

EVALUATING THE EFFECTS OF THE USE OF AN INNOVATIVE TURNING AND CHANGING DEVICE ON PATIENT OUTCOME AND NURSING STAFF WELL BEING

Charleen Solomon, Janet Bunney, R.N. (Ret)

Background: Pressure at the interface between bony prominences and support surface sufficient to occlude or reduce blood flow is thought to cause pressure ulcers (PUs). Pressure ulcers are prevented by providing support surfaces that redistribute pressure and by turning residents to reduce length of exposure. Pressure ulcers most commonly occur on the coccyx or sacral area, heels, greater trochanter or hip area, but can also occur anywhere there is prolonged pressure on a body part including the back of the head and ears, shoulders, elbows and inside the knee area.

Method: Our study was performed by recruiting random patients or residents in a single facility, all of whom had pressure ulcers of varying size and degree. These patients or residents ranged in age from 55-95 on two of the facility's units, a cardiovascular unit and a dementia unit in a nursing home. Our study ran for three weeks and all participants were placed on an every two hour turning protocol (Q2 Protocol) which is a current standard in most facilities to prevent skin breakdown and pressure ulcers from forming. The study required a weekly risk and skin assessment to be completed by independent assessors who would be blind to whether the Q2 protocol was adhered to with the participants. The primary outcome of the study would be to learn how the participant's pressure ulcers fared during the three week study using the Q2 protocol with half the participants using the Q2 Solution and half of them using the facility's standard linens and incontinent pads for turning and changing them.

Discussion: The Q2 Solution is a hands-free disposable turning and changing device as well as an incontinent pad. It is an innovative device designed to remove the weight of the patient off of the attending caregiver's back and arms and instead to transfer this weight onto the patient's bed rail or onto a Q2 Riser designed to be used on beds without rails attached, thereby reducing caregiver injury as well as preventing patients from developing further or worsening pressure ulcers. The Q2 Solution is designed to make turning and changing a patient faster, easier and more efficient for the caregivers, allowing them to adhere to the Q2 protocol. To the best of our knowledge, no other turning and changing device exists like the Q2 Solution. Our plan was to conduct a randomized control trial to determine the effects of using the Q2 Solution vs. the standard technique for turning and changing patients, particularly the optimal frequency of repositioning patients using the Q2 Solution.

Background

Pressure ulcers, also known as bed sores, decubitus ulcers and pressure sores, are an undesirable and largely preventable complication of prolonged pressure on the skin in patients whose mobility has been limited due to a medical condition. They can develop quickly, particularly in those with impaired circulation, inability to move themselves, and who are nutritionally compromised. Additional risk factors include incontinence, friction and shearing movements, and ability to communicate.¹

Pressure ulcers are a complication that can rapidly change and become a serious problem that can eventually lead to death, especially in the frail and elderly.² Pressure ulcers affect approximately 2.5 million people per year in the US, cost \$9.2-\$11.6 billion per year and is only second in litigation claims after wrongful death claims.³

Pressure ulcers can be categorized by four stages, depending on the level of injury and degree of skin and tissue involvement. Briefly, Stage 1 involves redness of the skin that is still intact, Stage 2 is where the skin has begun to break down so that there is partial-thickness skin loss, Stage 3 results in full-thickness skin loss, and Stage 4 is when there is full-thickness skin and tissue loss.⁴ See figure 1 for examples of each stage.

In 2008, the Centers for Medicare and Medicaid Services no longer reimbursed for hospital acquired conditions which included pressure ulcers not present at the time of admission. Pressure ulcers are considered a “never event,” meaning it is an avoidable diagnosis and could easily have been prevented using well-documented care and treatment protocols for preventing skin breakdown.⁵



Figure 1. Stages of Pressure Ulcers

The standard of care for the prevention of pressure ulcers is often called the Q2 Protocol where patients are turned and repositioned every two hours.⁶ Because pressure ulcers develop most commonly on skin areas covering bony prominences and where there is prolonged pressure at the interface of the skin and the support surface, pressure ulcers develop most often on the coccyx or sacral area, heels, greater trochanter or hip area, as well as the back of the head, ears, shoulders, elbows, ankles, and inner knees.⁷ See figure 2.

