ASPREX Fact Sheet

Postural support for wheelchairs

Seating system with postural features to be fitted onto a manual or powered wheelchair in addition to the basic seat and backrest. It may also consist of components which can be added to the basic seat and backrest. Modular seating systems are based on a framework whose position can be adjusted to achieve a particular seat configuration; components to be attached to the framework may include back supports, seat cushions, arm supports, head supports and neck supports, leg supports and foot supports, trunk supports and pelvic supports. Manual wheelchairs which are suitable for the addition of postural support components are bimanual handrim-drive wheelchairs (provided that the postural support components which support the body do not also restrict the ability to actively self-propel the wheelchair), or push wheelchairs, or powered-assisted push wheelchairs. Postural support can also be added to powered wheelchairs. All aspects of the wheelchair provision remain the same beyond the postural components.

- Product Classification
  - APL (WHO Assistive Product Priority List): 48 (Wheelchairs, manual with postural support).
  - ISO 9999:2022: 1225 (Accessories for wheelchair seating).
- Possible configuration variants

  None specified.
- Possible accessories or optional components
  - Seat cushion (a product for under the bottom and thighs that may involve pressure relieving surface, a contoured postural support surface, or both; designed to protect tissue integrity) [ISO 043303].
  - Back supports (a product to support the trunk, which may extend up to the neck region, and may be contoured to the individual including for example lumbar and thoracic supports) [043304].
  - Trunk support and pelvic support (wedges or contoured inserts intended to support or stabilize a person's shoulders, torso, hips or pelvic region when sitting) [181018].
  - Head and neck supports (accessories bolted to the backrest which provide cervical - neck - and occipital - back of head - support and positioning to maintain the head in a functional position) [181012].
  - Leg supports (include stump supports, abductors pommels (to maintain lower limb alignment and security within wheelchair), adductors (to position the legs together), and knee separators (to align and separate the knees and hips) [181015].
  - Arm supports (includes arm troughs to position and support the arms) [181009].
  - Harnesses (pelvic strap, shoulder harness, seatbelts, foot straps or calf straps to secure the body in the wheelchair and stabilize extremities) [ISO 090703].
  - Wheelbase: rigid wheelchair frame (postural supports require a firm base to secure them into the wheelchair and to ensure the postural support they offer is effective).
  - Wheelbase: folding wheelchair frame (if the wheelchair has a folding frame then the postural support will need to be removed when dismantling or transporting the wheelchair).
  - Wheelbase: tilt and recline features (tilt functions: where the entire seat pivots on its axis but maintains the persons sitting angle).
- Product goals

  Activities or functions the product is mainly intended to support, according to WHO ICF Classification:
  - Moving around using equipment [d465].
  - Maintaining body position [d415] (postural seating support).
  - Caring for body parts [d520] (pressure care management).
- Indicated impairments

Difficulties the product is mainly intended to address, according to the WHO ICF Classification:

- Maintaining body position [d415] (difficulty in maintaining a functional seated body position).
- Mobility of joint functions [b710].
- Stability of joint functions [b715].
- Protective functions of the skin [b810].
- Repair functions of the skin [b820].
- Sensation related to the skin [b840].

Contraindicated impairments

Difficulties for which the product may be inappropriate:
None specified.

Indicated environments

Specific environments in which the product should be used:
None specified.

Contraindicated environments

Environments in which the product may be inappropriate:

- Environments that may impact the operability and longevity of the product (such as ice, salt, dust, heat, unless the components are made of material especially designed for those environments).
- Stairs.
- Environments without a relatively smooth and sufficiently wide continuous path of travel.
- Extreme slopes.

Other indicated factors

Other factors or situations the product is intended to address:

- Risk of postural deformities and related pressure injuries.
- Conditions such as cerebral palsy and spina bifida.
- Musculoskeletal factors such as altered muscle tone and mild joint contractures.
- Difficulty in maintaining a functional seated body position.

