Soft Rollboards

The AliMed® Soft Rollboard has a proven safety performance, and is a fraction of the cost of air-assisted devices

In three out of four categories, the AliMed Soft Rollboard required the least amount of force—as much as 15% less force than air-assisted devices.

Lateral Transfer Data Findings

Peak force when transferring 171 lbs

SHOULDER

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Soft Rollboard	**5.43**	**154.10**	**1**
Air assisted	5.28	177.20	2
Friction-reducing sheet	5.38	183.58	3
Slide board	6.03	180.03	4
Incontinent pad over slide board	5.63	189.04	5
Incontinent pad/draw sheet	9.21	259.22	6

LOW BACK

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Air assisted	5.28	543.73	1
Soft Rollboard	**5.43**	**551.09**	**2**
Friction-reducing sheet	5.38	568.00	3
Slide board	6.03	572.40	4
Incontinent pad over slide board	5.63	613.16	5
Incontinent pad/draw sheet	9.21	703.35	6

Peak force when transferring 223 lbs

SHOULDER

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Soft Rollboard	**5.43**	**199.09**	**1**
Slide board	6.03	208.68	2
Incontinent pad over slide board	5.63	208.87	3
Air assisted	5.28	218.90	4
Friction-reducing sheet	5.38	247.25	5
Incontinent pad/draw sheet	9.21	284.98	6

LOW BACK

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Soft Rollboard	**5.43**	**604.63**	**1**
Air assisted	5.28	615.12	2
Slide board	6.03	618.85	3
Incontinent pad over slide board	5.63	623.83	4
Friction-reducing sheet	5.38	674.87	5
Incontinent pad/draw sheet	9.21	724.76	6

Ranked in order of least (1) to most (6) physically stressful or demanding.

Lateral Transfer Data Report

Principal Investigator: Andrea Baptiste, MA, OT, CIE
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Executive Summary:

Significance
According to the Bureau of Labor Statistics, nursing aides, orderlies, and attendants consistently ranked among the detailed occupations reporting the most cases of workplace injuries and illnesses during the 1995-2004 period. Nursing aides, orderlies, and attendants reported the third highest number of injuries and illnesses in 2004. Only truck drivers (heavy and tractor-trailer) and laborers and material movers (hand) had more cases. A **healthcare patient** was the leading source of injury among nursing, psychiatric, and home health aides, accounting for 59 percent of their injuries from 1995 to 2004. The most recent data available from 2010 BLS data showed the rate of injury in healthcare had risen 4% over 2009 data which specified 7.0%.

The event leading to injury:

Overexertion was the cause of more than half (53%) of work-related injuries and illnesses among nursing, psychiatric, and home health aides from 1995-2004. Most of the cases of overexertion among nursing, psychiatric, and home health aides resulted from lifting patients. Indeed, this group accounted for 65 percent of all such injuries that occurred during the 10-year period.

Reference: Occupational Injuries, Illnesses, and Fatalities among Nursing, Psychiatric, and Home Health Aides, 1995-2004 by Anne B. Hoskins Bureau of Labor Statistics.
The purpose of this analysis is to quantify the workload placed on the caregiver during a lateral transfer using the Rollboard and other types of lateral aids. Since lateral transfers are done at a high frequency and the healthcare patient is the leading source of injury, to better understand and try to minimize this exertion, a biomechanical evaluation was performed. This biomechanical assessment will also help us determine which device is easier on the caregiver's low back and shoulder and which one causes more strain and stress during the lateral transfer.

Methodology
A laboratory analysis was conducted to capture the dynamic biomechanical demands the caregiver experiences during laterally transferring a patient. The technology utilized can provide objective data of what is occurring at each joint of a human subject. The results

collected and reported remain objective due to the intent of the evaluation.

A subject was labeled and motion was tracked in real time, enabling us to look at forces and stresses on the low back. The evaluation was conducted in a laboratory setting using multiple cameras, two different weighted ADTs to represent the average weight and height of a fully dependent patient.

Data Analysis

1. Provide biomechanical data at the low back and shoulder during a lateral transfer of an average and bariatric patient when using the Rollboard.
2. Compare the Rollboard with the following other lateral transfer devices: an incontinent pad/draw sheet (traditional method), a friction reducing device (FRD) sheet type, a slide board, an incontinent pad over slide board and an air assisted device.
3. Calculate the biomechanical stresses on the lower back (L5/S1) and shoulder using a 50^{th} and 95% tile anthropomorphic test dummy (ATD).
4. Rank products in order of least to most physically stressful or demanding.

Design:

This project simulated a commonly performed nursing task in a controlled laboratory setting (a lateral transfer). This task involves the caregiver to logroll the patient to insert the product and then pull the patient over to another surface laterally. The design and testing protocol was set up with rest periods in order to avoid caregiver (subject) fatigue. Two different ADTs were utilized to represent the average weight and height of a fully dependent patient (50^{th} percentile and 95^{th} percentile). Each ADT was log rolled to place the lateral transfer device under it, and then the lateral transfer was performed.
The lighter ADT weighed approximately 171.3 lbs., and represented the 50^{th} percentile patient, while the other ADT weighed 223 lbs. and was representative of 95^{th} percentile patient population. A female who was approximately 5’4” tall and 167 lbs. in weight represented the caregiver.

