

**Manual of exercises to be used in study
“Effectiveness of a targeted falls prevention
program in the sub-acute hospital setting – a
randomised controlled trial”.**

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Underlying principles of exercise program

This program is intended to consist of 3 exercise sessions of 45 minutes duration per week. The exercises are to incorporate the therapeutic elements of Tai Chi (below) with functional activities such as transferring from chair to chair, stepping reaching and weight shifting. In conducting exercise with sub-acute hospital patients, therapists must be sensitive to fatigue levels of individual participants within the exercise group and tailor the intensity of the program accordingly.

7 therapeutic elements of Tai Chi exercise¹

1. Continuous movement performed **SLOWLY**
2. Small to large degrees of motion
3. Knee flexion and weight shifting
4. Straight and extended head and trunk
5. Combined rotation of head, trunk and extremities
6. Asymmetrical arm and leg movements about the waist
7. Unilateral weight bearing and constant shifting

One or more of these elements should be incorporated into every exercise performed, especially knees bent, upright posture, slow movement and weight shifting.

Functional context: Many of the exercises in this manual resemble activities that may be undertaken in everyday life. Where possible, visual imagery may be used to assist the patient to perform the exercises.

Hand support: Additional support should be provided where required. This can take the form of rails or the back of sturdy chairs. However contact between upper limbs and a supporting surface should be discouraged where safe to do so. In circumstances where patients are hesitant to attempt an activity without being able to hold onto something, the therapist may initially wish to offer their hands. They should be relaxed at all times and never serve as a supporting surface. If a patient places downwards pressure through your

hands, do not apply an equal force in the opposite direction, rather allow your hands to be pushed down (this is of course unless the hand pressure is a protective balance reaction where the patient will fall if you do not push back). This will teach the patient that they must rely on their lower limbs for their balance reactions.

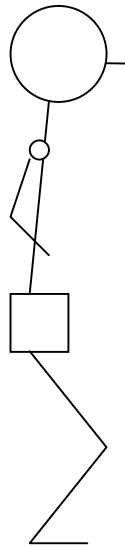
Format of group: For simpler exercises, the therapist can have all participants performing simultaneously. However for complex exercises or exercises where the participants struggle to perform the movement without losing balance, the therapist may wish to have participants perform exercises one at a time.

Basic starting position (BSP) – to be incorporated into most exercises.

Knees bent

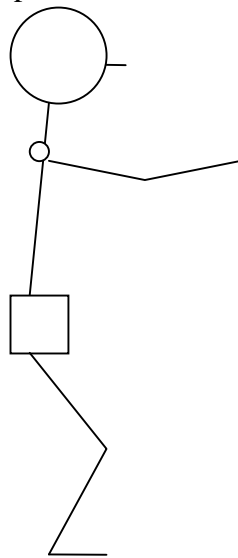
Upright posture (esp. head arms trunk)

Feet shoulder width apart



Side view

Basic starting position – upper limbs (BSPUL): Shoulders at 90 degrees flexion, wrists extended, fingers pointing up. This will move centre of gravity anteriorly, requiring lumbar spine and hip extensors to do more work.



Side view

Narrow basic starting position (NBSP): BSP + feet together

Wide basic starting position (WBSP): BSP + feet wide apart

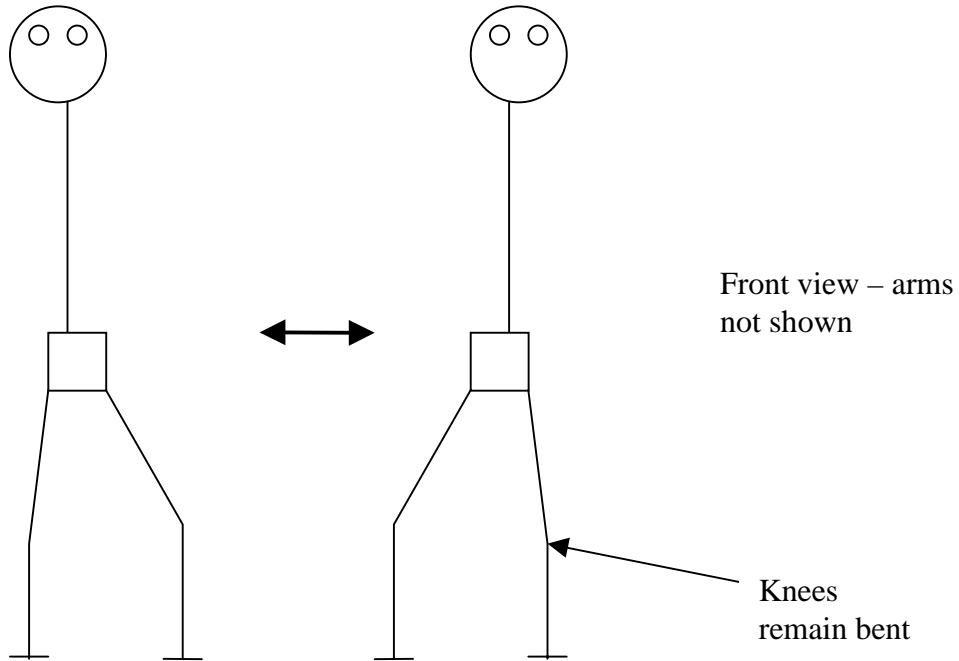
Abbreviations:

In this manual you will notice some abbreviations such as BSP (basic starting position), BSPUL (basic starting position upper limbs) and WBSP (wide basic starting position). Where you see (W)BSP(UL) this means that you could use the basic starting position alone, the wide basic starting position, the basic starting position – upper limbs or the combination of wide basic starting position and basic starting position – upper limbs.

