Successful Implementation of Ceiling-Mounted Lift Systems

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KEY WORDS

mechanical lifting devices
safe patient handling
work-related back injury

Rehabilitation nurses are well aware of the risks for musculoskeletal injuries related to patient handling tasks. Repetitive lifting, turning, and repositioning of patients with mobility limitations can take a toll on the nurse. This article chronicles integration of ceiling lift technology for patient-handling tasks into nursing practice on a spinal cord injury inpatient unit.

Review of Literature

Nurses have one of the highest incidences of work-related back injuries of all occupations (U.S. Department of Labor, Bureau of Labor Statistics, 2004). These injuries most often are associated with the high-risk activity of manually lifting and transferring patients. Research indicates that all manual lifting and transferring techniques place the nurse at risk for injury (Marras, Davis, Kirking, & Bertsche, 1999). As a result, the Occupational Safety and Health Administration (OSHA) recommended minimizing manual lifting and eliminating lifting when possible (U.S. Department of Labor, OSHA, 2005). The American Nurses Association (2003) also supports strategies to eliminate manual lifting. Use of assistive equipment and education in safe patient handling practices are two important approaches.

Mechanical lifting devices have been available in healthcare for decades and have demonstrated effectiveness in minimizing injury risk (Li, Wolf, & Evanoff, 2004; Nelson, 2005). However, consistent use by nurses is influenced by such issues as quantity, availability, storage location, retrieval time, ease of use, and the patient's perceived comfort and safety (Byrne, Reeder, Jin, & Pachis, 2004).

Ceiling-mounted lifts provide a viable alternative to floor-based lifts. A ceiling lift system is installed with tracks that are mounted into the overhead beams to support the weight of the patient. A battery-powered lifting motor unit is attached to the track. Some ceiling-mounted lifts have portable motor units that can be relocated from the track in one room to a track in another room. The motor unit raises and lowers the patient and can be moved along the track, which can be single or traverse (H-track). The traverse track enables the lift to be used at any location in the room. The patient is suspended from the motor unit in a sling. As with floor-based lifts, a variety of sling designs and fabrics are available. The ceiling lift is readily available, which can be advantageous if frequent lifts and transfers are necessary.

Studies comparing floor lifts with ceiling lifts report fewer caregiver musculoskeletal injuries with use of the ceiling lift (Engst, Chhokar, Miller, Tate, & Yassi, 2005; Ronald et al., 2002). Laboratory studies indicated that ceiling lifts require half the effort of floor lifts (Nelson, 2005). Lifting and transferring with a ceiling lift produce less trunk and shoulder muscle activity than with a floor lift (Keir & MacDonell, 2004; Nelson, Lloyd, Menzel, & Gross, 2003). This can be an important factor in reducing the effects of cumulative patient-handling activities performed by rehabilitation nurses. Engst et al. (2005) and Miller, Engst, Tate, and Yassi (2006) reported that the perceived risk of injury and discomfort was significantly lower when ceiling lifts were used for lifting and transferring patients. This was substantiated by a reduction in compensation costs. After installation of ceiling lifts, cost savings in terms of compensation costs alone are estimated to produce payback within 6 years (Engst et al.; Spiegel et al., 2002). Additional benefits include fewer lost work days, less severe injuries, and greater productivity. Engst et al., Miller et al., and Villeneuve (1998) indicated that both nurses and patients preferred the ceiling lift for lifting and transferring patients.

