FAME

A Group Exercise Program for People Living with Stroke

INSTRUCTOR'S MANUAL - Version 3

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www.fameexercise.com

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Vancouver Coastal Health
GF Strong Rehabilitation Centre

HEART & STROKE FOUNDATION

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List of Terms

Aphasia - Inability to understand or produce language

Circumduction - Leg rotates away from the body with each step in a semicircle movement pattern

Clonus - Muscular spasms characterized by repeated or rhythmic contractions

Dementia - Progressive brain disease characterized by memory loss, personality changes and impaired reasoning

Dysphagia - Difficulty or discomfort in swallowing

Fatigue - Subjective feeling of tiredness or exhaustion

Hemiparesis - Weakness over one side of the body

Impairment - State of weakness, damage, or being diminished due to a mental, physical, or cognitive condition

Orthosis - Assistive brace or other device used to provide support

Spasticity / Hypertonia - Exaggerated reflex activity of the muscles and tendons resulting in joint tightness, stiffness or contracture

Subluxation / Dislocation - Partial or full displacement of a limb from its normal joint position

Tone - Normal state of tension or responsiveness within the tissues

OVERVIEW OF THE FAME PROGRAM

The Fitness and Mobility Exercise Program (FAME) is a group exercise program developed for people living with stroke who have some standing and walking ability. The program was developed to fulfill the urgent need for a safe and effective exercise program to enhance mobility and fitness of people living with stroke who are generally older, less fit, have mobility problems and are prone to falls.

FAME is a group exercise program that can be easily implemented into inpatient or outpatient rehabilitation or community settings as it does not require costly one-on-one training, specialized settings or expensive equipment. The challenge is to achieve a level of exercise intensity, which will result in positive effects, yet ensure safety to avoid an exercise-related fall or cardiovascular event.

Based on clinical trials, the FAME Program has been found to improve motor function (muscle strength, balance, walking), cardiovascular fitness, and bone density of people living with stroke. The FAME Program may also help to reduce the risk of secondary complications such as falls, fractures, heart disease and dementia, which are common after a stroke. For more information, please refer to the section on Research Evidence.

GOALS OF FAME

- √ Increase the amount of physical activity of people living with stroke
- √ Provide a motivating and socially stimulating program to enhance exercise adherence
- √ Address multiple impairments arising from stroke
- √ Minimize risk of secondary complications (e.g., falls, fractures, heart disease and dementia)
- √ Provide an evidence-based, group exercise program for people living with stroke
- √ Serve as a complement to healthy living
- √ Improve fitness and mobility after stroke

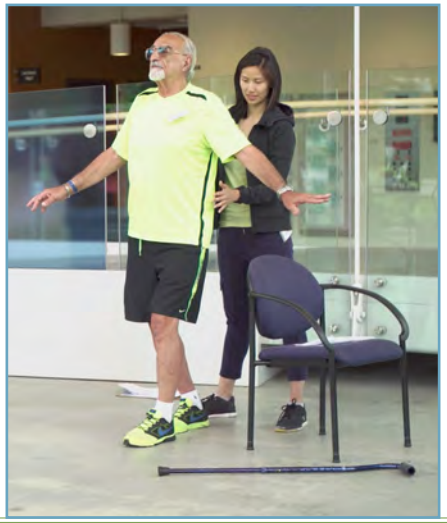
WHO IS APPROPRIATE TO PARTICIPATE?

The FAME program is designed for people living with stroke. There is no defined upper-limit as to who can participate, as the FAME program can physically challenge higher functioning participants to improve their physical abilities or prevent further decline. In addition, participants with compromised cardiovascular health would also benefit from regular exercise.

Participants should ensure that their medications are appropriately managed by their family doctor before exercising, such as medication for heart disease, high blood pressure, atrial fibrillation, diabetes, and osteoporosis. Additionally, a regular, well-balanced diet is critical for participants with diabetes.

Also ensure that people who have difficulty walking have an appropriately prescribed walking aid, like a walker or a cane. Participants with a known foot drop from their stroke should wear an ankle foot orthosis to allow their foot to safely clear the ground when walking. Those who have fallen in the last 6 months should wear a hip protector for safety. These can be purchased at a medical supply store.

NOTE: Those unable to stand or walk without support, or cannot follow instructions are not suitable for this group program.



WHAT ARE THE MINIMAL REQUIREMENTS TO PARTICIPATE?

- √ Able to stand for 5 minutes
- √ Able to walk 10 meters (30 feet) with or without assistive devices (cane or walker)
- √ Able to follow instructions and communicate with the instructor
- √ Medically stable (e.g., does not exhibit uncontrolled hypertension, angina, or seizures)
- √ Independent in making transfers and using the washroom

The FAME program is intended to be implemented by clinicians, therapists, or fitness instructors with knowledge and experience in the prescription of exercise for people with stroke. Instructors should understand common queries about stroke, and its impact on the ability to exercise. We recommend that a clinician serve as a resource for screening, progression and stroke-specific inquiries.

FAME RESEARCH EVIDENCE

The FAME Program was developed in Vancouver, Canada by Professor Janice Eng, PhD, BSc (PT/OT), with invaluable assistance from many graduate students, postdoctoral fellows and clinical colleagues, including Andrew Dawson, MD, FRCP, Maria Kim, MSc, PT, Jocelyn Harris, PhD, OT, Sif Gylfadóttir, MSc, PT, Daniel Marigold, PhD, Marco Pang, PhD, PT, Debbie Rand, PhD, OT, Ada Tang, PhD, PT, Amanda Mow, PT, Kristin Mow, OT, and Marie-Louise Bird, PhD, PT.

We are also thankful for the support from the Heart and Stroke Foundation, Canadian Institutes of Health Research, Vancouver Coastal Health Research Institute and G.F. Strong Rehabilitation Centre.

Six separate trials have helped to inform the development of the FAME Program. Major findings are documented below.

One of the unique aspects of FAME is that it has been compared to other active exercise programs, and not just a sedentary non-exercising group. For example, it has been shown to be superior to an exercise program consisting of weight-shifting, tai-chi and stretching exercises.

CATEGORIES	IMPROVEMENTS OF FAME GROUP
Balance Function	2-5 points improvement on the Berg Balance scale
Balance Reflexes	25 ms faster
Falls	1/3 less falls over 12 months
Walking Distance	25% further (6 minute Walk Test)
Balance Confidence	Increased 6-10 points (Activities Specific Balance Confidence Scale)
Cardiovascular Fitness	10% increase in maximal oxygen consumption (VO2max)
Muscle Strength	20-25% stronger
Hip Bone Density	Maintenance versus 3% bone loss in controls (DXA) Improved bone structure (pQCT)
Memory and thinking	Improvement in aspects of executive functioning including working memory, selective attention, and attentional conflict

OUR PUBLISHED RESEARCH WHICH INFORMED THE FAME PROGRAM

Bird ML, William M, Chu F, Acerra N, Wright A, Bagnell E, Hayley K, Yao J, Eng JJ. Building a Bridge to the Community – An integrated knowledge translation approach to improve participation in community based exercise for people after stroke. Phys Ther. In Press.

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FAME PRINCIPLES

Classes that include the following P.R.I.N.C.E. principles are considered to be compliant with the FAME program.

PROGRESSION

REPETITION

INTENSITY MONITORING

NORMAL MOVEMENT PATTERNS

CORE COMPONENTS (FAB

ENCOURAGEMENT

1. PROGRESSION

The body needs to be continually exposed to greater stress in order for adaptation to occur. Once participants have reached a plateau or they are able to complete exercises comfortably without pain, then the intensity and/or duration should be increased gradually to further challenge the body systems. Stop the exercise if there are signs of over-exertion (e.g., muscle soreness lasting more than a day or two, participants may stumble due to fatigue).

2. REPETITION

A unique feature of the FAME Program is the high repetitions of each activity. While 3 sets of 10 repetitions may promote muscle strength, it takes hundreds if not thousands of repetitions to improve the organization and strength of the neural connections in the brain (brain plasticity after a stroke. Repetitive exercise can strengthen the neural connections in the damaged area of the brain, as well as create new pathways through undamaged regions to make movement more efficient. Participants will start with 2 sets of 5 repetitions of an exercise and increase to 3 sets of 10 repetitions. Then that exercise will be progressed to be done continuously which is typically 5 minutes long.

3. INTENSITY MONITORING

The program should be run at a low to moderate intensity. The instructors have an important role in ensuring safety of the participants by monitoring them closely for response to exercise, signs of exertion and fatigue and pain.

4. NORMAL MOVEMENT PATTERNS

Normal movement patterns, biomechanics and postures should be encouraged, but abnormal or compensatory movements should not prevent participants from exercising or progressing unless pain persists or the movements jeopardize safety. Abnormal movement patterns may include postural tilt to one side, hunching forwards, circumduction of leg or shuffling gait.

5. CORE COMPONENTS (FAB)

Functional Strength

Although strength training and endurance exercises improve health outcomes, it is known that these improvements may not necessarily crossover to improved performance for functional tasks. For example, to improve the ability to rise from a chair, participants need to practice this specific task under challenging conditions, as strengthening lower limb muscles with resistance training may not be sufficient.

Agility & Fitness

Participants will increase their fitness and agility through the exercises in this component. Increase the duration before increasing the level of the exercise.

Balance

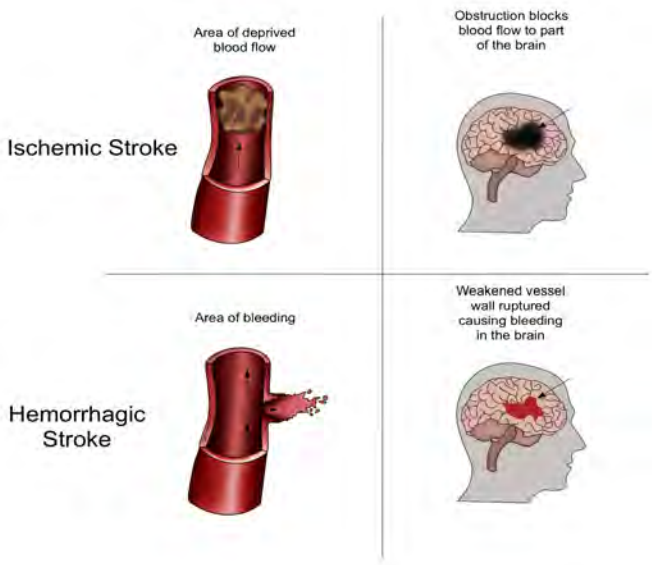
Balance is challenged while standing or moving, not while seated. Balance needs to be challenged in a safe and controlled way. Gradually remove hand support for standing exercises before increasing the balance duration.

6. ENCOURAGEMENT

Instructors have a principle role in providing an encouraging environment. By setting up activities that allow participants to experience success, they can improve their mental and physical health. The attitude of the instructor in providing positive feedback and encouragement motivates the whole group and is valued by them.

WHAT IS STROKE?

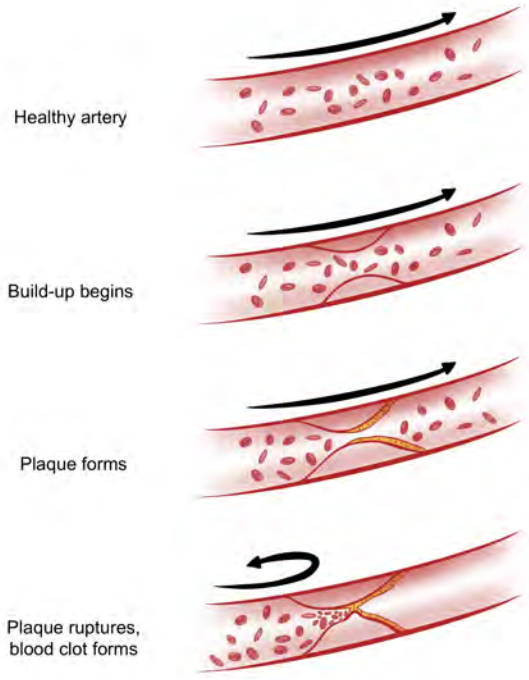
Stroke is the sudden loss of brain function that results when the flow of blood to a specific part of the brain is restricted leading to the death of brain cells in the affected area. Stroke is often categorized as either (1) ischemic - an interruption of blood flow to the brain, or (2) hemorrhagic - a rupture of blood vessels in the brain. Temporary or permanent loss of several functions may occur after stroke, including speech and movement.



CAUSES

Although stroke is considered a condition of the brain, the underlying pathology often leading to stroke is cardiovascular in origin.

- High blood pressure is the main risk factor for stroke, as it leads to arteriosclerosis and damages blood vessels in the brain.



STROKE STATISTICS

DEATHS

√ Every year, stroke claims 11% (6 million) of the total deaths worldwide

√ 2nd leading cause of death in the world

PREVALENCE

√ One in 6 people in the world will have a stroke in their lifetime

√ Risk of stroke doubles every 10 years after age 55

√ Typical age is 70-75 years at the time of stroke, but 25% of strokes occur in people under age 65

√ A stroke survivor has a 20% chance of having another stroke within 2 years.

√ 60% who have a stroke are women

RISK FACTORS FOR STROKE (80% OF ALL STROKES ARE PREVENTABLE)

- √ High blood pressure
- √ Cigarette smoking
- √ Obesity
- √ Diabetes
- √ Lack of physical activity
- √ Poor diet
- √ Alcohol consumption > 30 drinks/month
- √ Heart Disease

NOTE: Although most prevalent among older adults, stroke can occur at any age. There is an increasing number of younger adults who experience stroke, likely due to a rising number of people with diabetes and obesity. The ability to identify the common signs and symptoms of stroke often determines how quickly an individual receives treatment and will greatly influence the degree of impairment experienced post-stroke. Call for emergency services if you suspect someone is having a stroke.

IMPACT OF STROKE

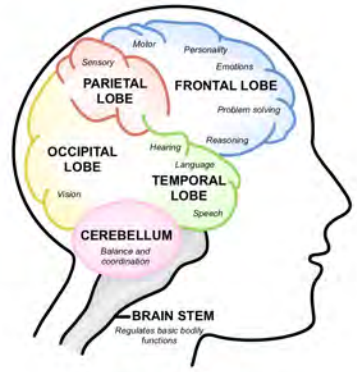
The impact and degree of functional impairment after stroke are highly dependant upon the location and extent of the damage to the brain. The amount of time the stroke is left untreated following an event profoundly influences the amount of brain damage incurred. The damage may potentially impact normal motor or sensory function, short or long term memory, and the ability to speak and understand language.

COMMON EFFECTS AFTER STROKE

- Muscle weakness on one side of the body (i.e., hemiparesis)
- Spasticity and abnormal muscle tone
- Fatigue
- Poor balance or lack of coordination
- Changes in cognitive function (e.g., memory, attention, reasoning)
- Reduced bladder or bowel control (i.e., incontinence)
- Speech difficulty
- Numbness or change in sensory function
- Reduced awareness of one side of the body (i.e., neglect)
- Difficulty swallowing (i.e., dysphagia)
- Poor vision and/or changes in vision

NEUROANATOMY BACKGROUND

The brain controls most of the movement and sensation in the body. It is compartmentalized into several segments (lobes), each with a specific function. The type of impairment or dysfunction present after stroke is often indicative of the damage sustained by the brain. The largest part of the brain is called the cerebrum which is divided into 2 sections: (1) the right hemisphere, and (2) the left hemisphere.



HEMISPHERES & FUNCTIONAL CONTROL

Each hemisphere of the brain controls the opposite side of the body. The right hemisphere controls the movement and sensation of the left side of the body and the left hemisphere controls the movement and sensation of the right side of the body.

