

# Surgical positioning: an update scientific evidence for interventions of nursing

*Posicionamento cirúrgico: uma atualização das evidências científicas para intervenções de enfermagem*

*Posicionamiento quirúrgico: una actualización de la evidencia científica para intervenciones de enfermería*

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**ABSTRACT: Objective:** To carry out an integrative review on the evidence related to Nursing interventions during the surgical positioning of the patient. **Method:** Integrative literature review carried out in February 2021 by consulting the MEDLINE, PubMed, Web of Science, BDEnf, and LILACS databases to answer the question: “What evidence is available on nursing interventions during surgical positioning of the adult patient?” **Results:** After search and analysis, nine articles contemplated the research objective and composed the final sample. It was possible to verify a variety of interventions, with a predominance of evaluation of preexisting and external factors, use of risk assessment scales, support surfaces, and use of prophylactic dressings. **Conclusions:** It was possible to update the scientific evidence regarding the application of interventions aimed at surgical positioning. The use of ELPO, SAEP, and Scott-Triggers is the most effective, as the patient’s assessment previously associated with the use of scales/instruments, allowing positive results and reduction of complications associated with the surgical position. It is necessary to carry out new research with higher levels of scientific evidence, aiming to qualify nursing care.

**Keywords:** Perioperative nursing. Patient positioning. Nursing care.

**RESUMO: Objetivo:** Realizar uma revisão integrativa sobre as evidências relacionadas às intervenções de Enfermagem durante o posicionamento cirúrgico do paciente. **Método:** Revisão integrativa da literatura realizada em fevereiro de 2021 por meio de consulta às bases de dados MEDLINE, PubMed, Web of Science, BDEnf e LILACS para responder ao questionamento: “Quais as evidências disponíveis sobre as intervenções de enfermagem durante o posicionamento cirúrgico do paciente adulto?” **Resultados:** Após busca e análise, nove artigos contemplaram o objetivo da pesquisa e compuseram a amostra final. Foi possível constatar uma variedade de intervenções, com predomínio de avaliação de fatores preexistentes e externos, uso de escalas de avaliação de risco, superfícies de suporte e uso de curativos profiláticos. **Conclusão:** Foi possível atualizar as evidências científicas quanto à aplicação das intervenções direcionadas ao posicionamento cirúrgico. O uso de ELPO, SAEP e Scott-Triggers é o mais eficaz, bem como a avaliação do paciente previamente associada à utilização de escalas/instrumentos, permitindo resultados positivos e diminuição das complicações associadas à posição cirúrgica. Faz-se necessário realizar novas pesquisas com maiores níveis de evidência científica, visando qualificar a assistência de Enfermagem.

**Palavras-chave:** Enfermagem perioperatória. Posicionamento do paciente. Cuidados de enfermagem.

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**RESUMEN:** **Objetivo:** Realizar una revisión integradora sobre la evidencia relacionada con las intervenciones de enfermería durante el posicionamiento quirúrgico del paciente. **Método:** Revisión integrativa de la literatura realizada en febrero de 2021 en las bases de datos MEDLINE, PubMed, *Web of Science*, BDEnf y LILACS para responder a la pregunta: “¿Qué evidencia está disponible sobre las intervenciones de enfermería durante el posicionamiento quirúrgico de pacientes adultos?” **Resultados:** Luego de la búsqueda y análisis, 9 artículos cubrieron el objetivo de la investigación y conformaron la muestra final. Fue posible verificar una variedad de intervenciones con predominio de la evaluación de factores preexistentes y externos, uso de escalas de evaluación de riesgo, superficies de apoyo y el uso de apósitos profilácticos. **Conclusión:** Fue posible actualizar la evidencia científica en cuanto a la aplicación de intervenciones dirigidas al posicionamiento quirúrgico. El uso de ELPO, SAEP y Scott-Triggers son los más efectivos, así como la evaluación del paciente previamente asociado al uso de escalas/instrumentos, permitiendo resultados positivos y reducción de complicaciones asociadas a la posición quirúrgica. Es necesario realizar nuevas investigaciones con mayores niveles de evidencia científica, con el objetivo de calificar el cuidado de enfermería. **Palabras clave:** Enfermería perioperatoria. Posicionamiento del paciente. Atención de enfermería.

