Aerobic Exercise Post Stroke

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Comprehensive Stroke Rehab Program

Task Oriented Training of

- Motor Control
- Balance
- Gait
- Functional Use of the Upper Extremity

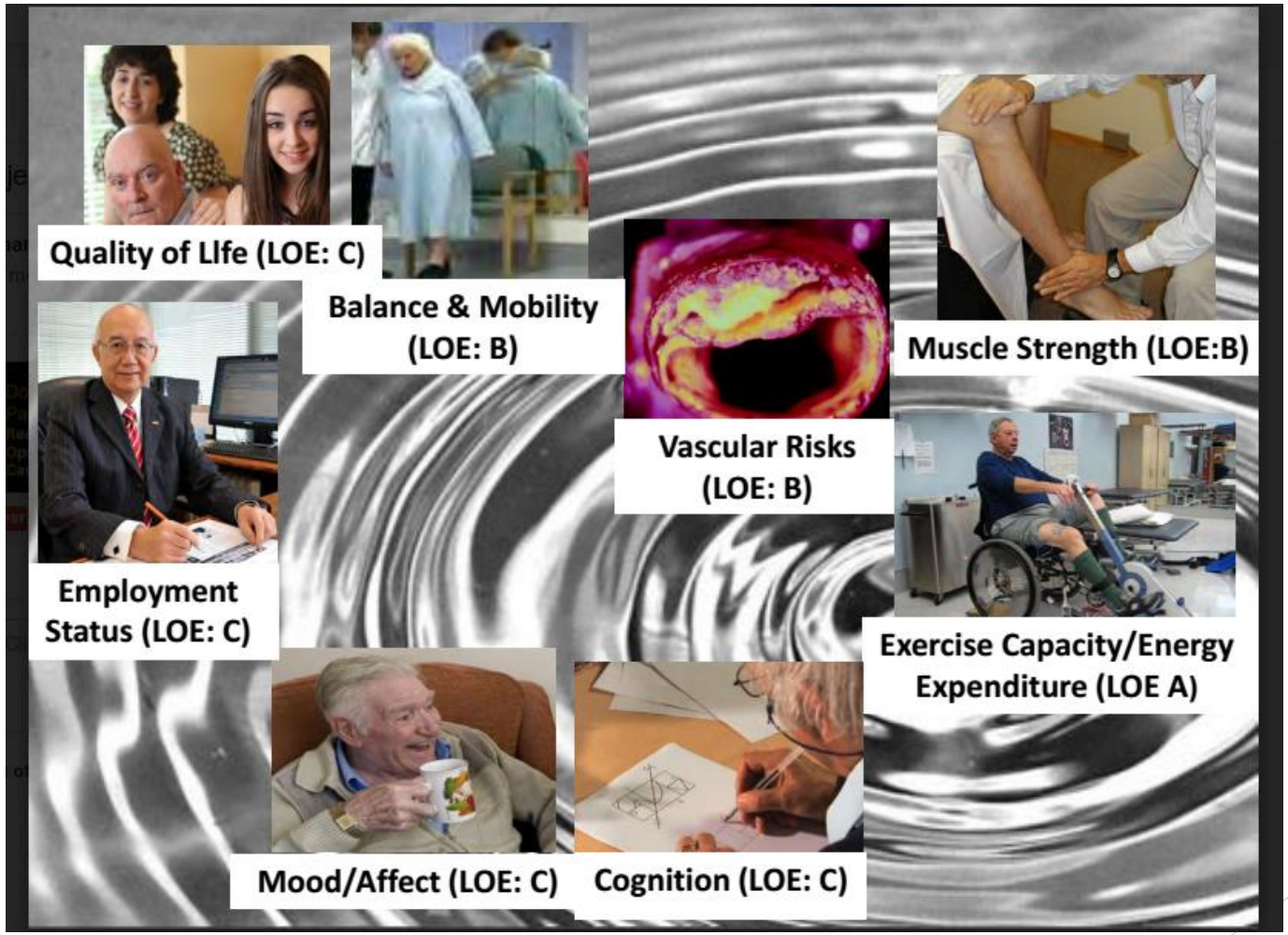
Muscle Strengthening

Aerobic Training

NOTE: Functional tasks may not increase heart rate enough to be aerobic

Compelling Evidence of Numerous Benefits of Aerobic Training Post Stroke

Marilyn Mackay-Lyons (Promoting Cardiovascular Fitness and Stroke 2013)

