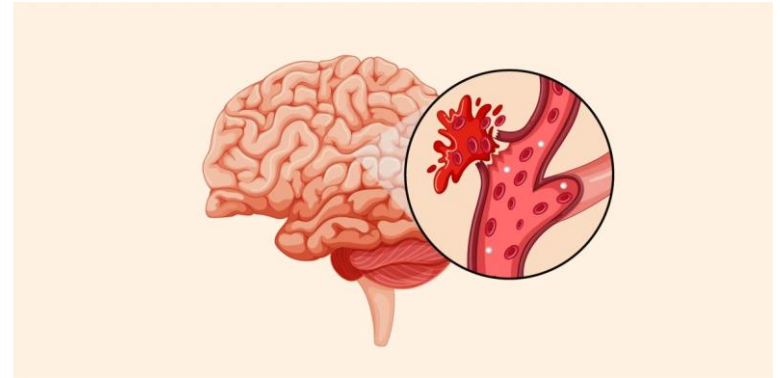
# Ischemic

- Occurs when a blood clot or narrowing of the arteries stops the flow of blood to an area
  - Clots and narrowing can be caused by fatty deposits within the arteries called plaque
- Most common form
  - Accounts for 85%



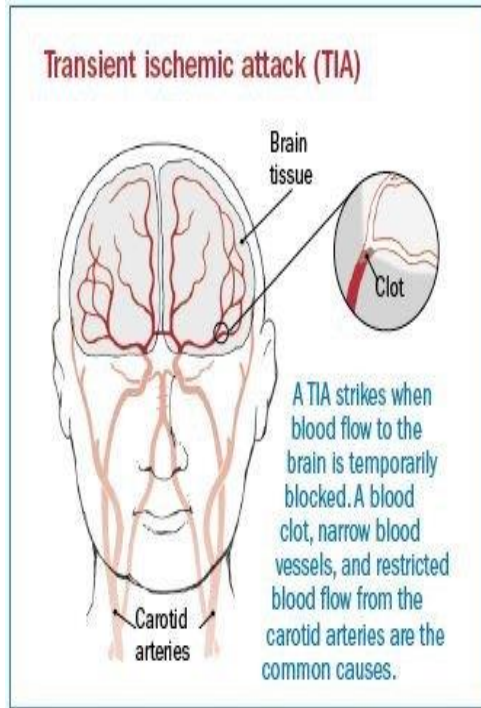
# Hemorrhagic

- Occurs when a weakened or diseased vessel ruptures and leaks blood into or around the brain tissue
- Can be caused by:
  - Hypertension
  - Trauma
  - Blood-thinning medications
  - Aneurysms
- Two Types
  - Intra cerebral
    - Most common type
    - Occurs when brain tissue is flooded with blood after an artery in the brain bursts
  - Subarachnoid
    - Less common
    - Bleeding occurs in the subarachnoid space





# Transient Ischemic Attack (TIA)









- Also known as “mini-strokes”
- Blood flow is only briefly interrupted
- Still considered a medical emergency
- “Warning Signs”
- Can be caused by:
  - Large artery atherosclerosis
  - Cardio-aortic embolism
  - Small artery occlusion
  - Undetermined
  - Other causes

# Warning Signs

Signs and symptoms of stroke

## Stroke Warning Signs

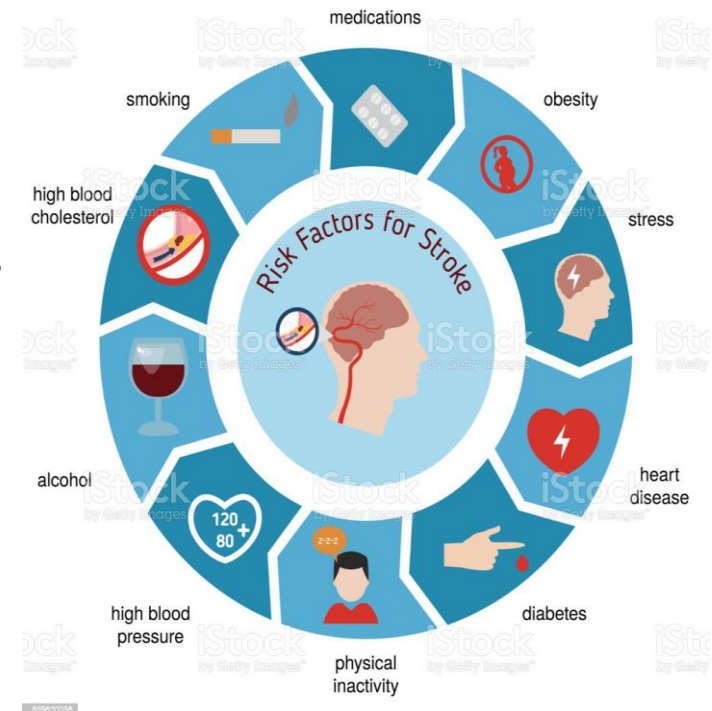
<b>B</b>	<b>E</b>	<b>F</b>	<b>A</b>	<b>S</b>	<b>T</b>
Balance	Eyes	Face	Arms	Speech	Time
					
