Rehabilitation

through empowering movement

Moving for recovery

People are made to move and they function best when upright and mobile. Mobility improves dignity, independence, and can lead to improvements in physical and mental well-being.

During periods of hospitalisation, facilitating mobility helps people recover faster and regain their independence to help return to life outside the hospital when possible.

Patients and residents, caregivers, and facilities all benefit from improved or maintained mobility. Facilities witness reductions in hospital acquired patient harms such as pressure injuries, with subsequent impact on reduced length of stay, overall cost of care and improvements in patient and caregiver satisfaction.

However, hospitalised patients who are sedentary will spend long periods resting in bed despite the ability to walk independently. Low physical activity during hospitalisation leads to loss of muscle strength, functional performance and independence after hospital discharge.

A clinical study to continuously monitor mobility levels early during a hospital stay, identified that on average, older hospitalised patients spent most of their time lying in bed, despite the ability to walk independently[1]

83%

of the hospital stay was spent lying in bed, although no patient remained in bed throughout its entirety.[1]

Partnering for mobility

By placing a focus on mobility early and regularly in a patient's recovery pathway, the opportunity for rehabilitation is optimised.

This guide offers suggestions to assist and enhance moments for mobility by introducing technology as a supporting aid in rehabilitation therapy.

The information included within has been developed to:

- Help caregivers recognise moments around the clock, to empower patient mobility
- Support therapists and caregivers by suggesting innovative ways of using equipment that is usually available in ICU or wards; for clinically validated rehabilitation and mobility activities

Healthier outcomes for all – mobility is key

When implemented, early mobility and rehabilitation programmes have demonstrated numerous benefits to patients, caregivers and healthcare facilities.

Hospital wide mobility programmes
The importance of maintaining patient mobility while in the hospital has led to a cultural change by the multi-disciplinary team. The introduction of hospital wide early mobility and activity programmes have been increasingly adopted with the aim of preventing functional decline, maintaining patient independence and facilitating earlier discharge.[2,3,4]

Patient

- Reduces the degree of muscle loss and minimises the poor physical condition associated with prolonged bed rest[5]
- Improves functional status at hospital discharge[6]
- Improves walking ability at discharge[5]
- Improves health related quality of life[5]

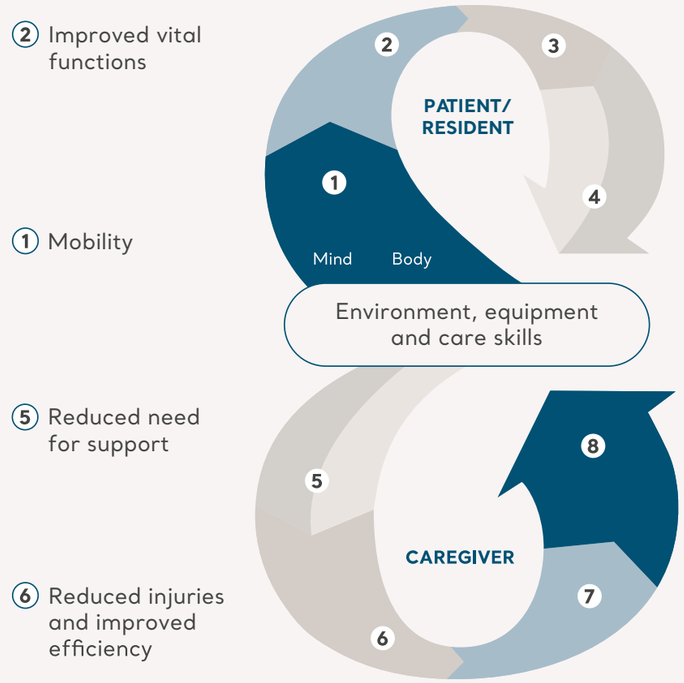
Caregiver

- Reduces need for physical assistance[7]
- Improves working efficiencies by supporting a single handed care approach[8]
- Can help to reduce risk of injury[7]
- Releases time to care[9]

Facility

- Cost reductions associated with reduced hospital length of stay[10]
- Reduces readmissions[11]
- Reduces cost associated with caregiver work related injury[12]

Your trusted partner for promoting healthier mobility outcomes



The right **environment**, **equipment and care skills** need to be in place to allow the benefits of the Positive Eight to flow

Positive 8
Arjo's philosophy of the Positive 8 illustrates the balance between quality of care and work, which supports the operational efficiencies of the facility[13]. Promoting, stimulating and maintaining movement and functional mobility in the rehabilitation process is central to this philosophy. Investing in the right environment, suitable assistive technologies, and adopting appropriate care skills can provide the optimal conditions to promote and enhance mobility.

Arjo is committed to being the most trusted partner in driving healthier outcomes for people facing mobility challenges. With over 40 years' experience as a global leader in the development of innovative mobility and patient handling solutions, Arjo can bring a wealth of experience and unrivalled product portfolio to support caregiver decision-making and practice choices when promoting patient mobility and rehabilitation interventions.

Maximising opportunities to empower mobility

Rehabilitation is instrumental to enable people with functional limitations to remain in or return to their place of residence, live independently and participate in education, work, and civic life as abilities allow.[14]

Rehabilitation strategies focus on achieving the following broad outcomes:

- Prevention of the loss of function
- Slowing the rate of loss of function
- Improvement or restoration of function
- Compensation for lost function
- Maintenance of current function

Mobilisation and rehabilitation can often be seen as activities that are only facilitated by a therapist. However, there are many opportunities for all caregivers to integrate mobility into the individuals' 24-hour care pathway.[15, 16, 17]

Caregivers need to consider how often their patient has moved each day. Have they utilised all opportunities to encourage and support mobility whenever possible?

