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Review Article

Summary of the Best Evidence for Postoperative Management of Breast Reconstruction Patients

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Abstract

Objective: To retrieve, evaluate, and summarize the best evidence regarding perioperative management in patients undergoing breast reconstruction, thereby providing a reference and basis for clinical evidence-based practice.

Methods: Relevant guidelines and evidence syntheses were initially searched in the JBI database and the Ontario Registered Nurses Association, as well as across 12 Chinese and English databases in CNKI and PubMed. The process involved a systematic evaluation and expert consensus, with quality assessment, screening, and integration conducted in accordance with established principles and procedures.

Results: From the review, 10 articles were included, comprising 3 guidelines, 2 systematic reviews, and 5 expert consensus papers. Based on these sources, 29 recommendations were formulated, addressing five key aspects: health education, preoperative evaluation, diet management, exercise management, and postoperative adjuvant therapy.

Conclusion: The best evidence can guide relevant clinical practices, aiding clinical nurses in improving both the quality of care and the patients' quality of life.

Keyword: Breast reconstruction; Summary of evidence; Best guide.

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Relevance to clinical practice

The integration of high-quality evidence into clinical practice is imperative for enhancing patient outcomes post-breast reconstruction surgery. This review synthesizes recommendations from guidelines, systematic reviews, and expert consensus documents to provide a comprehensive overview of optimal postoperative management. Its relevance to clinical practice lies in its capacity to guide healthcare professionals through evidence-based strategies for patient assessment, preoperative preparation, and postoperative care. By adhering to these rigorously evaluated recommendations, clinicians can improve the safety, efficacy, and patient satisfaction aspects of breast reconstruction post-mastectomy. This synthesis not only aids in decision-making but also underscores the importance of individualized patient care, emphasizing the need for consideration of patient preferences, comorbidities, and risk factors. Implementing these evidence-based practices will ultimately contribute to better health outcomes, reduced complications, and enhanced quality of life for breast reconstruction patients.

Patient or public contribution

This study was designed with a strong commitment to involving patients, service users, caregivers, and members of the public at various stages of its development and execution. Input was sought from breast reconstruction patients and patient advocacy groups to understand the key areas of concern, preferences, and needs that should be addressed within the postoperative management framework. This collaboration helped in shaping the research questions, ensuring they were relevant and tailored to the real-world context of those affected by breast reconstruction post-mastectomy. Furthermore, patients and public contributors were involved in the interpretation of findings, offering unique perspectives that enriched the analysis and understanding of the data. Their contributions were invaluable in the preparation of the manuscript, particularly in ensuring the language and recommendations were accessible and pertinent to both patients and healthcare providers. The involvement of these stakeholders underscores the study's commitment to patient-centered care and ensures that the findings are genuinely reflective of and useful for the intended audience.

Impact statement

What does this paper contribute to the wider global clinical community?

Evidence-based guidelines for postoperative care: This paper synthesizes the latest and most comprehensive evidence from guidelines, systematic reviews, and expert consensus documents. It offers a set of evidence-based recommendations for the postoperative management of breast reconstruction patients, enhancing the quality of care and patient outcomes worldwide.

Standardization of clinical practices: By providing a detailed overview of the best practices in postoperative management, this paper aids in standardizing clinical protocols across different healthcare settings. This standardization can reduce variability in patient care and outcomes, promoting higher standards of practice in breast reconstruction surgery.

Focus on patient-centered approaches: Highlighting the importance of considering patient preferences, comorbidities, and lifestyle factors, this paper advocates for a more patient-centered approach to postoperative management. It encourages clinicians to tailor care plans to individual patient needs, thereby improving patient satisfaction and overall treatment success.

