

Clinical Task Instruction

Skill Shared Task

S-MT12: Prescribe and administer bridging intervention: functional retraining for walking

Scope and objectives of clinical task

This CTI will enable the health professional to:

- prescribe, implement and review a functional retraining program for walking that the client will practice, with or without assistance, between therapy sessions.

VERSION CONTROL

Version: 2.0

Reviewed: (Profession) Statewide Directors of Physiotherapy Date: 16/09/2021

Approved: Chief Allied Health Officer, Allied Health Professions' Office of Qld. Date: 12/10/2021

Document custodian: Chief Allied Health Officer, Allied Health Professions' Office of Qld. Review date: 12/10/2024

The CTI reflects best practice and agreed process for conduct of the task at the time of approval and should not be altered. Feedback, including proposed amendments to this published document, should be directed to AHPOQ at: allied_health_advisory@health.qld.gov.au.

This CTI must be used under a skill sharing framework implemented at the work unit level. The framework is available at: <https://www.health.qld.gov.au/ahwac/html/calderdale-framework.asp>

Please check <https://www.health.qld.gov.au/ahwac/html/clintaskinstructions.asp> for the latest version of this CTI.

© State of Queensland (Queensland Health) 2018



This work is licensed under a Creative Commons Attribution Non-Commercial No Derivatives 3.0 Australia licence. In essence, you are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute Queensland Health and authoring unit listed above, and abide by the licence terms. You may not alter or adapt the work in any way. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/3.0/au/deed.en>.

For further information contact Allied Health Professions' Office of Queensland, PO Box 2368, Fortitude Valley BC QLD 4006, email allied_health_advisory@health.qld.gov.au, phone (07) 3328 9298. For permissions beyond the scope of this licence contact: Intellectual Property Officer, Queensland Health, GPO Box 48, Brisbane Qld 4001, email ip_officer@health.qld.gov.au, phone (07) 3708 5069.

Disclaimer

Queensland Health has made every effort to ensure that the information in this resource, at the time of distribution, is correct. The information in this resource will be kept under review and future publications will incorporate any necessary amendments.

The information in this resource does not constitute clinical advice and should not be relied upon as such in a clinical situation. The information is provided solely on the basis that readers will be responsible for making their own assessment of the matters presented herein and readers are advised to verify all relevant representations, statements and information. Specialist advice in relation to the application of the information presented in this publication must be sought as necessary to ensure the application is clinically appropriate. In no event, shall Queensland Health be liable (including negligence) for any claim, action, proceeding, demand, liability, costs, damages, expenses or loss (including without limitation, direct, indirect, punitive, special or consequential) whatsoever brought against it or made upon it or incurred by Queensland Health arising out of or in connection with a person's use of information in this publication.

- provide education to the client and/or carers (nursing staff/carer) regarding the rehabilitation program including specific program details, monitoring requirements, training thresholds and practice requirements
- contribute to the client's care plan based on observation of the client's functional performance and progress.

Note: This CTI is designed for health professionals with a qualification that includes relevant musculoskeletal anatomy, movement analysis and functional training and rehabilitation principles.

The purpose of a bridging task is to provide timely intervention as part of the management plan to address functional deficits identified on the skill shared assessment. It is intended to support a comprehensive rehabilitation program prescribed by the lead health professional which may be part of a collaborative practice service delivery model i.e. CTI S-MT10: Review and progress a transfer and/or walking training program.

Local implementation

The local health service will define the parameters for the local implementation of this CTI. The health service will determine the scope of the individual health professional with regard to:

- weight bearing status i.e. full weight bearing, weight bearing as tolerated, partial weight bearing, non-weight bearing
- types of walking aid/s e.g. 4 wheeled walker, hopper frame, crutches, walking stick
- environments e.g. rehabilitation ward, client's home, community settings
- client groups e.g. chronic disease, neurological, elderly, orthopaedic.

The local scope of the skill shared task will be approved by the health service and recorded in the CTI Performance Criteria Checklist.

Requisite training, knowledge, skills and experience

Training

- Mandatory training requirements relevant to Queensland Health/Hospital and Health Service (HHS) clinical roles are assumed knowledge for this CTI.
- If not part of mandatory training requirements, complete training in patient manual handling techniques, including lying to sitting techniques, the use of walk belts, and sit to stand transfers.
- A university qualification that includes relevant musculoskeletal anatomy (particularly appendicular skeleton), movement analysis and functional retraining of physical tasks and rehabilitation programming for mobility and physical function tasks. This includes task observation and analysis skills, training progression, training threshold and functional retraining skills including feedback.
- Completion of the following CTIs or equivalent professional competence:
 - S-MT01: Assess functional walking
 - S-MT05: Assess standing balance
 - S-MT07: Assess standing transfer
 - S-MT08: Assess and manage falls risk and risk reduction strategies for older persons in community settings using the FROP-Com.
 and if the use of walking aids is within the scope of the local implementation:

- CTI S-MT02: Prescribe, train and review of walking aids.

