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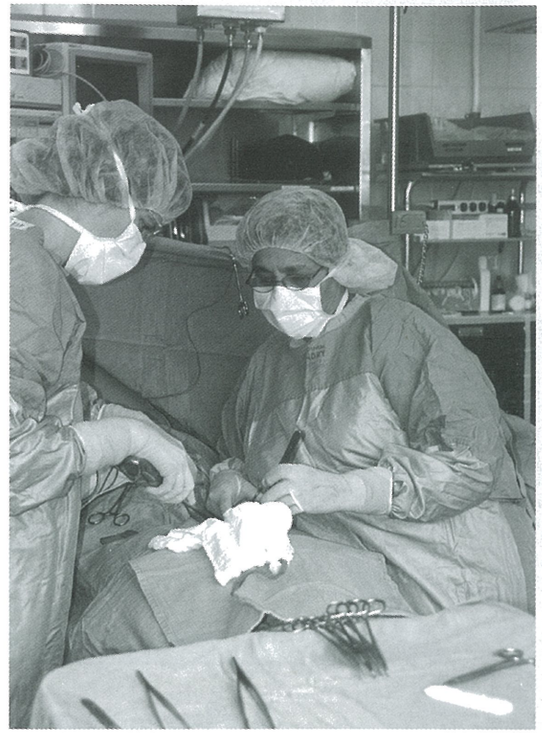
OH MY, THE PRESSURE!

ABSTRACT

The intraoperative phase of a surgical patient's hospital stay has been overlooked as a major contributor of pressure ulcers that may arise postoperatively. Pressure ulcers are defined and then the hazards, underlying knowledge, and prevention tactics are reviewed. Bed sore, decubitous ulcer, pressure sore, and pressure ulcer are different terms describing the same problem encountered by medical and surgical patients. The common denominator is pressure — sustained pressure.

Author
Margaret Farley RN, CPN(C),
Perioperative Registered Nurse,
Regina Health District
ORNAC Executive Secretary
& www.ornac.ca Webmonitor



Patient's arm, on the armboard, receives pressure

OH MY, THE PRESSURE!

Effective patient positioning to avoid intraoperative injury has become a major issue for surgical suites worldwide. It is especially challenging in prolonged surgical procedures. As we increase our knowledge and our ability to do more complex surgeries, so do we increase the risk of perioperative surgical complications. Although we cannot alter the length of surgery or the position required for our patients, we can continually assess, monitor, and search for better ways to protect our patients.

What is a pressure ulcer? It is an area of local damage to skin and underlying structures caused by constant pressure, shearing, or friction. Increased amounts of pressure, shearing forces caused by movement, and increased amounts of friction combine to cause pressure ulcers intraoperatively. One of the greatest risk factors is unrelieved pressure points.

What do pressure ulcers look like? They may be reddened, warm areas; blistered areas; abrasions; boggy or soft areas; areas where the skin is gone. Table 1 documents the four stages of pressure ulcers. Surgical patients may not display a pressure ulcer until three to five days post-operatively. Therefore, intraoperative factors are often for-gotten. We have all taken patients to the Post Anaesthesia Care Unit [PACU] and noticed a slightly reddened area. We generally give it a rub and often think no more of it. It is not normally documented in the operative record or in the nurse's notes, and may not be mentioned to the PACU admitting staff. Is this the beginning of a pressure ulcer? Perhaps it is. Documentation of the suspicious site — including its appearance and any actions taken — is very important. If no portion of the operative record is available for this, use the Nurse's Notes and be sure to pass these findings on to the PACU staff. Research shows a variety of statistics surrounding pressure ulcer formation with figures ranging from 7-66% in surgical patients (3-32% of hospitalized

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patients). This means that over half of our patients could be at risk! Documentation also shows that tissue damage may occur after 1-6 hours of sustained pressure.

Assessing patient risk for skin breakdown is routinely done on wards as well as in long-term care facilities. Unfortunately, the perioperative setting doesn't offer the luxury of time needed to review and apply these tools. Fortunately others have incorporated this process into the patient care plan. Awareness of the tools arms us with useful knowledge that can be applied in our theatres.