Sudden loss of balance?	Change in vision or trouble seeing?	Face looks uneven?	Arm or leg weak or hanging down?	Trouble speaking, slurred speech, or seem confused?	Call 911 now!

# The Importance of Time

- Increases ability for treatment
- 2 options:
  - Alteplase IV r-tPA, also known as tissue plasminogen activator
    - Mainly for ischemic strokes (80%)
    - Works by dissolving the clot and improving blood flow.
    - Goal is within 3 hours
  - Clot removal via catheter through blocked blood vessel in the brain
- Decreases risk of mortality
- Decreases risk of long-term impairments
- Improves recovery

# Risk Factors

- What you eat
- Whether you exercise regularly
- If you smoke
- Overall health
  - Routine physicals
- Controlled vs uncontrolled medical conditions
  - Cholesterol
  - Blood pressure
  - Heart disease
  - Diabetes



# Risk Factors

CONTROLLED	UNCONTROLLED
<ul style="list-style-type: none"><li>• What you eat</li><li>• Whether you exercise regularly</li><li>• Overall weight</li><li>• If you smoke or drink alcohol</li><li>• Overall health<ul style="list-style-type: none"><li>• Routine physicals</li></ul></li><li>• Controlled vs uncontrolled medical conditions<ul style="list-style-type: none"><li>• Cholesterol</li><li>• Blood pressure</li><li>• Heart disease</li><li>• Type II Diabetes</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Increasing age</li><li>• Gender</li><li>• Ethnicity</li><li>• Heredity</li><li>• Previous Cardiovascular Event<ul style="list-style-type: none"><li>• Heart Attack</li><li>• Stroke TIA</li><li>• History of Pre-Eclampsia or Eclampsia</li></ul></li></ul>

# How to Decrease Your Risk

# How to Decrease Your Risk

- Lower Blood Pressure
- Change your Diet
- Increase Exercise
- Lose Weight
- Moderate Alcohol Consumption
- Treat Diabetes
- Quit Smoking

# Benefits of Exercise



# Key Guidelines for Adults with Chronic Health Conditions and/or Disabilities

1. 150-300 minutes/week  
of moderate-intensity exercise
2. 75-150 minutes/week  
of vigorous-intensity aerobic physical activity
3. Equivalent combination  
of moderate and vigorous intensity aerobic
4. Muscle-strengthening activities of moderate or greater  
intensity that involve all major muscle groups 2+  
days/week

## Aerobic Training

Aim for 150 minutes of moderate-intensity a week, or be as physically active as possible

↑ VO2max and lifespan  
↑ Body weight control  
↑ Lipid profile and blood pressure  
↓ Depression and  
↑ Sleep  
↑ Quality of life  
↑ Cognitive function

## Resistance Training

For additional health benefits aim for 60 minutes of resistance exercises a week

↑ Muscular strength and power  
↑ Lean body mass and basal metabolism  
↑ Bone mineral density  
↑ Glucose control and insulin sensitivity  
↑ Functional efficiency

↑ Balance  
↑ Agility  
↑ Coordination and Gait  
↓ Risk of falling

## Neuromotor training

For additional health benefits aim for 60 minutes of task-specific exercises a week

## AEROBIC VS. ANAEROBIC

### Aerobic

- Distance running
- Cycling
- Walking
- Rowing
- Swimming
- Jump rope
- Gardening
- ↓ Resting heart rate
- ↓ Blood pressure
- ↑ Lung muscle endurance
- ↓ Body Fat