Clinical knowledge

- To deliver this clinical task, a health professional is required to possess the following theoretical knowledge:
 - expected progression and local service procedures, protocols and guidelines for mobility and transfers for conditions requiring rehabilitation that are relevant to the CTI implementation. This may include rehabilitation pathways and programs for sub-acute total hip replacement, total knee replacement, fractured neck of the femur, cardiac surgery or event, stroke, arthritis, Parkinson's Disease, falls and balance.
 - common strategies used to retrain walking including adjustment of the practice environment, positioning and manual guidance, part practice, cueing strategies and use of feedback e.g. scales, mirrors, verbal.
 - procedures for use and maintenance of equipment as relevant to the local implementation.
- The knowledge requirements will be met by the following activities:
 - complete the training programs listed above
 - review of the Learning resource
 - receive instruction from the lead health professional in the training phase
 - read and discuss references and resources relevant for the local implementation with the lead health professional in the training phase e.g. local service protocols, procedures, guidelines for mobility and transfer programs, care pathways and maintenance of equipment requirements.

Skills or experience

- The following skills or experience are not specifically identified in the task procedure but support the safe and effective performance of the task or the efficiency of the training process and are:
 - **required** by a health professional in order to deliver this task:
 - competence or ability to acquire competence in monitoring requirements and equipment for the client group/s relevant to the local implementation e.g. oxygen saturation (O2Sat), heart rate, blood pressure, pain and/or exertion. Monitoring tools may include specific equipment, rating scales and outcomes measures e.g. timed up and go test, 6-minute walk test, dynamic gait index and functional gait assessment. These should be listed in the Performance Criteria Checklist local implementation comments section for the assessment of walking i.e. CTI S-MT01: Assess functional walking.
 - demonstrated skills in prescribing, implementing and evaluating/reviewing a client-centred rehabilitation program, including developing and negotiating goals and engaging the client and carers in their program to improve function.
 - **relevant but not mandatory** for a health professional to possess in order to deliver this task:
 - demonstrated competence in related functional retraining tasks for sit to stand, transfers and/or walking e.g. CTI S-MT10: Review and progress a transfer and/or walking training program and/or CTI S-MT11: Prescribe and administer bridging intervention: functional retraining for sit to stand.

Indications and limitations for use of a skill shared task

The skill share-trained health professional shall use their independent clinical judgement to determine the situations in which they will deliver this clinical task. The following recommended indications and limitations are provided as a guide to the use of the CTI, but the health professional is responsible for applying clinical reasoning and understanding of the potential risks and benefits of providing the task in each clinical situation.

Indications

- The client has been assessed as having deficits with walking. This may have been identified by the skill share-trained health professional when implementing CTI S-MT01: Assess functional walking, CTI S-MT05: Assess standing balance, CTI S-MT07: Assess standing transfer, and if part of the local implementation, CTI S-MT02: Prescribe, train and review of walking aids.
- The client is able to participate in a functional retraining program i.e. is medically stable, has been cleared to participate in a functional retraining program, or is living in the community and is not acutely unwell.

Limitations

- Limitations listed in CTI S-MT01, CTI S-MT05, CTI S-MT07 and CTI S-MT08 apply. If walking aids are in scope, limitations from CTI S-MT02 also apply.
- Additional limitations include:
 - the client requires more than light assistance with walking.
 - the client has significantly limited or restricted activity levels due to cardiopulmonary function e.g. heart failure, COPD or oxygen dependency. The client may present with shortness of breath and an inability to perform a therapeutic number of repetitions without repeated rest periods. Discuss with the physiotherapist and the medical team the parameters for exercise prescription, monitoring requirements and methods prior to prescribing a program.
 - the client has medical or surgical restrictions that preclude participation in a walking retraining program, or restrictions are outside the scope of the skill share-trained health professional e.g. weight bearing status, rest in bed orders, care pathway restrictions.
 - the client has experienced a new fall since last reviewed. The client will require a falls risk assessment prior to re-engagement in the functional retraining program i.e. adherence to local falls protocols and pathways, implementation of S-MT08: Assess and manage falls risk and risk reduction strategies for older persons in community settings using the FROP-Com.
 - the client does not meet local service eligibility criteria e.g. on assessment there is no functional decline since the last episode of care, or the age or diagnosis criteria are not met. Discuss eligibility requirements with the client and alternative service options e.g. private therapy, community groups and/or programs.

Safety and quality

Client

- The skill share-trained health professional shall identify and monitor the following risks and precautions that are specifically relevant to this clinical task:
 - shoes should be enclosed, well-fitting and with good traction. If the client does not have shoes, socks/stockings should be removed, and bare feet should be documented as part of the training program and appropriate safety measures considered including floor surface texture and temperature.

Equipment, aids and appliances

- Equipment used during the functional retraining program should be checked for safety, maintenance and appropriateness to the client's needs prior to use. This may include safe working load check for weight, height of seat to meet hip precautions, brakes in working order, maintenance or calibration testing tag is current.

Environment

- The environment set-up should support the rehabilitation goals. This may include removal or inclusion of distractions, placement of equipment (mirror/cones/block/chair) and determining the appropriate setting for the practice session e.g. bedside, gym, parallel bars, outside.
- If the task is being undertaken in the client's home, a visual inspection of the practice environment should be conducted for safety, including the removal of clutter, checking for loose floor coverings or rails. If a fault is present, the client and/or carer should be informed regarding the required maintenance and an alternative practice location chosen.

