

# Case studies from the perspectives of aged care residents on turning and positioning: Implications for technical progress in pressure injury prevention

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The perspectives of aged care residents on turning and positioning is required to improve care and prevent pressure injuries. The following case studies share aged care resident perspectives and satisfaction with turning and positioning devices and equipment. Key learnings include the need for tailored turning and positioning care for diverse aged care residents; the benefits and drawbacks to purpose-designed and usual turning and positioning devices, and the high value of feedback from aged care residents on turning and positioning. The study also generated insights that will benefit technological progress in the field of turning and positioning and pressure injury prevention.

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Pressure injuries (also known as pressure ulcers or bed sores) are chronic wounds that affect 28% of aged care residents in Australia (Graves and Zheng, 2014), and the condition is prevalent internationally (European Pressure Ulcer Advisory Panel [EPUAP] et al, 2019). Those affected experience poorer physical, social, emotional and role functioning when compared to residents who do not have pressure injuries (Sebba Tosta de Souza, 2015). Efforts to prevent pressure injuries among aged care residents are highly valuable given the potential deleterious effects of the pressure injury on health and wellbeing.

Turning and positioning in bed helps to prevent pressure injuries (EPUAP et al, 2019); however, assessment of the effectiveness of the devices and equipment used for this intervention has been largely overlooked (Kapp et al, 2019). The perspectives of aged care residents are also important because their experiences, needs and preferences may influence the success of turning and positioning and, therefore, the development of pressure injuries. Moreover, the development of technological means for turning and positioning has been stagnated for decades, largely because engineering solutions often disregard patient and staff experiences in the turning and positioning process, which leads to poor adoption of products or low tolerance.

The following case studies share aged care residents' perspectives on, and satisfaction with, turning and positioning devices and equipment. Satisfaction is contingent on fulfilment of the patient's wishes, expectations and needs (Williams et al, 2016); therefore, these case studies are highly valuable, particularly given how challenging it can be to obtain perspectives from aged care residents, who often have cognitive impairment. Importantly, any initiative for technological progress in the field of turning and positioning should benefit from the resident perspective.

### Methods

Case studies are useful for promoting critical thinking about challenges associated with care, presenting new insights, and identifying research priorities and the need for new technologies to enhance the quality, effectiveness and safety of care (Gottschlich, 2000).

Human Research Ethics Committee approval was obtained, and the conduct of the study conformed to the standards of the Declaration of Helsinki.

The participants lived in a residential aged care facility (long-term care home/nursing home) in Australia. They did not have cognitive impairment. Each participant had used usual care devices for turning and



**Figure 1.** Top: The tested devices (left to right): Tortoise Turning Pad, Fluidized Positioner and Z-Flex Heel boot. Bottom: The usual care devices: slide sheet, pillow and sheepskin boot.

positioning, provided as required by the facility. Each participant had also used one or more purpose-designed turning and positioning devices (provided by the research team) and had 2 weeks' experience using the latter. The equipment and devices are displayed in [Figure 1](#).

The usual care devices include a standard pillow (Sleepmaster Cura+tic medical pillow, Jason Commercial) and slide sheet. The pillow is placed against the back to support body placement in the lateral side lying position when in bed, and to elevate the foot and heel when in the bed or chair. The slide sheet is placed temporarily underneath the person while in bed to enable healthcare providers to move the resident's body up, down, and side-to-side in bed.

The purpose-designed turning and positioning devices used were the Fluidized Positioner, the Tortoise Turning Pad and the Z-Flex Heel boot (Mölnlycke Health Care).

The Fluidized Positioner is a polyurethane bag containing a shape-memory composite material, which can be moulded and remoulded to the required shape and will hold the last mirror-shape of the individual anatomy once moulded to it, maximising the contact area for bodyweight force transfer (Katzengold and Gefen, 2018).

The Tortoise Turning Pad is a non-powered whole-body positioning mat with a low-pressure air chamber, which adapts to the body contours by positive air displacement, increases immersion and envelopment and thereby maximises the effective contact area for bodyweight force transfer (Peko Cohen et al, 2018).