### Anaerobic

- Sprinting
- HIIT
- Heavy lifting
- Isometrics
- Plyometrics
- Interval training
- ↑ Muscle strength
- ↑ Muscle power
- ↓ Blood pressure
- ↑ Muscle size
- ↓ Body Fat



## Aerobic vs. Anaerobic Training

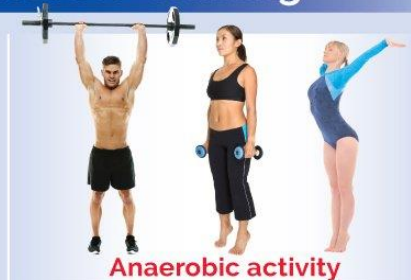


**Aerobic activity**

### Types of Aerobic Exercise Include:

Cardio Machines, Spinning, Running, Swimming, Walking, Hiking, Aerobics Classes, Dancing, Cross Country Skiing, and Kickboxing. There are many other types.

- 🔴 Requires the presence of oxygen.
- 🔵 Primarily works type I muscle fibers.
- 🔵 Increases muscle endurance and capillary size
- 🔵 Heart muscle to pump blood more efficiently
- 🔵 Sustain for an extended period of time
- 🔵 Heart rate between 120 and 150 BPM



**Anaerobic activity**

### Types of Anaerobic Exercise Include:

Heavy Weight-Lifting, Sprints (running, biking, etc.), Jumping Rope, Hill Climbing, Interval Training, Isometrics

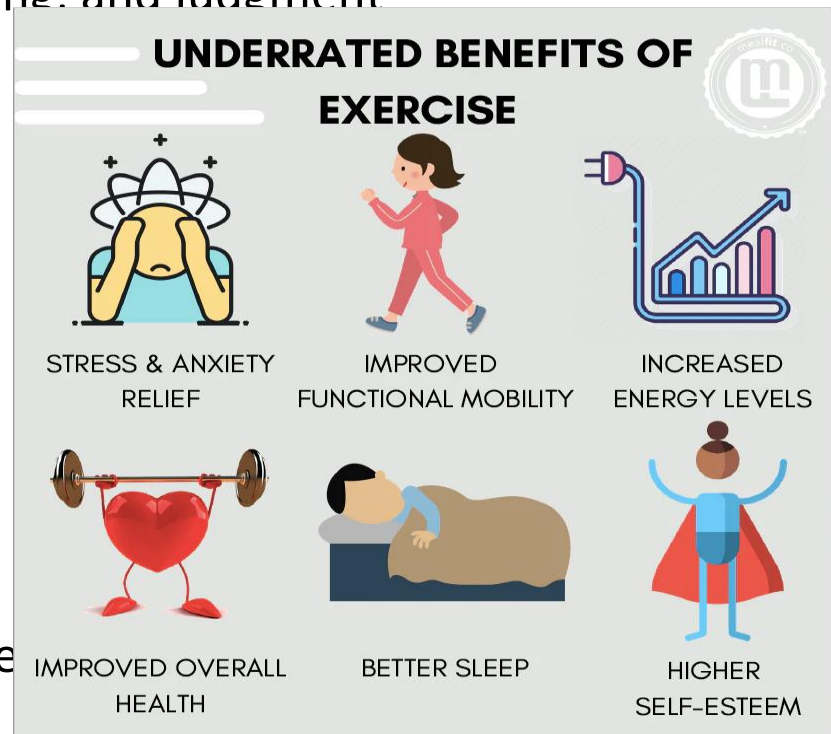
- 🔴 Does not require the presence of oxygen
- 🔴 It works the type II muscle fibers, which leads to greater size and strength of muscles.
- 🔴 You exercise till you gas out
- 🔴 Oxygen builds up, lactic acid builds up, and you start to feel the burn
- 🔴 You can't sustain this kind of activity for extended time





# General Benefits

- Decreased risk of depression and anxiety
- Sharpness of thinking, learning, and judgment
- Improve sleep
- Help manage weight
- Reduce health risk of:
  - Heart disease
  - Stroke
  - Type 2 Diabetes
  - Metabolic Syndrome
  - Some common cancers
  - Premature death
- Strengthen bones and muscle
- Prevent falls





