View in browser

MOOC - ANALYSIS & RETRAINING OF UL FUNCTION AFTER STROKE

In June 2024 we ran our inaugural MOOC ‘Analysis and Retraining of upper limb function after stroke’. Of the 1727 registrants, 33% did not start the MOOC, 46% completed the MOOC including the final quiz, and the remaining 21% started but did not complete the MOOC before it closed on the 15th July. Completion rates for MOOC are usually around 10%, so we are very pleased with 46%.

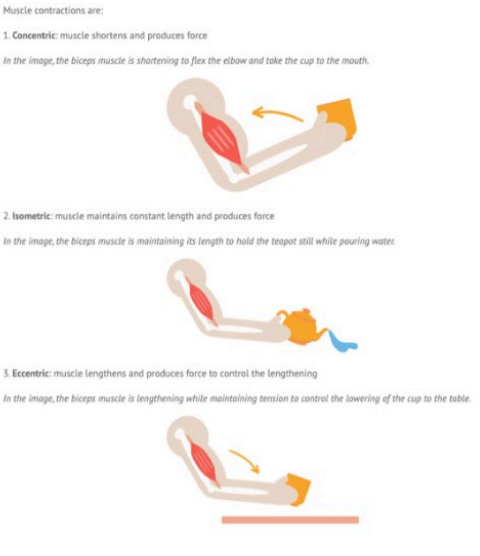
We charged $50 (AUD) to residents of high income countries, with no cost to residents of low-medium income countries.

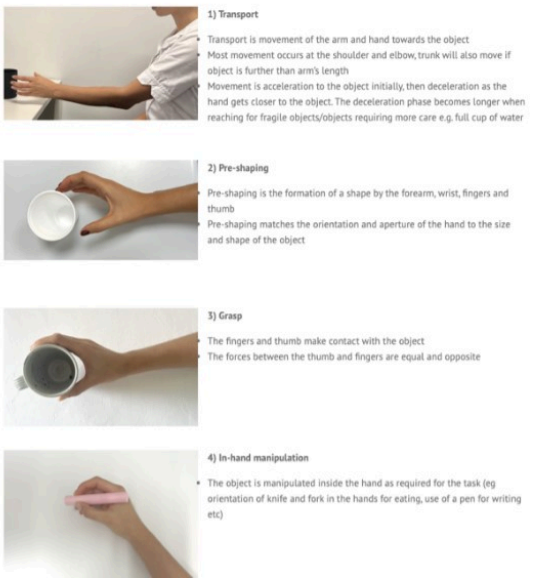
The learning content required approximately 3 hours/week of study (12 hours in total) over 4 weeks. The MOOC content consisted of text-based learning material, quizzes, recorded lectures and videos of upper limb assessment / training by StrokeEd presenters with stroke survivors.

The learning outcomes were:
At the completion of this MOOC, the participant should be able to:

 Describe a structured approach to the analysis of activity limitations in reach, grasp and manipulation tasks after stroke
 Outline the evidence base for rehabilitation of the affected arm after stroke
 Describe evidence-based training strategies to increase strength in very weak arm muscles and for intensive task training for the affected arm after stroke
 Describe evidence-based strategies to prevent and treat secondary impairments of the affected arm after stroke.

The images below show some examples of the content:





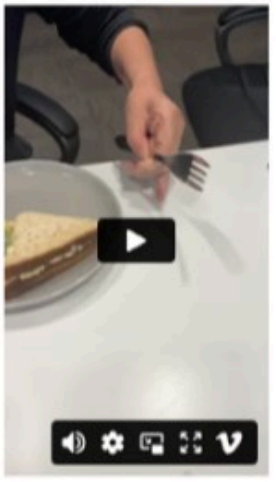
In these videos, stroke survivor Naomi who has significant ataxia improves her ability to grasp a cup and take it to her mouth. The first set of videos were taken across 3 days at a workshop and the second set of videos were taken 4 months later. Her left arm is in plaster due to a fracture.