Other contraindicated factors

Other factors or situations in which the product may be inappropriate:
None specified.

Points to be considered in product selection

- The use environment largely depends on the user's abilities and on the wheelchair materials and configuration. It is important that the wheelchair meets the demands of both the person, and the environment.
- Each user has a unique set of needs. These needs can be categorized as: physical – the user's health situation and postural and functional needs; environmental – where users live and where they need to use the wheelchair; lifestyle – the things users need to do in the wheelchair to engage in their chosen activities and participations.
- To meet the user's physical, environmental, and lifestyle factors, wheelchairs and postural support must be individually fitted
- Seat width: the seat should fit the user comfortably and ensure the hips are not touching the seat rails; this prevents skin breakdown.
- Seat depth: sufficiently deep to fully support thighs but ensure there is a space of two to three finger-widths between the front seat edge and the popliteal fossa (back of the knees)
- Seat height: when seated, the knees should be approximately level with the hips.
- Footrest: (footplates or footbar) should be adjusted to comfortably suit leg length and support the feet; ensure the feet are approximately at right angles and there is clearance between the footrest and the ground.
- The net weight of the wheelchair (with and without accessories / disassembled) will impact the person in the short and long term; lighter weight manual wheelchairs require less effort to propel, leading to less fatigue and preserving shoulder function in the longer term.
- The weight capacity of the wheelchair must be sufficient to bear the occupant and any accessories.

- Wheelchair and seating system too wide: inability to reach wheels to self-propel
- Wheelchair and seating system too narrow: encourages pelvic obliquity and instability and leads to discomfort, increased risk of pressure sores and decreased independent functioning.
- Wheelchair and seating system too long: pulls person forward in chair causing sacral sitting and instability, compromises lower limb circulation and may cause pressure ulcer development. Unstable seating position and flexed posture may limit use of hands and impact upon respiratory and gastrointestinal functions.
- Wheelchair and seating system too short: encourages instability by reducing base of support, increases pressure on thighs and supporting area, causing pressure ulcer development, unstable sitting base impacts use of hands and dynamic balance.
- Armrests too high: elevates shoulders resulting in discomfort. Armrest height should be approximately 2.5 centimeters higher than the resting forearm, with a relaxed shoulder and the elbow bent to 90 degrees. The armrest length may provide a support surface which is the length of the forearm or be shorter to enable access under a table or desk.
- Armrests too low: encourages slumping forward or sideways to reach support, may lead to reduced respiration capacity, instability impacts functional performance.
- Transporting the wheelchair to a car or for storage is made easier if components are removeable (i.e. postural support surfaces, wheels, footrests, armrests).

Points to be considered in product fitting

- Trained personnel should prepare the wheelchair for the initial fitting; depending on the product and service facilities, this may include assembly, and possible modification, of products supplied by manufacturers or production of products in the service workshop.
- During fitting, the user and competent personnel together check that: the wheelchair is the correct size; the wheelchair is correctly adjusted for the user; any modifications or postural support components are fitting correctly; and the wheelchair meets the user's mobility and postural support needs and minimizes the risk of the user developing secondary deformities or complications.
- The user tries the wheelchair. Final adjustments are made to ensure the wheelchair is correctly assembled and set up. If modifications or postural support components are required, additional fittings may be necessary.
- The user should try the wheelchair in real environments of use as an important step in troubleshooting and verifying the wheelchair choice and setup.
- If the wheelchair has a folding frame, then the postural support will need to be removed when dismantling or transporting the wheelchair.
- All body contact surfaces provide seating and postural support. Together, these parts of the wheelchair help the user to maintain a comfortable and functional posture and to provide pressure relief. If modifications or postural support components are required, additional fittings may be necessary. Users with postural deformities, reduced skin sensation and problems with muscle tone (for example spasticity) will require an assessment conducted by personnel with appropriate skills and knowledge and will require regular follow-up and support. The significance of good seating and postural support can mean the difference between the user being active and an independent member of society and the user being completely dependent and at risk of serious injury or even death.