Performance of clinical task

1. Preparation

- Determine any equipment required for the prescribed functional retraining program e.g. height adjustable seat, blocks or cones, and feedback tools such as a mirror, tape measure or stopwatch. Perform an equipment safety check.
- Check the client's shoes are on and appropriate.

2. Introduce task and seek consent

- The health professional checks three forms of client identification: full name, date of birth, **plus one** of the following: hospital unit record (UR) number, Medicare number, or address.
- The health professional introduces the task and seeks informed consent according to the Queensland Health Guide to Informed Decision-making in Health Care, 2nd edition (2017).

3. Positioning

- The client's position during the task should be:
 - standing, ready to walk.

- The health professional's position during the task should be:
 - standing, generally in front of and slightly to the side of the client in a position to observe performance and provide feedback and if necessary, assistance for safety including verbal cueing and manual guidance.

4. Task procedure

- The task comprises the following steps:
 1. Use information collected from the medical chart and subjective assessments to determine the client's suitability to participate in a functional retraining program. Refer to the Indications and limitations section. If not suitable, cease the task and discuss with the medical team (if indicated) and a health professional with expertise in the task.
 2. Use information from the walking assessment and compare performance to normal movement patterns. i.e. as per CTI S-MT01, CTI S-MT02, CTI S-MT05, and CTI S-MT07. Note any deviations from the normal movement pattern and compensatory strategies used.
 3. Develop a list of functional goals in partnership with the client. As the focus of this CTI is implementing bridging interventions following the skill shared assessment, the goal/s will focus on observed problems with walking and stepping to the side for a standing transfer that are amenable to short term intervention and client practice. More substantial or longer-term functional rehabilitation of walking and transfers will involve goal setting and intervention planning in collaboration with a health professional with expertise in the task.
 4. Design a functional retraining program for walking including training parameters, performance measures and monitoring requirements, environmental set up requirements, carer assistance and/or client compensatory strategies. This will include the number of sets and repetitions, step height, practice environment, cueing/manual guidance requirements, monitoring requirements e.g. observation, heart rate, respiratory rate, O2Sat, pain scale, rates of perceived exertion.
 5. Practice the planned program with the client and/or carer, observing performance and adjusting training parameters to meet training thresholds.
 6. Adjust the functional retraining program to be at a training threshold suitable for the client. If receiving carer assistance/support for practice, this must not exceed the capacity of the carer.
 7. In consultation with the client and any relevant team members, determine the need and timeframe for review of the program and progress arrangements as required.

5. Monitoring performance and tolerance during the task

- Common errors and compensation strategies to be monitored and corrected during task include:
 - poor performance of the planned activity. Check the activity set-up e.g. foot placement, block height, distance, number of repetitions, and adjust if required. If poor performance persists, adjust the training parameters of the activity to improve ease of performance e.g. reduce step length or block height, reduce duration, repetitions, distance or frequency. If no immediate improvement in performance is observed, cease the task and liaise with a health professional with expertise in the task.
 - the client performs the task but compensatory strategies are noted, see CTIs S-MT01, S-MT02, S-MT03, S-MT05, S-MT07 for details. Adjust the task to reduce the use of compensatory strategies i.e. by altering the environment, using verbal cueing or manual guidance. Determine

if the client is able to perform the task within the training parameters. If compensatory strategies continue, cease the task and liaise with a health professional with expertise in the task.

- the client performs the task appropriately within the required rehabilitation program parameters. Consider progressing the program to challenge the client to work within a training threshold. See section 6. Progression below.
 - the client reports pain during or after task performance. Monitor the client using a pain rating scale during task performance and if indicated, pause the activity. Discomfort from exercise should settle quickly once the exercise is ceased. If the client has been unable to attain a training threshold, consider altering the environment, equipment or assistance provided e.g. smaller step length, re-introduce manual guidance and support. If pain persists or does not settle quickly with exercise cessation, contact the medical team to request a review of the client's pain. Discuss the parameters for exercise performance with a health professional with expertise in the task
- Monitor for adverse reactions and implement appropriate mitigation strategies as outlined in the Safety and quality section above.

6. Progression

- The scope of this CTI relates to a bridging intervention following a skill shared assessment for standing transfers and walking. For implementing the progression of a transfer and walking retraining program previously prescribed under a collaborative practice model see CTI S-MT10.
- Strategies to develop an appropriate training threshold for the prescribed bridging intervention include:
 - changing the training environment e.g. altering the number of distractions such as moving from a quiet gym to an open gym area or lino flooring to carpeted flooring.
 - reducing the level of support provided. This may include the amount of cueing, manual guidance or support provided e.g. beside the wall progressed to an open area, light assistance progressed to standby assistance with verbal or internal cueing.
 - increasing the training parameters (resistance, duration, sets, frequency, repetitions) e.g. increasing the stepping distance, height or speed, the number of sets and/or repetitions per set.
 - incorporating the training activity into the functional tasks e.g. step standing part practice into walking or walking outdoors.

