Safe Surgical Practices for the construction of elimination stomas to prevent and reduce postoperative complications

Práticas Cirúrgicas seguras para a construção de estomias de eliminação para prevenir e reduzir complicações pós-operatórias

Prácticas Quirúrgicas seguras para la construcción de estomas de eliminación para prevenir y reducir complicaciones postoperatoria

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RESUMO

Objetivo: Identificar as melhores práticas para a construção segura de estomias, a fim de prevenir e minimizar complicações pós-operatórias e secundariamente destacar lacunas para futuras pesquisas. Introdução: A criação de estomias é utilizada no manejo do trato gastrointestinal, mas complicações pós-operatórias são comuns devido às técnicas empregadas. Avanços recentes permitiram identificar práticas ideais. Critérios de Inclusão: Incluirão diretrizes, revisões sistemáticas, meta-análises, protocolos e recomendações para profissionais na criação de estomias, excluindo fontes desatualizadas, irrelevantes ou qualitativas. Métodos: Esta revisão de escopo será conduzida de acordo com a metodologia JBI para revisões de escopo (2024) e seguirá as diretrizes PRISMA-ScR. As principais bases de dados a serem pesquisadas incluem PubMed/MEDLINE, Embase, Web of Science, Scopus, Cochrane Library, BVS, LILACS, Trip Medical Database, Epistemonikos e CINAHL. Fontes de literatura cinzenta também serão incluídas. A pesquisa considerará estudos publicados e não publicados a partir de 2015, em qualquer idioma. Os títulos e resumos serão triados no Rayyan por dois revisores independentes, seguidos da leitura completa dos textos elegíveis. Os dados serão extraídos em formulários padronizados, utilizando o Excel, e apresentados em diagramas PRISMA-ScR, tabelas e narrativas descritivas. Desvios metodológicos serão relatados, quando aplicável.
Descritores: Estomia; Complicações Pós-Operatórias; Guía de Práctica Clínica; Prevenção Primária; Procedimentos Cirúrgicos Operatórios.

ABSTRACT

Objective: To identify the best practices for the safe construction of stomas in order to prevent and minimize postoperative complications, and secondarily to highlight gaps for future research. Introduction: The creation of stomas is used in the management of the gastrointestinal tract, but postoperative complications are common due to the techniques employed. Recent advances have allowed for the identification of ideal practices. Inclusion Criteria: These will include guidelines, systematic reviews, meta-analyses, protocols, and recommendations for professionals in the creation of stomas, excluding outdated, irrelevant, or qualitative sources. Methods: This scoping review will be conducted following the JBI methodology for scoping reviews (2024) and will adhere to the PRISMA-ScR guidelines. The main databases to be searched include PubMed/MEDLINE, Embase, Web of Science, Scopus, Cochrane Library, BVS, LILACS, Trip Medical Database, Epistemonikos, and CINAHL. Grey literature sources will also be included. The search will consider published and unpublished studies from 2015 onward, in any language. Titles and abstracts will be screened in Rayyan by two independent reviewers, followed by full-text reading of eligible studies. Data will be extracted using standardized forms in Excel and presented in PRISMA-ScR diagrams, tables, and descriptive narratives. Methodological deviations will be reported when applicable.
Descritores: Ostomy; Postoperative; Complications; Practice Guideline; Primary Prevention; Surgical Procedures, Operative

RESUMEN

Objetivo: Identificar las mejores prácticas para la construcción segura de estomas, con el fin de prevenir y minimizar las complicaciones postoperatorias y, secundariamente, destacar las lagunas para futuras investigaciones. Introducción: La creación de estomas se utiliza en el manejo del tracto gastrointestinal, pero las complicaciones postoperatorias son comunes debido a las técnicas empleadas. Los avances recientes han permitido identificar prácticas ideales. Criterios de Inclusión: Se incluirán directrices, revisiones sistemáticas, metaanálisis, protocolos y recomendaciones para profesionales en la creación de estomas, excluyendo fuentes desactualizadas, irrelevantes o cualitativas. Métodos: Esta revisión de alcance se llevará a cabo de acuerdo con la metodología JBI para revisiones de alcance (2024) y seguirá las directrices PRISMA-ScR. Las principales bases de datos a ser investigadas incluyen PubMed/MEDLINE, Embase, Web of Science, Scopus, Cochrane Library, BVS, LILACS, Trip Medical Database, Epistemonikos y CINAHL. También se incluirán fuentes de literatura gris. La investigación considerará estudios publicados y no publicados a partir de 2015, en cualquier idioma. Los títulos y resúmenes serán seleccionados en Rayyan por dos revisores independientes, seguidos de la lectura completa de los textos elegibles. Los datos serán extraídos en formularios estandarizados, utilizando Excel, y presentados en diagramas PRISMA-ScR, tablas y narrativas descriptivas. Se reportarán desviaciones metodológicas, cuando sea aplicable.
Descriptores: Estomía; Complicaciones Posoperatorias; Guía de Práctica Clínica; Prevención Primaria; Procedimientos Quirúrgicos Operativos.