## INTRODUCTION

Nursing plays an important role in the Surgical Center (SC), since the knowledge of the perioperative nurse is paramount to guarantee interventions and the necessary safety for the situation, seeking to meet the individualities of each patient<sup>1</sup>.

Thus, nurses share with the surgical team the responsibility of ensuring that the operating room procedure takes place in a way that reduces damage from surgical positioning. Therefore, the objective is to offer adequate surgical exposure, in order to offer better assistance with the available resources to guarantee the safety and well-being of patients<sup>1,2</sup>.

The devices and Support Surfaces (SS) used in the SC to prevent the development of injuries, contribute positively when used correctly. They help protect the skin against shear and friction, as well as redistribute pressure, among other therapeutic functions. Its use should be applied according to the need and risk of each patient, considering the type of surgery<sup>3</sup>.

The surgical patient, when poorly positioned, may suffer complications in the circulatory, respiratory, neurological, and integumentary systems that, if not observed, can cause injuries and progress to temporary or even permanent damage<sup>1,4</sup>.

Among the risk factors related to the occurrence of complications, the intrinsic ones stand out, such as age, comorbidities, nutritional status, and anesthetic risk of the patient. As for the extrinsic factors, excess moisture, positioning, type and time of surgery, use of devices and SS are cited, which end up causing unexpected results, causing injuries, skin friction, and stretching during the surgical position<sup>5</sup>.

In this way, the Systematization of Perioperative Nursing Care (*Sistematização de Assistência de Enfermagem Perioperatória* - SAEP) is a care model that has as one of its objectives to minimize the risks related to surgery, seeking, in a preventive

way, the use of appropriate materials and equipment for the situation of each client, in order to avoid complications during and after the procedure. Therefore, some steps are determined for the execution of the SAEP to occur, namely: preoperative assessment, identification of problems, care planning, implementation of assistance, and postoperative evaluation<sup>6</sup>.

From this perspective, a scale was developed and validated with the aim of assessing the risk of injuries resulting from the position during surgery. 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* - ELPO), created by a nurse, aims to prevent and minimize possible damage to the patient undergoing surgery.

ELPO has 7 items with 5 sub-items each, scoring from 1 to 5, and has a maximum score of 35 points; the higher this score, the greater the risk of the patient developing injuries from surgical positioning<sup>1</sup>.

Thus, this research aimed to carry out an integrative review on the evidence related to Nursing interventions during the surgical positioning of the patient.

## METHODS

This is an integrative review that seeks to synthesize the results after gathering the research sources available in the literature on the subject, in order to theoretically support the construction of the work<sup>7</sup>.

As can be seen in the illustration in Figure 1, the work began with a study on the topic, from which the need for an update on the theme was observed.

Then, the guiding research question of the objective of this work was elaborated: “What evidence is available

on nursing interventions during the surgical positioning of adult patients?”.

The research was carried out in February 2021 by consulting the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), PubMed, Web of Science, *Base de Dados em Enfermagem* (BDEnf), and Latin American and Caribbean Literature in Health Sciences (LILACS).