Personal care
Sitting in a chair or going to the bathroom for hygiene purposes, rather than in bed

Seating
Sitting out for periods of time in the day

Mealtimes
Sitting out in a chair rather than in bed

Walking
Walking in the ward to achieve clear progressive goals

Toileting
Mobilising to and from the bathroom

Repositioning in bed
Sitting up in bed
Sitting on the edge of the bed
Encouraging self-repositioning

Engaging with the environment

Relaxation time

Mobility moments throughout the day

Empowering mobility through technology

While many caregivers recognise the importance of supporting patient mobility, some remain sceptical due to the perceived risk of injury to themselves and their patients during the process.

The focus on fall prevention programmes has often had unintended consequences for patient mobility, functional ability and well-being.[18] Mobility has not been encouraged due to the perception that improving mobility also increases the number of falls. However, studies show this perception is false.[19]

During the rehabilitation process, mobility assistive technologies can be seen as a 'mobility partner' to facilitate functional mobility, promote patient safety and reduce caregiver injury.

Best practice guidelines support the use of assistive technology during mobility and rehabilitation to empower mobility and reduce the risk of hospital acquired harm.[20, 21, 22]

Therapists have reported that patient handling equipment increased their options for therapeutic activities and allowed them to mobilise patients earlier in the rehabilitation process compared to not having the equipment available.[21]

55–91%

of physical therapists are estimated to experience work related musculoskeletal disorders (WMSDs) during their working career and one in six make career changes as a result of injury.[20, 21]

The Arjo Mobility Gallery™

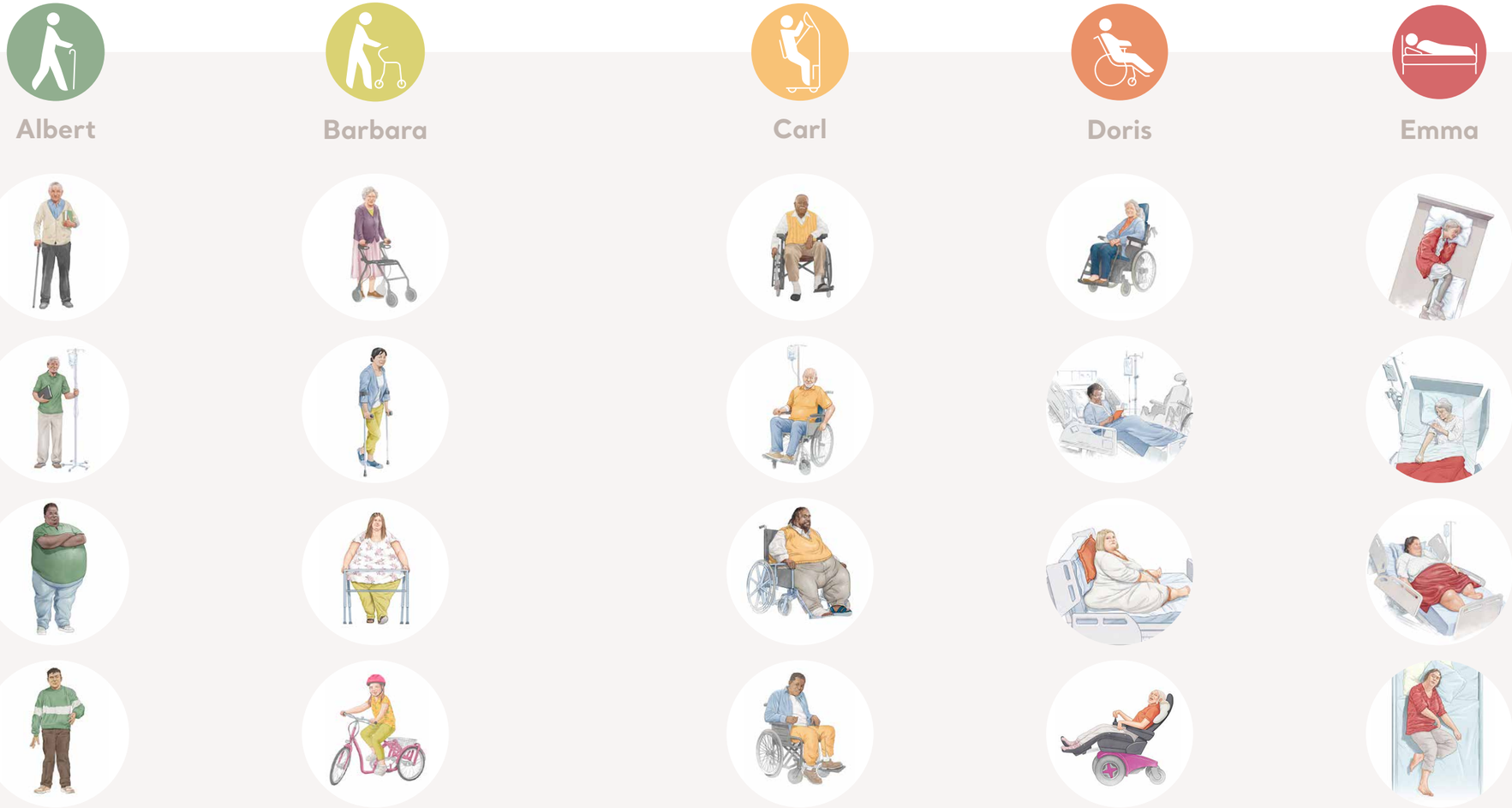
A person-centred approach is fundamental to ensure that rehabilitation is an active and enabling process for each patient. It ensures that support is built around patients' individual circumstances and responds to their diverse needs. This includes consideration of mental and physical health and their interdependent relationship, which is critical to planning effective care.[23, 24]

Developed from the internationally validated mobility classification tool based on 5 different levels of mobility, named in alphabetical order from A to E*, which was originally developed from the Resident Assessment Instrument.[25]

Arjo Mobility Gallery is designed as a functional assessment tool to determine:

- The functional mobility level of the patient/resident
- What level of assistance is required
- Level of risk to the caregiver
- How important stimulation of functional mobility is

Promote person-centred care by knowing who you care for.