# High Intensity Interval Training



- Repeated bouts of high intensity effort followed by varied recovery times
  - Similar fitness benefit as continuous endurance workouts, but in shorter bouts
- Could supplement low cardiovascular intensity typically achieved by achieving higher intensities required to optimize recovery
- Can be adapted to suit the needs of various populations and training goals
- Can be performed on all exercise modes and are perfect for group or individual exercise
- Also is more enjoyable

# How to Safely start to Exercise



## Key Guidelines for Safe Physical Activity

To do physical activity safely and reduce risk of injuries and other adverse events, people should:

- ✓ Understand the risks, yet be confident that physical activity can be safe for almost everyone.
- ✓ Choose types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- ✓ Increase physical activity gradually over time to meet key guidelines or health goals. Inactive people should “start low and go slow” by starting with lower intensity activities and gradually increasing how often and how long activities are done.
- ✓ Protect themselves by using appropriate gear and sports equipment, choosing safe environments, following rules and policies, and making sensible choices about when, where, and how to be active.
- ✓ Be under the care of a health care provider if they have chronic conditions or symptoms. People with chronic conditions and symptoms can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for them.

## 5 tips for exercise safety



Begin slowly



Consider  
your climate



Drink water



Listen to  
your body



Use proper form  
and equipment



- Be aware of injuries and reduce risk
- Be confident
- Choose appropriate types and amounts of activity
- Increase gradually over time
- Be aware of recovery times and your current level of fitness
- Prior experience
- Be aware of environment
- Start in a group environment or with a professional



# Next Steps

# Where to Start

- Discern your goals
- Assess current abilities and challenges
- Make a plan
- Discuss with provider
- Discuss with support group
- Find something you enjoy
- Determine what is needed:
  - Trainer
  - Group class (EX4L)
  - Gym vs. Home
- Start small



# WORLD STROKE DAY



## Who is at risk?

### Everyone

- Risk doubles every 10 years after age 55
- 1/3 of strokes occur before the age of 55

## What are my risk factors?

### HIGH BLOOD PRESSURE



### DIABETES



### SMOKING



### HIGH CHOLESTEROL



### EXCESSIVE ALCOHOL CONSUMPTION



## Ways to reduce my risks

### LOWER BLOOD PRESSURE

Keep blood pressure below 120/80

### DIABETES

Tips to control diabetes: exercise, weight loss, medications

### STOP SMOKING

Your risk decreases 5 years after you quit

### LOWER CHOLESTEROL

Tips to lower cholesterol: diet, exercise, medications

### REDUCE ALCOHOL CONSUMPTION

1 drink/day for women and 2 drinks/day for men

## REDUCE YOUR RISK: GET MOVING!

Walking briskly for an hour, five days a week is enough to help lower your risk.

## Signs of a Stroke



- ⚠ Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- ⚠ Sudden trouble seeing in one or both eyes
- ⚠ Extreme headaches with no known cause
- ⚠ Sudden trouble walking, loss of balance or coordination
- ⚠ Sudden trouble speaking

**CALL 911 IMMEDIATELY** if you or someone else are having signs of a stroke.

# Questions

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[www.rehabwithapro.org](http://www.rehabwithapro.org)