RIGHT HEMISPHERE STROKES

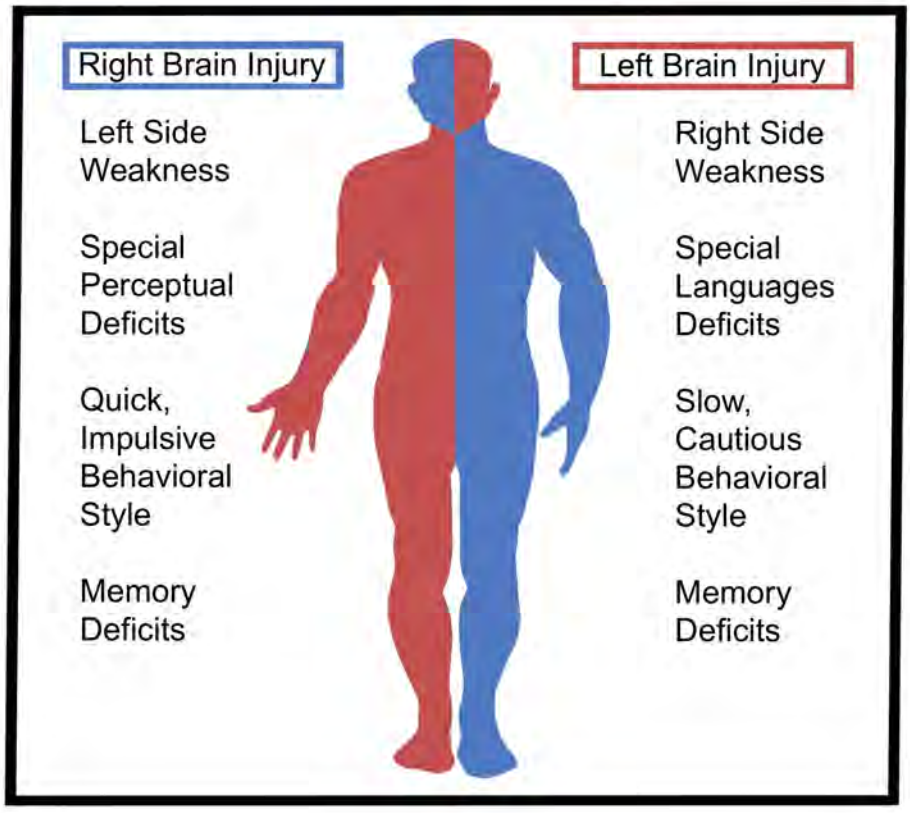
Strokes occurring on the right hemisphere of the brain affect motion and sensation on the left side of the body. They are also associated with the following symptoms and impairments:

- Loss of awareness of the left side of the body and anyone/thing on the left side. This is often refered to as left-side neglect.
- Vision problems
- Inability to recognize familiar objects or understand their use
- Difficulty judging distances, shapes and/or directions
- Impulsive behavior, mood swings, and poor judgment

LEFT HEMISPHERE STROKES

While strokes occurring on the left side or hemisphere of the brain often affect movement and sensation on the right side of the body, they may also produce the following symptoms and impairments:

- Problems understanding speech or trouble expressing thoughts (aphasia). Aphasia affects the ability to talk, listen, read and write.
- Slow, cautious behavior
- Memory loss resulting in shortened retention span and difficulty learning new information



STROKE TREATMENT

Treatment duration and hospitalization may vary among stroke survivors.

- Many stroke survivors will spend between 1-2 weeks in acute care
- Up to 1/2 of stroke patients go home directly after hospital admission
- 1/3 of stroke patients go to hospital rehabilitation for a period of 4-6 weeks
- Up to 1/4 of all stroke patients will go to nursing homes or other long-term care facilities

STROKE REHABILITATION

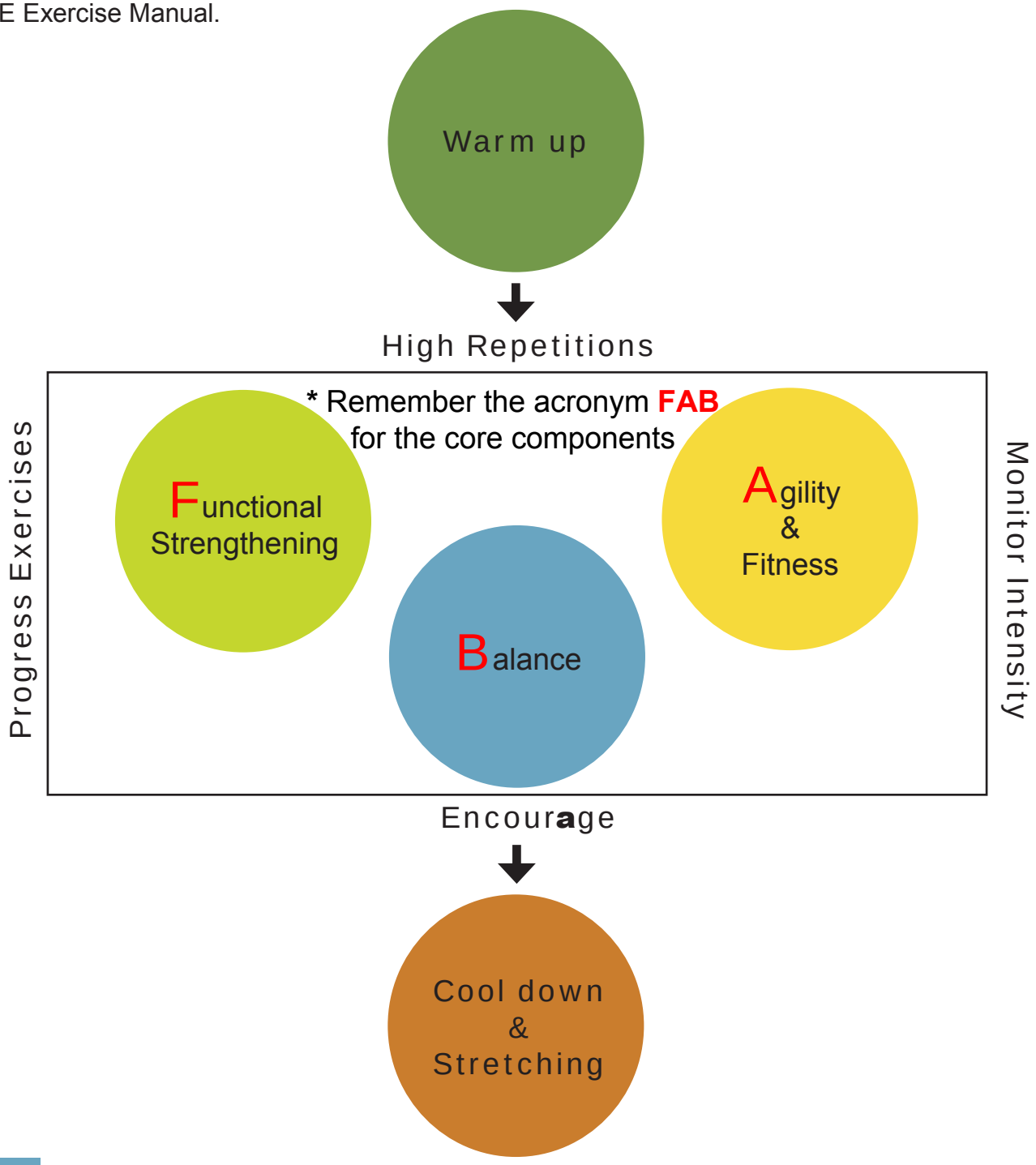
The following services may be used during the recovery and rehabilitation phase following a stroke

- Medical management, e.g., blood pressure medications, anti-depressants, cholesterol-reducing agents
- Nursing care
- Occupational therapy
- Physical therapy
- Speech therapy
- Recreation therapy

NOTE: Access to rehabilitation care is time limited. After 6 weeks, most stroke survivors do not receive hospital-based care or treatment.

FAME PROGRAM COMPONENTS

Each class is one hour long and is composed of a warm up, functional strengthening exercises, agility and fitness exercises, balance exercises and cool down stretches. Each of these components consist of several exercises to address different muscle groups. These exercises are outlined in the FAME Exercise Manual.



NOTE: Keep in mind that a high functioning group may be able to perform all the exercises, while others may only be able to do a select few from each category.

Warm up

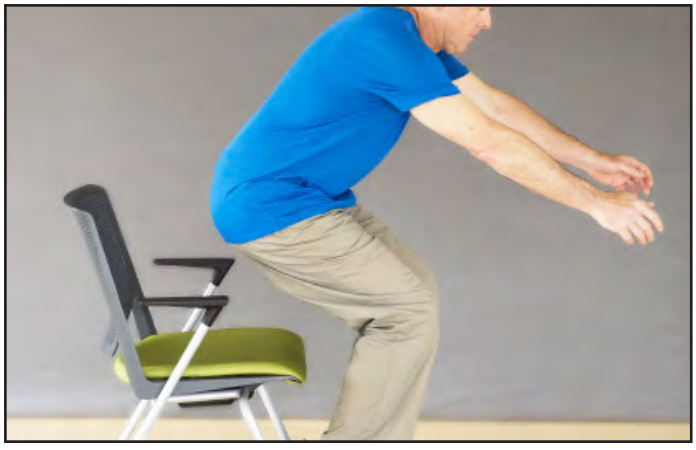
A low intensity warm up serves to gradually increase the body's temperature and blood flow, which helps prevent muscles from straining with more vigorous exercise. Warming up also helps maintain joint range of motion, which is usually decreased following a stroke due to weakness, muscle stiffness, spasticity or inactivity.

- Slow Marching
- Slow Marching + Swinging Arms
- Knee Circles
- Ankle Rotations
- Butt Kicks

Functional Strengthening

- Rise up on Heels
- Rise up on Toes
- Chair Push-Ups
- Sit to Stand
- Walking Around a Chair
- Wall Push-Ups
- Wall Sit

Functional strengthening involves exercises to improve muscle strength through repetitive, coordinated movements that challenge lower limb muscles. Altered motor coordination is evident following a stroke and improvements are best accomplished by utilizing functional movements and postures under challenging conditions. Strengthening exercises in standing also promote weight bearing and muscle activity which can help improve or maintain bone density.



Balance

- Slow Weight-Shifting
- Forward Reach
- Heel to Toe Standing
- Heel to Toe Walking
- One Leg Stands
- Figure-8 Walking
- Long Step Walking
- Backwards Stepping
- Pushed (1:1 only)

The balance component includes exercises to improve coordination and balance control. These exercises challenge participants to adopt a narrower base of support, to bear more weight on the stroke affected side or increase balance reflexes.

Agility & Fitness

- Stepping Up & Down
- Side Stepper
- Side & Forward Stepping
- Fast High Knee Marching
- Fast & Low Steps
- Quick Weight-shifting

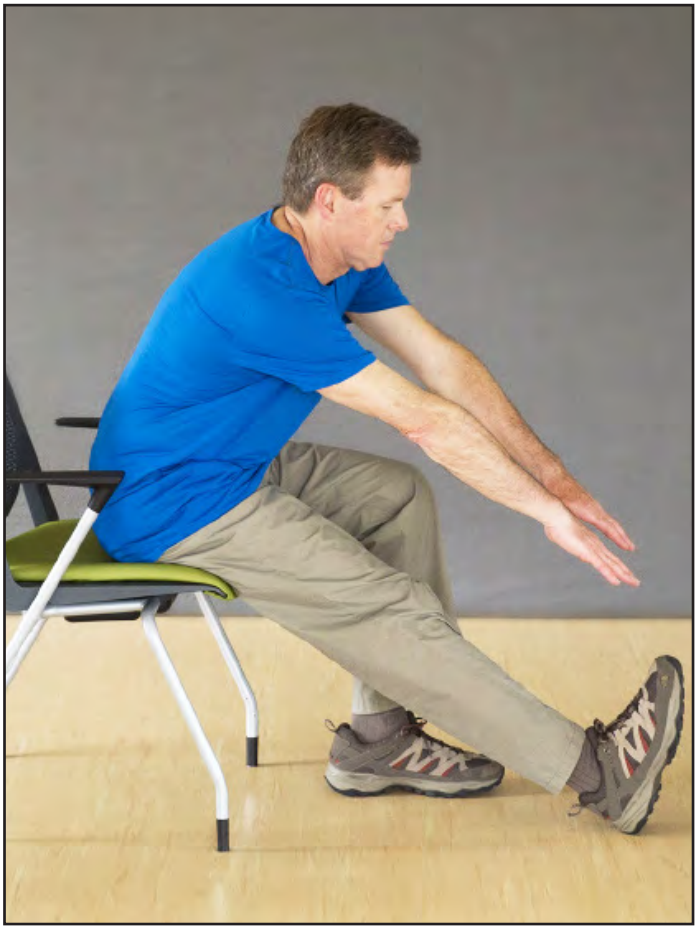
The agility and fitness component is designed to increase the speed of movement and improve heart health. Agility & Fitness are generally grouped together as fast movements using large muscle groups will increase the heart rate and challenge the heart. These exercises can help participants if they need to respond quickly, like stepping over a pothole or getting across the street before the light turns red.

Cool down & Stretching

- Trunk Side Stretch
- Trunk & Head Rotation Stretch
- Calf Muscle Stretch
- Thigh Muscle Stretch
- Buttocks Muscles Stretch
- Hamstring Muscle Stretch

NOTE: Ensure that stations are adequately spaced apart to provide sufficient space for safe exercise. If a participant were to stumble, he or she should be far enough from other participants, so that they do not collide.

The cool down is done at the end of the class to gradually return the heart rate to resting state. It is important that stretching is done when the body and muscles are warm. Stretching helps improve or maintain flexibility by preventing muscles from staying in a shortened position.



FAME PROGRAM COMPONENTS

REST BREAKS

The goal is to exercise continuously over the hour. However, participants do not need to continuously exercise initially. Rather, it is important to structure intermittent rest breaks in between exercises, as the onset of fatigue is likely to occur earlier for participants with lower cardiovascular endurance. For example, participants with low tolerance could commence with one set of sit to stands, followed by one minute of rest, then another set of sit to stands, and so on.

During their break, encourage participants to drink water. Remind participants to bring their own water bottle to class. As participants increase their stamina, gradually reduce the rest breaks each week as tolerated until continuous exercise is undertaken.

SEATED EXERCISES

Seated exercises should be done during the rest breaks to keep participants active and exercising at a lower intensity. Several of the above seated exercises focus on core or trunk control which can improve balance.

- Slow Marching with High Knees
- Knee Extensions
- Quick Foot Taps in multiple directions
- Side Leans & Reaches
- Forward Reaches
- Reclined Crunches
- Scooting Back & Forwards in Chair
- Hip Flexion
- Heel Toe Taps

Participants are encouraged to remain active during rest breaks by continuing to exercise at a lower intensity.

Provided are several exercises participants can do while having a seated break. Refer to FAME Exercise Manual for detailed instructions and videos.

DURATION & FREQUENCY

To achieve sustainable health benefits, participants should take part in the FAME program for a minimum of three months, with ideally three classes each week. Each class is one hour long. If the FAME program is delivered only twice a week, it is highly recommended that participants exercise one additional day at home. This could be going for a brisk walk for 30 minutes or doing some of the FAME exercises at home which have a low risk for falls. For example, Sit to Stands or brisk High Knee Marching with a counter for support, are some possible exercises. Ensure that participants understand the instructions to perform the exercises safely at home. A safe home exercise prescription should consider the participants' physical and cognitive levels, the presence and ability of caregivers or family support to monitor and assist with the exercises, as well as the available space.

FACILITIES & EQUIPMENT

The FAME program can be delivered in typical rehabilitation settings such as inpatient or outpatient hospital units, as well as in community settings (community centres, gyms, multi-purpose rooms or church halls). For safety, the room should be large enough to allow participants to do their exercises more than an arms length away from one another. Storage is needed for the chairs and steppers. The program will require one stable chair with armrests per participant and exercise steppers (one for every 3 to 4 people). Optional equipment include velcro cuff weights for higher-level participants who require greater challenge. A secured handrail or portable ballet barre is ideal for facilitating balance exercises, but the backs of stable chairs can also serve this purpose. A transfer belt is helpful for lower functioning participants. A heart rate monitor is recommended to set targets and monitor intensity.

INSTRUCTOR DUTIES

√ Understand issues specific to stroke

√ Have experience with exercise prescription for older adults with chronic disease

√ Be able to determine if a participant is eligible for the program or to refer for physician advice

√ Be able to progress exercises safely to challenge the musculoskeletal and cardiovascular systems while avoiding falls, excessive muscle soreness or fatigue and risk of cardiovascular events.