Table 1	CLASSIFICATION OF PRESSURE ULCERS
Stage I	- Visible Alteration of intact skin - Considered superficial
Stage II	- Partial thickness skin loss - Can be seen as blisters or an abrasion - Considered superficial
Stage III	- Involves full thickness of skin and deeper tissue
Stage IV	- Involves full thickness of skin - Extensive underlying tissue damage - May involve muscle and / or bone

(Barrett, 1996)

There are five notable risk assessment formulas: Norton and Waterlow (two distinguished European scales) and Knoll, Gosnell, and Braden (respected North American creators). The American Braden Scale is regularly used upon patient admission and at regular intervals throughout the hospitalization. Braden (*Ayello & Braden, 2001*) has six categories of assessment tools. They are sensory perception (including level of consciousness and cutaneous sensation); moisture; an evaluation of continence of bladder and bowel; mobility (whether or not the patient can move independently); activity (is the patient very mobile in day to day life, or does he/she sit the majority of the time); nutrition (quantity, frequency, and quality

Table 2	AREAS AT RISK FOR DEVELOPMENT OF PRESSURE ULCERS
OR Position	**Areas at Risk**
Supine	Scapula, occiput, sacrum, elbow, shoulder, heels
Lateral	Ear, shoulder, trochanter, medial portion of the knee, malleolus, edge of foot, elbow
Prone	Nose, forehead, chin, chest, breasts, genitalia, iliac crest, toe, patella, edge of foot
Lithotomy	Scapula, shoulder, occiput, sacrum, lateral knee, elbow, ankle
Sitting	Buttocks, sacrum, genitalia, heels, elbow, bottom of foot

(Fortunato & McCullough, 1998)

including hydration); and the friction/shearing factor (which goes along with mobility). These tools, along with the intensity and duration of pressure, accurately assess the risk of ulcer development. High-risk patients are then ranked in the clinical evaluation process. The result is an increase in prediction, awareness, and prevention. All models help you identify which patients are at the most risk of ulcers – perioperatively, it is a matter of managing the risks.

Table 2 shows the body areas frequently affected in five common intraoperative positions. Reviewing the risk factors will keep us aware of potentially high-risk patients. Diabetes, low preoperative haemoglobin (contributes to the amount of oxygen available to tissue under pressure), age, nutritional status, preoperative mobility, obesity, continence, hydration, preoperative skin care, friction, shearing, and underlying medical conditions all contribute to the creation of pressure ulcers.

Perioperative risks include things we do to our patients all day, every day. How we position the patient and the positioning devices we use (such

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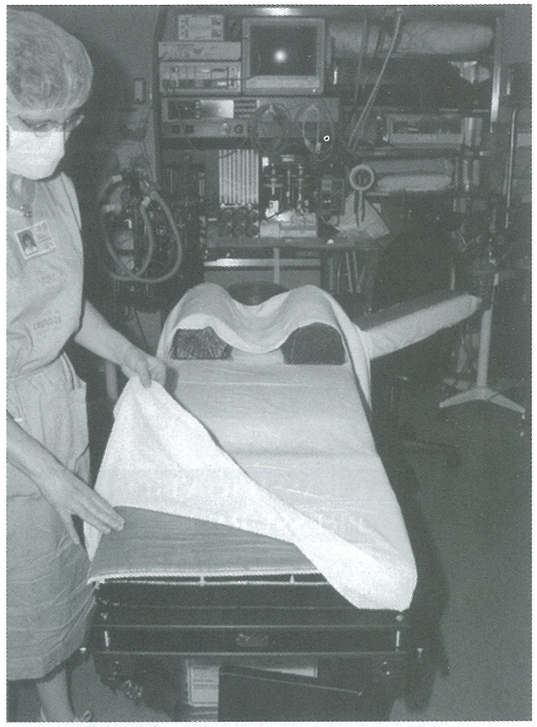
OH MY, THE PRESSURE! (*cont.*)

as gel pads, gel bolsters, pillows, and soft flannel linens) come with risks. Smooth surfaces are important, as pressure over a tiny wrinkle in linen can still cause skin and tissue damage. The choice of position and the duration of the surgery are factors we must work with. Care must be taken during surgical site skin preparation as both the pooling of chemical prep solutions and the exposure time to a chemical increase the risk. If necessary, tuck spare linen around the prep area to catch the "drips", then remove upon completion of the prep. Skin friction and shearing when the patient is moved, lifted and turned creates stress and exerts pressure on the skin. This is a major risk factor. There are many moving devices available, at a range of prices, to reduce this risk. One important way to decrease risk factors is to ensure that there is enough assistance available to achieve smooth, efficient turning or positioning of the patient. Many hands make for easier, safer and more effective positioning.

