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Enhancing adherence to best practice guidelines related to pressure injury prevention in the operating room at a children's hospital during comprehensive dental procedures.

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Enhancing Adherence to Best Practice Guidelines Related to Pressure Injury Prevention in the Operating Room at a Children's Hospital During Comprehensive Dental Procedures

by

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Contents

Abstract

***Background*:** 1,600,000 patients develop a hospital-acquired pressure injury every year, and 23% of these originate during surgery. Research has demonstrated that the incidence of hospital-acquired pressure injuries developing during surgery has risen over the past 5 years. This rise has been attributed to nurse circulators exhibiting poor knowledge regarding best practices for intraoperative patient positioning and intraoperative documentation that does not follow standards of care.

Purpose: This quality improvement project aimed to enhance circulator knowledge on best practices for intraoperative patient positioning and improve documentation of intraoperative patient positioning in the electronic medical record to comply with standards of care.

Intervention: Circulators completed a self-directed learning module on intraoperative patient positioning. Enhanced knowledge was assessed using a pretest-posttest study design. A concurrently implemented, but unrelated, intervention was a visual checklist that featured positioning elements for intraoperative documentation and placed throughout operating rooms on circulator used computers. Compliant documentation was measured via chart audit 2 months pre- and post-intervention.

***Results*:** The mean rank of postintervention test scores rose 15.75% compared to the preintervention test scores, a statistically significant result, (U = 88.50; p < .001). The mean number of positioning elements recorded postintervention (6.77) was greater than preintervention (5.94).

***Discussion*:** Self-directed learning modules led to enhanced knowledge and should be utilized to educate new and reeducate veteran circulators on intraoperative patient positioning techniques at this site and other facilities. Visual checklists displaying positioning elements should be referenced by circulators when recording patient positioning in the electronic medical record. Sporadic chart audits should be employed to increase documentation compliance.

Keywords: pressure injury prevention, knowledge enhancement, documentation compliance, intraoperative patient positioning

Enhancing Adherence to Best Practice Guidelines Related to Pressure Injury Prevention in the Operating Room at a Children's Hospital During Dental Procedures

Pressure injuries/ulcers (PI) are serious health complications that negatively affect patient healing (Shafipour et al., 2016). The National Pressure Injury Advisory Panel (2016) defines a PI as "localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. This injury can present as intact skin or an open ulcer and may be painful." A PI occurs when force is applied to the surface of skin through constant pressure or a shearing force with the surface (Cleveland Clinic, n.d.). Symptoms of PIs include skin color changes, skin swelling, skin loss, and pain or tenderness (Cleveland Clinic, n.d.). In the United States, 1,600,000 patients develop a hospital-acquired pressure injury (HAPI) every year, with 23% originating intraoperatively (i.e., during surgery; Primiano et al., 2011). Due to health initiatives, the incidence of HAPIs has decreased over the past 5 years; However, the incidence of intraoperatively developed PIs has increased (Association of Perioperative Nurses [AORN], 2016).

Background

One of the largest concerns for hospitals regarding HAPIs is poor patient outcomes. Infected PIs can turn into cellulitis, osteomyelitis, bacteremia, and even result in death (Cleveland Clinic, n.d.). Further, HAPIs extend hospital stays, increase staff workload, and cause undue emotional and mental stress for patients and their caregivers (Shafipour et al., 2016; Primiano et al., 2011). PIs in pediatric patients are particularly atrocious due to a child's inability to express feelings of pain, a high tolerance for pressure on soft tissue, and reliance on caregivers (Freundlich, 2017). The prevalence of pediatric patients in the United States who developed a HAPI from 2009—2016 was 1.17%—6.08%, respectfully, based on a sample population of 73,248 pediatric inpatients (Delmore et al., 2020). The incidence of HAPI development in pediatric intensive care units is about 27%, and 23% in neonatal intensive care units (Baharestani & Ratliff, 2007). In noncritical patients, the incidence of HAPI is about 0.47%—13%

(Baharestani & Ratliff, 2007). The prevalence of PIs in patients undergoing surgery lasting greater than 2 hours is 8.5% (Primiano et al., 2011). While the rate of intraoperative PI development in pediatric patients is not reported in the literature, it is understood that pediatric skin differs from adult skin and is particularly vulnerable to injury (Delmore et al., 2019).

Another concern for hospitals related to HAPIs is cost. HAPIs became a significant cost to hospitals in 2008 when the Deficit Reduction Act was initiated (Centers for Medicare and Medicaid Services [CMS], n.d.). According to the CMS (n.d.), as outlined in the Deficit Reduction Act, HAPIs that are stage III or stage IV do not qualify for reimbursement (i.e., the hospital or medical facility where the PI occurred will not be paid by CMS) due to the determination that prevention of PIs is more cost effective than treatment (Primiano et al., 2011). In the United States, a hospital's annual cost of treatment for all HAPIs ranges from $9,100,000—$11,000,000, or $20,900—$151,700 per PI (AORN, 2020).

Literature Review

A review of the literature reveals that PI prevention and rate reduction are best accomplished through a unit wide PI program. These programs aim to prevent PIs through evidenced based guidelines, recommendations, and standards of care. Two commonly used interventions for these programs are education and documentation. Education is one intervention used to reduce the rate of intraoperative PIs through enhanced knowledge of prevention strategies (Woodfin et al., 2018). Circulators (i.e., registered nurses who work in the operating room [OR]) are essential staff members responsible for positioning patients intraoperatively, in collaboration with the surgeon and anesthesia providers. Circulators must be knowledgeable in an array of topics related to patient positioning including principles of anatomy and physiology, the surgical procedure to be performed, anatomical and physiological changes related to anesthesia, surgical position, prolonged immobility, pressure points, selection and proper use of positioning equipment, and proper positioning techniques, as well as, risk factors that predispose patients to PI development, skin assessments, PI identification and staging, and

PI prevention strategies (Goodman & Spry, 2017; Spruce, 2017). Unfortunately, this critical positioning information is not routinely taught to circulators, rather it is learned during on-the-job training (Woodfin et al., 2018). On-the-job training can lead to variations in patient positioning techniques and practices, some of which may be informal and/or not evidence based (Woodfin et al., 2018). Further, on-the-job training restricts new circulators from gaining background knowledge (a formal education) that is essential for learning best practices for intraoperative patient positioning of the various surgical positions, PI prevention strategies, risk factors for PI development, and other standards of care (Spruce, 2017). Employment of a formal education has proved beneficial in increasing circulators comfort positioning and advocating for patients (Woodfin et al., 2018). Implementing a formal education program focused on PI prevention would reduce patient injury, promote patient safety, and eliminate unnecessary costs (Woodfin et al., 2018).

Another recommended intervention for PI prevention and risk reduction is proper documentation. Sufficient documentation of intraoperative patient positioning creates a clear picture of interventions, resources, and medical devices used by the care team to prevent harm and follow best practice (ANA, 2010). Although documentation does not directly prevent PIs from occurring, it is a critical component for interdisciplinary communication, and communication is the basis of information transfer through the continuum of care (American Nurses Association [ANA], 2010; Spruce, 2017). Documentation is also the source of evidence used to measure performance outcomes against standards, and analyzed for process improvement (ANA, 2010). However, documentation can be viewed by staff as burdensome, distracting from patient care, and unimportant, leading to poor documentation, poor communication, and negative patient outcomes (ANA, 2010). To promote high quality documentation, adequate time and resources should be provided for staff because insufficient documentation can lead to flawed communication and poor patient outcomes (ANA, 2010). According

to the AORN, the following eight positioning elements should be incorporated in the documentation of intraoperative patient positioning:

- position
- placement of extremities
- type and placement of positioning equipment and devices (e.g., stirrups, gel rolls, padding, and restraints)
- precautions to protect eyes
- presence and placement of a safety strap or equivalent
- who positioned the patient
- any changes made in positioning during the procedure
- signature or electronic signature of person completing the documentation (Goodman & Spry, 2017).

The literature indicated an increase in the incidence of PIs developing intraoperatively and the seriousness of PIs developing in pediatric patients (Delmore et al., 2019). This increase has been attributed to a lack of knowledge on best practices related to positioning, and failure of circulators documentation to follow the AORNs standards of care. Therefore, a formal educational program on PI prevention and an intervention to increase documentation compliance could decrease the incidence of intraoperatively developed PIs.

Purpose and Specific Aims

The purpose of this quality improvement (QI) project is to improve circulators' knowledge of best practices related to intraoperative patient positioning and to improve documentation in the electronic medical record (EMR) to reflect standards of care. The specific aims for this QI project are to 1) determine if circulators knowledge was enhanced following completion of an educational module focused on intraoperative patient positioning as evidenced by an increase in scores on a

postintervention test compared to a preintervention test and 2) assess if circulators documentation compliance improved after placement of a visual checklist in ORs as evidenced by a rise in the number of positioning elements documented in EMRs postintervention.

Quality Improvement Framework

The improvement model that guided this project was the Dartmouth Microsystem Improvement Ramp (DMIR; see Figure 1). DMIR is a systematic approach to help team leaders assess and understand their systems/processes, specifically focusing on aims, change generation, and testing change (Anderson, 2014a). The first step of the DMIR is assessment. The 5P Assessment tool is used as a guide to determine the purpose, patients, professionals, processes, and patterns at the facility where the project is to be completed (Anderson, 2014). The 5P Assessment tool broadens microsystem leaders' understanding of their microsystem and its functions (Anderson, 2014a). The 5p Assessment was completed during the needs assessment for this QI project. The second step of the DMIR is determining the overall theme. For this step, the Institute for Healthcare Improvement Initiatives were assessed and “patient safety” was chosen as the initiative to encompass PI prevention. The third step of the DMIR is to determine the global aims, which link the benefits expected to arise from exploring and revamping microsystem processes (Anderson, 2014a). In the case of this project, the global aims were to link enhanced education and compliant documentation to enhanced patient safety. The fourth step of the DMIR is determining the specific aims, which detail the measurable outcomes toward achieving improvement goals (Anderson, 2014a). The measurable aims for this project are discussed in the Purpose and Specific Aims section. The next step of the DMIR is to define how change is assessed and if that change led to improvement. This part of the framework was accomplished during data analysis planning and discussed in the Data Analysis section. The final portion of the DMIR is the Plan-Do-Study-Act cycle where the improvement ideas are conducted and evaluated (Anderson, 2014a). Often, multiple Plan-Do-Study-Act cycles are conducted, however, we conducted only one Plan-Do-Study-Act

cycle-due to time limitations and constraints-that focused on intervention development, implementation, data collection, and data analysis.

Needs Assessment

We conducted a needs assessment with the assistance of the surgical services (SS) manager, which revealed gaps in knowledge of best practices related to intraoperative patient positioning and documentation that did not follow the AORNs standards of care. Knowledge gaps were supported by an increase in PIs reported at this facility. In 2021, this facility had zero intraoperatively developed PIs, but two PIs developed in 2022. The documentation gaps were identified via a random chart audit performed by the SS manager, they found that many circulators were not including all eight positioning elements in their documentation of intraoperative patient positioning.

