



Stroke: Primary Prevention and Recovery

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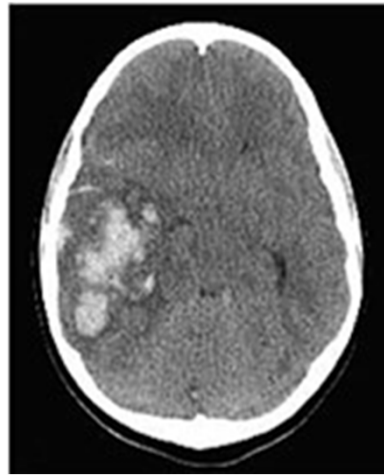
Objectives

- Review Ischemic and Hemorrhagic Stroke Overview
- Understand Modifiable (and Nonmodifiable) Risk Factors for Stroke
- Understand Expected Recovery Course for Different Neurological Symptoms
- Review General Counseling to Give to Stroke Survivors and Caregivers

Ischemic and Hemorrhagic Stroke



Ischemic Stroke
88%



Hemorrhagic Stroke
12%

Images: [INFARCT.jpg](#); [Lucien Monfils](#) ; Anatomy & Physiology, Connexions Web site

Nonmodifiable Risk Factors

- Age
- Female
- Black Race (in the U.S.)
- Genetics

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Images: [Micky Aldridge](#) from Finland

Modifiable Risk Factors



Blood Pressure



Diet



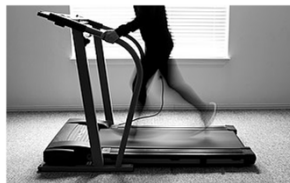
Sleep



Diabetes



Tobacco



Physical Activity



Weight



Lipids

82% of Population Attributable Risk



Blood Pressure



Diet



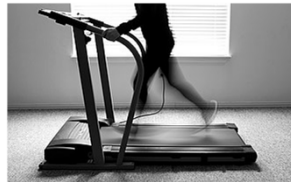
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Blood Pressure

Single Biggest “Lifestyle” Risk Factor for stroke

• **35% of strokes worldwide** would be prevented if blood pressure were controlled

Hypertension Definition:

- Stage 1: SBP 130-139 mmHg, DBP 80-89 mmHg
- Stage 2: SBP >140 mmHg, DBP >90 mm Hg

46% of US adults have HTN



Source: O'Donnell MJ, Xavier D, Liu L, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet*. 2010;376(9735):112-123. doi:10.1016/S0140-6736(10)60834-3

Tobacco Use



11.5% of US population smoke cigarettes

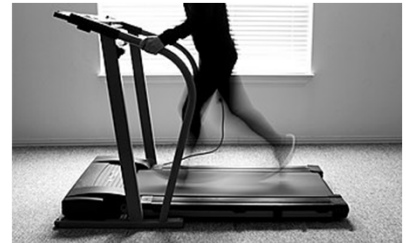
- High regional variation, up to 20% in parts of the Southeast
- Responsible for 19% of stroke deaths worldwide
- Current users at higher risk than former users

Combo of counseling and medication therapy most effective

- Bupropion (Wellbutrin)
- Varenicline (Chantix)
- Nicotine Replacement Therapy (gum, lozenge, patch)

Hajizadeh A, Howes S, Theodoulou A, et al. Antidepressants for smoking cessation. *Cochrane Database Syst Rev.* 2023;5(5):CD000031. Published 2023 May 24. doi:10.1002/14651858.CD000031.pub6

Physical Activity



AHA/US HHS/WHO Recommendation

- 150 min/week of moderate activity
 - Brisk walking
 - **30 min, 5 days per week**
- 75 min/week of vigorous activity
 - Running/Jogging
 - Swimming
 - Cycling, etc
 - 25 min, 3 days per week

Source: Bushnell C, Kernan WN, Sharrief AZ, et al. 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association *Stroke.* 2024;55(12):e344-e424. doi:10.1161/STR.0000000000000475