Side lying and repositioning in bed

GOAL
Facilitate assisted and independent repositioning in bed

Repositioning in bed has many clinical benefits:

- Prevent tissue damage[22, 24]
- Improve ventilation[26, 27], postural drainage, management of secretions
- Improve vital functions
- Facilitate muscle function, as well as stability and mobility[28]
- Improve their quality of life, wellbeing and participation in functional rehabilitation activities

Facilitate side lying using continuous and unilateral turn assist[29]

- With an integrated patient turn assist mattress, the Citadel Patient Care System can support repositioning in bed
- Use unilateral patient turn and hold or continuous 20° turn to assist the carer with side lying
- The bed frame provides restricted turning when the head of the bed exceeds 30° or when one or more of the bed frame side rails is lowered
- Position the limbs to encourage normal pattern of movement[31]
- Therapeutic support surfaces with effective pressure redistribution can complement repositioning regimens

Facilitate rolling and turning using Arjo's repositioning slings and passive lifts

A repositioning sling used in combination with a passive lift can help reduce the impact on caregiver workflow.[30]

- Use the repositioning sling or Maxi Transfer Sheet with Maxi Move or Maxi Sky 2 to initiate turning the patient toward the caregiver
- Position limbs to encourage normal movement patterns, and offer correct support to reduce the risk of limb contractures and associated reactions[31]
- Encourage the patient to lead the movement and follow on with the repositioning sling for support as needed

Side lying using slide sheets

- Depending on the patients' mobility level either use Maxi Slide sheets or Maxi Tube under the person's bottom / pelvis to assist them to reposition
- Enable the patient to lead the movement and ensure head and limb position is comfortable and supported

Moving sideways in the bed – "bridging"

- Encourage the patient to bridge (lifting their bottom up) and move from the centre of the bed towards the side of the bed
- This movement helps to facilitate abdominal and gluteal muscle function, as well as core stability and strength, which can help to mobilise the patient within the bed[32]
- A Maxi Tube can be used depending on patients' mobility level. By using friction reducing devices, the movement feels easier to the patient and can encourage a feedback pattern which can help facilitate natural movement over time

Moving up the bed using slide sheet(s)

- If the person can use one foot, use Maxi Slide Sheets underneath the patient. Ensure that the foot pushing is clear of the slide sheet to activate the transfer up the bed
- If the person is able to bend both knees, using their feet and raising their head and shoulders, the smaller Maxi Tube under the person's bottom can facilitate independent transfer up the bed
- Flexing the knees can encourage the patient to respond by pushing themselves up the bed - hence facilitating movement

GOAL
Facilitate limb/joint function, flexibility and range of movement

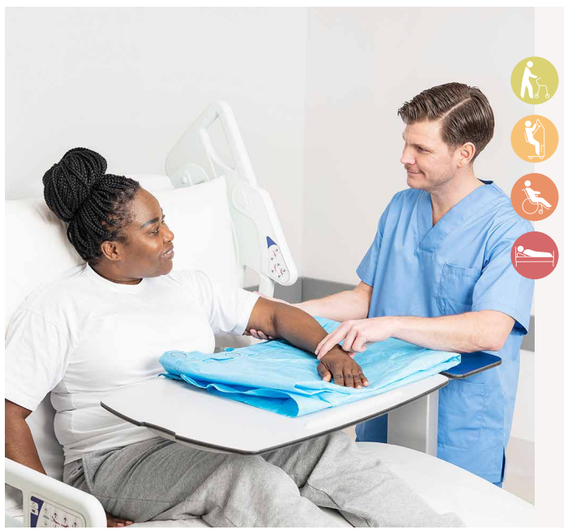
Limb positioning

The importance of passive and active limb movements is well recognised and the clinical benefits include:

- Improve muscle tone, strength, maintain joint range of motion and muscle length, and prevent associated contractures, pain and shortening of muscle groups.[33]

Limb positioning with the use of passive movements:

- Place Maxi Slide sheet/s underneath the part of the patient to be moved (e.g., under lower leg and heel)
- Facilitate desired passive movement on the support surface using the low friction properties of the slide sheets
- As functional mobility improves, the low friction slide sheets can help support more involvement from the patient



Limb positioning with the use of active movements:

- With the Maxi Slide sheet in place, encourage the patient to participate in limb movements
- A slide sheet placed on an over-bed table can help to assess range of upper limb movements while the patient is sitting in bed

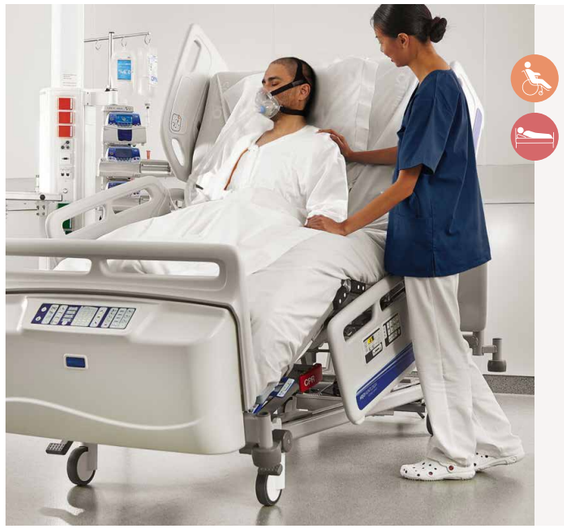
Moving to a sitting position in bed

GOAL
Achieve a supported and unsupported sitting position in bed or on the edge of the bed

Upright positioning is often used as an adjunct to therapy and is particularly useful for those patients where sitting out is more challenging or requires a high number of staff to facilitate the transfer out of bed.[27]

Clinical benefits of upright positioning include:

- Respiratory rehabilitation
- Environmental orientation, providing a better position for functional activities[34, 35]
- Prevention of cardiac function deterioration and postural hypotension[36]