Methods

Setting

This project is one component of the SS Performance Excellence plan for the 2021-2023 years that focused on PI prevention and risk reduction in comprehensive dental procedures. Comprehensive dental procedures were chosen as the focus of the Performance Excellence plan following a root cause analysis of an intraoperatively developed PI that appeared following a comprehensive dental procedure. Management identified origins of the PI as misuse of positioning supplies, lack of formal education, the patient's intraoperative position, and the extended procedure time.

This project took place at a level one pediatric trauma hospital in the Southern United States that is nationally recognized for three pediatric specialties: Diabetes & endocrinology, pulmonology, and urology. The unit of interest was the SS department, specifically ORs. There are 10 ORs at this facility; One dedicated to cardiac surgery, one dedicated to neurosurgery, and one dedicated to trauma surgery. The top five SS performed are general, ear nose and throat, orthopedics, neurosurgery, and dental. In 2021, this facility performed 181 comprehensive dental procedures, respectively.

Key stakeholder were the SS educators, SS director, SS managers and assistant nurse managers, SS risk reduction team, as well as, the skin care champions, chief nursing officer, wound ostomy care nurse, and the Research and Innovation Council. Facilitators for this project were nominal incentives. Potential barriers included staff attitude towards change, lack of motivation for learning, and misinformation related to intraoperative patient positioning.

Target Population

Education enhancement focused on circulators due to their critical part in intraoperative patient positioning. Circulators included were full- or part-time, per-diem, orienting, and clinical agency. At the time of implementation, 28 circulators fit this criterion. Traveler nurses were not included due to them historically not being required to participate in facility education.

Documentation compliance focused on circulators recording of intraoperative patient positioning in the EMR. Comprehensive dental procedures were chosen as the control to align with the coinciding Performance Excellence plan. Many comprehensive dental procedures occurring in the OR are for restoring and/or extracting carious teeth, patients with excessive anxiety, repeating a previously failed dental appointment due to a child's dental fear, painful dental infection, and/or the extent of work required (Ba'akdah et al., 2008). Typically, a comprehensive dental procedure is scheduled for 3 hr but actual procedure time can vary. The patient population of interest was pediatrics; Ages ranging from 12 months to 21 years and 0 days. The minimum age of 12 months was chosen because dental visits typically occur around then (American Academy of Pediatric Dentistry, 2013). The maximum age, 21 years, was chosen because it is when an adolescent, biologically, transitions to an adult (Hardin et al., 2017). Exclusion criteria were nondental procedures.

Interventions

This QI project consisted of simultaneously occurring parts: Enhancing education on intraoperative patient positioning and increasing documentation compliance of intraoperative patient positioning in the EMR.

Enhancing Education of Intraoperative Patient Positioning

Enhanced knowledge of intraoperative patient positioning was accomplished through a self-direct learning (SDL) module and measured via a pretest-posttest study design. Pretest-posttest study designs are widely used for comparing groups and measuring changes from an intervention (Dimitrov & Rumrill, 2003). The measurement of change can then provide a basis for assessing impact, which is what we aimed to do (Dimitrov & Rumrill, 2003). The reliability and validity of pretest-posttest study designs is not clearly reported in the literature. Statistical analysis was used to evaluate reliability and discussed in the Data Analysis section.

Circulators were alerted of interventions electronically via corporate email accounts and verbally at morning "safety huddles," see Figure A1. The first intervention was a preintervention test that was completed anonymously by circulators via SurveyMonkey (www.surveymokey.com). The preintervention test originally comprised of 10 multiple choice questions (i.e., A through D) based on the Prevention of Perioperative Pressure Injury presentation from the AORN (2020; see Figure B1). However, during the preintervention phase it came to our attention that Question 10 contained a definitions error (see Figure B2). The question was removed from the preintervention test and did not count toward or affect any of the scores and was not included on the postintervention test. After 3 weeks, the SDL module was sent electronically to circulators via corporate email (see Figure A2). The SDL was an educational PowerPoint presentation adapted with permission from the AORNs "Prevention of Perioperative Pressure Injury" presentation (2020). The presentation included information on positioning injuries and contributing factors, collaborative processes for patient positioning, equipment selection, the basics of various surgical positions, and proper documentation of surgical positioning to

strengthen communication, see Appendix C. After completing the SDL module, circulators took the postintervention test via SurveyMonkey (www.surveymonkey.com). The postintervention test was comprised of the same questions as the preintervention test. The SDL module and postintervention test remained open for the remainder of the project, approximately, 5 weeks after initial communication. One reminder communication to complete interventions was sent electronically via corporate email 2 weeks after the initial communication (see Figure A3). During this project, the facility experienced a cyberattack and all applications on the network were shut down (i.e., circulators did not have access to their corporate email accounts or learning platforms). Due to this, 13 circulators were unable to complete the SDL module or postintervention test.

Before the cyberattack, management decided that circulators must complete the SDL module as a requirement for the units Performance Excellence plan. Circulator completion was tracked via an employee roster supplied by the SS manager, as well as verbal and electronic communication. However, the pre- and post-intervention tests were not required by management, so, to incentivize completion, $5 gift cards were given to the first 5 circulators who communicated completion.

The SDL module was feasible because it was time efficient and gave circulators autonomy for their own learning (Murad et al., 2010). The preintervention test took circulators an average of 3 min and 28 sec to complete and the postintervention test took an average of 2 min and 59 sec to complete (according to data extracted from SurveyMonkey [www.surveymonkey.com]). According to several participating circulators, the SDL module took approximately 12 min to complete. The total staff time for interventions was 277 staff min [(3 min 28 sec X 28 circulators) + (12 min X 15 circulators) + (2 min 59 sec X 15 circulators)]. No financial support was needed or provided for this portion of the project.

Increasing Documentation Compliance of Intraoperative Patient Positioning in the Electronic Medical Record

Increased documentation compliance was accomplished via a visual checklist that featured the eight positioning elements addressed in the Literature Review section. A visual checklist was chosen as an appropriate intervention because it has been shown to improve circulator comfort with new processes (Murad et al., 2010). We created the visual checklist using Microsoft Word and printed them on hot pink construction paper (see Appendix D). The checklists were then laminated for infection prevention purposes and adhered to circulator used computers throughout the OR. Documentation compliance was assessed using a retrospective chart audit pre- and post-intervention. Chart audits are appraisals of the medical record often viewing physician and nursing notes, emergency room notes, consults, etc., and using that gathered information to conduct quality improvement activities (i.e., root cause analyses, preforming care assessments, preforming retrospective research, etc.; Siems et al., 2020). The validity and reliability of a chart audit is not documented in the literature due to dependence on variable features in the medical records and subjectivity of the review elements (Siems et al., 2020).

Prior to implementation, we created a data collection tool in Microsoft Excel regarding documentation of the positioning elements; A one numeral indicated that the positioning element was recorded, and a two numeral indicated the positioning element was not recorded, see Appendix E. Documentation was deemed compliant if all eight positioning elements were recorded in the EMR. Documentation was deemed noncompliant if one or more positioning element(s) was/were missing. Documentation compliance assumes that OR staff positioned the patient according to best practice guidelines. To ensure data completeness, we utilized a tool in SPSS that tracked missing data variables.

This intervention was feasible because chart audits took no time away from staff and the checklist was easy to follow. Further, circulators already recorded patient positioning in the EMR, so no excess work or time was required. No financial support was needed or provided.

Measures

The pre- and post-intervention tests assessed if circulators knowledge on intraoperative patient positioning was enhanced after completing an SDL module. The tests were scored as percentages. The number of circulators who correctly/incorrectly answered the preintervention test questions and the number of circulators who correctly/incorrectly answered the postintervention test questions were evaluated to see if circulators missed the same questions and/or if their scores on each of the questions improved. The number of circulators who completed the SDL was also measured.

The retrospective chart audit included EMRs of patients who underwent comprehensive dental procedures 2 months before and 2 months after implementation to determine if circulators documented the eight positioning elements. The positioning elements were assessed by frequency of documentation in EMRs, pre- and post-intervention, to determine if any elements were omitted from documentation. The average number of positioning elements recorded in an EMR, pre- and post-intervention, was also assessed to determine if the average number of positioning elements recorded increased after intervention.

Data Analysis

To evaluate the effectiveness of interventions, quantitative data analyses were performed. Microsoft Excel (version 16.55) and International Business Machines Corporations' Statistical Package for Social Sciences (SPSS; version 29.0.0.0 [241]) were used for data recording and analysis. Results from this project will be shared with the SS department for use in their Performance Excellence plan and the chief nursing officer. The final manuscript will be disseminated through a poster presentation and submitted for publication.

Enhanced knowledge was assessed using descriptive statistics, frequencies, and standard deviation to describe the pre- and post-intervention test scores. Kendall's rank-order correlation coefficient was utilized to determine the relationship between the pre- and post-intervention test scores. Statistical analysis: The Mann-Whitney U test was used to determine if the mean ranks of the

pre- and post-intervention test scores were significantly different. Data gathered was stored in SPSS, see Appendix F.

Documentation compliance was evaluated using various statistical analyses. Descriptive statistics were used to determine the number and percentage of EMRs that had each positioning element recorded versus the number of EMRs that did not have each positioning element recorded, pre- and post-intervention. A chi-square distribution was used to determine if frequency documenting each positioning element was statistically significant pre- and post-intervention. Each EMR was then evaluated for the sum of positioning elements recorded. The overall mean of positioning elements recorded pre- and post-intervention was assessed using descriptive statistics and standard deviation. Student's *t*-tests were computed on the data from the mean number of positioning elements recorded by circulators pre- and post-intervention. A separate Student's *t*-test was used to evaluate if there was an association between the overall number of positioning elements recorded pre- and post-intervention, and to determine if the difference was statistically significant. Levene's test was used to determine if population variances were equal pre- and post-intervention to examine internal consistency and reliability of the sample. Cohen's measure was used to determine the effect size. The gathered data was contained and analyzed in SPSS (see Appendix G).

Ethics

Permission for use and adaptation of the educational materials from the AORN is open to all members. Permission for implementation of this QI project was submitted and approved by the University of Louisville Institutional Review Board and approved by the facility's Institutional Review Board.

In terms of privacy, no patient identifiers were included in the data collection. Further, no Doctor of Dental Surgery or circulator were named in this project. We acquired circulators' corporate email addresses from the human resources department following facility protocol.

An itemized list of all pediatric patients who underwent a comprehensive dental procedure was acquired from the SS business manager. The patient list provided the name, medical record number, and date of birth for each patient who met the criteria for chart audit. Access to patient EMRs was granted by the information technology department, again following facility protocols. The list of patients was stored in the SS assistant nurse manager's office that remained locked 24 hours/day. We were the sole chart auditors for this project. Three patient identifiers-name, medical record number, and date of birth-were used to ensure correct EMRs were being accessed. Chart audits were completed at the facility in which this project took place using encrypted computers. The information extracted from the chart audits was stored on an encrypted password protected laptop.