The following descriptors and their combinations were used, correlated by the Boolean operators AND and OR, in Portuguese, English, and Spanish: (“*Enfermagem perioperatória*” OR “*Enfermagem Cirúrgica*” OR “*Enfermagem Pré-Operatória*” OR “Perioperative Nursing” OR “Surgical Nursing” OR “*Enfermería Perioperatoria*” OR “*Enfermería Quirúrgica*”) AND (“*Posicionamento do paciente*” OR “*Posição do paciente*” OR “Patient Positioning” OR “*Posicionamiento del Paciente*” OR “*Posición del Paciente*”) AND (“*Cuidados de enfermagem*” OR “*Assistência de Enfermagem*” OR “*Atendimento de Enfermagem*” OR “*Cuidado de Enfermagem*” OR “Nursing Care” OR “*Atención de Enfermería*” OR “*Cuidados de Enfermería*” OR “*Cuidado de Enfermería*”), in MEDLINE, LILACS, BDEnf, and Web of Science; and PubMed used (“Perioperative Nursing” OR “Surgical Nursing” OR “Perianesthesia Nursing”) AND (“Patient Positioning” OR “Patient Positionings”) AND (“Nursing Care” OR “Nursing Care Management”).

After cross-checking the databases, the selection of studies was carried out, based on the inclusion criteria: articles available in full, published in the last 10 years (2011 to 2021), in Portuguese, English or Spanish, and original studies available in full text. Articles that related the theme with children and adolescents, editorials and letters to the editor, duplicated

articles and articles that did not explain Nursing care associated with surgical positioning were excluded.

An adaptation of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model, shown in Figure 2, was used to present the article selection steps.

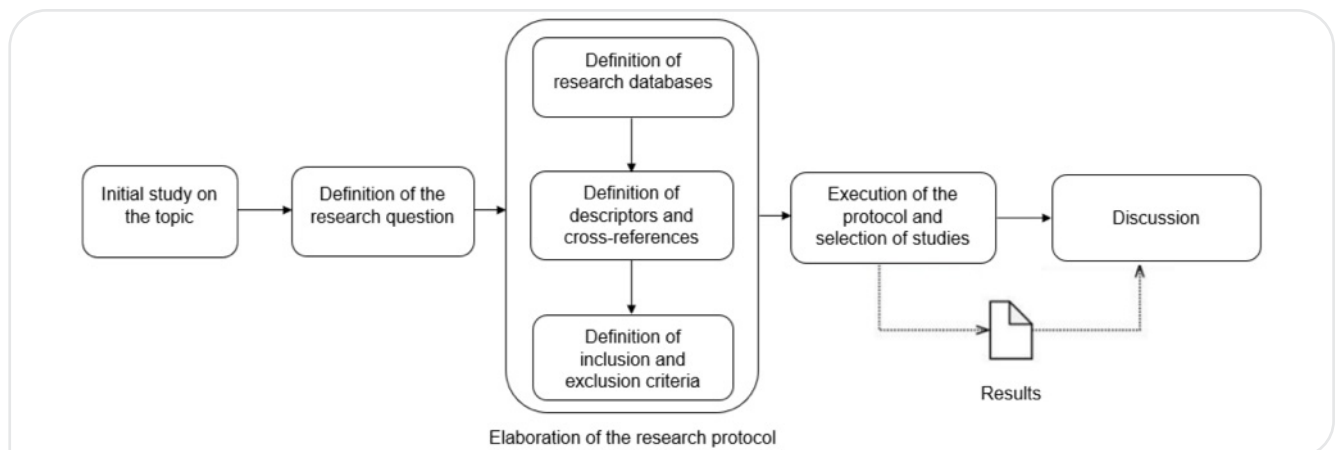
The levels of evidence contemplated by the studies are: level I — systematic review or meta-analysis of randomized controlled clinical trials; level II — evidence from at least one well-designed randomized controlled clinical trial; level III — well-designed clinical trials without randomization; level IV — well-designed cohort and case-control studies; level V — systematic review of descriptive and qualitative studies; level VI — evidence from a single descriptive or qualitative study; and level VII — opinion of authorities and/or report of expert committees<sup>8</sup>.

