

# Protocol for Safe Use of Patient Handling Slings - Does One Size Fit All?

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**L**ifting and handling of patients during the course of an 8-12 hour shift entails a host of skills complicated by factors such as an aging RN workforce, nursing shortages in hospitals, higher patient acuity level, an increasing prevalence of obese patients, and limited work space within patient rooms. Every manual lifting/repositioning/transferring task is unique and physically challenging for the healthcare provider, so it is not surprising that injury and illness statistics report that nurses are ranked sixth among any profession within the United States as having the highest number of strains and sprains within the workplace (Bureau of Labor Statistics, 2002). Back injuries cost between \$24 billion and \$64 billion dollars annually in direct and indirect costs, of which up to \$20 billion dollars is attributed to the health care industry (Fragala, 1992; Fragala, 1993; Garrett, Singiser, & Banks, 1992; Williamson, Turner, Brown, Newman, & Sirles, 1988).

Within the past few years, there has been an increase in evidence-based documentation suggesting that use of mechanical lifts and other patient handling devices within U.S. hospitals and long term care facilities has a significant impact in reducing lifting-related musculoskeletal injuries among healthcare providers, particularly nursing personnel (Fragala, 1996; Fragala & Santamaria, 1997; Nelson & Baptiste, 2004). In addition to employer efforts to reduce and/or eliminate patient handling incidents, other entities driving our “culture change” regarding manual handling practices are evidenced by professional organization activities such as the American Nurses Association’s *Handle With Care* campaign, and regulatory standards such as those introduced in the United Kingdom and in the United States (American Nurses Association (ANA), 2004; Evanoff, Wolf, Aton, Canos, & Collins, 2003; Ronald, Yassi, Spiegel, Tate, Tait, & Mozel, 2002; Health & Safety Executive (HSE), 1992; Occupational Safety & Health Administration OSHA, 2004).

Although the hazards of manually lifting in healthcare are well-covered in the literature few articles have focused on sling design, selection criteria, or its application in providing care to patients with varying medical conditions. New technology introduces the potential for new and different errors and slings are no exception. (Hignett, 2003; OSHA, 2004, Nelson, Lloyd, Menzel, & Gross, 2003; Battles & Reyes, 2002). Nelson and colleagues found that the correct operation of all patient handling equipment is not intuitively obvious to staff and that staff have found some attachment mechanisms significantly more stressful than others to use (Nelson, Lloyd, Gross & Menzel, 2001). Serious adverse events to patients, caregivers, or others following use of a hoist and sling are typically attributed to one or more of the following factors: (1) Incorrect selection of equipment, (2) Lack of/improper patient assessment, (3) Malfunctioning and/or damaged slings/sling attachments/lift, (4) Insufficient user training, and (5) Incompatibility of sling and hoist. (Ali, & Glenister, 2001).

The purpose of this article is to acquaint the reader with a brief overview of types and uses of slings and to provide safety and comfort suggestions for choosing the optimal sling based on the patient’s condition. It is important for the reader to understand that slings are not functional without a mechanical lift and that it is important to use a sling and lift from the same manufacturer to maintain a safe patient transfer.

## Sling Definition

An operational definition of a patient care sling is a fabric device that is used with mechanical lifting equipment to temporarily lift or suspend a body or body part in order to perform a patient handling task (VA Patient Safety Research Center, 2005). For the purpose of this article, the term *lift-*

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**ing** refers to a procedure used by the nurse or clinician to lift or carry the patient's full body weight or extremity upwards before moving downward or horizontally (Coleman, 1999). **Transfer** refers to a procedure used to move a patient from one surface, or position, to another, and **repositioning** is used to adjust a patient's position on the same surface. (Health Care Health and Safety Association of Ontario (HCHSA), 2000). Patients may or may not be able to assist with transfers and/or repositioning, depending on their diagnosis and current medical status.