Diet – Mediterranean



Recommended	Goal
Olive Oil	4 tbsp/day
Tree nuts and peanuts	3 servings/wk
Fresh Fruits	3 servings/day
Vegetables	2 servings/day
Fish, Seafood	3 servings/wk
Legumes	3 servings/wk
White Meat	Instead of Red

Discouraged	Goal
Soda	<1 drink/day
Commercial Baked Goods	<2 servings/wk
Spread Fats	<1 serving/day
Red/Processed Meat	<1 serving/day

5 year absolute risk: 5.7% ->3.6%
NNT: 53

Vitamins



Maybe

- Folic acid
- B complex vitamins (vitamin B12, B6)

Not Effective

- Vitamin C
- Vitamin E
- Selenium
- Anti-oxidants
- Calcium
- Calcium with vitamin D
- Multivitamin

Source: Bushnell C, Kernan WN, Sharrief AZ, et al. 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association *Stroke*. 2024;55(12):e344-e424. doi:10.1161/STR.0000000000000475

Weight

- Increase in BMI of 5 = 10% increased risk of stroke
- Calorie Counting – low cost, labor intensive
 - Awareness of portion size, read labels
 - MyFitnessPal
 - Lose It!
 - Easier the more you use them
- Bariatric Surgery
- GLP-1 agonists
 - Stimulate insulin release, slow gastric emptying, promote satiety
 - Semaglutide, Tirzepatide, etc



Diabetes + Lipids

- Diabetes:
 - 1% A1c reduction = 12% decrease in stroke risk
- Lipids:
 - 10% LDL reduction = 13.5% relative risk reduction for stroke
 - Statins primarily tested
 - Other agents: Ezetimibe, PCSK9 Inhibitors



Stratton IM, Adler AI, Neil HA, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ*. 2000;321(7258):405-412. doi:10.1136/bmj.321.7258.405

Amarencu P, Labreuche J. Lipid management in the prevention of stroke: review and updated meta-analysis of statins for stroke prevention. *Lancet Neurol*. 2009;8(5):453-463. doi:10.1016/S1474-4422(09)70058-4

Obstructive Sleep Apnea



- Independently associated with mortality, stroke, HTN, AFib, heart disease
- CPAP improves daytime sleepiness and Quality of Life in moderate-severe OSA
 - CPAP more effective than dental implant device
 - Inspire stimulator is a new option

Modifiable Risk Factors



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Sleep



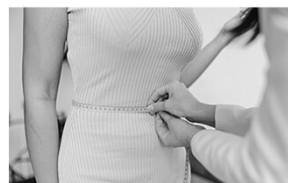
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***JUMP* to Stroke Recovery**