## RESULTS

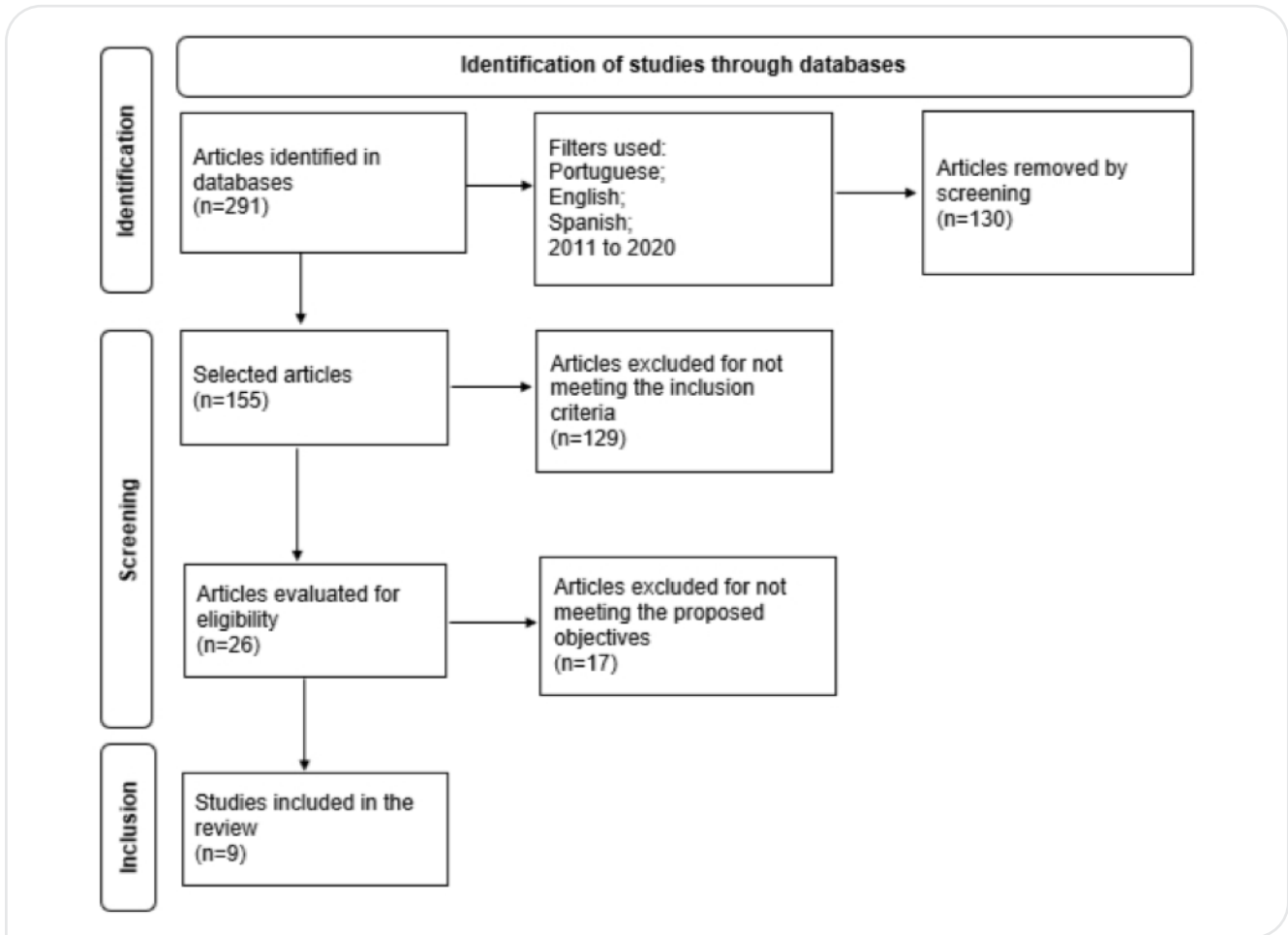
The final sample comprises 9 studies, out of 291, extracted from different journals and according to eligibility criteria. In Graphic 1, it is possible to visualize the number of selected studies corresponding to their level of scientific evidence.

In Chart 1<sup>4,9,10-16</sup>, selected studies and their respective identified Nursing interventions are observed. It is possible to observe a variety of interventions, especially those related to SS.