Results

Enhancing Education of Intraoperative Patient Positioning

The preintervention test was taken by 28 circulators. Scores from the preintervention test were collected and recorded into SPSS. Table 1 displays the descriptive statistics, frequency, and standard deviation of the test scores. The preintervention test score mean was 73.25% (*SE* = 2.69). The percentage of circulators who selected the correct and incorrect answer(s) on the pretest was determined for each of the nine test questions, see Table 2. The same analyses were then conducted on the postintervention test scores, also presented in Table 1 and Table 2. The postintervention test was taken by 15 circulators following completion of the SDL module; Thirteen circulators were unable to access the SDL module or postintervention test following a cyberattack that occurred at this facility. The mean postintervention test score was 89% (*SE* = 3.22).

Table 1

Descriptive Statistics of the Pre- and Post-Intervention Test Scores

	Preintervention test (*N* = 28)	Postintervention test (*N* = 15)

	%	%
M (*SEM*)	73.25 (2.69)	89 (3.22)
Mdn	67	89
SD	14.25	12.47
Minimum	44	67
Maximum	100	100
95% CI		
LL	67.72	82.09
UL	78.77	95.90
Skewness	.302	-.678

Note. CI = Confidence interval.

Table 2

Positioning the Surgical Patient Questions (N = 9)

Question	Preintervention test results (*N* = 28)		Postintervention test results (*N* = 15)	
	n	%	*n*	%
1. When the patient's arms are tucked at the sides and secured with a draw sheet, how should the palms be placed (while in the supine position)?				
Palms facing up	4	14.29	0	0
Palms facing down	0	0	0	0
Palms facing the body*	24	85.71	15	100
Palms facing away from the body	0	0	0	0
2. In the supine position, where is the best place for a safety strap				
Across the abdomen	6	21.43	1	6.67
Across the chest	2	7.14	1	6.67
Across the thighs*	17	60.71	12	80
Across the pelvis	3	10.71	1	6.67
3. While in the supine position it is best practice to keep the patients' heels:				
Elevated off the surface*	18	64.29	11	73.33
Heels flat on the OR table	1	3.57	0	0
Heels padded with Mepilex, lying flat on the OR table	7	25	2	13.33
None of the above	2	7.14	2	13.33
4. In the supine position, I should flex my patients' knees				
0 to 5 degrees	3	10.71	0	0
5 to 10 degrees*	13	46.43	10	66.67

Question	Preintervention test results (*N* = 28)		Postintervention test results (*N* = 15)	
	n	%	*n*	%
15 to 20 degrees	4	14.29	2	13.33
In neutral alignment with the arm*	22	78.57	14	93.33
Hyperextended while the hand is supinated (palm facing up)	5	17.86	0	0
Hyperflexed while the hand is pronated (palm facing down)	0	0	0	0
None of these options	1	3.57	1	6.67
6. Which of the following is NOT a major pressure point in the supine position?				
Heels	0	0	0	0
Occiput	0	0	2	13.33
Lumbar area	4	14.29	0	0
Knees*	24	85.71	13	86.67
7. What would be appropriate to use as a "shoulder roll" during a supine procedure?				
Rolled towels, sheets, or blankets	7	25	0	0
Half round gel roll fitted to the patient*	15	53.57	15	100
Liter bag of fluid wrapped with cast padding	0	0	0	0
All the above are appropriate	6	21.43	0	0
8. Which of the following is NOT considered correct positioning of the arms while in the supine position?				
Tucking them at the sides with a drawsheet	0	0	0	0
Flexing and securing them across the body	1	3.57	0	0
Securing them at the sides with armguards	0	0	0	0
Extending them above the head*	27	96.43	15	100
9. I should protect my patients' feet from (while in the supine position)				
Hyperextension and hyperflexion*	24	85.71	15	100
Hyperextension only	1	3.57	0	0
Hyperflexion only	0	0	0	0
The patients' feet can be hyperextended or hyperflexed	3	10.71	0	0

Note. Asterix indicates correct answer.

A comparison of the mean distribution between the pre- and post-test scores was desired, however due to non-normality of the variable (pretest, *N* = 28; posttest, *N* = 15) the Mann-Whitney test statistic was utilized to compare mean ranks. Results from the analysis are presented in Table 3. Kendall's tau showed that pre- and post-intervention test scores were inversely related, a strong monotonous relation (τ_b = .440, *p* = .001).

Table 3

Ranks and Mann-Whitney U Analysis of Pre- and Post-Intervention Test Scores

Variable	Ranks		Scores			
	N	Mean rank	Sum of ranks	*U*	*z*	*p*
Preintervention test scores	28	17.66	494.50			
Postintervention test scores	15	30.10	451.50			
Pre-postintervention test scores				88.50	-3.18	.001

Note. U = Mann-Whitney test statistic.

Increasing Documentation Compliance of Intraoperative Patient Positioning in the Electronic Medical Record

The preintervention retrospective chart audit yielded 57 patients who underwent a comprehensive dental procedure from December 1st, 2022, to January 31st, 2023. The postintervention retrospective chart audit yielded 81 patients who underwent a comprehensive dental procedure from February 1st, 2023, to March 31st, 2023. Frequency and percentage were used to analyze the findings, see Table 4. Preintervention, the positioning elements "position" and "extremities" were recorded the most (*n* = 55), and "signature" was recorded the least (*n* = 5). Postintervention, the positioning elements "position," "extremities," "equipment and devices," and "safety strap" were recorded in 100% of patient EMRs, and "signature" was recorded the least (*n* = 38). Chi-square distribution was performed

to evaluate the relationship between the documented positioning elements pre- and post-intervention, see Table 5.

Table 4

Frequency of Positioning Element Documented Pre- and Post-Intervention

Positioning element documented	Preintervention (*N* = 57)		Postintervention (*N* = 81)	
	n	%	*n*	%
Position				
Documented	55	96.5	81	100
Not documented	2	3.5	0	0
Extremities				
Documented	55	96.5	81	100
Not documented	2	3.5	0	0
Equipment and devices				
Documented	50	87.7	81	100
Not documented	7	12.3	0	0
Eyes				
Documented	48	84.2	78	96.3
Not documented	9	15.8	3	3.7
Safety strap				
Documented	53	93	81	100
Not documented	4	7	0	0
Who				
Documented	46	80.7	59	72.8
Not documented	11	19.3	22	27.2
Position changes				
Documented	27	47.4	49	60.5
Not documented	30	52.6	32	39.5
Signature				
Documented	5	8.8	38	53.1
Not documented	52	91.2	43	46.9

The yielded patient EMRs were analyzed for the number of positioning elements recorded-on a scale from zero to eight (Table 6). Descriptive statistics were used to determine the mean number of positioning elements recorded pre- and post-intervention (see Table 7). The mean (with standard deviation in parentheses) for the number of positioning elements recorded was 5.94 (1.39) preintervention, and 6.77 (1.21) postintervention. The mean for the collective number of positioning

elements recorded pre- and post-intervention was 6.43. One-sample *t*-tests were used to determine if there was a significant difference between the preintervention mean and the collective mean and/or the postintervention mean and the collective mean (see Table 7). An independent samples *t*-test was used to determine if significant difference existed between the pre-postintervention means (Table 7). Levene's test showed that the variances for the mean number of positioning elements recorded pre- and post-intervention were not equal, F (136,1) = 5.60, p = .019. Cohen's measure of sample effect size for comparing the means of the number of positioning elements recorded pre- and post-intervention was 0.64, indicating a moderate effect.

Table 5

Comparison of Positioning Elements Documented Pre- and Post-Intervention

Positioning element	X^2	
	Value	*p*
Position	2.88 [a]	.09
Extremities	2.88 [a]	.09
Equipment & devices	10.48 [a]	.001
Eyes	7.51 [a]	.006
Safety strap	4.36 [a]	.04
Who	1.14 [a]	.29
Position changes	2.32 [a]	.13
Signature	22.69 [a]	<.001

Note. [a] degree of freedom = 1

Table 6

Total Number of Positioning Elements Recorded per Electronic Medical Record

Variable	Preintervention [a]		Postintervention [b]	
	n	%	*n*	%
Zero	2	3.5	0	0
One	0	0	0	0
Two	0	0	0	0
Three	0	0	0	0

Four	1	1.8	0	0
Five	8	14	18	22.2
Six	30	52.6	16	19.8
Seven	13	22.8	13	16
Eight	3	5.3	34	42

Note. [a] $N = 57$; [b] $N = 81$

Table 7

Mean, Standard Deviation, Student's t Distribution, Sigma, Levene's, and Cohen's d for Number of Positioning Elements Recorded

Electronic medical records	*M*	*SD*	*t*	*df*	*p*	MD	σ	*d*
Preintervention (*N* = 57)	5.94	1.39	-2.61	56	.006	-.48		
Postintervention (*N* = 81)	6.77	1.21	2.58	80	.006	.13		
Pre-postintervention	6.43		3.63	109.85	<.001		0.19	0.64

Note. The means for the pre- and post-intervention EMRs were calculated using one sample *t*-tests. The pre-postintervention EMR mean was calculated using an independent samples *t*-test. MD = mean difference.

Discussion

Enhancing Education of Intraoperative Patient Positioning

We conducted a QI project to evaluate if circulators had enhanced knowledge of best practices for intraoperative patient positioning after reviewing an SDL module. The planned data analysis for this project was unable to be utilized for computation of the difference in means due to the asymmetric distribution of variables. However, the Mann-Whitney statistic was employed and showed that scores on the postintervention test (mean rank = 30.10) ranked higher compared to the scores of the preintervention test (mean rank = 17.66), a difference that was statistically significant ($U = 88.50$; z = -

3.18; $p < .001$). These results are consistent with other studies that suggest learning modules provide a simple method for reinforcing and enhancing patient positioning practices (Woodfin et al., 2018).

Several test questions were incorrectly answered by one or more circulator(s) postintervention including: Question 2, Question 3, Question 4, Question 5, and Question 6. We theorized several reasons why incorrect answers were chosen postintervention including that some circulators may not learn independently, circulators may lack interest in the chosen topic, and an overwhelming amount of education already assigned to circulators. According to Murad et al. (2010), learning is influenced by factors like motivation, self-efficacy, and subject area of interest, and without factors such as these, knowledge outcomes are poor. Overall, the SDL module enhanced circulators knowledge of best practices for patient positioning at this facility as evidenced by a statistically significant Mann-Whitney test statistic.

The use of an SDL module could be beneficial in other practice areas seeking to enhance staff knowledge on assorted topics. However, consideration for self-directed type learning should be weighed with cultural and environmental factors in mind because interventions that work well in one setting, context, or culture may not work equally well in others (Brandt, 2020). So, choosing to do an SDL over another educational intervention should be discretionary and based on staff needs.

This portion of the QI project had several limitations. The first limitation was a small sample size ($N = 28$). Although this number of participants can still be used for significant statistics, a larger group of participants could have increased the confidence interval. Internal validity was affected by attrition because the pre- and post-intervention groups differed in size due to loss of follow-up caused by a facility wide cyberattack. The substantial change in the number of participants pre- and post-intervention was not anticipated. Due to these factors, these findings are not generalizable. This portion of the project is not sustainable due to education taking time away from circulators and the fact that technology may or may not be available.