Basic standing exercises

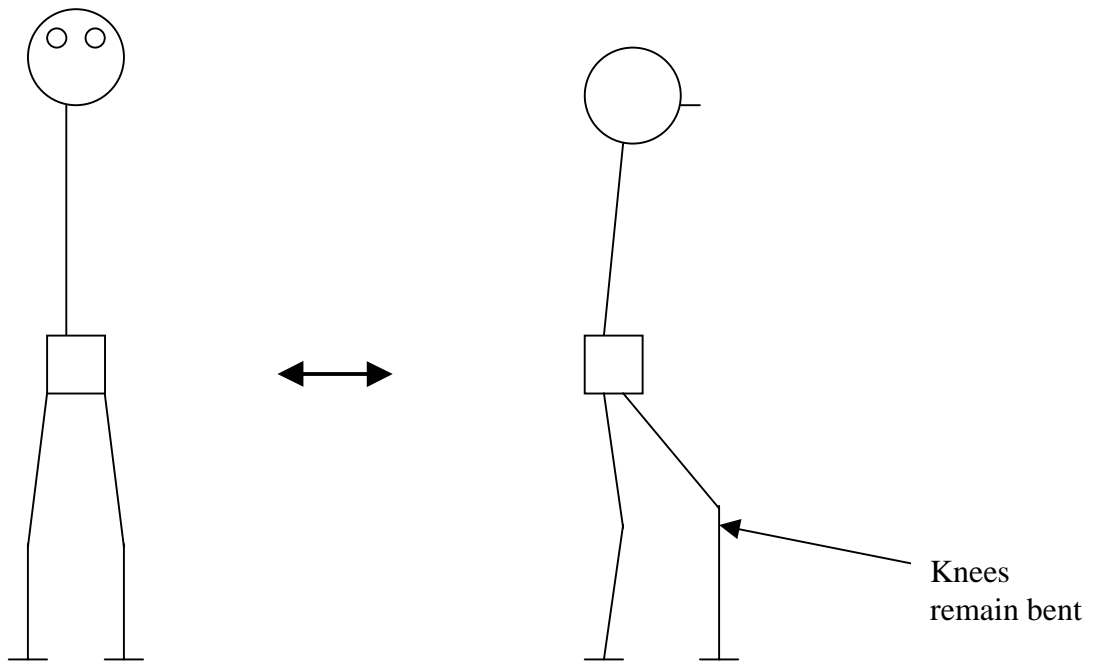
1. (W)BSP(UL) + lateral weight shift

Slowly move from side to side with no rotation in horizontal plane



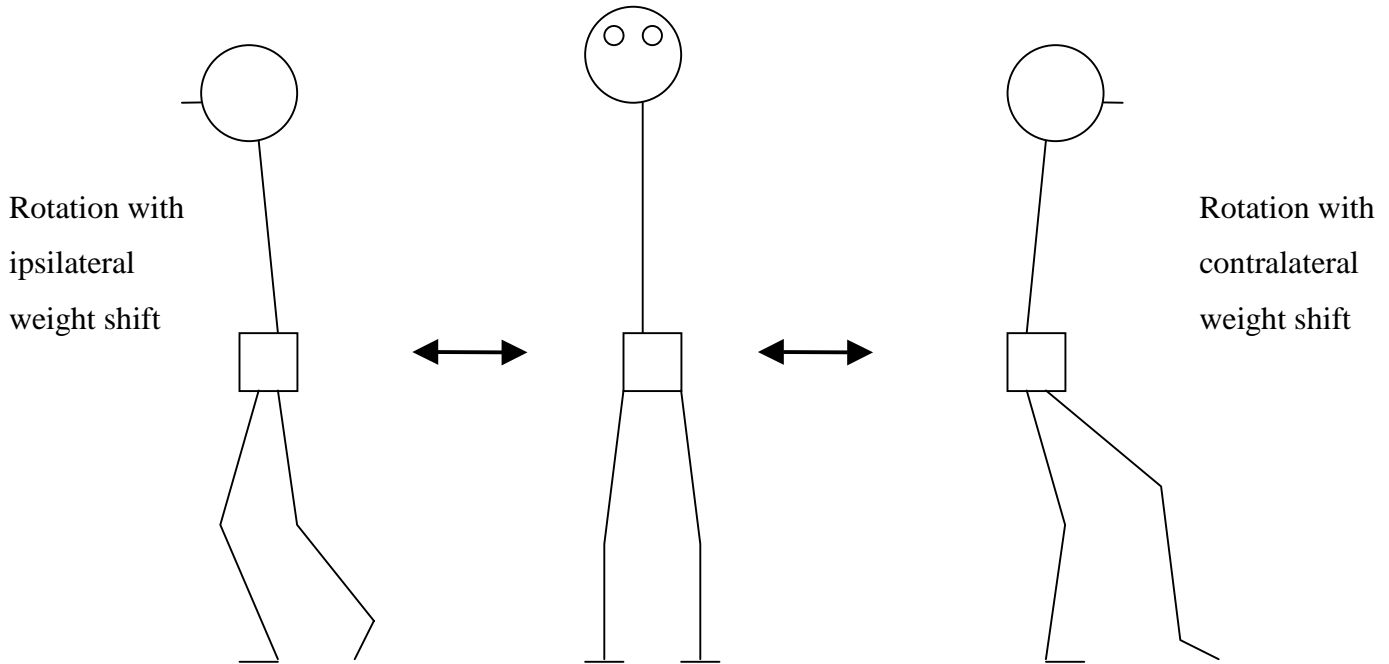
2. BSP(UL) + trunk rotation

Slowly rotate HAT as a unit in horizontal plane



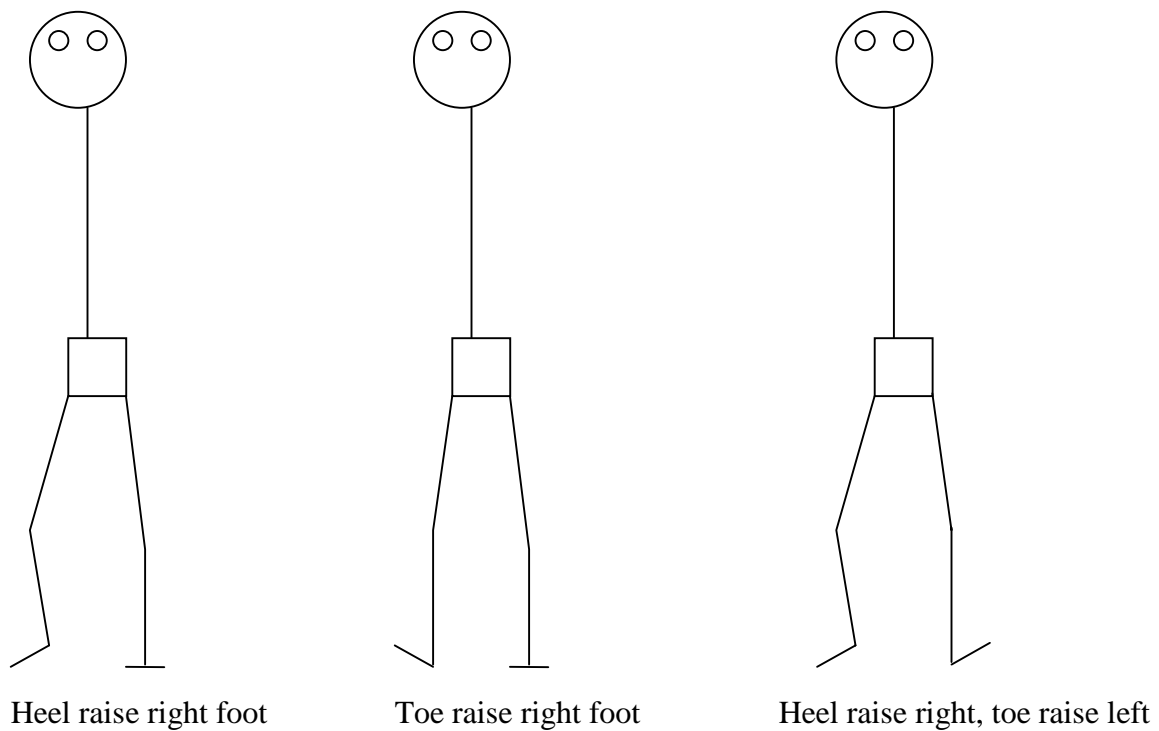
3. (W)BSP(UL) + lateral weight shift + trunk rotation

