Lessons learnt from the ExDose Trial: *a trial of telehealth delivered exercise program aimed at increasing cardiorespiratory fitness for people after stroke.*

Margaret Galloway (PhD) University of Newcastle, School of Health Sciences [margaret.galloway@newcastle.edu.au](mailto:margaret.galloway@newcastle.edu.au)

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**Overview:** We recently completed a study aimed increasing cardiorespiratory fitness for people after stroke. 21 stroke survivors in 4 groups completed 8 weeks of CFR training, 3 days/week at moderate to vigorous intensity for 10-25 min/session. All sessions were delivered via *telehealth*. The main finding was that it was feasible for community-dwelling stroke survivors to participate (see link to our published paper below).

Below are some helpful tips and lessons we learnt from delivering this intervention.

**Pre-exercise Screening**

All participants were screened by their GP prior to commencing the program. Screening was based on ACSM guidelines (contra-indicators for exercise)

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| Tips:   * use the ESSA screening form to determine if this is needed for your patients, or follow your service’s established exercise screening process <https://www.essa.org.au/Public/ABOUT_ESSA/Adult_Pre-Screening_Tool.aspx> or go to the ACSM website (see <https://journals.lww.com/acsm-msse/Fulltext/1998/06000/AHA_ACSM_Joint_Position_Statement__Recommendations.34.aspx>) * Add some stroke-specific screening items for telehealth e.g. falls history, communication, level of disability, aids used, living arrangements/support, mobility etc |

**Home visit prior to commencing** **and initial session**

Useful for: face to face meeting, tech set up, home exercise space safety review, discussion with family/responsible adult re emergency procedures, and to for initial assessments

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| Tips:   * A home visit may not be needed if the patient has adequate internet/computer skills and/or has someone at home to help and supervise. * Use the initial telehealth session to familiarise and assess only * Ensure emergency plan is discussed. * Address and phone number where person is exercising needs to be confirmed EACH session and on hand in case of emergency (people can log in from anywhere) * Check wellness at the beginning of each session (illness, injury, soreness) |

**Safety assessment**

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| **Tips**   * Can be done over telehealth. * Ask patient or carer to rotate device so you see the entire exercise space (Note that depth perception is affected with a 2D view of their space) * Ask them to estimate or step out the distance between the computer and the back of the room. * Make note of any rugs, coffee tables etc and remove any obstacles. * Review each session |

**Exercise Dose and Session details: (FITT components)**

Our participants exercised 3d/week, at mod-vigorous intensity for between 10 and 25 min/session.

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| Tips:  “Start with what you do already, and adapt it to telehealth as you need”  Frequency 2-3 times per week is ideal  Intensity Prescribe light-moderate intensity if pre-ex testing not available  40-70% HRmax\* or  8-13 on a 20- point Borg scale or 1-4 on 0-10 scale  Duration 20 min plus warm up and cool down  Break down into 5 min hits of alternating intensity  Switch between upper and lower body exercises to prevent fatigue  Aim for 2 to 5 different exercises per session, minimal rest between exercises  Progression 5 mins of 1:1 (15s hard:15s easier), gradually progressing to longer work intervals and shorter rest intervals as patients adapt (e.g 60s:15s)  *\*Max HR is usually estimated by 220-Age, however in the elderly a better equation to use is*  *HR max = 206.9- 67% x Age. E.g. if Age = 65, predicted HR max = 163. Note: predictions not valid if on β-blockers* |

**Equipment**

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| Technical   * Phones (use phone while logging on the first time with the patient) * Laptops work best as screen angle can be adjusted easily. * Internet speed- NBN is best. Broadband- generally not recommended. Video quality will vary (do a test connection before committing to telehealth) * Platform: choose one you are familiar with. Test with many volunteers (tech and non-tech savvy) before commencing * Have telephone numbers available for you to call client, and for them to call you * Provide written instruction on how to connect * Have pre-prepared videos and share-screen with exercises   **Exercise**   * Sturdy high backed chair (use for balance, and for sit to stands) * Small weights (e.g. tins of food, pasta) * Aerobic Step (consider providing if required) * Exercise bike, theraband, pedals etc * Heart rate monitor or pulse oximeter * Participant manual (including descriptions of exercises included in their exercise program) |