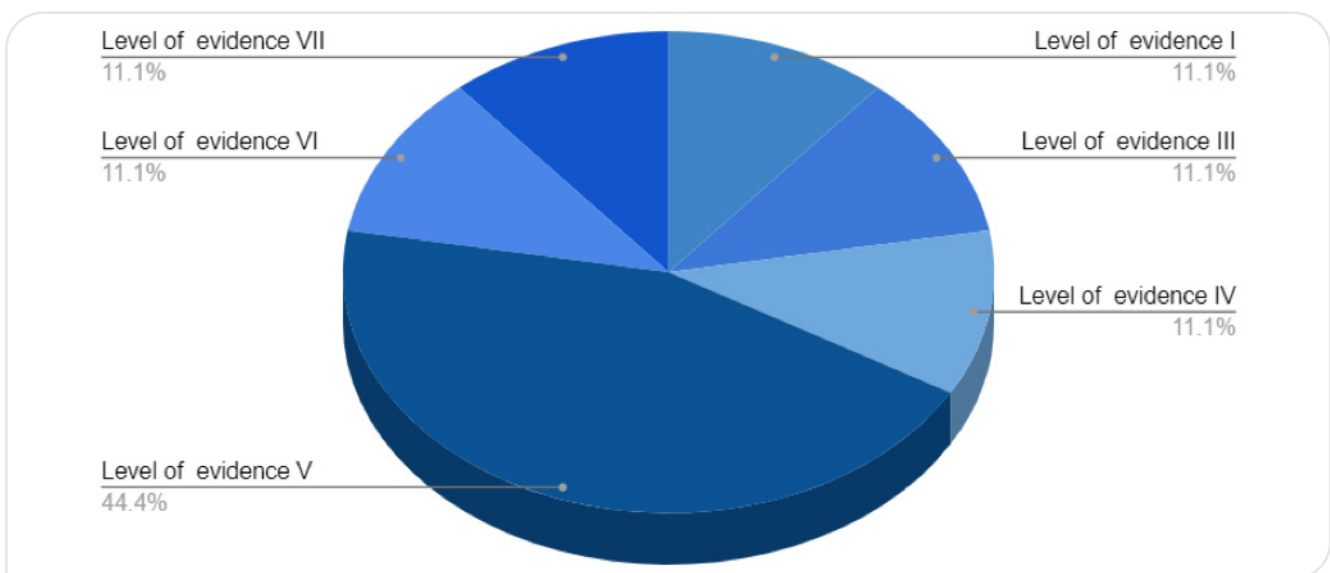
Chart 2 allows the visualization, in a synthetic way, of the interventions found in the selected studies. In addition, the presence of two other columns can be observed, regarding the perioperative phase, in which interventions were classified



**Figure 1.** Representation of the work methodology.



**Figure 2.** Flowchart based on the PRISMA model with the result of the selection of articles.



**Graphic 1.** Number of included studies and their levels of evidence.

according to their applicability in the phase corresponding to their period and also the column of purposes, in which each listed intervention can be applied.

## DISCUSSION

The use of scales such as ELPO, Scott-Triggers instrument, and SAEP, when applied in the preoperative period, allows nurses to list the main interventions to mitigate complications from surgical positioning<sup>4,9-12</sup>. However, only ELPO stands out as an excellent assessment tool to be used to prevent the

development of injuries resulting from surgical positioning, with validated and approved application<sup>4,9</sup>.

The Scott-Triggers instrument identifies possible adverse events resulting from the surgical position in advance, but the literature lacks research on its use<sup>10,12</sup>. Regarding SAEP, due to its contribution to the care planning carried out by nurses, it is highly recommended for guaranteeing interventions according to the evidenced patients' needs<sup>11,17</sup>. However, as they do not know and/or understand the reason for its use, some nurses find it difficult to apply it<sup>17,18</sup>.