# Resources/Citations

1. Lackland DT, Rocella EJ, Deutsch AF, Fornage M, George MG, Howard G, et al.; American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Quality of Care and Outcomes Research; Council on Functional Genomics and Translational Biology. Factors influencing the decline in stroke mortality: a statement from the American Heart Association/American Stroke Association. *Stroke*. 2014; 45:315–353. [LinkGoogle Scholar](#)
2. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al.. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012; 380:2197–2223. [CrossrefMedlineGoogle Scholar](#)
3. Mackay J, Mensah G. *The Atlas of Heart Disease and Stroke*. Geneva, Switzerland: World Health Organisation; 2004. [Google Scholar](#)
4. Leys D, Deplanque D, Mounier-Vehier C, et al. Stroke prevention. *J Neurol* 249, 507–517 (2002). <https://doi.org/10.1007/s00415020005>
5. Science JD. Nutrition and Risk of Stroke. *Nutrients*. 2019; 11(3):647. <https://doi.org/10.3390/nu11030647>
6. Sullivan K, A., White, K. M., Youno, R. M., Chang, A., Roos, C., & Scott, C. (2008). Predictors of intention to reduce stroke risk among people at risk of stroke: An application of an extended health belief model. *Rehabilitation Psychology*, 53(4), 505–512. <https://doi.org/10.1037/a0013359>
7. Field MJ, Gebruers N, Shanmuga Sundaram T, Nicholson S, Mead G. Physical activity after stroke: a systematic review and meta-analysis. *ISRN Stroke*. 2013; 2013:464176. doi: <http://dx.doi.org/10.1155/2013/464176>. [CrossrefGoogle Scholar](#)
8. Saunders DH, Greig CA. Physical fitness and function after stroke., Mead GE, van Wijck F, eds. In: *Exercise and Fitness Training After Stroke: A Handbook for Evidence-Based Practice*. 1st ed. London: Churchill Livingstone Elsevier; 2013:77–91. [Google Scholar](#)
9. Lee CD, Folsom AR, Blair SN. Physical activity and stroke risk: a meta-analysis. *Stroke*. 2003; 34:2475–2481. [LinkGoogle Scholar](#)
10. Saunders DH, Sanderson M, Brazzell M, Greig CA, Mead GE. Physical fitness training for stroke patients. *Cochrane Database Syst Rev*. 2013; 10:CD003316. doi: 10.1002/14651858.CD003316.pub5. [Google Scholar](#)
11. Lee YH, Yoon ES, Park SH, Heffernan KS, Lee C, Jae SY. Associations of arterial stiffness and cognitive function with physical fitness in patients with chronic stroke. *J Rehabil Med*. 2014; 46:413–417. [CrossrefMedlineGoogle Scholar](#)
12. Heyn P, Abreu BC, Ottenbacher KJ. The effects of exercise training on elderly persons with cognitive impairment and dementia: a meta-analysis. *Arch Phys Med Rehabil*. 2004; 85:1694–1704. [CrossrefMedlineGoogle Scholar](#)
13. Cumming TB, Tyedin K, Churilov L, Morris ME, Bernhardt J. The effect of physical activity on cognitive function after stroke: a systematic review. *Int Psychogeriatr*. 2012; 24:557–567. [CrossrefMedlineGoogle Scholar](#)
14. Egan KJ, Janssen H, Sena ES, Longley L, Speare S, Howells DW, et al.. Exercise reduces infarct volume and facilitates neurobehavioral recovery: results from a systematic review and meta-analysis of experimental models of focal ischemia. *Neurorehabil Neural Repair*. 2014; 28:800–812. [CrossrefMedlineGoogle Scholar](#)
15. Mang CS, Campbell KL, Ross CJ, Boyd LA. Promoting neuroplasticity for motor rehabilitation after stroke: considering the effects of aerobic exercise and genetic variation on brain-derived neurotrophic factor. *Phys Ther*. 2013; 93:1707–1716. [CrossrefMedlineGoogle Scholar](#)
16. Harris JE, Eng JJ. Strength training improves upper-limb function in individuals with stroke: a meta-analysis. *Stroke*. 2010; 41:136–140. [LinkGoogle Scholar](#)
17. Lerdal A, Bakken LN, Kouwenhoven SE, Pedersen G, Kirkevold M, Finset A, et al.. Poststroke fatigue—a review. *J Pain Symptom Manage*. 2009; 38:928–949. [CrossrefMedlineGoogle Scholar](#)
18. Duncan F, Kulluabaev MA, Dennis MS, Greig C, Mead GE. Fatigue after stroke: a systematic review of associations with impaired physical fitness. *Int J Stroke*. 2012; 7:157–162. [CrossrefMedlineGoogle Scholar](#)
19. McGough E, Pollock A, Smith LN, Dennis M, Sharpe M, Lewis S, et al.. Interventions for post-stroke fatigue. *Cochrane Database Syst Rev*. 2009; 3:CD007030. doi: 10.1002/14651858.CD007030.pub2. [Google Scholar](#)