Use both rotation and lateral weight shift (ipsilateral or contralateral to the side of the rotation)



4. (W)(N)BSP + toe / heel lift

Slowly raise heel / toes of one foot, or combinations with both feet.

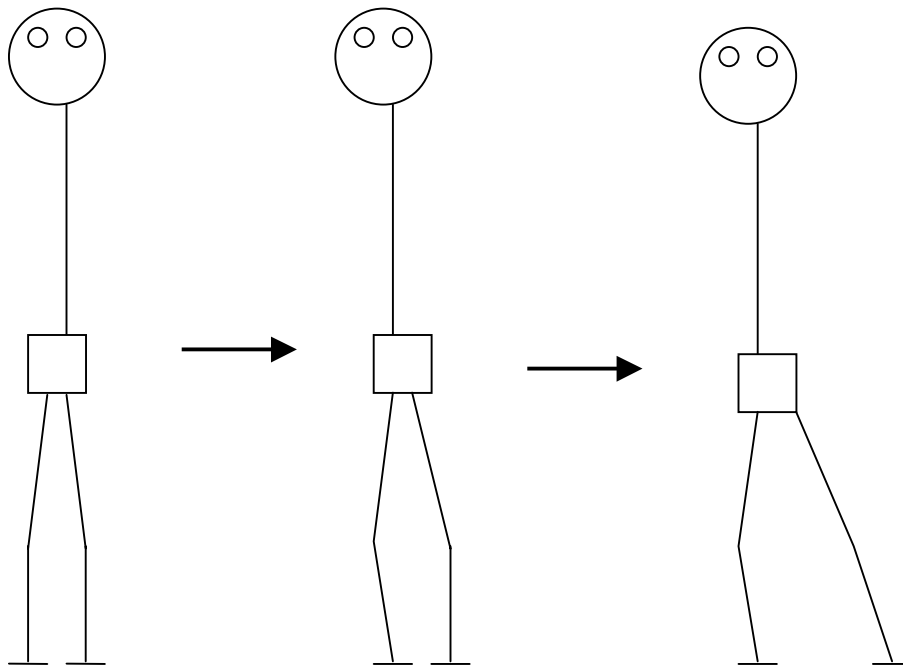


Stepping exercises

1. Uni-direction foot slide

Start in NBSP, slowly slide one foot forwards / sideways / backwards then return.