Nurses must accept and embrace new technology to benefit from its use. Integration of any new equipment into day-to-day practice often entails modifications in practice. According to Lewin (1947), individual behavior is influenced by the group environment. When the status quo of the group is disrupted, unfreezing of group norms occurs, and the group strives to adjust and move to a new level. There are forces that help drive the change (driving forces) and forces that may impede the change (restraining forces). Evaluating all factors at work will identify the factors that must be diminished or strengthened. It is important for evaluation to take place at the group level as a collaborative process. Lewin maintained that as the balance of driving and restraining forces shifts, the status quo becomes unstable (unfreezing stage), and

Key Practice Points

1. Manual lifting and transferring techniques place the nurse at risk for injury.
2. Ceiling-mounted lift systems provide a viable alternative to floor-based lifts in minimizing the risk of injury.
3. Kurt Lewin's concepts of change and group norms can provide a framework for planning and implementing practice change.
4. Involvement of bedside nurses during the implementation process was a key factor in the successful transition to the use of a ceiling-mounted lift system.
5. The addition of ceiling-lift technology to patient-handling equipment resources can create a practice setting that promotes safe patient handling and patient dignity.

new patterns of behavior emerge as group norms are changed (moving stage). New individual behaviors are sustained as the group environment stabilizes again (refreezing stage). Lewin's concepts provide a framework to plan and implement the integration of ceiling lift technology into practice.

Preparation Phase

The current supply of patient-handling equipment on the existing spinal cord injury (SCI) units was evaluated in anticipation of the planned construction of new SCI inpatient units at the James A. Haley Veterans' Hospital (JAHVH) in Tampa, FL. The goal was to reduce work-related injuries and to enhance the comfort and dignity of the patients during lifts and transfers. SCI staff nurses and patients did not have experience with ceiling lifts, so it was not known how they would perceive them. A pilot project comparing a floor-based electric lift and a ceiling-mounted lift was conducted on one of the SCI units. This project found that the SCI nurses and patients preferred the ceiling lift to the floor-based lift (Smith, 1999). The preference for ceiling lifts was the initial factor that helped drive the change in practice. In addition, patient-handling studies being conducted at the Patient Safety Center of Inquiry at JAHVH provided evidence-based support for the use of ceiling lifts. When plans for construction of the new SCI units were finalized, installation of a ceiling-mounted lift system had been identified as a priority.

Clinical Evaluation Phase

The nurses were charged with the task of identifying the system for the new building that would best meet the specific needs of the SCI staff and the patients. Using Lewin's concept that change must take place at the group level, an interdisciplinary implementation team was formed to coordinate the process of comparing the available ceiling lift brands. The team identified the basic requirements of the ceiling lifts and conducted a preliminary survey of vendors. Five brands of ceiling lifts met the requirement criteria. A clinical evaluation of all five lifts was conducted concurrently to determine patient comfort, safety, and ease of use (Smith, Weinel, Doloresco, & Lloyd, 2002). The components of the clinical evaluation were as follows:

- overall comfort
- ease of use
- time efficacy
- caregiver safety
- patient safety
- sling attachment
- positioning bar
- functionality
- readability of controls
- understandability of controls.

The engineering department also examined the lifts for maintenance requirements, past performance record, ease of repair, and structural integrity. As a result of the evaluation, the team recommended that one ceiling lift system, with specific application to the SCI patient care environment, be installed in the new building.

Implementation Phase

As construction of the new SCI units continued, the implementation team actively sought input from staff members regarding facility-specific issues related to the ceiling lifts. It was important to identify and strengthen the factors that would help drive the change in practice and diminish the factors that would impede the successful transition from floor-based lifts to ceiling lifts. Because each patient room would have a ceiling lift, a major driving force for the nurses was the ready availability of a ceiling lift when needed. Ceiling lifts were considered for areas other than patient rooms as staff members, such as physical therapists, identified applications for their areas. As a result, a single-track ceiling lift was added in the therapy room to assist with gait training in conjunction with parallel bars. The ceiling lift slings would be laundered off site, so a sufficient number of slings was ordered to ensure constant availability.

The implementation team also focused on identifying potential issues that could impede the transition from floor-based lifts to ceiling lifts. For example, during a field study the nurses selected a two-function (up-down) control over the multifunction control

with powered tracking. Without powered tracking, the nurse manually moves the patient in the sling along the track with minimal effort. The nurses favored this hands-on approach. The nurses discovered that they worked against the powered tracking motor because they perceived the tracking as slow.

