# The use of tilt-in-space wheelchairs: Two different perspectives


**J Casey[1] & E Regan[2]**

[1]School of Health Sciences, Ulster University, N.Ireland [2]Regional Wheelchair Training Occupational Therapist, Belfast HSCT

j.casey2@ulster.ac.uk emma.regan@belfasttrust.hscni.net


## Background

- Tilt-in-space (TIS) is used with a wide range of individuals of various ages and conditions, and for a variety of activities and purposes[1].
- TIS is a costly design feature in wheelchairs and therefore clinicians should be confident in the reasons for its prescription[2].
- There continues to be a dearth of high quality evidence on the benefits of TIS upon the user's function[3]. Most research continues to focus upon the therapist or the technical reasons for using TIS as opposed to the occupant's personal reasons for using it.

| Reasons for using TIS | |
|---|---|
| **Reduce discomfort and pain** | Sonenblum et al 2009[1]; Harris et al 2010[4] |
| **Assist with transfers** | Lacoste et al 2003[5] |
| **Pressure management care** | Lacoste et al 2003[5]; Dewey et al 2004[6]; Ding et al 2008[7]; Sonenblum et al 2009[1]; Harris et al 2010[4]; Ward et al 2010[8] |
| **Resting and relaxation** | Dewey et al 2004[6]; Ward et al 2010[8] |
| **Assist with bowel and bladder management** | Lacoste et al 2003[5]; Dewey et al 2004[6] |
| **Improved breathing** | Lacoste et al 2003[5] |
| **Comfort** | Dewey et al 2003[6]; Lacoste et al 2003[5]; Harris et al 2004[4]; Ding et al 2008[7]; Ward et al 2010[8]; Sonenblum et al[1] |
| **Prevent sliding** | Lacoste et al 2003[5]; Dewey et al 2004[6] |
| **Reduce spasms** | Dewey et al 2004[6] |
| **Positioning to eat/drink** | Pountney et al 2008[9] |

## Angle of TIS

- **Smaller ranges of tilt** appear to be helpful to improve posture and balance, comfort, decrease pain;
  - 5-25° posterior tilt for postural stability and or maintain head upright; caution for more than this may compromise function and vision.
  - 45-60° posterior for pressure redistribution; caution with those clients who opt to lean forward to see and adopt an unsupported kyphotic posture.
- **Larger angles of tilt** appear to be more effective for rest/relaxation; and pressure redistribution.
- **Frequency** – as often as possible for user.
- **Orientation** – Posterior, Anterior or Lateral tilt options depending upon activity being performed and/or reason for using.

## Personal Accounts: Posterior Tilt

*"I like to use between 10 and 15 degrees of backward tilt when driving my wheelchair. This way, I feel more secure and balanced especially if I'm travelling over uneven ground or going downhill".*

*"When driving in compact spaces, I can neutralise the tilt when required to decrease the turning circle of my wheelchair".*

*"Being able to change from my tilted driving position to a neutral position also allows me to sit upright to eat and drink when I need to".*

*"My wheelchair can tilt back to 55 degrees. I like to use maximum tilt and full leg extension to transfer pressure from my bottom to my back. It also helps in decreasing fluid build up around my ankles".*

*"I can rest like this for up to 30 minutes a few times per day which reduces pain in my hips and lower back when I start to fatigue".*

*"Having this function allows me to alter my position when I like so I don't have to be hoisted back to bed for a rest".*

## Personal Accounts: Anterior Tilt

*"The anterior tilt allows me to get my feet on the floor so I can remove my footplates which gets me much closer to items in my kitchen."*

*"With my feet on the floor, I am well supported as I reach to lower levels such as my oven or washing machine".*

*"Tilting slightly forward helps me get my feet on the ground so I can stand up from the wheelchair. Although I can't take any steps, it's useful so I can reach items at a higher height, or independently use a urinal or toilet".*

*"In public spaces, access to tables can be a problem if they are too low. I can reduce the front ground to seat height of my wheelchair by tilting it forward to get under the surface".*

*"I have used this function in my college and public library to access computer workstations. It's also useful in cafes and restaurants to get closer to the table".*

## Conclusions

- Minimal evidence on optimal angle of tilt for what function.
- Use and frequency should be individualised.
- Clinicians should consider using TIS for myriad of reasons, including posture, pain, comfort, pressure management, ease of transfers, and importantly to facilitate activity and social participation.
- Consider manual versus power tilt options.
- For greater manoeuvrability and environmental access in power wheelchairs explore wheel drive options[3].


**References**

1 Sonenblum SE, Springle S, Maurer CL (2009). Use of power tilt systems in everyday life. Disability and Rehabilitation: Assistive Technology. 4 (1), 24-30.
2 Casey J, Grittins L (2013). Use of tilt-in-space in seating systems for adults with physical disabilities: a systematic review. Physical Therapy Reviews. 18 (4), 285-299.
3 Harrand J, Bannigan K (2014). Do tilt-in-space wheelchairs increase occupational engagement: a critical literature review. Disability and Rehabilitation: Assistive technology. 27, 1-10.
4 Harris F, Sprigle S, Sonenbluma SE, Maurerb CL (2010). The Participation and Activity Measurement System: An example application among people who use wheeled mobility devices. Disability and Rehabilitation: Assistive Technology. 5 (1), 48-57.
5 Lacoste M, Weiss-Lambrou R, Allard M, Dansereau J (2003). Powered Tilt/Recline Systems: Why and How Are They Used? Assistive Technology. 15 (1), 58-68.
6 Dewey, A Rice-Oxley Dean, T. (2004). A Qualitative Study Comparing the Experiences of Tilt-in-Space Wheelchair Use and Conventional Wheelchair Use by Clients Severely Disabled with Multiple Sclerosis. British Journal of Occupational Therapy. 67 (2), 65-74.
7 Ding D, Leister E, Cooper RA, Cooper R, Kelleher A, Fitzgerald SG, Boninger ML (2008). Usage of tilt-in-space, recline, and elevation seating functions in natural environment of wheelchair users. Journal of Rehabilitation Research & Development. 45 (7), 973 — 984.
8 Ward AL, Sanjak M, Kerry Duffy K, Bravver E, Williams N, Nichols M, Brooks B. (2010). Power Wheelchair Prescription, Utilization, Satisfaction, and Cost for Patients with Amyotrophic Lateral Sclerosis: Preliminary Data for Evidence-Based Guidelines. Archives of Physical Medicine and Rehabilitation. 91 (2), 268–272.
9 Pountney, T, Najaf L, Cowan D (2008) The effect of tilt-in-space wheelchairs on children's posture and function Association of Paediatric Chartered Physiotherapists, 1 (3). pp. 22-32. ISSN 1368-7360


Ulster University

HSC Belfast Health and Social Care Trust