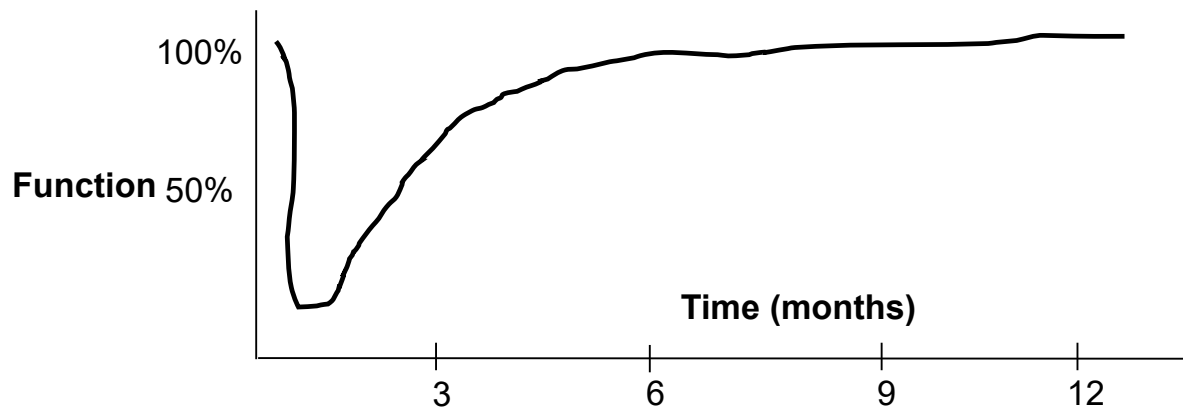


Physical Symptom Recovery

- Realistic hope for improvement
- Acknowledge ambiguity
- Recovery timeline depends on function impacted
 - Motor/language
 - Vision
 - Sensory
 - Fatigue/Cognitive Slowing
 - More severe cognitive impairment

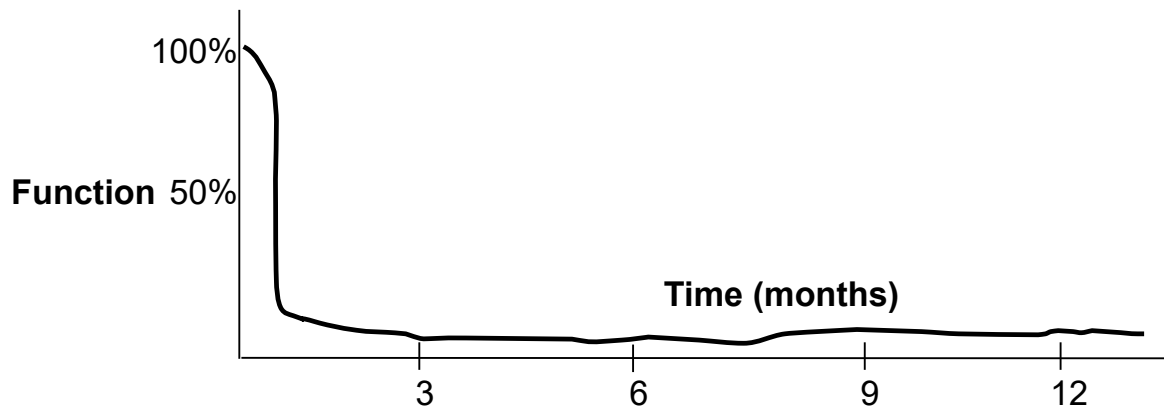
Motor/Language

- Classic timeline
 - Most rapid improvement in first 3 months
 - Keep recovering out to 1.5-2 years



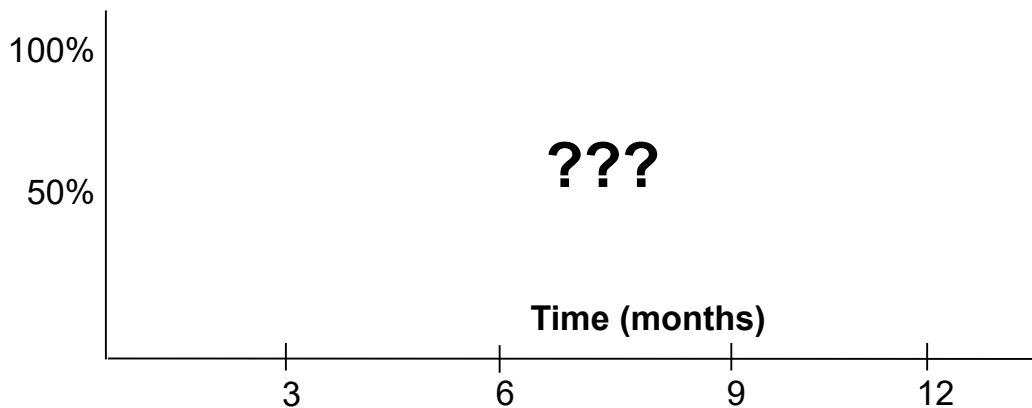
Vision – CRAO, Parieto-occipital infarct

- “Bad News and Good News”
- Poor recovery but....
- Very good adaptation



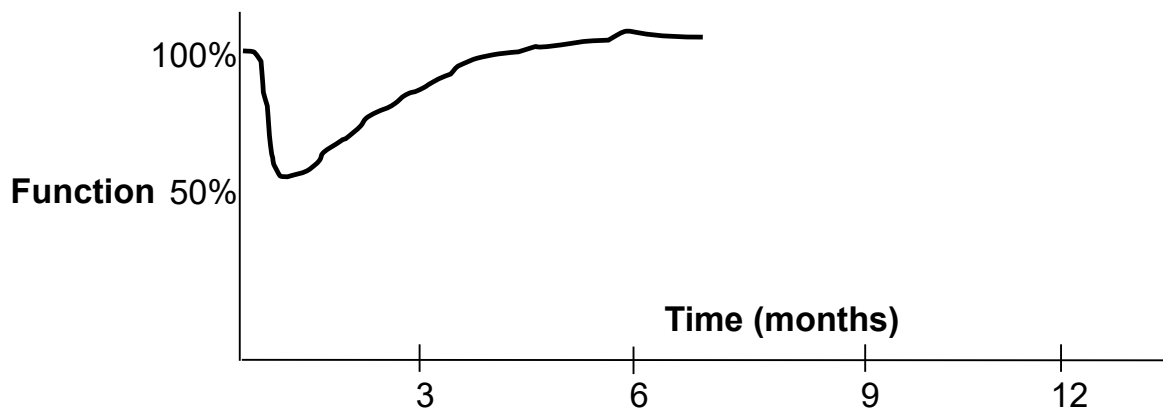
Sensation

- SUPER variable
- Most are mild, but can be debilitating



Cognitive Impairment and Fatigue

- Vey Common, can be debilitating
- Requires the patient to “give yourself grace”
- Improves over 3-6 months (strongly age dependent)



Neuropsychological Testing

- Particularly useful for:
 - Working age with few motor deficits -> objective evidence of disability
 - Baseline Cognitive Function for young patients
 - Identifying specific cognitive adaptive strategies

Specific Physical Concerns

- Dysarthria/Dysphagia – SLP. PEG removal?
- Spasticity – Baclofen is my first line. Botox is treatment of choice – PM&R referral
- Movement/adaptive equipment – wheelchair clinic
- Neuropathic pain – gabapentin, pregabalin, duloxetine. Exercise.
- Headache
 - Preventative: Usual headache treatment (BB, topiramate, CGRP)
 - Abortive: CGRP (Ubrovelvy). Triptans and NSAIDS contraindicated

Emotional Recovery

- Orient to the process of recovery
- Validate/name feelings and normalize experience
- Instill realistic hope – “There is life after stroke”

- Months 0-1: “Survival Mode”
- Months 2-4: “Stabilizing”
 - Effort directed inward
- Months 5+: “Re-engaging”
 - Effort directed outward
 - Sometimes people need a push
 - Service is important to provide meaning to your days

Depression and Anxiety

- Some degree is totally normal
- Needs treatment if:
 1. Impairing recovery
 2. Preventing from living their life

- Treatment Options:
 1. SSRI
 2. Psychology for psychotherapy

- Special consideration: Bupropion to double dip depression and smoking cessation

Specific Activities

- Activities limited by function, less by stroke risk
 - Typically mention no restriction of:
 1. Travel
 2. Sex*
 3. Exercise*
 1. Dissection is special circumstance: no heavy lifting or vigorous exercise for 3-6 months afterward.
- *Especially critical in RCVS or TGA which can be triggered by exercise or sex

Specific Activities - Driving

- Judgement Call
- Want approval from:
 - Patient
 - Caregiver
 - Provider
- Occupational Therapy driving evaluation
 - Vision deficit
 - Cognitive Deficit
 - Motor – if borderline
- Special case: CDL drivers – NO DRIVING FOR A YEAR
 - Professional truck drivers
 - School Bus Drivers