



The Use of Friction Reducing Devices to Aid Comfort and Reduce the Risk for Injury During Patient Handling Activities

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Background

The Bureau of Labor Statistics (BLS) estimates that employees in nursing suffer more than 200,000 patient-handling injuries a year amounting in approximately \$1 billion annually in workers' compensation costs (DuBose & Donahue, 2006). Professional nursing and labor organizations, regulatory agencies and the scientific community have recognized the significance of this issue and are focused on prevention of ergonomic injuries related to patient handling.

In 1994 the National Institute for Occupational Safety and Health (NIOSH) lifting equation suggested the ideal maximum weight to be lifted under ideal conditions for a 'load constant' was 23kg (51lb), not to include patient handling. The revised NIOSH lifting equation yields a maximum recommended weight limit of 35lb for patient handling tasks in ideal conditions. For example the patient is cooperative and unlikely to move fast. However, in less than ideal conditions, or for patients weighing more than 35lb, the use of assistive devices is recommended (Waters, 2007).

The American Nurses Association (2004) produced a position statement promoting a "Handle with Care" campaign to prevent musculoskeletal injuries by the increased use of assistive equipment and patient-handling devices and improvements in education and training.

In response to these issues studies have been performed to analyze muscle activity of the shoulders, hands, back; spinal compression and shear forces during patient handling activities. Various friction reducing devices including traditional draw sheets, mechanical aids and manual lifting have also been studied to determine consequences on back load, physical stress, perceived patient comfort, length of time required and number of personnel needed to perform a maneuver.

Organizational Priority

Present practice at CHOC Children's is to use cotton draw-sheets to reposition and laterally transfer patients. There are patient transfer boards available in the MRI, CT and radiology departments. Occasionally parents, staff members or associates will manually lift the child. These maneuvers have potential to cause injury to patients, parents and staff members.

In addition to reducing the risk of injury, the use of assistive devices can help make these maneuvers more comfortable for the patient, improving quality of care and patient/family satisfaction.

There are proven direct and indirect cost-effective benefits associated with the implementation of safe handling protocols with assistive devices such as; decreased sick time, decreased workers compensation, increased morale and a reduction in costs for medical treatment (i.e. at risk of pulling IV lines out, sheering force during move may lead to pressure sores etc.) Furthermore, the benefits of this project reflect CHOC Children's mission and values.

PICO Question

During repositioning and transferring dependent patients, does the use of sliding sheets and transfer boards, as opposed to using draw sheets and manual lifting, improve the comfort and safety of the patient and staff. Furthermore are they cost-effective?

Evidence Search

Database search for this review included CINAHL, MEDLINE, OVID, COCHRANE Library.

Websites included:

- Joanna Briggs Institute,
- American Academy of Pediatrics,
- Occupational Safety and Health Association (OSHA),
- National Institute for Occupational Safety and Health (NIOSH),
- Bureau of Labor and Statistics (BLS),
- Veterans Health Administration Patient Safety Centre, (VHA)
- American Nurses Association.

Articles ranged from years 1996-2007. Reviewed studies included systematic reviews and meta-analysis, randomized controlled trials, quasi-experimental trials and descriptive studies.

Critique

Samples sizes of the studies varied greatly using health care personnel of differing weight and stature. Subjects used for the transfers included manikins, volunteers and patients. Different settings included OR, rehabilitation unit, Medical/Surgical unit, emergency room, research laboratories and community settings. The length of time required to perform the studies also varied.

There were several large randomized and non-randomized controlled trials involving patients in various settings. (Baptiste et al, 2006; Pellino et al, 2006; Yassi et al, 2001; Zelenka et al, 1996). Numerous maneuvers were performed by many caregivers using various transfer devices. These factors all added strength to the evidence. However, the studies did not identify patient characteristics or dependency level. For example, if they were unconscious, co-operative, combative or confused. It is difficult to determine therefore, if identification of these points would have altered the results.

The studies performed in a laboratory settings using a manikin, were to evaluate different patient handling devices and determine pull force required of the person performing the move (Lloyd & Baptiste, 2006; McGill & Kavcic, 2005). Although this may not be representative to normal patient population, there was strong evidence to suggest that friction reducing devices significantly decreased the force required to transfer an individual between adjacent surfaces.