Increasing Documentation Compliance of Intraoperative Patient Positioning in the Electronic Medical Record

The second aim of this QI project was to determine if circulators had compliant documentation after implementation of a visual checklist of the eight positioning elements in ORs. Postintervention, circulators were compliant documenting the positioning elements "position," "extremities," "equipment and devices," and "safety strap" in 100% of EMRs. The chi-square distribution showed that circulators were more likely to document the positioning elements "eyes," "safety strap," "equipment and devices," and "signature" postintervention compared to preintervention. The positioning elements "position" and "extremities" did not have a meaningful change pre- to post-intervention, possibly resulting from the elements already being detailed in 96.5% of the preintervention EMRs, which indicated that circulators were close to documentation compliance for those positioning elements. The positioning element "who" had a small and insignificant change pre- to post-intervention. The positioning element "position changes" also lacked meaningful change pre- to post-intervention possibly due to procedures added into the EMR after final verification of the record by the circulator. For example, a circulator might document positioning for a comprehensive dental procedure in the EMR, but after verifying the documentation a biller may add a second procedure, such as tooth extraction, and the circulator is not made aware of the added procedure, thus the positioning documentation would be blank for tooth extraction.

Circulators were compliant documenting all eight positioning elements in 42% (*n* = 34) of postintervention EMRs, which is a significant increase from the percentage of compliant EMRs preintervention, 5.3% (*n* = 3), showing enhanced documentation compliance. Two independent samples *t*-tests were performed to evaluate whether there was a difference between the number of positioning elements recorded by circulators pre- and post-intervention. The results indicated that circulators recorded a significantly greater number of positioning elements in the EMR postintervention (*M* = 6.77,

SD = 1.21) compared to preintervention (*M* = 5.94, *SD* = 1.39). These findings are consistent with other studies that suggest visual checklists aid in information retention (Woodfin et al., 2018).

Future studies could set goals of higher documentation compliance because recording intraoperative patient positioning is one-way circulators communicate to other providers that patients were positioned correctly; Some of these providers may be outside the direct care team but rely on patient documentation for various needs including credentialing, legal claims, audits to address quality initiatives, reimbursement, research, and quality process and performance improvements (ANA, 2010). Documentation compliance is necessary for direct and indirect patient care, especially communication of that care. Other future studies could focus on Principle 2 of the ANAs nursing documentation principles: Education and training. Principle 2 states that "nurses, in all setting and at all levels of services, must be provided comprehensive education and training in the technical elements of documentation and the organizations policies and procedures that are related to documentation (ANA, 2010; p. 13)." We had minimal discussion about the intervention with circulators prior to implementation, so it is possible that they were unaware of the importance. Future studies could incorporate educating circulators of interventions prior to implementation.

Limitations of this portion of the QI project included an unequal number of procedures audited pre- and post-intervention and circulators being unaware of the intervention. Statistical analyses showed improvement of documentation and could be generalized to other settings because documentation occurs in all areas of healthcare and the documented positioning elements are the standard. This project focused on using documentation for communication needs to prevent PIs but could easily be applied to ongoing QI initiatives. According to the ANA (2010), facilities should support staff through facilitation of processes for documentation that allow and enhance efficiency, evaluation of outcomes, interdisciplinary input and access, seamless communication among providers across the

continuum of care, and transferability. This project is sustainable as evidenced by the interventions continued utilization at this facility.

Next Steps

The ongoing process evaluation, and last step in the DMIR, will be conducted by the SS director, manager, and assistant nurse managers who will continue the units Performance Excellence plan. Next steps include a second Plan-Do-Study-Act cycle where enhancements to the interventions could take place. According to Brandt (2020), self-directed type learning could be improved through instructional approaches, such as inquiry-, problem-, and project-based learning. The use of these approaches enhances learning through collective problem solving, collaboration, and community engagement (Brandt, 2020).

Conclusion

The findings from this QI project showed 1) knowledge of intraoperative patient positioning was enhanced following completion of an SDL module on the same subject as evidenced by an increase in the postintervention test score mean, 89% (*SE* = 3.22), from the preintervention test score mean, 73.25% (*SE* = 2.69) and 2) circulators compliance documenting positioning elements increased after placement of a visual checklist in ORs as evidenced by an rise in the number of positioning elements recorded in EMRs postintervention (*M* = 6.77, *SD* = 1.21) compared to the number of positioning elements recorded preintervention (*M* = 5.94, *SD* = 1.39). These findings indicate that SDL modules enhance knowledge and should be used in PI prevention programs and visual checklists increase documentation compliance and should be used to aid in information retention.

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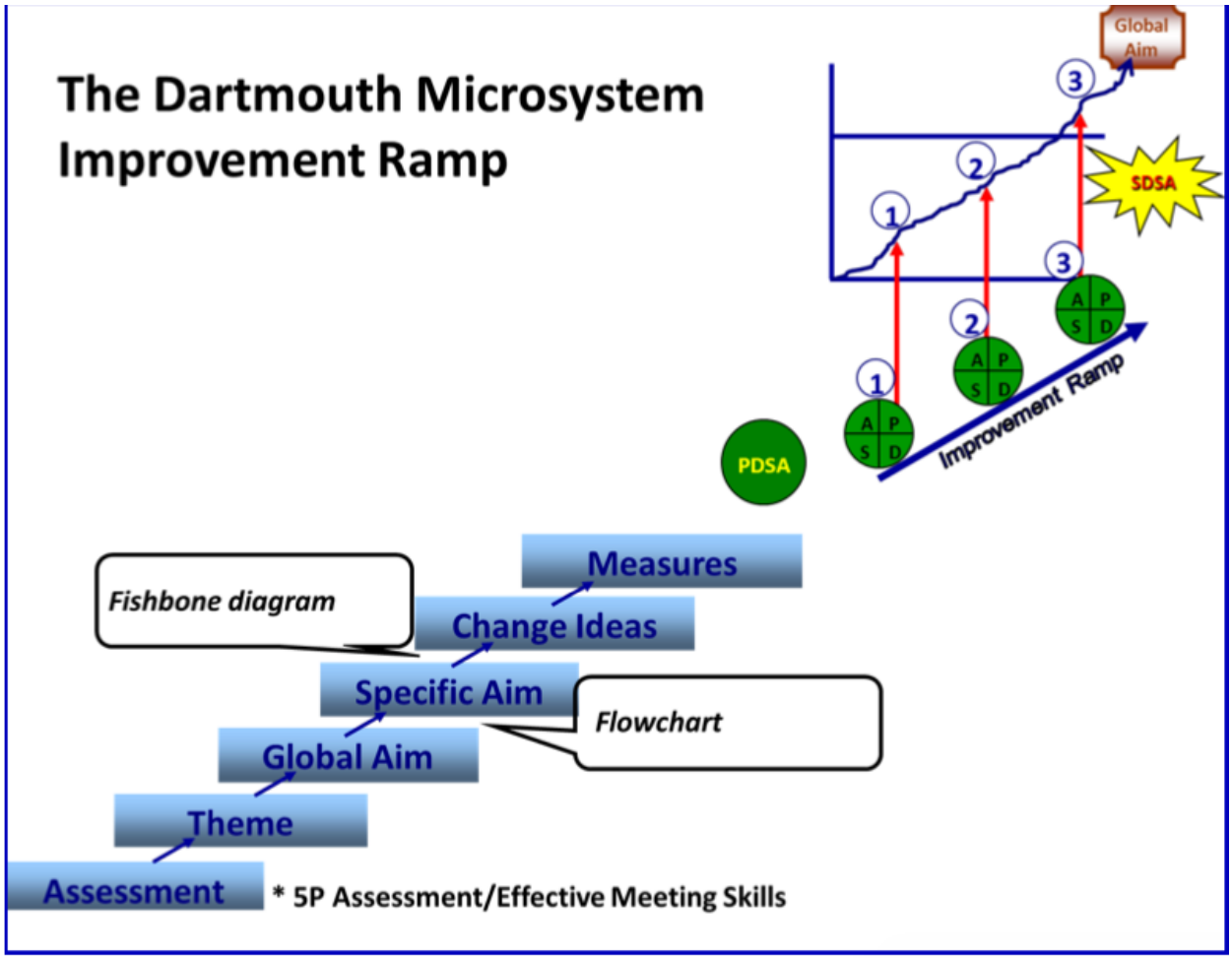
Figure 1

The Dartmouth Microsystem Improvement Ramp



Note. Each blue rectangles represents one step in the Improvement Ramp. Each step is designed to be completed in this consecutive order. The letters "PDSA" enclosed in the solid green circle represent the Plan-Do-Study-Act method used for testing improvement ideas and designed to be carried out in the same sequential order. The letters SDSA enclosed in the solid yellow star represent the change from Plan to Standardize once the specific aims are met. From "The Microsystem Improvement Ramp: A One Page book," by D. Anderson, 2014, Trustees of Dartmouth College; Sheffield Microsystem Coaching Academy (https://www.sheffieldmca.org.uk/UserFiles/File/Overview_of_Ramp_One_Page_Book.pdf). In the public domain.

Appendix A

Email Communication Alerting Circulators of Interventions

Figure A1

Preintervention Communication

Team,

Attached below is a link to a quiz on positioning surgical patients. The quiz is very short (10 questions) and should take less than 3 minutes to complete.

The reason for the quiz is to determine our collective strengths and weaknesses on patient positioning. This will guide where we need education and where we excel. Your answers to this quiz are anonymous. After completion please send me an email or text that you have completed the quiz, so I can mark you off the roster.

Responses are due by [insert date].

[insert quiz link]

If you have any questions or concerns, please feel free to message me, and thanks for you participation,

[insert name & credentials]

Figure A2

Education Communication

Team,
As many of you know, I am working towards obtaining my Doctor of Nursing Practice degree at [insert school here]. My DNP project is incorporated as a part of the surgical services performance excellence plan for 2023. Each of you are an integral part of the success of this work!

To be successful we need all circulators to complete the following three steps.
1) Please review the attached PowerPoint presentation on patient positioning for surgical procedures. This education comes from the Association of PeriOperative Registered Nurses and will take approximately 10 to 15 minutes to review. Please review in the normal view for access to important information in the notes section of each slide.
2) Follow the education, please take the quiz on the last slide of the education (this quiz has nine questions and should take about two minutes to complete).
3) After reviewing the education and taking the quiz you will need to either sign the employee roster that will be at the charge nurse desk, or you can e-mail text your name for completion credit.

Education will we need to be completed by [insert date] the first 5 people who complete the education and let me know will receive a $5 Starbucks gift card.

Figure A3

Subsequent Communication

Team,

This email is sent as a reminder to complete the educational materials and quiz by [date]. If you have already completed the education and quiz and have not signed off or let me know, please do so I can give you credit.