The team faced the challenge of addressing patient privacy in rooms with multiple patients. The use of the ceiling lift would interfere with the use of the traditional ceiling-hung privacy curtains. Wall-mounted privacy screens on casters were identified as an alternative. The 5½-foot-high hard-surfaced screens fold against the wall when not in use and extend 11 feet to provide privacy.

With a focus on rehabilitation and promotion of patient independence, the team addressed the appropriate use of the ceiling lift. Whereas some patients would need the use of a ceiling lift for transfers throughout their hospitalization, other patients would need the ceiling lift for a short time or not at all. The nurses already used safe patient handling algorithms developed by the Patient Safety Center of Inquiry (Nelson, 2005) to determine the appropriate patient-handling equipment and the amount of staff assistance each patient needed. The nurses modified the algorithms to include the ceiling lift as an equipment selection for SCI. Nurses also incorporated more frequent patient-handling reassessments to identify equipment changes related to the patient's increasing functional ability.

Patient care practices had to be modified to fully use the capability of the ceiling lift. A major change was the way in which nurses transported patients for bathing. In the new units each patient room had a large wheelchair-accessible bathroom with a ceiling lift track that connected with the track in the patient room. Patients would be transported into the bathroom via the ceiling lift rather than on a stretcher to a shared shower room. The nurses on the SCI units discussed this process and prepared for this change in practice.

After relocating to the new SCI units, the nurses found that they used the ceiling lifts more frequently than they had used the floor lifts because the ceiling lifts were readily available and easy to use, and patients liked the lifts. For some nurses the new practice of transporting the patient for showering by ceiling lift instead of a stretcher initially seemed cumbersome. Within a few months the nurses became more efficient, and this new practice became the group norm. Because the nurses projected a positive attitude and high confidence level, there was little reluctance by the patients to be lifted and transferred using the ceiling lift. Patients reported feeling secure during transfer and perceived less jostling than with the floor lift.

Education

Safe operation of a ceiling lift required new skills for the nurses and therapists. It was vital to thoroughly address the process of training because patient perception of safety and comfort during transfers is positively correlated to the caregiver's technique (Kjellberg, Lagerstrom, & Hagberg, 2004). A train-the-trainer approach was used to provide initial and ongoing training. The back injury resource nurses who were already recognized as unit-based peer experts on safe patient handling were identified to be trainers. Additional nurses from each shift also volunteered to be trainers. This group of nurses attended comprehensive training on the mechanics and safety features of the ceiling lifts, lifting and transfer techniques using various sling types, and determination of proper sling type and size. The trainers practiced using the ceiling lift on one another to develop proficiency in the lift operation.

One month before relocating to the new SCI units, the trainers conducted hands-on training sessions for all SCI nurses and therapists. These sessions addressed sling size and type, application of each type of sling, safe operation, safety and emergency features of the lift, troubleshooting tips, and preservation of patient comfort and dignity. Staff members were lifted and transferred in the lift so they could appreciate the patient's perspective. To complete the competency evaluation, each staff member performed a return demonstration using the lift. Retraining was not necessary because all staff correctly performed the return demonstrations.

After relocating to the new SCI units, the trainers were available to provide on-the-spot coaching and ceiling lift reviews as needed on all shifts. These trainers became the unit champions and have continued to serve as a source of information on lifting and transferring with the ceiling lift. They also provide ceiling lift training to all new staff members during unit orientation.

