



# Scientific documentation

## Ceiling lifts

### DO ERGONOMIC PRINCIPLES IN PATIENT HANDLING TECHNIQUE HAVE IMPACT ON THE WORK LOAD OF THE HEALTH CARE STAFF?

### WHAT ARE THE DIFFERENCES BETWEEN WORK LOADS, WHEN HANDLING FLOOR LIFTS VS. CEILING LIFTS?

### DOES IMPLEMENTATION OF CEILING LIFTS HAVE IMPACT ON THE RISK FOR HEALTH CARE WORKER INJURIES?

### WHAT IS THE RETURN ON INVESTMENT PERIOD?

#### Physical work load in patient handling

Health care staff should master patient handling techniques as well as techniques related to the principles for working with friction or non-friction devices. If they succeed in that, the work load is optimized (1, 2, 3).

#### The work load when handling floor vs. ceiling lifts

Under manoeuvres with a floor lift the interface between the floor surface and the wheels are significant for the friction forces between wheels and floor. Small wheels on a rough surface make a higher load on the low back than large wheels on hard floor. In all cases ceiling mounted lifts impose significantly smaller loads (4).

#### Reduction of healthcare worker injuries after implementation of ceiling lifts

Several studies show long term effectiveness of use of ceiling lifts in reducing the risk of injury to workers (5, 6, 7). The number of claims, compensation costs, and time loss are shown to decrease after implementation of a ceiling lift program, and continues to decline after the intervention (6, 7).

#### Return on Investment

The implementation of a ceiling lift program may generate economic benefits due to reduced compensation costs within 3 years of intervention (6).

#### Conclusion

The rapid economic gain and sustained reduction in the frequency and cost of patient handling injuries strongly advocate for ceiling lift programs as an intervention strategy (6).

#### References

1. Skotte JH, Essendrop M, Hansen AF, Schibye B. A dynamic 3D biomechanical evaluation of the load on the low back during different patient-handling tasks. *J Biomech* 2002; 35:1357-1366.
2. Schibye B, Hansen AF, Hye-Knudsen CT, et al. Biomechanical analysis of the effect of changing patient-handling technique. *Appl Ergon* 2003; 34:115-123.
3. Skotte JH and N. Fallentin. Low back injury risk during repositioning of patients in bed: the influence of handling technique, patient weight and disability. *Ergonomics*, Vol. 51, No. 7, July 2008, 1042-1052.
4. Marras WS, Knapik GG and Ferguson S. Lumbar spine forces during manoeuvring of ceiling-based and floor-based patient transfer devices. *Ergonomics*, vol. 52, No. 3, March 2009, 384-397
5. Andersen LL, Burdorf A, Fallentin N, et al. Patient transfers and assistive devices: prospective cohort study on the risk for occupational back injury among healthcare workers. *Scandinavian Journal of Work Environment & Health* 2014; 40(1):74-81
6. Chhokar R, Engst C, Miller A, et al. The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries. *Appl. Erg.* 36 (2005) 223-229.
7. Miller A, Engst C, Tate RB, et al. Evaluation of the effectiveness of portable ceiling lifts in a new long-term care facility. *Appl Erg* 37 (2006) 377-385.

Contact by phone:  
+1-800-664-8834 or mail:  
[info@guldmann.net](mailto:info@guldmann.net)  
[www.guldmann.net](http://www.guldmann.net)

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