# APPLICATION OF THE RISK ASSESSMENT SCALE FOR THE DEVELOPMENT OF INJURIES DUE TO SURGICAL POSITIONING

## *Aplicação da escala em avaliação de risco para o desenvolvimento de lesões decorrentes do posicionamento cirúrgico do paciente*

## *Aplicación de la escala en la evaluación de riesgos para el desarrollo de lesiones derivadas del posicionamiento quirúrgico del paciente*

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**ABSTRACT: Objective:** To identify whether there are consecutive risks of surgical positioning through the application of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning (ELPO). **Method:** Observational, descriptive, cross-sectional study with a quantitative approach, carried out in a teaching hospital located in the north of the state of Ceará, Brazil. Two instruments were used, a clinical-epidemiological profile based on a structured interview and the ELPO scale, applied in the perioperative period to 31 surgical patients. **Results:** Most patients were men, mixed-race, and aged between 18 and 39 years. The most frequent procedures were debridement and fracture reduction, in accordance with hospitalizations due to motorcycle accidents. When evaluating the patients as for the risk of injuries due to surgical positioning, all subjects had ELPO score≤19, that is, they presented a lower risk for the development of injuries. **Conclusion:** The study allows for the profile of patients undergoing surgical procedures in the institution to be known, as well as the characterization of the participants regarding the risk of developing injuries due to surgical positioning, which was classified as low.

**Keywords:** Patient positioning. Pressure ulcer. Nursing care.

**RESUMO: Objetivo:** Identificar se há riscos consecutivos do posicionamento cirúrgico, por meio da aplicação da Escala de Avaliação de Risco para o Desenvolvimento de Lesões Decorrentes do Posicionamento Cirúrgico (ELPO). **Método:** Estudo observacional, descritivo, transversal, com abordagem quantitativa, executado em um hospital de ensino do norte do estado do Ceará. Foram utilizados dois intrumentos, um de perfil clínico-epidemiológico com base em entrevista estruturada e a ELPO, aplicada no período perioperatório a 31 pacientes cirúrgicos. **Resultados:** A maioria dos pacientes era do sexo biológico masculino, parda, na faixa etária entre 18 e 39 anos. Os procedimentos mais frequentes foram debridamentos e reduções de fraturas, em conformidade com as internações por acidentes motociclísticos. Quando avaliados quanto ao risco de lesões decorrentes do posicionamento cirúrgico, todos os pacientes apresentaram escore ELPO≤19, isto é, em menor risco para o desenvolvimento de lesões. **Conclusão:** O estudo oportunizou conhecer o perfil dos pacientes submetidos a procedimentos cirúrgicos na instituição, assim como a caracterização dos participantes quanto ao risco de desenvolver lesões decorrentes da posição cirúrgica, que foi classificado como baixo.

**Palavras-chave:** Posicionamento do paciente. Lesão por pressão. Cuidados de enfermagem.

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**RESUMEN: Objetivo:** Identificar el riesgo, mediante la aplicación de la Escala de Evaluación de Riesgos para el Desarrollo de Lesiones Derivadas del Posicionamiento Quirúrgico (ELPO). **Método:** Estudio observacional, descriptivo, transversal con abordaje cuantitativo, realizado en un hospital universitario del norte del estado de Ceará. Se utilizaron dos instrumentos, uno con perfil clínico-epidemiológico basado en entrevista estructurada y el ELPO, aplicado en el período perioperatorio a 31 pacientes quirúrgicos. **Resultados:** La mayoría de los pacientes eran hombres biológicos, *pardos*, con edades entre 18 y 39 años. La mayor frecuencia de procedimientos fue el desbridamiento y reducción de fracturas, en consenso con las hospitalizaciones por accidentes de motocicleta. Cuando se evaluó el riesgo de lesiones por posicionamiento quirúrgico, todos los pacientes tuvieron un puntaje ELPO≤19, es decir, un menor riesgo de desarrollar lesiones. **Conclusión:** El estudio permitió conocer el perfil de los pacientes sometidos a procedimientos quirúrgicos en la institución, así como la caracterización de los participantes en cuanto al riesgo de desarrollar lesiones derivadas de la posición quirúrgica, el cual fue clasificado como bajo.