Supported upright positioning using the bed articulation

- Bed frame articulation helps to support in-bed rehabilitation and the progression to a seated position on the edge of the bed
- Synchronised bed movements help minimise abdominal compression (direct pressure) and in-bed sliding or patient migration (shear and friction) during bed articulation

Self-positioning using slide sheets and bed side rail

- With Maxi Slide sheets under the patient and the side rails raised, encourage the patient to push up the bed to achieve a sitting position
- The slide sheets may also aid the patient to turn and reposition on their side in bed, with minimal supervision

Facilitate unsupported sitting on the edge of the bed using the bed articulation

- Follow normal pattern of movement, with knees bent, heels and lower leg over the side of the bed
- Encourage patient to push up with elbow and hand to come up into seated positon, whilst feet are controlled to floor
- The back rest on the bed can be used to support the patient as required

Sitting on the edge of the bed

GOAL
Sit unsupported on the edge of the bed and undertake functional activities of daily living

Sitting a patient on the edge of the bed forms an important part of the early patient assessment, structured rehabilitation and seating plan.

Sitting on the edge of bed provides neurological stimulus to aid waking and orientation.[37]

Activities may include:

- Sitting on the edge of the bed with multiple caregivers
- Sitting on the edge of the bed with a passive lift and sling
- Core movements on the edge of the bed using a slide sheet
- Sitting on the edge of the bed with an active lift

Challenge balance stability

- Can be achieved with support from caregivers and/or therapists
- Once sitting balance can be achieved safely and unaided, a progressive out of bed seating program can be implemented

Supporting sitting balance and dynamic movement using slide sheets

- With the Maxi Tube under the patient's bottom, but away from the edge of the bed, dynamic sitting balance and movements can be encouraged with additional support from the therapist

"We would not be able to get the majority of our patients to engage in early rehab without the correct tools"

James Bruce • Occupational Therapist

Facilitate normal movement pattern activity in supported seating with an active lift

- In a seated position on the edge of the bed, supported by the Sara Plus, encourage movements with varying heights, distances and activities, ensuring the patient's feet are on the floor or footplate

GOAL
Ensure proper positioning and interacting with the environment

Seated activity out of bed

A person's body shape and size, the supporting surface, and even their health or emotional state can influence their seated posture.

Effective seating can help to:[32]

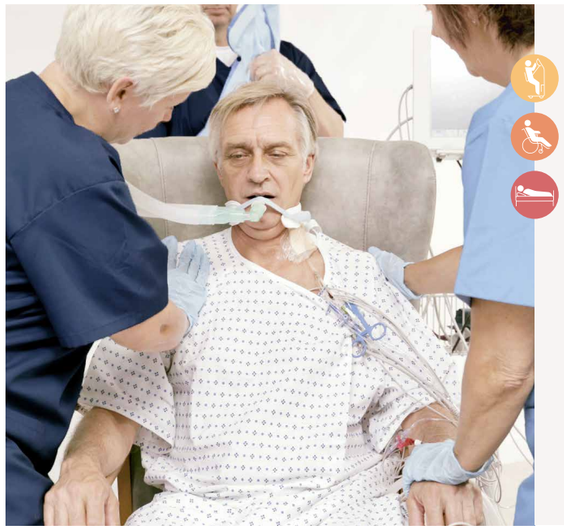
- Reduce muscle atrophy
- Improve sitting balance, strength and conditioning
- Increase environmental awareness
- Improve quality of life, well-being and participation in functional rehabilitation activities

Challenge core stability and trunk control in supported seating with a ceiling or passive floor lift and sling

- Facilitate the patient, with sling in situ, to sit on the side of the bed supported by the Maxi Sky 2 or Arjo passive floor lift, with seated or ambulation sling
- Ensure that the patient's feet are positioned flat on the floor to encourage proprioceptive feedback[38]

Challenge core stability and trunk control in supported seating earlier, in a multi-position aid

- Upright posture challenges the patient's sitting balance and trunk control and utilising the Sara Combilizer, can be adjusted from sitting to tilt in space
- An upright posture in Sara Combilizer will also support functional tasks such as eating and drinking, brushing teeth or communicating with family



Seat the patient in a safe supported position, considering the principles of good seating[39, 40]

- Loading the body
- Provide postural support, targeting all body segments
- Allow effective repositioning
- Appropriate surface / cushion for pressure injury prevention
- A good posture facilitates effective functional mobility, enables independence, encourages interaction, promotes physiological function, and manages comfort levels and quality of life

Facilitate normal movement pattern activity in perch position with a standing and raising aid

With a patient in supported perch position in the Sara Stedy, challenge core stability and functional activities

- Control the ascent to standing position encouraging concentric muscle activation
- With the patient in a supported sitting position, allow the patient to control their descent to the supporting surface, encouraging eccentric movement of abdominal, thigh and lower limb muscles

> **"Helping ICU patients to be awake, mobile, and aware of their surroundings without fear has never been more challenging or important. Consistent early mobility is an essential part of restoring people beyond survival and toward recovery, back at home."**
>
> **Heidi Engel • Critical Care Clinical Specialist**

Challenge dynamic sitting balance using an active lift

With a patient supported by the Sara Plus and sitting on a gym ball use functional activities, facilitate and assess dynamic sitting balance

- The legs of the Sara Plus can be widened to increase the range of patient movement if appropriate

Progressive standing

GOAL
Be able to stand independently

Progressive verticalisation into a standing position provides additional benefits over the chair position by:

- Facilitating increased proprioceptive feedback through the load bearing joints
- The orthostatic challenge provided by this early verticalisation can help to reduce the deterioration in vital body systems or act as an early challenge for those with postural hypotension
- Preventing or reducing the impact of bone demineralisation[41]
- Recruiting muscle activation considering autonomic response of vital body systems
- Environmental orientation providing a better position for communication, eating and drinking or functional activities