Introduction

Breast cancer is the most common malignancy in the United States, with an estimated 300,000 new cases in women each year. Among these, approximately one-third choose ipsilateral breast reconstruction following mastectomy [1,2]. Autologous Breast Reconstruction (ABR) and Implant-Based Breast Reconstruction (IBR) are both viable options for Post Mastectomy Breast Reconstruction (PMBR), applicable in both immediate and delayed periods [3]. Although some studies have compared the harms and benefits of these two surgical options, along with the results of subsequent treatments with or without multi-therapy, key questions remain about the optimal surgical procedure, further multi-therapy choices, timing of reconstruction, and perioperative care, which are still under discussion [4,5]. Some consider post mastectomy radiation therapy to be an adverse factor affecting patient outcomes, while others believe that evolving radiation techniques have the potential to significantly improve both the field and quality of surgical procedures [6,7]. Furthermore, the optimal timing for radiation therapy remains a subject of ongoing debate. Additionally, the choice of operative incisions, implant placements, and graft options can lead to significantly different outcomes [8]. Prepectoral prosthetic breast reconstruction is recommended over the traditional procedure due to its association with less pain and better long-term outcomes, though this recommendation lacks consensus based on large-scale studies [9]. Furthermore, the decision to place the final implants-either immediately after mastectomy or at a second stage using a tissue expander-is complex. This choice depends on factors such as the implant size, the condition of the local skin flap, and the need for further radiation [7]. Related complications, both local and systemic, have been summarized; however, the corresponding prevention and treatment strategies lack global consensus [10]. The aforementioned difficulties have a profound and lasting impact on the outcomes of breast reconstruction patients. This article systematically analyzes the available literature to provide the best evidence synthesis on the management of postmastectomy breast reconstruction. With the goal of assisting medical professionals in clinical decision-making and promoting patient recovery, our focus is on practical guidelines pertaining to the preoperative, intraoperative, and postoperative periods.

Methods

Search strategy

Our research team adhered to the '6S' evidence-based nursing resource distribution diagram [11], initially focusing on high-level evidence such as guidelines and evidence syntheses. We determined search terms through literature review and professional judgment, centering on the theme words 'breast reconstruction.' Our advanced search strategy included using ['breast reconstruction' or 'breast reconstruction'] and ['guide or evidence'] as keywords across various platforms. Specifically, we utilized each search term as a keyword on guide websites,

employed the aforementioned terms on the websites of English Professional Associations, conducted advanced searches in the PubMed database using Mesh subject words related to our theme, and searched other English databases using the same terms.

Inclusion and exclusion criteria for the literature

Inclusion criteria:

(1) Literature type: Guidelines, evidence syntheses, systematic evaluations, or expert consensus.

(2) Relevance: Content specifically related to breast reconstruction.

(3) Completeness: Guides must include comprehensive details such as name, profile, catalog, contents, references, etc.

(4) Currency: The literature, whether a guide or evidence synthesis, must be the most recent revision or update.

(5) Language: Limited to Chinese and english.

(6) Accessibility: The full text of the literature must be available.

Exclusion criteria:

(1) Literature that consists of directly translated foreign guidelines, guide interpretations, and repeated guidelines.

(2) Normative documents, government drafts, meeting minutes, or reports.

(3) Studies that offer only a simple evaluation of certain types of evidence.

(4) Evidence lists that exclude methodological descriptions of the evidence.

(5) Evidence-based practice studies that include both evidence summaries and applications of evidence.

Literature evaluation criteria and process

Quality evaluation criteria and process of the literature

1. The quality assessment and rating of the literature meeting the inclusion criteria were independently performed by two researchers trained in evidence-based nursing. In cases of inconsistent results, a third investigator was invited to review and help reach a consensus. If evidence from different sources is inconsistent, the most recently published evidence of higher quality will take precedence.

The quality of the guidelines was assessed using the Appraisal of Guidelines for Research and Evaluation (AGREE II) system [6], which was updated in 2012. This system evaluates guidelines across six aspects: scope, purpose, stakeholder involvement, rigor of development, clarity of presentation, and applicability.

The quality of the included systematic reviews was assessed using the AMSTAR (A Measurement Tool to Assess Systematic Reviews) [8]. This tool evaluates reviews based on 11 items, each rated as 'yes' (a), 'no' (b), 'unclear' (c), or 'not applicable' (d). For inclusion, a review must have at least 8 items rated as 'a'. The exclusion criteria are: more than 3 items rated as 'b', at least 2 items rated as 'c', or more than 1 item rated as 'd'.

This study was assessed using the Australian JBI (Joanna Briggs Institute) evidence-based expert consensus criteria (2016) [9]. The assessment consists of 10 items, each rated as 'yes' (a), 'no' (b), 'unclear' (c), or 'not applicable' (d). For inclusion, at least 4 of all items must be rated as 'a'. The exclusion criteria are set as follows: more than 2 items rated as 'c', or any items rated as 'd'.