This video is Day 1 of the 3 days of training – Naomi attemps to pick up and move a cup of water across the table

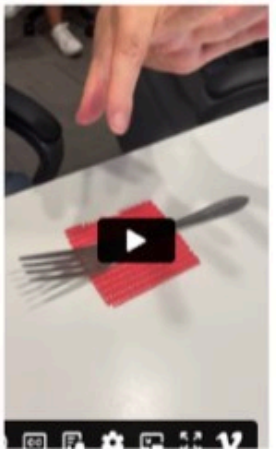
These videos are Naomi's training of grasping and moving a cup on Days 1, 2 and 3

In these videos, stroke survivor Margaret who has severe sensory loss in her affected arm does task-specific practice to improve her ability to pick up a fork. You can see her progress across one session of practice.

In this video Margaret attempts to pick up a fork, the slow motion video enables you to see the difficulties she is having with pre-shaping and grasp



In this video the task has been made easier by placing the fork horizontally across the table and on a piece of non-ship mat and you can hear Annie giving Margaret specific feedback



In this video you can see the improvement in Ngoc's ability to bring the cup to his mouth.

Plans for a 2025 MOOC

We plan to repeat the UL MOOC in June 2025. We will advertise the event on our website and via social media. Registrations will open in May 2025.

Some feedback from participants:

I want to thank you for an excellent course on treatment of the upper extremity in stroke survivors….the videos showing the various presenters working with stroke survivors were wonderful, and the focus on evidence-based decision-making was also excellent. I am so glad I had the opportunity to participate in this MOOC.

It has been very helpful, with clinically relevant information and practical ideas that are easy to implement in a community setting with limited resources.

I found that after completing the MOOC, I now feel more confident to identify specific muscles which are notably weak, and I have gained a wealth of ideas in which these muscles can be targeted through intervention, as well as the person being set up to continue with their own practice at home.

UPCOMING WORKSHOPS

European Workshops 2024

Between **July and November 2024**, StrokeEd presenters Simone Dorsch, Annie McCluskey and Karl Schurr are teaching a range of workshops. Below you will find dates, locations and contact people for each workshop. Most workshops are fully subscribed. You will also find information about each workshop on the StrokeEd website: https://strokeed.com/events/category/face-to-face/

As most of the team will be overseas for the second half of 2024, face to face workshops in Australia will cease in June/ July and resume in early 2025.

StrokeEd workshops - Europe, 2024

Dates	City	Workshop	Presenters	Contact person
22-24 July (Mon-Wed)	**Klaksvik**, Faroe Islands	**Hybrid** (UL & LL retraining & 1000 reps)	**K, A**	**Sunrid Mørkøre** sunridm@hotmail.com
1 Aug (Wed)	**Edinburgh**, Scotland	**1000 reps**	**K, A**	**Charlie Chung** charlie.chung2@nhslothian.scot.nhs.uk
2-4 Aug (Thu-Sat)	**Edinburgh**, Scotland	**Upper** limb retraining	**K, A**	**Charlie Chung** charlie.chung2@nhslothian.scot.nhs.uk
23-25 Aug (Fri-Sun)	**Carlisle**, England	**Upper** limb retraining	**K, A**	**Claire Allison** claire.allison@ncic.nhs.uk
1-3 Sep (Sun-Tues)	**Preston**, England	**Upper** limb retraining	**K, A**	**Angela Alty** Angela.alty@lthtr.nhs.uk
5-7 Sept (Thu-Sat)	**Dublin**, Ireland	**Lower** Limb retraining	**S, K**	**Eoin Synnott (CPNG)** cpng@iscp.ie
9-10 Sept (Mon-Tue)	**Dublin**, Ireland	**Balance** retraining	**S, K**	**Eoin Synnott (CPNG)** cpng@iscp.ie
11-13 Sept (Wed-Fri)	**Dublin**, Ireland	**Upper** limb retraining	**A, S**	**Eoin Synnott (CPNG)** cpng@iscp.ie
19-21 Sept (Thu-Sat)	**Dun Laoghaire** Ireland	**Upper** limb retraining	**K, A**	**Laura Horan (AOTI)** cpd@aoti.ie
23-24 Sept (Mon-Tue)	**Manchester**, England	**Balance** retraining	**S, K**	**Hannah Jones** Hannah.jones2@nca.nhs.uk
26-28 Sept (Thu-Sat)	**Manchester**, England	**Lower** Limb retraining	**S, K**	**Hannah Jones** Hannah.jones2@nca.nhs.uk
1 Oct (Tues)	**Oxford**, England	**1000 reps**	**A, S**	**Flora Juckes** OCEcourseadmin@ouh.nhs.uk
2-4 Oct (Wed-Fri)	**Oxford**, England	**Lower** Limb retraining	**S, K**	**Flora Juckes** OCEcourseadmin@ouh.nhs.uk
7-9 Oct (Mon-Wed)	**Oxford**, England	**Upper** limb retraining	**A, S**	**Alex Daisa** OCEcourseadmin@ouh.nhs.uk
23-25 Oct (Wed-Fri)	**Aarhus**, Denmark	**Upper** limb retraining	**K, A**	**Sine Secher Mortensen** sinesecherm@hotmail.com
28-30 Oct (Mon-Wed)	**Aarhus**, Denmark	**Lower** limb retraining	**K, S**	**Sine Secher Mortensen** sinesecherm@hotmail.com
1-3 Nov (Fri-Sun)	**Copenhagen**, Denmark	**Lower** limb retraining	**K, S**	**Sine Secher Mortensen** sinesecherm@hotmail.com
5-7 Nov (Tues-Thu)	**Copenhagen**, Denmark	**Upper** limb retraining	**K, A**	**Sine Secher Mortensen** sinesecherm@hotmail.com