The Z-Flex Heel boot is a fluidised heel boot for pressure redistribution, so that localised

heel forces are dispersed across the length of the leg. The purpose-designed devices are registered with the Australian Therapeutic Goods Administration as Class One medical devices for patient positioning purposes (TGA numbers 282958, 282967 and 282966). Further information about the devices can be found at: <https://www.molnlycke.us/products-solutions/turning-and-positioning-system>.

#### Data collection

A purpose-designed paper-based survey rated the participants' satisfaction with the devices. Participants were asked to comment about the devices and their individual experiences with turning and positioning. Responses were read back to the participants to confirm accuracy.

#### Analysis

The case studies represent individual participants, therefore a narrative describing the participant, individual survey results and participant quotes is reported. Pseudonyms have been used.

#### Results

The results of the case studies are shown in [Boxes 1, 2 and 3](#).

#### Discussion

The residents needed support from healthcare providers with turning and positioning; however, the cases otherwise digress with respect to similarity. Bill is independent and may reject interventions to reduce pressure injury risk; Dolly accepts assistance to manage her comfort and Nora is willing to try new interventions and share her views for the

## Box 1. Bill.

### About Bill

Bill is a 57-year-old man who has been at the facility for 3 years. He has a history of cerebrovascular accident, cirrhosis, gout, hypertension and acquired brain injury. Bill is a smoker and reports poor diet. He is 176 cm tall and weighs 176 kg (BMI 48.4). Bill is continent of urine and faeces. He can verbally communicate with staff. Bill requires full assistance from two staff and an electric hoist to get out of bed. He cannot walk or weight bear and spends most of his day in his electric wheelchair.

During the day, he often takes himself out of the facility and returns to bed late in the evening, at his request. Bill is unable to move or roll independently when in bed, although he can grab a side rail and provide minor assistance once he is partially turned on to his side. Bill has a high risk of pressure injury development, with a score of 10 on the Braden scale. He is turned and repositioned every 4 hours overnight, if he permits.

Every second day, if Bill allows and is available, his bilateral leg ulcers are treated by the facility nurses. These wounds have been present since before his admission to the facility. They are on the left posterior and anterior calf, and left dorsum of the foot. He also has wounds in the right gaiter (lower third of the leg) region. Bill typically wears sheepskin boots as footwear, although this does not occur every day due to lower limb swelling and/or the boots being soiled. After using the devices for 2 weeks, Bill was asked to reflect on his satisfaction with the purpose-designed devices and his usual devices and equipment.

### Bill's survey results

Ratings for ability to:	Poor	Fair	Good	Very good	Excellent
Turn/position you comfortably			Z-Flex Heel boot Sheepskin boot	Slide sheet	Tortoise Turning Pad
Turn/position you safely			Z-Flex Heel boot Sheepskin boot Slide sheet		Tortoise Turning Pad
Support the position of your body once it is moved			Sheepskin boot Slide sheet	Z-Flex Heel boot Tortoise Turning Pad	
Keep your skin from over-heating or under-heating		Sheepskin boot	Z-Flex Heel boot Tortoise Turning Pad Slide sheet		
Keep your skin from being excessively moist			Z-Flex Heel boot Sheepskin boot Tortoise Turning Pad Slide sheet		
Be cleaned effectively	Sheepskin boot		Z-Flex Heel boot Tortoise Turning Pad Slide sheet		
Turn/position you in a reasonable period of time		Sheepskin boot Slide sheet	Z-Flex Heel boot Tortoise Turning Pad		

### Bill's comments

Z-Flex Heel boot: When asked to rate how satisfied he was overall with the Z-Flex Heel boot, Bill responded that he was "satisfied" versus "dissatisfied" for the sheepskin boots. He described the Z-Flex Heel boot as "easier to get on" and "feels softer".

Tortoise Turning Pad: When asked to rate how satisfied he was overall with the Tortoise Turning Pad, Bill responded that he was "satisfied" versus "dissatisfied" for the slide sheet. He described the Tortoise Turning Pad as "like an airbag", "feels better underneath the body", "keeps me more comfortable", "softer under (my) legs" and "better with pain in my leg".

benefit of others. Turning and positioning care plans should be individualised (Langemo et al, 2015) and account for potential barriers and enablers that may arise when negotiating care with patients who have different attitudes and preferences. Planning throughout the care episode is imperative, as the preferences of aged care residents may be at odds with the goals of care set by healthcare providers and may change over time.

