

Creating Healthy Work Environments 2019

Creating a Safe Environment for Providers During Horizontal Patient Transfer

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Background

The unpredictability of the healthcare environment, especially in emergent situations, place emergency medical technicians (EMTs) and nurses at significant risk for musculoskeletal injury (Olkowski, 2014; Occupational Safety and Health Administration [OSHA, 2013]; Roffey, 2010). Musculoskeletal injuries create an economic burden on the worker, their families, employers, and the healthcare system (OSHA, 2015) by contributing to days away from work and shortening direct care contact (Welch, Hunting, Haile & Boden, 2010; LeMasters, Bhattacharya, Borton & Mayfield, 2006). Musculoskeletal injuries account for about half of all injuries to EMS and nurses making healthcare workers consistently among the most frequently injured occupations (Bureau of Labor and Statistics, 2016). Of these injuries, 72% are caused by overexertion and bodily reaction (The National Institute for Occupational Safety and Health, 2016).

While mechanical lifting devices have demonstrated promise in reducing the number of back injuries among nurses (Charney, 2006; Collins, 2010), these devices are not available to EMTs in the field. In addition, the devices become impractical in emergency settings (Olkowski, 2014; Roffey, 2010). Even in the presence of mechanical lifting devices, it has been noted in over 50% of the time utilized while performing nursing tasks, the healthcare worker demonstrates position of poor posture (Hignett, 1996). This finding, coupled with the findings of Bacharach and colleagues (2016), which determined that when using patient transfer devices, 80% of the load on the body was directly related to the positioning of the participants body during the lift.

The horizontal transfer of a patient from the EMT stretcher to a hospital bed is an essential step in the transfer of care from EMT to the hospital providers. However, the published literature indicates this movement puts healthcare workers at high risk for injury (Lavender, Conrad, Reichelt, Johnson, & Meyer, 2000). The educational models utilized in nursing programs incorporates the approach of raising the bed to the height of the waist to perform this move (Perry, Potter, & Osterdorf, 2018). Yet, little is known about this movement to verify if this is the safest approach for patient transfer. The purpose of this presentation is to disseminate the results of a study conducted to identify properties of horizontal patient transfer on the healthcare worker's ankles, knees, hips, pelvis, and trunk. A background highlighting the significance of musculoskeletal injury among healthcare workers will be discussed, the theoretical framework and research methodology will be presented, and implications for future studies and the development of equipment will be explored.

Methods

An observational study to identify kinetic and kinematic data for the ankle, knee, hip, pelvis, and trunk during the horizontal transfer of a patient was conducted with seven senior-level nursing students and three licensed EMTs using motion capture and force plate technology.

Participants completed three repetitions of two horizontal push/pull transfer movements: pushing the patient across the bed, and pulling the patient across the bed.

Results

The force exerted on the ankles, knees, and hips were determined with peak values that more than doubled the participants own body weight. The pull motion of the horizontal patient transfer demonstrated 2 distinct movement patterns. While all participants began the motion with their foot in the dorsi-flexed position, or on their toes, to reach the load, some participants generated the movement with a single leg while the other participants used both legs to move the load. It was noted that with increased amounts of dorsi-flexion, there was notably increased moments at the ankle, knee, and hip with peak moments of 86%, 131%, and 159% of body weight respectively. Two movement patterns were also noted for the push portion of the horizontal transfer with participants again beginning with the ankle dorsi-flexed, with some participants generating the movement with both legs ($n=3$) and the other ($n=7$) with the motion generated from one leg. As the dorsi-flexion of the ankle increased beyond 30 degrees, the magnitude of the joint moments increased with peak moments of 96%, 113%, and 156% of body weight for the ankle, knee, and hip.

Discussion

Two different techniques were identified during the horizontal transfer of a patient between a stretcher and a hospital bed. The participants all began both movements with their ankle dorsi-flexed, either extending across the bed to grasp the patient to begin the pull, or to press the patient across the bed in the push. While the technique utilized for the movement, one leg or two, did not appear to have an effect on the peak moment for the movement, the isolation of the force to one side of the body only, could cause uneven loading across the pelvis, thus placing the healthcare worker at a higher risk for musculoskeletal injury.

Force is exerted on all joints of the body when performing the horizontal transfer of a patient from a stretcher to a hospital bed. The dorsiflexion of the ankle gives indication that the greater the level of dorsiflexion, the greater the moment of the ankle, knee, and hip. It would be hypothesized that the moment at the lumbar spine would also be increased consistent with the moment of the lower extremities. It is also hypothesized that for the single leg technique, rotation of the pelvis toward the leg producing the movement will be seen. Further studies are needed to evaluate the horizontal transfer of the patient to compare lifting techniques and develop educational models that reduce the need to dorsiflex the ankle during the movement, and minimize the moment, or loading, of the joints and body segments. While mechanical lifts have indicated a reduction in injury risk in the acute care setting, they are impractical to use in the emergency setting, resulting in this movement being both common, and risky to nursing and EMT workers.

Title:

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Keywords:

Clinical Environments, Healthcare workers and Musculoskeletal injury

References:

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Abstract Summary:

Back injury continues to be a significant problem among healthcare providers. The horizontal transfer of a patient has been shown a risky movement that is frequently practiced. This educational activity will discuss the identified risk factors of this common patient care movement.

Content Outline:

I. Introduction

a. Back injury data

1. Nursing and EMTs are among the most injured occupations
2. Overexertion and bodily reaction are most common cause of musculoskeletal injuries among these professions

b. Current practice

1. The horizontal transfer of a patient is a common movement required in the progression of care for a patient.
2. Current educational models teach to raise the bed up to waist height when moving and transferring the patient.
3. Minimal data is available to the loads on the body of the participant during this patient movement to determine this teaching to be the safest model for the movement.

II. Presentation of research study

a. Methods

1. Motion capture of the angles of the ankle, knee, hip, pelvis, and trunk
2. Force exerted on the ankles, knees, and hips.

b. Results

1. Forces up to one and a half times the body weight of the participant were demonstrated
2. The dorsiflexion of the ankle gave indication of influencing the force exerted on the ankles, knees, and hips.

c. Discussion

1. The need to dorsiflex the ankle (come up on toes) to reach across the bed creates an increase in the force exerted on the ankles, knees, and hips

III. Future directions

a. Educational models

1. research into the method of transfer which reduces the need to dorsiflex the ankle during the movement.

b. Equipment development

1. The engineering of equipment that will allow the minimization of the distance between the participant and the load.

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Professional Experience: 2013 –Present Assistant Professor, Capstone College of Nursing, The University of Alabama, Tuscaloosa, Alabama 2006–2012 Registered Nurse, Trauma- Surgical Intensive Care Unit, DCH Regional Medical Center, Tuscaloosa, Alabama Author or coauthor of multiple publications related to creating and sustaining healthy living, learning, and work environments. Numerous presentations at state, regional, national, and international nursing professional organizations. Past Scholar in the Nurse Faculty Leadership Academy (2016-2017), sponsored by Sigma Theta Tau International and The Elsevier Foundation.

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Professional Experience: I have trained in disaster response with the fire service as a first responder, in Hospital organizations as a responder, and have training from the Department of Homeland Security specific to terrorist response to bombings and nuclear incidents. I have participated in, planned, and evaluated disaster simulations in both arena's over the past 18 years, and have utilized everything from standardized patients to high fidelity simulators.

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