INSTRUCTORS

Depending on the size of the class, multiple instructors may be required. In general, one instructor for every three to five participants is required, depending on the level of function of the group. A more acute or inpatient rehabilitation unit might even operate the program with one physical therapist for two patients. We recommend that one instructor who has supervisory experience, as well as experience with individuals with stroke be designated as the lead to coordinate the other instructors and staff. Instructors should have relevant certification in exercise prescription, such as a physical therapy degree, personal trainer certification, rehabilitation assistant training or fitness instructor designation.

STAFF ROLES

CLINICAL ADVISOR

Having a clinical advisor experienced in stroke (e.g., physical therapist, physician, occupational therapist) involved with the FAME program is ideal. The clinical advisor may serve as a consultant and answer questions from the instructors regarding stroke presentation or management. The clinical advisor will also be instrumental in teaching the FAME program to instructors, as well as monitoring the quality of the program. It is also important to have a clinical advisor who may act as a navigator between local hospitals that will be discharging stroke patients into the community. Thus, the clinical advisor can assist with establishing a referral pathway from the hospital to community program.

SUPPORTING STAFF & VOLUNTEERS

University students who are interested in pursuing a career in health sciences (nursing, physical therapy, occupational therapy) are ideal volunteers, as these programs often require volunteer hours as part of the admission process. Their role includes demonstrating exercises, supporting and assisting the instructors, ensuring participants are performing the exercises correctly, and providing encouragement. Supporting staff should arrive at the facility 10 to 15 minutes prior to the start of class to set up the equipment. Equipment should also be cleaned with anti-bacterial wipes prior to and after the exercise class.

NOTE: If the FAME Program is implemented for the first time in your city or country, an instructor experienced in stroke and exercise prescription should be involved.

CARERS

In some cases, it is appropriate for a family member or caregiver to assist their participant in the program, particularly if they are familiar with transferring or walking with this individual in their home and community. The instructor will need to make a judgment whether the participant would benefit from having their carer assist them in the program. A carer who is the same age as an older participant may not have the physical abilities or attention to assist. As with volunteers, carers can assist with motivating the individual, encouraging upright posture, encouraging equal weight-bearing and assist with monitoring intensity especially if heart rate monitors are worn.

If the carer already provides transfer and mobility assistance in the home to the participant, they may be appropriate to help spot this individual in some of the balance activities.

SPOTTING PARTICIPANTS

Participants will benefit from people who provide physical support for some of the exercises, especially the more challenging balance exercises. To improve balance, the participant will eventually have to let go of their handhold and the spotter can provide that additional support. Whether the spotter is a fitness instructor, physical therapist, volunteer or carer, they need to be familiar with the following:

Any spotter needs to be in good physical shape and be familiar with basic biomechanics when physically assisting others. In particular, they need to understand how to keep their back straight and bend their knees when spotting a participant.

The size of the participant relative to the spotter matters. A very small spotter may not be safe to spot a large participant, especially if the participant is low functioning.

FAME exercises do not require any lifting. Spotters should be providing some physical guidance in helping the person balance. If heavy physical support is required, the individual is likely not appropriate for FAME and may require one-on-one therapy.

The spotter needs to stand close to the participant to be an effective spotter and have their hands ready and close to the trunk in case the participant's balance needs adjustment. The spotter should not grab onto the participant's stroke-affected arm or hand. Note that only some participants will have their arm or hand affected from their stroke. Ask the participant if their arm or hand is affected from their stroke.

A transfer belt may make it easier to spot the participant. A transfer belt is a wide, typically canvas belt with or without handles that is easy to grab onto.

Do not let the participant grab onto the spotter. Instead, the spotter can help the participant balance by lightly supporting the trunk or the non-affected forearm and upper arm.

PARTICIPANT RECRUITMENT

Operating FAME within an inpatient or outpatient rehabilitation setting will require coordination to schedule patients with appropriate abilities into one class. However, operating FAME in the community will require additional screening and recruitment efforts.

1. MARKETING

Distribute and post flyers or pamphlets on community boards, bulletins, community centre program brochures, or e-newsletters to garner interest and awareness. The title and description of the program, class dates, time and location, and administrator or lead instructor contact information should be clearly displayed. Pamphlets can also be distributed to social workers, doctors' offices, and hospitals to promote the program. It is important to clearly state who will benefit from the FAME program. By doing so, interested participants will hopefully be able to self identify whether they are suitable to participate. It is ideal if a referral pathway is developed, e.g., a referral to FAME from a stroke rehabilitation centre with a clinical person who can act as the liaison.

2. RECRUITMENT

Typically, there should be a maximum of ten participants per class but this may depend on the available space and instructors. We suggest promoting the program and recruiting participants 2-3 months prior to the scheduled class date. A sample poster is provided in the Appendix.

3. PRE-SCREENING

Screening may look different for each site, depending on the referral system and local community centre requirements. For example, interested participants or their caregivers can contact the lead instructor or program administrator or community centre by telephone or email. In some cases, screening may be done by the referring hospital. In other cases, the community centre may require the participants to provide personal information, complete the Health screening form and the Modified Physical Activity Readiness Questionnaire (PAR-Q) or Physical Activity Readiness Medical Examination (PARmed-X). Participants who can stand for 5 minutes, are able to walk 10 meters (30 feet) with or without assistive devices (cane or walker), are able to follow instructions and can communicate with the instructor, and are medically stable (i.e., do not exhibit uncontrolled hypertension, angina or seizures) are suitable for the program. These forms are available in the Appendix. Inclusion should be assessed on an individual basis.

4. MEDICAL CLEARANCE

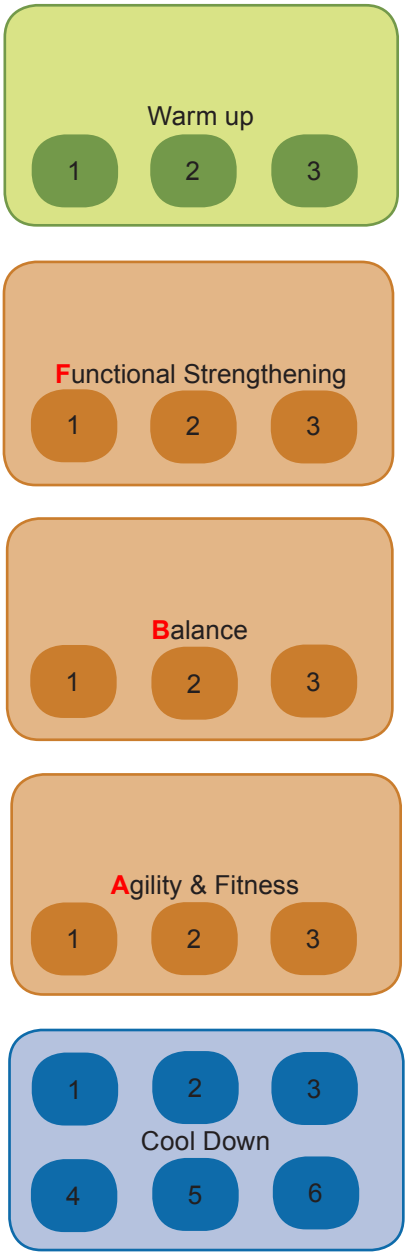
Medical clearance will depend on the type of referral pathway. Many community centres have their own medical information form, while others will require a physician-completed form if the participant has not been referred from a hospital.

5. CONTACT PARTICIPANTS

Once medical clearance is provided, it is ideal if lead instructors contact participants in advance to introduce themselves and to remind them about the scheduled start of the class. They may suggest participants arrive early in order to fill out any outstanding paperwork, i.e., consent forms, and remind them to bring water, their usual assistive device and braces, and to wear appropriate exercise clothing such as a t-shirt, shorts or loose pants and proper running shoes. Instructors should also be sure to provide detailed directions to the meeting location, as transportation may be an issue. Transportation is a known barrier and may require efforts to facilitate getting to the centre. This may include providing opportunities for carpooling or providing contacts for disability transportation resources. This is a critical piece required for success of the program.

FAME CLASS FORMAT

Before each class, select three warm up exercises to perform and select three exercises for each of the program components - **F**unctional Strengthening, **A**gility & Fitness, and **B**alance. Perform all cool-down stretches. Images, exercise descriptions, and video demonstrations can be found in the FAME Exercise Manual and website (www.fameexercise.com).
Review the exercise plan every week to determine if changes are required and to make the class more interesting. Also consider whether the exercises chosen require spotters and whether you have enough instructors or volunteers to assist. Always keep at least half of the exercises the same.



WARM UP

Use this time to engage with the class to better understand their expectations or to discuss local/current events, the weather or activities they have done. Address participants by name so everyone can get to know one another. Introduce the tip of the day.

EXERCISES

The majority of the class time will be spent performing **F**unctional Strengthening, **A**gility & Fitness, and **B**alance exercises. Each of these components includes three exercises. Each exercise will be progressed from 2 sets of 5 repetitions to 3 sets of 10 repetition, to then continuously for the full 5 minutes, totally 15 minutes for each component. Once the participant is familiar with the exercises and is doing higher numbers of repetitions, then variations in the exercises listed in the exercise manual can be introduced to make the activity more interesting. For example, within the 5 minutes, the Sit To Stand exercise can be done at regular speed; fast up, slow down; feet together; feet further ahead; and arms crossed on chest. Initially true sitting rest breaks may be required, but should be progressed so that seated exercises are done during rest breaks. Five-minute stations allow for a large number of repetitions to be done and also minimizes the switching of exercises which takes valuable instructor time. However, for some higher functioning, self-directed individuals who are able to do a lot of repetitions, 3-5 exercises can be done for each 15-minute component.

COOL DOWN

Cool down stretches are done as a group at the end of the class. Instructors can use this time to check in with participants and make important announcements. Remind the participants of the tip of the day.

FAME CLASS FORMATS

GROUP FORMAT

A single group format is ideal for small classes or for the initial classes when participants are learning new exercises. The instructor leads the class and the participants follow and perform the exercises together as a group. A group format works well for small class sizes with participants with similar abilities. Participants can move through the components together. If there is a large range of abilities, a circuit format may be more effective.

GROUP FORMAT EXAMPLE

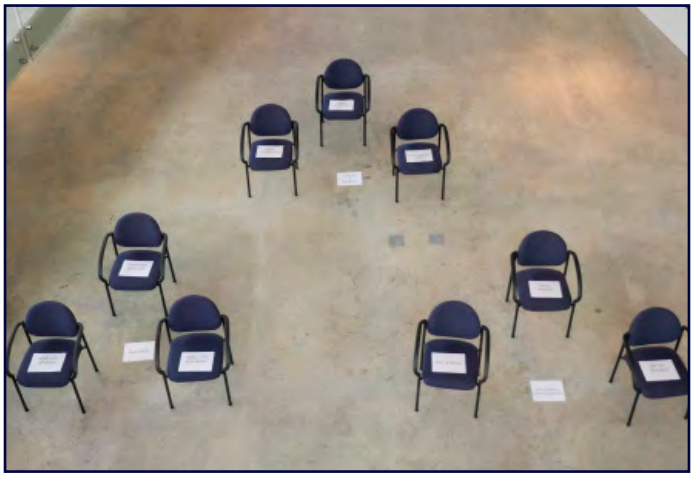
- Warm-up: Slow Marching, Knee Circles, Butt Kicks
- Perform 3 Functional Strengthening exercises:(Sit to Stands, Toe Raises, Heel Raises)
- Perform 3 Agility & Fitness exercises: (High Knee Marching, Side Stepper, Quick Weight Shifts)
- Perform 3 Balance exercises: (Heel Toe Walking, Single Leg Stands, Forward Reaches)
- Cool down: perform all stretches together

CIRCUIT FORMAT

After a few sessions, instructors will have some familiarity with the level of assistance and supervision required for participants, and at that point they may wish to switch to a circuit class format. To transition, organize the exercises for each component of the circuit.

A circuit class format maximizes space. For instance, it would be difficult for all participants to perform ambulatory exercises at the same time in a group setting. Less equipment is required as well, as steppers or weights are not required for each person at a given time. Instructors can also provide participants with attention when needed, as opposed to a group setting where instructors cannot adequately spot several participants for Balance Exercises.

We suggest that participants rotate as a group between the exercises within the station. For example, at the Functional Strengthening station, one participant will perform Wall Sits, another participant will perform Sit to Stands, and the third participant will complete Heel Raises. They will then travel together to the next station once they have all completed the three exercises within the station.



Grouping Participants

Once you are familiar with the functional levels of participants, strategically group participants by varying the functional levels in each group. Having low functioning participants all in one group can be very difficult, as they would require frequent supervision and spotting. Instead, have a mixture of low and high functioning participants in one group so that you can supervise the lower functioning participants while the higher functioning participants are more independent. Although such varying levels can appear unmanageable in a group setting, our experience is that such diversity is helpful for many reasons. We find that higher level functioning participants often encourage and motivate those with lesser function. In addition, the instructor can often get higher functioning participants started on an exercise set and then spend more time with those who may need assistance on some exercises. Instructors should quickly divide participants into groups, and assign them the specific exercise they should start on.

NOTE: For a given station, post the exercise sheets for each exercise as a reference copy for participants to refer to. Photocopies of the exercises from the FAME exercise manual can be used.

Organizing the Circuit

To stay organized, we suggest that instructors stay at one station while the participants move together to different stations that may have different equipment (e.g., steppers). This way, participants can work with different instructors. Depending on the exercises prescribed and function of the participants, be sure to position an instructor or volunteer to spot the participants at stations with greater balance demands. Ensure that participants have adequate space between each other.

Have a volunteer keep track and announce when to change stations every 15 minutes to manage time. Use a tambourine, dinner bell or invite participants to bring in a “noise-maker” for the day, like bongo drums, a bike horn or a musical triangle. It is important to bring the group back together for a cool-down to close the session.