"Rehab is a continuum. Appropriate equipment allows patients to progress while maintaining the safety of them and their caregivers."
Dr David McWilliams, Consultant Physiotherapist

Challenge weight bearing and stability in progressive in and out of bed verticalisation

- Challenge patients' ability in supported standing following stretching and reaching activities
- Utilising multifunctional devices, challenge patients' ability in supported standing
- Use early verticalisation to develop stretching and reaching activities with the Total Lift Bed or Sara Combilizer

Facilitate normal movement pattern from sit to stand using standing and raising aids

In an evaluation of sit to stand devices, Sara Flex was shown to:

- Allow more forward knee movement during raising and lowering
- Allow more body weight through the feet
- Give one of the closest natural active movement patterns
- Allow the patient to be more active during sitting and standing transfers

Support normal movement patterns through the variable height function of the bed

With a patient in unsupported seated position on the edge of the bed raise and lower the bed height to assist standing and sitting.

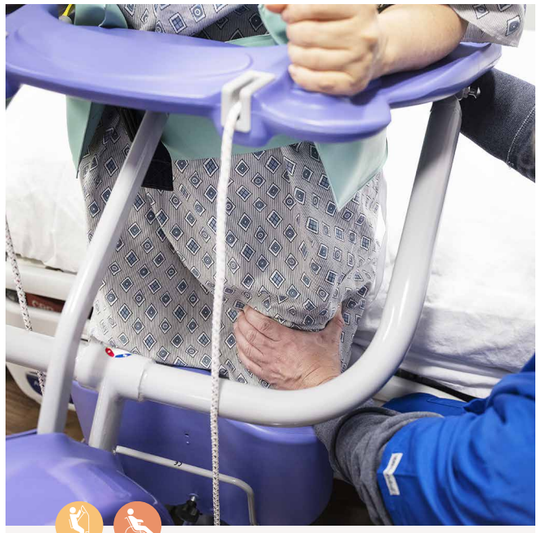
- Encourage patient to stand and sit independently
  - On standing encourage concentric muscle activation
  - On sitting down encourage eccentric movement of abdominal, thigh and lower limb muscles

GOAL
Achieving functional activities in standing

Functional activity in standing

Helping patients re-learn to transfer is a central goal addressed by many therapists during physical rehabilitation. Safe patient handling and mobility technology can be used to promote patient mobilisation with the goal of rehabilitation and restoring independence.[42]

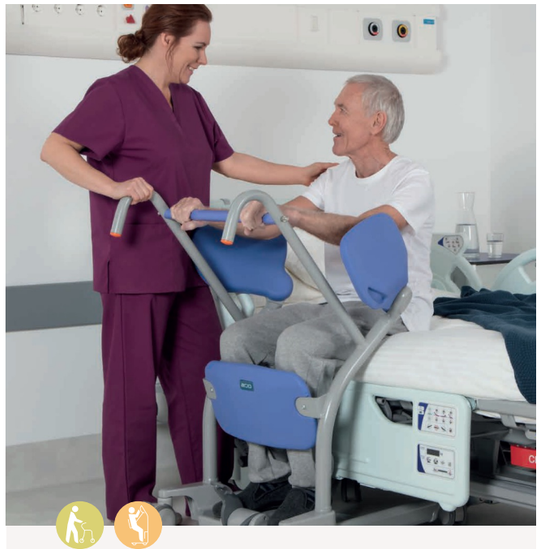
- Facilitating increased proprioceptive feedback through the load bearing joints
- Facilitate normal movement patterns in sit to stand
- Engaging and recruiting muscle activation considering autonomic response of vital body systems
- Environmental orientation



Challenge balance and stability in a standing position using a standing and raising aid

With a patient in supported seated position on the edge of the bed using the Sara Plus:

- Encourage to stand and sit independently with support utilising a normal movement pattern
- Use functional activities to improve static and dynamic balance and weight transference activities

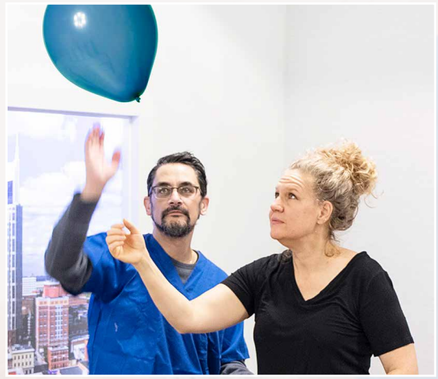


Encouraging functional activity with a standing and transfer aid

- Using Sara Stedy, encourage the patient to lean forward to hold the crossbar ready for standing
- Patient to initiate the standing movement with concentric lower limb activation and lean forward to encourage weight transference for the stand
- Pulling up into standing position, encourage core activation to bring hips forward to full standing position

"Confidence that both the patient and caregiver are safe during an exercise session, freeing up hands to facilitate movement patterning."

Tracy Fulcher • Neuro Physio



Functional activity in standing using a standing and raising aid

With the patient supported in a standing position using Sara Plus:

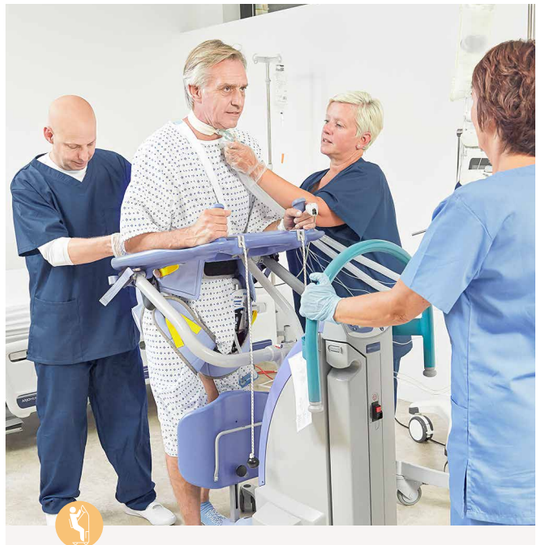
- Encourage the patient to stand away from the support of the sling to independently weight bear and balance
- Challenge the patient's standing balance and weight bearing tolerance using functional activity