Assistive Devices:

The assistive devices used in this evaluation included two surfaces, two ADTs, the testing apparatus and the following lateral transfer devices:
1) Incontinent pad/draw sheet-standard method (IC pad)
2) Incontinent pad over slide board
3) Friction Reducing sheet
4) Slide board
5) Rollboard
6) Air-Assisted Lateral Transfer Device

Results:
The analysis focusing on the stresses affecting the low back and the shoulder while using the Rollboard in comparison to other lateral transfer devices proved interesting. Due to the nature of this task, lateral transfers are high risk due to the extended reach, pull force, log roll, weight of patient, and friction of sheets which all result in high forces. Caregivers are at risk of injury from high peak forces through various body segments. The area of concentration presented in the result section is the low back and the shoulder joint since there have been numerous low back and shoulder injuries reported as a result of this task. Our goal was to quantify these factors in an attempt to determine how much risk is involved while using each device. Peak force can be defined as the maximum force developed during a muscle action.
Biomechanical data is as follows with the following products: Incontinent Pad, Incontinent pad over slide board, friction reducing sheet, slide board, Rollboard, and air assisted.

The following tables present peak resultant forces at the low back and shoulder using the 50th and 95th %tile ADT's.

Results:
Table 1: Resultant Peak Force at ***low back*** using a 50th %tile ADT:

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Incontinent Pad/ draw Sheet	9.21	703.35	6
Incontinent Pad over slide Board	5.63	613.16	5
Friction Reducing Sheet	5.38	568.00	3
Slide board	6.03	572.40	4
Rollboard	5.43	551.09	2
Air Assisted	5.28	543.73	1

Table 2: Resultant Peak Force at the ***shoulder*** using a 50th %tile ADT

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Incontinent Pad/ draw Sheet	9.21	259.22	6
Incontinent Pad over slide Board	5.63	189.04	5
Friction Reducing Sheet	5.38	183.58	4
Slide board	6.03	180.03	3
Rollboard	5.43	154.10	1
Air Assisted	2.28	154.10	2

Table 3: Resultant Peak Force at ***low back*** using a 95th %tile ADT:

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Incontinent Pad/ draw Sheet	9.21	724.76	6
Incontinent Pad over slide Board	5.63	623.83	4
Friction Reducing Sheet	5.38	674.87	5
Slide board	6.03	618.85	3
Rollboard	5.43	604.63	1
Air Assisted	2.28	615.12	2

Table 4: Resultant Peak Force at the ***shoulder*** using a 95th %tile ADT

Device	Task Duration (seconds)	Peak Force (Resultant) Newtons	Rank
Incontinent Pad/ draw Sheet	9.21	284.98	6
Incontinent Pad over slide Board	5.63	208.87	3
Friction Reducing Sheet	5.38	247.25	5
Slide board	6.03	208.68	2
Rollboard	5.43	199.09	1
Air Assisted	2.28	218.90	4

Log Roll Techniques:

Part of what makes the lateral transfer task challenging is log rolling the patient to insert the device. Several types of log roll techniques were analyzed to identify forces on the spine. Based on the video on McAuley Medical website, the illustration of logroll placement is to hold at the patient's shoulder and pelvic or hip area to logroll. However, our evaluation shows that there are better techniques to lower the forces to the spine. The technique used to logroll the patient can cause varying degrees of strain on the caregiver's low back and this physical stress in addition to the effort used to transfer the patient all contributes to the total forces exerted throughout the body. The type of lateral transfer device used and the type of logroll used will produce different results on the spine. Therefore, forces at low back can be reduced by changing the method of the log roll as seen by data collected.

Summary:

Based on the results, the analysis indicates that Rollboard ranks first in terms of the least biomechanical loading on the low back when laterally transferring a 95_{th} %tile ADT, and second when laterally transferring a 50_{th} %tile ADT.
The Rollboard also proved to reduce forces at the shoulder joint in comparison to other lateral transfer products. Results display that the Rollboard ranked first in having the lowest peak resultant forces at the shoulder during the lateral transfer of the 50_{th} and 95_{th} %tile ADT's. Time taken to perform the transfer was comparable to using other transfer aids. The nature of the Rollboard is that it has a firm board covered by a tube which rolls easily, thus moving the patient. The benefit of this is that the board offers a firm support surface for the patient during the transfer and the tubular design offers the ability to easily move the patient from one surface to another with a reduction in frictional force. The product's ability to fold is of benefit since storage is always a challenge in most facilities. The Rollboard has proven to be a beneficial solution in reducing the forces on the caregivers' spine during lateral transfers.

It should be noted that the data presented here was attained through biomechanical analysis and findings are objective therefore the ranking of devices is not an endorsement of one product over another.

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