Introdução

The creation of a stoma is often an integral part of the surgical treatment for various diseases, particularly conditions affecting the gastrointestinal tract, including cases of colorectal cancer, inflammatory bowel disease (IBD), diverticulitis, intestinal trauma, intestinal perforation, fecal diversion in high-risk situations such as high-risk anastomoses, or to relieve obstructions and incontinence[1,2]. The incidence of this surgical procedure is considerable. A multicenter study found that 25% of patients with mid or low rectal cancer ended up with a permanent stoma[3]. A population-based study in Sweden revealed that the five-year cumulative incidence of stoma formation was 2.5%[4]. A national study on subtotal colectomy for inflammatory bowel disease found that 33% of patients ended up with a permanent stoma[5]. Thus, it can be inferred that there is variability in the incidence of stoma construction depending on the underlying clinical condition, yet all have significant clinical relevance.

Complications in stomas are common, affecting between 2.9% and 81.1% of cases, with nearly half being considered 'problematic' due to issues with pouches and the surrounding skin, leading to high morbidity and the need for surgical revision, which increases healthcare costs[6]. Regarding stoma-related complications following emergency surgery, it has been observed that 54.1% of patients experienced early complications[6]. The incidence varies depending on the type of ostomy, with lower rates for end colostomies and end ileostomies. Loop ileostomies have the highest complication rates, including skin irritation and small bowel obstruction. Prolapse is more common in loop colostomies, especially those constructed with the transverse colon. Hernias and retractions are the most frequent complications for both end and loop ileostomies and colostomies. Complications may arise immediately after surgery or even many years later[7].

There are intrinsic risk factors related to the patient that are associated with postoperative stoma complications, such as obesity, malnutrition, and stoma types[8]. However, it is evident that the surgical techniques used in stoma creation, including, for example, stoma height, as well as preoperative planning, can influence the risk of complications. A relevant aspect of this issue is that these factors are more easily modifiable, even in urgent and emergency situations[6,9,10]. Therefore, paying attention to the surgical aspects of stoma construction and reviewing the scientific literature for evidence-based practices is essential to improving patient outcomes.

Despite significant advances in scientific research, evidence-based surgery remains a relatively new field, facing methodological and clinical challenges[11,12]. However, progress has been made, and the number of publications related to surgery, as well as to stomas, has increased significantly in recent years, reflecting frequent discoveries and important innovations that can support safer and more effective practices, even though not all recommendations are based on high-quality methodological studies[12,13].

A preliminary search was conducted in the databases PROSPERO, MEDLINE, Cochrane Database of Systematic Reviews, Open Science Framework, and JBI Evidence Synthesis, and no current or ongoing systematic

reviews or scoping reviews were identified that share the same central objective as this scoping review, which aims to evaluate the extent of the literature on the most ideal and evidence-based recommendations of good quality for stoma construction, aiming to prevent and minimize postoperative complications. A secondary outcome of this review will be the identification of practices or processes that lack robust scientific support, which may be indicated as targets for future research.

Review question

P (*Population*): Health professionals, doctors, and surgeons.
C (*Concept*): Best practices in stoma construction in adults and the elderly.
C (*Context*): Prevention and reduction of postoperative and peristomal complications.

Established research question:

The main question is:

What are the safe surgical practices adopted by healthcare professionals, physicians, and surgeons for the construction of elimination stomas, with a focus on preventing and reducing postoperative complications?

The review will also include the following secondary questions:

- Are there advantages to performing complete bowel preparation before stoma creation?
- Does preoperative stoma site marking reduce complications?
- Does preoperative patient education influence the incidence rate of complications?
- What is the impact of the patient's nutritional and metabolic status on surgical outcomes?
- What are the recommendations for patients with inflammatory bowel diseases?
- Which techniques are safest for stoma creation in emergency situations?
- Should ileostomies be preferred over colostomies for temporary fecal diversion?
- What is the optimal position for stoma placement? Should the stoma be positioned through the rectus abdominis muscle or in another location?
- What are the recommendations regarding skin and aponeurosis incision in the abdominal wall?
- What is the ideal protrusion height of the stoma relative to the skin?
- Should the incision/dissection in the rectus abdominis muscle be circular, vertical, or cross- shaped? Transrectal or lateral pararectal?
- What is the safest technique for stoma fixation to the skin?
- Does extraperitoneal tunneling in terminal colostomies reduce complications?
- Do minimally invasive techniques reduce stoma-related complications?
- Should prophylactic mesh be used to prevent parastomal hernias in

permanent stomas? What is the best type of mesh for prophylactic use in stomas? What is the optimal position for placing the prophylactic mesh?
- What materials are most suitable for stoma construction?
- Is the use of specific stoma support devices recommended during the immediate postoperative period?
- What specific techniques are recommended to ensure adequate stoma protrusion in obese patients?
- What are the recommendations for ensuring good vascular perfusion during bowel mobilization?
- What type of ostomy collection system is recommended for the immediate postoperative period?

Keywords
Ostomy; Postoperative Complications; Practice Guideline; Primary Prevention; Surgical Procedures, Operative.

Eligibility criteria

Population

The participants in this scoping review will include surgeons and physicians involved in the creation of elimination stomas, enterostomal therapy nurses, and other healthcare professionals whose practices may impact stoma-related outcomes. The focus will be on the construction of elimination stomas, including colostomies, ileostomies, and urostomies, in elective, urgent, or emergency settings, with no age restrictions, encompassing pediatric to elderly populations. Specific comorbidities of patients undergoing this procedure by these professionals, such as obesity, diabetes, inflammatory bowel diseases, or particular anatomical conditions, will be considered in the interpretation of the results. These aspects will also be taken into account.

Concept

The central concept of this scoping review is the identification of best surgical practices, based on scientific evidence, for the construction of elimination stomas with the aim of preventing and reducing postoperative complications, both immediate and late. This includes specific practices related to preoperative planning, surgical techniques, intraoperative care, and initial management in the immediate postoperative period. The included studies should encompass guidelines, systematic reviews, meta-analyses, protocols, or recommendations from medical and scientific societies, as well as research with high scientific impact that describe safe surgical techniques and strategies for preventing stoma-related complications. If the selected study for full-text reading does not address practices or techniques related to the construction of elimination stomas, focuses exclusively on the management of already established complications without exploring preventive surgical practices, describes stomas that are not elimination stomas, or does not include evidence-based recommendations or descriptions of surgical practices applicable to the review's objective, it will be excluded.

Context

This review will consider studies encompassing safe surgical practices related to the construction of elimination stomas in any healthcare setting, including, for example, hospitals, specialized clinics, ambulatory surgical centers, or emergency and urgent care units.

There are no restrictions regarding the geographical location of the studies, allowing for the inclusion of evidence from different healthcare systems, cultures, and socioeconomic contexts. Cultural, subcultural, and regional factors that may influence the surgical approach and postoperative management will also be considered, including variations in the techniques employed, the resources available, and care practices. Studies limited to purely laboratory or experimental descriptions that are not applicable to clinical practice will be excluded.

Types of Sources

This scoping review will cover both clinical guidelines and protocols published by medical societies, professional associations, and governmental organizations, provided they are based on systematic reviews or robust evidence, ensuring high-quality standards. Guidelines developed based on observational studies or expert opinions will only be included if they clearly detail their sources and methodologies, allowing for critical analysis. Additionally, systematic reviews and meta-analyses that meet the inclusion criteria, according to the research question, will be considered. Randomized clinical trials, non- randomized controlled trials, before-and-after studies, and interrupted time series studies will also be included in this review, but only if they provide detailed information and demonstrate good methodological quality in line with the objectives of this review.

In addition, gray literature, including technical reports, institutional documents, theses, dissertations, and materials from governmental and non-governmental organizations, will be considered for inclusion. Opinion articles, editorials, letters, and technical reports discussing surgical practices related to stomas, institutional protocols, educational materials, and scientific conference reports will also be considered in this scoping review. However, the inclusion of these materials will be subject to eligibility criteria and their relevance to the objectives of this review. Furthermore, they will undergo a more rigorous evaluation, as studies with a higher impact will be prioritized in the synthesis of results.

Narrative and integrative review articles will be excluded. Analytical observational studies, including prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, as well as descriptive observational study designs such as case series, individual case reports, and descriptive cross-sectional studies, will also be excluded. Qualitative studies will not be considered. Outdated guidelines and protocols will be excluded, with only the most recent versions available from each society or organization being considered.

Method

This scoping review will be conducted following the JBI methodology for scoping reviews (2024 version), using the PRISMA-ScR guideline[14].