Points to be considered in product use

- Postural support surfaces can provide significant assistance in maintaining aligned and functional positioning; however, the presence of close-fitting surfaces can also cause problems and requires a number of precautions. Closely fitting seating systems may limit ventilation of the skin and impact on the management of sweating, which can lead to skin breakdown. This is a particular issue with people who cannot move easily and people who have difficulty with temperature control (such as people with spinal injuries, neurological conditions, or amputations).
- A wheelchair without inadequate pressure relieving surfaces can cause pressure sores. This in turn may require the user to spend many months in bed; without appropriate care and treatment, this may lead to secondary complications and even premature death.
- Orientation: tilt versus recline options have some advantages and disadvantages. Tilt functions (where the entire seat pivots on its axis but maintains the persons sitting angle) keeps the seated position intact and ensures support surfaces remain fitted to the body during orientation change, but may not facilitate resting postures or assist digestion as much as a recline function. Recline functions (where the backrest is reclined and the legrests elevated, therefore opening the sitting angle), can however cause shear forces (slippage between support surfaces and body).

- The presence of athetosis, tone or uncontrolled movements will influence the strength of any fastening within the postural support system, and also the need to protect and pad any hard surfaces or edges on the postural support system and wheelchair.
- The presence of spasticity and reflex activity means care must be taken in positioning the overall body, to avoid stimulating reflex activity and to manage (break up) patterns of tone.
- Poor design can result in places on the wheelchair where the user or others can get their fingers or skin pinched.
- Wheelchairs that cannot endure daily use in the user's environment may fail prematurely and can injure the user

- Points to be considered in product maintenance / follow-up
  - Instruct users and caregivers on how to safely and effectively use and maintain the wheelchair. Key areas of user training include: how to transfer in and out of the wheelchair, how to handle the wheelchair; basic wheelchair mobility; how to stay healthy in the wheelchair – for example prevention of pressure sores; how to look after the wheelchair and cushion and, if appropriate, dismantle and reassemble the wheelchair; and who to contact in case of problems.
  - Key areas of user training include: how to transfer in and out of the wheelchair, how to handle the wheelchair; basic wheelchair mobility; how to stay healthy in the wheelchair (for example prevention of pressure sores; how to look after the wheelchair and cushion and, if appropriate, dismantle and reassemble the wheelchair); and who to contact in case of problems.
  - Follow-up appointments are an opportunity to check wheelchair fit and provide further training and support. Users with postural deformities, reduced skin sensation and problems with muscle tone (for example spasticity) will require more frequent follow-up and support.
  - Follow-up should include a review of: how well the wheelchair has worked for the user; any problems the user has had in using the wheelchair; the wheelchair's fit, in particular checking that the wheelchair is providing good postural support for the user; the user's skills, and whether further training is required; the condition of the wheelchair and whether any adjustments or repairs are required; and the user's ability to care for and maintain the wheelchair, and whether any further training is required.
- Examples of products available on the market
  - Live product search in the EASTIN website https://www.eastin.eu/en/searches/products/list?iso=1225

Source

This Fact Sheet was compiled in 2021 by an international team of experts, to provide the initial knowledge base for a project ("An online system to assist the selection of assistive product") supported by the World Health Organization in 2020-2021 within the GATE Initiative (Global collaboration on Assistive Product). Fact Sheets were compiled for each of the 50 types of products included in the WHO APL (Assistive Product Priority List).

The team was composed of Renzo Andrich (Italy, group leader), Natasha Layton (Australia), Stefan von Prondzinski (Italy), Jerry Weisman (USA), Silvana Contepomi (Argentina) and Hasan Minto (Pakistan).

The project led to a prototype online tool called ASPREX (ASsistive PRoduct EXplorer). At the end of the project, it was transferred to a WHO collaborating center (the Global Disability Hub in the UK), in view of possible future developments.