**Exercise selection from the ExDose program**

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| --- | --- | --- | --- | --- |
| Exercise Type | Equipment  *(exercise adaptations)* | Higher intensity exercises  *(pace)* | | Lower intensity exercises  *(pace)* |
|  |  | **Easier** | **Harder** |  |
| Whole Body | |  |  |  |
| Marching on the spot | Nil | Marching  *(moderate)* | Marching  -Knees up  -Using Arms  *(faster)* | Marching  Walking  *(slower)* |
| Aerobic moves | Nil *(vary according to ability)* | Heel touches  Side-stepping  *(moderate)* | 4-square  Side step with clap  Using arms  *(fast)* | Heel touches  Side steps *(slower)* |
| Lower Body | |  |  |  |
| Stepping | Aerobic step  *(height variable)* | Step ups  Up and over  *(steady)* | Step ups *(fast)*  Raised step height | Marching  *(moderate)* |
| Sit to Stand | Stable chair  *(with or without arm rests; with or without hands on thighs)* | Higher chair with arm rest  Lower chair with arm rest  Higher chair no arm rest.  *(moderate)* | Lower chair no arm rest  *(moderate)*  Lower chair no arm rest.  *(fast)* | Marching  Walking  *(slower)* |
| Squats | Nil | ¼ squats (wall)  ¼ Squats  ¼ Squats (moving)  *(moderate)* | ½ Squats  ½ squats (wall)  ½ Squats (moving)  *(moderate)* | Marching  Walking  *(slower)* |
| Stairs | Stairs *(using handrail)* | 2-3 stairs up and down *(slow)* | 3-5 stairs up and down (*slow)* | Marching  Walking  *(slower)* |
| Wall push ups | Wall  *(One or two arms placed on wall)* | Push ups (½ arm length from wall)  *(moderate)* | Push ups (arm’s length from wall)  *(moderate)* | Marching  Walking  *(moderate)* |
| Upper Body |  |  |  |  |
| Dumbbell arm exercises | Light dumbbells or small weights (e.g. tins of food)  *(increasing weights as required; single or both arms according to ability*) | Shoulder press *(alternate arms)*  Lateral raises Upright row  *(moderate)* | Push press  Shoulder press/lateral extension *(both arms)*  Cleans *(from knees, ½ squat)*  *(moderate)* | Biceps curls  Marching with biceps curls  *(slower)* |

**Generic ExDose program for 20 min sessions, 8- week program**

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| Week | Intervals or Reps | | Exercise | | | | |
|  | High:Low intensity (s) | Reps (n) | 1 | 2 | 3 | 4 | 5 |
| (20 min sessions) | | |  |  |  |  |  |
| 1 | 15: 15 | 3-5 | Whole | Upper | Lower | Whole |  |
| 2 | 30: 30 | 3-5 | Whole | Upper | Lower | Whole |  |
| 3 | 30: 30 | 3-5 | Whole | Upper | Lower | Whole |  |
| 4 | 30: 30 | 5-7 | Whole | Upper | Lower | Whole |  |
| 5 | 45: 15 | 7-10 | Whole | Upper | Lower | Whole |  |
| 6 | 45: 15 | 7-10 | Whole | Upper | Lower | Whole |  |
| 7 | 60: 15 | 7-10 | Whole | Upper | Lower | Whole |  |
| 8 | 60: 15 | 10-12 | Whole | Upper | Lower | Whole |  |

**Some useful references**

Galloway et al (2019). The feasibility of a telehealth exercise program aimed at increasing cardiorespiratory fitness for people after stroke. <https://telerehab.pitt.edu/ojs/index.php/Telerehab/article/view/6290/6855>

Crotty, M., Killington, M., van den Berg, M., Morris, C., Taylor, A., & Carati, C. (2014). Telerehabilitation for older people using off the-shelf applications: Acceptability and feasibility. Journal of Telemedicine & Telecare, 20, 370-376. doi:10.1177/1357633X14552382

Chen, J., Jin, W., Zhang, X.-X., Xu, W., Liu, X.-N., & Ren, C.-C. (2015). Telerehabilitation approaches for stroke patients: Systematic review and meta-analysis of randomized controlled trials. Journal of Stroke & Cerebrovascular Diseases, 24, 2660-2668. doi:https://doi.org/10.1016/j.jstrokecerebrovasdis.2015.09.014

Clark, R. A., Conway, A., Poulsen, V., Keech, W., Tirimacco, R., & Tideman, P. (2015). Alternative models of cardiac rehabilitation: A systematic review. European Journal of Preventive Cardiology, 22(1), 35-74. doi:http://dx.doi.org/10.1177/2047487313501093

Maddison, R., Rawstorn, J. C., Stewart, R. A. H., Benatar, J., Whittaker, R., Rolleston, A., . . . Gant, N. (2018). Effects and costs of real-time cardiac telerehabilitation: Randomised controlled non-inferiority trial. Heart. doi:10.1136/heartjnl-2018313189

**Suitable exercises could be adapted from**

Marsden, Dunn, A., Callister, R., McElduff, P., Levi, C. R., & Spratt, N. J. (2016). A home- and community-based physical activity program can improve the cardiorespiratory fitness and walking capacity of stroke survivors. Journal of Stroke & Cerebrovascular Diseases, 25, 2386-2398. doi:10.1016/j.jstrokecerebrovasdis.2016.06.007

FAME (Canadian group exercise program <https://fameexercise.com/>

Or telehealth specific: from

Galloway, M. (2019). An exploration of low doses of exercise on cardiorespiratory fitness in people with chronic stroke (Unpublished doctoral dissertation). University of Newcastle, Callaghan, Australia. http://hdl.handle.net/1959.13/1407802