The Braden scale, although not mentioned by the selected studies, is widely used for the evaluation of surgical patients,

**Chart 1.** Chart referring to the nursing interventions found in the selected studies.

Code	Reference	Database	Title	Level of evidence	Nursing interventions
E1	Nascimento e Rodrigues <sup>4</sup>	Lilacs	Risk for surgical positioning injuries: scale validation in a rehabilitation hospital.	IV	Application of ELPO; Assessment of pre-existing and external factors.
E2	Croke <sup>15</sup>	Medline	Essential strategies for safe patient positioning.	VII	Use of prophylactic dressings; Use of convoluted foam.
E3	Oliveira et al., <sup>16</sup>	Lilacs	Influence of support surfaces on the distribution of body interface pressure in surgical positioning.	III	Use of sealed foam D33.
E4	Spruce <sup>12</sup>	Medline	Back to basics: preventing perioperative pressure injuries	VI	Application of the Munro Pressure Ulcer Risk Assessment Scale; Use of the Scott-Triggers tool; Not using sheets and blankets for positioning; Evaluation of the skin in the mediate postoperative period.
E5	Miranda et al., <sup>11</sup>	Lilacs	Posicionamento cirúrgico: cuidados de enfermagem no transoperatório.	V	Assessment with the SAEP tool; Use of micropulsating air mattress; Relieving of pressure during and after the procedure on the surgical table over the standard mattress; Use of dry viscoelastic polymer mattress cover and gel pads.
E6	Oliveira et al., <sup>13</sup>	Web of Science	Support surfaces in the prevention of pressure ulcers in surgical patients: An Integrative review.	V	Use of gel-based, fluidized air, static air, and polyurethane mattresses.
E7	Gefen et al., <sup>10</sup>	PubMed	Critical biomechanical and clinical insights concerning tissue protection when positioning patients in the operating room: A scoping review.	V	No use of rolled up pillows and towels, as well as threaded gel head supports; Diversifying the patient's position during the perioperative phases.
E8	Trevilato et al., <sup>9</sup>	PubMed	Posicionamento cirúrgico: prevalência de risco de lesão em pacientes cirúrgicos	I	Use of viscoelastic cushions; Use of cotton pads.
E9	Bouyer-Ferullo <sup>14</sup>	PubMed	Preventing perioperative peripheral nerve injuries.	V	No use of sheets and blankets to position the patient.

ELPO: Risk Assessment Scale for the Development of Injuries Dues to Surgical Positioning (*Escala de Avaliação de Risco para o Desenvolvimento de Lesões Decorrentes do Posicionamento Cirúrgico*); SAEP: Systematization of Perioperative Nursing Care (*Sistematização de Assistência de Enfermagem Perioperatória*).

but it has shown low applicability due to its restricted results regarding the prognosis of only the onset of Pressure Ulcers (PU), offering low efficacy to predict risks for the development of lesions in surgical patients<sup>5,19,20</sup>.

Other indispensable factors to list the main interventions to be applied are the knowledge and evaluation of preexisting and external factors that favor the appearance of PUs. About 60% of the studies discuss the subject, citing as preexisting factors

the presence of comorbidities, such as vascular and respiratory diseases, neuropathies and malnutrition, and external factors, such as immobility and the presence of humidity<sup>4,10-14,21</sup>.

In this context, with regard to Nursing interventions inherent to surgical positioning, SS is mentioned in 70% of the studies. However, due to the political, economic, and social issues to which health institutions are subject, mainly the public sector, these interventions are affected by the unavailability of materials<sup>9-16</sup>.