In keeping with other technological advances, patient handling slings have greatly improved. Early versions of slings were made from ship's canvas and recycled fire hoses (Grant, 1961). Today, slings are made from light, durable materials such as washable nylon, polyester, or even materials which may be disposed of following single patient use. A one-piece sling is standard and some slings have plastic stays at one end to offer more head support (Simonton, K. & Wilcox, D., 1999). Slings can be categorized into these five types: (1) seated, (2) standing, (3) supine or stretcher, (4) ambulation, and (5) limb support slings. Development of limb support slings has not been addressed as fully by manufacturers as other types of slings, although prototypes have been used in other countries to suspend an extremity for prolonged periods while performing prolonged treatment tasks such as dressing changes. (National Back Pain Association (NBPA), 1998, & Royal College of Nursing (RCN), 1998).

## Sling Types

### Sitting Slings

A seated sling is used when a patient is not physically able to assist with transfers, is unable to understand simple directions, is unable to bear weight on at least one extremity; or is unable to maintain upper trunk stability while in a seated position. Typically, the seated sling is styled from a single hammock-like rectangular piece of fabric but may also be a U-shaped piece of fabric with a divided leg section. There are advantages to both styles depending on an individual's condition. For example, split-leg slings are easily applied to the patient while he/she is sitting or lying. Additionally, having divided leg straps enables the patient's legs to be supported in an adducted or abducted position (NBPA, 1998; RCN, 1998). Seated slings are available with or without head support. Head

support is an added feature that is important to consider because almost all slings for seated transfers give a backward, semi-inclined body position during the transfer (Mutch, 2004; HCHSA, 2000). For orthopedic patients, some seated slings may result in a trunk-to-thigh angle of more than 90 degrees, which is a problem for patients with hip pain, reduced hip flexion, and/or hip replacement surgery. For patients who may experience respiratory distress, placement of the patient at least 45 degrees upright is suggested to maximize lung function, offer better respiratory mechanics, and increase patient comfort (Burns, Egloff, & Ryan, 1994; Edlund, Harms-Ringdahl, & Ekholm, 1998). In selecting a sling for a bilateral amputee, cautionary measures should be taken due to the amputee's altered center of gravity. If the amputee patient is placed into a standard sling there is an increased likelihood that the residual stump may slip through the leg opening. To avoid potential slippage of the stump and prevent forward loss of balance, an amputee sling should be used along with a lift that tilts or reclines the patient to maximize comfort (ARJO/Diligent, 2005).



Standard Sling



Amputee Sling

### Stand-Assist Sling

Powered stand-assist lifts typically use a narrow one-piece band sling designed to fit under the arms and around the back of the patient, at about waist level, to assist with standing for transfers, repositioning in chairs, or for rehabilitative therapy. When considering rehabilitation tasks such as a patient's initial standing/weight-bearing session, therapists may prefer a harness-type of standing sling to ensure both patient safety and comfort in very weak patients and to avoid excessive staff lifting. Harness-style slings are placed on the patient similar to a vest or parachute harness and can be used with some floor or ceiling lifts as well as specialized, mobile, free-standing lifts (NBPA, 1998; RCN, 1998) The harness-style sling is predominately used while a patient is receiving rehabilitation such as gait training, balance/ambulation practice, or sit to stand transfer practice. Patients using stand-assist lifts should be alert, cooperative, able to bear some weight on at least one leg and one arm, and able to understand and follow simple commands (Mutch, 2004; Nelson, et



Sit to Stand Sling

al., 2003). When using a stand-assist sling, it is important that the nurse or therapist not position the sling directly underneath the patient's armpits and that any flaccid extremities be stabilized and/or supported during the standing to avoid painful subluxation of the shoulder joint (NBPA, 1998; RCN, 1998).



*Walking Sling*

### ***Supine or Stretcher Sling***

Supine or stretcher full-body slings are used to provide full body support for patients who are highly dependent or for post-mortem transfers. Typically tasks involving stretcher slings include transferring out of bed to a gurney/stretcher, making an occupied bed, repositioning a patient in bed, and fall rescues (Nelson, Owen, Lloyd, Fragala, Matz, Amato, Bowers, Moss-Cureton, Ramsey & Lentz, 2003). The patient is usually unable to provide any assistance with the lift or transfer, or must remain supine for medical reasons. There are three types of supine slings: soft supine slings, strap slings, and scoop slings. There are also specialized rigid stretcher slings for use in hydrotherapy. The type of supine sling selected will depend upon the needs of the healthcare provider. For example, the strap stretcher may be found in intensive care and orthopedic units where it is useful in changing bed linen and allows easier accessibility to wounds for dressing changes.