V9, 7 July 2024

Online workshops

There are still plenty of vacancies for two online workshops being run later in 2024:

Analysis & retraining of the UL post-stroke: An introduction (3 x Saturdays, 9am-1pm Sydney time, fully online)
5th, 12th and 19th Oct 2024
Cost: AUD $438.48
https://strokeed.com/event/analysis-and-retraining-of-the-ul-post-stroke-an-introduction-3-saturdays-fully-online/

Analysis and training of walking after stroke (2 evenings, 6-10pm Sydney time, fully online)
25th Nov and 9th Dec 2024.
Cost: AUD $288.19
https://strokeed.com/event/analysis-and-training-of-walking-after-stroke-online-5/

NEWS

In May 2024, Simone was invited to be a keynote speaker at the ACPIN (Assoc of Chartered Physios in Neurology) conference in London. Her keynote presentation was titled *'What does the evidence tell us*? *Implementing intensive task-specific practice in stroke rehabilitation*' and she ran a conference workshop titled 'Movement analysis, clinical reasoning and implementing intensive task-specific practice in stroke rehabilitation'.

The following is an article that she wrote for the ACPIN newsletter.

Implementing effective task-specific practice in stroke rehabilitation Associate Professor Simone Dorsch

The Cochrane review of repetitive task-specific training[1] defines it as "an active motor sequence performed repetitively and aimed towards a clear functional goal". It can include pre-task movements that are complex and multi-joint. To ensure that task-specific training is effective it needs to be;

1. Tailored to address the biomechanical requirements of the task
2. Adapted to the impairments of the stroke survivor
3. Intensive

The implications of these features for physiotherapists will be discussed.

1.Effective task -specific training needs to be tailored to address the biomechanical requirements of the task

Therapists need to apply a clinical reasoning process to ensure that task-specific training addresses the biomechanical requirements of the task being practised. Therapists need a detailed knowledge of the essential components of tasks and an understanding of the contributions of impairments to activity limitations after stroke. A detailed understanding of the biomechanics of tasks includes the critical muscle groups, joint angles, movement speeds and the types of muscle contractions required for any of the components of the task being trained[2].

The steps of this clinical reasoning process are outlined and applied to the example of stroke survivor, Michael' s walking.

a. Observe the stroke survivor perform the task to identify the kinematic deviations

- Michael has reduced hip flexion and reduced ankle dorsiflexion in swing phase. See Image 1.

b. Hypothesise the impairments that could be causing these kinematic deviations. In this example, the most likely contributing impairments are listed.

