

# Fitness after stroke



**Dr Sarah Moore and Simon Clark - May 2016**

©Newcastle University, 2014. Do not copy without permission



**fuse**

The Centre for Translational  
Research in Public Health

UK  
CLINICAL  
RESEARCH  
COLLABORATION

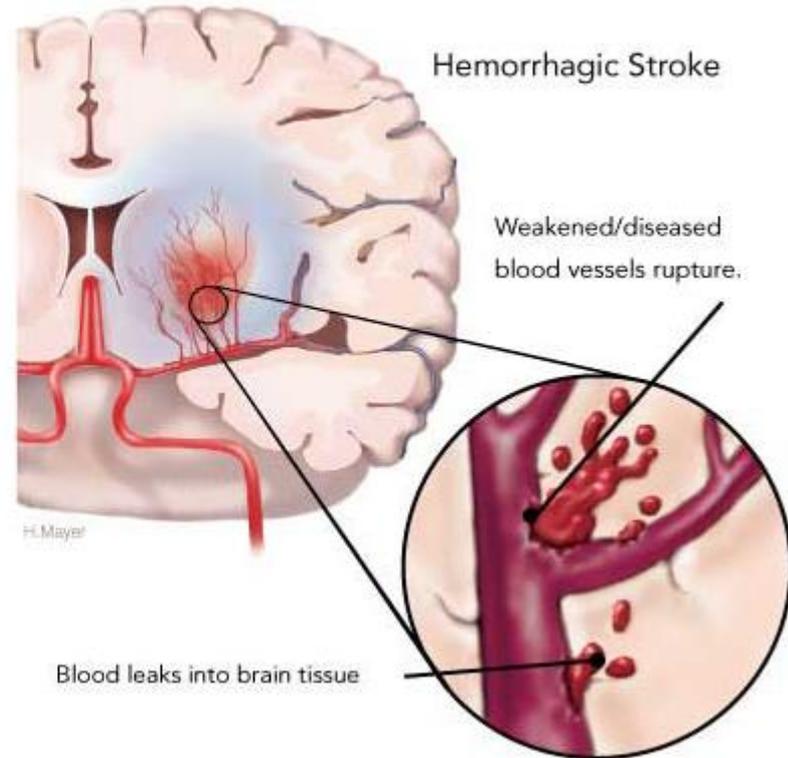
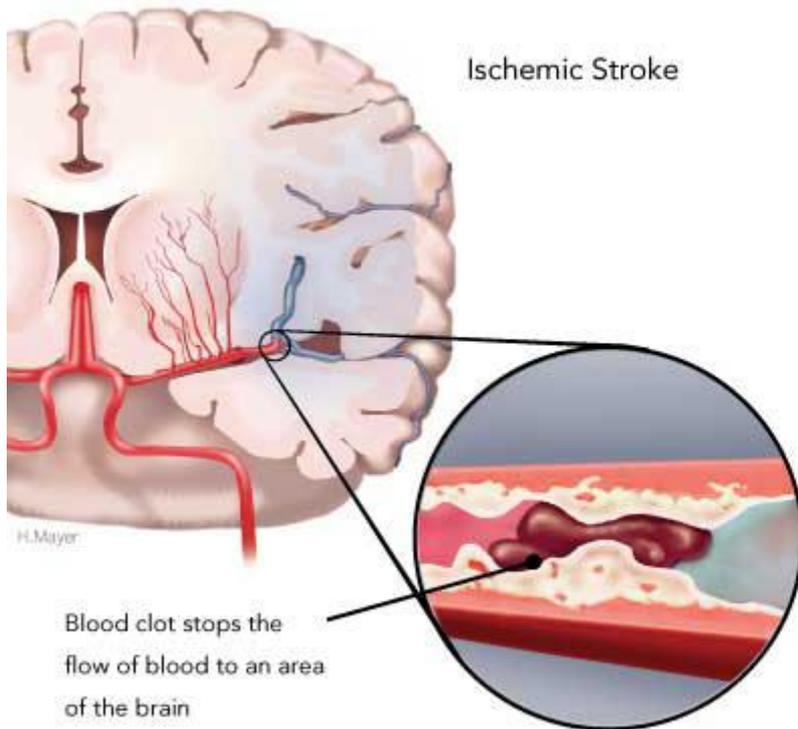
igniting our potential