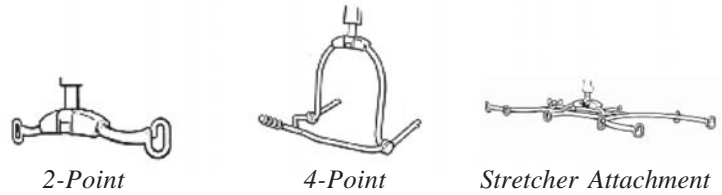


*Stretcher Sling*

## **ADDITIONAL SLING FEATURES**

### **Spreader Bar Design**

There are a variety of spreader bars with 2-point, 4-point, or 6-point suspension available on the market. Spreader bar design choice is vital to patient safety because the spreader bar/ sling combination determines the degree/angle of the patient during the lift and therefore the patient's safety and comfort (Edlund, et al., 1998). Literature suggests that an increase in number of attachments is positively correlated to an increase in patient comfort in the sling (NPBA, 1998; RCN, 1998). It is strongly advised NOT to "mix and match" products from different manufacturers. Attachments for most slings are either loop or clip in nature. Loop or clip sling-attachments may be incompatible from one manufacturer to another, creating the risk of equipment failure and voiding warranties. It is strongly recommended that clinicians or product



management supervisors contact specific manufacturers to discuss any problems and concerns they have about matching appropriate slings and spreader bars (Ali & Glenister, 2001). Some would suggest that the benefits of using clips versus loops is that clips minimize "swing and sway" of your patient while they are positioned in the sling (McGuire, Moody, Hanson, & Tigar, 1996)

### **Sling Markings**

Each sling should be clearly labeled to identify size, safe maximum weight capacity in pounds and kilograms, and laundry instructions (NBPA, 1998; RCN, 1998). If a sling becomes worn to the extent that information is difficult to read on the label, there is a chance that the sling fabric may be worn enough to be compromised, creating a safety risk. Nursing staff should have a policy that includes criteria that will assist staff with identification of worn slings for disposal, and a method for replacing worn slings with functional ones free of undue signs of wear that still retain an attached, legible label.

## **PATIENT CONSIDERATIONS**

To promote caregiver safety and patient mobility, the caregiver should conduct a patient lift assessment every time a lift is performed. This should include consideration of the patient's mental and physical acuity. A patient lift assessment can be "formal" or "informal". Formal assessments may include documentation on a patient's plan of care, use of algorithms, and/or visual display of icons designating lift-status in the patient's room. Informal assessments may include verbal exchange of information among staff, as well as staff-patient interchanges, prior to every lift or transfer, and prior to shift change. It is important to include patient feedback regarding comfort and experiences during lifts in any assessment. Regardless of the assessment procedure selected, it should be simple and easy to use. Staff should have the flexibility and responsibility to apply, modify, or adapt their assessments to situations as they unfold (Blamire, 1995).

Some healthcare providers have reported that their sling selection consists of placing the sling alongside the patient to make a visual determination and "best guess" as to which sling is the best fit. This is not the most reliable method for ensuring proper fit and there have been numerous advisories and warnings reported through oversight agencies such as

the Food and Drug Administration and Health Canada alerting health care professionals of the dangers resulting from improper using and/or application of slings. ([http://www.hc-sc.gc.ca/dhp-mps/alt\\_formats/hpfb-dgpsa/pdf/medeff/patient\\_lifts-level\\_109\\_nth-ah\\_e.pdf](http://www.hc-sc.gc.ca/dhp-mps/alt_formats/hpfb-dgpsa/pdf/medeff/patient_lifts-level_109_nth-ah_e.pdf))