**Chart 2.** Nursing interventions and their relationship with the perioperative phases and purposes.

Nursing intervention	Study(ies)	Perioperative phase(s)	Purpose(s) of the intervention
Application of ELPO	E1, E8	Pre- and intraoperative	Preventing the development of injuries resulting from positioning.
Assessment of pre-existing and external factors	E1, E4, E5, E6, E7, E9	Preoperative	Preventing the development of injuries resulting from positioning.
Use of prophylactic dressings	E2, E7	Intraoperative	Decreasing the peak Interface Pressure (IP) of the Support Surfaces (SS).
Use of convoluted foam	E2	Intraoperative	Mitigating occurrences of patient slipping on the surgical table.
Use of Foam-Based Support Surface	E3	Intraoperative	Decreasing the peak Interface Pressure (IP) of the Support Surfaces (SS).
Application of the Munro Pressure Ulcer Risk Assessment Scale	E4, E7	Pre-, intra-, and postoperative	Preventing the development of injuries resulting from positioning.
Use of the Scott-Triggers tool	E4, E7	Preoperative	Preventing the development of injuries resulting from positioning.
Not using sheets and blankets for positioning	E4, E7, E8, E9	Intraoperative	Guaranteeing the effectiveness of the SS.
Evaluation of the skin in the immediate postoperative period	E4	Postoperative	Checking for signs of injury that only appear 72 hours after the surgical procedure.
Assessment with the SAEP tool	E5	Pre-, intra-, and postoperative	Preventing the development of injuries resulting from positioning.
Relieve pressure during and after the procedure, on the operating table over the standard mattress	E5	Intra- and postoperative	Preventing the development of injuries resulting from positioning.
Use of micropulsating air mattress; Use of dry viscoelastic polymer mattress cover; Use of gel pads	E5	Intraoperative	Preventing the development of injuries resulting from positioning.
Use of gel-based mattresses	E6	Intraoperative	Mitigating the risk of shear.
Use of fluidized air mattresses; Use of polyurethane mattresses	E6	Intraoperative	Decreasing the peak Interface Pressure (IP) of the Support Surfaces (SS).
Absence of rolled up pillows and towels	E7	Intraoperative	Preventing the development of injuries resulting from positioning.
Absence of donut shaped gel head holders	E7	Intraoperative	Avoiding the occurrence of occipital injury.
Diversifying the patient's position during the perioperative phases	E7	Pre-, trans-, and postoperative	Minimizing body weight forces on tissues.
Use of viscoelastic cushions; Use of cotton field cushions	E8	Intraoperative	Preventing the development of injuries resulting from positioning.

ELPO: Risk Assessment Scale for the Development of Injuries Dues to Surgical Positioning (*Escala de Avaliação de Risco para o Desenvolvimento de Lesões Decorrentes do Posicionamento Cirúrgico*); SS: Support Surfaces; SAEP: Systematization of Perioperative Nursing Care (*Sistematização de Assistência de Enfermagem Perioperatória*).

The convoluted foam is a device that prevents patients from sliding on the operating table, preventing the development of shear injuries<sup>15</sup>. In addition, it allows for an increase in the contact area, outlining the body's curves and collaborating to reduce the pressure of the points most conducive to the occurrence of injuries<sup>22</sup>.

Another effective intervention is the foam-based SS, specifically the D33 sealed foam, responsible for generating better redistribution of the body Interface Pressure (IP) on the operating tables, a pertinent result so that new effective and low-cost SS can be produced. However, its use in the calcaneal region showed a higher IP average peak, which can generate good results if associated with prophylactic dressings<sup>10,15,16</sup>.

A recent study specifies that the micropulsating air mattress would be the most efficient first SS option, followed by the dry viscoelastic polymer mattress cover and then gel pillows, all of which are effective in preventing the development of PUs, according to evidence available in the literature<sup>11</sup>.

The viscoelastic polymer mattress is more cost-effective by reducing the incidence of PUs and hospital costs, mitigating the occurrence of shear and serving as weight support<sup>13</sup>. However, it does not reduce PU when compared to the control SS, and it is little used in Brazil, due to its high cost<sup>16</sup>.

Threaded gel head holders should not be used as the scalp tissue is most exposed and undergoes a period of stress when used. Thus, it presents a risk for the development of occipital lesions<sup>10,23</sup>.