7. Document

- Document the outcomes of the task as part of the skill share-trained health professional's entry in the relevant clinical record, consistent with relevant documentation standards and local procedures and commenting on the client's ability to complete the training task including the following specifics of performance:
 - practice environment/s including hand support e.g. walking or stepping practice along the deck railing or kitchen bench
 - equipment requirements e.g. scales, mirror, cone or markers
 - the planned feedback for performance e.g. self-monitoring, mirror, pain rating scale or manual guidance
 - assistance requirements such as set-up, cueing (internal/external) and/or manual guidance

- prescription parameters i.e. number of repetitions and sets and the frequency of performance.
- The skill shared task should be identified in the documentation as “delivered by skill share-trained (insert profession) implementing S-MT12: Prescribe and administer bridging intervention: functional retraining for walking” or similar wording.

References and supporting documents

- Bohannon RW, Glenney SS (2014). Minimal clinically important difference for change in comfortable gait speed of adults with pathology: a systematic review. *Journal of Evaluation in Clinical Practice*. Doi:10.1111/jep.12158
- Carr JH, Shepherd RB (1991). *A Motor Relearning Programme for Stroke*. 2nd Ed. Butterworth-Heinemann: Oxford.
- Drabsch T, Lovenfosse J, Fowler V, Adams, R, Drabsch P (1998). Effects of task-specific training on walking and sit-to-stand after total hip replacement. *Australian Physiotherapy* 44(3): 193-198.
- Mathew SA, Varghese P, Kuys SS, Heesch KC, McPhail SM (2017). Gait outcomes of older adults receiving subacute hospital rehabilitation following orthopaedic trauma: a longitudinal cohort study. *BMJ Open* 2017;7:e016628. doi:10.1136/bmjopen-2017-016628.
- Queensland Health (2017). *Guide to Informed Decision-making in Health Care* (2nd edition). Available at: https://www.health.qld.gov.au/_data/assets/pdf_file/0019/143074/ic-guide.pdf
- Rubenstein TC, Giladi N, Hausdorff JM (2002). The power of cueing to circumvent dopamine deficits: a review of physical therapy treatment of gait disturbances in Parkinson’s disease. *Movement Disorders* 17(6): 1148-60
- Van Peppen RPS, Kwakkel G, Wood-Dauphinee S Hendriks HJM, Van der Wees PJ, Dekker J (2004). The impact of physical therapy on functional outcomes after stroke: what’s the evidence? *Clinical Rehabilitation* 18(8):833-862.
- Verghese J, Wang C, Holtzer R (2011). Relationship of clinic-based gait speed measurement to limitations in community-based activities in older adults. *Archives of Physical Medicine and Rehabilitation* 92(5) 644-846

Assessment: performance criteria checklist

S-MT12: Prescribe and administer bridging intervention: functional retraining for walking

Name:

Position:

Work Unit:

| Performance criteria | Knowledge acquired | Supervised task practice | Competency assessment |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| | <i>Date and initials of supervising AHP</i> | <i>Date and initials of supervising AHP</i> | <i>Date and initials of supervising AHP</i> |
| Demonstrates knowledge of fundamental concepts required to undertake the task through observed performance and the clinical reasoning record. | | | |
| Identifies indications and safety considerations for the task and makes appropriate decisions to implement the task, including any risk mitigation strategies, in accordance with the clinical reasoning record. | | | |
| Completes preparation for the task including determining and collecting the required equipment, conducting an equipment safety check, setting up the environment, and confirming the client is wearing suitable footwear. | | | |
| Describes the task and seeks informed consent. | | | |
| Prepares the environment and positions self and client appropriately to ensure safety and effectiveness of the task, including reflecting on risks and improvements in the clinical reasoning record where relevant. | | | |
| <p>Delivers the task effectively and safely as per the CTI procedure in accordance with the Learning Resource.</p> <ul style="list-style-type: none"> a) Clearly explains and demonstrates the task, checking the client's understanding. b) Uses information collected from subjective assessment and clinical record to determine the client's suitability to participate in a functional retraining program for walking. c) Uses information from the assessment and accurately identifies functional deficits and appropriate clinical monitoring requirements for the planned program. d) Develops goals relevant to the bridging intervention program. e) Appropriately prescribes a functional retraining program including an independent practice program. f) Reviews the prescribed program and adjusts to match training thresholds for the client. g) Determines the need, timeframe and process for review. h) During the task, maintains a safe clinical environment and manages risks appropriately. | | | |

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Monitors for performance errors and provides appropriate correction, feedback and/or adapts the task to improve effectiveness, in accordance with the clinical reasoning record. | | | |
| Documents in the clinical notes including a reference to the task being delivered by the skill share-trained health professional and the CTI used. | | | |
| If relevant, incorporates outcomes from the task into an intervention plan e.g. plan for task progression, interprets findings in relation to care planning, in accordance with the clinical reasoning record. | | | |
| Demonstrates appropriate clinical reasoning throughout the task, in accordance with the Learning Resource. | | | |

Notes on the service model in which the health professional will be performing this task:

Comments should include details regarding scope on weight bearing status, types of walking aids, environments, client groups. Information on and competence in any local service protocol requirements e.g. 6-minute walk test, timed up and go test, etc.