Each participant rated the purpose-designed devices as more satisfying overall, and equally or more satisfying than the usual care devices,

for all qualities that were assessed. This points to the value of innovation and technological progress in pressure injury prevention. Lack of equipment for people who are larger in body size can be a barrier to effective pressure injury risk management (EPUAP et al, 2019), therefore it was encouraging that the purpose-designed devices used in the study were useful for Nora and Bill.

The indication by Dolly that the purpose-designed device stayed in place better than the pillow suggests that the resident can be an excellent judge of whether an intervention

## Box 2. Dolly.

### About Dolly

Dolly is a 76-year-old woman with a history of left cerebrovascular accident (CVA), arthritis and chronic back pain. Dolly has been at the facility for 7 months. She was well and living at home prior to her CVA. She does not have cognitive impairment and is hopeful to return home in the future as she reports that her recovery has been progressing well. Dolly has hemiplegia of the right arm and finds positioning her shoulder and upper arm problematic when in bed. Facility staff assist her with this task each evening. She has an average BMI and scores low risk on the Braden scale (score of 15). Dolly is continent of urine and faeces.

During screening by facility staff, it was recorded that Dolly was ambulant and able to move and position herself in bed independently, with the exception of positioning her right arm and shoulder, for which staff would typically assist. Dolly had consented to participate in the study, so the Fluidized Positioner was trialled as a substitute for the usual pillow to support her arm and shoulder. Information about the suggested use was provided to Dolly and healthcare staff. After using the device for 2 weeks, Dolly was asked to reflect on her satisfaction with the purpose-designed device and her usual equipment.

### Dolly's survey results

Ratings for ability to:	Poor	Fair	Good	Very good	Excellent
Turn/position you comfortably				Fluidized Positioner Pillow	
Turn/position you safely				Fluidized Positioner Pillow	
Support the position of your body once it is moved			Pillow	Fluidized Positioner	
Keep your skin from over-heating or under-heating					Fluidized Positioner Pillow
Keep your skin from being excessively moist				Fluidized Positioner Pillow	
Be cleaned effectively				Fluidized Positioner Pillow	
Turn/position you in a reasonable period of time				Fluidized Positioner Pillow	

### Dolly's comments

Fluidized Positioner: When asked to rate how satisfied she was overall with the Fluidized Positioner, Dolly responded that she was "very satisfied" versus "satisfied" for the pillow. She described the Fluidized Positioner as one that "stays in place whereas pillow moves a bit", and said it was "firmer, felt better being firmer" and "more comfortable" than the pillow.

is working as intended. Nora's previous experience of falling out of bed when turning and positioning highlights the need to address potential or actual fear during this activity. Given the wealth of experience that aged care residents have, it is unfortunate that such a large proportion of residents have cognitive impairment and are often unable to provide feedback. The use of family proxies may be considered, although there are limitations to this approach (Castle, 2006).

Interestingly, two of the interviewed residents used their own words to describe their perception and user experience of the bioengineering design principles implemented in the new turning and positioning devices employed in this study. Namely, these design principles were reduction of localised soft tissue deformations through larger body-support surface contact areas, by either immersion and envelopment (Tortoise Turning Pad) or moulding to shape (Fluidized Positioner). For example, Bill

described his experience with the Tortoise as "feels better underneath the body", "keeps me more comfortable", "more softer under [my] legs" and "better with pain in my leg". Likewise, Dolly described use of the Fluidized Positioner device as a "more comfortable" experience.

Discomfort and pain result from elevated, localised and sustained forces on the body surface. These are central nervous system responses to nociceptor signalling in skin and deeper tissues, which translate potentially damaging mechanical stimuli as a "threat" for the brain (Steeds, 2016). If the brain perceives these signals as valid, it creates a discomfort or pain sensation to direct attention to the affected body part (Steeds, 2016). This process, called nociception, is a critically important mechanism in protecting tissues from pressure injuries.