Summary of Findings

- The greatest force needed to transfer a patient comes from using a plastic bag or a draw sheet (Lloyd & Baptiste, 2006, Silvia, et al, 2002).
- When using a draw sheet compression force to L5/S1 disc can exceed the maximum level for safety as determined by National Institute of Occupational Safety and Health, of 3,400 Newton's (Owen, 2000).
- The least force required to perform transfers is using a friction reducing transfer aid e.g. air assisted devices and sliding sheets (Lloyd & Baptiste, 2006; Baptiste, et al, 2006).
- The evidence supports the use of a multifactor intervention strategy to include:
 - Equipment provision/purchase
 - Education and training
 - Risk assessment
 - Policy and procedure
 - Patient assessment
 - Work environment redesign
 - Changes in work organization/practice (Hignett, 2003).
- Pull forces and spinal force compression are minimized by the friction reducing ability of the transfer devices (Bohannon, 1999).
- The weight of a patient and the device used has a direct effect on spinal force required to perform a patient transfer (Zelenka, et al 1996).
- Caregiver's rate air assisted devices significantly higher than any other assistive device (Baptiste, et al, 2006).
- Technique, training, choice of device, patient and caregiver characteristics, organizational and environmental factors are significant in determining the effectiveness of patient transfers (Baptiste, et al, 2006; McGill & Kavcic, 2005; Pain et al, 1999).
- Time for performing transfers and number of personnel required can be significantly reduced using mechanical assistive devices (Pellino, et al 2006).
- Repositioning and transferring dependent patients can be performed with more ease, comfort and safety when combining 'no strenuous lifting' with assistive transfer devices and mechanical aids (Owen, 2000; Yassi, et al, 2001).
- Evidence supports the use of assistive devices including hoists, sliding sheets and lateral transfer boards (Hignett, 2003).
- Technique training alone has no influence on working practice or injury rates (Hignett, 2003).
- Advice and training with or without assistive devices do not prevent back pain, back pain related disability or reduce sick leave (Martimo et al, 2007).

Limitations

From the studies used in this evidenced-based review there was little research evaluating actual patient responses to comfort when using assistive devices. Further research in this area may be useful, however there may be ethical implications due to the particular patient population and their ability to communicate responses (e.g. confused, unconscious, brain-injured).

All the studies were performed on adults; it would be interesting to see if research in the pediatric population would offer different conclusions. Again there may be ethical implications.

Adoption of Change

- Discussed evidence collected and perceived need to change practice with hospital Safety Committee.
- Garnered support from colleagues to move forward with a practice change that would include the use of friction reducing devices to move patients.
- Determined current practice and equipment use for patient handling used at the clinical facility.
- Interviewed nurse colleagues at the institution regarding the benefits and obstacles of introducing friction reducing devices and transfer boards for patient handling.
- Contacted employee health department regarding injury rates and current health and safety/ergonomic policy status.
- Contacted the infection control department for information regarding cleaning/laundering of the non disposable friction reducing devices.
- Contacted Environmental Services (EVS) to determine laundering services offered, cost per sliding sheet to launder is \$1.75 and turn around time to launder products is 2-3 days.
- Liaised with various companies and representatives regarding their different products – disposable and non-disposable, suitable for the needs of the hospital and a pediatric population.
- Obtained samples and prices of friction reducing devices.
- Received a demonstration of products from company representatives.
- Return on investment (ROI) analysis completed by Liko, safe lifting people

References

References available on request from:
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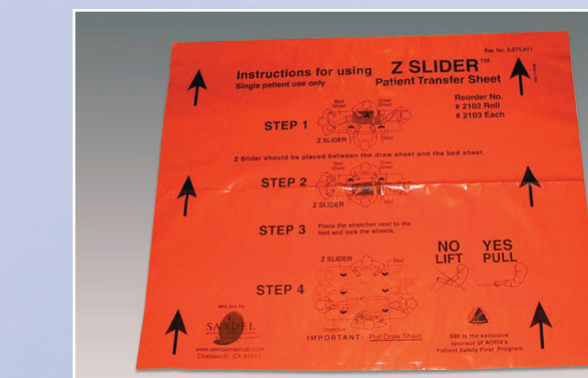
Examples of Assistive Devices