Emphasise, contralateral weight shift first, then smooth sliding motion of foot. If foot moves incrementally then foot is taking too much weight and must emphasise more contralateral weight shift. Only expect small step when going forwards or backwards. To effectively slide foot further away from body, the contralateral knee must bend further.



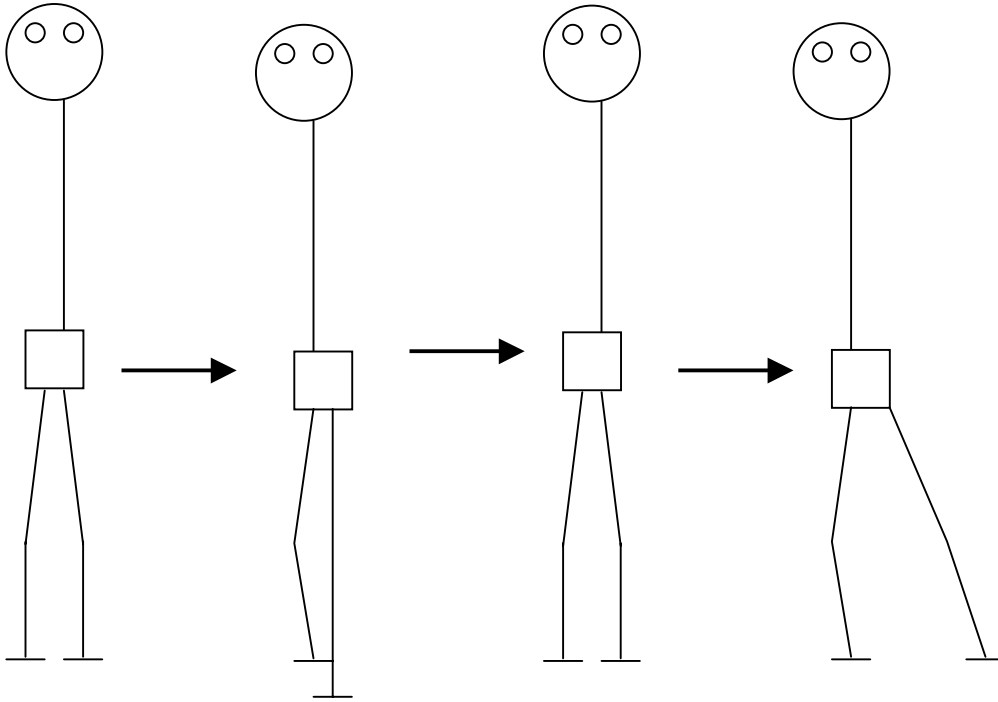
Variation: Move foot on a diagonal forwards or backwards – this progresses to chair transfers later.

Once patient is more confident in single limb support, foot slide may no longer be necessary, use instead SLOW steps. If stepping forwards / forwards diagonal try to completely extend knee and dorsiflex ankle before initial contact. If stepping laterally, back diagonal, try to fully evert ankle before initial contact.

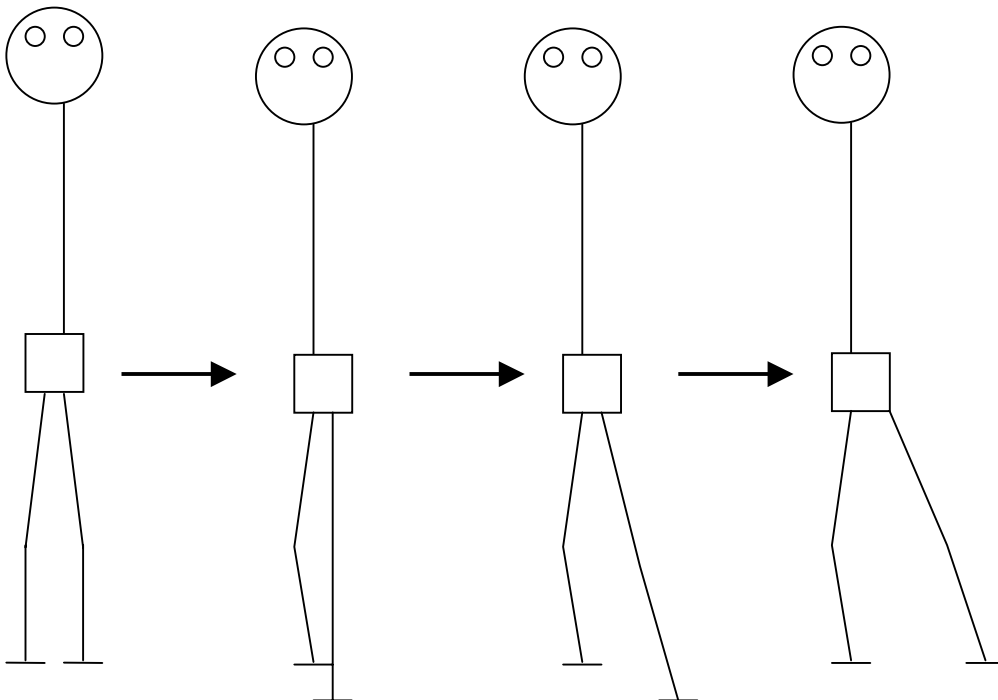
Variation: Incorporate use of upper limb in movement. Eg. Lateral foot slide moving left foot, abduct right arm to 90 degrees slowly during slide. Could also have flexed shoulder or used ipsilateral arm in either manner. Might choose to incorporate hand positioning such as thumb touching finger-tips, fingers straight and wrist flexed.