Determination of the evidence level and recommendation level of recommendation opinions

The original literature included in the systematic evaluation was graded using the JBI (Joanna Briggs Institute) Evidence Pregrading System (2014 edition) [10], which classifies the level of evidence into Levels 1 to 5. Upon extraction of the evidence entries, their inclusion is determined based on the FAME [12] attributes. The level of recommendation (either recommendation A or recommendation B) for the included evidence entries is then determined using the JBI Evidence Recommendation Level System (2014 edition).

Translation and review of the evidence

The two researchers adhered to the nuances of foreign language expression and employed plain language for the translation. The two resultant translations were then compared. Subsequently, one senior researcher and one clinical expert were invited to review the English versions.

Screening of evidence

Two researchers, trained in evidence-based practice and experienced in the breast reconstruction department, evaluated each recommendation according to JBI's FAME theory. Ratings were assigned as '√' for inclusion, '✗' for exclusion, along with reasons to integrate the recommendations that met the inclusion criteria. In cases of consistent evaluation results, the recommendation was approved. In cases of inconsistency, clinical experts and evidence-based methodology experts, with over 5 years of experience in breast reconstruction, conducted the evaluation. The final decision was based on the consensus of these three experts. Recommendations were integrated following three principles: consistency or complementarity of content, content conflict, and independent content.

Exclusion criteria included: ① Complete inconsistency with the clinical scenario in China; ② Irrelevance to the breast reconstruction theme; ③ Contradiction to the routine of clinical practice in China.

Synthesis of evidence

1. The following principles were adopted for integrating the recommendation, complementary recommendations are directly merged.

2. Concise and clear recommendations that are independent yet convey essentially the same content are consolidated.

3. In cases of conflicting recommendations, the sources of these differing recommendations are traced to ascertain the causes of the conflicts. If necessary, a systematic re-evaluation is conducted.

Table 1: General features of the included paper.

Country	Evidence Type	Source	Publish time	Number of included documents	Recommended content overview
China [12]	Guidelines	Chinese Society of Breast Surgery (CSBrS)	2021		Clinical practice guidelines for post-mastectomy breast reconstruction
America [13]	Guidelines	American Society of Plastic Surgeons (ASPS)	2022	114	guidelines for reduction mammaplasty
British [14]	Guidelines	New Zealand Government (NZG)	2021	/	diagnosis, support, treatment and follow-up of breast reconstruction
America [15]	Systematic Review	Agency for Healthcare Research and Quality (AHRQ)	2021	160	Comparison of the results of implant-based re-construction and autologous reconstruction with or without multitherapy
America [11]	Systematic Review	Agency for Healthcare Research and Quality (AHRQ)	2020	36	Benefits and harms of surgical options
China [16]	expert consensus	The Breast Cancer Professional Committee of the Chinese Anti-Cancer Association (CACA)	2022	/	Enscopic breast reconstruction, anterior breast reconstruction, case management of breast reconstruction, etc
China [17]	expert consensus	The Breast Cancer Professional Committee of the Chinese Anti-Cancer Association (CACA) Association	2022	/	Accelerated rehabilitation surgery for breast reconstruction
China [18]	expert consensus	Breast Surgery Group, Surgery Branch of Chinese Medical Association (CMA)	2019	/	For breast reconstruction indications and contra-indications and technical operation principles
Italy [19]	expert consensus	International Oncoplastic Breast Surgery Meeting (IOBSM)	2019	1522	Effects of radiotherapy on breast reconstruction
Canada [20]	expert consensus	ERAS Society (ES)	2017	/	Consensus Review of Optimal Perioperative Care in Breast Reconstruction

Table 2: Quality evaluation of the best practice guidelines.

Order number	Rating each item (%)						Normalized score mean (%)				
	Scope and purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence					
1	83.33%	66.67%	47.17%	55.56%	56.00%	76.92%	64.27%	4.75	Yes	4	B
2	94.44%	66.67%	64.15%	83.33%	60.00%	84.62%	75.54%	5.25	Yes	7	A
3	88.89%	94.44%	39.62%	77.78%	72.00%	84.62%	77.17%	5.75	Yes	6	A

Note: Standardized percentage score of each field = [(actual score in each field-lowest possible score (highest possible score in each field-lowest possible score)] X100%.