*Sling Sizing Tape Measure*

To better assist healthcare providers in sling selection and fitting, some manufacturers provide charts and other guidelines for determining the appropriate size sling (e.g. use of measuring tapes). Figure 6. For example, some patients are long-legged and short-waisted, while others may be short-legged and long-waisted. If a sling is too short under the leg portion, the patient may feel like he/she is slipping through the sling. If the patient's thighs are very large, a split sling may add comfort by reducing the possibility of pinching. Patients surveyed indicated a comfort preference for supine lifts, but a supine position may not be advisable for some patients especially those with respiratory distress, airway, or swallowing problems (Jacobs, 1994; Ronald, Yassi, Spriegel, Tate, Tact, & Mozel, 2002). When considering patient size, it is essential that the safe working loads for both lift and sling are not exceeded. To determine the safe working load of most lifts and slings, healthcare providers can refer to the label located on the lift and sling, or consult the manufacturers' operating manual. If loads are not clearly labeled on all equipment, the healthcare provider should remove equipment from use until safe working load-limits are identified, properly labeled on the equipment, and properly communicated to all caregivers.

### Infection Control Guidelines for Sling Use

Sling shortages and the custom of sharing of hoists, fabric slings, low friction slides, sliding sheets, and turning aids between patients have been determined to be problematic for most healthcare environments, particularly in view of the rising statistics on drug-resistant organisms and nosocomial infections (Weiss & McMichael, 2004). Health care providers bear the responsibility for preventing adverse events including iatrogenic infections. Standard infection prevention precautions, especially hand washing, and equipment sterilization/disinfection procedures can control and eliminate many of the iatrogenic infections within healthcare facilities (Tilton, 2002). The costs of iatrogenic infections (those acquired after hospital admission or associated with health care) are high for hospitals and patients. Infection-related adverse events affect approximately 2 million patients each year in the United States, result in some 90,000 deaths, and add an estimated \$4.5 to \$5.7 billion per year to the costs of patient care (Burke,

2003). A study in England and Wales estimated the cost at over 110 million pounds per year (Chapman, et al., 1993). The authors suggest that the cost of providing sufficient slings would be far less than the potential cost of iatrogenic infections.

Inadequate decontamination of staff and equipment, including slings, has been an acknowledged source of actual and potential outbreaks of infection in hospitals, including infections caused by antibiotic-resistant organisms (Cefai, Richards, Gould, & McPeake, 1990; Flynn, 1999; Jones, 1992; Kolmos, Thuesen, Nielsen, Lohmann, Kristoffersen, & Rosd, 1993). In a multi-site study, Barnett and colleagues found patient handling slings employed on a multi-patient basis were inadequately cleaned between patients and demonstrated a source of methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* cross contamination (Barnett, Thomlinson, Perry, Marshall, & MacGowan, 1999).

### **Recommendations for Infection Control in Sling Use**

Research available on cross contamination from the shared use of moving and handling equipment suggests the following guidelines to users of lifts and slings for the prevention of contamination:

- (1) Assign each patient their own sling to be stored within their room
- (2) Launder or disinfect fabric slings and/or discard disposable slings that are soiled, damaged or suspected of being contaminated. Effective disinfection is determined by both the manufacturer and facilities' Infection Control Departments. It has been observed in practice that many laundering processes (both onsite and vendor assigned) have drying temperatures too high for the materials used in slings, causing distortion of the sling's original shape, thereby affecting sizing (Boden, 1999).
- (3) Hand washing is essential for staff following each patient contact and after handling slings and other patient equipment that have come in contact with patient skin, body fluids, and bedding, whether the equipment and slings appeared soiled or not.
- (4) Store clean slings in a central location for ease of staff accessibility.
- (5) Provide sufficient supply of fabric slings.
- (6) Ensure users receive adequate training about cleaning and laundering instructions of contaminated slings.
- (7) Consider onsite laundering process for quick turnover of clean slings and to reduce equipment loss. (Boden, 1999a; Boden, 1999b; Barnett, Thomlinson, Perry, Marshall, & MacGowan, 1999).