FAME CLASS FORMAT

CIRCUIT EXAMPLE 1 (SIMPLE STATIONS)

Station 1: Functional Strengthening (5 minutes each)

- Sit to Stands, Toe Raises, Heel Raises

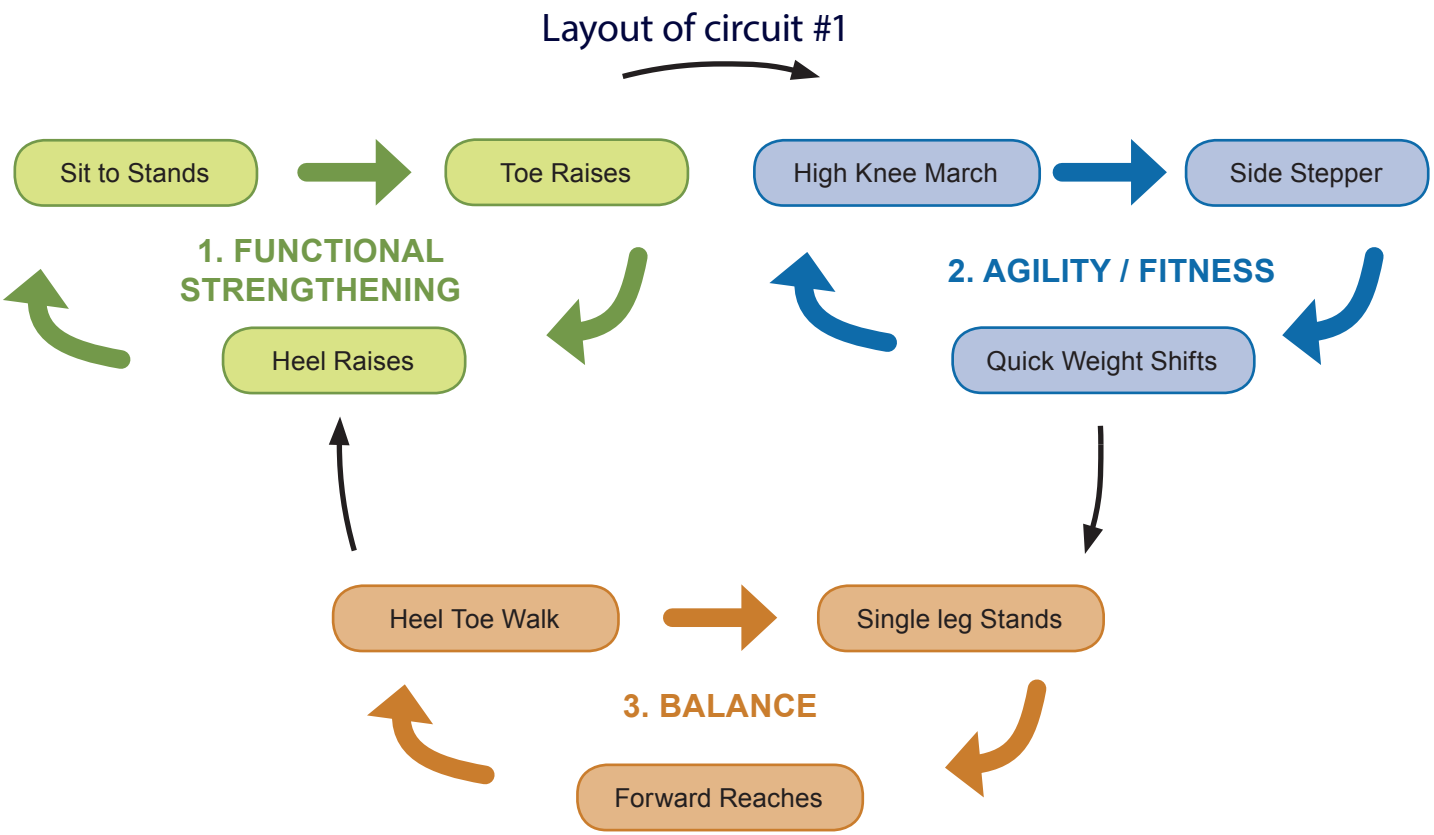
Station 2: Agility & Fitness (5 minutes each)

- High Knee Marches, Side Stepper, Quick Weight Shifts

Station 3: Balance Exercise (5 minutes each)

- Heel Toe Walking, Single Leg Stands, Forward Reaches

The simplest circuit has 3 stations, each with 3 exercises in the first sessions. This can be increased to 4 or 5 exercises over time, although some of our instructors prefer to stay with 3 exercises, each for 5 minutes for simplicity. Participants perform each exercise for 5 minutes, although variations in the exercise can be introduced (e.g., Sit to Stand, slow, fast, or feet together). Each station will be 15 minutes long. This circuit is beneficial, as participants get continuous aerobic training at the **Agility & Fitness** station and lower intensity activities at the other stations. Select 3 sitting exercises that will be done while people are resting.



NOTE: Ideal for more than 10 participants divided amongst 3 stations

FAME CLASS FORMAT

CIRCUIT EXAMPLE 2 (MIXED STATIONS)

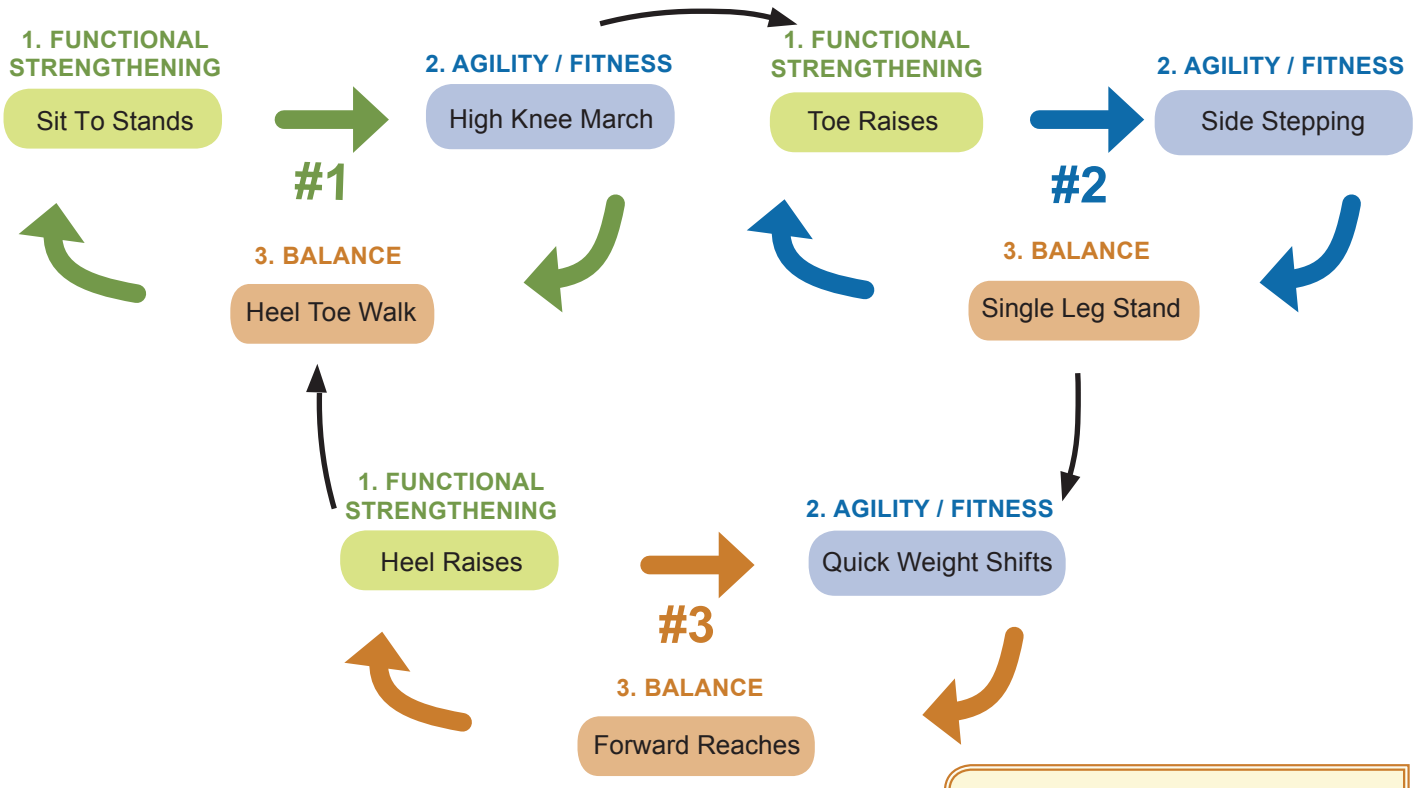
Station 1:
- Sit to Stands, High Knee Marches, Heel Toe Walk

Station 2:
- Toe Raises, Side Stepping, Single Leg Stand

Station 3:
- Heel Raises, Quick Weight Shift, Forward Reach

An alternative circuit could have a mix of exercises from each exercise component at a given station. For example, each station would be comprised of one Functional Strengthening exercise (e.g., Sit To Stand), one Balance Exercise (Heel Toe Walking), or one Agility & Fitness exercise (High Knee Marching). The two other stations would consist of a mix of different exercises as well. Mixed stations are preferred if there is a greater number of lower functioning participants. This way, slower Balance Exercises are distributed at each station and some form of rest is provided. Less spotting may be required with a mixed circuit.

Layout of circuit #2



NOTE: Ideal for less than 10 participants and if there are a greater number of participants with lower function

PREPARING FOR THE FIRST CLASS

ADMINISTRATION

If you are fortunate enough to have administrators, they can complete or collect any outstanding forms and class fees if not done so already. Ideally, the administrator should notify participants prior to the start of class to confirm screening and eligibility. If a program evaluation is desired, a pre-screen assessment can be done before the first class with the instructor to monitor progress. Suggested outcome measures are provided in the Appendix.

THE FIRST WEEK

Welcome participants to the class and provide nametags as they register. Reusable name tags are ideal as it may take a few sessions for everyone to learn each other's names. After administrative duties are completed, gather the participants into a circle and introduce yourself, the instructors, assistants and volunteers. Indicate that the format of the first class will likely differ from the rest of the classes, as some may be anticipating a full exercise class.

Begin by providing an introduction to the FAME program and the exercise components. Also describe the program components and highlight the benefits and contraindications of exercise.

Have participants introduce themselves – it is helpful to provide an ice-breaker such as providing their name and their favorite hobbies. Review housekeeping tasks, like safety procedures in the event of a fire and appropriate clothing for exercising. Encourage participants to let any instructors know if they are experiencing any adverse effects. Most importantly, take time to get to know the participants!

INTRODUCTIONS

For the first week of classes, introduce exercises at the first graded level regardless of the participant's functional ability to better gauge the participant's baseline level before progressing to the next level. Introduce a maximum of 3 exercises per station. Higher functioning individuals who complete all repetitions can take a short rest doing sitting exercises and then continue additional reps for the full 5 minutes. Demonstrate and repeat the same exercises for the first week. Participants may need several sessions to become familiar with the exercise and to increase their exercise tolerance.

Some participants may feel that they are not being challenged enough or may not find much value in the classes initially. Emphasize that the goal is to focus on proper technique, positioning and to increase familiarity with the exercises, rather than progression on the first week.

Our experience is that participants prefer slow changes to the program so they become familiar with the exercises while instructors tend to be more impatient in changing the exercises.

MONITORING INTENSITY

Intensity of the exercise should be monitored before, during and after exercise to ensure that the exercise stays within a safe threshold. Intensity can be measured using the Rate of Perceived Exertion (RPE) Scale, identifying the participant's ability to converse, and using heart rate measures. If a formal cardiovascular stress test has not been undertaken, then exercise should remain at moderate activity levels (average of 40% heart rate reserve over the session) or perceived exertion of 4 or 5.

Use at least two methods to accurately assess exertion in response to increasing exercise intensity, as one method may not be reliable alone. For example, heart rate may not necessarily increase with exercise when participants are taking beta blockers or other heart regulating medications. In this case, using the Rate of Perceived Exertion (RPE) Scale is the appropriate tool.

RATE OF PERCEIVED EXERTION SCALE

1 -	No exertion at all or extremely light
2 -	Very light
3 -	Light
4 -	Fairly light
5 -	Somewhat hard
6 -	Hard (heavy)
7 -	Harder
8 -	Very hard
9 -	Extremely hard
10-	Maximal exertion

The Rate of Perceived Exertion (RPE) scale ranges from 1-10. A moderate level of exertion is considered a 4-5 out of 10 on the RPE scale and should be the target for the FAME program. Monitor the participants' exertion level throughout the class to avoid over exertion or fatigue using the RPE. A printable copy is available in the Appendix .

SUMMARY

- Participants should identify their exercise Intensity as Fairly Light to Somewhat Hard on Rate of Perceived Exertion Scale.

OR

- Moderately Easy to Moderate on the Ability to Converse Scale (Talk Test).

Visibly post the ratings of perceived exertion scale at each exercise station for participants to refer to. A print copy is available in the Appendix.

ABILITY TO CONVERSE (TALK TEST)

The level of effort can be determined when talking to participants as they exercise. The target should be moderately easy to moderate (4 or 5).

1 or 2 - Very easy: can converse with no effort
3 - Easy: can converse with almost no effort
4 - Moderately easy: can converse comfortably with little effort
5 - Moderate: conversation requires some effort
6 - Moderately hard: conversation requires quite a bit of effort
7 - Difficult: can talk but must stop talking to catch breath, conversation requires quite a bit of effort
8 - Very difficult: conversation requires maximum effort
9 - Approaching to extreme: difficult to breathe
10 - Extreme effort: cannot continue

A printable copy is available in the Appendix.

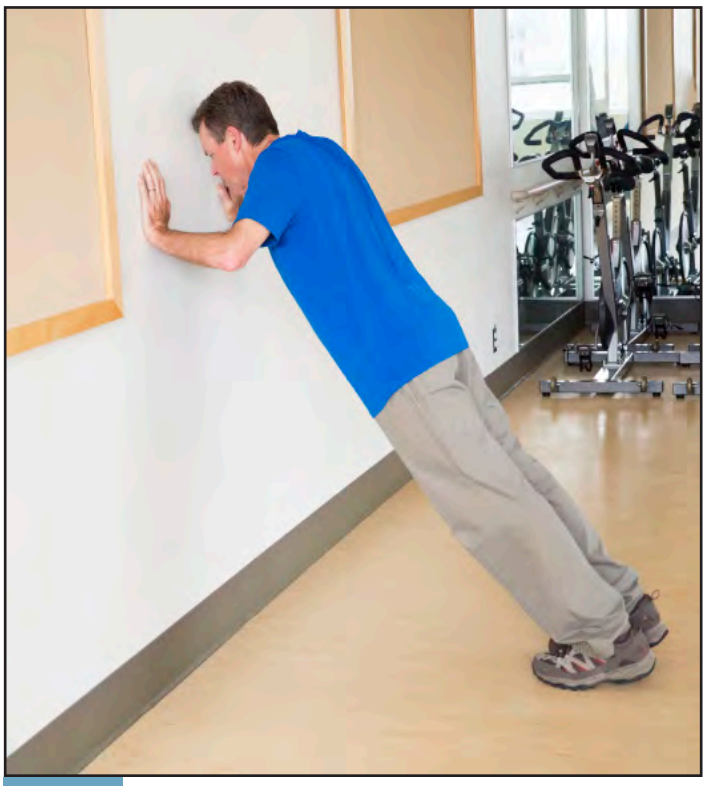
PROGRESSING EXERCISE COMPONENTS

FUNCTIONAL STRENGTHENING

Begin by progressing from 2 sets of 5 repetitions to 3 sets of 10 repetitions at a given level of difficulty. Once able to do so continuously and comfortably without pain or soreness for 3 sets of 10 repetitions, progress to the next level of difficulty. Again, start at 2 sets and 5 repetitions at the new level until able to complete 3 sets of 10 repetitions.

For example, have participants perform Chair Push-Ups at Level One difficulty first, with the buttocks remaining on the chair, for 2 sets and 5 repetitions. Then progress to 3 sets and 10 repetitions before attempting Level Two. Once participants have attained the maximum number of sets and the highest level of difficulty, they can continue the exercise for the entire 5-minute interval.

NOTE: Remember that the initial exercise ability will be different for all participants. Some may only be able to complete a few repetitions and may need to start with one set.



SUMMARY

- Increase repetitions
- Increase level of difficulty

BALANCE

Gradually remove hand support for standing exercises before increasing the balance duration for a given level. It is more beneficial to maintain balance for a shorter period of time without holding on than it is to maintain balance with hand support for a longer time.

The goal is to hold the balance position for 10 seconds without hand support before progressing to the next level of difficulty. Different challenges include changing or moving out of their base of support. Again, introduce this progression with some hand support and gradually reduce hand support as balance improves. Ideally, participants should try maintaining their balance at 10-second intervals for the duration of the station.

NOTE: Remember that spotters can spot the participant by having their hands close to the participant's trunk or lightly supporting their forearm and upper arm. Do not allow the participant to grab onto the spotter's arm.

SUMMARY

- Reduce hand support
- Increase duration spent in balance position
- Increase level of difficulty

AGILITY & FITNESS

Participants requiring hand support will start at Level 1 difficulty. If they do not need hand support, participants will start at Level 2. From here, gradually increase duration of continuous activity. For participants with very low aerobic tolerance, increase the duration of continuous exercise by one minute each week. The goal is to continuously exercise for 5 minutes at a comfortable pace. Then participants should target their exertion from Fairly Light to Somewhat Hard on the Rate of Perceived Exertion Scale.

Once able to exercise continuously for 5 minutes, progress to the next level of difficulty. This may mean reducing the hand hold or increasing the speed of the movement. This way, participants take more steps. Increasing speed also requires more balance and effort as opposed to performing Agility & Fitness exercises at a slower pace. The next progression would be to exercise continuously throughout the entire 15-minute Agility & Fitness component without rest at a Fairly Light to Somewhat Hard Rate of Perceived Exertion.

NOTE: Some participants may always require hand support for safety as they challenge their cardiovascular fitness. Continue to progress the level of difficulty and have participants use hand support if this is the case.