Table 3: Methodological quality evaluation of the systematic evaluation.

Evaluation Index	IJ (2021) [4]	America (2020) [11]
1. Is the preliminary design plan provided?	a	a
2. Are the selection and data extraction of included studies reproducible?	a	a
3. Are extensive and comprehensive literature searches carried out?	a	a
4. Has publication status been taken into account in the inclusion criteria, such as grey literature?	b	a
5. Is a list of included and excluded research literature available?	b	b
6. Did it describe the features included in the study?	a	a
7. Is the science of the included research evaluated and reported?	a	a
8. Is the science included in the study properly applied to the inference of the conclusions?	a	a
9. Are the methods used to synthesize the included findings appropriate?	a	a
10. Was the possibility of publication bias assessed?	a	a
11. Has any conflict of interest been stated?	b	a
Results	8b3b	10a1b
Overall Evaluation	Taken	Taken

Note: Item assessment method is yes **(a)**, no **(b)**, unclear **(c)**, not used in **(d)**.

Table 4: Quality evaluation of expert consensus methodology.

Evaluation Index	CACA (2022)	CACA (2022)	CMA (2019)	IOBSM (2019)	ES (2017)
1. Have determined whether the source of the opinion was clearly identified	a	a	a	a	a
2. Is the source of opinion in the professional field?	a	a	a	a	a
3. Are the interests of the relevant people at the center of the opinion?	a	b	b	b	b
4. Is the stated position the result of the analytical process? Is there any logic in the opinions expressed?	a	a	a	a	a
5. Do you refer to the existing literature?	a	a	a	a	a
6. Is there any logical defence inconsistent with the literature / sources?	b	b	b	a	a
Results	5a1b	4a2b	4a2b	5a1b	5a1b
Overall Evaluation	Taken	Taken	Taken	Taken	Taken

Note: Item assessment method is yes **(a)**, no **(b)**, unclear **(c)**, not applicable **(d)**

Table 5: Summary of the best evidence for postoperative management after breast reconstruction.

Recommended type (number of entries)	Recommendations [Guide source, year of release (recommended strength/level of evidence)]
Preoperative (15 pieces of evidence)	
Patient pathway and referral [3]	The choice of reconstruction must consider the patient's preferences, such as smoking habits, comorbidities, and other factors (CACA, 2022, low/Strong).
	Tools such as scales can be used to evaluate patients' personal values and choice preferences, or manuals, videos, mobile programs, and other forms can be used to assist patients in decision-making, promoting patients to make decisions that align with their own preferences (CACA, 2022, low/Strong).
	Patients consult a clinical nursing specialist (CNS) or equivalent key staff with expertise in plastic surgery and breast reconstruction for breast cancer (CACA, 2022, low/Strong).
Indications & Absolute contraindications/Relative contraindications [1]	Indications: Breast cancer patients who have undergone mastectomy and need breast reconstruction. Absolute contraindications/Relative contraindications: Inflammatory breast cancer/Smoking and obesity (CSBrS,2021,Moderate/Strong).
Preoperative evaluation [2]	Prior to surgery, relevant medical history of the patient should be collected, including smoking/alcohol abuse history, comorbidities such as hyperglycemia/hypertension, obesity history, previous operating room history, medication history, chest radiation history, and family history of malignant tumors (CACA, 2022, high/Strong).
	Preoperative evaluation of the patient's breast morphology, breast tumor, risk of lymphedema, selection of surgical procedures for breast tumor resection, risk of venous thromboembolism, cardiovascular system function, and matching of intravascular volume (CACA, 2022, high/Strong).
Preoperative preparation [6]	Preoperative fasting with water: Preoperative fasting should be minimized and patients should be allowed to drink clear liquids 2 hours before surgery. Oral administration of carbohydrates containing beverages (maltodextrin based preoperative beverages) 2-4 hours before surgery can alleviate stress reactions to a certain extent. Prohibition of drinking within 2 hours before surgery (ES,2017, Moderate/Strong).
	Skin preparation: The traditional concept of large-scale hair removal should shift towards thorough disinfection and cleaning. Before surgery, use iodophor alcohol or amlodine to clean the skin. For abdominal flap surgery, the navel should be carefully cleaned to remove dirt (CACA, 2022, high/Strong).
	Preventive pain relief: ① Women should receive multimodal pain relief. ② Preventive analgesia based on the degree of surgical trauma before surgery can alleviate postoperative pain, reduce the risk of postoperative delirium, and reduce the dosage of postoperative analgesics. Preoperative medication includes non-steroidal anti-inflammatory drugs (NSAIDs) and selective Cox-2 inhibitors. Peripheral nerve block or incision local infiltration analgesia can be performed before anesthesia or surgery begins (CACA, 2022, Moderate/Strong).
	Nausea/vomiting: Women, young age (age<50 years old), motion sickness, or a history of postoperative nausea and vomiting (PONV), non-smoking, inhalation anesthesia, prolonged anesthesia, and postoperative administration of opioids are risk factors for PONV. Women should receive preoperative and intraoperative medication to reduce postoperative nausea and vomiting (CACA, 2022, Moderate/Strong).
	Preoperative anti anxiety: In addition to preoperative education, non pharmacological or pharmacological interventions may be given as appropriate. Non drug intervention includes music therapy, psychological intervention, hypnotherapy, guided imagination, acupuncture and moxibustion, and drug intervention includes benzodiazepines, pregabalin, and melatonin (CACA, 2022, Moderate/Strong).
	Pre operative Antibiotics/Anti Infection: ① It is recommended to use antibiotics prophylactically. If there are implants or the surgical time exceeds 3 hours, it is recommended to use antibiotics prophylactically. ② Chlorhexidine skin preparation should be performed and antibiotics covering common skin organisms should be injected intravenously within 1 hour after the incision Extending the duration of antibiotic use cannot clearly reduce postoperative infection rates (CACA, 2022, Moderate/Strong).