The next important step is to maintain body temperature during long surgeries or when cavity organs will be exposed for extended periods of time. Fluid warmers are a proven source of steady heat. Fluid warming blankets have been proven to have only limited success with maintaining normal thermia and may contribute to pressure ulcer formation. The hot air style warming blankets are considered to be a better option. Controlled hemodynamics, along with relatively unaltered circulation, helps in the prevention of ulcerations.

During the time it takes to move the patient to the operating table, and during positioning, catheterization, prepping and draping, note the status of your patient's skin. Document the integrity of your patient's skin in order to provide a baseline should a concern be noted post-operatively.

Intraoperatively the constant pressure exerted by the holding of retractors can contribute to skin breakdown and the creation of ulcers. Another often-unseen factor in tissue damage is a surgical team member leaning on the patient during surgery or allowing the patient to be used as a mayo tray. The patient is unable to express discomfort or shift to relieve the pressure. Avoid leaning on an anaesthetized patient and remember that heavy instrumentation belongs on a table or mayo tray, not on a motionless patient.



OR bed with gel positioning devices

Until recently, the operating table mattress has been a well used but ignored piece of equipment. A standard O.R. mattress is usually 1-2 inches of foam covered in a thick, durable, easily cleaned, non-allergenic, radiopaque, firm, fluid resistant material. It is difficult to have all these properties and to maintain an even pressure distribution without the mattress flattening, compressing or allowing the patient to "bottom out" or sink. Numerous layers of linen between the mattress and patient are also discouraged. Proven alternatives – air, various foams, gel, and water – have made mattresses more effective in the prevention of ulcers. Surgical suites need to review what is offered in today's marketplace. Research has been conducted on various theatre table mattresses.

One mattress study (*Defloor & De Schuijmer, 2000*) made several conclusions:

1. Patients in the lateral position have the highest pressure exerted on portions of the body
2. Foam is a poor contributor to the prevention / relief of pressure ulcers
3. When doing research on perioperative pressure ulcer formation, patient positioning should be considered
4. Gel mattresses prevent pressure ulcer formation in a limited capacity
5. Visco-elastic polyether foam and visco-elastic polyurethane offer the best resistance to ulcer prevention

Some alternates, such as circulating air or circulating water, are difficult to use in surgical suites, as the necessary pumps and cords are cumbersome and inconvenient in tight quarters. They also increase the danger of patient movement intraoperatively.

Solutions are neither easy to find nor inexpensive. Gel-filled mattresses have been used in many palliative and long-term care situations with positive results (*Defloor & De Schuijmer, 2000*). Gel mattresses are now available for use with operating tables. A recent clinical evaluation of one gel mattress indicated that although the mattress was heavy, it was "worth its weight in gold" {Farley, 2002, equipment trial}. Resistance was encountered when it was time to return the trial unit! Columns of gel that distributed patient weight evenly made it a joy to recline on and equally as comfortable in the prone position - I tried it myself as a guinea pig and felt it was definitely comfortable! Purchasing new mattresses for O.R. tables is a costly proposition, but the initial expense would prove cost effective if one incident of pressure ulcers (as described in Table 1) was prevented. The Case Study below demonstrates this.

CASE STUDY

A healthy young man underwent eighteen hours of surgery in the lateral position. Upon removal of the surgical drapes, it was noted there were several areas of altered skin on the scapula, hip, knee, elbow and ankle. Recovery from the surgery was not as prolonged as the recovery from the intraoperatively acquired pressure ulcers! The scapula region needed draining and primary closure of the area. The process took six months of physician visits, dressing changes, medications, and further surgery. The cost to the healthcare facility was significant, and to the patient, intangible. Not the outcome you would want, choose, or expect.

The increased cost factor for a facility is measurable but the cost to our patients is not. Perioperative time spent diligently considering all the mentioned risks could improve your patient's outcome. Patients agree to the direct risks of a surgical intervention, but don't expect the added complications of a pressure ulcer. The resulting pain, increased possibility of infection, altered lifestyle, emotional stress, physical limitations, disfigurement, additional surgery, continued dressing changes in areas other than the surgical site, and perhaps months of continued care and treatment are not an expected outcome of surgery.