SUMMARY

- Increase duration
- Reduce hand support
- Increase level of difficulty

ADDING AN UPPER EXTREMITY COMPONENT

PURPOSE

Following a stroke, arm or hand control may be difficult or, in a small number of cases, not possible at all. This is due to weakness and poor muscle control. Some participants may have difficulty coordinating movements and adding an upper extremity component will be too demanding.

An upper extremity component is optional. It serves to increase the exercise intensity for participants with good coordination, exercise endurance and balance, especially since weights can destabilize balance.

The purpose of adding an upper extremity component is to strengthen the weaker, paretic arm. However, it is also beneficial to engage the non-affected arm. Participants will also exercise at a higher intensity due to greater muscle mass activated. It is difficult to increase the heart rate if only upper extremity exercises are performed, as the arm muscles are fairly small and tend to fatigue easily.

WHO IS APPROPRIATE

√ Have active upper extremity range of motion

√ Able to minimally raise arm up to 90 degrees without pain or discomfort

IMPLEMENTATION

First, determine whether a participant is capable of performing upper extremity exercises. Most participants should be able to use their unaffected arm, however, exercise considerations need to be made when exercising the stroke-affected arm. Participants with shoulder pain should not incorporate an upper extremity component as additional one-on-one monitoring is required

Add the upper extremity component later in the program when participants are comfortable with the FAME program exercises and if they need to be further challenged after completing the FAME levels of difficulty.

Use velcro weights instead of hand weights to avoid potential dropping of the weights and the hands remain free for balance if required.

UPPER EXTREMITY EXERCISES

Adding an upper extremity component and incorporating the trunk increases balance demands and challenges strength and proprioception. For example, performing Chair Push-Ups and Wall Push-Ups increase loading of the joints, while adding arm extensions when fast marching challenges balance.

When performing upper extremity exercises in conjunction with the FAME program exercises, participants will achieve gross muscular benefits. Upper extremity exercises focus on gross arm movements rather than fine motor control tasks.

Fine motor therapy may require specific hand exercises, which focus on precision, and are probably not suitable for combining with leg exercises. For fine motor exercises, refer to the fine motor exercises in the Graded Repetitive Arm Supplementary Program (GRASP) at www.neurorehab.med.ubc.ca

The upper extremity exercises include shoulder and elbow strengthening exercises as well as hand and arm stretches. Instructions are outlined in the FAME Exercise Manual. Most of these upper extremity exercises can be performed in conjunction with selected FAME program exercises. For example, participants can perform Lateral Arm Raises while in Heel Toe Standing or perform Bicep Curls during Wall Sits. Different combinations are suggested in the Upper Extremity Exercise Manual. As well, simultaneously moving the arms and legs also challenges coordination. Ensure participants adopt a safe and slow rhythm when adding an upper extremity component, like arm swings. This is because balance is more affected.

UPPER EXTREMITY EXERCISES

- Shoulder Retractions
- Back Twists
- Bicep Curls
- Lateral Raises
- Shoulder Raises
- Arm Extensions
- Arm & Hand Stretches

However, some FAME exercises are not suitable to be done with upper extremity exercises, like Chair Push-Ups. Alternatively, perform upper extremity exercises independently in between repetitions or sets when participants need to rest. For example, participants can perform a set of Shoulder Retractions after one set of Sit to Stand or participants can alternate repetitions, like one Sit to Stand followed by one Shoulder Retraction.

PROGRESSING UPPER EXTREMITY EXERCISES

Progression of upper extremity exercises is similar to progressing functional strengthening exercises. Begin with the 2 sets 5 repetitions, first level of difficulty, and then progress to 3 sets 10 repetitions. Once able to comfortably perform three sets, participants can progress to the next level.

Again, with any increase in exercise intensity, supervision is required to ensure participants are safe and pain free.

UPPER EXTREMITY CONSIDERATIONS

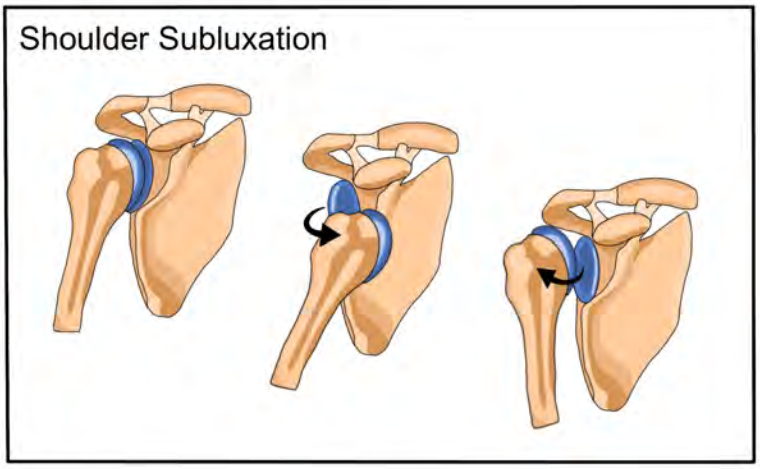
Participants may or may not have grasping ability and require modifi ations or adaptations, like using wrist weights. For safety, only use weights wrapped around the wrist or forearm and avoid hand held weights. Also be mindful of painful shoulder and hypertonia.

CUFF WEIGHTS

Sometimes participants may have a weak grasp or upper extremity hypertonicity that prevents them from holding an object or a weight. The weight of the arm itself may be enough resistance or the addition of a light cuff weight may be a better option.

SHOULDER PAIN

Shoulder pain is caused by muscle weakness and spasticity. This causes the shoulder to subluxate or partially drop out of the socket. The joint structures get stretched and the tissues and tendons get pinched with movement. Participants with a history of shoulder pain need to be treated with care.



Some participants wear a sling to reduce pain or may hold onto their stroke affected arm to raise it. It is important not to pull on the affected arm or to increase the stress with an added weight, as it is a vulnerable joint. Movements within the participant's pain free range of motion is recommended if an upper extremity component is incorporated. Encourage bilateral movements with safe mechanics (e.g., hold on to paretic arm during arm raises). Ensure that participants with a history of shoulder pain, subluxation or instability do not perform resisted over head movements (e.g., pulleys). Keep the upper limb under 90 degrees unless the limb is being stretched. The shoulder can be moved passively beyond 90 degrees to achieve greater range of motion.

Some participants may have mild shoulder pain following exercise in the first 1 to 2 weeks, but this should resolve with continued use and with exercises that help to stabilize the shoulder. However, if the exercises continue to aggravate the shoulder, modify or discontinue the exercises. If it persists, participants should see their physician.

MANAGING SHOULDER PAIN

- √ Do not pull on stroke-affected arm
- √ Avoid overhead, resisted movements (e.g., pulleys)
- √ Avoid arm positions above the horizontal if pain is present
- √ Instructor stands on non-affected side when spotting participant
- √ Use a sling or strap the arm if very painful *Clinical studies do not necessarily support this approach

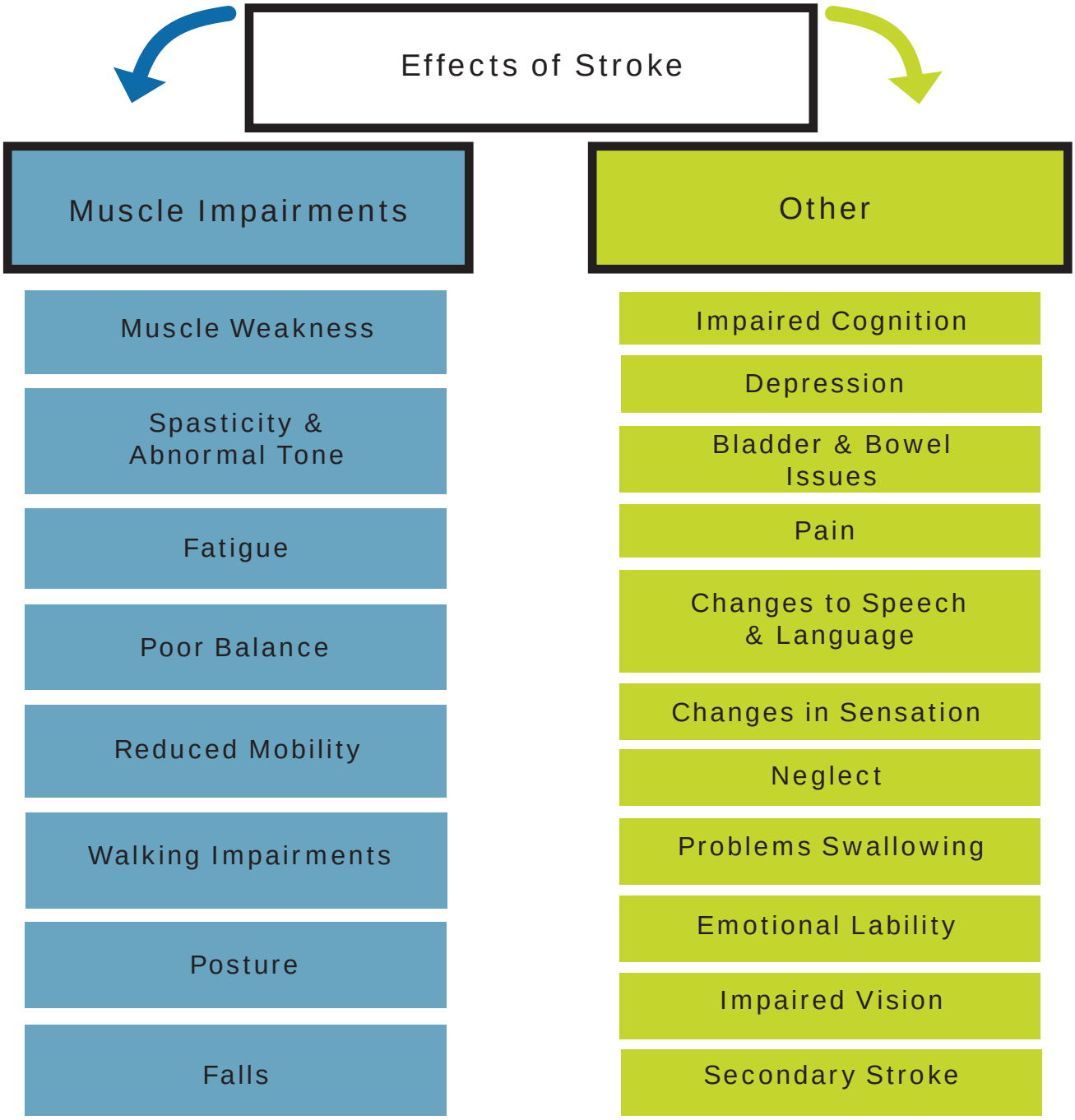
HYPERTONIA

Participants presenting with a paretic hand and/or arm have decreased range of motion and loss of motor control in the affected limb. Slow, passive stretching of the affected limb with the unaffected hand is beneficial and can be performed in conjunction with other exercises in the FAME program. If participants present with shoulder movement, they are encouraged to perform strengthening exercises as tolerated. Participants should place their stronger hand over the raised shoulder to prevent the shoulder from hiking.

The goal is to strengthen the weaker arm, but it is also beneficial to perform upper extremity exercises with the non-affected arm.

EXERCISE CONSIDERATIONS

In order to effectively implement the FAME program, it is important to understand how impairments following a stroke can affect the participant's ability to communicate, perform everyday activities and exercise. As an instructor, be knowledgeable of the effects these impairments have on participants' ability to understand instructions and perform exercises.



MUSCLE IMPAIRMENTS

MUSCLE WEAKNESS

A majority of stroke survivors will continue to have impaired muscle function one year post stroke. Muscle weakness, or hemiparesis, occurs on the side opposite to the brain injury. For example, disruption in blood flow on the right side of the brain, will affect the left side of the body. A small number of participants will experience the effect of stroke on both sides of the body.

As a result, controlling movement is difficult, like walking or grasping. Most often, participants will favor the stronger, non-affected side to compensate. This leads to further muscle weakening of the affected limb.

Muscle strengthening and activation of the weakened side is important post-stroke. Encourage participants to adopt proper sitting and standing postures and to walk with even steps between the right and left side. Continue to practice walking even if participants have different movement patterns, as the joints are still being loaded.

Discontinue if abnormal movements cause pain, discomfort or are unsafe.

SPASTICITY & ABNORMAL TONE

Spasticity can interfere with everyday activities, like dressing, and can cause pain from abnormal postures, joint contractures, or spasms. Spasticity is a result of altered muscle tone and increases when the muscle is stretched quickly or with greater physical effort. A spastic joint feels very tight and stiff when stretched.

Participants with stroke can exhibit various patterns of spasticity. For example, a participant with upper limb spasticity may present with a flexed upper extremity on the stroke-affected side as they walk faster.

Signs of spasticity include muscle stiffness (rigidity loss of range of motion, muscle spasms or clonus (muscle spasms), or outward rotation of the affected leg when walking. The stroke-affected arm is often held with the elbow flexed, and hand fisted.

Participants are encouraged to use their stroke-affected (weaker leg or arm as much as possible. Participants will likely favor the stronger, non-affected side, which may result in muscle imbalance, postural changes and compensatory movements. An affected limb which is not used equally between sides results in a continuing loss of muscle mass and bone density on that limb.

Be mindful of exercises that may evoke spasticity (i.e., quick lunges), as exertion or muscle strengthening can temporarily increase spasticity. For example, when walking faster, the elbow flexes and the hand will fist more often. However, it is important to understand that strengthening will not worsen spasticity. In fact, there is some evidence that exercise may reduce spasticity over time. The temperature of the room should also be monitored to prevent extreme temperatures.

For participants with high tone or rigidity, provide time and encourage participants to perform the movement. If the participant shows difficulty with the flexibility exercises (i.e., warm up stretches), consider adjusting exercises based on the participant's ability. Participants may also need a bit more assistance.

NOTE:
Treatments for spasticity include medication delivered orally or by injection to relax the muscle, like botox. Stretching may help to prevent permanent shortening of the muscles, so contractures do not develop.

FATIGUE

Following a stroke, participants may feel unusually tired because extra energy is used to cope with physical and emotional changes.

Exercise has been shown to reduce fatigue after stroke. However, it may take a few weeks for participants to adjust to the exercise. Encourage participants to take frequent rest breaks, especially when getting accustomed to exercise. It is normal to feel fatigued after exercising. If a participant is tired all the time, whether they are exercising or not, they should seek advice from their physician, as there are other causes of constant fatigue which can be treated, like depression and sleep abnormality. If exercise is causing extensive fatigue that affects other daily activities, then incorporate more rest breaks and reduce the exercise intensity.

POOR BALANCE

Poor balance can be attributed to one-sided weakness, reduced ability to sense joint and limb position, spasticity, as well as damage to the centres of the brain that control balance function and coordination.

REDUCED MOBILITY

These muscle impairments, as well as increased muscle tone, result in reduced mobility. Participants are less confident and may often adopt a sedentary lifestyle in order to avoid falls. The FAME program is designed to incorporate weight bearing activities that increase bone mass density and decrease the risk of sustaining a fracture from a fall.

Instructors should supervise participants particularly during balance and ambulation exercises. Participants with poor balance will need to hold onto a support during challenging exercises. This support can be the back of a stable chair or a rail fixed on the wall. Refer to the Fall Prevention section for strategies to keep participants safe when they exercise.

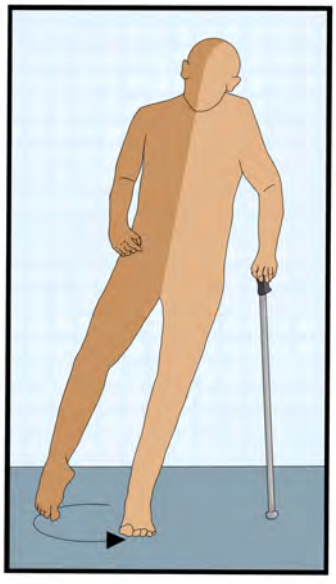
WALKING IMPAIRMENTS

Slower gait and abnormal gait patterns favoring the stronger side are common due to poor motor coordination and weakness on the affected side.

An abnormal-looking gait pattern should not be a reason to avoid walking activities. However, if walking is causing joint pain, encourage the participant to seek advice and treatment from a health professional (e.g., physician, physical therapist). Also, point out strategies to maintain good posture. Some compensatory strategies include limping, leaning towards one side or swinging the leg out to the side.