Reports of better comfort or less pain are therefore indirect but good indications that the localised tissue deformation levels resulting from the sustained bodyweight forces were

## Box 3. Nora.

### About Nora

Nora is a 71-year-old woman with a history of osteoarthritis, rheumatoid arthritis, hypertension and falls who has been at the facility for 1 year. She is 159 cm tall and weighs 122 kg (BMI 48). Nora does not have cognitive impairment. She is a keen painter and enjoys spending time with her family. Nora is assisted by staff to turn and position when she is in bed.

During screening by facility staff, it was identified that the Tortoise Turning Pad would be a suitable device for Nora, and also the Fluidized Positioner if she was prepared to side-lie even to a small degree. This was discussed with Nora, who agreed to try both devices, noting that any side-lying angle would be minimal; however, her capacity and willingness to provide feedback about her experiences with the devices was high. After using the devices for 2 weeks, Nora was asked to reflect on her satisfaction with the purpose-designed devices and her usual devices and equipment.

### Nora's survey results

Ratings for ability to:	Poor	Fair	Good	Very good	Excellent
Turn/position you comfortably		Slide sheet	Fluidized Positioner Pillow	Tortoise Turning Pad	
Turn/position you safely		Slide sheet	Fluidized Positioner Pillow	Tortoise Turning Pad	
Support the position of your body once it is moved		Slide sheet	Tortoise Turning Pad Fluidized Positioner Pillow		
Keep your skin from over-heating or under-heating		Slide sheet	Tortoise Turning Pad Fluidized Positioner Pillow		
Keep your skin from being excessively moist		Slide sheet Pillow	Tortoise Turning Pad Fluidized Positioner		
Be cleaned effectively		Slide sheet	Fluidized Positioner Pillow		Tortoise Turning Pad
Turn/position you in a reasonable period of time		Slide sheet	Fluidized Positioner Pillow		Tortoise Turning Pad

### Nora's comments

**Fluidized Positioner:** When asked to rate how satisfied she was overall with the Fluidized Positioner, Nora responded that she was "very satisfied" versus "satisfied" for the pillow. She described the Fluidized Positioner as "more solid, more secure than pillows".

**Tortoise Turning Pad:** When asked to rate how satisfied she was overall with the Tortoise Turning Pad, Nora responded that she was "very satisfied", but that she was "dissatisfied" with the slide sheet. She described feeling "confident when [the nurses are] turning me" with the Tortoise, that its "sides are so much better", that "the Tortoise doesn't slip, stays in place", and that the nurses "can hold the sides and pull me one way or the other. I think they have done that well". Regarding the slide sheet, Nora stated that she "would not trust it" and is "mindful of the ones who are pregnant, I worry about the nurses". She noted that, unlike the Tortoise, "the other [slide sheet] has to be removed." Nora also described a previous experience with the slide sheet which resulted in her falling out of bed.

experienced by the participants as being lower. This is consistent with the currently known pathophysiology of pressure injuries, which begin as tissue deformation-inflicted damage (EPUAP et al, 2019).

Overall, testing the biomechanical efficacy of turning and positioning equipment in minimising tissue exposures to deformations by integrating bioengineering work (Katzengold and Gefen, 2018; Peko Cohen et al, 2018), with patient perspectives, is the way forward.

#### Strengths and limitations

Strengths of the case studies are the descriptive nature of the data and the illuminating participant quotes. A limitation is the subjective nature of the case study methodology.

#### Conclusion

An approach that includes tailored turning and positioning care and use of the most acceptable and effective turning and positioning devices has the potential to improve care and prevent pressure injuries among aged care residents. Patient reports of their user experience should be fed back into the engineering design and improvement process to optimise the performances of turning and positioning equipment.

More rigorous research should be conducted to understand the experience, satisfaction, needs and preferences of aged care residents concerning turning and positioning and pressure injury prevention. Aged care residents should be involved in all stages of research (from conception to reporting) and the relationship

between a discomfort or pain experience and their risk of a pressure injury should be effectively explained to them. Further research is required to evaluate the clinical effectiveness of purpose-designed turning and positioning devices, compared to usual care equipment, for preventing pressure injuries. **WINT**

### Declarations

Funding from Gandel Philanthropy was obtained to conduct the study. The purpose-designed turning and positioning devices described in the manuscript were provided at no cost for use in the study by Mölnlycke Health Care.

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