2. Combination foot slide

Sequentially perform two uni-direction foot slides with the same foot in different directions.



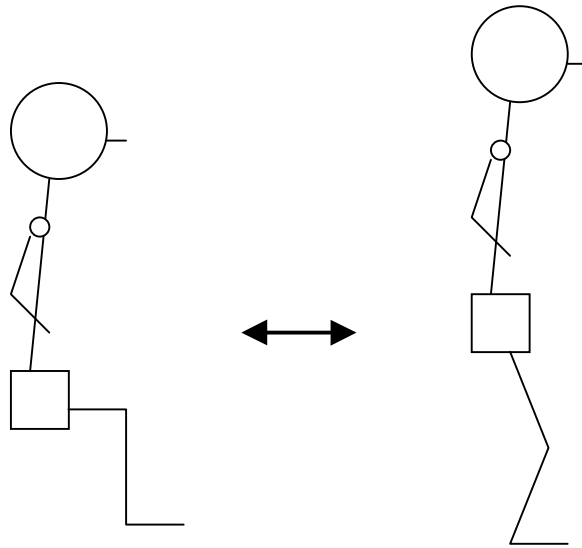
Variation: After initially sliding foot away from body (eg. backwards), use a slide that is like an arc to move to a position 90 degrees away (eg. sideways), then return to NBSP.



Transferring exercises

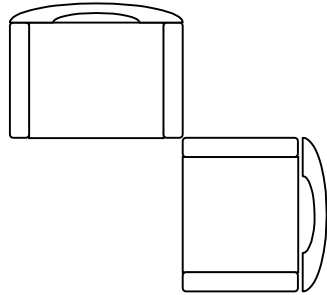
1. Sit to stand.

Sit to stand in BSP then stand to sit. Do not allow use of hands for stand to sit, even for beginners. Must emphasise slowness of movement and control of descent. Progress to no / minimal use of hands for ascent. Then emphasise slowness of movement for ascent.

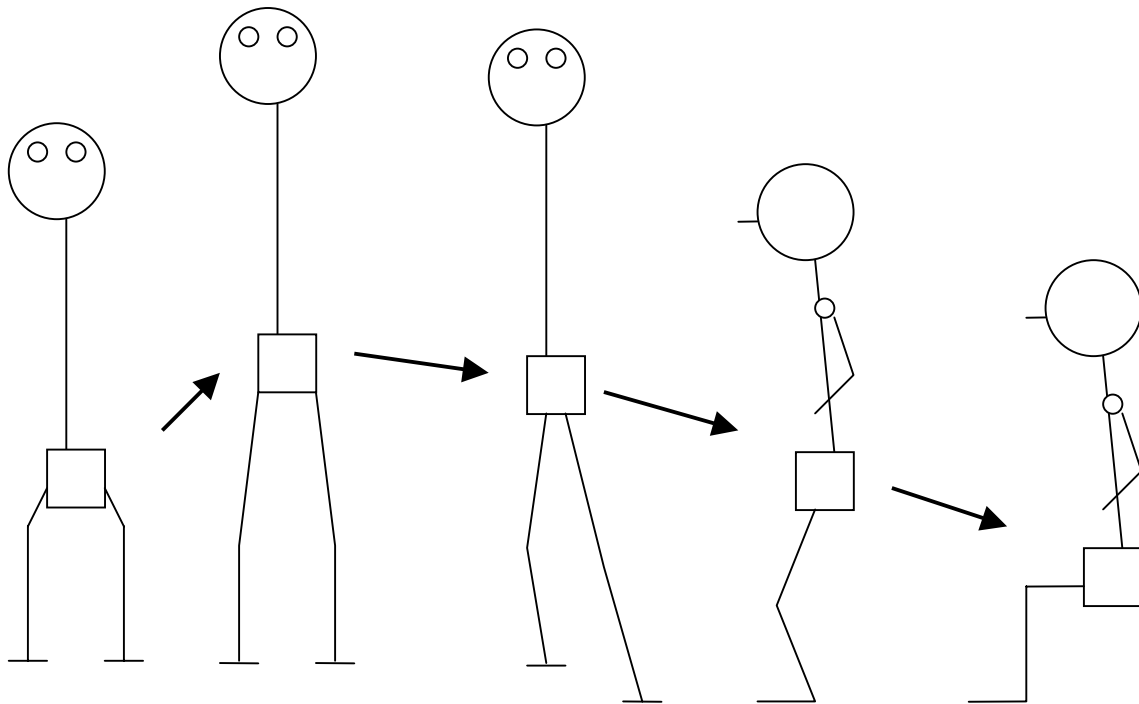


2. Chair to chair transfer.

Important to progress to this quickly due to its functional importance even if previous moves cannot be performed perfectly. Set up chairs with arms of chairs touching at 90 degree angle.



Sit to stand, BSP(UL), with foot closer to target chair forwards diagonal foot slide towards distant front leg of target chair. Weight shift onto this foot, rotate head arms and trunk away from this side (so that patient is now facing away from chair). Slide foot that is closer to the original chair towards the opposite foot, ending up in BSP(UL). Sit down without using hands very slowly.