Maintaining this standard of care using the Q2 protocol has deleterious effects for caregivers. The number one cause of nurse injury is due to lifting patients, which must be done to maintain the Q2 protocol. Nurses sustain injuries more often than any other job involving lifting, including construction workers! Even when following proper lifting technique, the repeated strain and motion on the caregivers’ muscles leading to injury. This results in time away from work, increased worker’s comp claims, replacing staff and training new staff, and limited staff availability which leads to fatigue and staff burnout.⁸

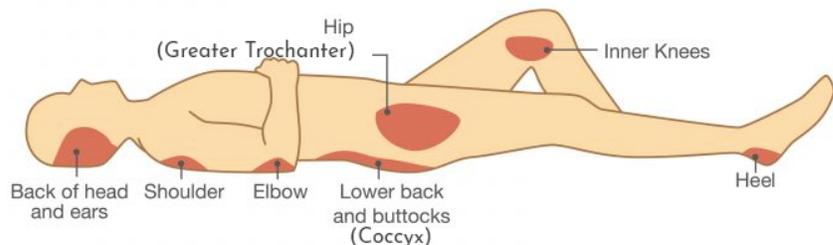


Figure 2. Common Locations of Pressure Ulcers

The Q2 Solution was invented and designed by a caregiver experiencing all of these problems: a hospice patient requiring frequent turning with pressure ulcer and incontinence care, a back injury caused by frequent turning and lifting of her patients, and the need to find a product that would take the weight of the patient off of her back and arms so she could give adequate care to prevent worsening of his pressure ulcer as well as the formation of new pressure ulcers, reposition the patient and maintain a comfort level for both herself and the patient. After four years of research and development, the Q2 Solution was born and an informal study was completed as detailed here.

Method

Our study was conducted in a nursing home facility that was comprised of a cardiovascular unit and a dementia unit with residents of varying weights, ages and diagnoses. These residents required regular turning due to various risk factors for pressure ulcers, including immobility, impaired circulation, dementia, incontinence and altered nutritional status. The study would be done over a three week period with the participants maintaining their usual daily routine and activities.

We recruited 20 patients as participants in our study, fourteen female and six male, both Caucasian and Black, ages ranging from 55-95 with a mean age of 76, of varying weights and all with pressure ulcers at various stages of development. The most common co-morbidities were cardiovascular disease and dementia.

Participants were on a turning schedule of every two hours (Q2 Protocol) in divided randomly into two groups, Group 1 using the Q2 Solution and the Group 2 using the standard incontinent pad. Each participant would receive a weekly risk and skin assessment completed by assessors blinded to group allocation. The primary outcome measure would be the assessment of the pressure ulcer located on the coccyx or sacral area, the greater trochanter or hip area or the heels. The nursing staff did not know what the study was measuring. The study assessors did not know which group the participants were in as they assessed the risks and skin condition each week.

Caregiver staff included 20 nurses or CNAs involved in the study working the various shifts at the facility. Ten of the staff used the Q2 Solution and 10 used the standard incontinent pad.

Results

Overall, there was a significant difference between Group 1 and Group 2, resulting in better performance and outcome for Group 1 using the Q2 Solution. Participants had an overall better quality of life with the Q2 Solution.

Participants that had the Q2 Solution were maintained on the Q2 Protocol, being turned every two hours and it took less time for each turn, allowing the caregivers to perform the procedure on schedule. Staff were also able to incorporate more cares such as dressing, feeding, toileting, bathing, and range of motion exercises into their daily routine. The staff using the Q2 Solution had no staff injuries or complaints with no missed work due to injury and no worker's comp claims. Staff also reported more enthusiasm with the Q2 Solution, felt less fatigued at the end of the shift, and they reported feeling good and relieved at being able to perform the duties of their job requirements. Patients had no injuries involving skin tears or bruising. Existing pressure ulcers were overall improved.

Participants that had the standard incontinent pad were turned an average of every 4 to 5 hours, often required two staff to perform adequately (doubling the cost of the intervention) and the staff were unable to keep up with the Q2 protocol of turning and changing the residents every two hours as needed and still be able to do all the additional job requirements including dressing, feeding, toileting, bathing and range of motion exercises. The staff using the standard incontinent pad had three sick calls in three weeks (one each week) with each being off work for one week, there was one worker's comp injury reported, four nursing registry nurses had to be called in to replace the staff who were out at significant cost to the facility, staff had to be paid for four sick days, it required extra time to train replacement staff, and there were seven complaints of fatigue and soreness at the end of their shifts. Overall, there was less job satisfaction at not being able to complete all the usual duties of their job requirements. Participants showed little to no change in their pressure ulcers.

Patient outcomes during the three week study is noted in the table below:

Patient Outcomes for those using Q2 Solution:

Name	Age	Sex	Weight	Starting Condition	Ending Condition (3 weeks)
T.D.	73	M	173 lbs	Stage one PU on trochanter	Healed
B.H.	79	F	158 lbs	Stage one PU on coccyx	Healed
S.B.	80	F	180 lbs	Stage one PU on right elbow	Healed
J.P.	94	M	210 lbs	Stage two PU on coccyx	Stage one P.U.
H.A.	82	F	145 lbs	Stage two PU on left heel	Stage one P.U.
T.A.	76	M	190 lbs	Stage two PU on trochanter	Healed
P.S.	81	F	110 lbs	Stage two PU on coccyx	Stage two P.U.
W.J.	79	F	150 lbs	Stage two PU on coccyx	Edges beginning to heal
S.W.	56	F	210 lbs	Stage two PU on coccyx	Skin closing around edges
V.M.	75	F	195 lbs	Stage four PU on coccyx	Stage three PU

Patient Outcomes for those using the standard incontinent pad:

Name	Age	Sex	Weight	Starting Condition	Ending Condition (3 weeks)
T.W.	87	F	187 lbs	Stage one PU on coccyx	No changes
D.G.	75	F	178 lbs	Stage two PU on coccyx	No changes
C.L.	73	F	164 lbs	Stage two PU on trochanter	No changes
R.C.	82	M	235 lbs	Stage two PU on elbow	No changes
C.A.	68	F	165 lbs	Stage one PU on elbow	Skin intact, less red
J.R.	72	M	191 lbs	Stage two PU on coccyx	Outer Edges Healing
T.M.	84	F	232 lbs	Stage two PU on heels	No changes
T.S.	61	F	165 lbs	Stage one PU on heels	No changes
E.J.	90	M	175 lbs	Stage three PU on coccyx	No changes
R.G.	69	F	189 lbs	Stage one PU on coccyx	No changes

Nurse/CNA outcomes with 20 total staff involved in study:

10 staff with Q2 solution:

- No call in sick days.
- No complaints of back or shoulder injuries.
- No worker's comp claims filed.
- Nurses reported great enthusiasm with using the Q2, felt less tired at end of shift.
- All patients were able to be kept in Q2 protocol, turned and changed
- Nurses felt good and relieved at being able to perform their jobs.
- Didn't have to hurt to do their job.
- Nurses had additional time to perform other patient job duties, such as feeding, changing, range of motion exercises, etc.

10 staff with standard incontinent pad:

- Three called in sick in three weeks, one per week with
- One shoulder injury and two back injuries;
- One worker's comp back injury,
- Four registry nurses called in to replace injured staff at significant cost to facility
- Staff had to be paid four sick days
- Required time to train replacement staff
- Staff complaints of fatigue and soreness at end of shift
- Patients were only turned every 4-5 hrs
- Staff unable to complete all usual duties each shift.

Conclusion

This clinical trial aimed to determine if having the Q2 Solution in place at care facilities decreases the risk of injury to patients and caregivers. Overall, results of the study supports the use of the Q2 Solution on moderate to high risk residents or patients, turning at intervals of every two hours. Patients' pressure ulcers showed overall improvement. Using the Q2 Solution helps to ensure that the Q2 Protocol is maintained and that less injury results when there is less strain on the caregivers. Caregivers did not have to hurt to do their jobs and had better job satisfaction using the Q2 Solution.

End Notes:

1. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2912087/>
2. <https://medlineplus.gov/pressuresores.html>
3. <https://www.ahrq.gov/professionals/systems/hospital/pressureulcertoolkit/putool1.html>
4. <https://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/>
5. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/index.html>
6. <https://www.ncbi.nlm.nih.gov/books/NBK2650/>
7. <https://jamanetwork.com/journals/jama/fullarticle/203224>
8. <http://www.healthcarebusinesstech.com/nurses-safe-lifting-patients/>