**Palabras clave:** Posicionamiento del paciente. Úlcera por presión. Atención de enfermería.

## INTRODUCTION

Nowadays, patient safety is one of the great challenges in healthcare, which has been widely discussed in recent times, promoting debates worldwide. However, there are still many goals to be achieved in order to improve the quality of care[1].

In this sense, quality of care is directly linked to patient safety. The later involves preventing errors in the care provided to patients and eliminating the harm that can result from such errors. Adverse events caused to the patient in the hospital environment can result in serious damages, generating morbidity or mortality[2]. Based on international patient safety goals, the safe surgery protocol was created.

The Surgical Center (SC) is considered a critical area in the hospital environment, in which surgical procedures of varied complexities are performed, and it is one of the sectors that pose risk and generate several cases of adverse events (AE) during hospitalization[3].

During hospitalization in the SC, patients undergo the following periods that compose the phases of surgical care: immediate preoperative, intraoperative, and immediate postoperative (which includes anesthetic recovery)[4].

In the perioperative period, there are several factors that can trigger an AE, such as procedures that take more than two hours and can compromise tissue oxygenation; hypothermia, which can damage the perfusion of the whole body, impairing oxygenation and favoring the emergence of injuries; patient positioning and lack of pressure relief[5].

Nurses, in their professional practice in the SC, can identify patients at risk of injuries due to surgical positioning in the intraoperative period. It is the "risk of involuntary anatomical and physical changes resulting from posture or equipment used during an invasive/surgical procedure" and that has the following risk factors: disorientation, edema, emaciation, immobilization, muscle weakness, obesity, and sensory and perceptual alterations due to anesthesia[6].

When positioning the patient on the operating table, there is an instrument to detect the risk of developing a postoperative complication, the pressure ulcer, which is the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning (*Escala de Avaliação de Risco para o Desenvolvimento de Lesões Decorrentes do Posicionamento Cirúrgico do Paciente* – ELPO). This instrument was validated and developed in Brazil in 2013 by Camila Mendonça de Moraes Lopes, PhD in Nursing, aiming at guiding the clinical practice of perioperative nurses. It was developed in the doctoral dissertation titled *Risk Assessment Scale for the Development of Injuries due to Surgical Positioning: construction and validation*[7].

The purpose of ELPO is to guide clinical practice, helping nurses to make decisions about the care provided to surgical patients, especially in the prevention of possible complications related to surgical positioning. This becomes essential in the nursing work process, as this instrument has a practical application and must be used when positioning the patient on the operating table[7,8].

The ELPO scale considers risk factors based on the best available evidence, namely: type of surgical positioning, type of anesthesia, surgical time, type of support surface, limb position, and patient-related factors such as age and comorbidities, aiming at obtaining adequate accommodation, lack of risks, and performing a safe and effective surgical procedure[7].

The advent of the ELPO scale contributes by adding information and indicates special attention to patients who may be at higher risk and who require special care, considering that the score ranges from 7 to 35 points. The higher the score, the greater the risk of the patient developing injuries due to surgical positioning[7,8].

The basic types of surgical positioning are the supine position, the prone position, and the lateral position. They can be

modified according to the type of surgery, the anesthetic-surgical team, or the patient's specificity. Among the best-known modifications are the following positions: Trendelenburg, reverse Trendelenburg, lithotomy position, sitting or modified Fowler's position, Kraske or Jackknife position, and others[9,10].

The nurse, as the professional responsible for the patient in the SC, provides direct care, ensuring their protection and safety by using the Perioperative Nursing Care Systematization (PNCS), an available, indispensable, and vitally important tool that allows better assessment as well as integral health care according to the needs of each patient[5].