- Michael's reduced hip flexion in swing could be caused by decreased hip flexor strength and/or decreased hip flexion co-ordination
- Michael's reduced ankle dorsiflexion in swing could be caused by decreased ankle dorsiflexor, strength, decreased ankle dorsiflexion co-ordination (eg unable to sustain ankle dorsiflexion as the knee extends), decreased passive ROM ankle dorsiflexion

c. Test to determine the contribution of these likely impairments

- Test hip flexor strength by MMT
- Test the speed of hip flexion
- Test hip flexion co-ordination by reproducing the demands of hip flexion in swing, i.e., in standing test Micheal's ability to flex his right hip from approximately 10^{o} extension to 25^{o} flexion rapidly (compare to left side)
- Test passive ankle dorsiflexion ROM with knee flexed and knee extended (compare to left side)
- Test ankle dorsiflexion strength by MMT with knee flexed and knee extended
- Test ankle dorsiflexion co-ordination by reproducing the demands of ankle dorsiflexion in swing, i.e. in standing: test Micheal's ability to dorsiflex his right ankle from approximately 20^{o} plantarflexion to 5^{o} dorsiflexion rapidly (compare to left side) and test ability to maintain dorsiflexion as knee moves from flexion to extension.

d.Prescribe training exercises that address the main impairments

- Michael has adequate strength in hip flexion (Grade 4+) but is unable to achieve rapid hip flexion in standing (Time taken for 10 reps, Left leg = 9 sec, Right leg = 12 sec). Training needs to be task specific part practice of rapid hip flexion as per testing procedure. See images 2a and 2b.
- Michael has insufficient strength in ankle dorsiflexion (Grade 2) and is unable to achieve rapid dorsiflexion in sitting or standing (Repetitions in 10 sec, Left leg = 32, Right leg = 12). Training needs to focus on strengthening right ankle dorsiflexors and task specific part practice of dorsiflexion as per testing procedure. See images 3a and 3b.
- Whole practice of walking that targets rapid hip flexion and ankle dorsiflexion in swing could include:
    - Walking on a treadmill - the constant speed of the treadmill can be useful for increasing speed of swing phase
    - Walking with cueing of cadence, this has been shown to be effective at increasing walking speed and step length[3]

Where stroke survivors have insufficient strength to produce adequate force for to do a task, strength needs to be targeted. This can include isolated strengthening exercises, such as that shown in Images 5a and 5b where Michael uses a sliding tiltable to strengthen his plantarflexors. When people can undertake task-specific training, it can be used to increase muscle strength as well as improve the muscle co-ordination required to perform the task successfully[4].

2. Effective task -specific training needs to be adapted to the impairments of the stroke survivor

The sensori-motor impairments that have the biggest impact on activity limitations after stroke are loss of strength and loss of co-ordination[5,6]. These are also the impairments that are the most amenable to being trained after stroke. However, training is not effective if it does not accommodate the other impairments that may occur after stroke. An example is Pusher's syndrome. This perceptual impairment results in the stroke survivor 'pushing' towards their affected side. Setting up task-specific practice of sitting or standing without adapting to this impairment would result in ineffective training. In Image 5a, a stroke survivor attempts to sit and is unsuccessful because he has Pusher's syndrome. However, when the sitting practice is set up so that there is a wall on his intact side (Image 5b) he can start to sit successfully as he has a cue for verticality. If he starts to push to the left side he is able to correct himself using this strong vertical cue.

3. Effective task -specific training needs to beintensive

Task-specific training can address the features above but not achieve change due to a low dosage of practice. To change outcomes after stroke, stroke survivors need to do enough

practice. To increase amounts of practice, stroke survivors need to practise outside of time spent with therapists. Therefore, therapists need to focus on practice that will be done without them present. These expectations of practice outside therapy time need to start from the initial assessment. By the end of an assessment the stroke survivor should have some practice that they can undertake on their own. For example, once the exercise has been set up, Michael would be able to do his swing phase practice and plantarflexion strengthening exercises without the therapist present.
Strategies which have been shown to increase intensity of practice,(i.e. the amount of practice done within a timeframe) include using goal-oriented instructions with target numbers[7] and counting and recording repetitions of practice[8].