Comments:

Record of assessment competence:

| | | |
|----------------|--------------------|--------------------------|
| Assessor name: | Assessor position: | Competence achieved: / / |
|----------------|--------------------|--------------------------|

Scheduled review:

| | |
|------------------|--|
| Review date: / / | |
|------------------|--|

S-MT12: Prescribe and administer bridging intervention: functional retraining for walking

Clinical reasoning record

- The clinical reasoning record can be used:
 - as a training resource, to be completed after each application of the skill shared task (or potential use of the task) in the training period and discussed in the supervision meeting.
 - after training is completed for the purposes of periodic audit of competence.
 - after training is completed in the event of an adverse or sub-optimal outcome from the delivery of the clinical task, to aid reflection and performance review by the lead practitioner.
- The clinical reasoning record should be retained with the clinician's records of training and not be included in the client's clinical documentation.

Date skill shared task delivered: _____

1. Setting and context

- insert concise point/s outlining the setting and situation in which the task was performed, and their impact on the task

2. Client

Presenting condition and history relevant to task

- insert concise point/s on the client's presentation in relation to the task e.g. presenting condition, relevant past history, relevant assessment findings

General care plan

- insert concise point/s on the client's general and profession-specific/allied health care plan e.g. acute inpatient, discharge planned in 2/7

Functional considerations

- insert concise point/s of relevance to the task e.g. current functional status, functional needs in home environment or functional goals. If not relevant to task - omit.

Environmental considerations

- insert concise point/s of relevance to the task e.g. environment set-up/preparation for task, equipment available at home and home environment. If not relevant to task - omit.

Social considerations

- insert concise point/s of relevance to the task e.g. carer considerations, other supports, client's role within family, transport or financial issues impacting care plan. If not relevant to task - omit.

Other considerations

- insert concise point/s of relevance to the task not previously covered. If none - omit.

3. Task indications and precautions considered

Indications and precautions considered

- insert concise point/s on the indications present for the task, and any risks or precautions, and the decision taken to implement/not implement the task including risk management strategies.

4. Outcomes of task

- insert concise point/s on the outcomes of the task including difficulties encountered, unanticipated responses

5. Plan

- insert concise point/s on the plan for further use of the task with this client including progression plan (if relevant)

6. Overall reflection

- insert concise point/s on learnings from the use of the task including indications for further learning or discussion with the lead practitioner

Skill share-trained health professional

Name:

Position:

Date this case was discussed in supervision:

Outcome of supervision discussion:

Lead health professional (trainer)

Name:

Position:

/ /

e.g. further training, progress to final competency assessment

Prescribe and administer bridging intervention: functional retraining for walking: Learning resource

This CTI assumes the skill share-trained health professional possesses a tertiary qualification and current eligibility to practice in a profession that possesses knowledge of musculoskeletal anatomy, movement analysis and functional retraining of physical tasks and rehabilitation programming for functional walking tasks. This includes task analysis, training progression, training threshold and functional retraining techniques including feedback. This information is not included in this Learning resource.

Required reading

General

- Bull F, Al-Ansari S, Biddle S, et al (2020). World Health Organisation 2020 guidelines on physical activity and sedentary behaviour. *British Journal Sports Medicine* 54(24): 1451-1462. DOI: 10.0036/bjsports-2020-102955. Available at: <https://bjsm.bmj.com/content/54/24/1451>
- Fell DW (2004). Progressing therapeutic intervention in patients with neuromuscular disorders: a framework to assist clinical decision making. *Journal of Neurological Physical Therapy* 28(1):35-46. DOI: 10.1097/01.NPT.0000284776.32802.1b. Available at: http://journals.lww.com/jnpt/Fulltext/2004/03000/Progressing_Therapeutic_Intervention_in_Patients.5.aspx
- Wuest S, van de Langenberg R, de Bruin, ED (2013). Gentile's motor skill taxonomy p121 in Design considerations for a theory-driven exergame-based rehabilitation program to improve walking of persons with stroke. *European Review of Aging and Physical Activity* 11:119-129. DOI: 10.1007/s11556-013-0136-6. Available at: <https://eurapa.biomedcentral.com/articles/10.1007/s11556-013-0136-6>
- Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, Nieman DC, Swain DP (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Medicine & Science in Sports & Exercise* (43)7:1334-1359. Available at: http://journals.lww.com/acsm-mse/Fulltext/2011/07000/Quantity_and_Quality_of_Exercise_for_Developing.26.aspx

Walking

- Physiopedia (2017).
 - Gait Re-education in Parkinson's Disease. Available at: http://www.physio-pedia.com/Gait_Re-education_in_Parkinson%27s_Disease
 - Gait Training in stroke. Available at: https://www.physio-pedia.com/Gait_Training_in_Stroke

Optional reading

- Anemaet WK, Hammerich AS (2014). A framework for exercise prescription. *Topics in Geriatric Rehabilitation* 30(2):79-101. Available through CKN via library request for Queensland Health staff.

- Anemaet WK (2014). Application of the framework for exercise prescription. *Topics in Geriatric Rehabilitation* 30(2):102-107. Available through CKN via library request for Queensland Health staff.
- Manske RC, Cullen MN, Brotzman SB (2011). Chapter 6: The arthritic lower extremity p 371-392. In, *Clinical Orthopaedic Rehabilitation: An evidence-based approach* (3rd Ed). Editors Brotzman SB, Manske RC and Daughtery K. Elsevier Mosby: Philadelphia. Available through CKN for Queensland Health staff.
- Lazaro RT, Reina-Guerra SG, Quilben MU (2020). Chapter 8 Interventions for individuals with movement limitations. p 174-204. In *Umphred's Neurological Rehabilitation* (7th Ed.). Editors Lazaro RT, Reina-Guerra SG, Quilben MU. Elsevier, Missouri. Available for Queensland Health staff through Queensland Health Libraries and CKN.