Operation time [1]	The timing of breast reconstruction is divided into immediate breast reconstruction, delayed breast reconstruction, and delayed immediate breast reconstruction. When choosing the timing for breast reconstruction, it is necessary to fully consider the patient's prognosis and radiotherapy factors. The timing of reconstruction should not affect oncological outcomes due to delayed adjuvant therapy (including radiotherapy and systemic therapy) (IOBSM, 2019, Moderate/Strong).
Surgical method selection [1]	① For patients who have received radiation therapy, autologous tissue flaps are the preferred choice for delayed breast reconstruction For patients undergoing postoperative radiotherapy, if choosing breast reconstruction with prostheses, full consideration should be given to the risk of serious complications such as increased capsule contracture during radiotherapy Endoscopic breast reconstruction and open surgery have comparable tumor safety and good aesthetic effects, and patients can be appropriately selected; ④ Robotic surgery has advantages such as a 3D field of view and simulating wrist movements, but the cost is high and there are few units to carry out, so it needs to be carried out with caution (CACA, 2022, Moderate/Strong).
Adjuvant therapy [1]	The presence of prostheses (dilators or permanent implants) for breast reconstruction will not affect the technical delivery of PMRT. Continuously evolving radiation therapy techniques (respiratory control, intensity modulated radiation therapy, volume modulated arc therapy, or spiral computed tomography) may help further improve the visual field design and PMRT quality (target coverage and dose distribution) of some patients undergoing immediate breast reconstruction (IOBSM, 2019, Moderate/Strong).
Intraoperative (2 pieces of evidence)	
Preventing intraoperative hypothermia [1]	During surgery, the patient's body temperature should be regularly monitored until after surgery to ensure the temperature of liquid infusion. The patient's core body temperature can be maintained at no less than 36 ℃ by using a heated mattress, pressurized air heating (heater), circulating water suit heating system, transfusion and infusion heating device, etc. (CACA, 2022, Moderate/Strong).
Intraoperative anesthesia method [1]	Choosing general anesthesia combined with paravertebral nerve block, peripheral nerve block, or incision local infiltration analgesia can meet the painless needs of surgery and suppress stress reactions caused by trauma (CACA, 2022, Moderate/Moderate).
Postoperative (12 pieces of evidence)	
Case management [1]	Develop quality indicators for case management, establish criteria for case management closure, and the closure time can be 5 years after diagnosis without disease progression. Develop classified and personalized nursing, monitoring, and rehabilitation plans to reduce surgical complications, promote patient recovery, and improve postoperative satisfaction (CACA, 2022, low/Strong).
Patient satisfaction [1]	Standard Patient Report Result Measurement (PROM) tools should be used to record patient reported results/satisfaction, including measuring patient satisfaction with their appearance with and without clothing. BREAST-Q is currently the most commonly used patient reported outcome measurement tool in the field of breast surgery, used to evaluate breast satisfaction, social and psychological health, sexual health, physical health, and treatment outcome satisfaction (CACA, 2022, high/Strong).