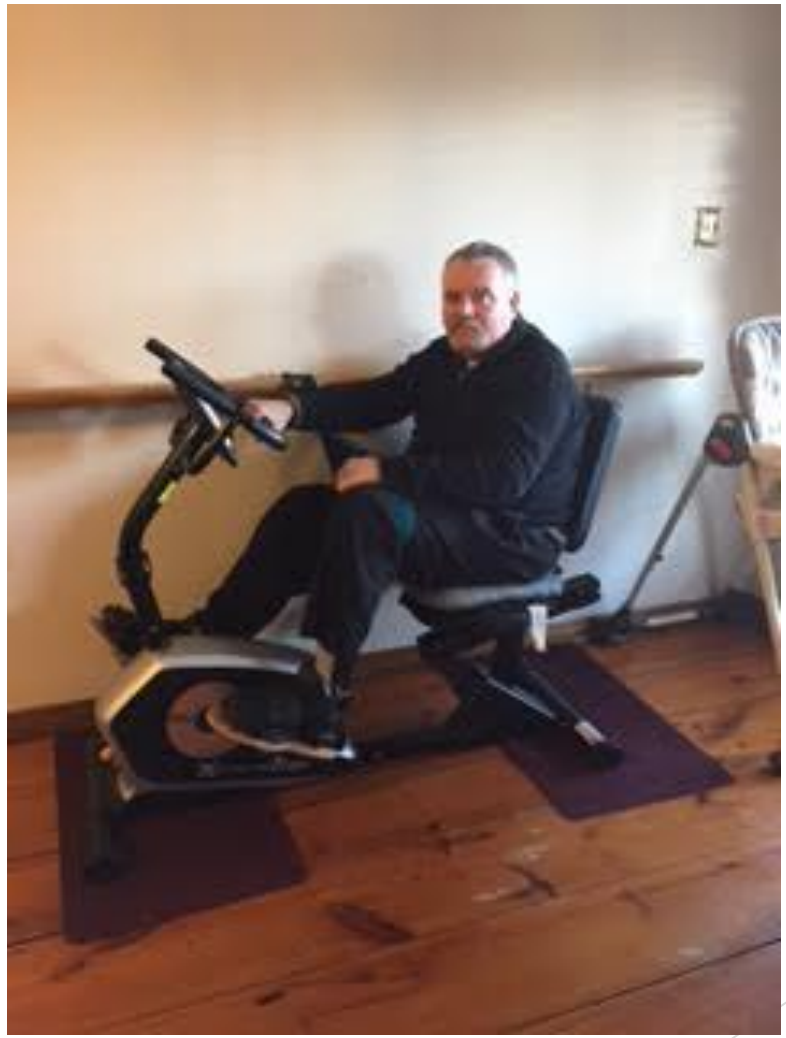


Structure of Aerobic Training

- **Total time:** 26-30 minutes (includes warm up, training phase and cool down)
- **Frequency:** most days of week initially (rehab), at minimum of 3 days per week (community) - other days unstructured activity
- **Intensity** is most important parameter
- **Progress program** in this order : frequency>session duration>intensity
- **Duration** of program: 8 weeks to achieve clinically meaningful training effect

Patient #1

- 19 months post stroke
- Assisted gait with single pt cane
- 30-40% HRR
- 20 min/3x/week



Patient #2

- 10 weeks post CVA
- 40% HRR intensity
- Walking outdoors with 4WW, 30 min
- Now urban pole trial 3x/week
- Supervised exercise

Patient #3

- 7 years post CVA
- Stress test completed
- >60% HRR
- 5 days/week, 30-40 min
- Independent gait

Helpful Tools

- Separate Aerobic Screen Assessment Form.
- Prepared calculation forms – fill in blanks.
- Formulae and list of common Beta Blocker medications in cell phone for quick reference.
- Safety first – 5 minute bouts and monitor response to the activity