Walking

GOAL
Walk independently with/without walking aids

Gradually increasing muscle strength and stamina will lead to:

- Improved functional independence
- Improved patients' psychological status as they become more independent
- Reduced risk of falls[42]
- Improved balance, spatial awareness[42]



Challenge balance and stability when walking using a standing and raising aid

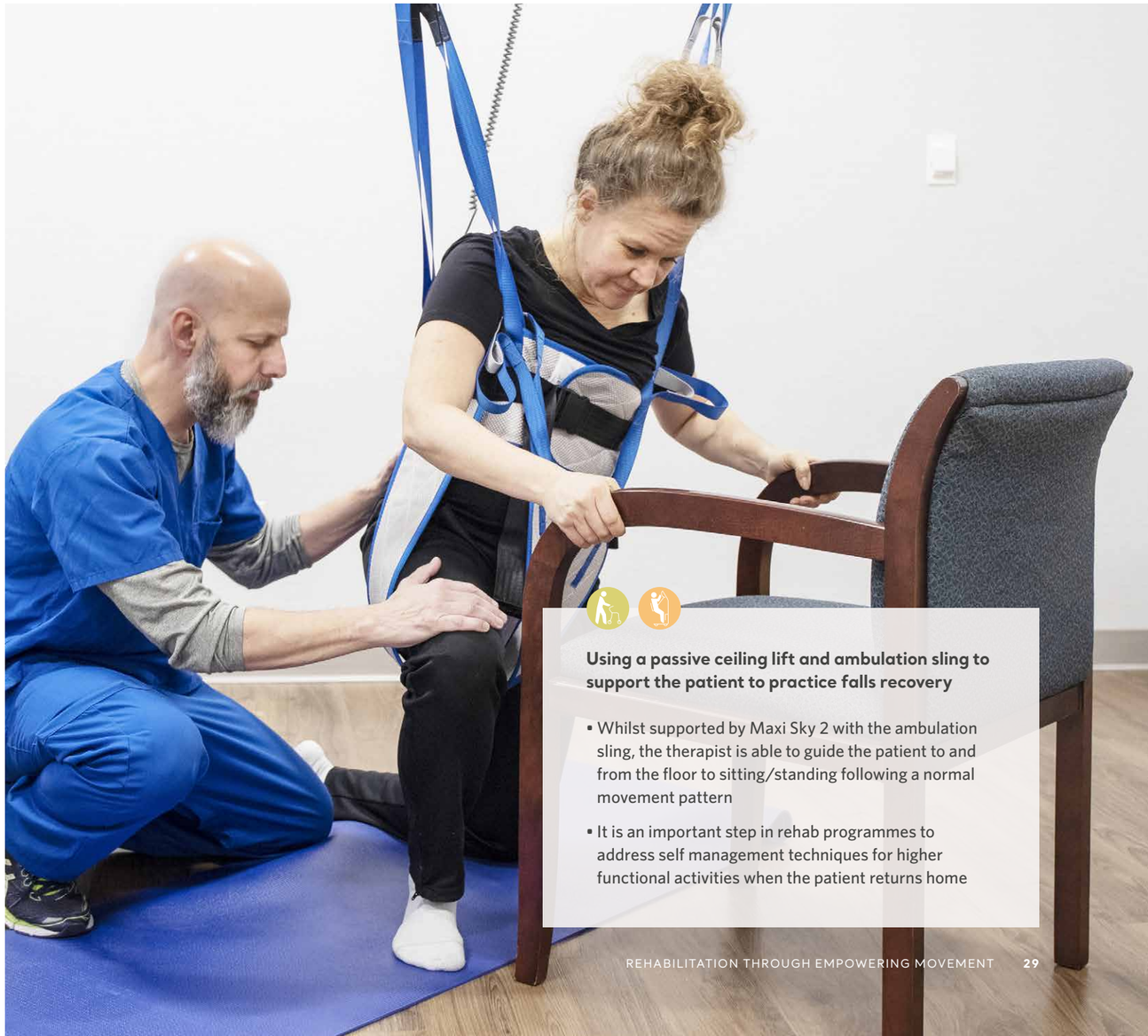
- With the patient supported in the Sara Plus walking sling and with the arc rest at correct height for patient support, the footplate can be removed for mobility practice
- Encourage patient to step through and mobilise with guidance/assistance of the therapist to move the Sara Plus
- Hands on facilitation to assist and encourage normal movement and posture throughout the process

Walking with a mobility aid

- The need for an assistive walking or standing device means that the individual has some problem with strength, gait, balance, or cognitive status; hence, attempting to rise and walk introduces the risk of falling
- Exercise reduces the occurrence of falls, and although sit-to-stand activities and walking increase strength, it may improve balance and gait

Using a passive ceiling lift and ambulation sling for support with walking

- Using Maxi Sky 2 with an ambulation sling, combined with a walking frame can offer additional support and confidence with walking practice
- This allows the therapist to guide and support with walking and correct use of the mobility aid



Using a passive ceiling lift and ambulation sling to support the patient to practice falls recovery

- Whilst supported by Maxi Sky 2 with the ambulation sling, the therapist is able to guide the patient to and from the floor to sitting/standing following a normal movement pattern
- It is an important step in rehab programmes to address self management techniques for higher functional activities when the patient returns home

Mobility for living

GOAL
To achieve meaningful activities of living

Rehabilitation programmes recognise the importance of focussing on the individuals specific activities of living that are meaningful to them. Activities can be difficult to practice without additional support. Technology can help to provide additional support to practice some of the activities that the patient would normally do at home such as:

- Cleaning and domestic activities
- Playing sport or engaging in activities with children
- Dancing
- Negotiating obstacles in everyday life

Using a ceiling lift with an ambulation sling can give the all important support to the patient, allowing the therapist to facilitate these meaningful and realistic activities.

