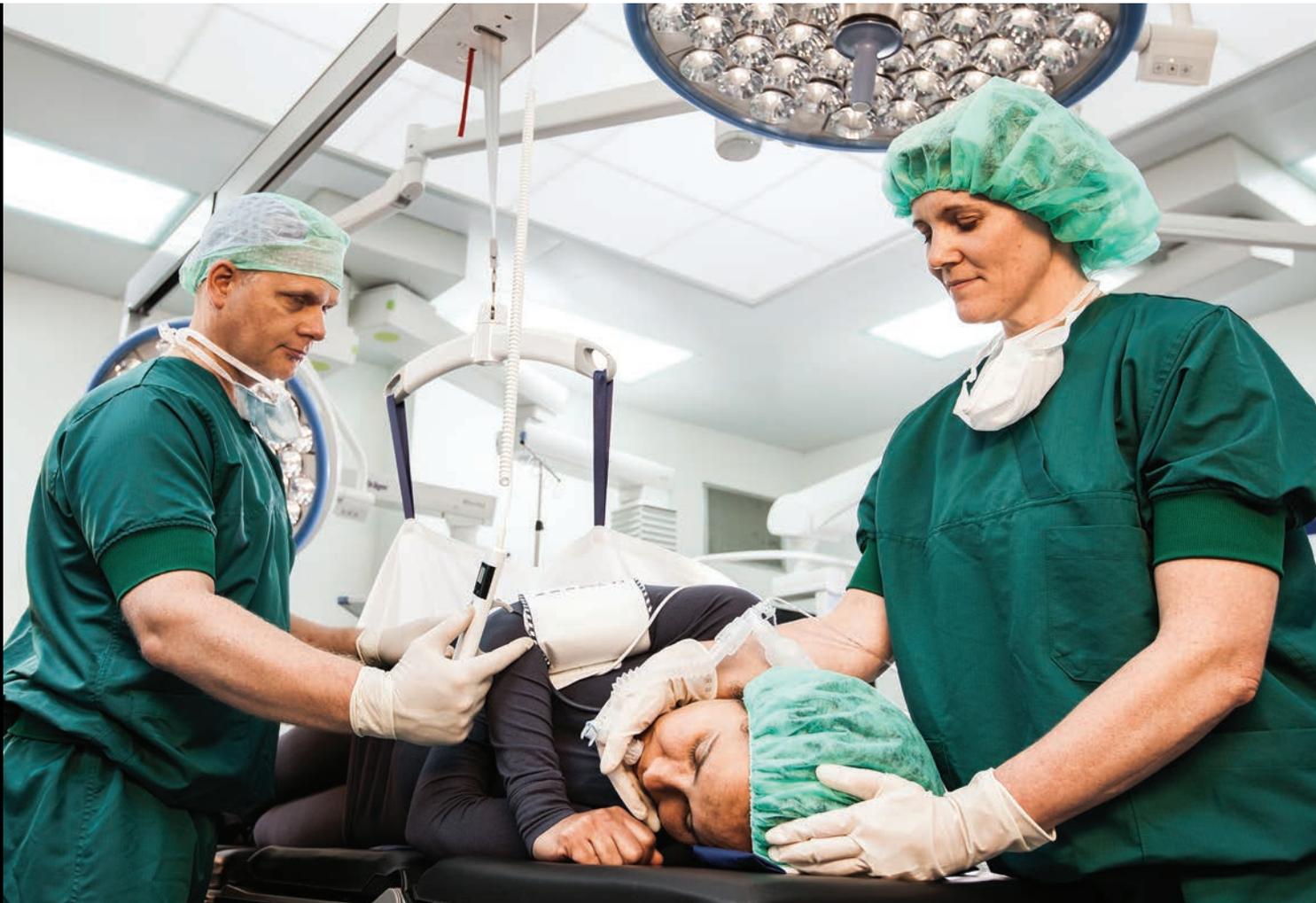




3 Good Reasons to Implement Ceiling Hoist in OR

The Case for Using Overhead Hoists in the Perioperative Areas



Background

Over the years we have learned by personal experience how complex and dynamic the operating room and perioperative care areas are. It is clear that the staff's attention in such care areas is focused on highly technical functions, such as surgical procedures, anesthesia, hygiene and technical equipment, rather than on work techniques when positioning or assisting dependent patients and body parts.