Taking this into consideration, the following question was raised: are patients undergoing the surgical procedure at risk of developing injuries due to surgical positioning?

The guiding question arose from the author's experience as a resident nurse in the surgical center at a teaching hospital, as it would be necessary to apply the assessment instrument to the patient during the intraoperative period, identifying whether there are consecutive risks of surgical positioning. Therefore, this study is focused on surgical patients concerning the risk of developing pressure ulcer, to whom nurses working in the surgical center can stratify the care with greater need for prevention in all care-related processes.

This study is relevant because the hospital where the research was conducted is the reference in urgent and emergency care (with provision of immediate healthcare services) and has high rates of surgical procedures, requiring the application of the ELPO scale, which enables to identify the risks of developing pressure ulcers. In addition, it is worth mentioning that the research intends to contribute and guide healthcare practices, to promote patient safety and the development of continuing education in the service to improve the quality of nursing care and encourage the development of care protocols aimed at patients' surgical positioning.

## OBJECTIVE

To identify the risk of pressure ulcer in surgical patients through the application of the ELPO scale.

## METHODS

This is an observational, descriptive, cross-sectional study with a quantitative approach. The research was developed in accordance with the ethical precepts of Resolution No. 466 of the National Health Council, of December 2012, and the project was approved by the Scientific Committee and by the Research Ethics Committee, under opinion No. 3,554,625.

The study location was the teaching hospital Santa Casa de Misericórdia, located in the northern region of the state of Ceará, Brazil. This institution is considered a reference hospital in urgency and emergency care in the city of Sobral. This institution does not work with the ELPO scale in the PNCS process; it is characterized as a tertiary, high complexity hospital that operates as a teaching hospital, focused on the development of teaching, research, extension activities, and health care. The SC has 10 operating rooms (OR) that operate 24 hours a day, with emergency, urgent, and elective surgeries afforded by health insurance plans or by the Brazilian Unified Health System (SUS).

The research was carried out with patients treated at the Surgical Center Unit of Hospital Santa Casa de Misericórdia de Sobral. The study population consisted of people of both sexes admitted to the SC requiring surgical approach, whether emergency, urgent, or elective. The study inclusion criteria were:

- patient undergoing musculoskeletal trauma surgery;
- patients requiring surgical re-approach due to trauma;
- aging 18 years or older;
- conscious patients;
- unconscious patients with a family member who authorized the participation in the research.

Data were collected between October and November 2019, and the sample consisted of 31 patients. The study considered two instruments: clinical-epidemiological profile and the ELPO scale.

The clinical-epidemiological profile instrument was used to conduct a semi-structured interview with each patient to identify social and epidemiological characteristics, which helps to identify risk factors and the possibilities of guidelines for interventions. Conversely, the ELPO scale was applied as an instrument to investigate the clinical situation regarding surgical positioning in the OR. The applications of both instruments were necessary for the best design of this research.

In the data collection process, there was the first contact with the patient or family member to provide explanations about the study. After signing the informed consent form, a structured interview was conducted, with the completion of the clinical-epidemiological profile instrument; then, the patients were followed up in the OR, where the ELPO scale was applied in the intraoperative period. The scale was applied after the patient was positioned on the operating table for surgery.

The analysis was performed with the results obtained from the descriptive statistical instruments. The clinical-epidemiological profile and the ELPO data were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The results are presented in graphs and tables, which provide quick visualization and understanding.

## RESULTS

The analyses and discussions regarding the application of the ELPO scale to 31 surgical patients, in the preoperative and intraoperative periods, are described in topics and organized according to the clinical-epidemiological profile (sex, ethnicity, age group, causes of hospitalization) and also to the evaluation of the risk score, according to ELPO.

Most patients (27/87.1%) were men and self-reported to be mixed-race (28/90.3%); 17 (54.8%) aged between 18 and 39 years, and 11 (35.4%) aged between 40 and 59 years (Graph 1).