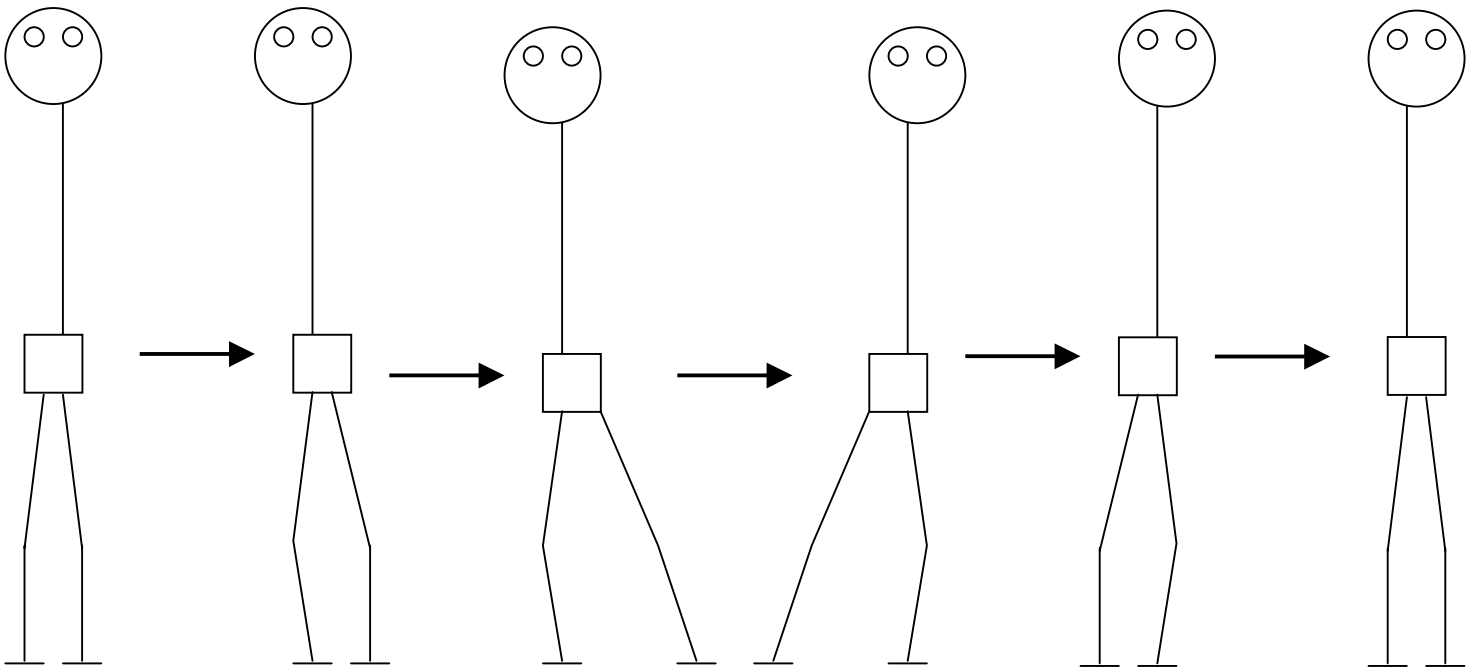


Complex movements

1. Charleston

NBSP(V), lateral foot slide, weight shift towards that side, lateral foot slide of contralateral leg to return to NBSP(V) however now one step lateral from original starting position. Return to the original position using the same technique in reverse.

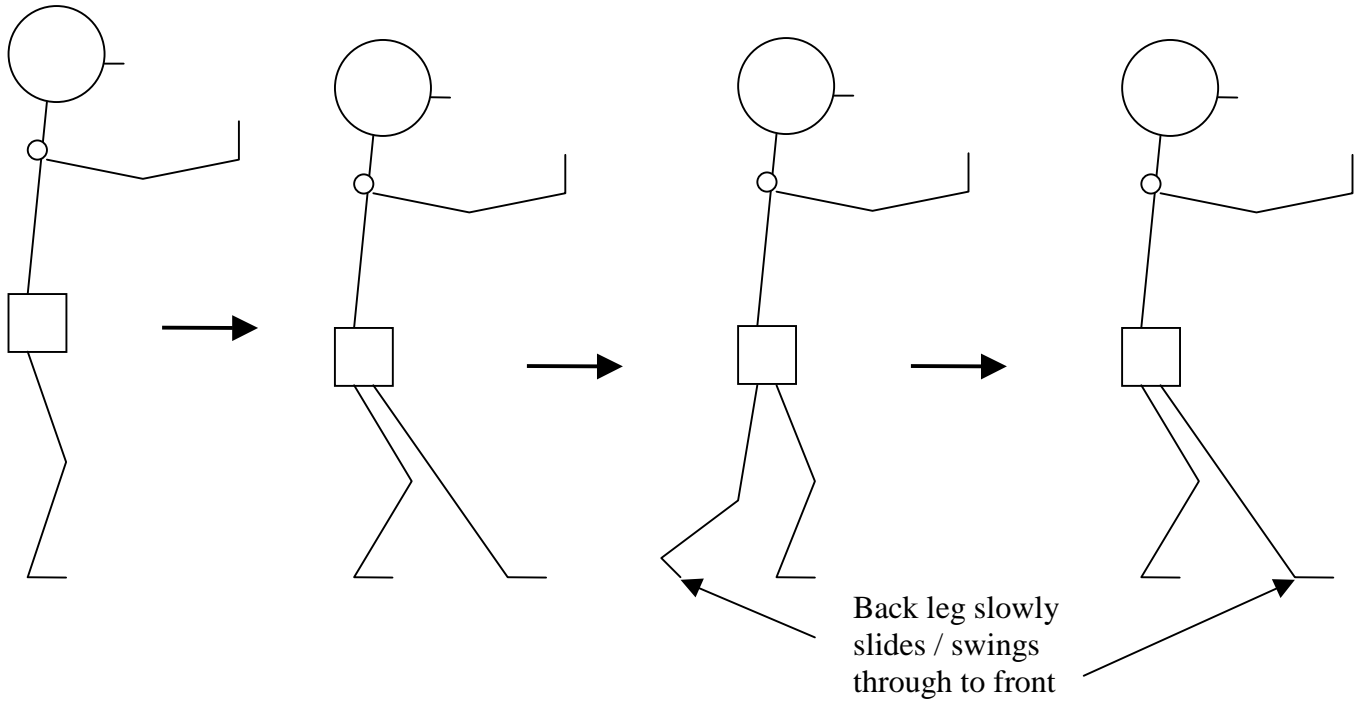
Variation: From NBSPV, horizontally extend ipsilateral shoulder of lead foot