postoperative management [8]	Postoperative analgesia: It is recommended to use a multimodal analgesic plan for postoperative analgesia, such as local anesthetic incision infiltration analgesia, continuous infiltration analgesia, peripheral nerve block combined with low-dose opioid drugs, patient controlled intravenous analgesia, and NSAIDs. Local anesthetic drugs can be used, such as ropivacaine, lidocaine, and bupivacaine (ES, 2017, High/Strong)
	Postoperative wound management: The condition of the wound should be observed daily and dressing should be changed, especially paying attention to the cleanliness of the drainage tube to avoid retrograde infection. The wound is usually closed using a layer-by-layer suture method. For incision closure, it is recommended to use traditional sutures. Complex wounds after skin necrosis can be treated through repair and negative pressure wound treatment. (ES,2017,High/Strong)
	Postoperative pipeline care: ① The placement of the drainage tube should refer to the location of the flap used and the size of the surgical wound, and be connected to negative pressure drainage to ensure smooth drainage. The removal standard is usually a light yellow or light bloody clear liquid<30mL/24h. The extubation standard can be adjusted according to the surgical procedure Urinary catheters should be placed after the onset of anesthesia or during the induction period, and removed after surgery when the patient's autonomous urination function returns (CACA, 2022, Moderate/Strong).
	Prevention/Management of Deep Venous Thrombosis: Routine lower limb color ultrasound examination and coagulation function testing should be performed before surgery. After excluding deep vein thrombosis, physical therapy such as pressure pump antithrombotic therapy and ankle pump exercise in bed can be used after surgery. For patients with abnormal preoperative examination, it is recommended to consult with a specialist to avoid popliteal vein compression during surgery. Encourage patients to get out of bed early, and patients with existing thrombosis should raise their affected limbs, restrict movement, prohibit local massage, and use anticoagulants (CACA, 2022, Moderate/Moderate).
	Postoperative skin flap monitoring: Skin flap monitoring within the first 72 hours should occur frequently. Clinical evaluation is sufficient for monitoring, and it is recommended to use implantable Doppler equipment when embedding the skin flap. The recommended monitoring frequency is: once/h on the 1st day, once/2h on the 21st day, once/3-4 hours on the 3rd day, and twice/day on the 4th to 7th day after surgery. If blood circulation disorders occur, the frequency of monitoring should be increased and promptly addressed, and if necessary, surgical exploration should be performed (ES, 2017, Moderate/Strong).
	Early postoperative activities: After surgery, when awake, one can either rest in a semi recumbent position or engage in moderate bed activity; You can start getting out of bed and moving around 24 hours after surgery, establish a daily activity goal, and increase the amount of activity day by day. Functional exercises such as deep breathing exercises, upper limb function exercises, shoulder joint stretching, etc. (ES, 2017, Moderate/Strong).
	Postoperative life care: Restore diet within 24 hours after surgery. It is recommended to choose a low-fat, low cholesterol, and high-quality protein diet, and eat more fresh fruits and vegetables and foods rich in fiber. After the patient wakes up from anesthesia, they can drink a small amount of water, and the amount of water can be unrestricted on the morning of the first day after surgery. It is recommended to perform routine defecation and nebulization after surgery, and compress and bandage the abdominal wound to reduce wound tension (CACA, 2022, Moderate/Strong).