Local resources

- Local service protocols, procedures, guidelines for mobility and transfer programs, care pathways and maintenance of equipment requirements as relevant for the local implementation.
- The lead health professional may identify key texts that are relevant to the rehabilitation approach and available in the local setting. For example:
 - Carr JH, Shepherd RB, Gordon J, Gentile AM, Held JM (1987). *A motor relearning programme for stroke* (2nd Ed). Butterworth-Heinemann Ltd: Oxford.
 - Carr JH, Shepherd RB, Gordon J, Gentile AM, Held JM (1987). *Movement science: foundations for physical therapy in rehabilitation*. Heinemann Physiotherapy: London.
 - Shumway-Cook A, Woollacott MH (2017) *Motor control: translating research into clinical practice* (5th Ed). Wolters Kluwer: Philadelphia.

Exercise thresholds, monitoring and tolerances

The skill share-trained health professional will need to determine the parameters for exercise. This will include the type of exercise, duration, frequency, repetitions, and sets. This CTI will focus on the type of activities to include for a functional retraining program for walking. Information on the duration, frequency, number of repetitions and number of sets will not be covered. If required, review this information from undergraduate training. As part of training in this CTI discuss the application of these concepts to walking functional re-training with the lead health professional.

Prescribing a functional retraining program for walking

Carr and Shepherd (1991) have proposed that in order to achieve optimal improvement in performance of functional tasks like walking and sit-to-stand, clients need to practice exercises which approximate these tasks. The goal of functional retraining is to improve task performance by supporting the practice of normal movement patterns. The assessment process determines the client's usual movement pattern and variances from normal whilst walking and stepping to the side with standing transfers. Poor movement patterns can result in changes in neuroplasticity affecting motor co-ordination/recruitment patterns and control, and can impact on muscle length and strength, and other musculoskeletal adaptive change. Timely prescription of a functional retraining program aims to reduce and/prevent pathological changes. The main purpose of functional retraining for the skill share-trained health professional is to facilitate a more "normal" movement pattern for walking by adjusting the environment, providing feedback and/or assistance to improve performance and achieve practice of stepping up as part of re-training. Basic strategies to retrain walking are described in Table 1 below.

Task specific walking retraining has been shown to be beneficial for a variety of client groups including stroke (Van Peppen et al 2004) and post total hip replacement (Drabsch et al 1998). Exercises to address specific problems with lower limb strength, length and co-ordination can be beneficial and should be included as part of a collaborative service model using CTI S-MT10.

Setting up the environment

Practice environment (general)

With the client and carer (if relevant) determine where the functional retraining program will occur. The area should be free of clutter. Practicing next to a wall, in the corner of a room, or near a rail or bench can improve safety and it can also give the client a sense of security. The practice environment should be recorded as part of the prescription process including support available to the client for safety such as a wall, bed, plinth, or rail in front of or beside the client e.g. walking or stepping practice along the deck railing or kitchen bench.

Hand support

If the client requires hand support, it must be stable. Undertaking the program near a window sill, veranda, deck railing, kitchen bench or grab/hand rail may be appropriate for safety. It is important to note that the goal of stepping/walking practice is to reduce the use of the upper limbs and encourage the lower limbs to strengthen and co-ordinate. Having the client practice normal arm swing during practice is also beneficial if the client is safe to adopt this posture for the training program. It should be noted that for safety the client may require hand support at all other times and this should be discussed with the client and carer/givers (if relevant) as part of the prescription process.

Speed of movement

It is a common clinical observation that individuals with movement dysfunction tend to perform walking at a slower-than-normal speed. Gait speed has been proposed as a clinical marker of functional status in older adults (Verghese, Wang, Holtzer, 2011). Matthew and colleagues (2017) showed that improvements in gait speed have been associated with a lower risk of mortality and improved independence in community ambulation, with changes between 0.10 to 0.20 m/second being clinically important (Bohannon and Glenney 2014). Clinically, the speed of walking can be used as a meaningful indicator of progression in performance e.g. timed 10 m walk test, two-minute walk test, six-minute walk test, four step square test. Functional retraining should therefore include facilitating a more “normal” speed of movement. Additional training strategies to improve muscle strength and endurance include slowing the speed of movement to improve control, having the client stop, start or change directions during walking or stepping over/onto blocks.

Feedback

As part of practice, the client requires feedback on performance. This ensures that the more “normal” movement pattern is practiced. Feedback may include a combination of immediate feedback to enhance performance and monitoring for longer term goals. Feedback for walking includes:

- the use of a mirror to assist the client to self-assess and correct body alignment prior to, during, or after the movement e.g. during stepping practice.
- placing a line, cone or marker to guide foot placement e.g. the client must step up to/over a mark on the floor or stay between the line/s as part of reducing the base of support.

- scales under feet to encourage even weight bearing or weight transfer as part of stepping or standing balance.
- use of a tape measure to measure step length or distance the feet are apart.
- use of a timer or stopwatch to time the movement or encourage speed of movement.
- counting the number of repetitions and sets.