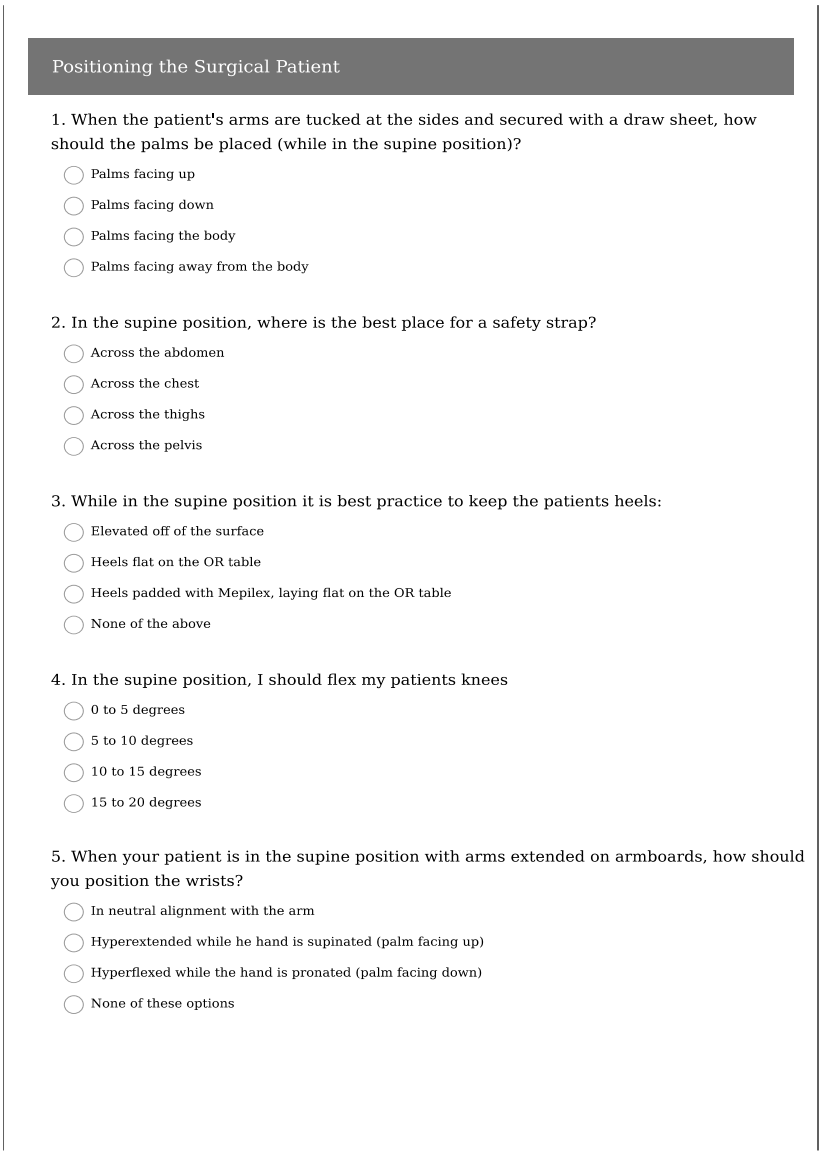
Thanks for your continued work,
[insert name and credentials]

Appendix B

Pre- and Post-Intervention Test Questions

Figure B1

Preintervention Test with Incorrect Question



Positioning the Surgical Patient

1. When the patient's arms are tucked at the sides and secured with a draw sheet, how should the palms be placed (while in the supine position)?

- ◯ Palms facing up
- ◯ Palms facing down
- ◯ Palms facing the body
- ◯ Palms facing away from the body

2. In the supine position, where is the best place for a safety strap?

- ◯ Across the abdomen
- ◯ Across the chest
- ◯ Across the thighs
- ◯ Across the pelvis

3. While in the supine position it is best practice to keep the patients heels:

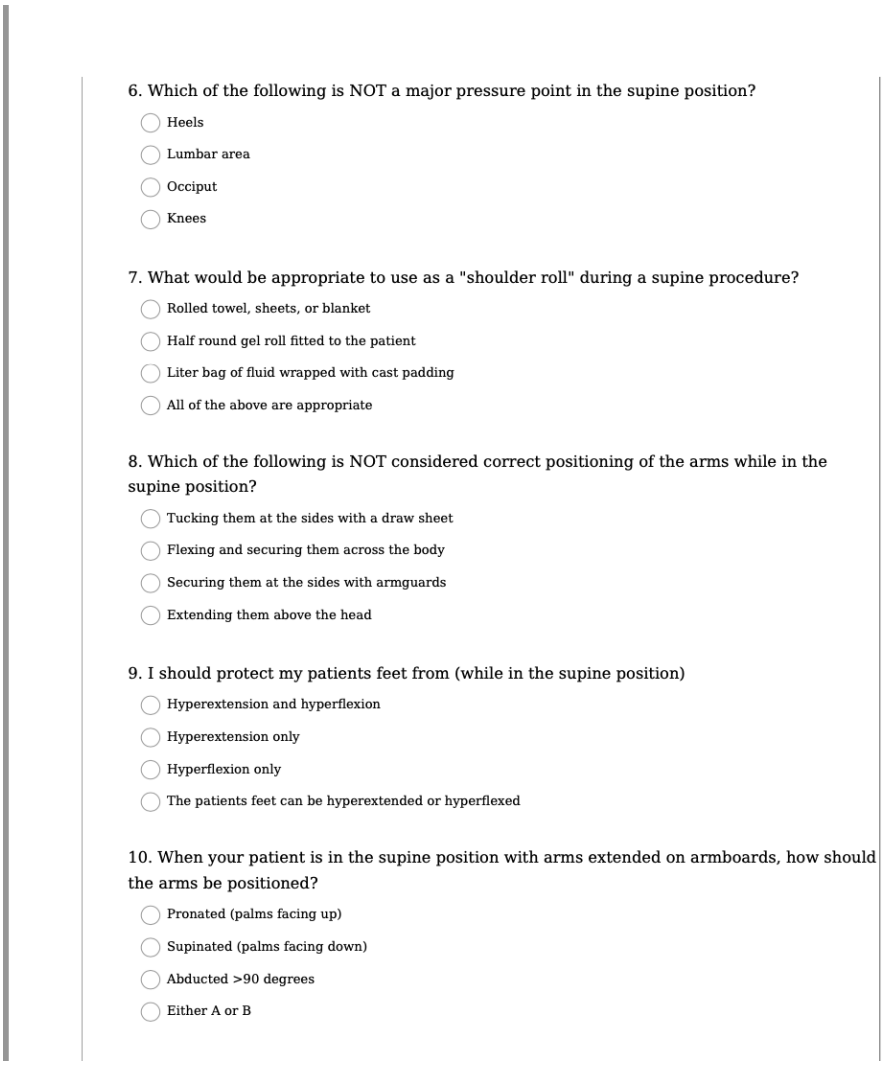
- ◯ Elevated off of the surface
- ◯ Heels flat on the OR table
- ◯ Heels padded with Mepilex, laying flat on the OR table
- ◯ None of the above

4. In the supine position, I should flex my patients knees

- ◯ 0 to 5 degrees
- ◯ 5 to 10 degrees
- ◯ 10 to 15 degrees
- ◯ 15 to 20 degrees

5. When your patient is in the supine position with arms extended on armboards, how should you position the wrists?

- ◯ In neutral alignment with the arm
- ◯ Hyperextended while he hand is supinated (palm facing up)
- ◯ Hyperflexed while the hand is pronated (palm facing down)
- ◯ None of these options



6. Which of the following is NOT a major pressure point in the supine position?

- Heels
- Lumbar area
- Occiput
- Knees

7. What would be appropriate to use as a "shoulder roll" during a supine procedure?

- Rolled towel, sheets, or blanket
- Half round gel roll fitted to the patient
- Liter bag of fluid wrapped with cast padding
- All of the above are appropriate

8. Which of the following is NOT considered correct positioning of the arms while in the supine position?

- Tucking them at the sides with a draw sheet
- Flexing and securing them across the body
- Securing them at the sides with armguards
- Extending them above the head

9. I should protect my patients feet from (while in the supine position)

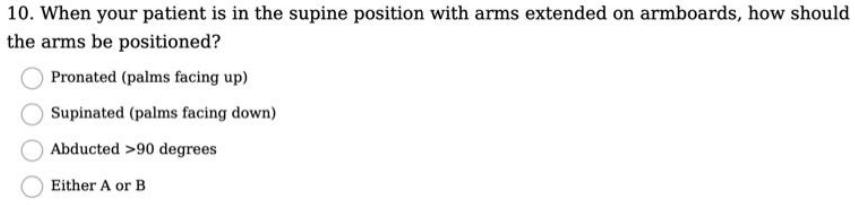
- Hyperextension and hyperflexion
- Hyperextension only
- Hyperflexion only
- The patients feet can be hyperextended or hyperflexed

10. When your patient is in the supine position with arms extended on armboards, how should the arms be positioned?

- Pronated (palms facing up)
- Supinated (palms facing down)
- Abducted >90 degrees
- Either A or B

Figure B2

Question Ten Showing Incorrect Definitions of Pronated and Supinated

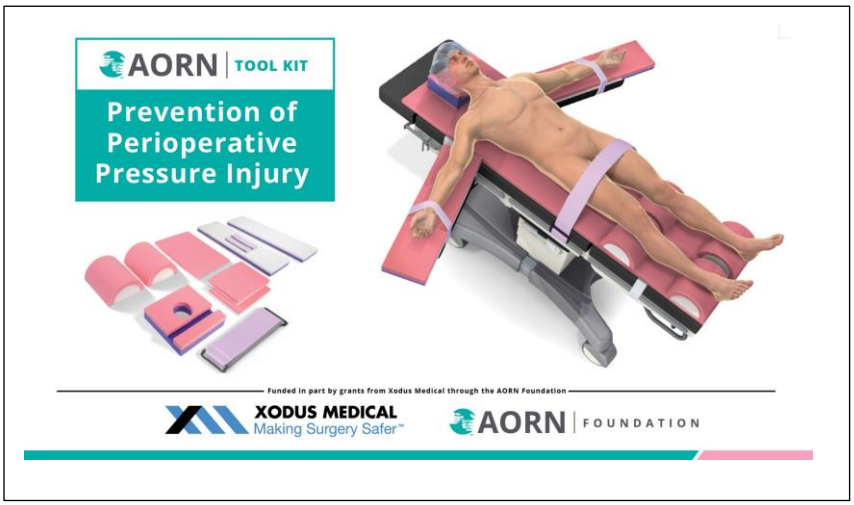


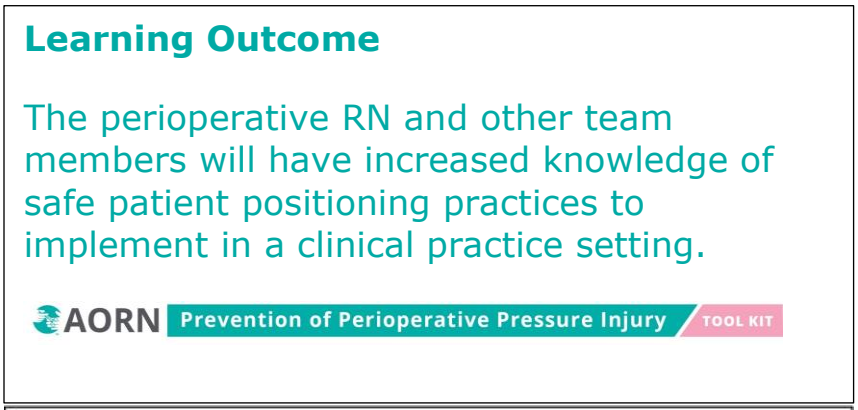
10. When your patient is in the supine position with arms extended on armboards, how should the arms be positioned?