# Stroke facts

- Stroke occurs approximately **152,000 times a year** in the UK; that is one every **3 minutes 27 seconds**.
- There are over **1.2 million** stroke survivors in the UK.
- Stroke is the **3rd** most common cause of death
- Stroke is the single **most common** cause of **adult disability**
- **Age is the single most important risk factor for stroke**
- **Risk of stroke doubles every decade after the age of 55**

Approximately **30%** of stroke survivors will experience a recurrent stroke or TIA.<sup>17</sup>





**Stroke is due to an interruption of the blood flow to part of the brain; effects will depend upon the part of the brain affected and the amount of damage. There are two types of strokes – ischaemic (clot) and haemorrhagic (bleed). About 85% of all strokes are ischaemic and 15% haemorrhagic.**

Ischaemic strokes are caused by a blockage cutting off the blood supply to the brain. The blockage can be caused by a blood clot forming in an artery leading to the brain or within one of the small vessels deep inside the brain.



Haemorrhagic strokes are caused when a blood vessel bursts within or on the surface of the brain. Because the blood leaks out into the brain tissue at high pressure, the damage caused can be greater than the damage caused by strokes due to a clot.

### Ischaemic stroke are usually classified into five different categories:

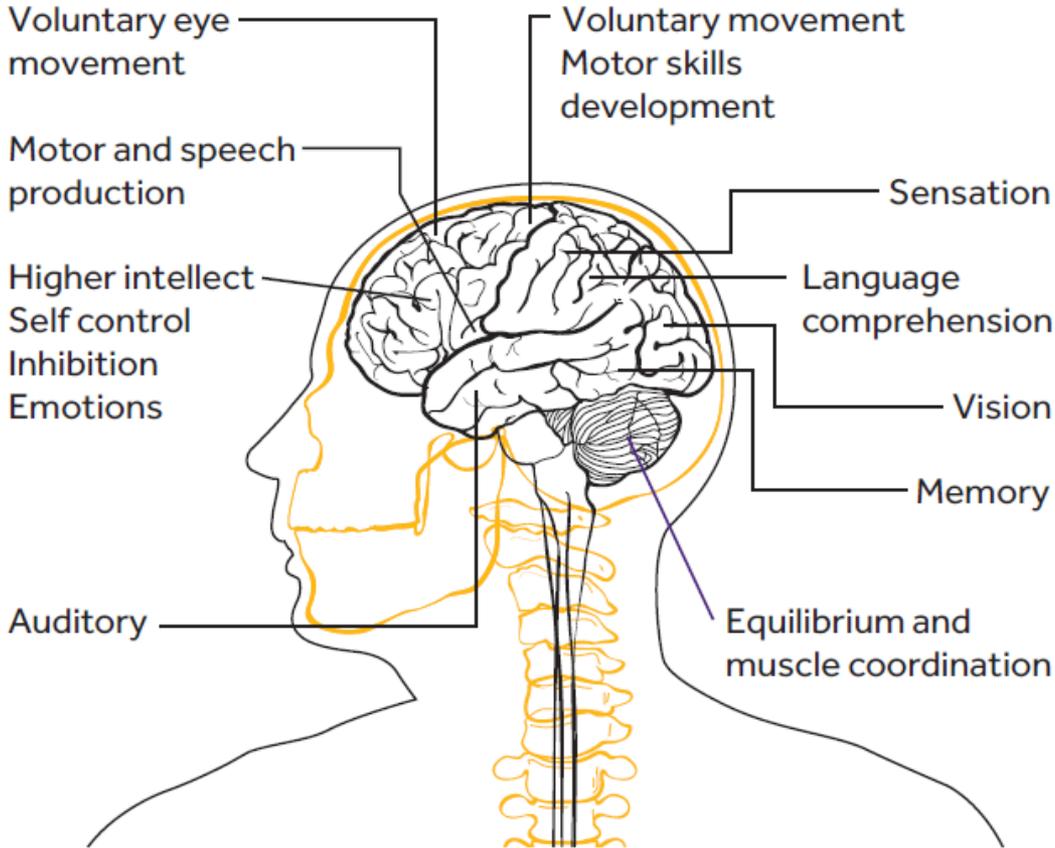
1. Large-artery atherosclerosis-a clot from the arteries
2. Cardioembolism-a clot from the heart
3. Small-vessel occlusion- a narrowing and weakening of blood vessels
4. Stroke of other determined aetiologies
5. Stroke of undetermined aetiology

### There are two types of haemorrhagic stroke:

1. Intracerebral haemorrhage (ICH)- bleeding within the brain
2. Subarachnoid haemorrhage (SAH)- bleeding on the surface of the brain

# What are the main effects of stroke?

## Functions of the brain



**The effects of stroke are dependent on where the damage occurs in the brain**

**Dementia 30%**

**Emotionalism within 6 months 20%**

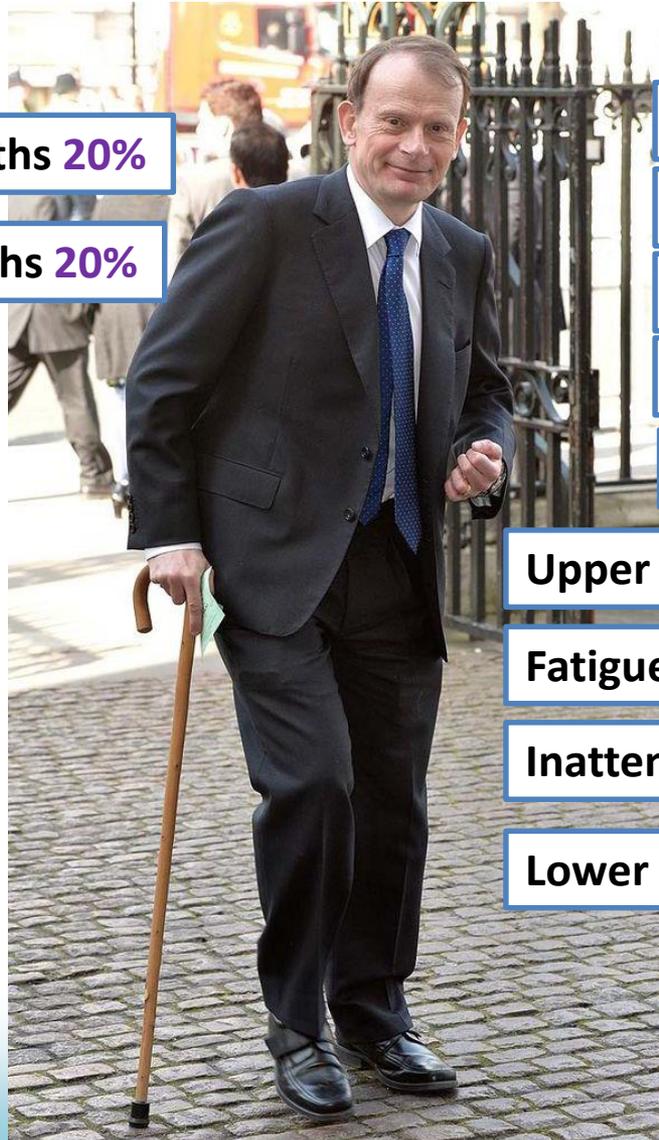
**Emotionalism post-six months 20%**

**Depression 33%**

**Bowel control 33%**

**Bladder control 50%**

**Co-morbidity e.g. diabetes,  
coronary artery disease**



**Visual problems 60%**

**Facial weakness 54%**

**Aphasia 33%**

**Slurred speech 50%**

**Swallowing 45%**

**Upper limb arm weakness 77%**

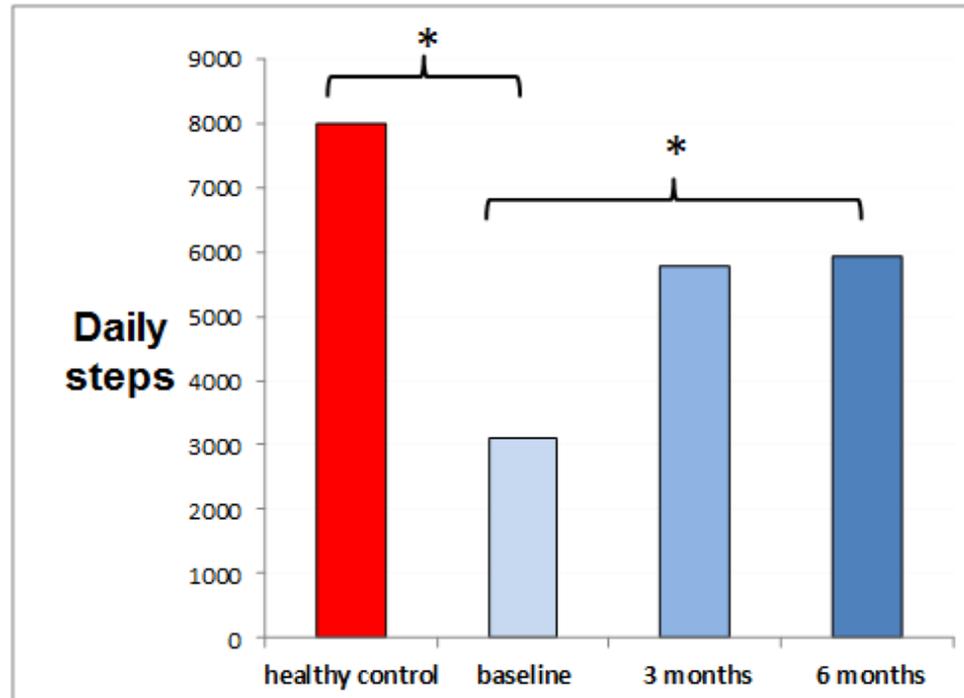
**Fatigue 33%**

**Inattention neglect 28%**

**Lower limb weakness 72%**

**How would each of the effects described impact on the delivery of an exercise programme in the community?**

# Physical activity levels are low post-stroke



# Benefits of exercise post-stroke

## Physical fitness training for stroke patients (Review)

Saunders DH, Sanderson M, Brazzelli M, Greig CA, Mead GE



- 45 trials 2188 patients
- Cardio/resistance/mixed
- Chronic
- Cardiorespiratory exercise improves walking
- Some evidence cardio improves fitness
- ?death/dependency/QOL/vascular risk factors
- Few trials studied long term effects

# Randomised controlled trial exercise post-stroke



**Vs.**



# Intervention-Fitness and Mobility Exercise Programme



**Flexibility**



**Strength**

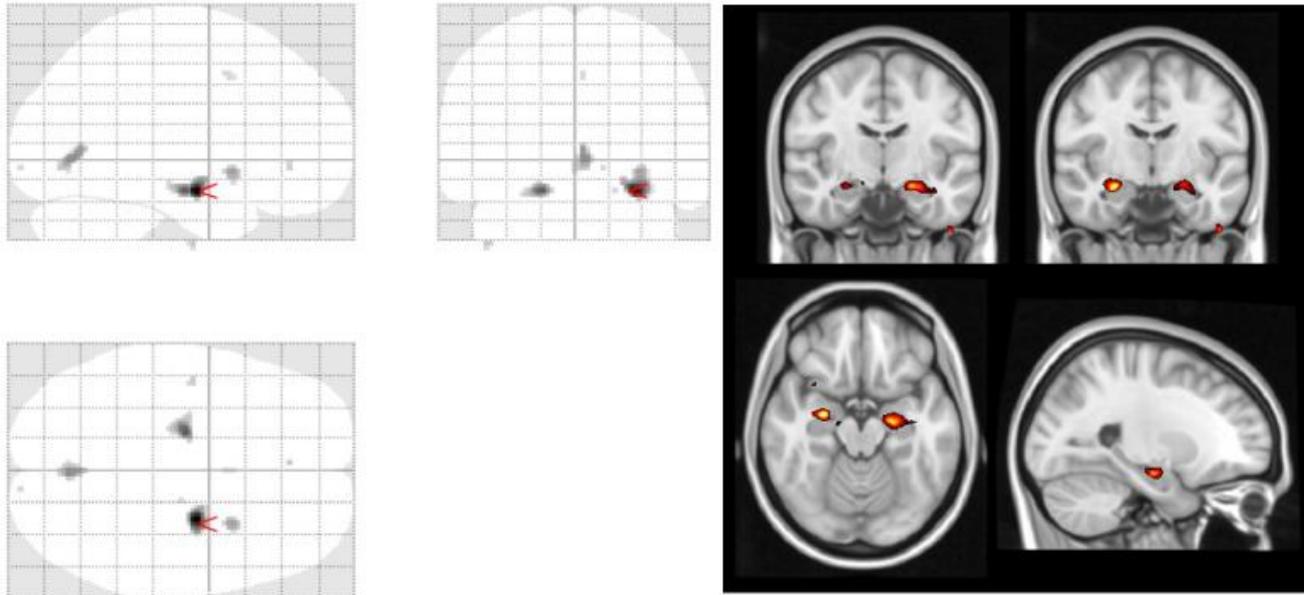


**Balance**

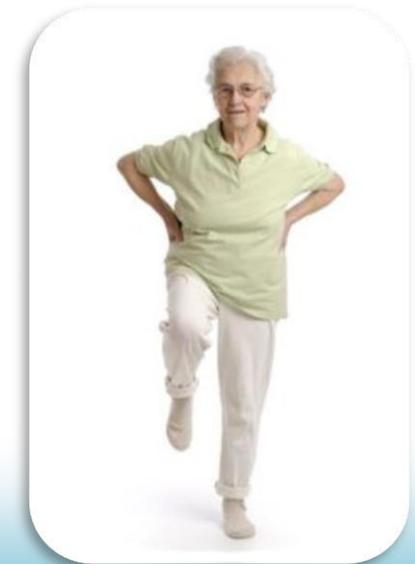
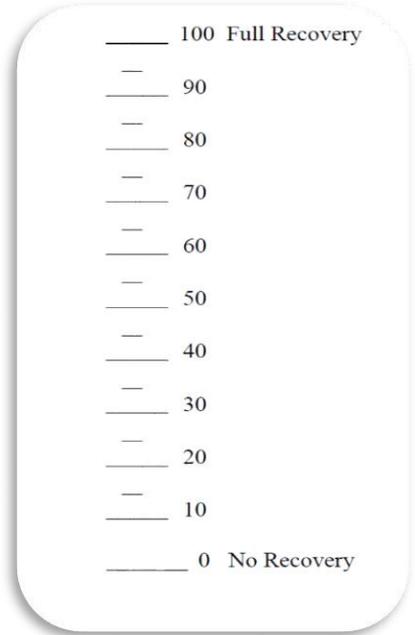
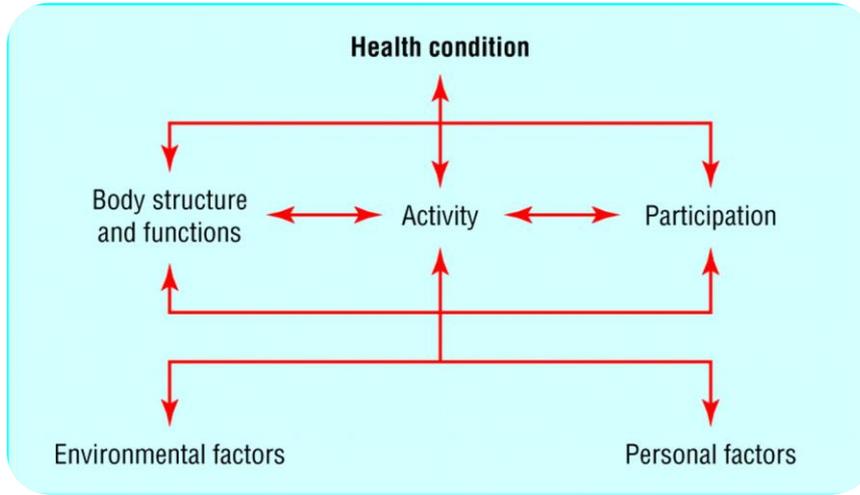


**Aerobic**

# Exercise prevents medial temporal lobe atrophy and increases blood flow



Moore, S. A., K. Hallsworth, et al. (2014). "Effects of community exercise therapy on metabolic, brain, physical and cognitive function following stroke: A randomised controlled pilot trial. ." Neurorehabil Neural Repair:29 (7) 623-635



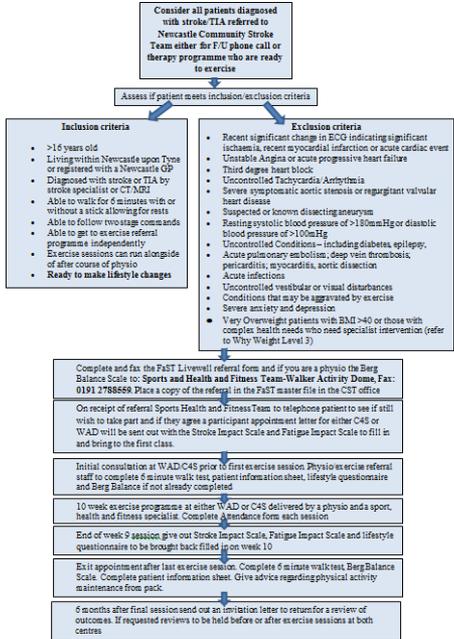


What, who, where, how?

**FaST**

**FITNESS AFTER  
STROKE MANUAL  
JANUARY 2013**

The Fitness after Stroke programme is an adaptation of the Fitness and Mobility Exercise Programme developed by Janice Eng 2006. The programme was developed based on research conducted by Dr Sarah Moore 2012.



**Fitness after Stroke**

- 10 week exercise programme
- Designed for people with stroke
- Held at Walker Activity Dome/Centre for Sport, Newcastle Upon Tyne
- Run by physiotherapists and fitness instructors



**FaST**  
Fitness after Stroke



**Exercise programme for people with stroke**  
Newcastle Community Stroke Team

## Inclusion criteria

- >16 years old
- Newcastle upon Tyne/Newcastle GP
- Stroke or TIA
- Independent walk 6 minutes with/without stick
- Two stage commands
- Independent travel
- Exercise sessions alongside/post physio
- **Ready to make lifestyle changes**

## Exclusion criteria

- Recent significant change ECG
- Unstable Angina or acute progressive heart failure
- Third degree heart block
- Uncontrolled Tachycardia/Arrhythmia
- Severe symptomatic aortic stenosis or regurgitant valvular heart disease
- Suspected/known aortic aneurysm
- SBP of >180mmHg, DBP of >100mmHg
- Uncontrolled Conditions
- Acute pulmonary embolism; deep vein thrombosis; pericarditis; myocarditis; infections
- Uncontrolled vestibular or visual disturbances
- Conditions that may be aggravated by exercise
- Severe anxiety and depression
- BMI >40

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Rater: \_\_\_\_\_

**1. SITTING TO STANDING**

*INSTRUCTIONS: Please stand up. Try not to use your hands for support.*

- (4) able to stand without using hands and stabilize independently
- (3) able to stand independently using hands
- (2) able to stand using hands after several tries
- (1) needs minimal aid to stand or to stabilize
- (0) needs moderate or maximal assist to stand

**2. STANDING UNSUPPORTED**

*INSTRUCTIONS: Please stand for two minutes without holding.*

- (4) able to stand safely 2 minutes
- (3) able to stand 2 minutes with supervision
- (2) able to stand 30 seconds unsupported
- (1) needs several tries to stand 30 seconds unsupported
- (0) unable to stand 30 seconds unassisted. If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

**3. SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL**

*INSTRUCTIONS: Please sit with arms folded for 2 minutes.*

- (4) able to sit safely and securely 2 minutes
- (3) able to sit 2 minutes under supervision
- (2) able to sit 30 seconds
- (1) able to sit 10 seconds
- (0) unable to sit without support 10 seconds

