

The Lower Limbs

CareFlex

THE SEATING CHALLENGES SERIES

SEATING CHALLENGES OF THE LOWER LIMBS

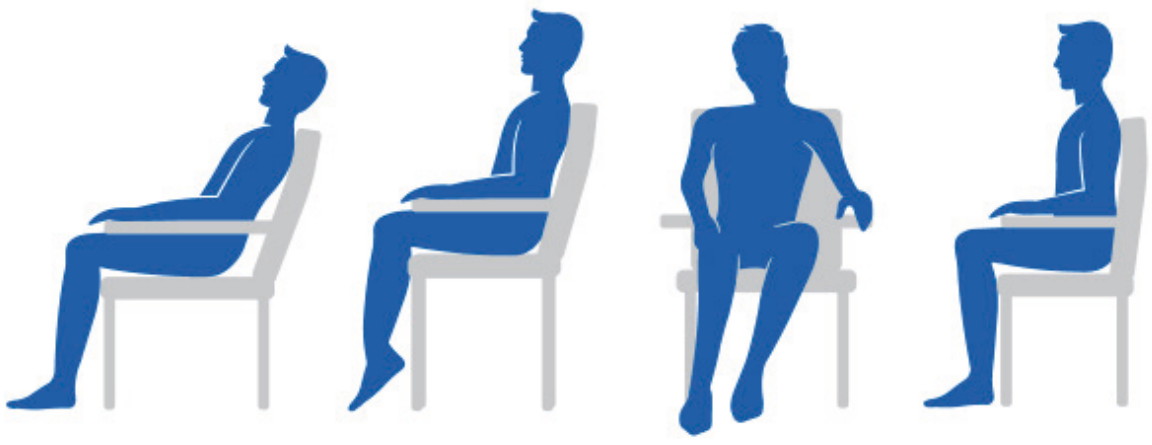
Pelvic stability and trunk functionality being key for good seated posture is often highlighted; however, it is also essential to consider the lower limbs, even in seated postures. Unsupported lower limbs can affect the position of the thighs, consequently impacting on the pelvis and trunk. The critical angles for sitting are also a crucial consideration; an individual requires the ability to achieve 90° hip flexion and 90° knee flexion for optimum positioning.

As a load bearing body segment, it can be easy to forget about the feet but they are a crucial part of postural management in sitting too. Insufficient foot support can negatively impact on postural stability and upper trunk functionality; we naturally seek support through our feet to obtain the proprioceptive feedback required to remain secure but also dynamic within and outside our base of support. Foot support can also offer a platform for an individual to reposition.

Even in the gold standard 90-90-90 sitting position, the buttocks and thighs take 75% of a person's body weight and the feet take 19%,[1] it is therefore essential that they are loaded correctly and weight is distributed equally over the maximum support surface to encourage effective pressure management.

What can challenge lower limb positioning?

Abnormal muscle tone, contractures, sensory problems, weakness and reduced hamstrings muscle length are common challenges to lower limb positioning. Reduced range of movement at the hips and knees can make it difficult to achieve the optimum seated posture. Leg length discrepancies and windsweeping can also challenge thigh alignment. Obesity can present a challenge in achieving optimum alignment as larger calves or oedematous lower legs can position the lower limbs too far forward restricting knee flexion.



LEG LENTH DISCREPANCY

What is a leg length discrepancy?

A leg length discrepancy is a difference between the lengths of the lower limbs. In most cases, the bones affected are the femur and tibia. A length difference may simply be a mild 'normal' variation between the left and right sides of the body. However, greater differences in length can impact on an individual's wellbeing and quality of life.

Causes of a leg length discrepancy include neurological conditions, inflammatory conditions, dysplasias, bone infection and injury. In some cases, the cause can be idiopathic.

Management will depend upon the severity. Minor differences in length can be managed by orthotic devices. An individual who presents with significant discrepancy may benefit from surgical intervention. Specialist seating can be prescribed to accommodate a leg length discrepancy through a range of seating solutions.





WINDSWEEPING

What is windsweeping?

A windswept deformity is identified by the abduction and external rotation of one hip with the adduction and internal rotation of the other. It is termed according to which side of the body the lower limbs are windsweeping; they give the impression that they have been 'swept' away together to one side of the chair.

This postural challenge can be associated with pelvic obliquity with a scoliosis, pelvic rotation with a spinal rotation, and posterior pelvic tilt. Unmanaged, windsweeping can result in an increased pressure injury risk, especially in the groin region, and overall postural deterioration.

Windsweeping is often seen in individuals that are non-ambulant with cerebral palsy and osteochondritis dissecans. It can also be caused by hip dislocation or subluxation, joint weakness, or contractures related to other diagnoses. Inappropriate seating that doesn't provide adequate support and alignment can also impact on windsweeping, such as seat depth being too shallow, seat width being too wide, seat height being too low, or leg rest length being too short. It is important to determine during the assessment whether the windsweeping is correctable or fixed. A fixed windswept deformity should not be corrected as this can cause undue pain, and therefore needs to be accommodated. If the posture is flexible then the seating goal should be to correct the windsweeping gradually whilst addressing associated postural challenges.