Assistance

Cueing

Clients and carers are able to use cueing. Internal cueing may include the client reminding themselves to take a bigger step or to provide a count to the movement for rhythm or speed. The carer may provide a verbal cue to the client each time assistance is provided e.g. to encourage push off during swing or gait patterning with walking aid use. Other auditory cueing methods include keeping time to a beat e.g. metronome or music. Visual cueing methods include signage or placement of a line, a cone or marker to provide a visual reminder. Sensory cueing has been shown to improve gait in clients with Parkinson's disease (Rubenstein, Giladi, Hausdorff, 2002).

Manual guidance

Due to neuromuscular control problems, the client may require manual guidance to improve movement patterns. If the client requires more than one light assist for walking and standing transfers, refer to the Indications and limitations section of this CTI.

Examples of manual guidance for walking and stepping include:

- arm swing: a stick can be used to guide normal arm swing. The assistance is provided by having the client hold the ends of the stick and guiding the normal arm swing movement pattern whilst walking. The assistant can walk behind the client or in front of the client. The assistant needs to be trained in the normal arm swing movement and not have any walking deficits them self.
- Lateral pelvic shift during the stance phase of walking is normally 4-5 centimetres (cm) which allows the centre of gravity to shift sufficiently laterally to allow the opposite leg to swing through (Carr and Shepherd 1991b). This lack of hip control is usually associated with difficulty contracting the ipsilateral hip abductors, extensors and contralateral trunk side flexors. Standing behind the client, the carer can provide manual guidance and feedback to the client during weight transfer onto the stance leg. The skill share-trained health professional can indicate with their finger how far the pelvis should shift onto the stance leg i.e. 2.5 cm, whilst performing a stepping exercise or practicing lateral weight shift in standing. Feedback from a mirror placed in front of the client can also be beneficial.

Prescription

The prescription of a functional retraining program for walking prioritises independent practice.

Prescription should specify:

- the environment in which the practice will occur including location, available hand support and safety requirements.
- any additional equipment required for the practice session e.g. scales, mirror, cone or markers.
- the planned feedback for performance e.g. self-monitoring, mirror, pain rating scale or manual guidance.

- assistance requirements including set-up, cueing (internal/external) and/or manual guidance.
- the number of repetitions and sets that can be attained with normal movement pattern. The environmental set up and assistance should allow 6-15 repetitions, 3 sets. If the client cannot attain 6 repetitions or exceeds 15 repetitions, adjust the environment and/or assistance to attain a training threshold.

Training parameters

- When designing the training program, a task can be made more challenging by reducing the amount of support e.g. hand support, assistance and feedback. Alternatively, a task can be made more or less challenging by changing the client's position/activity requirements or by increasing the need for dynamic balance control or introducing/increasing cognitive complexity or attentional burden.
- The principles of training parameters include:
 - changing the clients' position i.e. standing to step standing, stepping or walking. Activities are more challenging when the size of the base of support is reduced thereby increasing the dynamic control required to maintain the centre of mass within the base of support.
 - changing the requirements of the task within the position/activity. Activities are more challenging when there is an increase in the physical, sensory and cognitive demands of the task e.g. turning the head, reaching and manipulating objects or introducing distractions or dual tasking.
- Activities do not need to be in a strict sequential order. For example, stepping mastery does not necessarily need to occur prior to walking retraining commencing or dual tasking in standing is not required before commencing stepping practice.
- The decision of how to challenge the client's activities is based on the following considerations:
 - the client's safety and feasibility to practice the prescribed program. For example, if the client's environment or carer supports are limited and the client cannot practice walking independently due to safety concerns, alternative strategies will need to be examined.
 - the client's goal including functional relevance. For example, if the client reports difficulty pouring the kettle in the kitchen, the training program may focus on adding reaching to standing and stepping tasks rather than necessarily progressing to walking. Whereas, if the client's primary goal is walking in the kitchen environment, activity challenges from standing balance to walking retraining would be functionally relevant. See Table 1 below.
- If training parameters are unclear or the client experiences problems with the planned activities, liaise with a health professional with expertise in the task.
- Other functionally relevant tasks include walking outdoors and stairs. These require specific strategies and are more likely to be implemented as a shared care model with the lead professional being involved in clinical decision making and implementation shared. These activities are outside the scope of this CTI.