20. Zedlitz AM, Rietveld TC, Geurts AC, Fasotti L. Cognitive and graded activity training can alleviate persistent fatigue after stroke: a randomized, controlled trial. *Stroke*. 2012; 43:1046–1051. [LinkGoogle Scholar](#)
21. Korpershoek C, van der Bijl J, Halsteinsdóttir TB. Self-efficacy and its influence on recovery of patients with stroke: a systematic review. *J Adv Nurs*. 2011; 67:1876–1894. [CrossrefMedlineGoogle Scholar](#)
22. Sharma H, Bulley C, van Wijck FM. Experiences of an exercise referral scheme from the perspective of people with chronic stroke: a qualitative study. *Physiotherapy*. 2012; 98:336–343. [CrossrefMedlineGoogle Scholar](#)
23. Reed M, Harrington R, Duggan A, Wood VA. Meeting stroke survivors' perceived needs: a qualitative study of a community-based exercise and education scheme. *Clin Rehabil*. 2010; 24:16–25. [CrossrefMedlineGoogle Scholar](#)
24. Carin-Levy G, Kendal M, Young A, Mead G. The psychosocial effects of exercise and relaxation classes for persons surviving a stroke. *Can J Occup Ther*. 2009; 76:73–80. [CrossrefMedlineGoogle Scholar](#)
25. Pang MY, Charlesworth SA, Lau RW, Chung RC. Using aerobic exercise to improve health outcomes and quality of life in stroke: evidence-based exercise prescription recommendations. *Cerebrovasc Dis*. 2013; 35:7–22. [CrossrefMedlineGoogle Scholar](#)
26. Naci H, Ioannidis JP. Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *BMJ*. 2013; 347:f5577. [CrossrefMedlineGoogle Scholar](#)
27. Ivey FM, Ryan AS, Haferkamp CE, Goldberg AP, Macko RF. Treadmill aerobic training improves glucose tolerance and indices of insulin sensitivity in disabled stroke survivors: a preliminary report. *Stroke*. 2007; 38:2752–2758. [LinkGoogle Scholar](#)
28. Rimmer JH, Riley B, Creviston T, Nicola T. Exercise training in a predominantly African-American group of stroke survivors. *Med Sci Sports Exerc*. 2000; 32:1990–1996. [CrossrefMedlineGoogle Scholar](#)
29. Rimmer JH, Rauworth AE, Wang EC, Nicola TL, Hill B. A preliminary study to examine the effects of aerobic and therapeutic (nonaerobic) exercise on cardiorespiratory fitness and coronary risk reduction in stroke survivors. *Arch Phys Med Rehabil*. 2009; 90:407–412. [CrossrefMedlineGoogle Scholar](#)
30. Turnbull F, Neal B, Ninomiya T, Algert C, Arima H, et al.; Trialists' Collaboration BPLT. Effects of different regimens to lower blood pressure on major cardiovascular events in older and younger adults: meta-analysis of randomised trials. *BMJ*. 2008; 336:1121–1123. [CrossrefGoogle Scholar](#)
31. Cornelissen VA, Smart NA. Exercise training for blood pressure: a systematic review and meta-analysis. *J Am Heart Assoc*. 2013; 2:e004473. [LinkGoogle Scholar](#)
32. Billinger SA, Arena R, Bernhardt J, Eng JJ, Franklin BA, Johnson CM, et al.; American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Lifestyle and Cardiometabolic Health; Council on Epidemiology and Prevention; Council on Clinical Cardiology. Physical activity and exercise recommendations for stroke survivors: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2014; 45:2532–2553. [LinkGoogle Scholar](#)
33. Mead G, Bernhardt J. Physical fitness training after stroke, time to implement what we know: more research is needed. *Int J Stroke*. 2011; 6:506–508. [CrossrefMedlineGoogle Scholar](#)
34. <https://www.cdc.gov/stroke/prevention.htm>
35. [https://stroke.recoveryfoundation.org/stroke-prevention/?qclid=CwKCAjwaVZ5hBGEIwACslQ4oOvcFTz2OD82UbxzW9\\_amBV2kGP2MmUtgQfPSi9zX0DzVXexRoCyMIQAvD\\_BwE#?keyword\\_session\\_id=vt-adwordslkt-stroke%20riskslmt-blta-380013332523&\\_vsrfdom=wordstream](https://stroke.recoveryfoundation.org/stroke-prevention/?qclid=CwKCAjwaVZ5hBGEIwACslQ4oOvcFTz2OD82UbxzW9_amBV2kGP2MmUtgQfPSi9zX0DzVXexRoCyMIQAvD_BwE#?keyword_session_id=vt-adwordslkt-stroke%20riskslmt-blta-380013332523&_vsrfdom=wordstream)
36. <https://www.stroke.org/en/about-stroke/types-of-stroke/is-getting-quick-stroke-treatment-important#:~:text=If%20you're%20having%20a,greatly%20over%20the%20last%20decade>
37. <https://www.health.harvard.edu/womens-health/8-things-you-can-do-to-prevent-a-stroke>