HOW TO SUPPORT THE LOWER LIMBS

The aim is to keep the thighs level and in midline with the knees positioned slightly apart and fully supported. This ensures equal weight distribution to reduce the risk of pressure injury and encourages lateral stability. The aim is to also correct foot posture to achieve a neutral plantargrade position, especially if an individual needs to maintain range of movement for mobility, with maximum contact with the support surface. Some individual's present with fixed foot deformities, and may require a softer foot support to accommodate their posture, ensure equal weight distribution and reduce the risk of further postural deterioration. Seating solutions that can help include:

- Ensuring correct chair set-up and dimensions for overall presentation is critical.
- An increased seat width may be indicated for windswept or rotation deformities, or extended lateral thigh support pads to further encourage thigh alignment and ensure safety especially when the chair is being manoeuvred.
- A contoured cushion to encourage pelvic stability and optimum thigh alignment.
- A pommel, centred or off-set, can also be trialled.
- Back angle recline to accommodate hip range of movement limitations that affect the critical angles for sitting.
- An elevating leg rest to encourage a comfortable and relaxing position. Raising the lower limbs above hip level for 30 minutes, three to four times a day, may also help improve swelling and encourage circulation.[2]
- Using tilt-in-space and leg rest elevation in combination can be more comfortable than elevating them with the knees fully extended.
- A negative angle leg rest and a chamfered cushion to accommodate limited knee range of movement. This feature can also facilitate safe standing by allowing optimum foot position, and can accommodate oedematous lower legs or large calves for users with obesity.
- A channelled or w-trough leg rest to help maintain alignment at the lower legs.
- An angle adjustable foot plate, which may be indicated for fixed foot deformities.
- A detachable footplate pad or pillow can ensure that feedback through the feet and alignment is gentle, especially for users with sensory challenges.







HOW TO SUPPORT THE LOWER LIMBS

Complex postures and presentations may require a tailored seating solution to achieve the seating objectives, such as:

- A stepped base to accommodate a thigh length discrepancy, or a unilateral raised foot support to accommodate a calf length discrepancy.
- A unilateral ramped base may be indicated to address thighs that are not level due to differences in hip range of movement.
- A split leg rest for unequal knee range of movement due to contractures.
- A hanging footrest for significant fixed knee flexion and foot deformities.

NB: It is essential that leg rest elevation, back angle recline and tilt-in-space are prescribed carefully and responsibly with a clear hand-over of how to utilise them safely and appropriately:

- Back angle recline and leg rest angle should be set according to hip and knee range of movement and should accommodate any contractures.
- Leg rest elevation is not indicated for individuals with reduced knee range of movement; elevating the lower limbs will cause pain and result in the individual posteriorly tilting at the pelvis and sliding down the chair.
- Back angle recline can cause a posterior pelvic tilt in individuals who present with pelvic instability if this is not addressed first.
- Tilt-in-space must be safe and appropriate for the user following a comprehensive assessment of posture and risk, with advice sought from the multi-disciplinary team where indicated.
- In some cases, these functions will be contra-indicated, and they could also increase shear and friction forces.







HOW CAN CAREFLEX HELP?

A comprehensive seating assessment is critical for appropriate seating prescription. Due to the variability among people, a universal seating position is not practicable or safe; therefore, a thorough assessment is recommended to ensure the chair prescribed is tailored to the individual. CareFlex offer a free no-obligation assessment service; we are a team of highly skilled and extremely knowledgeable professionals and we pride ourselves on our efforts to truly improve quality of life, from initial contact through to after-care.

CareFlex seating is flexible and adjustable allowing the chairs to accommodate to any deformities present, but also allowing correction of body segments to reduce the risk of them developing.

The HydroTilt with tilt-in-space, a negative angle leg rest and integrated WaterCell Technology could be a great solution for windsweeping.

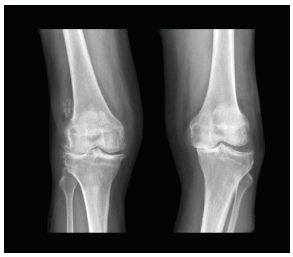
For more complex postures, the HydroFlex with an independently elevating channelled leg rest and the ability to fit a pommel could be the suitable solution. Or the SmartSeatPro with back angle recline and multi-adjustable back components, which can be altered in height, depth, angle, offset and rotation, could be indicated.

The MultiAdjust could be the ideal provision for multi-user environments with flexible seat dimensions, including seat depth and seat width, and an angle and height adjustable flip-up footplate.

CareFlex also offer a Tailored Seating Solutions service. During the seating assessment, it may become evident that a unique modification is required to achieve optimum posture and pressure management that is supportive yet comfortable. If so, details are passed to the design and engineering team, who then produce a schematic drawing and quotation. Sometimes the modification can be a simple accessory; in other instances it can be a significant alteration to the structure of the chair. CareFlex have many years of experience producing unique seating solutions.



REFERENCES



References

1. Collins F (2001) Selecting cushions and armchairs: how to make an informed choice *Journal of Wound Care / Therapy Weekly Supplement* **13**(5)
2. Sussman C, Bates-Jensen BM (2007) *Wound Care*: *A Collaborative Practice Manual* Baltimore: Lippincott Williams & Wilkins



Please check out our further publications in this Seating Challenges Series and don't forget to visit our website for all our available learning resources.

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The information given in this book represents current advice at the time of publication. It is intended as general information and guidance and is not a substitute for professional medical advice which should be sought for specific, individual cases. It is the responsibility of the treating clinician, relying on independent knowledge and skills, to determine the best intervention and method of application for the client.

1. Tilt-in-Space and Back Angle Recline should always be prescribed responsibly, ensuring that they are safe and appropriate for the user following a comprehensive assessment of posture and risk, with advice sought from the multi-disciplinary team where indicated. In some cases these functions will be contra-indicated, and they could also increase shear and friction forces.

2. All belts and harnesses must also be prescribed, implemented and monitored responsibly following a comprehensive risk assessment. Please see the Device safety information alert for further information: www.gov.uk/drug-device-alerts/all-posture-or-safety-belts-fitted-to-supportive-seating-wheelchairs-hoists-and-bathroom-equipment-risk-of-serious-injury-or-death