Evaluation

The effective transition to ceiling lifts was directly related to staff member involvement throughout the process. Staff nurses provided strategies to address the balance of driving and impeding factors to the transition. A survey of nurses 18 months after implementation provided feedback on the impact of the ceiling lifts. Nearly 90% of the nurses reported perceived exertion during patient handling as 50% less than before installation of ceiling lifts. The majority of the nurses found that the accessibility of ceiling lifts in each patient room decreased the time spent locating lift equipment, bringing lift and transfer equipment into the room, and transferring patients. Although the number of transfer and lifting injuries remained constant, the

time the injured nurses were on modified duty decreased by 87% with the implementation of the ceiling lifts. This suggests that although injuries occurred at the same rate 1 year before and after ceiling lifts were installed, they were less severe afterward (Doloresco, 2004). Repetitive turning and pulling of patients up in bed continued to pose a risk for musculoskeletal injury for the nurses. The ceiling lift was effective for lifting and transferring patients but initially was not used for repositioning patients. Repositioning sheets, which work in conjunction with the ceiling lift and can safely remain under the patient, became available after our implementation. Because these sheets expand the use of the ceiling lift to repositioning activities, we have now incorporated them into our practice. Data on the effect of the repositioning sheets on the number of patient-handling injuries are being collected.

Patients were asked to rate the ceiling lift on lifting comfort, security, safety, and sling comfort. The ceiling lift received favorable ratings on all elements with the exception of sling comfort, which received an average rating. It was possible that inaccurate sizing may have contributed to the sling discomfort that patients expressed, so this area was targeted for improvement. Because some patients with SCI accumulate additional weight in the hips and buttocks, a larger sling provided a more comfortable fit. We added hip measurements to the sling size charts so this factor would be addressed in sling size selection.

At the time of implementation, none of our patients exceeded the standard lifting capacity of the ceiling lift motor. Currently we have a few patients with weights that exceed or are close to the lifting capacity of our lift motor. With the growing number of patients with bariatric needs, at least one lift should accommodate this population. As other units in our facility transition to ceiling lifts, bariatric ceiling lifts are being included.

Lessons Learned

The staff gained important insight during the process of implementing ceiling lifts at our facility. Lessons learned include the following:

- The involvement of bedside nurses during all phases of implementation was vital and resulted in a sense of ownership. This was one of the key driving factors for the successful transition.
- Formal and informal discussion groups, interdisciplinary teams, patient input, and field evaluations were valuable components of this decision-making process. They provided opportunities to address any factors that would impede the change process.
- Competency training for the nurses cannot be overemphasized. The comprehensive hands-on training with return demonstrations yielded proficiency and confidence in the staff operating the ceiling lifts. The unit-based peer trainers continue to provide support and training for new staff.
- To maximize rehabilitation potential, it was vital to frequently assess the patient's functional abilities to determine changes in transfer- and lift-equipment needs. For example, as a patient transitioned to transferring independently, patient-handling equipment such as a lateral transfer board would be more appropriate. Preparation for the patient's discharge would involve training with the patient-handling equipment needed in the home, such as floor-based lifts.
- The lifting capacity of the standard ceiling lift currently meets the needs of 95% of our patient population. At least one ceiling lift on a unit should accommodate the patient with bariatric needs.
- The nurses' perceived exertion during patient handling was reduced, and the time the nurses spent obtaining lift equipment was decreased.
- Continued monitoring of patient-handling injuries can indicate the need for further improvements. Patient-handling injuries after implementation of the ceiling lift were related mainly to repositioning activities. The introduction of repositioning sheets expanded the use of the ceiling lift to these activities. We continue to monitor patient handling injuries to determine effectiveness of our practice.

Conclusions

The SCI nurses embraced the challenge of implementing a ceiling lift system for the new SCI units at JAHVH. Using Lewin's concepts, the nurses collaboratively addressed the factors that would drive or impede the transition to ceiling lifts. They also considered the unique characteristics of their patient population. The nurses successfully shifted to a new group norm. The use of ceiling lifts is now an essential part of their practice. The addition of ceiling-lift technology to our arsenal of patient-handling equipment has created a practice setting that promotes safe patient handling and patient dignity.

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