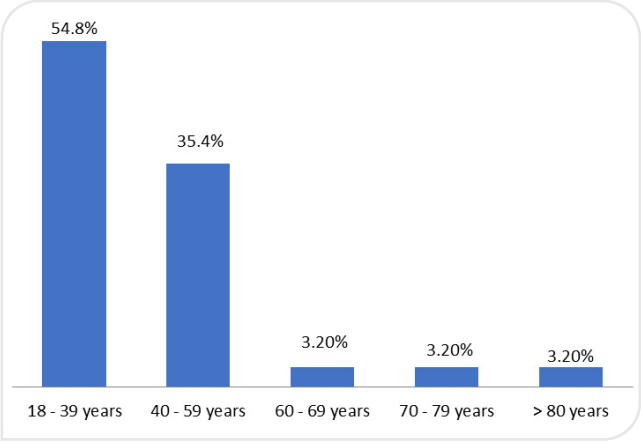
In Graph 2 it is demonstrated that, among the causes of hospitalization of the study patients, there was a predominance of motorcycle accidents (16/51.6%), followed by work accidents and same-level falls (4/12.9% each).

Regarding the type of surgical specialty, there was a higher frequency of plastic surgery procedures (14/45.2%), followed by orthopedics/traumatology (9/29%) and neurology (3/9.6%).

In Table 1 the surgical procedures that the 31 patients underwent are highlighted, with emphasis on debridement (9/29%), followed by surgical fracture reduction (4/12.9%).

In Table 2 the analysis of the seven ELPO variables applied to the patients in the study sample is presented. There was a prevalence of the supine position (26/83.8%), surgery time of up to one hour (21/67.7%), and local anesthesia (18/58%). All patients (31/100%) used the operating table mattress and foam pads as the support surface. As for the position of the limbs, most patients (21/67.7%) had their upper limbs open at a <90° angle. The vast majority of patients did not have comorbidities (30/96.7%) and the predominant age group was young adults, aged from 18 to 39 years (17/54.8%), followed by the age group of subjects aged between 40 and 59 years (11/35.4%).

Considering the distribution of the scores of each ELPO item (Table 2), it was observed that all 31 (100%) patients participating in the study had scores lower than or equal to 19, classified, therefore, as of low risk of developing injuries due to surgical positioning in the perioperative period (Table 3).




**Graph 1.** Age group of study patients.

## DISCUSSION

The prevalence of occurrences in men is due to their greater exposure to risky economic and recreational activities, as well as to violence and drugs, gender-specific behavior, in addition to the influence of cultural and social factors[11,12].

As for ethnicity, there was a predominance of mixed-race people (90.3%). When asked to identify their race, some patients had difficulty responding. Race is represented by skin color, self-reported in the main Brazilian censuses carried out by the Brazilian Institute of Geography and Statistics (IBGE), and is characterized as a group of individuals who share certain features[13-15].

Regarding age group, in this study there was a predominance of young adults (54.8% aged between 18 and 39 years). The youngest patient was 18 years old and the oldest, 83 years old. Corroborating the study[11], when analyzing the age group, the population of young adults is the most affected by cases of violence, with several theories about the reasons for such cases, such as inexperience, impulsiveness, irresponsibility, lifestyle, search for risky situations for personal satisfaction, and substance abuse[11]. In Brazil, there are serious problems of youth exclusion and social inequality that contribute to this significant number of young victims[12].

When evaluating the causes of hospitalization, there was a predominance of accidents involving motorcycles (51.60%), followed by work accidents and same-level falls (12.9% each). The causes of hospitalization in the study are consistent with the characteristics of the research site, a large public hospital, specialized in trauma, which mostly serves victims of traffic accidents.

Regarding the type of surgical specialty, the most frequent were plastic surgeries (45.16%) and orthopedic surgeries due to trauma (29.0%). There is disagreement with other studies[15,16] whose target population consisted in patients undergoing elective procedures of any surgical specialty.