Staff members position, move and handle the patients manually. We have learned that such manual methods have been in use for many decades with little variation. Given the rapidity of technological innovation in healthcare, should we not consider the important care tasks related to patient positioning and handling as due for improved methods as well?

By Guldmann Consulting



The justification and recommendations for such improved methods will be addressed through three themes:

- 1. PATIENT SECURITY**
- 2. WORKING ENVIRONMENT FOR THE STAFF MEMBERS**
- 3. ORGANIZATIONAL AND FINANCIAL ISSUES**

1. PATIENT SECURITY

One of the main reasons for pressure sores among patients are exposure to shear forces⁷⁾. Shear force is the pulling forces against and among the different layers of skin. Shear forces are created when friction occurs between the skin of the patient and the surface, e.g. during manual pushing, pulling or incomplete lifting of the patient. Furthermore, time constraints and demands, under which the perioperative departments' caregivers often work, can be fast and therefore may lead to errors and rushed techniques. This may result in an increase in the risk for the staff to unintentionally and accidentally injure patients and have near misses when utilizing manual only methods of positioning assistance.

2. WORKING ENVIRONMENT FOR THE STAFF MEMBERS

Worldwide, you see the same pattern. Musculoskeletal injuries among staff members in the healthcare sector are frequent and are severe compared with workers in other sectors/industries. The main reason for this is the physical working conditions. Manual patient handling techniques create high loads on the healthcare worker. A research program at the National Research Center for Working Environment, Denmark, shows that manual handling of patients often results in a low back load exceeding the maximum acceptable limit of 3400 Newton²⁾. This may result in a high risk of physical deterioration. Characteristic for injuries related to manual handling of patients, is a high level of complexity and very often these injuries result in prolonged sick leaves. A low back load/ compressive disc pressure higher than 3400 Newton can create microscopic vertebral endplate fractures. Considering the repetitive and cumulative nature of perioperative staff members' manual work methods, there is a significant exposure and potential lifetime work prevalence of such damage. Because the vertebral endplates are avascular and do not have nociceptors, cumulative healed micro fractures create scarring limiting the perfusion of nutrients to the vertebral disc; further, one doesn't feel discomfort associated from such microfractures until the associated spine anatomy is negatively affected, such as muscle, ligament, disc and nerve. Such musculoskeletal damage is exceedingly difficult to remediate and is better to be prevented³⁾.

Another issue for the perioperative working environment is the topic of space. Much equipment is floor based, which challenges and competes for available work space for nurses and doctors to stand and move within. We have seen some floor based lifting equipment of variable quality which, on one hand helped with some of the lifting processes, but on the other hand caused crowding, resulting in limited floor space.

3. ORGANIZATIONAL AND FINANCIAL ISSUES

In the absence of proper lifting and handling technology, manual methods require more staff members to move and position patients. It also requires more time, due to the delays in waiting for colleagues, to be available for assistance. We have been involved in a manual handling situation with a bariatric OR patient which involved 11 staff members for almost one hour. When needing to turn and position persons into prone, it often requires 4-6 staff members to accomplish this task in an anaesthetized patient. Further consider how many staff members it takes to manually move perioperative, critical care, and emergency or trauma patients between departments. It is not an optimal use of staff resources.

Implementation of ceiling hoists in the perioperative department care sector can address the challenges which have been presented.

Patient security

Using a ceiling hoist and the connected sling system will significantly reduce the patient exposure to skin shear forces during patient handling situations as the patient's skin can achieve full separation from surfaces. Use of an overhead lift and sling will ensure the patient will be handled and lifted symmetrically and the technology devices are not prone to human fatigue. Such benefits will significantly reduce the risk of accidents and near misses with patient injuries.

Working environment for the staff members

Use of a ceiling hoist compared to a floor lift will lead to a reduction in the numbers of manually heavy and dangerous lifting situations. In 2009, Marras and colleagues concluded that the use of floor lifts in confined spaces and when turning is required, created risky antero-posterior shear forces on the spine, in comparison to same tasks being performed with a ceiling lift⁴⁾. A key principle of ergonomic management is to select the most appropriate engineering controls and optimize work tools. The consequence is a reduction

of the numbers of injuries⁵⁾ among the staff members leading to fewer days of sick leave. Implementation of an overhead hoist system will create more space on the floor. A full room-covering hoist system furthermore gives you the opportunity to cover the potential functional space of the whole OR room.