Using Maxi Sky 2 with an ambulation sling

- To support mobilisation in the early stages, ceiling lifts or walking harnesses can be used to support the patient and protect them from falls during stepping or walking practice
- With the patient supported in a walking sling, encourage challenging postures with functional activities outside base of support
- Use functional activities, varying heights, distances across the patients' midline, ensuring the patients' feet are on the floor to support normal patterns of movement, improve static and dynamic standing balance, weight bearing and gait activities.

Arjo consultancy programs

The Arjo consultancy programs provide the healthcare facility with positive and measureable quality, clinical, operational and financial outcomes.

The programs are a partnership between Arjo and the organisation, and are based on the fundamental principle of a person-centred approach – optimising the mobility of the people you care for, reducing risk to the caregiver and reducing the impact of costs of healthcare acquired conditions to the facility. The programs principle focus are understanding and fulfilling the facility and organisational needs via a facility wide assessment, process mapping with policy and process resolution, equipment and technology, and evidence based education for the facility coaches, who are there to assist with cultural change and knowledge transfer to peers. The Arjo Consultant supports the sustainment of the program at every step to achieve success.

A partnership with the Arjo consultancy team empowers you with the ability and skill to unlock potential and embed a sustainable culture that fine tunes existing processes and efficiencies for improved patient outcomes, staff wellbeing and financial optimisation.

Moving for recovery

A modern healthcare system and associated technologies need to equip patients to live their life and create opportunities to reach their maximum potential.

Empowering movement through early mobilisation and rehabilitation achieves this by focusing on the impact that the health condition, developmental difficulty or disability, has on the person's life rather than focusing on a diagnosis. It involves working in partnership with the person, their family, and friends so that they can maximise their potential and independence while having choice and control over their own lives.
Effective early mobilisation and rehabilitation delivers better outcomes, improved quality of life and has the potential to reduce health inequalities and make significant cost savings across the healthcare system.

Healthcare professionals play a tremendous role in restoring patients' functional mobility and ultimately, their quality of life. The challenges they face are self-evident. However, all too often, we see therapists putting themselves at greater risk as they strive to achieve the best possible outcomes for their patients. As patient handling and mobility experts, Arjo shares the therapists' fundamental aim of empowering mobility.

We work in partnership with healthcare professionals to find solutions that can help achieve therapeutic goals and activities while also reducing the risk of musculoskeletal injury that can be associated with many physical therapy interventions.

Reference list

1. Brown, C.J., Redden, D.T., Flood, K.L. and Allman, R.M. (2009), The Underrecognized Epidemic of Low Mobility During Hospitalization of Older Adults. Journal of the American Geriatrics Society, 57: 1660-1665. https://doi.org/10.1111/j.1532-5415.2009.02393.x

2. https://www.hopkinsmedicine.org/physical_medicine_rehabilitation/education_training/amp/everybodymoves/index.html Accessed February 2021

3. https://www.plymouthhospitals.nhs.uk/rehablegend Accessed 15-10-2020

4. https://www.movementismedicine.com/ Accessed 15-10-2020

5. Burtin C, Clerckx B, Robbeets C, et al: Early exercise in critically ill patients enhances short-term functional recovery. Crit Care Med.2 2009; 37:2499–2505

6. Schaller SJ, Anstey M, Blobner M, et al. Early, goal-directed mobilisation in the surgical intensive care unit: a randomised controlled trial. Lancet 2016;388:1377-88

7. Matz M, 2019. Patient Handling and Mobility Assessments: A White Paper Second Edition

8. Harrison, D. Single Handed Care Part One The Winning Formula. ATToday, UK. Available from http://attoday.co.uk/single-handed-care-part-one-the-winning-formula/ Accessed February 2021

9. https://www.standardsofcare.org/understanding-care/types/rehabilitative/Accessed 5-2-2021

10. Timing of rehabilitation on length of stay and cost in patients with hip or knee joint arthroplasty: Asystematic review with meta-analysis (2017) https://journals.plos.org/plosone/article?id=10.1371/journal. pone.0178295 Accessed February 2021

11. https://www.kindredhealthcare.com/docs/default-source/default-documentlibrary/khrs-reducing-readmissions-wp.pdf Accessed February 2021

12. CEN ISO ISO/TR 12296:2012, Ergonomics -- Manual handling of people in the healthcare sector, hhttps://www.iso.org/ standard/51310.html, Accessed February 2021

13. Lahmann NA, Tannen A, Kuntz S, Raeder K, Schmitz G, Dassen T, Kottner J. Mobility is the key! Trends and associations of common care problems in German long-term care facilities from 2008 to 2012. Int J Nurs Stud. 2015 Jan;52(1):167-74.

14. https://www.who.int/news-room/fact-sheets/detail/rehabilitation Accessed February 2021

15. Guidelines for Care: Person-centred care of people with dementia living in care homes 2011 https://alzheimer.ca/en/Home/We-can-help/Resources/For-health-care-professionals/culture-change-towards-person-centred-care/guidelines-for-care Accessed 15-10-2020

16. https://www.england.nhs.uk/wp-content/uploads/2016/04/ rehabilitation-comms-guid-16-17.pdf Accessed 25-9-2020

17. NHS (2014). Rehabilitation, reablement and recovery. Rehabilitation is everyone's business: Principles and expectations for good adult rehabilitation. Wessex Strategic Clinical Networks. Retrieved from: https:// www.networks.nhs.uk/nhs-networks/clinical-commissioning-community/ improving-adult-rehabilitation-services/principles-expectations

18. https://www.who.int/disabilities/care/rehabilitation_guidelines_concept.pdf Accessed 15-10-2020

19. JAMA Intern Med. 2017 June 01; 177(6): 759–760

20. Daragh A, et al. Safe Patient Handling Equipment in Therapy Practice: Implications for Rehabilitation. The American Journal of Occupational Therapy. 2013; 67(1):45-53.)