## Clinical Presentation and Suggested Sling Style

Contrary to belief, mechanical hoist and slings may be used when working with patients who have “complex” medical conditions. The following chart addresses issues that should be considered with patient handling tasks involving complex patients but should not be considered all inclusive. Healthcare providers are encouraged to consult with team members, including but not limited to nursing, medical, and/or rehabilitative staff, to assist in problem solving and selecting a method that ensures comfort and safety for both staff and patient as well as maintains a patient’s level of mobility. **See Table 1.**

## Summary

There are no single approaches and/or answers when selecting a sling to be used with a mechanical lift. One size does not fit all! Each situation will need to be evaluated separately each and every time a transfer is planned and implemented. **See Table 2.** The good news is that there are tools available for healthcare providers so that frequent manual handling becomes the “exception” rather than the “norm” of doing transfer/repositioning and lifting tasks.

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**Table 1: Medical Conditions Affecting Sling Choice**

Clinical Presentation	Sling Type				Considerations
	Sit	Stand	Supine	Specialty Slings	
Abdominal Wounds	(*)	X	X		Seated slings may be contraindicated for pts. with increased intra-abdominal pressure and/or abdominal bleeding
Amputee (Unilateral Leg)	X	X (*)	X	Amputee Sling	High, above-knee amputation patients should use single amputee seated sling designed to support the stump and buttocks.  *For stand-assist activities, lower extremity amputee patients must be able to place weight on the unaffected side to support standing position.
Amputee (Bilateral Leg)	X (*)	X (*)	X	Amputee Sling	*An amputee-style sling is recommended for seated transfers to support the stumps & buttocks & prevent the patient from falling through sling due to changes in patient’s center of gravity. Standard seated slings may also be more difficult to remove while patient is seated.  *Parachute-type standing harnesses are <u>not</u> recommended for hip disarticulation patients and must be used with caution during gait training of bilateral, high; above-knee amputee patients to prevent the patient from slipping out of the harness should their prosthesis slip off.
Bariatrics	X (*)	X (*)	X (*)	Weight capacity of bariatric size sling	*Specific bariatric hoists, slings, & stretchers must be used.  *Most bariatric patients cannot tolerate the supine position. To avoid respiratory distress, keep the head at 45 degrees.
Burns	X	X	X	Limb Support Sling  Disposable Sling	Avoid shearing, friction, & pressure over burns, donor sites, & fresh scars. Major burns of the torso or buttocks/genitals will be more comfortable in supine slings.  Consider wounds & neurovascular status when using limb support slings during dressing changes & patient care. Monitor comfort & circulation during use.  Disposable slings may be useful for burn patients.
Contractures/ Spasms	(*)		X		*Custom-designed slings are available to accommodate the changes in center of gravity in patients with extreme contractures.
Fall Recovery	X (*)		X		*Assess for breathing, fractures/dislocations first. Take spinal precautions as needed. Use seated sling only if no fractures or spinal injuries are evident. When in doubt, use a supine sling.
Fractures	X (*)	X (*)	X	Seated sling with head support	Consider stability and location of fractured body part. Sling should <u>not</u> add pressure or torque to any fracture site.  *Do <u>not</u> use seated slings with unhealed thoracic or lumbar spine,