DRAW SHEETS FOR LATERAL TRANSFER



HANDY TUBE with handles,
Launderable - by Liko



Z - SLIDER - Disposable
by Sandel Medical Industries



ERGOSHEET - Disposable
Ergosafe, by Waverly Glen



MAXI-SLIDES (2 sheets)
Launderable - By Arjo



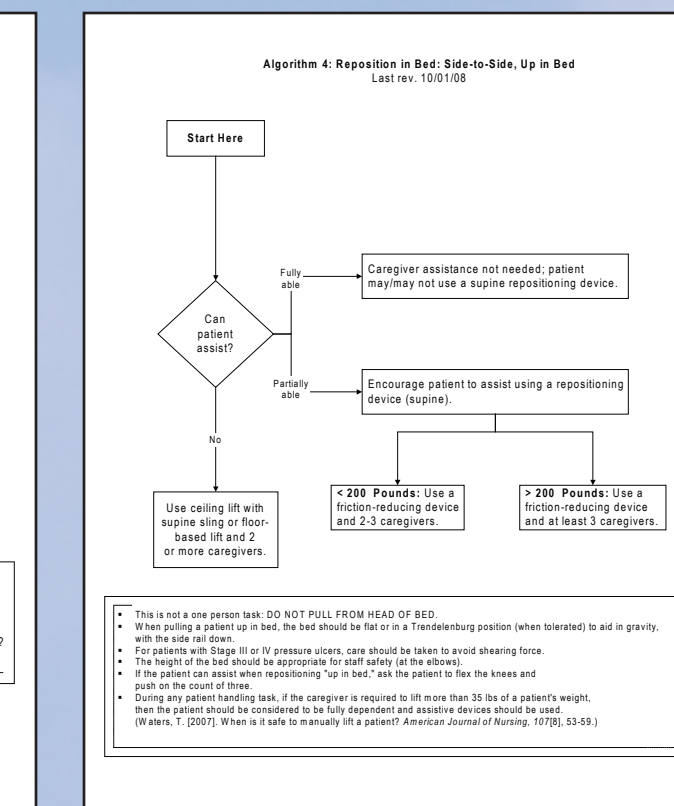
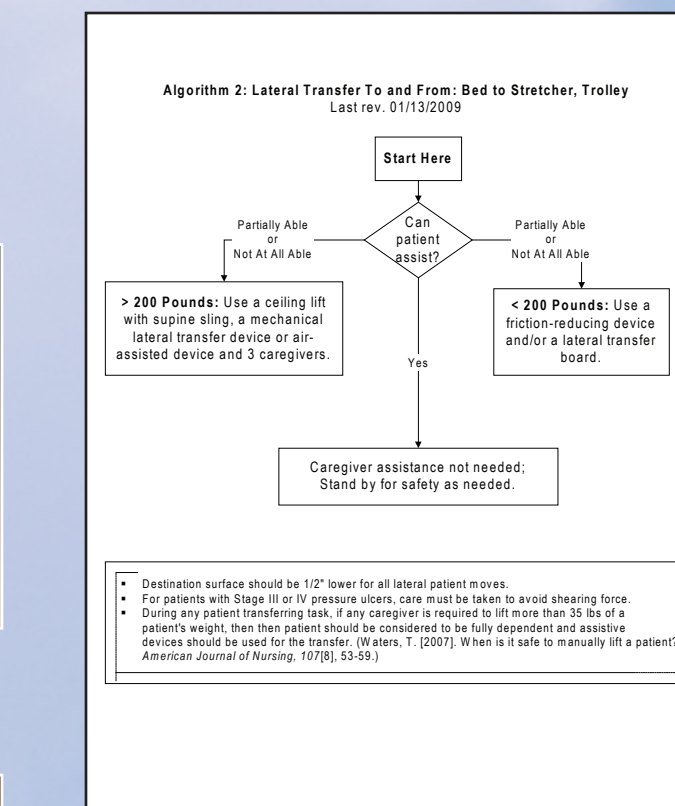
ANTI-STATIC
PATIENT
SHIFTER
22"x72"



THE SLIPP
Launderable
or
antimicrobial
wipes,
by Wright
Industries

Next Steps

- Contact central supplies department and purchasing with request for purchase of equipment.
- Develop a process for equipment to be easily accessible, preferably in each room, with transfer boards on each side of the hallways.
- Identify sufficient numbers of sliding sheets needed to account for laundering turn around time.
- Develop equipment use initial and ongoing training program.
- Approach policy and procedure committee to suggest changes or addition to current Illness Injury Prevent Plan/ Worker Safety Plan, also addition of Ergonomics policy.
- Determine indication for use of assistive devices during patient handling activities, by use of algorithms from VHA Patient Safety Centre. To be accessible in each room.
- Evaluate use of equipment.



Acknowledgements

- The Evidence Based Scholars program at CHOC was supported by a grant from the Walden and Jean Young Shaw Foundation
- Vicky R. Bowden, DNSC, RN
Azusa Pacific University
EBP Scholars Program Mentor
- Jennifer Cohen, RN, MSN, CNS, CNRN,CCRN, Clinical Nurse Specialist, PICU, CHOC
- Cathy Griffin, RN,BSN,CCRN, Clinical Educator, PICU
- Daniel Gilmore – Safe Lifting Consultant, Liko, a Hill-Rom Company
- Jeff Robertson – Senior Account Executive, Dynamic Medical Systems
- Tony Coleman - Vice President – National Accounts, Dynamic Medical System