  (HR/BP/SOB/autonomic responses – clammy skin,etc)

Key Message

- PTs working in rehab and the community should reflect on how to introduce aerobic exercise training as part of their comprehensive stroke rehab programming.
- Consider using the HRmax (pred) formulae and monitor HR and BP
- Even if our region is not structured yet for stress test screening of patients post acute phase prior to aerobic training, calculate the low end training ranges that we feel are safe 30%-40 % HRR.
- For patients who you deem are capable of training at more moderate to high levels > 45% HRR then they should be referred by physician for stress testing and then training should proceed/start in a facility where access to medical assistance and life saving devices are available (ie Cardiac Rehab programs) and then transitioned to the community.
- Watch for future E-AEROBICS modules in the future.

Resources

- Promoting Cardiovascular Health and Fitness after Stroke: New Clinical Recommendations. Marilyn Mackay-Lyons PhD. School of physiotherapy, Dalhousie University, CDHA Affiliated Scientist. CPA Teleconference February 2013
- canadianstroke.ca Aerobic Exercise after Stroke – Clinician's Guide
- (E-AEROBICS) Closing the gap between evidence and clinical practice regarding aerobic exercise in stroke rehabilitation: an educational strategy to improve knowledge and self-efficacy of physiotherapists. Aerobics Education Delivery Study 2016
- Community Physiotherapy Clinical Practice (CCAC/Private Practice)

THANK YOU

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Additional Information

Structure of Aerobic Training

- **Warm up : 3-5 minutes** (65-75% target HR)
- **Training Phase : 20 minutes in target HR zone** - start with 5 minute bouts and gradually increase (10 minute bouts required to capitalize on aerobic benefits)
- **Cool down: 3-5 minutes** (aids in venous return to prevent blood pooling in peripheral vasculature and subsequent drop in diastolic blood pressure)

Mode of Exercise Training

- Task specific exercise that activates large muscle masses should be used.
- Exercise modality should be aligned with participant's functional goals.
- Treadmill with or without body weight support – relevant to daily functional activities
- Cycle ergometers (including stationary bikes, recumbent bikes, and arm-leg ergometers) are the tools of choice – can be used with non-ambulatory stroke survivors/can provide trunk stability and support
- Over ground walking
- Arm ergometers generally not used – compromised stroke shoulders but also the low muscle mass recruited

Participation Screening

- General information, Contraindications to exercise testing, Function
- Exercise stress test should be an integral component of pre-participation screening for aerobic training after stroke or TIA. However, if the targeted intensity of the planned training program is light (< 45% of HRR) and the participant is without symptoms or a known history of cardiovascular disease and has a normal resting ECG, then an alternative clinically-based submaximal test may be an option. 6 MWT, shuttle test, submax. trial
- Training of high risk individuals must be done in a setting with immediate access to external defibrillation and emergency medical response.
- For lower risk individuals, supervised home-based aerobic programs may be a safe and effective option.

Calculating Intensity and Training HR

- Determined on an individual basis depending on:
- Response to exercise test
- Health status (neurologic status, cardiac status, other comorbities)
- Planned exercise frequency and duration

- Frequent HR monitoring and periodic Blood Pressure
- RPE
- ECG facility dependent

Calculations for Target Training Heart Rate (HR)

- HRrest minimum of 5 minutes of quiet sitting with back support, legs uncrossed and feet on floor . Exercise, alcohol, nicotine, and coffee should be avoided 2-3 hours preceding measurement. At least 2 HR readings and record lower one
- HRmax best obtained from maximal exercise test. But HRmax can be predicted using one of these formulae:
- HRmax(pred) = 220 - age traditional formula
- HRmax(pred) = 206.9 - (0.67 x age) somewhat more accurate estimation
- HRmax(pred) = 164 – (0.7 x age) if the patient is on a beta-blocker

Calculations continued…

- Heart Rate Reserve (HRR) is HRmax(pred) – HRrest
- Target HR for aerobic training prescription is calculated using the Karvonen formula:
- HRtarget = (X% of HRR) + HRrest
- X is selected based on the planned exercise intensity: typically for people with chronic conditions :
- Light intensity = < 30%-40% of HRR
- Moderate intensity = 40%-60% of HRR
- vigorous intensity = 60%-90% of HRR

Intensity

Note: these relationships are based primarily on data from studies involving non-disabled individuals. Validation of the relationships in special populations, including stroke, has not been done. As well, there is inconsistency in the literature regarding which rating of perceived exertion corresponds to what level of exercise intensity.