2. Pushing the car

(N)BSPV, forward foot slide, weight shift onto front foot, forward foot slide, forward weight shift onto new front foot. All steps performed slowly with knee bend maintained.

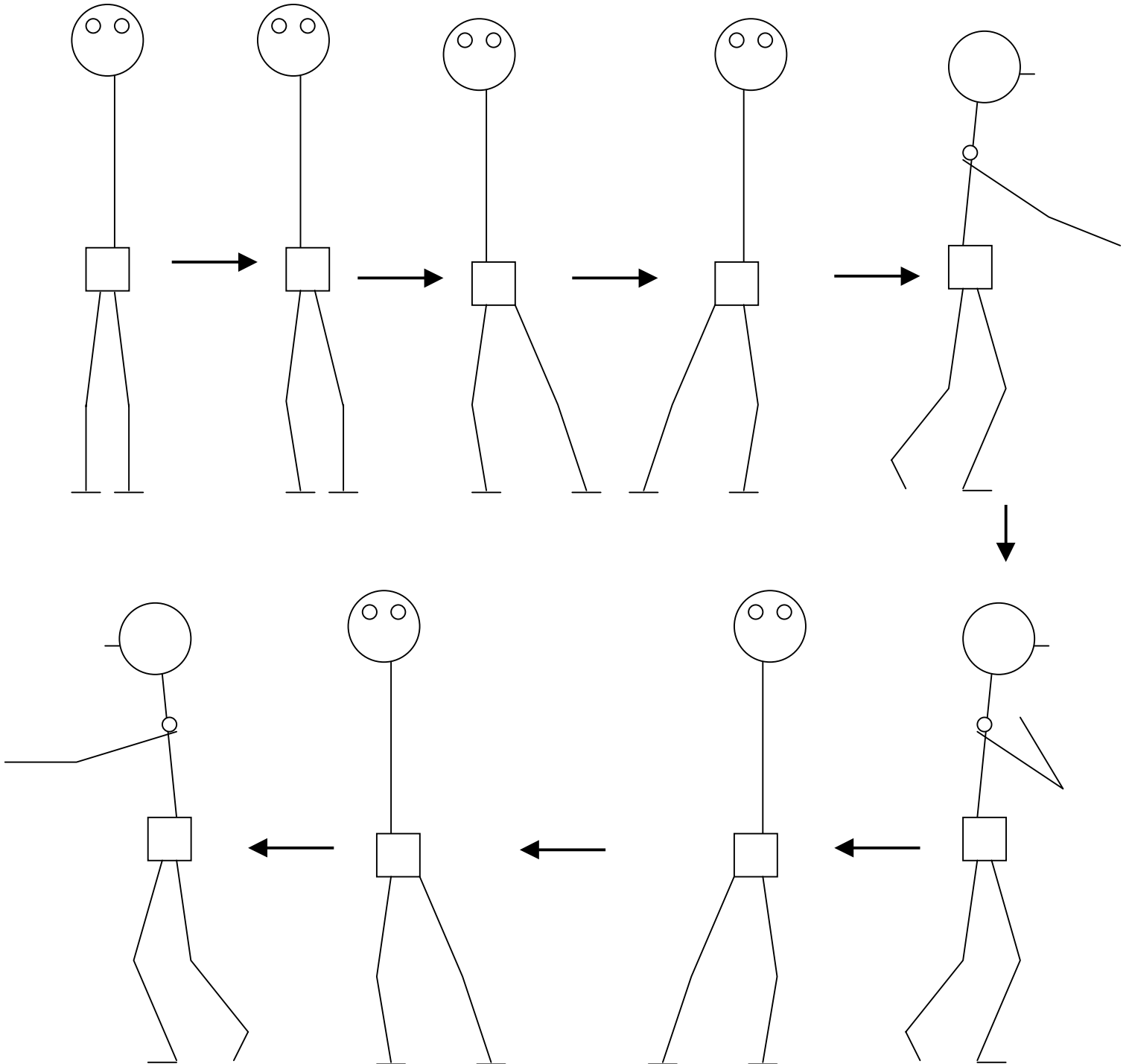
Can repeat for many steps and use therapist hands for minor support if necessary.