Search Strategy

Search for similar Scoping Review

An initial limited search was conducted in the MEDLINE (Medical Literature Analysis and Retrieval System Online), Web of Science, Scopus, and Trip Medical Database.

Identification of descriptors and keywords

The search strategy will aim to locate both published and unpublished studies. A limited search was conducted in MEDLINE and Web of Science to identify articles on the topic and to verify the main descriptors and keywords used in studies addressing the subject of interest:

(Ostomy OR Colostomy OR Ileostomy OR "Jejunoileal Bypass" OR Physicians OR Surgeons OR "Health Personnel") AND ("Anastomosis, Surgical" OR "Surgical Mesh" OR "Surgical Procedures, Operative" OR "Intraoperative Care" OR "Preoperative Care") AND ("Postoperative Complications" OR "Skin Diseases")

The keywords contained in the titles and abstracts of relevant articles, as well as the indexing terms used to describe the articles, were used to develop a comprehensive search strategy for PubMed/MEDLINE (see Appendix I). The search strategy, including all identified keywords and indexing terms, will be adapted for each database and/or information source included. The reference lists of all included sources of evidence will be reviewed for additional studies.

This scoping review will consider published and unpublished studies written from 2015 onwards, available online in electronic databases or through contact with the study authors. The rationale for this time frame is based on the fact that, from this period onward, there was a significant increase in scientific production in surgery, with greater emphasis on evidence-based practices and methodological rigor. Before this period, scientific research in surgery was not as widespread, with only 3.4% of studies published in leading surgical journals until the early 2000s being randomized clinical trials, reflecting the low adoption of evidence-based practices in surgery at that time[11,13]. Studies in any language will be included to ensure the comprehensiveness of the available evidence.

The databases to be searched include Medline (PubMed); Embase; Web of Science; Scopus; Cochrane Library; Biblioteca Virtual de Saúde (BVS); Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS); Trip Medical Database; Epistemonikos; and the Cumulative Index to Nursing and Allied Health Literature (CINAHL).

Sources of unpublished studies/grey literature to be searched include National Institute for Health and Care Excellence (NICE); OpenGrey; Grey

Literature Report; Networked Digital Library of Theses and Dissertations (NDLTD); DART-Europe E-theses Portal; Open Access Theses and Dissertations (OATD); Bielefeld Academic Search Engine (BASE); PAHO/WHO IRIS; Electronic Theses Online Service (EThOS); Canadian Agency for Drugs and Technologies in Health (CADTH); National Technical Information Service (NTIS); EuroPub; FAO Document Repository; ProQuest Dissertations and Theses Global; Government Printing Office (GPO); World Health Organization IRIS; ClinicalTrials.gov; Trove; System for Information on Grey Literature in Europe (SIGLE); HEALTH-Evidence; Community Research and Development Information Service (CORDIS); Biblioteca Digital Brasileira de Teses e Dissertações (BDTD); ProQuest Dissertations and Theses Global (PQDT); Cybertesis; OpenDissertations (EBSCO); Theses (França); TesiOnline (Itália); Theses Canada; UBC Library's Collections; Deutsche Nationalbibliothek (German National Library); RCAAP – Repositório Científico de Acesso Aberto de Portugal; CiNii Dissertations (Japão); Banco de Teses da CAPES; Repositórios Institucionais de Instituições de Ensino Superior e Institutos de Pesquisa; Repositório Institucional da Fiocruz (ARCA); Repositório Institucional de Produção Científica da ENSP; Repositório Institucional Digital do IBICT; Repositório do Conhecimento do Ipea; Repositório Institucional do Instituto Nacional de Tecnologia; Biblioteca Multimídia da Fiocruz; Lume - Repositório Digital da Universidade Federal do Rio Grande do Sul; Repositório Institucional da UNIFESP; Repositório Institucional da Universidade Federal de Pernambuco; Repositório Institucional da Universidade Federal do Ceará; Repositório Institucional da Universidade Federal de Santa Catarina; Repositório Institucional da Universidade Federal do Rio Grande do Norte; Repositório Institucional da Universidade Estadual de Campinas; Repositório Institucional da Universidade de São Paulo; Repositório Institucional da Universidade Federal de Minas Gerais; Repositório Institucional da Universidade Federal da Bahia; Repositório Institucional da Universidade Federal de São Carlos; Repositório Institucional da Universidade Federal Fluminense.

Selection of Studies/Sources of Evidence

After the search, all identified citations will be gathered and uploaded to Rayyan. The Rayyan web application will be used to facilitate the selection and analysis of studies retrieved from the databases. This tool organizes and manages systematic reviews, enabling remote work and simultaneous collaboration among the research team, in addition to identifying duplicate studies[15].

After a pilot test, titles and abstracts will be screened in Rayyan by two independent reviewers to assess their compliance with the review's inclusion criteria. This screening, based on the relevance of the studies to the review question, aims to select articles for full- text reading. The citations and reference lists of the selected texts for full-text reading will also be analyzed to identify additional studies that may meet the inclusion criteria. If potentially relevant sources are found, their full texts will be retrieved.

The full text of the selected citations will be thoroughly evaluated against the inclusion criteria by two independent reviewers. The reasons for excluding

sources of evidence, in cases where they do not meet the inclusion criteria, will be recorded and reported in the scoping review. Any disagreements between reviewers at each stage of the selection process will be resolved through discussion or with an additional reviewer. Studies deemed relevant will be selected for full-text reading and subsequent data extraction.

The results of the search and study inclusion process will be fully reported in the final scoping review and presented in a flow diagram following the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping reviews (PRISMA-ScR)[16].

Data Extraction

Data will be extracted from the articles included in the scoping review by two independent reviewers using a data extraction tool developed by the reviewers. These two reviewers will conduct a pilot test for data extraction, which will be applied to three studies to ensure consistency, applicability, and comprehension of the data of interest. If necessary, the data extraction form will be adjusted to better encompass the information from the studies. The extracted data will include specific details about participants, concept, context, study methods, and key findings relevant to the review questions.

A preliminary extraction form is provided (see Appendix II). The preliminary data extraction tool will be modified and revised as needed during the data extraction process for each included source of evidence. Any modifications will be detailed in the scoping review. Any disagreements arising between the reviewers will be resolved through discussion or with the involvement of an additional reviewer. If necessary, the authors of the articles will be contacted to request missing or additional data.

Data Analysis and Presentation

Two independent reviewers will use Excel as a tool for data extraction and organization in this scoping review. The complete details of the analysis will be reported in the final review. The presentation of the results will include diagrams, tables, and descriptive narratives. The PRISMA flow diagram will be used to present the results of this scoping review[17].

Additionally, a narrative summary of best practices performed by healthcare professionals regarding stoma construction will be developed to complement the tabulated results, providing a detailed description of how the findings contribute to the objectives of this scoping review. This scoping review aims to inform safer practices related to stoma construction, promoting the prevention of postoperative complications and supporting future studies.

In the absence of robust scientific evidence from the researched databases, grey literature will be considered as a complementary source to address the review's objectives. These materials will be critically analyzed, taking into account their origin, the methodology employed, and their level of scientific support. Thus, grey literature will not be used as the primary source of evidence but may be incorporated to fill identified gaps, always prioritizing sources with greater credibility and impact on clinical practice.

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Appendix 1: Search strategy

Full search strategy for Pubmed/MEDLINE from 2015 onwards filter; search conducted on February 02, 2025:

#	Search terms and searches	Records retrieved
1	(Ostomy OR Colostomy OR Ileostomy OR "Jejunoileal Bypass" OR Physicians OR Surgeons OR "Health Personnel") AND ("Anastomosis, Surgical" OR "Surgical Mesh" OR "Surgical Procedures, Operative" OR "Intraoperative Care" OR "Preoperative Care") AND ("Postoperative Complications" OR "Skin Diseases")	2,052 results

Appendix 2- Data extraction instrument	
VARIABLE	**STANDARDIZATION**
Study/author/year	Full Title of the Study; Author(s); Year of Publication
Types of evidence source	Article; Systematic Review; Meta-Analysis; Guideline; Protocol; Randomized Controlled Trial; Non-Randomized Controlled Trial; Before-and-After Study; Interrupted Time Series Study; Technical Report; Institutional Document; Thesis; Dissertation; Governmental Organization Material; Non-Governmental Organization Material; Opinion Article; Editorial; Letter; Technical Opinion; Institutional Protocol; Educational Material; Scientific Conference Report
Origin/country of origin	Country where the source of evidence was published or conducted
Aims/purpose	Description of the objective or purpose of the study.
Population and sample size within the source of evidence	Detailed characteristics of participants (age/sex) and sample size
Context	Study setting: hospital, clinic, or other relevant setting
Methodology / methods	Methods employed in the study, as described by the author
Intervention type	Surgical practice or preventive approach investigated
Duration of the intervention	Total duration of the intervention assessed, when applicable
Outcomes and details of these	Description of the main results, metrics used, and detailed outcomes
Key findings that relate to the scoping review question/s.	Key conclusions related to optimal surgical practices for stoma construction

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