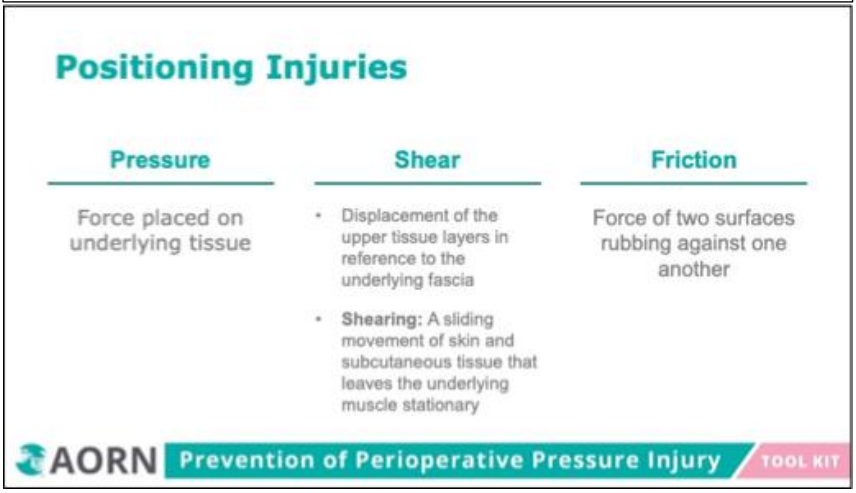
- Pronated (palms facing up)
- Supinated (palms facing down)
- Abducted >90 degrees
- Either A or B

Appendix C

Self-Directed Learning Module



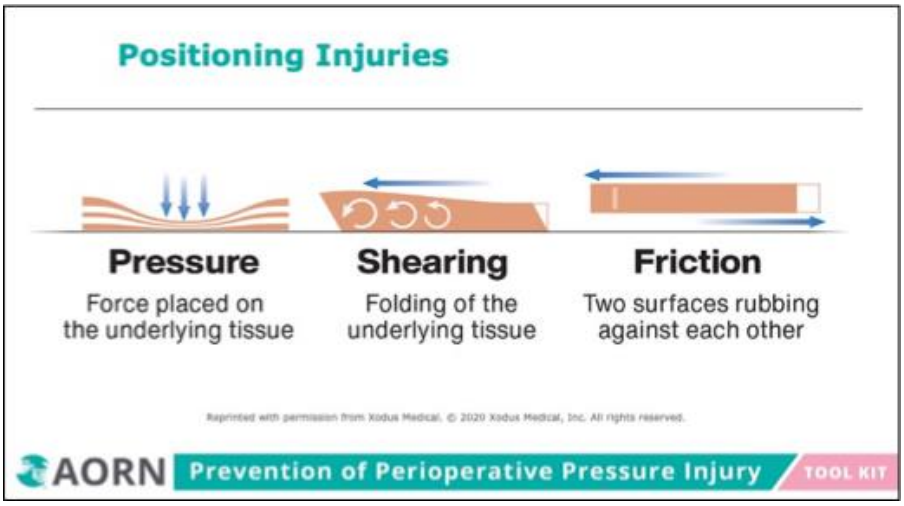


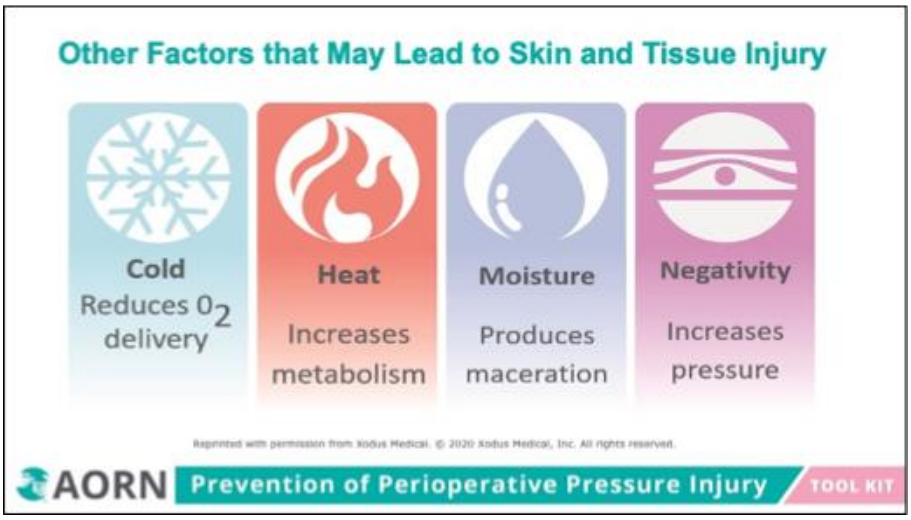


Note: **Pressure** can occur from the weight of the body as gravity presses it downward toward the surface of the bed or can results from the weight of equipment/personnel resting on/against the patient. **Shear**

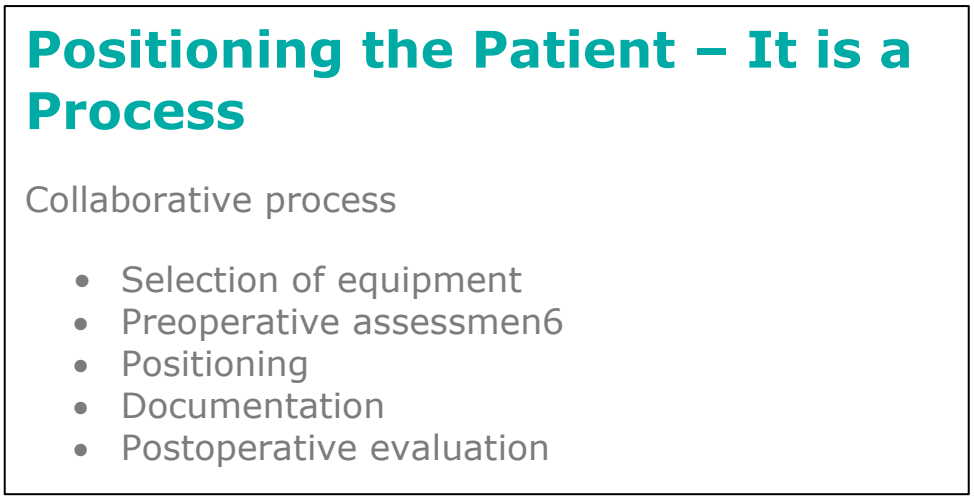
can occur when the head of the bed is raised or lowered and when the patient is placed in Trendelenburg position. **Friction** can occur when the body is dragged across the bed linens instead of being lifted.

-Friction can strip the epidermis and make the skin more susceptible to pain, infection, and pressure injury formation.

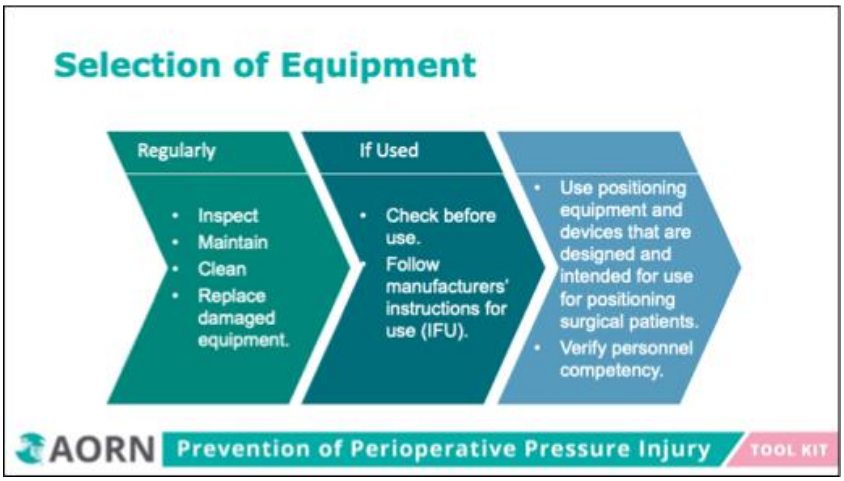




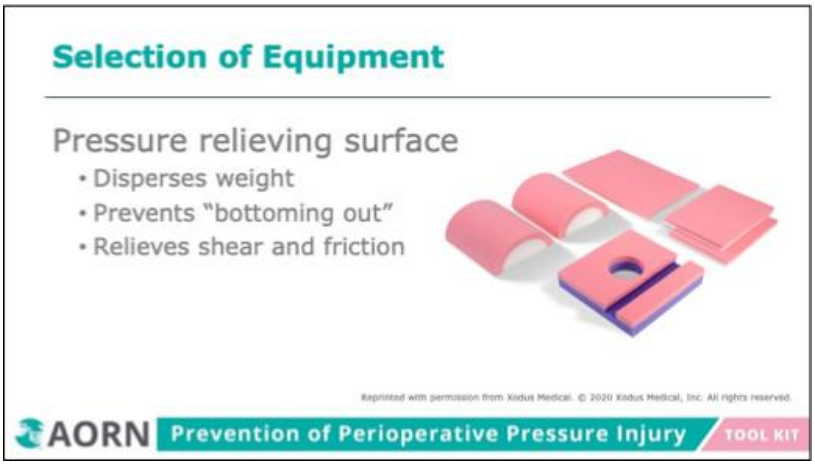
Note. Here are other factors that can increase the vulnerability of the skin and underlying tissues to injury: **Cold** environmental conditions can lead to hypothermia. **Heat** on the body surface increases the demand for oxygen. **Moisture** worsens the effects of pressure, shear, and friction. Maceration can occur when the patient perspires excessively or remains in a pool of prep or irrigation solution, blood, urine, or feces. **Negativity** occurs when layers of materials, such as extra sheets or blankets are placed over the OR mattress or padding. Extra linen is abrasive and diminishes the pressure-reducing properties of the mattress or padding. Therefore, extra layers of material between the patient and the OR bed mattress should be avoided as much as possible. Remember to take the extra seconds required to untie the patient's gown and ensure that the gown and blanket do not become lodged under the patient.



Note. Positioning the surgical patient is a collaborative process that involves the surgeon, anesthesia professionals, perioperative RN, and other perioperative team members (e.g., surgical techs, patient care associates).



Note. Positioning equipment should be used to **protect, support, and maintain** the patient's position with additional padding used to protect bony prominences.