Understanding the causes of skin breakdown and how to prevent it is a crucial component of the perioperative nursing practice. Skin is a layered, multifunctional covering that aids in the activities of daily living and keeps a body's contents in the correct area. This first line of defence deserves the best care possible. The surgical suite is no longer "the great unknown" in the pressure ulcer equation. We cannot underestimate the risk of pressure ulcers in a surgical patient who is immobilized for extended periods of time. High intensity pressure in the short term or low intensity pressure over an extended period of time will result in tissue damage. No one in the surgical suite intentionally increases a patient's chances of morbidity and mortality, or would knowingly contributes to pressure ulcer formation. If we watch for new and improved products, ask for and share product information, and lobby for the evaluation or purchase of equipment we can help keep our patient's skin intact and healthy during their time in the O.R. theatre.

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ORNAC in a Nutshell — Spring 2002 Update

❖ Our spring *2002 Executive & Board meeting* was held in Windsor ON in May. We were fortunate to be invited by *ORNAO* to join them at "*The Impact Zone*", their 7th biannual Provincial Conference, chaired by President **Kathy Bruce.** Approximately 18 *ORNAC* Board members remained for the conference.

❖ **Lynn Anderson** of NF, **Ray Larkins** of MB & **Kim McLennan-Robbins** of AB have completed *ORNAC* Board terms. We bid them farewell and thank them fortheir hard work!

❖ **Susan Bell**, ON President Elect has resigned her position to continue her studies. We thank her for her time and effort and we wish her well in the future.

❖ Welcome to Alberta (*ORNAA*), as they join the increasing number of provincial associations with pages on **www.ornac.ca.** Visit and find out what is going on in Alberta.

❖ **Peggy Ziegler**, President Elect of *ORNAA*, is the new Chair of the Awards Committee.

❖ There were many busy committee workers in Windsor! They created the *ORNAC Education Committee* – a blend of the *Research, Translation, Scope of Perioperative Practice, Public Awareness, Perioperative Nursing Education, and the Editorial Advisory Committees.* **Linda Socha** of SK is the Chair of this new committee. Our goal is to be more productive with a smaller number of committees. We will continue trying to "right size" our Board at the meeting this fall!

❖ **Marla Ewen**, *ORNAC* Research Chair, & **Vafa Jamali**, Vice President & General Manager, *Allegiance Healthcare*, presented **Deb Clendenning** of the *Children's Hospital Eastern Ontario* (*CHEO*) with this year's Allegiance Research Grant. Congratulations to Deb!

❖ President **Mary Knight** has been very busy as well, and recently attended *AORN* in Anaheim. *AORN* announced that the *International Planning Committee* has been renamed the *International Education Planning Committee* (*IEPPC*), to help clarify the purpose of the committee. The *International Federation of Perioperative Nurses* held a meeting during the conference, and reported that Uganda is now a member and that Zambia will join later the year.

❖ The theme of the *2003 Hong Kong World Conference* is **One World - Working Together.** A call for papers is forthcoming and the deadline will be June 28th, 2002. Stay tuned to **www.ornac.ca.**

❖ The 2007 *ORNAC National Conference* is going to be held in Victoria, BC rather than Vancouver!

❖ BC's new President Elect, and *ORNAC* Board member, is **Bonnie McLeod** from the *Royal Columbian Hospital.* Ontario has **Alaine Young** from the *Hamilton Health Sciences Centre* as its new President Elect and *ORNAC* Board member.

❖ The last week of April 2002 marked a "first" for *ORNAC*- the first issue of *CORNJ* published by Clockwork Communications on *ORNAC*'s behalf! *CORNJ* information can be found on **www.ornac.ca**

AIISOC en Bref

❖ Notre *réunion de l'exécutif et du conseil d'administration* du printemps 2002 s'est tenue à Windsor, Ontario. Quelle chance ! Nous étions invités par l'Association des infirmières et infirmiers en salles d'opération de l'Ontario à joindre leur groupe pour leur 7ième Conférence provinciale bi-annuelle "*The Impact Zone*", sous la direction de la

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