Table 4.5.2 Approximate relationships among indicators of exercise intensity based on data from studies involving non-disabled individuals

Exercise Intensity			Clinical Indicators of Exercise Intensity				
			RPE Scales				Talk Test
Description	%HRR	%HR max	6-20	Description	0-10	Description	Description
Very Light	<30	<57	6		0	Nothing at all	Can sing and converse with no effort
			7	Very, very light	0.5	Extremely light	
			8		1		
Light	30 - <40	57 - 63	9	Very light	1	Very light	Can converse with almost no effort
			10		2	Light	
			11	Fairly light			
Moderate	40 - <60	64 - 75	12		3	Moderate	Can converse comfortably with little effort
			13	Somewhat hard	4	Somewhat hard	
Vigorous	60 - 89	76 - 95	14		5	Hard	Can converse with some effort ➔ converse with quite a bit of effort
			15	Hard			
			16		6		
			17	Very hard	7	Very hard	
Near maximal or maximal	≥ 90	≥ 96	18		8		Can converse with quite a bit of effort and must stop talking to catch breath ➔ Converses with maximum effort ➔ Unable to converse
			19	Very, very hard	9		
			20		10	Extremely hard	

Cardiac Rehab Programs – HDH/LACGH

Religious Hospitallers of Saint Joseph of the Hotel Dieu of Kingston
HOTEL DIEU HOSPITAL

Cardiac Rehabilitation Centre Referral

Telephone: 613-544-3400 Ext.3123
Fax: 613-544-4749
Internet: www.hoteldieu.com

CARDIAC

Health Card #
CRA:
Patient Name:
Date of Birth (yyyy/mm/dd):
Address:
Postal Code:
Phone - Home:
Work:

Primary Diagnosis:

- ☐ Cardiac Surgery
- ☐ Percutaneous Coronary Intervention (PCI)
- ☐ Myocardial Infarction (MI)
- ☐ Acute Coronary Syndrome (ACS)
- ☐ Stable Coronary Artery Disease (CAD)
- ☐ Other Cardiovascular Insufficiency: _____
- ☐ 3 or more Cardiovascular Risk Factors: _____
- ☐ Congestive Heart Failure
- ☐ Transient Ischemic Attack
- ☐ Cerebrovascular Disease
- ☐ Peripheral Arterial Disease
- ☐ Chronic Kidney Disease

Cardiovascular diagnosis/event date (yyyy/mm/dd): _____

Diabetes Status:

- ☐ Non Diabetic
- ☐ Diabetic

Baseline Functional Status:

- ☐ Limited
- ☐ Active
- ☐ Athletic

Comments:

Referring Practitioner Signature: _____
Referring Practitioner Printed Name: _____
Referral Date (yyyy/mm/dd): _____

Your patient will be assessed in a **SCREENING CLINIC** by an interdisciplinary team, including a cardiologist, to determine his/her suitability for the Cardiac Rehabilitation Centre's (CRC) services. Upon admission, your patient will receive the following services at the CRC:

- An individually prescribed and monitored graduated exercise program.
- Education classes in risk factor modification in the physical, psychosocial and nutritional areas.
- Access to dedicated time with a physiotherapist, dietitian, social work, cardiovascular nurse and/or cardiologist as appropriate.

Mail or FAX Referral to the Cardiac Rehab Centre Clinic - Fax # 613-544-4749

Please advise patients that they will:

- Be contacted by the Hospital with the appointment date and time.
- Need to bring their health card and medications with them.

HDH Print Shop Orig: 06/Jun/Rev: 13/Jun

Cardiac Rehab Centre Referral

Doing our Best for our Patients

Marilyn Mackay-Lyons 2013