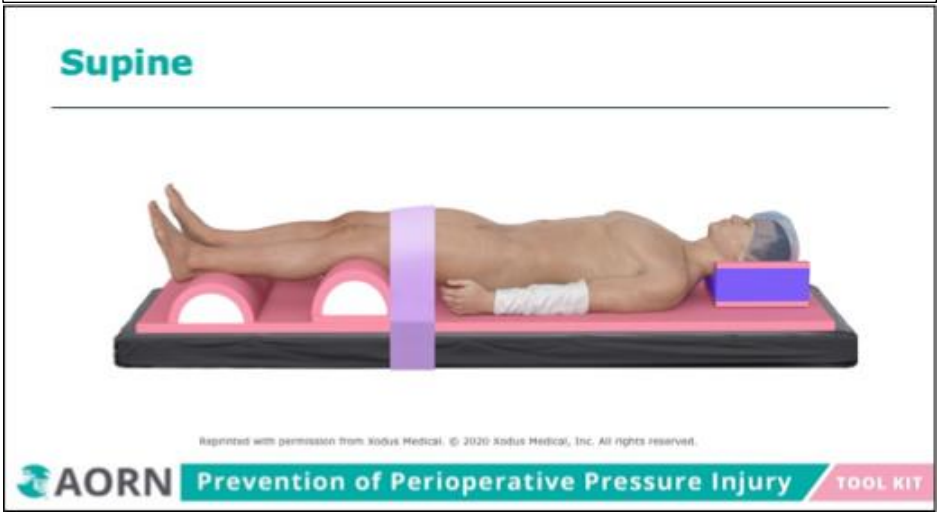


Note. **Rolled blankets and towels should not be used as positioning devices because they create pressure and do not redistribute the weight over a larger area.

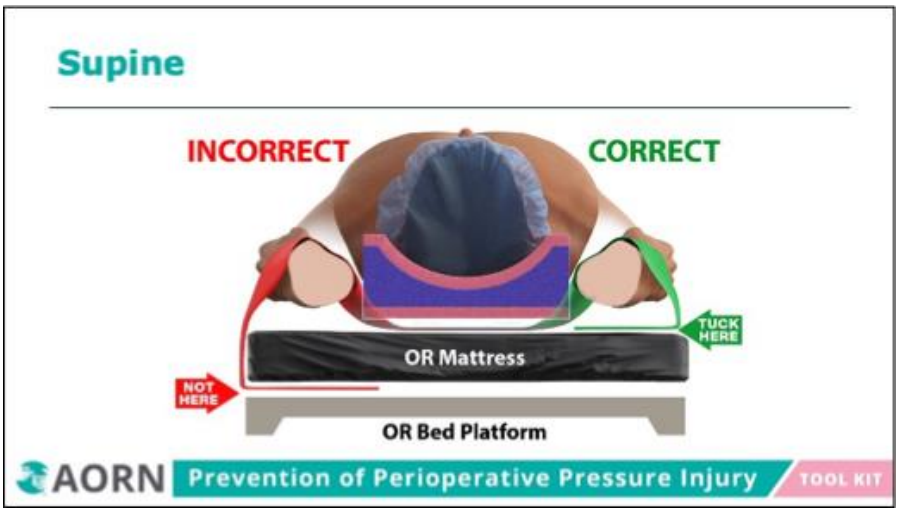
Surgical Positions

Although the choice of position for a particular procedure ultimately rests with the surgeon, the decision should be made in collaboration with the anesthesia professional, perioperative RN, and other appropriate members of the surgical team.

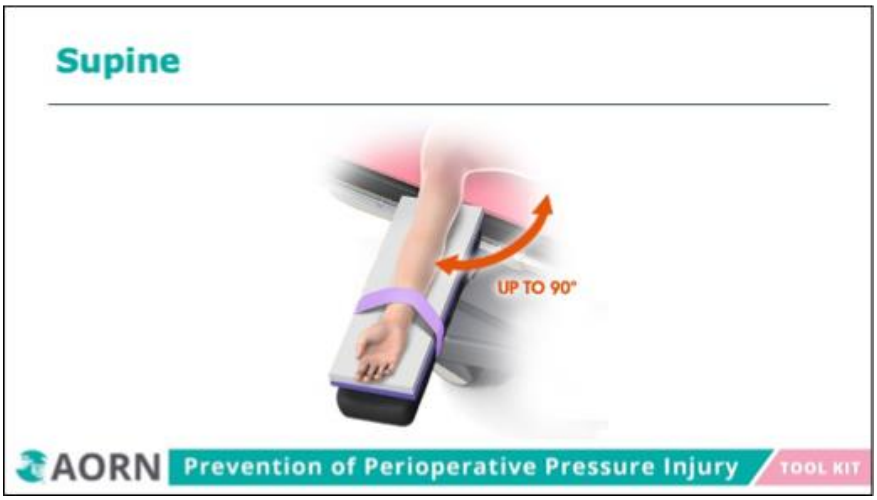
As an advocate for the patient, perioperative RNs should question the surgeon's chosen position if they believe it may compromise the patient's safety.



Note. The supine position is the most common surgical position. The pressure points of concern in this position are **the occiput, scapulae, arms, elbows, thoracic vertebrae, lumbar area, sacrum/coccyx, buttocks, and heels**. These areas should be adequately padded during the procedure. In this position: Arms should be tucked at the sides with a draw sheet, secured at the sides with arm guard's, flexed and secured across the body, or extended on arm boards. Arms should not be positioned above the patient's head; The safety strap should be placed across the thighs approximately 2 inches above the knees; The legs should be parallel with the ankles uncrossed; Heels should be elevated off the underlying surface; Knees should be flexed approximately 5 to 10 degrees; Feet SHOULD NOT be hyperflexed or hyperextended.



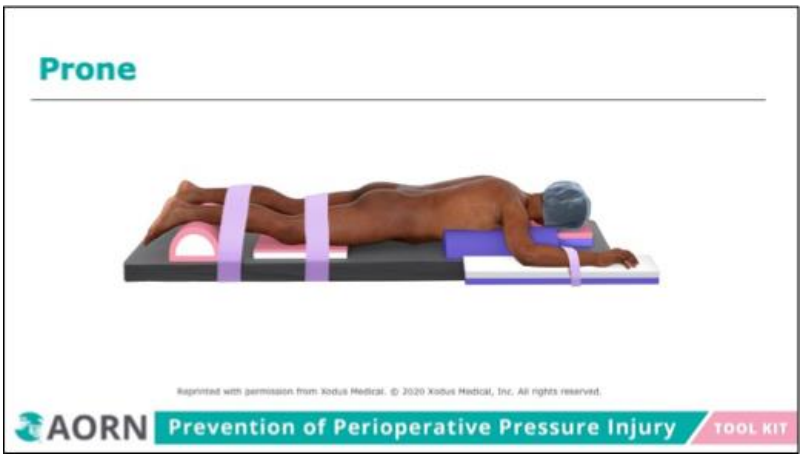
Note. When tucking the arms close to the body: Arms should be in a neutral position; Palms should face the body; Elbows should not be hyperextended; The drawsheet should be tucked under the patient and not be tucked under the mattress.



Note. If an arm board is used: The arm board should be padded with the pad level equal to that of the OR bed; Arms should be extended (abducted) at no more than a 90-degree angle at the shoulder; Palms should be supinated (palm up); Wrists and arms should remain in neutral alignment without hyperextension; Wrist restraints should be used to secure the arm to the arm board; however, these restraints should be padded and should not be secured too tightly.

Note. Trendelenburg position (feet higher than head). The pressure points of concern in this position are **the occiput, scapula, arms, elbows, vertebrae, lumbar, sacrum/coccyx, buttocks, and heels**. These areas should be adequately padded during the procedure. Patients should be placed in the Trendelenburg position for the shortest amount of time possible. The patient should be taken out of Trendelenburg position slowly to allow the body to readjust to the change in blood volume.

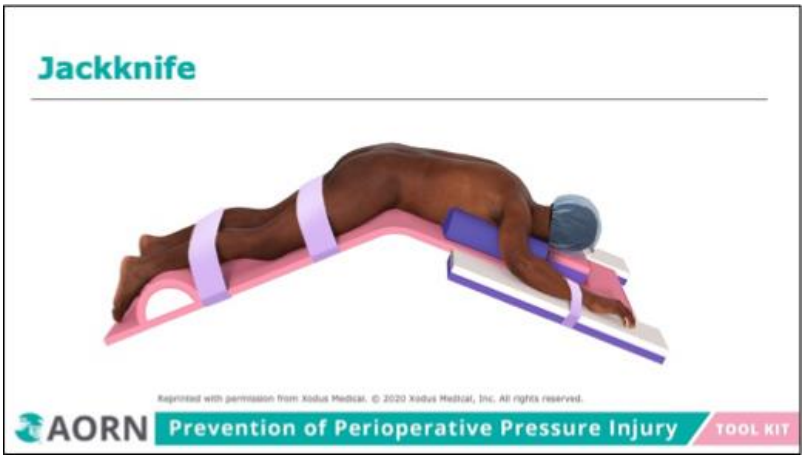
Note. Reverse Trendelenburg (feet are lower than the head). A well-padded foot board should be used to help maintain alignment. Lumbar and small pillows placed under the knees may help to prevent the body from slipping while lessening strain on the patient's back and legs.



Note. The pressure points of concern in this position are **the forehead, ears, chin, chest/breast, lower costal margins, iliac crest, genitalia, knees, shins, dorsum of feet, and toes**. These areas should be adequately padded during the procedure. In this position: Place a headrest under the patient's head; Head should be positioned in neutral forward position without significant neck flexion, extension, or rotation; Place two large chest rolls from the clavicle to the iliac crest; Female breasts should be moved laterally; Male genitalia should be hanging free; Loosely hanging skin folds should not be crimped under the patient.

In this position: Toes should be elevated off the bed by padding under the patient's shins; Knees should be padded; Arms should be placed at patient sides, or Arms should be placed on arm boards at less than a 90-degree angle at the shoulder, with elbows flexed and palms facing downward; Hands and wrists should be kept in normal alignment; Avoid placing the patient's arms above his or her head.

A stretcher or transport cart should be immediately available for emergency repositioning into the supine position for cardiopulmonary resuscitation should the need arise.



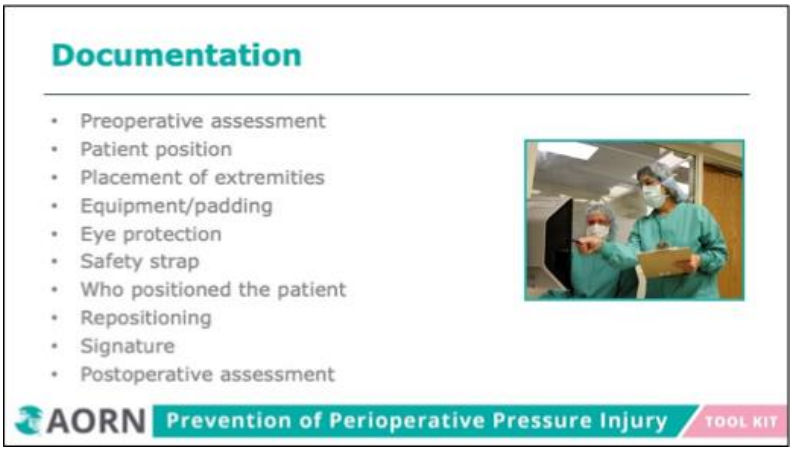
Note. The jackknife, or Kraske, position is a variation of the prone position and thus requires the same precautions. It has been said that this is the most dangerous of all surgical positions.

Note. In the lateral position, the patient is positioned on the nonoperative side. When documenting, a right lateral position means the patient is lying on his or her right side. This position provides exposure for a left-sided procedure. The pressure points of concern in this position are the **side of face and ear, shoulder, arms, dependent axilla, dependent hip, legs, dependent knee, ankles, feet.** There have been reports of pressure ulcers occurring on the dependent thorax after use of wrapped IV fluid bags being used as axillary rolls.

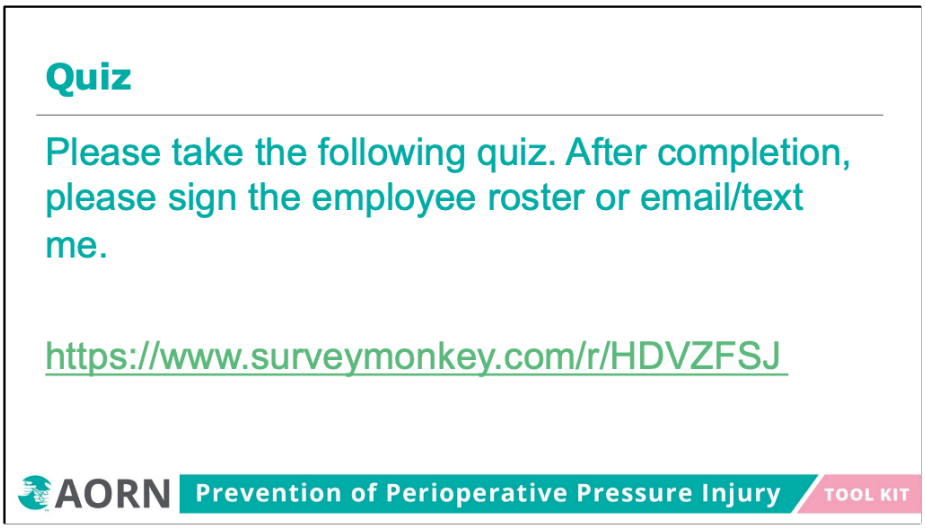
In the lateral position: Upper arm should be secured on a padded arm board in front of the patient; Lower arm should be flexed and placed on a separate padded arm board; An axillary roll should be

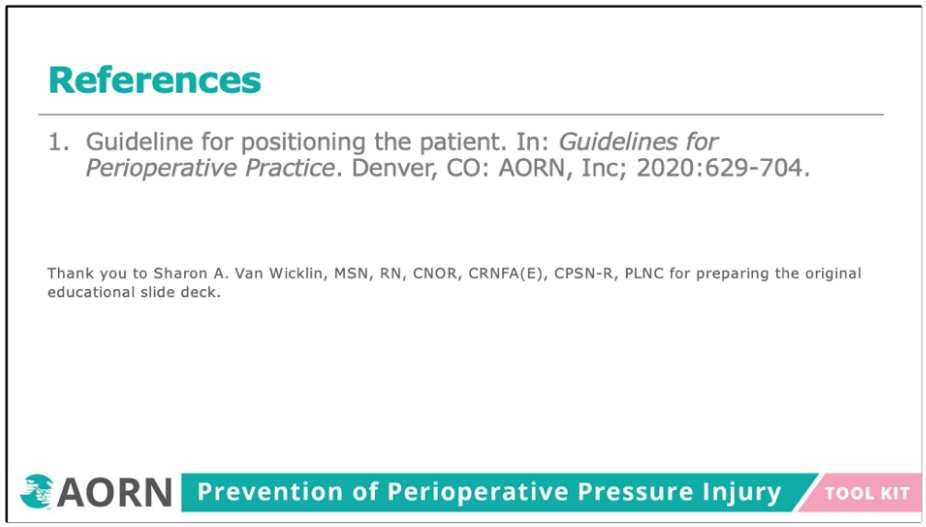
placed under the rib cage, posterior to the axilla; Lower leg should be kept flexed; Upper leg should be kept straight; A pillow should be placed between the legs; Padding should be used under the knee, ankle, and foot of the dependent leg; A headrest or pillow should be placed under the head.

There is an increased risk for ulceration when a solid object or positioning device (e.g., bean bag) is used to maintain a patient in this position. Vulnerable areas should be adequately padded during the procedure.



The perioperative RN should be diligent in documenting any actions taken related to patient positioning. At a minimum, the following information should be documented: Preoperative assessment documented by pre-op nurse; Patient position throughout the operative process; Position of the patient's upper extremities (e.g., extended on arm boards at < 90 degrees with palms up); Position of the patient's lower extremities; Type and placement of positioning equipment and devices (e.g., stirrups, gel rolls, padding); Precautions to protect eyes (e.g., taped, goggles, drops); Presence and placement of safety strap or equivalent; All persons involved in positioning activities; Repositioning activities during the procedure; Electronic sign-off of person who completed the documentation; Postoperative assessment.


Quiz
Please take the following quiz. After completion, please sign the employee roster or email/text me.
https://www.surveymonkey.com/r/HDVZFSJ
AORN
Prevention of Perioperative Pressure Injury
TOOL KIT


References
1. Guideline for positioning the patient. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2020:629-704.
Thank you to Sharon A. Van Wicklin, MSN, RN, CNOR, CRNFA(E), CPSN-R, PLNC for preparing the original educational slide deck.
AORN
Prevention of Perioperative Pressure Injury
TOOL KIT

Appendix D

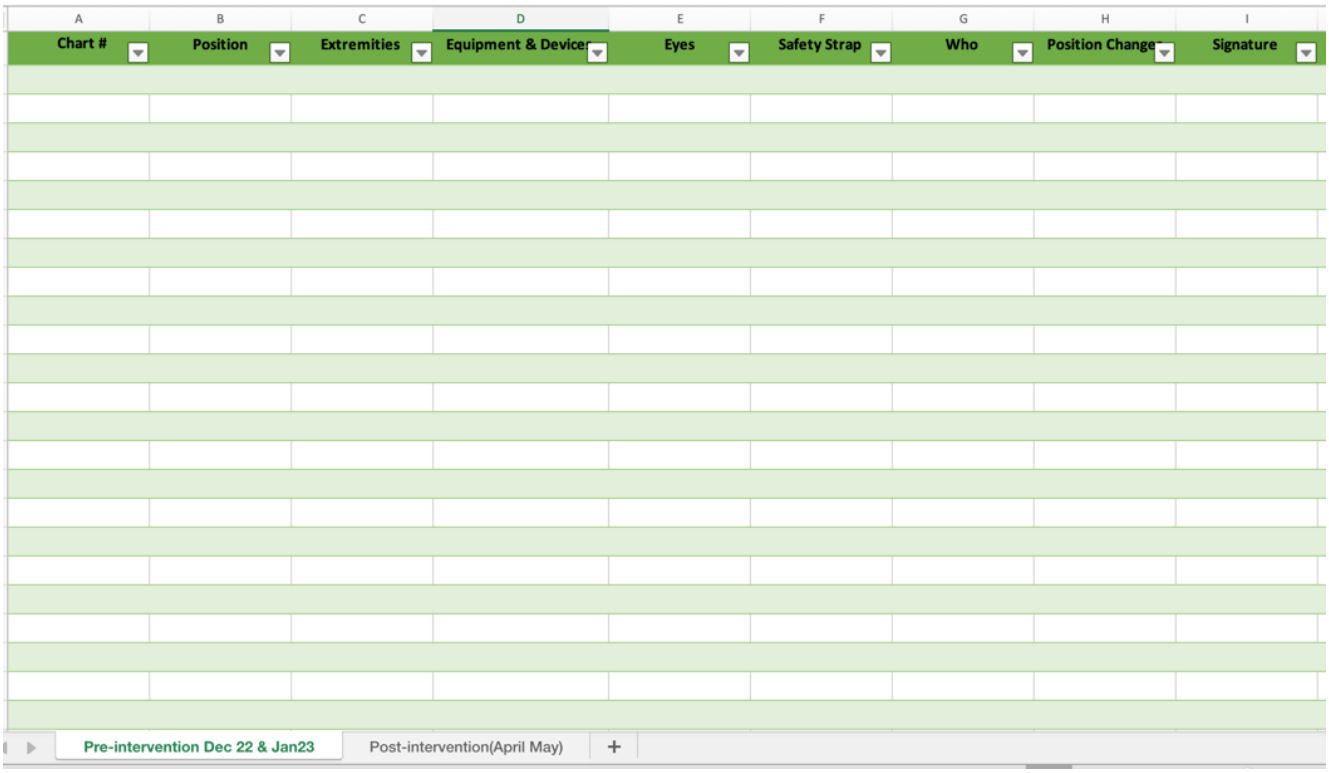
Visual Checklist of Positioning Elements for Documentation

Patient positioning documentation elements:

- overall skin condition on arrival and discharge from the perioperative suite (pre- and post-operative skin assessment tabs)
- position
- placement of extremities
- type and placement of positioning equipment and devices (e.g., gel rolls, padding, and restraints)
- precautions to protect eyes
- presence and placement of safety strap or equivalent
- who positioned the patient (check off boxes)
- any changes made in positioning during the procedure (if applicable)
- The name of the circulator DOCUMENTING positioning goes at the top or bottom of the comment section (e.g., John Snow, RN)

Appendix E

Chart Audit Data Collection Tool



Instructions: Insert a “1” if the positioning element is included in the intraoperative patient positioning documentation, or “2” if the positioning element is not included.

Appendix F

Example of Preintervention Test Scores in SPSS

	Scores	QuizNum
1	44.00	1.00
2	67.00	1.00
3	78.00	1.00
4	100.00	1.00
5	67.00	1.00
6	78.00	1.00
7	89.00	1.00
8	100.00	1.00
9	67.00	1.00
10	78.00	1.00
11	56.00	1.00
12	67.00	1.00
13	56.00	1.00
14	67.00	1.00
15	67.00	1.00
16	78.00	1.00
17	67.00	1.00
18	78.00	1.00
19	67.00	1.00
20	89.00	1.00
21	78.00	1.00
22	56.00	1.00
23	89.00	1.00
24	67.00	1.00

Appendix G

Example of Chart Audit Data After Export to SPSS

	Group	Position	Extremities	Eyes	SafetyStrap	Who	Position Changes	EquipmentampDevices	Signature	ElementsDocumented
1	1.00	2.00	2.00	2.00	2.00	2.00	2.00	0	2.00	.00
2	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1	2.00	6.00
3	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1	2.00	6.00
4	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1	2.00	6.00
5	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1	2.00	6.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	2.00	7.00
7	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
8	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
9	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	5.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1.00	8.00
11	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
12	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
13	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
14	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1	2.00	5.00
15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1.00	8.00
16	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1	2.00	5.00
17	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
18	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
19	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
20	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
21	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
22	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
23	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00
24	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1	2.00	6.00