A study carried out in a rehabilitation hospital in the city of Brasília (DF), Brazil[16], found a prevalence of the surgical specialty of orthopedics (48.1%), followed by neurosurgery (36.8%), and plastic surgery (11.3%). In another study, carried out in the state of Minas Gerais, Brazil[15], there was a predominance of digestive system surgeries (33.7%), head/neck and orthopedics (13.5% each), and otolaryngology (11.2%).

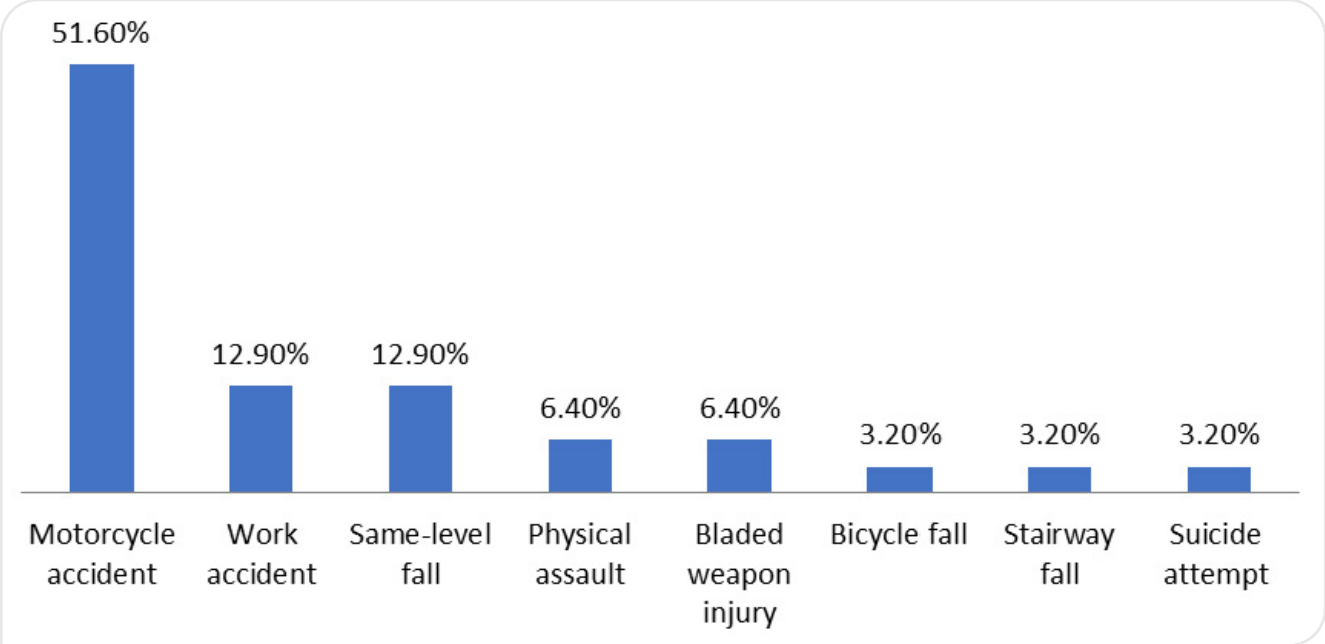
As for the type of surgical procedure, it is observed that, in traumatic cases, the highest incidence of surgeries was debridement (29%), followed by fracture reduction (12.9%). Another study[15] showed that the highest prevalence of surgeries were breast (33.7%), maxillofacial (13.5%) and otolaryngology procedures (11.2%). However, differences between institutions where the studies were carried out should be considered.

In the analysis of the ELPO variables, regarding the position in which the patients remained, the supine position had the highest incidence (83.8%). In this position, care must be taken to protect the patient's prominences in contact with the operating table considering that, with prolonged time and immobilization, subjects can develop pressure ulcer in the occipital, shoulders, scapula, elbows, lumbar and sacral, gluteal and heel regions. In addition, heart rate, vascular resistance, and lung capacity can be decreased in the supine position[4].

Regarding surgical time, there was a prevalence of procedures with short duration, up to one hour (67.7%). Surgical time of up to one hour results in an ELPO score of 1.

**Table 1.** Surgical procedures underwent by the study patients.

| Surgical procedure | Number | Percentage (%) |
|---|---|---|
| Debridement | 9 | 29 |
| Surgical fracture reduction | 4 | 12.9 |
| Amputation | 2 | 6.5 |
| Lumbar cerebrospinal fluid drainage | 2 | 6.5 |
| Osteotomy | 2 | 6.5 |
| Repair of substance loss | 2 | 6.5 |
| Thoracostomy | 2 | 6.5 |
| Arthroplasty | 1 | 3.2 |
| Cervicotomy | 1 | 3.2 |
| Cranioplasty | 1 | 3.2 |
| Grafting | 1 | 3.2 |
| Gastrostomy | 1 | 3.2 |
| Catheter implantation | 1 | 3.2 |
| Partial reconstruction | 1 | 3.2 |
| Surgical treatment for fractures | 1 | 3.2 |
| Total | 31 | 100 |




**Graph 2.** Causes of hospitalization of the study patients.

As for the type of anesthesia, local anesthesia was administered to 58% of the 31 patients studied in the investigated sample. This type of anesthesia has the highest frequency of use in surgical procedures. Anesthesia is a temporary condition of loss of sensation and, depending on its type, complications may occur, which require actions that involve great responsibility on the part of professionals in providing safe care. The prolonged time of the anesthetic-surgical process alters the maintenance of skin integrity and may cause some harm to the patient and increase the risk of injuries due to surgical positioning[17].

Concerning the distribution of support surfaces used for the surgical positioning of patients in the hospital, all subjects (100%) used the conventional operating table mattress, made of foam, and foam pads. The study SC is composed of 10 OR, where this support surface is used in all operating tables, providing greater protection to the patient and lower risk of developing injuries. This finding corroborates a study[16] in which there was a prevalence of the use of operating table mattress made of conventional foam and foam pads as support surfaces for most patients (59.4%).

As for the position of patients on the operating table in the intraoperative period, the most prevalent (21/67.7%) was

**Table 3.** Study patients according to the score of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning.

| ELPO | n | % |
|---|---|---|
| Low risk (≤19) | 31 | 100 |
| 9 | 4 | 12.9 |
| 10 | 4 | 12.9 |
| 11 | 6 | 19.3 |
| 12 | 5 | 16.1 |
| 13 | 4 | 12.9 |
| 14 | 6 | 19.3 |
| 16 | 1 | 3.20 |
| 19 | 1 | 3.20 |
| High risk (>19) | 0 | 0 |

**Table 2.** Descriptive analysis of variables of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning, applied to the study patients.

| | Variables | N | % |
|---|---|---|---|
| Surgical positioning | Supine | 26 | 83.8 |
| | Lateral | 5 | 16.1 |
| Surgery time | Up to 1 h | 21 | 67.7 |
| | Over 1 h and up to 2 h | 9 | 29 |
| | Over 2 h and up to 4 h | 1 | 3.2 |
| Type of anesthesia | Local | 18 | 58 |
| | Sedation | 3 | 9.6 |
| | Regional | 8 | 25.8 |
| | General | 2 | 6.5 |
| Support surface | Operating table mattress made of foam + foam pads | 31 | 100 |
| Position of the limbs | Body alignment | 6 | 19.3 |
| | Opening of upper limbs <90° | 21 | 67.7 |
| | Knees elevated at <90° and opening of the lower limbs <90º | 1 | 3.2 |
| | Knees elevated at >90° and opening of the lower limbs >90° | 3 | 9.6 |
| Comorbidities | No comorbidities | 30 | 96.7 |
| | Diabetes mellitus | 1 | 3.2 |
| Age | 18–39 years old | 17 | 54.8 |
| | 40–59 years old | 11 | 35.4 |
| | 60–69 years old | 1 | 3.2 |
| | 70–79 years old | 1 | 3.2 |
| | >80 years old | 1 | 3.2 |

the opening position of the upper limbs <90°. The surgical team is responsible for the surgical positioning procedure, which must be carefully, safely performed, and specifically focused on each type of patient, as it implies risk during care provision[16].

Regarding the specific comorbidities listed in the ELPO scale, only one patient had diabetes mellitus and had a higher score in this item on the scale. Most patients in the study (96.7%) had no preexisting pathology/comorbidity. In the study conducted in Minas Gerais[15], as for preexisting diseases, most patients (48.3%) had no comorbidities as well, corroborating the findings of this study.

In the age group variable of the ELPO scale, most patients in the present study (54.8%) aged between 18 and 39 years, which favored the lower risk of developing injuries. This finding is in line with another study[15], which found the same age group as the most prevalent one (34.8%). Studies show that the incidence of complications increases proportionally to age due to the decrease in tolerance to prolonged positioning. This finding is also evidenced in the obese population because, depending on the type of position, it favors abdominal compression and hinders chest expansion[18,19].

When estimating the risk of injuries due to surgical positioning, the ELPO score showed that all patients in the sample (31/100%) were classified as low risk (scores lower than or equal to 19), as they were in the supine position (83.80%), had their surgeries performed within one hour (67.7%), were administered with local anesthesia (58%), had no comorbidities (96.7%), and belonged to the age group of 18 at 39 years (54.8%). For each of these items of the variables evaluated in the ELPO scale, the score equals one point (score=1), which resulted in low total scores (total score≤19), indicating a lower risk of developing injuries due to perioperative positioning.

Therefore, the incidence of injuries due to surgical positioning in the present study was considered low when compared with other studies[15,16]. Another study[15] also found a higher prevalence of patients with low risk score (53.9%), but almost half of them (46.1%) had an ELPO risk score>19, which corresponds to higher risk of developing injuries due to surgical positioning. Conversely, authors of a research[16] predominantly found patients at higher risk of developing perioperative positioning injuries (54.7%) compared with those at lower risk (45.3%). Once again, the characteristics of the institution must be considered in addition to the type of patients served by it.

Taking these results into consideration, the importance of the care provided in the SC is highlighted, more specifically in the OR, with the availability of different resources for proper positioning, nurses following up the patient and the procedure, using the PNCS, and being directly responsible, with the other team members, by positioning the patient for surgery.

Thus, it is possible to verify the effectiveness of using the ELPO scale by proposing the evaluation of seven specific items, closely interconnected, whose total sum/final score means the propensity that each evaluated patient has to present or not with injuries due to surgical positioning.

## FINAL CONSIDERATIONS

The study proposal enabled the author to apply the ELPO scale in a hospital in the northeast of Brazil, where the ELPO instrument was not used in PNCS.

The study provided the assessment of its items with a consequent review of scientific evidence and enabled the profile of patients undergoing surgical procedures in the institution to be known, characterizing them as to the risk of developing injuries due to surgical positioning. The 31 patients followed up in the pre- and intraoperative periods were classified as at low risk of developing such injuries, considering that ELPO scores were lower than or equal to 19.

These results made it impossible to implement modifiable care practices in the prevention of injuries during surgical positioning, as there were no patients at high risk of developing injuries. Modifiable care practices would be performed with patients with high-risk scores. During the intraoperative period, the surgical team should perform care-related practices: transitions in the type of surgical positioning, in the support surface, adding pads (made of cotton, foam, or viscoelastic ones) or padding support, or even changing the position of the limbs in order to promote comfort on the operating table and avoid possible injuries.

It is noteworthy that, in the research hospital, the care provided by the team during surgical positioning favored the low risk of injuries, demonstrating the quality of the care provided to patients undergoing surgery.

As relevant contributions of this study to the field of surgical nursing, in the scientific field and in clinical practice, good results were obtained in patient care. The authors suggest further research to be carried out, with the application of the ELPO scale to patients from other surgical specialties, age groups, and evaluation of protective equipment.

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