In addition, the use of cotton pads, despite being widely used, does not provide pressure redistribution and is associated with the occurrence of PUs, hence the use of viscoelastic pads being more recommended<sup>13,9</sup>.

The pressures resulting from positioning need to be relieved not only during but also immediately after the procedure, due to the process of positioning and post-anesthesia recovery, which causes loss of sensitivity and causes physical dependence, being one more risk factor to be added to the others to which the patient has been exposed<sup>11</sup>.

Of the analyzed studies, 40% highlighted the non-use of sheets and blankets as patient positioners<sup>9,10,12,14</sup>. The two tools decrease SS efficiency and generate greater pressure on the body<sup>12</sup>. Similarly, rolled up pillows and towels should not be used, although this practice is quite common in SCs, due to lack of resources<sup>10</sup>.

With regard to the use of dressings as a form of intervention, prophylactic ones stand out, especially in soft tissues in areas of bony prominence<sup>10,15</sup>. As an example, dressings made with multilayer silicone foam for the sacral and calcaneal area, responsible for minimizing the risks posed to soft

tissues from body weight and friction caused in places with the highest incidence of injuries during the surgical approach<sup>10,15</sup>.

Regarding surgical positioning, the intervention to be taken into account is the diversification of the patient's position during the perioperative phases by nurses and the multidisciplinary team<sup>10</sup>. When possible, early walking should also be encouraged in order to relieve the areas affected by the pressure resulting from the positioning and ensure the return of perfusion to the regions that suffered pressure during the procedure<sup>10</sup>.

An important factor to take into account to avoid or even minimize complications caused by surgical positioning is the evaluation of the patient's skin in the immediate and mediate postoperative period, since some signs of injury take up to 72 hours after surgery to manifest<sup>12</sup>.

Although studies point to Nursing interventions to prevent complications resulting from surgical positioning, evidence regarding the application of this care and the use of devices and SS are not discussed<sup>11,11</sup>.

Limitations of the present study were the lack of standardization regarding the nomenclature used to designate devices and SS, which hinders the reliability of the results. Another limitation is the levels of evidence of the included studies: only 1 (10%) has level I, showing the deficit of studies with quality of evidence.

## CONCLUSION

This article provided an update on the scientific evidence related to Nursing interventions during surgical positioning, showing that the most effective interventions refer to the use of ELPO, SAEP, and Scott-Triggers. Furthermore, it should be noted that prior evaluation of the patient, associated with the use of scales/instruments, allows professionals to intervene in order to avoid possible adverse events. Thus, the importance of carrying out interventions from the preoperative to the postoperative period is evident, in order to continuously assist patient.

The results found are highly relevant for surgical patients. However, interventions need further discussions and new research with a higher level of scientific evidence and updated literature. Additionally, the lack of standardization regarding the nomenclature used to designate devices and SS hinders the reliability of the results presented by the studies. Thus, it is necessary to develop more research involving this theme, in order to promote studies to improve the quality of nursing care.

In addition, it is suggested that Nursing professionals be updated periodically, in order to correctly assist surgical

patients through patient assessment, planning and implementation of interventions, according to the evidence available in the literature, based on a systematized care, aiming to reduce adverse events resulting from surgical positioning.

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## CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

## AUTHORS' CONTRIBUTIONS

**ACFS:** Project management; Formal analysis; Conceptualization; Data curation; Investigation; Methodology; Resources; Writing — first draft; Writing — review & editing; Supervision; Validation; Visualization. **CBO:** Data curation; Resources; Writing — review & editing; Validation; Visualization. **BSS:** Resources; Writing — review & editing; Validation; Visualization. **EABM:** Formal analysis; Resources; Supervision. **HMMDS:** Formal analysis; Resources; Supervision. **SSMX:** Project management; Formal analysis; Conceptualization; Data curation; Investigation; Methodology; Resources; Writing — first draft; Writing — review & editing; Supervision; Validation; Visualization.

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