Organizational and financial issues

Utilizing overhead hoist technology, will give better opportunities for your employees to utilize their time more efficiently. An example could be prone positioning. Instead of 4-7 staff members for prone positioning you can reduce the need of staff members by about 50% (or 2-3 persons) with a ceiling hoist and a special sling system. This complicated process can thereby be handled effectively with fewer staff members and at the same time reduce the injury risk for patients and caregivers. The investment toward overhead hoist technology does result in reducing expenses associated with managing caregivers' musculoskeletal injuries, time away from work due to injury and need to replace injured staff. This will have an economically beneficial effect on the department's resources^{5,6)}.

Situations where use of overhead hoist is beneficial in the perioperative care departments:

- Repositioning towards head or feet
- Prone positioning
- Sidelying positioning and maintaining the position
- Lifting of torso (i.e. with positioning with torso bolsters)
- Lifting / holding of extremities – upper or lower
- Lifting patient from bed to OR table and return transfer
- Lifting of pelvis
- Lifting up legs after a spinal sedation (e.g. patient sitting on the edge of OR table)
- General handling / lifting of bariatric patients



“What are the barriers?”

In considering changes to the perioperative care areas by installing overhead hoists, there are commonly expressed concerns or barriers. The rationale to address these concerns is as follows:

- **“We don't have enough space in the ceiling”** – In most cases it's possible to find the needed space in the ceiling (also in an OR department)
- **“It takes too much time”** – You will win more time to care. There is widespread perception and Alamgir in 2007 found that manual patient handling tasks are completed faster compared to methods utilizing an overhead hoist and sling⁷⁾. However, according to Mechan, 2014, task times for handling in non-perioperative environments utilizing overhead hoist and sling technology are competitive and do not necessarily require more time to complete⁸⁾. Furthermore, there is little literature which measures time to complete and standardizes manual handling and transfer methods to support the perception that newer methods

would be comparatively too long. Evaluating task time efficiency with overhead hoist technology is a worthwhile topic to explore.

- **“It's too expensive”** – The return on investment in cases with ceiling hoist range from 2-4 years depending on the type of implementation⁹⁾. All objective research on the result of implementing patient handling technology shows very positive effects.
- **“What about the hygiene and infection control issues”** – With a full room covering system you will have neither rails nor hoists above the patient during surgical procedure. The hoist can be parked away from the sterile field in an area designated by caregivers. Furthermore the experience from OR departments with ceiling mounted hoist systems have given no negative feedback regarding the hygiene issue⁹⁾.
- **“This is not how we normally will handle this”** – While past performance and historical experience is relevant to consider in deciding how to handle present and future care decisions, it should not be the only



strategy by which to decide how to handle care delivery. Change is often necessary and can produce positive results.

- **“It will disturb the air flow”**
– A systematic literature study⁹⁾ indicates moderate evidence that, using laminar air flow, the linear filtered air streams are perturbed by colliding with, for example, surgical lamps and people, and that this may result in increasing the number of bacteria-carrying particles in the surgical field. However, no studies have yet confirmed any association between ventilation with ultraclean air versus less pure air and the incidence of deep infection after surgery. The overall conclusion therefore is that overhead hoists should not be considered an independent risk factor for infections after surgery.
- **“I am unsure what overhead hoists can do in the perioperative environment”** – The prevalence of overhead hoists in the perioperative environment is low, as is the discussion in literature and in professional conferences and discussion groups. Increased awareness efforts can assist in providing perioperative professionals access to information on benefits of overhead hoists and improve the chance that safety technology, such as overhead hoists, will be considered for patient handling needs.

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Future perspective

Gazing into a crystal ball, it is likely that 10 years from now you will find many operation theatres with ceiling hoists as standard equipment. We are confident that they will probably use these systems for many more tasks than those mentioned in this article. In the future, we are sure, that perioperative OR areas will be hospital departments not

only specialized in surgery and anaesthesiology, but also with a high level of patient and handling security, working environment and optimal utilization of the staff members' resources. The final outcome of this development will be perioperative (OR) departments with more time to care.