NOTE: Participants may rush when turning or pivoting on one leg, which can impair balance and result in a fall. Cue participants to turn slowly and to pick up their feet.

COMMON WALKING IMPAIRMENTS



FOOT DROP

Drop foot occurs when the stroke-affected ankle muscles are too weak and the toes do not clear the ground during the swing phase of gait. An ankle-foot orthosis (AFO) is a plastic brace that can help keep the ankle in a near 90 degree position and enables the limb to swing through without the toes hitting the ground. Some find an elastic cord between the shoe and ankle helpful.

KNEE HYPER-EXTENSION

Due to knee weakness, the knee may hyper-extend when walking as weight is transferred onto the limb. Hyper-extension can often be reduced with an appropriate prescription of an AFO from an orthotist or therapist.

CIRCUMDUCTION

To compensate for muscle weakness in the forward direction, the stroke-affected limb may "circumduct" or move out to the side and around to the front.

DECREASED ARM SWING

Participants may have decreased arm swing due to increased tone or spasticity. Others may not swing their arms or keep their arms out to the side to maintain balance.

WHAT IS "GOOD" POSTURE?

Adopting a proper posture may be difficult to attain especially following a stroke. Some participants may be limited by pain and adopt suboptimal postures to alleviate their pain, like leaning forwards. Others may be unable to adapt different positions due to tone and spasticity or may have structural abnormalities that prevent them from obtaining optimal posture. For example, participants with osteoporosis may have degeneration of their spinal column and appear kyphotic (bent forwards) or scoliotic. Despite these limitations, encourage participants to adapt more optimal postures by engaging their core and lower back muscles. The following images provide strategies to improve posture.

FALL PREVENTION

Fall prevention post stroke is extremely important, as 70% of individuals with a stroke fall within 6 months following hospital discharge and fall frequencies are high beyond 1-year post-stroke (Batchelor et al., 2010). In addition, stroke is one of the top risk factors for incurring fractures as a result of a fall in older adults due to poorer balance and osteoporosis on their stroke affected side. Call 911 if a fall occurs and the participant experiences pain or cannot get up on his or her own. If participants do not report pain and are able to get back up, have them stop exercising and rest. Have the participant follow-up with their physician. Hip protectors are highly recommended for all participants, and particularly for any participants who have fallen in the past. Adverse events must be documented and instructors need to determine whether the participant should continue with the program.

1. HIGH INSTRUCTOR TO PARTICIPANT RATIO

The instructor to participant ratio will depend on the level of the participants. One instructor and one assistant/volunteer to ten participants (1:5) is typical. If high fall risk activities are incorporated, one-on-one spotting is required and more instructors are necessary. Alternatively, fewer subjects with low motor function decrease the need for more staff to make the program safer.

2. PAY ATTENTION TO OVER-EXERTION

Participants should consult their physician if dizziness, chest pain or shortness of breath occurs. Instructors and participants should be aware of these signs and stop exercising. Participants with pain should have the exercises modified to work in a pain-free range.

3. EQUIPMENT MODIFICATIONS

It is important that the chairs used in this program are stable and do not glide easily on the floor. Add non-slip pads to the bottom of each chair leg to ensure that the participant will not fall as a result of a moving chair.

4. PREDICTABLE ENVIRONMENT

The FAME program can be done safely in a controlled environment. A competitive milieu is not encouraged as such spontaneity can lead to falls. For example, competitive activities (relay races) or unpredictable tasks (ball tossing) can lead to falls. Participants may be determined to win or catch the ball and become unaware of their personal safety and limitations. Unpredictable tasks where the environment is changing (e.g., standing or walking on foam, batting a balloon while standing) can be undertaken only if the participant is properly “spotted”. There are many ways to make the program fun without relays or competitive games.

5. SPOTTING

The FAME program is comprised of exercises that can be done with some hand support (wall/chair). Individually participants need to be “spotted” for more difficult balance exercises.

ASSISTIVE DEVICES

1. USE OF MOBILITY AIDS

Mobility aids are commonly used to help with walking and balance, as they increase the base of support. By improving balance, fall risk is reduced.

Common mobility aids include regular canes, quad canes, and four-wheeled walkers.

Some participants may use a power or electric wheelchair for long distances, but can walk short distances without it. Participants should be assessed by a clinician to ensure they are using the appropriate gait aid.

For ambulatory exercises, participants generally use their regular mobility aid (e.g., cane, wheeled walker). For balance exercises, the use of the mobility aid will depend on the specific exercise. For example, performing an exercise like balancing with one foot in front of each other could be done standing between two chair backs and having the participant reduce his or her hold on the back of the chairs. This is a safer alternative than solely using their gait aid for support if needed.

2. USE OF ANKLE FOOT ORTHOSES

Ankle foot orthoses (AFO) are used to compensate for weakness of the dorsiflexors that allow the ankle muscles to lift up the toes. The AFO helps the foot maintain better positioning during walking, and prevents the toe from catching as the foot swings through.

For safety, participants should use their AFO if they have been prescribed one. Be aware that participants often want to “throw away” AFOs if they feel they are improving. As with all assistive devices, participants should be assessed by a clinician if they want to change their assistive device or stop using it. Alternatively, some individuals find it helpful to have an elastic cord between the top of their shoe and ankle which can also reduce mild foot drop.

3. HIP PROTECTORS

For participants known to exhibit poor balance, have hip issues (arthritis, replacement), or had a fall within the last six months, it is encouraged that they wear hip protectors to prevent further injury if a fall or adverse event were to occur.

IMPAIRED COGNITION

More than 20% of stroke survivors have impaired cognitive function following a stroke, including difficulties with attention, concentration and memory (Nys et al. 2007). People with stroke also have higher risk for developing dementia, including Alzheimer's disease (Pendlebury 2009).

Be mindful that participants with attention difficulties may have a harder time focusing for the first sessions as the exercise program is new to them. They may also be impulsive and as a result, be unsafe.

For example, participants may not comply with instructions, like holding onto a handrail, and may not be aware of their own safety. Impulsive participants may not be appropriate for the group program. Attention generally improves as participants learn the structure and exercises of the program. Participants are often very content performing the same exercises as they feel more comfortable. Changes to the program are fine as long as they are introduced gradually.

DEPRESSION

Individuals who survive a stroke often have feelings of fear, anxiety, frustration, anger, sadness and a sense of grief from experiencing physical and mental losses. This is a natural response to the psychological trauma of stroke. However, depression which interferes with a person's daily functioning needs appropriate treatment from a healthcare professional. There are effective medications for depression. Exercise has also been shown to reduce depression after stroke.

BLADDER & BOWEL ISSUES

Bladder and bowel problems are common immediately after a stroke. Up to 20% of people, particularly women, report urinary incontinence and constipation in the chronic stage, which may be partly due to inactivity and effects of medications (Woodward, 2014).

Make sure participants know where restrooms are located and whether they will need assistance. If they do, consider having a family member or caregiver come with the participant to class.

PAIN

Participants may have pain for many reasons. Stop participants from exercising if they experience any pain with certain movements. Have the participant rate his or her extent of pain on a scale of 0 (no pain) to 10 (maximum pain) to monitor pain.

CHANGES TO SPEECH, LANGUAGE, & FACIAL EXPRESSION

Aphasia is a language impairment, often associated with a stroke of the left side of the brain. Damage to Broca's area of the brain may lead to expressive aphasia. In expressive aphasia, the person knows what they want to say, but cannot produce the words or sentences properly. Damage to Wernicke's area of the brain leads to receptive aphasia where people have problems understanding verbal information because the brain cannot process the sounds and the meaning of the words properly.

Expressive aphasia is rarely a significant problem during classes because participants can follow the actions. It is useful to ask their caregivers or family members about their preferred method of communication. Some may have text-to-speech programs and devices to communicate.

For those with severe aphasia, agree on a set of understood gestures. For example, if inquiring about pain or fatigue, participants can use a "thumbs up" to mean that they are fine, while a "thumbs down" indicates a problem. Alternatively, index cards showing 'Yes", "No" and "I don't understand" might be helpful. Print the RPE and pain scale for the participant to point and indicate their level of pain or fatigue.

NOTE: Those with severe receptive aphasia are not suitable to participate in the FAME program, as they will be unable to understand instructions or feedback.

COMMUNICATION STRATEGIES

- √ Speak slowly & clearly, not louder
- √ Speak in shorter sentences
- √ Speak respectfully & be patient
- √ Agree on understood gestures

CHANGES IN SENSATION

Participants may experience decreased sensation of the affected limbs, exhibit numbness and have poor proprioception, the awareness of joint position in space. Also, they may not be able to distinguish hot from cold.

As a result, participants may not be aware of an injury, like a skin abrasion, and pain might not always accompany muscle strains or injuries with altered sensation. Balance will also be affected, increasing the risk for falls when exercising.

Participants with stroke rely more on vision to compensate for some of these sensory deficits. Consequently, balance can be particularly challenging in low lighting or if the eyes are closed. If fortunate enough to have mirrors along the gym walls, participants will receive greater visual feedback and will be more aware of their posture and positioning. Participants will have more success correcting their movements.

Ensure that the temperature remains at a comfortable or cool level when participants are exercising. For instance, choose an air conditioned room or have fans available. Suggest that participants wear lightweight and easily breathable clothing when exercising and having water readily available to help with cooling is essential.

NEGLECT

Neglect is the loss of awareness of anyone or anything presented on one side of the body. It is common immediately after a stroke, but often resolves over time, and is less common in chronic stroke. Neglect is noticeable if participants do not use one side or have difficulty judging distances and shapes or directions, and have diminished motor and sensory coordination. For example, they may misjudge distances and bump into door frames.

As a result, participants may not use that side of the body and may become prone to injury. Cue participants to be aware of the neglected side by adjusting their movements to include the affected side, like reminding them to turn their head and scan their environment. Participants may need extra assistance to move the neglected side when exercising. Another strategy is to integrate exercises in midline. For example, use both hands to perform a bicep curl in midline as opposed to performing bicep curls separately. Spotting is required for balance activities.

PROBLEMS SWALLOWING

Approximately 50% of people following a stroke may have initial difficulties swallowing and may drool as a result of muscle weakness (Beavan, 2015). They may also be restricted to eat certain food consistencies and may be only able to drink thicker liquids. These difficulties often resolve in the first few months after stroke.

EMOTIONAL LABILITY

Emotional lability occurs because the areas of the brain responsible for awareness and control of emotion are damaged following a stroke. Participants may express strong emotion spontaneously, such as hysterical laughter, crying or increased anger or irritability, especially when stressed or fatigued.

Reassure the participant but refrain from providing too much attention, as this may increase the behaviour. Allow the participant to take a break to recollect emotions, change the topic, and engage in deep breathing techniques. Other volunteers should encourage other participants to continue exercising, as they may be distracted by this event.

IMPAIRED VISION

Following a stroke, eyesight may be affected. However, vision changes are usually resolved in the chronic stage.

If vision is limited, guide the participant through ambulatory exercises and provide clear and succinct verbal instructions. If the participant experiences vertigo (dizziness), sit them down and tell them to rest.

SECONDARY STROKE

Regular exercise can reduce the risk of another stroke. However, one-third of stroke survivors may still experience another stroke and experience further harm due to another insult to the brain. Common signs and symptoms of a stroke include slurred speech, paralysis or weakness, and sensory loss on one side of the body. Stroke is a medical emergency and 9-1-1 should be dialed immediately.

NOTE: Secondary stroke is considered a medical emergency. If participants experience any of these signs, call 911. Do not allow them to drive to the hospital. An ambulance will get them to the best hospital for stroke care.

Some participants may have other conditions associated with stroke. Instructors need to be aware of these conditions and be mindful of the potential effects as participants exercise.

Conditions Associated with Stroke

- Cardiovascular Disease
- Arthritis
- Seizures
- Diabetes

CARDIOVASCULAR DISEASE

Individuals with stroke are likely to have poorer cardiovascular (CV) health with cardiac arrhythmias, hypertension and atherosclerosis developed prior to their stroke or afterwards as a consequence of inactivity. Most participants will be on blood pressure medication and some will be on beta blockers to manage their symptoms.

If participants develop chest pain while exercising, ask them if they have brought medication (Nitroglycerin) with them. Some participants will be aware that they have occasional chest pain (angina) which is controlled with medication. However, if this pain is new, persistent (more than momentary or fleeting), or is associated with other symptoms (i.e., arm or upper body pain, nausea) then call 9-1-1, as this is a medical emergency. Meanwhile, have the participant rest and not participate. If the participant consistently presents with chest pain during exercise, stop the exercise and refer the participant to their doctor.

Be aware that beta blockers or calcium channel blockers will influence the heart rate and an alternate exertion measure, like the RPE scale, should be used.

ARTHRITIS

Many participants may have arthritis, as it is common in seniors. The lower extremities are more commonly affected and may limit participants from walking or weight bearing depending on the severity.

Participants may not be able to step or walk due to pain with flexing the hip or knee joints. Adaptations need to be made to increase function and reduce pain. Participants should be encouraged to work within a pain-free zone. Strengthening the muscles can often lead to reduced pain.

SEIZURES

A seizure is the result of abnormal electrical activity in the brain that causes brief brain dysfunction. Participants may be on medications to control or prevent seizures, but side effects include drowsiness, loss of muscular coordination and dizziness.

Seizures are common following a stroke or brain injury and are usually elicited by low blood sugar, infection, stress, changes in sodium or potassium levels or fever (Beghi et al. 2011).

In the event of a seizure, the participant typically loses consciousness, moves convulsively and has a blank gaze.

Be aware of participants with a history of seizures. If a seizure occurs, remain calm and attend to the participant. Other instructors and volunteers can continue to engage other participants in order to not draw too much attention on the incident. Do not restrain the participant or put any objects in the mouth. Remove any equipment away from the participant to protect the body from injury. Roll the participant onto the side afterwards. Following a seizure, seek medical assistance if the participant is injured. If not, refer the participant to see his or her doctor to control seizures and medication.

NOTE: When in doubt, seek medical attention and follow-up with the participant.

DIABETES

Participants presenting with type 1 or type 2 diabetes need to be able to self-monitor their blood glucose levels before and after exercising. The responsibility of the instructor is to be aware of the signs and symptoms of hypoglycemia (low blood sugar level) and hyperglycemia (high blood sugar level).

Exercise is highly beneficial for managing diabetes, as it can help the body effectively use insulin and improve insulin sensitivity. With exercise, however, blood glucose levels tend to decrease below the target range, which may lead to hypoglycemia. Participants may feel dizzy, nauseated, weak, light headed or present with numbness of their tongue or lips. Participants should stop exercising and check their blood glucose levels immediately. Participants should come to class prepared with light snacks consisting of fast-acting carbohydrates (e.g., juice, crackers). Have participants continue to rest and monitor their blood glucose levels 10 to 15 minutes after and continue to ingest more glucose if needed.

Less frequently, hyperglycemia (fasting blood glucose >11mmol/L) can occur as well. Symptoms include being thirsty, urinating more than usual and being fatigued. Participants should stop exercising and check their blood glucose levels. Encourage participants to drink water and refer participants to see their doctor if these symptoms are commonly present. The doctor may need to change the medication and insulin doses.

Decreased sensation of the feet is also common. Ensure participants wear proper footwear as any laceration, ingrown nails, or foot pain may go undetected and could lead to infection of the injury or greater damage to tissues. Balance while walking may also be compromised.

GET TO KNOW EACH OTHER

Have participants wear name tags for the first few weeks. Plastic pin-on badges are inexpensive and can be reused. Have participants leave the name badges with the instructor at the end of class or else they may get lost. Encourage the instructors to say the names of participants so people hear the names and can learn them quicker. Use the warm-up at the beginning to generate a short dialogue on one topic.

INVOLVE PARTICIPANTS

Have participants bring their favorite CDs or tapes to play or something they want to share with the class. This creates a focal point of discussion for participants.