**4. STANDING TO SITTING**

*INSTRUCTIONS: Please sit down.*

- (4) sits safely with minimal use of hands
- (3) controls descent by using hands
- (2) uses back of legs against chair to control descent
- (1) sits independently but has uncontrolled descent
- (0) needs assistance to sit

**5. TRANSFERS**

*INSTRUCTIONS: Arrange chairs(s) for a pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.*

- (4) able to transfer safely with minor use of hands
- (3) able to transfer safely definite need of hands
- (2) able to transfer with verbal cueing and/or supervision
- (1) needs one person to assist
- (0) needs two people to assist or supervise to be safe

**6. STANDING UNSUPPORTED WITH EYES CLOSED**

*INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.*

- (4) able to stand 10 seconds safely
- (3) able to stand 10 seconds with supervision
- (2) able to stand 3 seconds
- (1) unable to keep eyes closed 3 seconds but stays steady
- (0) needs help to keep from falling

**7. STANDING UNSUPPORTED WITH FEET TOGETHER**

*INSTRUCTIONS: Place your feet together and stand without holding.*

- (4) able to place feet together independently and stand 1 minute safely
- (3) able to place feet together independently and stand for 1 minute with supervision
- (2) able to place feet together independently but unable to hold for 30 seconds
- (1) needs help to attain position but able to stand 15 seconds feet together
- (0) needs help to attain position and unable to hold for 15 seconds

**8. REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING**

*INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the finger reaches while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)*

- (4) can reach forward confidently >25 cm (10 inches)
- (3) can reach forward >12 cm safely (5 inches)
- (2) can reach forward >5 cm safely (2 inches)
- (1) reaches forward but needs supervision
- (0) loses balance while trying/requires external support

**9. PICK UP OBJECT FROM FLOOR FROM A STANDING POSITION**

*INSTRUCTIONS: Pick up shoe/slipper which is placed in front of your feet.*

- (4) able to pick up slipper safely and easily
- (3) able to pick up slipper but needs supervision
- (2) unable to pick up but reaches 2-5cm (1-2 inches) from slipper and keeps balance independently
- (1) unable to pick up and needs supervision while trying
- (0) unable to try/needs assist to keep from losing balance or falling

**10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING**

*INSTRUCTIONS: Turn to look directly behind you over toward left shoulder. Repeat to the right. Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.*

- (4) looks behind from both sides and weight shifts well
- (3) looks behind one side only other side shows less weight shift
- (2) turns sideways only but maintains balance
- (1) needs supervision when turning
- (0) needs assist to keep from losing balance or falling

**11. TURN 360 DEGREES**

*INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.*

- (4) able to turn 360 degrees safely in 4 seconds or less
- (3) able to turn 360 degrees safely one side only in 4 seconds or less
- (2) able to turn 360 degrees safely but slowly
- (1) needs close supervision or verbal cueing
- (0) needs assistance while turning

**12. PLACING ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED**

*INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.*

- (4) able to stand independently and safely and complete 8 steps in 20 seconds
- (3) able to stand independently and complete 8 steps >20 seconds
- (2) able to complete 4 steps without aid with supervision
- (1) able to complete >2 steps needs minimal assist
- (0) needs assistance to keep from falling/unable to try

**13. STANDING UNSUPPORTED ONE FOOT IN FRONT**

*INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width).*

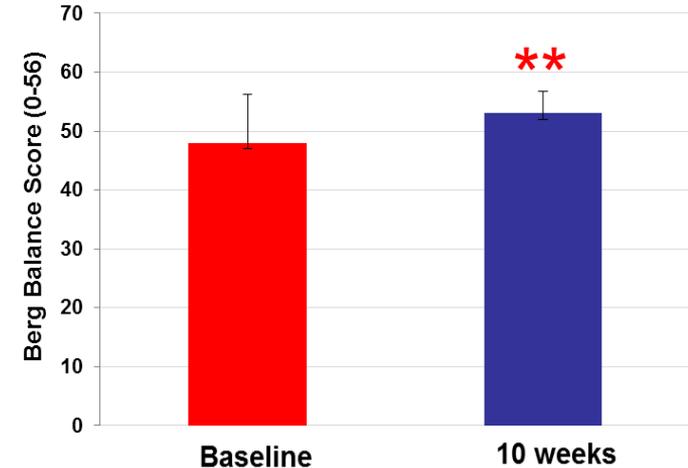
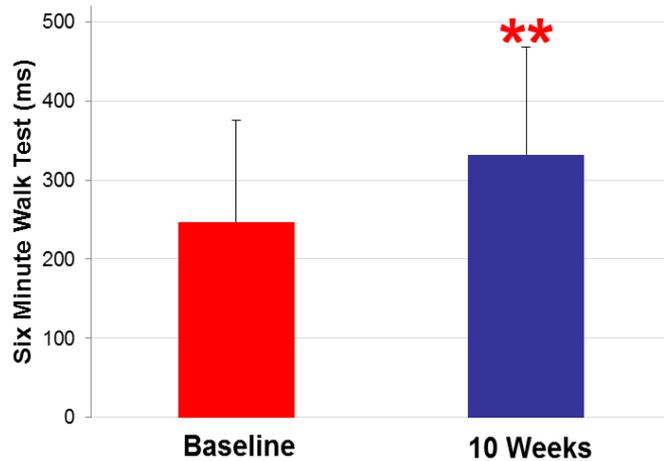
- (4) able to place foot tandem independently and hold 30 seconds
- (3) able to place foot ahead of other independently and hold 30 seconds
- (2) able to take small step independently and hold 30 seconds
- (1) needs help to step but can hold 15 seconds
- (0) loses balance while stepping or standing

**14. STANDING ON ONE LEG**

*INSTRUCTIONS: Stand on one leg as long as you can without holding.*

- (4) able to lift leg independently and hold >10 seconds
- (3) able to lift leg independently and hold 5-10 seconds
- (2) able to lift leg independently and hold = or >3 seconds
- (1) tries to lift leg unable to hold 3 seconds but remains standing independently
- (0) unable to try or needs assist to prevent fall

( ) TOTAL SCORE (Maximum = 56), a person scoring below 45 is considered to be at risk for falling.



*'A very worthwhile initiative, help and advice freely given with genuine care and concern'*

*'Increased knowledge and confidence in using outcome measures'*

*'Nice to see other stroke patients gave me hope for a full recovery.'*

*'I developed exercise skills which I went on to use with other patients in the community'*

*'Helped with confidence'  
'spot on'*

*'Excellent resource as a transition between completion of hands on rehab and accessing local services'*

*'Made me think about different exercises'*

*'Rewarding to see clients out of their home environment moving on with life'*

# Reflections

## What has gone well.....

- Short term improvement in function/QOL
- Positive qualitative feedback
- Skills mix
- Minimum adverse events (2 falls in 3 years)
- Regular audit with action planning

## Potential for improvement

- Post-group social
- Long-term monitoring
- Exit interview
- Transport
- Low referral rate
- Limited inclusion criteria

# Useful resources

Exercise after stroke website:

<http://www.exerciseafterstroke.org.uk/>

Fitness and mobility exercise programme (FAME)

<http://neurorehab.med.ubc.ca/fame/>

[Physical activity and exercise recommendations for stroke survivors: a statement for healthcare professionals from the American Heart Association/American Stroke Association.](#)

Billinger SA, et al **Stroke**. 2014 Aug;45(8):2532-53. doi: 10.1161/STR.0000000000000022. Epub 2014 May 20.

Contact: **Sarah Moore**

Email: [s.a.moore@ncl.ac.uk](mailto:s.a.moore@ncl.ac.uk)

**Simon Clark**

Email: [simon.clark@newcastle.gov.uk](mailto:simon.clark@newcastle.gov.uk)

Best Practice Guidance for  
the Development of  
**Exercise after Stroke Services**  
in Community Settings

Catherine Best, Frederike van Wijck, Susie Dinan-Young, John Dennis, Mark Smith, Hazel Fraser, Marie Donaghy, Gillian Mead



THE UNIVERSITY  
of EDINBURGH

November 2010