21. Cromie JE, Robertson VJ, Best MO: Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. PhysTher 2000, 80(4):336-351.

22. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline, Emily Haesler (Ed.)EPUAP/NPIAP/PPIA:2019. Section 8: Repositioning and Early Mobilisation Recommendation 5.6 Repositioning Techniques. Page 121

23. Knibbe H.J.J., Panhuys P., Vugt W., Waaijer E., Hooghiemstra F., (2008) Handbook of Transfers ISBN0956969208, 9780956969200

24. Parry, S.M., Knight, L.D., Connolly, B. et al. Factors influencing physical activity and rehabilitation in survivors of critical illness: a systematic review of quantitative and qualitative studies. Intensive Care Med. 2017; 43: 53

25. Centers for Medicare & Medicaid Services 2018. Long-Term Care Facility Resident Assessment Instrument 3.0 User's Manual Version 1.16

26. Hanekom S, Louw QA, Coetzee AR. Implementation of a protocol facilitates evidence-based physiotherapy practice in intensive care units. Physiotherapy. 2013 Jun; 99(2):139-45. PMID: 23219640.

27. Morris PE, Berry MJ, Files DC, Thompson JC, Hauser J, Flores L, et al. Standardized rehabilitation and hospital length of stay among patients with acute respiratory failure. J Am Med Assoc. 2016;315(24):2694–9. Cited in Clinical Evidence Summary – ICU Early Mobility Solutions Published by Arjo. A00007.1.2.UKI.EN in March 2020

28. Bobath https://en.wikipedia.org/wiki/Bobath_concept#References Accessed 15-10-2020

29. Arjo White Paper Citadel Patient Care System Patient Turn and Continuous Patient Turn ARJO.A00025.1.0.INT.EN

30. Wiggerman N., Zhou J., McGann N. (2020). Effect of repositioning aids and patient weight on biomechanical stresses when repositioning patients in bed, 2020. https://doi.org/10.1177/0018720819895850. Accessed 15-10-2020

31. Chiu H-C. Ada L, Butler J. and oulson S., Characteristics of associated reactions in people with hemiplegic cerebral palsy (2010) Physiotherapy Research International DOI 10. https://www.researchgate.net/publication/45283823_Characteristics_of_associated_reactions_in_people_with_hemiplegic_cerebral_palsy Accessed 15-10-2020

32. Carr J.H., Shepherd R. B., (2011) Neurological Rehabilitation, Optimising motor performance. Second edition, Churchill Livingstone, Published 27th July 2010 Paperback ISBN: 9780702040511, eBook ISBN: 9780702044472

33. Parker A., Sricharoenchai T., Needham D (2013) Early Rehabilitation in the Intensive Care Unit: Preventing Physical and Mental Health Impairments. Curr Phys Med Rehabil Reports. 2013 Dec; 1(4): 307–314. doi: 10.1007/ s40141-013-0027-9

34. Thomas P, Paratz J, Lipman J (2013) Seated and semi-recumbent positioning of the ventilated intensive care patient – Effect on gas exchange, respiratory mechanics and hemodynamics (CritCare), Heart and Lung FCICM published on line 09 December 2013.

35. Leditschke IA, Green M, Irvine J, et al. What are the barriers to mobilizing intensive care patients? Cardiopulm Phys Ther J. 2012 Mar;23(1):26-9. PMID: 22807652.

36. McWilliams, D.J., Westlake, E.V., Griffiths, R.D. Weakness on the Intensive Care Unit – Current Therapies. British Journal of Intensive care. 2011 Summer edition. pp. 23-27

37. Chang AT, Boots RJ, Brown MG, et al. Ventilatory changes following head-up tilt and standing in healthy subjects. Eur J Appl Physiol. 2005;95(5–6):409– 17 Cited in Clinical Evidence Summary – ICU Early Mobility Solutions Published by Arjo. A00007.1.2.UKI.EN in March 2020

38. Turner-Stokes L, Thu A, Williams H, Casey R, Rose H, Siegert RJ. The Neurological Impairment Scale: reliability and validity as a predictor of functional outcome in neurorehabilitation. Disabil Rehabil. 2014;36(1):23-31. doi:10.3109/09638288.2013.775360

39. Gillick BT, Marshall WJ, Rheault W, Stoecker J. Mobility criteria for upright sitting with patients in the neuro/ trauma intensive care unit: an analysis of length of stay and functional outcomes. Neurohospitalist 2011; 1: 172–177

40. Tierney M The Clinicians Seating Handbook 5th ed, Seating Matters

41. Burnfield J, McCrory B, Shu Y et al (2013). Comparative kinematic and electromyographic assessment of clinician and device assisted sit-to-stand transfers in patients with stroke. Physical Therapy, 93(10): 1331-1341

42. Tinetti M E et al. Risk Factors for Falls Among Elderly Persons Living in the Community. N Engl J Med 1988 Dec 29;319(26):1701-7

Further Support and information

Throughout this document, we have offered suggested use of Arjo devices to support rehabilitation through mobility. For detailed device instructions and intended use, please see the individual Instructions for use (IFU). The latest IFUs are available for download on the product pages on our website:

https://www.arjo.com/int/products/safe-patient-handling/

At Arjo, we believe that empowering movement within healthcare environments is essential to quality care. Our products and solutions are designed to promote a safe and dignified experience through patient handling, medical beds, personal hygiene, disinfection, diagnostics, and the prevention of pressure injuries and venous thromboembolism. With over 6000 people worldwide and 60 years caring for patients and healthcare professionals, we are committed to driving healthier outcomes for people facing mobility challenges.

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