CELEBRATE ACHIEVEMENTS

Have participants set goals at the beginning of the program to ensure participation is meaningful to them. Administering outcome measures at the start of the program, re-evaluating midway and at the end of the program is an objective way to mark progress. Suggested outcome measures are outlined in the Appendix. Providing FAME program completion certificates is also a way to celebrate participants' achievements.

INVOLVE FRIENDS & FAMILY

Include partners and spouses to participate in the program if they are safe to do so and get some exercise themselves.

MAKE EXERCISE FUN!

Promote fun activities in class, such as celebrating special events or themes e.g., wearing green on St. Patrick's Day or singing of Christmas or Hanukkah songs during the warm up on a day close to the holidays.

SOCIAL ACTIVITIES

Have a potluck tea (cookies, snacks) after the mid-way class and after the final class. Take a group photo and e-mail it to the class.

Top Tips

Choose one of the topics to talk about in the warm up. Remind people of this week's 'tip' in the cool down. Each heading has several different topics to talk about.

SAFE EXERCISE

- Know your limits
- Know the benefit
- Exercise can reduce pain and fatigue.

EATING & SWALLOWING

- Choking or inhaling food and drinks
- Dehydration
- Malnutrition
- Get help from a health professional if swallowing problems persist

PAIN

- Keep pain diary to see the pattern, which will help your health care provider to diagnose and treat
- Be physically active
- Relaxation or meditation
- Medication management

DIET

- Good diet with enough fibre (whole fruit and vegetables) will help with constipation, cholesterol and blood pressure
- Choose fresh foods
- Limit fats and avoid salt – check the labels
- Serving size – what is it – keep a diary

Top Tips

Choose one of the topics to talk about in the warm up. Remind people of this week's 'tip' in the cool down. Each heading has several different topics to talk about.

TALKING WITH YOUR HEALTH PROFESSIONAL

- Before you go – prepare what you want to say (write if need)
- Ask what you want, bring along a friend to help
- Repeat their answer to you
- Take the action they recommend

MEMORY - People after stroke often have problems remembering.

Tips to help:

- Use a planner or calendar
- Repeat things
- Store things in the same place
- Keep to routine
- Keep things simple
- Associate things and create a story

ATTENTION - Sometimes after stroke people have difficulty focusing.

Tips to help:

- Keep a diary
- Get plenty of rest and exercise
- Do brain exercises like Sudoku
- Minimise background noise and distractions
- Do one thing at a time

KNOW THE SIGNS OF STRESS

- Talk to someone, exercise, relax, do something fun
- Get enough good quality sleep
- Say no to things you don't want to do
- Say yes to things that you enjoy!

Top Tips

Choose one of the topics to talk about in the warm up. Remind people of this week's 'tip' in the cool down. Each heading has several different topics to talk about.

HELP WITH BLADDER CONTROL

- Exercises
- Develop good habits (go to the bathroom every 2-3 hours)
- Drink during day and less in evening
- Drink fewer caffeine and alcohol drinks
- Consider wearing pads

GOAL SETTING- There are several steps to follow when setting goals:

- Identify the options you can take to help realize the goal
- Choose an option to try out
- Specify how often it will be done, for how long, and when

MEDICATION MANAGEMENT- Participants may be on several medications and it is important to manage them.

- Create a daily routine of taking medication at the same time
- Use a pillbox or blister packs from your pharmacist to organize medications
- Use a diary
- Consult a doctor or pharmacist to address any concerns – simply discontinuing medications is not advised

FALLS

- Clear paths in home
- Wear non-skid shoes
- Avoid wet and slippery area
- Remove mats and loose carpets
- Ensure enough light
- Use handrails
- Avoid doing two things at once
- Don't rush

A Group Exercise Program for People Living with Stroke

APPENDIX & RESOURCES

CERTIFICATION GUIDELINES

All instructors, assistants, and volunteers must have standard first aid and Cardiopulmonary Resuscitation (CPR) certifications. In British Columbia, St. John's Ambulance and Red Cross are recognized certifiers. In British Columbia, fitness instructors and personal trainers are certified through the British Columbia Recreation and Parks Association (BCRPA) and must have the BCRPA Older Adult Designation to work with the senior population. Depending on the city or country of implementation, there should be an appropriate equivalent to these certifications and programs. It is important that instructors have appropriate insurance coverage and liability protection.

The benefits of being certified and registered through an organization (e.g., BCRPA) include coverage for liability, decreased risk of liability exposure, and support from the health community. Provided are the basic BCRPA guidelines for certification program details and requirements. For full certification guidelines, please visit the BCRPA website (www.bcrpa.bc.ca).

1. OBTAIN FIRST AID & CPR CERTICIFICATIONS

Content includes roles and responsibilities of first aid responder, casualty management, cardiovascular and respiratory emergencies, wounds and bleeding management, bone and joint injuries, and resuscitation techniques.

2. FITNESS THEORY COURSE & WRITTEN EXAMINATION

Content on anatomy, physiology, nutrition, exercise risks, common injuries, exercise prescription, injury prevention, etc.

3. REGISTRATION

Registration with the organization upon passing the written examination.

4. COMPLETE >1 SPECIALITY MODULE

- Weight Training Leader
- Group Fitness Leader
- Personal Trainer

A Group Fitness Leader module would be highly relevant for the FAME program.

5. COMPLETE PRACTICUM & EXAM

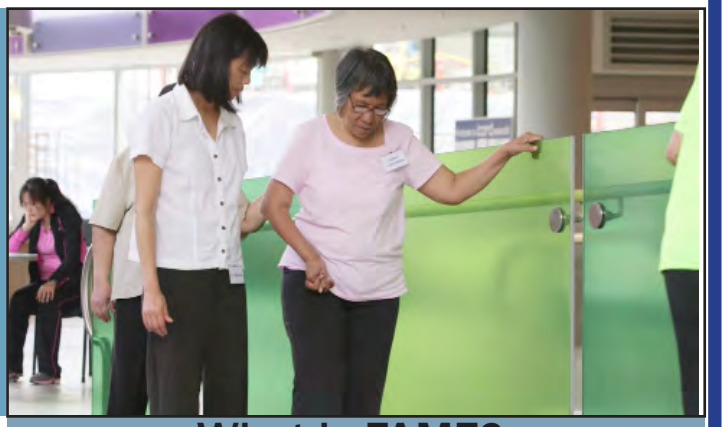
Successfully complete the instructor competency evaluation requirements (practical exam) for each module. Register with the organization upon completion of specialty module.

6. OLDER ADULT DESIGNATION

- Specialty exercise program and delivery to individuals 55 years of age and older
- Overview of physical activity and program modifications with aging
- Risk factors and injury prevention (e.g., falls)

Did you have a stroke and want to improve your muscle strength, balance and walking?

Join the Fitness & Mobility Exercise Program (FAME)!



What is FAME?

A community-based exercise program for individuals with stroke with some standing and walking ability.

Designed to enhance mobility and fitness, and to reduce the risk of secondary complications such as falls, fractures, and heart disease.

When?

September xxth to December xxth
Tuesday & Thursday
Time: XX-XX a.m.

Where?

Community Centre X
(X Street, Vancouver, B.C.) Room X

Program Components

- 1 hour classes- 2x/week
- $XXX class fee
- Includes warm up, exercises focused on balance, strength, and agility, followed by cool down and stretching

Contact Us:

Instructors Name:
Phone #:

Modified Physical Activity Readiness Questionnaire (PAR-Q)

Name:_____ Date: _____
DOB: _____ Age:_____

Regular exercise is associated with many health benefits, yet any change in your activity level may increase your risk of injury. Completion of this questionnaire is a first step when planning to increase the amount of physical activity in your life. Please read each question carefully and answer every question honestly:

Has a physician ever said you have a heart condition and you should only do physical activity recommended by a physician?

☐ Yes ☐ No

When you do physical activity, do you feel pain in your chest?

☐ Yes ☐ No

When you were not doing physical activity, have you had chest pain in the past month?

☐ Yes ☐ No

Do you ever lose consciousness or do you lose your balance because of dizziness?

☐ Yes ☐ No

Do you have a joint or bone problem that may be made worse by a change in your physical activity?

☐ Yes ☐ No

Is a physician currently prescribing medications for your blood pressure or heart condition?

☐ Yes ☐ No

Have you been diagnosed with Osteoporosis or had any fractures?

☐ Yes ☐ No

Do you have any lung or breathing problems?

☐ Yes ☐ No

Do you have insulin dependent diabetes?

☐ Yes ☐ No

Do you know of any other reason you should not exercise or increase your physical activity?

☐ Yes ☐ No

If you answered yes to any of the above questions, if you are over 40 years of age and have been inactive, or if you are concerned about your health, talk with your doctor BEFORE you participate in a fitness test or become substantially more physically active. Tell your doctor your intent to exercise and to which questions you answered yes. If you answered no to all questions you can be reasonably positive that you can safely increase your level of physical activity gradually.

Signature: _____ Date: _____

FAME Medical Information Form

I, _____(participant's name) consent to and authorize _____ (Doctor's Name), to release health information concerning my ability to participate in the exercise program. Authorization is not valid beyond 6 months from the date of signature. Further disclosure of release of my health information is prohibited without specific written consent of the person to whom it pertains.

Participant's Signature:_____ Date:_____

Instructor's Signature: _____ Date:_____

_____

Dear Doctor: Your patient, _____, wishes to participate in the Fitness and Mobility Exercise Program (FAME) for People with stroke. This program will include a 5 minute warm-up, 5 minute stretching component, 15 minute functional strengthening (e.g., repetitive sit-to-stand), 15 minute fitness and agility (e.g., step up stepper while holding onto support) and a 15 minute balance component (e.g., standing and reaching). The classes run two to three times a week over an 8 to 12 week period. The intensity will be gradually increased to a moderate intensity of 60% age-predicted heart rate maximum (i.e., fairly light to somewhat hard effort).

By completing this form, you are not assuming any responsibility for the exercise. However, this information will help us determine whether your patient is appropriate for the program. When completed, please fax this form to:_____.

Physician's Recommendation (please check 1 box)

I authorize the applicant to participate in the FAME program

- ☐ I am not aware of any contraindications toward participation in this program
- ☐ I believe the applicant can participate, but urge caution because:

_____
_____

- ☐ The applicant should not engage in the following activities:

_____
_____

☐ I recommend the applicant NOT participate in the FAME program

Physician's signature:_____ Physician's name (printed:) _____

Address:_____ Date:_____
_____

Community Center Information Form (Sample)

Assessment date: _____
Performed by: _____

Community Exercise Program for Stroke
Participant Information Sheet

Demographics	
Name	
Address	
Postal Code	Date of Birth
Telephone (Home)	(Work)
Emergency Contact (Name)	(Telephone)

Information on Stroke		
Date of Stroke (dd/mm/yyyy)		
Post-Stroke Impairments	☐ Left Sided Weakness ☐ Right Sided Weakness ☐ Communication ☐ Shoulder Pain	☐ Memory ☐ Attention ☐ Perception ☐ Vision
Assistive Devices	☐ Ankle Foot Orthosis (AFO) ☐ Cane	☐ Shoulder Brace/Sling ☐ Walker

Other Medical Conditions		
☐ Osteoarthritis of the...	☐ Knee ☐ Ankle	☐ Hip ☐ Other _____
☐ Osteoporosis		
☐ Cardiovascular Condition	☐ Congestive Heart Failure ☐ Heart Attack ☐ Heart Surgery ☐ Arrhythmia	☐ High Blood Pressure ☐ Valve Disease ☐ Angina ☐ Other _____
☐ Diabetes	☐ Type 1 (Insulin Dependent)	☐ Type 2 (Adult Onset)
☐ Other Conditions		

Safety - Risk of Falls		
☐ Low Risk	☐ Intermediate Risk	☐ High Risk
Increased supervision needed with the following exercise activities:		
Additional Information:		

FAME Program Participation Consent Form

FAME is a group exercise program developed for people with stroke who have some standing and walking ability. I am knowledgeable of the program components, which include warm-up exercises, functional strengthening, balance, flexibility, and agility, and cool-down activities. I understand the purpose of the FAME program and desire to improve my motor function (muscle strength, balance, mobility), cardiovascular fitness, and executive functioning as a result of participating in the FAME program. Progression of exercises is based on the discretion of the instructor and my needs as the participant. I understand that I am responsible for monitoring my own condition throughout the FAME program and should any unusual symptoms occur (pain, dizziness, nausea), I will cease my participation and inform the instructor of any symptoms, injuries, or illnesses.

In the event that a medical clearance must be obtained prior to my participation, I agree to consult and obtain written permission from my physician before commencing.

Also, I agree to assume the risks and consequences of exercising, which include pain, fatigue, falls, fractures, and in very rare cases, severe injuries or death. In no event will the University of British Columbia or developers of the program, be liable for any tort, personal injury, medical malpractice, death, product liability, loss of profit or data, or for special, indirect, or punitive damages, however caused and regardless of the theory of liability, arising out of or related to the use or inability to use the FAME program.

By signing this consent form, I affirm that I have read this form in its entirety and that I understand the description of the FAME program components. I also affirm that my questions regarding the FAME program have been answered to my satisfaction.

Signature of Participant: _____ Date_____

Signature of Lead Instructor: _____ Date:_____

EQUIPMENT GUIDELINES

The only required equipment are chairs with arm rests and steppers. Additional equipment such as dumbbell free weights, blocks, therabands, and heart rate monitors are optional.

STEPPERS

Steppers with anti-slip surfaces and bases are recommended. Ideally, the stepper should have adjustable heights.

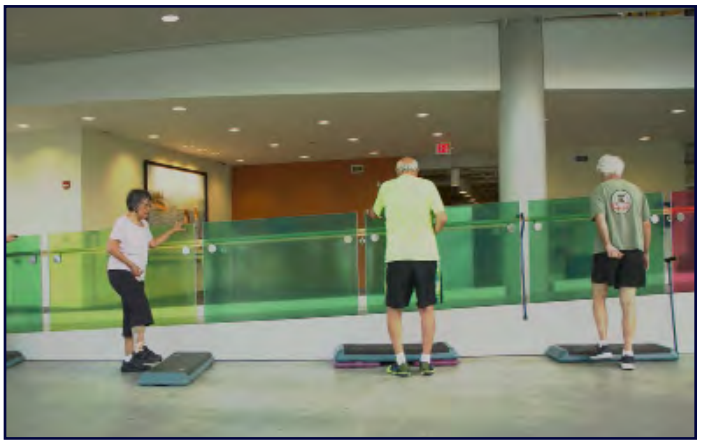
The Step: Anti slip surface, adjustable heights (4”-6”), supports up to 200 lb.
http://thestep.com
http://www.walmart.com

EQUIPMENT CHECKLIST Depends on class size and abilities

Date:_____

____ CHAIRS
____ WEIGHTS _____ (_____lb)
____ STEPPERS _____ (_____lb)
____ BLOCKS
____ THERA BANDS

Note:
Stackable chairs are ideal for storage. Additional stepper blocks may be added for more advanced participants.



HEART RATE MONITORS (OPTIONAL)

A heart rate monitor is highly recommended as a useful optional complement to the FAME Program to monitor exertion and provide motivation. Also, variability in heart rate may be indicative of underlying health issues (e.g., high resting HR), which may be helpful when deciding to include or exclude a participant from the program. Intensity of exercises can be adjusted based on the participant’s HR throughout the program. A monitor without a chest strap is ideal for participants with stroke and there are now several brands on the market. Brands change frequently with new technology. Current strapless continuous heart monitors include Fitbit, Polar, Garmin and Mio.

We have found that participants really enjoy using the heart rate monitors and several purchased their own for home use.

MEASURING PROGRESS

A number of valid clinical tests exist to measure and monitor participant progress. It is recommended to conduct a pre-, mid, and post-assessment based on the duration of the program. The first scheduled class can be used to introduce the program and conduct the tests. It is important to note that the maintenance of function, rather than improvement, may be considered a positive outcome given the known functional decline that occurs in the chronic phase of stroke. If desired, review the results with participants regarding their progress (or regression).