Table 1: Basic strategies to retrain walking

| Observation | Strategy | Resources and program instructions |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Does not use the walking aid features e.g. height adjustment or brakes. Poor gait patterning with the walking aid or a stooped/flexed posture, listing of the trunk, whilst using the walking aid.</p> <p>If the client presents with a walking aid/s that is not in scope for the skill share-trained health professional, liaise with a health professional with expertise in the prescription, training and review of the required walking aid.</p> | <ul style="list-style-type: none"> • Review of walking aid including: <ul style="list-style-type: none"> – maintenance check – review/adjust walking aid height, this may include prescribing a higher than recommended height to encourage trunk extension – retraining in use i.e. positioning of the aid, walking pattern, engagement of brakes – prescription of an alternative aid. • Poor neuromuscular control during stance (see below). | <ul style="list-style-type: none"> • Manufacturers guidelines • S-MT02: Prescribe, train and review of walking aids • S-MT05: Assess standing balance i.e. assess the client’s ability to attain normal standing alignment. Observe how this is altered/changed with the use of the walking aid. |
| <p>Stooped/flexed or trunk listing posture, including reaching/using hand support or watching feet.</p> | <ul style="list-style-type: none"> • Discuss with the client any underlying problems e.g. pain, visual deficit, peripheral neuropathy. Check the limitations of this CTI prior to prescribing a functional retraining program. • Standing balance retraining | <ul style="list-style-type: none"> • S-MT05: Assess standing • Feedback to adopt an upright posture in standing. This may be verbal or visual (mirror) • Standing balance retraining - measure initial distance between feet. Practice with feet closer together. Goal is to have client standing with feet together for >30 seconds. Client should be positioned close to hand support or in the corner of a room for safety. Feedback can include placement of tape on the floor to define where feet should be positioned, scales to measure weight distribution, manual guidance to the client’s hip/pelvis to maintain reduce excessive lateral shift/sway • Progression includes the introduction of: <ul style="list-style-type: none"> – head/trunk turning or movements of the upper limb including reaching tasks. Initially with feet |

| Observation | Strategy | Resources and program instructions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> Stepping retraining | <p>shoulder width apart, then reducing the base of support i.e. feet together or in step standing</p> <ul style="list-style-type: none"> cognitive tasks in standing e.g. counting backwards by threes, naming animals, listing days of the week in reverse order dual tasking activities e.g. simulation of doing the dishes, preparing food, grooming, counting coins. <ul style="list-style-type: none"> Stance phase - stepping forwards/backwards or sideways focusing on step width and length. Feedback can include placement of tape/cones on the floor to define where feet should be positioned for step width, length and/or direction, scales for weight transfer, mirror and/or manual guidance to the client's hip/pelvis to reduce excessive lateral shift/sway with weight transfer onto the stance leg. |
| <p>Wide base of support or uneven weight bearing Principally occurs due to poor balance or poor control of the stance leg during swing (Carr and Shepherd 1991b).</p> | <ul style="list-style-type: none"> Standing balance retraining Stepping retraining | <p>See above</p> |
| <p>Problems with initiation walking e.g. mild freezing, mild cognitive decline, lack of fluency and control whilst walking, that is not related to muscular strength. This may also be observed when negotiating thresholds during walking e.g. doorways, changes in floor surfaces/coverings.</p> | <ul style="list-style-type: none"> Walking retraining | <ul style="list-style-type: none"> Standing balance, stepping retraining (see above) Auditory cueing including metronome, music for timing or verbal instruction to step over lines on the floor Visual or internal cueing including to 'step over' lines on the floor e.g. tile grout lines, carpet pattern Practice of cognitive tasks whilst either performing stepping or walking tasks e.g. counting backwards by 3, naming animals, listing days of the week in reverse order. |

| Observation | Strategy | Resources and program instructions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Absent/reduced arm swing</p> <p>NB: clients using a walking aid will have arm swing impacted due to holding the handle/s.</p> | <ul style="list-style-type: none"> Arm swing is directly related to walking speed. Increasing walking speed can improve arm swing Stepping retraining (see above) | <ul style="list-style-type: none"> Use verbal cueing or a metronome to increase walking speed Use manual guidance to promote normal arm swing e.g. use of a stick co-ordinated by another person. Step ups. |
| <p>Poor neuromuscular control during stance e.g. mild Trendelenberg, reduced step length bilateral/unilateral, shuffling gait, problems with side stepping to transfer into a chair.</p> <p>Lack of knee extension control can also contribute to poor stance and will appear as a 'locked back' knee position (Carr and Shepherd 1991b).</p> <p>Specific training of the knee is required and is outside of the scope of this CTI. Liaise with a Physiotherapist if this is observed.</p> | <ul style="list-style-type: none"> Walking retraining (see above) Part practice of stance phase of walking | <ul style="list-style-type: none"> On the stance leg practice pelvic control whilst placing swing leg up onto a block, transferring the weight up on to the block and back down. Blocks are generally 6-15 cm high e.g. a taped phone book. Feedback includes the number of repetitions achieved with pelvic shift control during stance. Progression includes: <ul style="list-style-type: none"> stepping over narrow blocks whilst walking. <p>Step-downs</p> <ul style="list-style-type: none"> Standing on a bottom step or block practice pelvic control whilst placing swing leg down to tap the ground. Weight, pelvic and lower limb control is maintained on the stance leg. Hand support should be discouraged to improve balance and lower limb strengthening. Progression includes changing the speed of the movement and height of the step-in preparation for walking down stairs. |
| <p>Poor neuromuscular control during swing i.e. shuffling, toe catching, short step length.</p> <p>Note: swing may also be impacted by foot drop/push off. These are outside the scope of this CTI.</p> | <ul style="list-style-type: none"> Part practice of swing phase of walking | <ul style="list-style-type: none"> In step standing (swing leg behind) practice stepping forwards and backwards. Use a line on the floor to indicate required step length. Provide verbal cueing to push through the toes to initiate swing phase and heel contact first to initiate dorsiflexion at heel strike. Increasing walking speed has been shown to increase push off and increase step length. Use verbal or auditory cueing to increase walking speed e.g. metronome. |