Variation: Car is too heavy – as above but backwards foot slides.

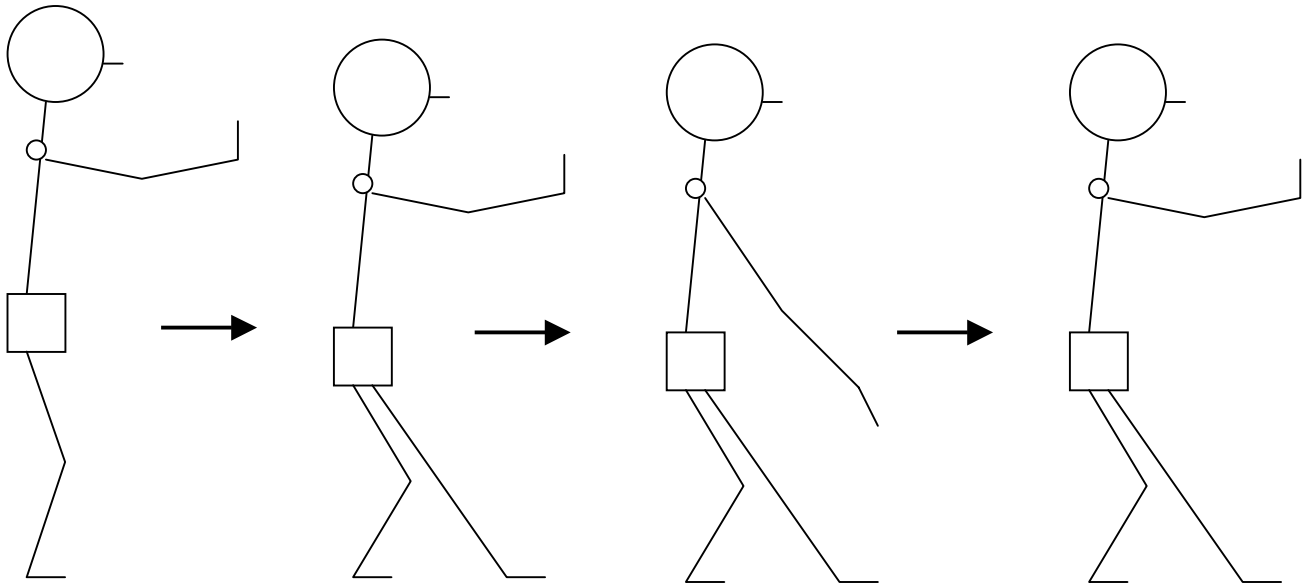
3. Stinky baby

(N)(W)BSP(V), first half of Charleston, rotate upper body towards this direction, reach into imaginary baby's cot, lift imaginary baby to chest, ½ Charleston back in other direction, rotate upper body towards this direction, push baby out to mum / dad (for nappy change).

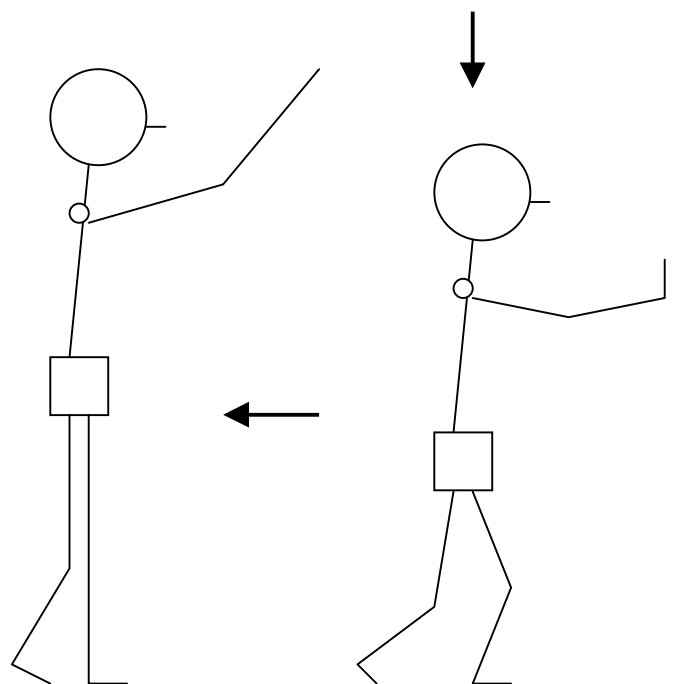


4. Watering flower pots

(N)(W)BSP(V), forward foot slide, back weight shift as much as possible and imagine filling up watering pot from ground level tap (can reach down with both hands to do this), imagine picking up watering pot, forwards weight shift, lift arms right up and pour water into hanging pot plant.



Variation: Can imagine that flower pots are diagonally forward, across a step or any where you like. Can use real watering pot as a prop for this one.



Closing remarks

This manual is not intended to be an exhaustive description of all exercises that can be included in this program. The exercises described provide sufficient content to conduct many sessions with, however therapists may wish to add other particular exercises of their own design. It is important though that they preserve the underlying principles of the program outlined in pages 2 and 3 of this manual.

Reference

1. Wolf S, Kutner N, Green R, McNeely E. The Atlanta FICSIT study: two exercise interventions to reduce frailty in elders. *Journal of the American Geriatrics Society* 1993;41:329-332.