Table 1: Medical Conditions Affecting Sling Choice

Clinical Presentation	Sling Type				Considerations
	Sit	Stand	Supine	Specialty Slings	
					<p>pelvis, or femur fractures. Seated slings may be used with cervical spine fractures if the neck is stable or fixed (egg, Halo fixation).</p> <p>*Seated slings may be used with caution for patients with acute distal limb fractures if an additional caregiver provides support to stabilize the affected fractured limb during the transfer.</p> <p>*Patients with acute total hip replacements, hip or pelvic fracture should <u>not</u> use parachute-type walking harnesses.</p> <p>*To use a standing sling, the patient must be able to distribute weight to the unaffected leg.</p>
Hemiplegia	X (*)	X (*)	X		<p>*Flaccid upper extremity must be supported to avoid subluxation of affected shoulder joint, particularly in a seated or stand-assist sling.</p> <p>*Use caution if the patient lacks trunk control. The standing sling may be used to help stimulate trunk tone but to use a standing device, the patient must be able to distribute weight on unaffected side.</p>
Ostomy patients	X (*)	X (*)	X		*Avoid disruption/pressure over ostomy sites when using seated & standing slings.
Paraplegic	X (*)		X	Toileting Sling	<p>Monitor skin to avoid maceration &amp; pressure sores. Patients using toileting slings must have trunk stability.</p> <p>*Do <u>not</u> use a seated sling for acute spine injuries.</p>
Post-mortem care			X	Disposable slings	Supine, disposable sling is recommended for post mortem patients.
Postural Hypotension	X	X	X		<p>Change positions slowly. If possible, prepare patient by raising the head of the patient's bed before lifting the patient.</p> <p>Monitor vitals closely during transfer. This is a significant problem, initially, for joint replacement patients.</p>
Presence of Tubes	X (*)	X (*)	X		Avoid sling interference with tube placement particularly in seated or stand-assist slings.
Pressure Ulcers	X	X	X		Avoid friction, shearing, & pressure against pressure ulcer sites.
Quadriplegic	X (*)		X	Seated sling w/ head support	<p>*Do <u>not</u> use a seated sling for acute spinal injuries. Seated sling use is ok with remote injuries but</p> <p>The patient's neck/head must be supported. Do not allow sling to interfere with halo fixation.</p> <p>Avoid shearing and pressure over bony prominences &amp; existing pressure sores. Monitor skin to avoid maceration &amp; pressure sores.</p>
Respiratory	X	X	(*)		Keep head elevated during

Clinical Presentation	Sling Type				Considerations
	Sit	Stand	Supine	Specialty Slings	
Distress					transfer.
Total Hip Replacement (THR)		X (*)	X (*)	Bilateral Amputee or Unilateral Amputee Sling	<p>A THR patient is at high risk for dislocation. Knowledge of hip replacement surgical approach &amp; post-operative hip precautions is essential. *Do NOT use a parachute-style stand-assist sling with acute THR.</p> <p>*In general, do <u>not</u> use a seated sling with acute hip THR patients. Avoid adduction/rotation of hips &amp; hip flexion past 90 degrees and Use hip abductor splint or pillows to maintain hip/leg abduction alignment during <u>any</u> transfer.</p> <p>For patients with remote THR, amputee style slings provide more support to buttocks.</p> <p>To avoid increased risk of skin maceration, limit sling use under the patient to a short period of time.</p>
Total Knee Replacement (TKR)	X (*)	X (*)	X		<p>During transfers by seated sling, avoid unsupported knee flexion of fresh post-op surgical limb(s).</p> <p>*For acute post-operative TKR patients, an additional caregiver is helpful to provide support under the affected limb if a seated sling is used for transfers.</p> <p>*For standing sling use, the pt. must be able to distribute weight to unaffected leg.</p>
Severe Osteoporosis			X		Seated slings are <u>not</u> recommended due to stress on the spine and hips.
Splints/Traction/External Fixation Devices	X	X	X		Make sure involved areas are well supported during the transfer & be cautious of getting sling straps angled with external fixation devices.
Unstable Spine			X		Maintain spine alignment on rigid surface. Do <u>not</u> use a seated sling due to stress on the spine.

Legend: X=May use this type of sling

(\*)=Use with caution in some circumstances--See Considerations column in this Table.

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Table 2: Sling Do's and Don'ts

DO	DON'T
Do patients lift assessment to determine most appropriate sling to be used with mechanical lift.	Do not share slings without adequate decontamination between patient uses.
Do inspect slings for wear and tear, loose parts, etc.	Do not use sling with damaged or worn parts.
Do review manufacturers instructions for proper application of sling	Do not remove sling label.
Discard slings that do not have legible label.	Do not leave patient unattended in a sling.
Do ensure that all users of slings and mechanical lifts receive proper education and training.	Do not apply shearing force during removal and/or placement of sling.
Do ensure that sling provides support and	Do not interchange sling and mechanical

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