In conclusion, for therapists to deliver effective task specific training in stroke rehabilitation they need to have a detailed understanding of the biomechanics of the tasks being trained. They need to apply an explicit clinical reasoning process that identifies the impairments contributing to the stroke survivor's activity limitations. Additionally, they need to set up exercises that mimic the biomechanics of the task being trained, then to provide goal-oriented instructions, count and record repetitions of practice and organise for intensive practice to happen outside of therapy sessions.

Image 1

Image 2a

Image 2b

Image 3a

Image 3b

Image 4a

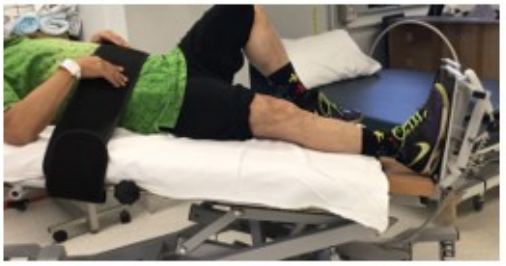


Image 4b

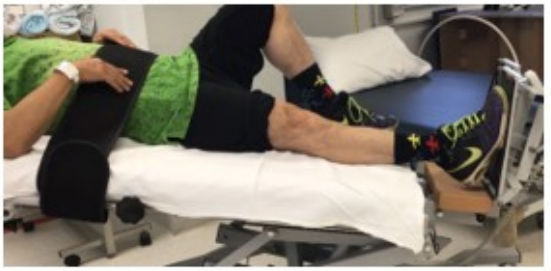


Image 5a

Image 5b

References

1. French B, Thomas LH, Coupe J, et al. Repetitive task training for improving functional ability after stroke. *Cochrane Database Syst Rev.* 2016;11(11):CD006073. Published 2016 Nov 14. doi:10.1002/14651858.CD006073.pub3
2. Williams G, Hassett L, Clark R, Bryant A, Olver J, Morris ME, Ada L. Improving Walking Ability in People With Neurologic Conditions: A Theoretical Framework for Biomechanics-Driven Exercise Prescription. *Arch Phys Med Rehabil.* 2019 Jun;100(6):1184-1190. doi: 10.1016/j.apmr.2019.01.003. Epub 2019 Jan 26. PMID: 30690011.
3. Nascimento LR, de Oliveira CQ, Ada L, Michaelsen SM, Teixeira-Salmela LF. Walking training with cueing of cadence improves walking speed and stride length after stroke more than walking training alone: a systematic review. J Physiother. 2015;61(1):10-15. doi:10.1016/j.jphys.2014.11.015
4. de Sousa DG, Harvey LA, Dorsch S, Glinsky JV. Interventions involving repetitive practice improve strength after stroke: a systematic review. J Physiother. 2018;64(4):210-221. doi:10.1016/j.jphys.2018.08.004
5. Bohannon RW (2007) Muscle strength and muscle training after stroke. Journal of Re habilitation Medicine 39: 14-20
6. Canning CG, Ada L, O'Dwyer NJ. Abnormal muscle activation characteristics associated with loss of dexterity after stroke. J Neurol Sci. 2000 May 1;176(1):45-56. doi: 10.1016/s0022-510x(00)00305-1. PMID: 10865092.
7. Hillig T, Ma H, Dorsch S. Goal-oriented instructions increase the intensity of practice in stroke rehabilitation compared with non-specific instructions: a within-participant, repeated measures experimental study. J Physiother. 2019;65(2):95-98. doi:10.1016/j.jphys.2019.02.007
8. Dorsch S, Kander D, Chowdhury F. In stroke survivors, counting and recording repetitions and using target numbers increases intensity of practice: a randomised control trial. IGNITE conference, Brisbane, Australia. October 2023.

Follow Us:

Our mailing address is:
StrokeEd
5 Shepherd St
Ashfield Nsw 2131
Australia