Typically, therapists applying FAME within an inpatient or outpatient rehabilitation setting will have expertise in comprehensive measures such as the Berg Balance Scale, Activities Specific Balance Confidence Scale, or the Community Balance and Mobility Scale. These are ideal as they are valid and reliable balance and mobility measures but take some practice and skill to assess, and also take a longer time that might not be feasible in some community settings. If there is not dedicated time for evaluation, we suggest conducting three short assessments which could even be done as part of the exercise class.

Designate one instructor to lead one of the three tests and assess participants separately. Volunteers can work with participants who are waiting to be screened and can clarify testing procedures. Participants may feel pressured to overexert themselves and engage in unsafe movements when being watched by other class members during their assessment. Ideally, conduct the tests in separate rooms or put dividers in between assessments. It may be helpful to introduce the assessments as activities to avoid stressing participants.

Refer to the following pages in the Appendix for the outcome measure procedures.

Short Assessments

√ Functional Reach Test
√ 10 Meter Walk Test
√ Timed Up & Go Test

Longer Assessments

√ 6 Minute Walk Test
√ Short Physical Performance Battery

Functional Reach

OBJECTIVE

- A test of balance, usually in the forward direction.
- Assesses the ability to move the center of mass towards the edge of the base of support.
- Can be modified to be performed in a seated position if required to cater for safety.

INSTRUCTIONS FOR ADMINISTRATION AND SCORING

ADMINISTRATION

- The participant is instructed to stand next to, but not touching, a wall and position the arm that is closer to the wall at 90 degrees of shoulder flexion.
- The assessor records the starting position at the 3rd metacarpal head on the yardstick.
- Instruct the patient to “Reach as far as you can forward swithout taking a step”. The location of the 3rd metacarpal is recorded.
- Scores are determined by assessing the difference between the start and end position which is the reach distance, usually measured in inches.
- Three trials are done and the average of the last two is noted.

EQUIPMENT

- A meter yardstick attached or line drawn horizontally to a wall
- A seat for resting between efforts or for performing the test in sitting
- A backboard (at an angle of 90 degrees).

SCORING

- The average of the three trials is reported in either centimetres or inches.

INTERPRETABILITY

Stroke

- A score of less than 15 cm may indicate a risk for falls

CLINICAL CONSIDERATIONS

This test measures balance and the ability to maintain the centre of mass within the base of support during trunk motion. It is used in healthy aging population as well as those with balance deficits from neurological conditions. It is used as a screening tool and to measure changes in performance over time and to assess the effects of an intervention.

10 Meter Walk Test (10 MWT)

OBJECTIVE

Assesses short duration walking speed (metres/second). This test has been used in various patient populations including stroke, Parkinson's disease, general neurological movement disorders and spinal cord injury.

INSTRUCTIONS FOR ADMINISTRATION AND SCORING

ADMINISTRATION

- Clinician-administered.
- Measure the time required to walk 10 meters.
- Administration time is usually less than 5 minutes.
- Performed using a "flying start": the participant walks 14 meters and the time is measured for the middle 10 meters.
- The participant walks at his or her preferred walking speed. Participants can use their usual assistive device, braces and must wear shoes.
- Instructions and a demonstration video can be found at: http://www.scireproject.com/videos/outcome-measures-group/lower-limb-walking/

EQUIPMENT

- 14 meter corridor
- Stop watch

SCORING

- The time to the nearest second is reported
- Walking speed (meters/second) can be calculated

INTERPRETABILITY

Stroke

- A change of 0.05 m/s is considered a meaningful change in older adults, including those with stroke (Perera et al., 2006).

CLINICAL CONSIDERATIONS

The 10 MWT only assesses walking speed and does not consider endurance, use of devices, or amount of physical assistance required. The test is conducted in a controlled environment, so results cannot be directly translated to a relevant or applicable context (i.e., crossing a busy street). The 10 MWT also requires the participant to ambulate a minimum of 14 meters. Assessment is easy to set up and administer, and is well-tolerated by most participant groups.

Timed Up and Go Test (TUG)

OBJECTIVE
- Timed walking test designed to measure gait performance and balance
- Originally developed as a clinical measure of balance in older adults

INSTRUCTIONS FOR ADMINISTRATION AND SCORING

ADMINISTRATION
- The participant is instructed to stand up from an arm chair, walk 3 meters, return to the chair and sit down at their preferred walking speed.

INSTRUCTIONS TO THE PATIENT
- "When I say 'go' I want you to stand up and walk to the line, turn and then walk back to the chair and sit down again. Walk at your normal pace."

EQUIPMENT
- Chair
- Stop watch
- 3 meter walkway

SCORING
- Time for 'Up & Go' test: _____sec
- Unstable on turning? Y/N
- Walking aid used? Y/N
- Type of aid: _____

INTERPRETABILITY
Stroke
- Scores greater than 14 seconds may indicate a risk for falling (Andersson et al., 2006)

CLINICAL CONSIDERATIONS
This test is used to discriminate balance and ambulatory function between participants and evaluate change over time in a single participant.

The task is very functional and incorporates mobility, balance and lower extremity leg strength.

The distance walked in the TUG is only 3 meters, so it is not a good test of endurance. The test is simple and fairly easy to administer.

6 Minute Walk Test

OBJECTIVE

- A self-paced test. It measures the distance that a participant can walk on a flat, hard surface in 6 minutes
- Assesses the sub-maximal level of functional capacity
- The test in its entirety evaluates the integrated response of pulmonary, cardiovascular, and circulatory systems, in addition to level of motor control, functional neuromuscular units, and muscle

INSTRUCTIONS FOR ADMINISTRATION AND SCORING

ADMINISTRATION

- May be performed either indoors or outdoors, along a long, flat, straight, and hard surface
- 6 minutes is required for the actual test
- 5-10 minutes is required to set up and explain the test to the participant
- the American Thoracic Society (ATS) recommends that the walking course should be 30 meters in length, marked every 3m, 5-10min required for set up and explanation
- The participant uses their usual walking aid and braces during the test.

EQUIPMENT

- Countdown timer
- Tape Measure
- Cones to mark the Turnaround
- Chair that can be easily moved along the walking course if a rest might be required

INTERPRETABILITY

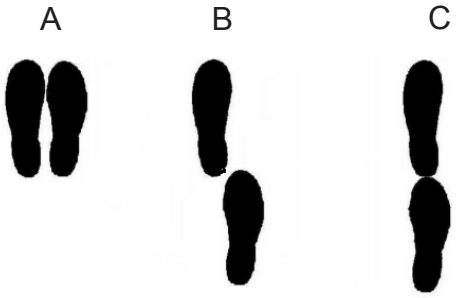
Stroke

- A change of 34 meters has been suggested as a meaningful change (Tang et al., 2012)

Short Physical Performance Battery (SPPB)

OBJECTIVE

The SPPB is a reliable and valid mobility measure which has three balance tests, a walking test and a chair rise test. People can receive a maximum score of 12.



INSTRUCTIONS FOR ADMINISTRATION AND SCORING

ADMINISTRATION

Balance tests: (Equipment – stop watch) Explain 'We are looking at your standing balance. We want to know if you can stand for 10 seconds without holding with your feet in certain positions.

A. Side-by-Side balance test
Explain "Begin with feet together beside each other. I want you to try to stand with your feet together, side by side, for about 10 seconds. Please watch while I demonstrate. You may use your arms, bend your knees, or move your body to maintain your balance, but try not to move your feet. Try to hold this position until I tell you to stop". If successful, score 1 point and move to next balance task.

B. Semi Tandem
Repeat in semi tandem stand (heel of one foot placed by the big toe of the other foot). Explain "Now I want you to try to stand with the side of the heel of one foot touching the big toe of the other foot for about 10 seconds. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate". Demonstrate. If successful, score 1 point and move to next balance task.

C. Tandem Stand (feet directly in front of each other)
Explain "Now I want you to try to stand with the heel of one foot in front of and touching the toes of the other foot for 10 seconds. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate". If holds for 10 seconds give a score of 2 points. Give 1 point if holds for 3-9.99 seconds

Walk test: (Equipment - Measuring Tape, stop watch and cone
Measure out 4 meters. Place a cone at the end.
Explain "This is our walking course. If you use a walking aid when walking outside your home, please use it for this test. I want you to walk at your usual pace between the two cones Walk all the way past the cone before you stop. I will walk behind you. We will be doing this test two times". Score for the lowest time.

Repeated chair stands: (Equipment – chair 45cm and stopwatch
Explain "I want to see how long it takes you to stand up and sit down as quickly as possible 5 times without stopping. After standing up each time, sit down and then stand up again. Keep your arms folded across your chest. Please watch while I demonstrate. I'll be timing you with a stopwatch" Demonstrate. Start timer when they bend forwards at hips. Count number out loud. Stop when they have straightened for the fifth time. Stop if they use their arms, get short of breath of if you are concerned for their safety or after one minute.

SCORING

Score Sheet

Detailed instructions and protocol can be found at fameexercise.com

1. Balance Tests – note if 0 points on 1A or 1B, end Balance Tests

A. Side-by-side-stand:		B. Semi-Tandem Stand:		C. Tandem Stand:	
Held 10 sec	❒ 1 point	Held 10 sec	❒ 1 point	Held for 10 sec	❒ 2 points
Not held for 10 sec	❒ 0 point	Not held for 10 sec	❒ 0 point	Held for 3 to 9.99 sec	❒ 1 point
Not attempted	❒ 0 point	Not attempted	❒ 0 point	Held for < than 3 sec	❒ 0 point
				Not attempted	❒ 0 point

D. Total Balance Tests (sum points)

2. . Gait Speed Test (sec) using 3 or 4-Meter Walk

Record the shorter of two times in seconds. If the participant was unable to do the walk: ❒ 0 points

For 3-Meter Walk:		Or For 4-Meter Walk:	
If time is more than 6.52 sec:	❒ 1 point	If time is more than 8.70 sec:	❒ 1 point
If time is 4.66 to 6.52 sec:	❒ 2 points	If time is 6.21 to 8.70 sec:	❒ 2 points
If time is 3.62 to 4.65 sec:	❒ 3 points	If time is 4.82 to 6.20 sec:	❒ 3 points
If time is less than 3.62 sec:	❒ 4 points	If time is less than 4.82 sec:	❒ 4 points

3. Repeated Chair Stand Test

Record time in seconds for participant to stand up from a chair 5 times without use of their arms.

Participant unable to complete 5 chair stands:	❒ 0 points
Unable to complete without using arms:	❒ 0 points
Completes stands in >60 sec:	❒ 0 points
If chair stand time is 16.70 sec or more:	❒ 1 points
If chair stand time is 13.70 to 16.69 sec:	❒ 2 points
If chair stand time is 11.20 to 13.69 sec:	❒ 3 points
If chair stand time is 11.19 sec or less:	❒ 4 points

Total Score: _____

INTERPRETABILITY

A change score of 1 considered the minimally clinically important difference. Higher functioning participant may not be appropriate for the SPPB.

Below is a sample one page feedback form that can be provided to participants and is derived from the Short Physical Performance Battery.

Name: **Date**

Balance assessments	
	**Held for ____ seconds**
	**Held for ____ seconds**
	**Held for ____ seconds**
Walking assessment	
	**4 Metres in ____ seconds**
Chair stand assessment	
	**5 Chairs stands in ____ seconds**

FAME PROGRAM ATTENDANCE SHEET

DATE		TIME	
LOCATION		INSTRUCTOR	
PARTICIPANT NAME			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

FAME Program Adverse Event Form

Date: _____
Participant Name: _____

Lead Instructor: _____ Signature: _____

- ☐ Fall(s)
- ☐ Dizziness
- ☐ Cardiac Arrest
- ☐ Increased Neurological Sx
- ☐ Aggressive Behaviour
- ☐ Near Fall
- ☐ Pain
- ☐ Headache
- ☐ Seizure
- ☐ Excessive Fatigue
- ☐ LOC
- ☐ Diabetic Shock
- ☐ Respiratory Distress/Asthma
- ☐ Fracture(s)
- ☐ Other_____

Description of Injury/Incident:

_____
_____
_____
_____
_____
_____
_____
_____

Follow-up/Resolution Date:_____

_____
_____
_____
_____
_____
_____
.

FAME Progam Class Plan

DATE: ____________________

	WARM-UP	STRENGTHENING	AGILITY&FITNESS	BALANCE	COOL-DOWN
1					- Thigh - Buttocks - Hamstrings - Calf - Trunk side - Trunk rotation
2					
3					
4					

DATE: ____________________

	WARM-UP	STRENGTHENING	AGILITY&FITNESS	BALANCE	COOL-DOWN
1					- Thigh - Buttocks - Hamstrings - Calf - Trunk side - Trunk rotation
2					
3					
4					

DATE: ____________________

	WARM-UP	STRENGTHENING	AGILITY&FITNESS	BALANCE	COOL-DOWN
1					- Thigh - Buttocks - Hamstrings - Calf - Trunk side - Trunk rotation
2					
3					
4					

DATE: ____________________

	WARM-UP	STRENGTHENING	AGILITY&FITNESS	BALANCE	COOL-DOWN
1					- Thigh - Buttocks - Hamstrings - Calf - Trunk side - Trunk rotation
2					
3					
4					

Rate of Perceived Exertion Scale

1	Extremely light (or no exertion at all)
2	Very light
3	Light
4	Fairly light
5	Somewhat hard (moderate intensity)
6	Hard (heavy)
7	Harder
8	Very hard
9	Extremely hard
10	Maximum exertion

Rate of Perceived Exertion Scale: Ability to Converse (Talk Test)

1	Extremely easy; effortless to converse
2	Very easy; can converse with no effort
3	Easy; can converse with almost no effort
4	Moderately easy; can converse comfortably with little effort
5	Moderate; conversation requires some effort
6	Moderately hard; conversation requires quite a bit of effort
7	Difficult; can talk but must stop talking to catch breat
8	Very difficult; conversation requires maximum e fort
9	Approaching extreme; difficult to breathe
10	Extreme effort; cannot continue

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Certificate of Completion

First Name Last

has successfully completed the FAME Program at X Community Centre

DATE _____ INSTRUCTOR _____

Advice for Caregivers in the FAME Class

Thank you for coming and supporting your FAME class participant. Please follow the specific instructions of the fitness leader in the session. The types of activities that you can assist with are:

Spotting during balance and walking activities

Please stand at the:

☐ left side ☐ right side

☐ behind the person when they are doing their balance exercise

☐ Encouraging more equal weight bearing

☐ Encouraging upright posture

You may need to use a transfer belt

NOTE:

- It is not safe to hold someone by their more affected arm if they do not have full movement
- Please support their trunk if they need more assistance
- Try to keep their feet level

Assisting with monitoring intensity

☐ **Check scale of Rate of Perceived Exertion (RPE)**

1 -	No exertion at all or extremely light
2 -	Very light
3 -	Light
4 -	Fairly light
5 -	Somewhat hard
6 -	Hard (heavy)
7 -	Harder
8 -	Very hard
9 -	Extremely hard
10 -	Maximal exertion

☐ **Check heart rate**

Should be working at a light to moderate rate (4-5 on the RPE scale) or 40% heart rate reserve if using a monitor.

Instructor Log								
Exercises taught on this date	**Date**	**Date**	**Date**	**Date**	**Date**	**Date**	**Date**	**Date**
WARM UP								
Slow Marching								
Slow Marching with Arm Swings								
Knee Circles								
Ankle Rotations								
Butt Kicks								
FUNCTIONAL STRENGTHENING								
Toe Raises								
Heel Raises								
Chair Push-Ups								
Sit to Stand								
Sit to Stand & Walk Around								
Wall Push-Ups								
Wall Sits								
BALANCE EXERCISE								
Slow Weight Shift - Sideways								
Slow Weight Shift - Forward & Backward								
Forward Reach								
One Leg Stands								
Heel Toe Standing - Advanced								
Heel Toe Walking								
Figure 8								
Long Step Walking								
Backwards Walking								
Pushed								
AGILITY & FITNESS								
Stepping Up and Down								
Side Stepper								
Side Stepping								
Forward Stepping								
Fast High Knee Marching								
Fast & Low Steps								
COOL DOWN								
Trunk Side Stretch								
Trunk & Head Rotation								
Calf Muscle Stretch								
Thigh Stretch								
Buttocks Stretch								
Hamstring Stretch								

Comments: