

Development of Injuries resulting from Surgical Positioning

Letícia Veroneze¹, Gercilene Cristiane Silveira², Cássia Marques da Rocha Hoelz³,
Elcie Aparecida Braga de Oliveira⁴, Anelvira Oliveira Florentino⁵, Cláudia Rosana Trevisani Corrêa⁶,
Amanda Aparecida Camargo de Oliveira⁷, Felipe Cesar Aparecido Canato Malagutti Brasil⁸,
Marceline Vieira Camargo Costa Luz⁹, Adriane Lopes¹⁰

¹Nursing student at Faculdades Integradas de Jaú, São Paulo, Brazil

Email: leeveroneze@gmail.com

ORCID: 0000-0001-7739-4915

²Master of Science in Clinical Research, Lecturer at the Integrated Colleges of Jaú in the undergraduate course in Nursing Jaú, São Paulo, Brazil

Email: ger_silveira@hotmail.com

ORCID: 0000-0002-1642-6917

³PHC Nurse at the Bauru City Hall Health Department (SP)/Lauro de Souza Lima Institute (SES/SP)

Email: cassiahoelz@bauru.sp.gov.br

ORCID: 0000-0001-8721-9969

⁴Nurse Secretary of Health of the City Hall of Bauru (SP)/Lauro de Souza Lima Institute (SES/SP)

Email: elcieoliveira@bauru.sp.gov.br

ORCID: 0000-0001-6364-0345

⁵Paulista State University. Botucatu, São Paulo - Brazil

Email: anelviraflorentino@yahoo.com.br

ORCID: 0000-0001-8628-0565

⁶PhD student in Collective Health Faculty of Medicine of Botucatu Paulista State University (Unesp) Botucatu, SP, Brazil

Email: crtcorrea@gmail.com

ORCID: 0000-0002-3158-8666

⁷PhD in Pathophysiology in Internal Medicine at the Faculty of Medicine of Botucatu UNESP Paula Souza Center

Email: amanda.camargo.oliveira@hotmail.com

ORCID: 0000-0002-4838-7561

⁸Enfermeiro da Prefeitura Municipal de Bauru, São Paulo, Brasil

Email: lopesadriane98@gmail.com

ORCID: 0000-0002-8887-3716

⁹Occupational Nurse and Professor at Paula Souza Center Itapetininga, São Paulo, Brazil

Email: enf.marceline_camargo@outlook.com

ORCID: 0009-0009-0023-8784

¹⁰Master in Administration, Education and New Technologies/ Professor at Faculdades Integradas de Jaú, São Paulo, Brazil/Faculdades Gran Tietê da Barra Bonita, São Paulo, Brazil.

E-mail: lopesadriane98@gmail.com

ORCID: 0000-0001-7221-7012

Abstract: *The aim was to analyze in the literature the main interventions regarding the development of pressure injuries resulting from surgical positioning. This is a literature review study. Thus, we searched for studies in three databases: PubMed, LILACS and Web of Science with the following search strategy: "Patient Positioning" AND "Wounds and Injuries" AND "Surgery". Of the six articles that were included in this review, it was noticed that overweight, prone and lateral positioning were crucial for the high rate of IAPI. Two studies dealt with the relevance of silicone foam dressings as a preventive method for the development of lesions. The other three articles describe the importance of two distinct scales that allow the identification of the risk of injury resulting from surgical positioning. It is concluded that, with the advancement of technology and the development, application and implementation of interventions during surgical procedures, they significantly reduce important pressure injuries in patients who need to spend long hours during surgery.*

Keywords: Surgical Positioning, Nursing Care, Patient Safety, Perioperative Nursing, Pressure Injury

1. Introduction

Surgical positioning is a highly complex procedure

performed by the Nursing team in partnership with the anesthetic and surgical teams. That is, it requires the Nurse to consider the surgeon's preferences for better exposure of

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the surgical site, the surgical technique to be performed and the necessary access for medication administration, along with the monitoring and ventilation of the patient performed by the anesthesiologist [1, 2].

During the perioperative period, the nurse acts in the management of the Nursing team and in partnership with the anesthetic. In addition, as the person in charge of the Surgical Center, he is responsible for evaluating the patient as a whole. For this, it is necessary to know the anatomical and physiological changes resulting from the surgical positioning of the patient, since this procedure, when performed improperly, can cause pressure injuries as a result of the positioning [1, 2].

With the technological advances in the area of surgery, changes in procedures and techniques adopted in the various specialties imply the use of new equipment, innovative care practices, improvement of medications and new features to protect the patient [1-3].

Faced with this, there is a growing need for trained professionals who are constantly updated to keep up with technological and health care development. This trend is reflected in the concern of health providers to increasingly ensure the improvement of the quality of care provided and to avoid risks to the patient's health, developing, for example, checklists to ensure patient safety [2, 4, 5].

Among these checklists is the Risk Assessment Scale for the Development of Injuries Due to Surgical Positioning (ELPO), created and validated by a Brazilian nurse during her PhD. Currently, this scale encompasses seven items: type of position, duration of surgery, type of anesthesia, support surface, limb position, comorbidities and patient age. Each of these is organized with five sub-items that indicate from the lowest to the highest risk situation. Thus, the scale score ranges from 7 to 35, and the higher the value, the greater the risk of the patient developing complications resulting from surgical positioning. In order to further facilitate the interpretation of the score, a cutoff score was

statistically defined, with this value being 19, from which it is possible to identify patients at higher risk [6, 7].

In this context, there is a need to develop strategies for the implementation of effective actions that help and guide the Nursing professional in detecting probable risks or even imminent risks for each surgical patient, as well as employing them in clinical practice to decision-making aimed at achieving the best care, implying the prevention of complications or their solution in a timely manner [2].

Given the above, the objective was to analyze the main interventions in the literature regarding the development of pressure injuries resulting from surgical positioning.

2. Methods

This is a literature review study, which consists of systematically presenting an analysis of the bibliographic production, focusing on temporality in order to provide a state of the art on the proposed theme, thus noting new knowledge, which have evidence in the literature [8].

Thus, the PICO strategy was used (P: patient, I: intervention, C: comparison: O: outcome), to elaborate the research question: "How to prevent pressure injuries during surgery?" [9].

Chart 1: PICO Strategy. Jaú, SP, Brazil, 2023

P	surgical patient
I	prevention
C	Risk of injury due to surgical positioning
O	preventing injuries during surgery

Thus, we searched for scientific papers in three databases: PubMed, LILACS and Web of Science with the following descriptors, as shown in Chart 2.

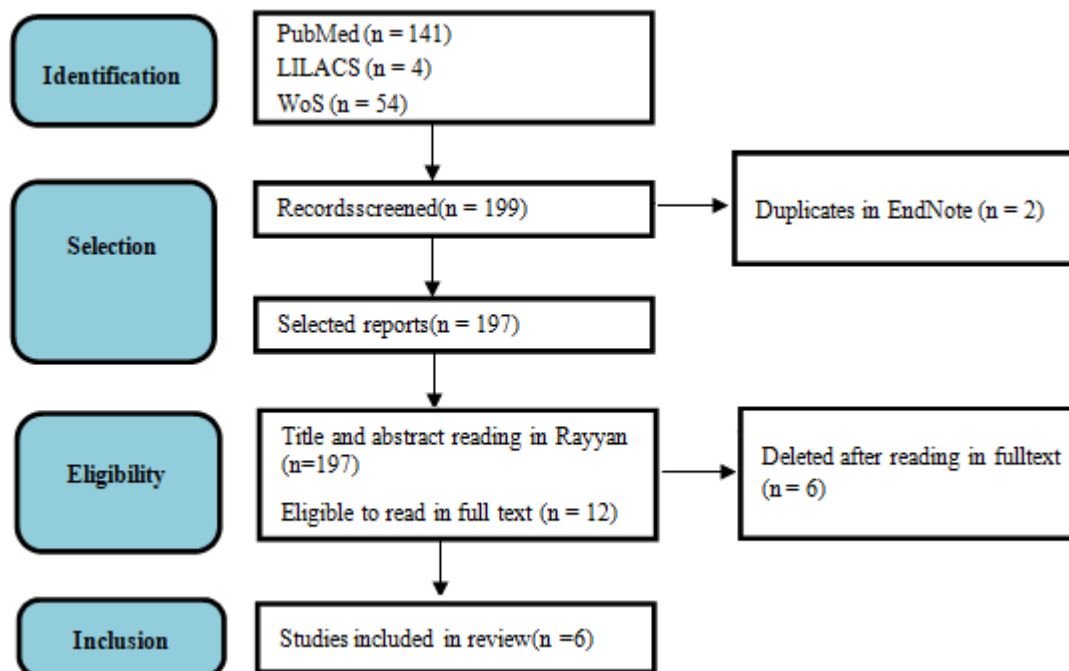
Chart 2: Search in databases with the selected descriptors. Jaú, SP, Brazil, 2023

Database	Descriptor	Number of articles found
PubMed	(Patient Positioning) AND (Wounds and Injuries)) AND Surgery)	141
LILACS	atient Positioning [Words] and Wounds and Injuries Words] and Surgery [Words]	4
WoS	(Patient Positioning) AND (Wounds and Injuries)) AND Surgery)	54

As inclusion criteria, the following were adopted: 1) factors related to pressure injuries; 2) prevention; 3) pressure injury resulting from surgical positioning.

The following were excluded: patents, citations, works that did not have full text available; those whose links were in

error, preventing access to the document; those related to other topics. Selected articles were exported to exclude duplicates in EndNote and later titles and abstracts were analyzed in the free version of the Rayyan online software.



Flowchart 1: Search and selection of studies. Jaú, SP, Brazil, 2023

3. Results and Discussion

Only six eligible articles were included in this study. The selected articles were classified into themes as shown in Chart 3.

Chart 3. Distribuição dos trabalhos que foram utilizados para análise da pesquisa, de acordo com a temática. Jaú, SP, Brazil, 2023

Title	Author/Year	Objective/ Method	Final Considerations
Identification of Risk factors for Intraoperative acquired Pressure Injury n Patients Undergoing neurosurgery: A retrospective single- Center Study	Wu et al., 2021	Explore independent risk factors for intraoperative acquired pressure injury (IPI) in patients undergoing neurosurgery. Retrospective study analyzing a total of 465 patients screened using the Scott Triggers preoperative Rating Scale.	The present study indicates that overweight, prone and lateral positioning, head frame use, and longer surgical times are associated with an increased risk of IAPI in patients undergoing neurosurgery.
Effect of Soft Silicone foam Dressings on intraoperatively Acquired pressure Injuries: A randomized Study in patients Undergoing spinal Surgery	Yang; Shin, 020	Examine how the use of a soft silicone foam dressing affects the development of intraoperative acquired pressure injury IAPIs in patients undergoing spinal surgery o obtain baseline data that support evidence-based nursing care. Self-controlled clinical study with 4 patients requiring thoracic or lumbar surgery.	The results of this study show that any stage 1 IAPIs resolve with time and that the use of soft silicone foam dressings during spinal surgery can significantly reduce API rates.
High body mass index is a strong predictor of intraoperative acquired pressure injury in spinal surgery patients when prophylactic film dressings are applied: a retrospective analysis prior to the BOSS Trial	Yoshimura et al., 020	Assess the incidence and extract risk factors for intraoperative acquired pressure injury (IAPIs) in cases where the polyurethane film dressing was used against IAPIs before the trial period. two-center retrospective cohort study between August 2014 and June 2015 using medical records in the operating room.	The application of soft silicone multilayer foam dressings is important to prevent the development of IAPIs in patients with high BMI values.
Development and validation of a nomogram or predicting the risk of pressure injury in adult patients undergoing abdominal surgery	Feng et al., 2022	Develop a nomogram to predict pressure injury (PU) risk in adult patients undergoing abdominal surgery and to validate its effectiveness in these patients. This study retrospectively included 1,247 adult patients undergoing abdominal surgery and postoperative supervision in the ICU at a tertiary hospital in western China between January 2017 and December 2020.	Compared with the Braden scale, the nomogram showed better predictive performance. This nomogram is informative and has the potential to better guide are givers towards risk stratification and prevention of PI, although it requires further validation.
Risk for injury in surgical positioning: scale validation in a rehabilitation hospital	Nascimento; Rodrigues, 2020	Validate the Risk Assessment Scale or the Development of Injuries Due o Surgical Positioning in the stratification of the risk of developing injuries in perioperative patients of	The validation of the scale is evidenced by the association of cores with the appearance of injuries, therefore, it is a valid and useful tool, and may guide the

		a rehabilitation hospital. Analytical and longitudinal study, with a quantitative approach.	clinical practice of perioperative nurses in a rehabilitation hospital in reducing the risk of injuries resulting from the surgical position.
Surgical positioning: prevalence of injury risk in surgical patients	Trevilato et al., 018	Determine the prevalence of patients at risk of developing injuries resulting from surgical positioning. Cross-sectional study, carried out in a private hospital located in the southern region of Brazil. Random sample of 378 adult patients undergoing elective surgeries between January and September 2017. The Risk assessment Scale for the development of Injuries Due to surgical Positioning was applied.	The ELPO allowed to determine the prevalence of risk for injuries in patients undergoing elective procedures, identifying that the risks more related to the position surgery than with the size of the surgery.

Of the six articles that were included in this review, it was noticed that overweight, prone and lateral positioning were crucial for the high rate of IAPI. Two studies dealt with the relevance of silicone foam dressings as a preventive method for the development of lesions. The other three articles describe the importance of two distinct scales that allow the identification of the risk of injury resulting from surgical positioning.

It is known that currently the identification of individual risks is the gold standard for the implementation of nursing care through the prevention of complications. In this sense, it is necessary to implement and use the risk assessment scale in nursing care in different surgeries, as a premise for decision-making on the implementation of the care provided [10].

Researchers investigated the incidence of perioperative pressure injuries derived from surgical positioning and found the following rates: 12.2% in Portugal (4), 12.7% in Italy (5) and 13% in the United States of America (6).

In Brazil, the occurrence of PI due to surgical positioning was noticed in comparison with other countries: 25% in Paraná (7), 74% in the municipality of Triângulo Mineiro (1) and 10.1% in the city of São Paulo (8) [11].

Risk factors associated with PI in surgical patients are divided into two groups: intrinsic, such as age, body weight, nutritional status and chronic diseases such as diabetes mellitus, vasculopathies, neuropathies, hypertension and anemia; and extrinsic, for example, type and duration of surgery, anesthesia, surgical positions and positioning. The intensity of these factors and the duration of the anesthetic-surgical procedure show the greater or lesser risk of developing PI, which can be observed after the end of the procedure and rapidly increase. The most common sites for the development of PI due to surgical positioning are: sacral region, calcaneus, chin region and trochanters [12]. As technology advances and mattresses are created, silicone dressings, foam and other positioning devices continue to evolve, and this is important for the perioperative period. The main safety feature consideration for positioning equipment is that it redistributes pressure, especially on bony prominences in the patient's body [13,14].

Effective interventions in the prevention of skin lesions are related to pressure relief during and immediately after the patient remains on the surgical table on the standard mattress.

Examples of more effective devices in preventing this type of injury are: micropulsating air mattress, dry viscoelastic polymer mattress cover and gel pads, in addition to multilayer silicone foam dressings, which are important for the prevention of PI in patients with high BMI [11,13-15].

It is also worth highlighting the light technologies that are used in scale format. The development of these depends on the constant search for evidence that helps in the decision making of the health professional. This search for recent evidence is healthy, and has been discussed by researchers with the advent of Evidence-Based Practice. However, we still face barriers to the implementation of EBP in nursing, such as lack of nurses' time and encouragement from health institutions, difficulties in transferring research results to clinical practice, and also the lack of studies with strong evidence [2, 16].

The Risk Assessment Scale for the Development of Injuries Due to the Patient's Surgical Positioning (ELPO) was developed during the doctorate of nurse Camila Mendonça de Moraes Lopes, at the School of Nursing of Ribeirão Preto, University of São Paulo (EERP-USP), completed in 2014. After the elaboration of the first version of the scale, its apparent and content validation was carried out by 30 judges and a field research was carried out to carry out its concurrent validation, predictive validation and interobserver reliability. The validation study proved that the ELPO is a reliable and valid instrument to identify the risk of surgical patients to develop injuries resulting from their positioning, such as pain and pressure injuries [7].

ELPO provides nurses with autonomy and subsidies that enable nursing to act quickly and safely to ensure the best for the patient. ELPO is being widely used in scientific research throughout Brazil, and its cross-cultural validation is also being carried out in Europe and is already being used to direct care in several hospitals in the South and Southeast regions of Brazil. The correct identification of risks ensures that care is implemented in those patients who really need it. Often, in the operating room, decisions have to be taken quickly and, in this case, the best interventions may be for those patients who are not at as much risk [7].

The need for nurses to use instruments or checklists that guide the implementation of nursing care is evident, through the identification of probable risks or even imminent risks of each surgical patient, in order to then promote the prevention of complications in the surgical postoperative period [10].

The studies presented in relation to pressure injuries resulting from poorly performed surgical positioning show musculoskeletal pain, skin and peripheral nerve injuries as one of the main complications related to surgical positioning. In another research, the results indicate that, of the 172 participants, 12.2% were affected by injuries resulting from surgical positioning, five of the 172 patients who participated in the research had more than one type of injury (26 injuries in total), 9.9% of patients reported severe pain at pressure points, 4.7% had peripheral nerve injuries and 0.6% had erythema [17].

4. Conclusion

In this study, it was possible to perceive that the main interventions regarding the development of pressure injuries resulting from surgical positioning were related to the high body mass index of each patient, in addition to the application of important scales that quantify the risk of PI.

Thus, with the advancement of technology and the development, application and implementation of interventions during surgical procedures, significantly reduce important pressure injuries in patients who need to spend long hours during surgery. In this context, using foam dressings with silicone layers, performing, through the results of scores analyzed on the nomogram and ELPO scales, guarantee the quality, safety and reduction of the risks of developing lesions.

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