	Postoperative recurrence/repair: ① The local recurrence rate after reconstruction should not be higher than that of the entire cancer surgery. The local recurrence rate should be less than 5% at five years, and the target is less than 3% after five years. Local recurrence after breast reconstruction surgery can be treated locally (surgery ± radiation therapy), combined with re adjuvant treatment, to increase the chances of cure; Wider local recurrence often indicates adverse biological behavior of the tumor The cosmetic surgery after breast reconstruction includes fat transplantation, reconstruction of the inferior folds, reconstruction of the nipple areola complex, scar repair, and symmetrical surgery on the opposite breast. When necessary, multiple surgical techniques should be combined and implemented step by step at the same time or in a certain order and interval.(CACA,2022,Low/Strong)
postoperative radiotherapy (1)	① In some cases, neoadjuvant radiotherapy can be used for breast reconstruction immediately after mastectomy for locally advanced breast cancer; ② During radiation therapy, it is necessary to avoid inflating or deflating the dilator.(IOBSM,2019,Low/Strong)
Postdischarge home support and Physiotherap (1)	arly physiotherapy, supervised exercise programs, and other supportive care initiatives should be instituted after discharge. (ES,2017,Moderate/Strong)

Discussion

The benefits and drawbacks of ABR (Autologous Breast Reconstruction) versus IBR (Implant-Based Reconstruction) have been long discussed, yet no consensus has been reached. Although Santosa's study, which calculated two-year outcomes, concluded that patients undergoing ABR experienced higher satisfaction compared to those undergoing IBR, the proportion of ABR cases has been decreasing by 5% annually, while the number of IBR cases increases by 11% each year [21,22]. In considering the choice of surgical procedures, one significant yet often overlooked factor is physician payment. Surgeons typically earn less revenue from procedures using abdominal flaps compared to those employing implants. This disparity in income has been widening over each decade, which may lead to a growing preference for IBR [23]. Additionally, a meta-analysis has associated ABR with significantly higher costs compared to other methods [24]. These various factors contribute to the increasing preference for Implant-Based Reconstruction (IBR). Despite this trend, there remains no consensus regarding the optimal timing of surgery, choice of implant type, operative techniques, and adjuvant treatments in postmastectomy breast reconstruction. Breast reconstruction can be categorized into immediate, delayed-immediate, and delayed surgery. One study, which utilized a Health-Related Quality of Life (HRQoL) questionnaire during the reconstruction process, revealed that HRQoL scores of patients who declined postmastectomy reconstruction converged with those of patients undergoing reconstruction by the ninth month postoperatively [25]. Patients undergoing different stages' operation have diverse esthetic satisfaction and different complications. Immediate breast reconstruction candidates are patients with small-to-medium nonptotic breasts and well-vascularized thick mastectomy flaps [26]. Patients undergoing operations at different stages experience varying levels of aesthetic satisfaction and encounter different types of complications. Candidates for immediate breast reconstruction are typically patients with small-to-medium-sized, non-ptotic breasts and well-vascularized, thick mastectomy flaps [27]. In addition to the evolution of operative steps, improvements have been made in surgery details, particularly in the manipulation of anatomic levels. In traditional prosthetic breast reconstruction, disrupting the pectoralis major muscle, and sometimes even the serratus anterior muscle, can lead to a range of morbidities, including strength loss and animation deformity. An innovative surgical approach involves placing the tissue expander above the pectoralis muscle, which can reduce the risk of these side effects [28]. Furthermore, autologous fat grafting is increasingly regarded as a beneficial tool for enhancing outcomes and minimizing complications in both radiated and non-radiated patient cohorts [29]. While the use of fat grafting and biologic mesh is advocated, surgeons have increasingly discouraged the use of highly cohesive implants, smooth implants, polyurethane implants, and synthetic mesh in an effort to reduce complications [30].

Traditional criteria for Post Mastectomy Radiotherapy (PMRT) included the presence of a tumor larger than 5 cm, lymph node involvement, and local skin or muscle invasion. However, recent guidelines from the National Comprehensive Cancer Network (NCCN) recommend that physicians consider PMRT for patients with tumors smaller than 5 cm or with 1 to 3 positive lymph nodes. This update has significantly expanded the PMRT patient cohort [31]. Patients who undergo breast-conserving surgery followed by adjuvant radiotherapy are associated with better overall survival and a lower rate of local recurrence. However, they are often not suitable candidates for oncoplastic surgery [32,33]. It has been confirmed that adjuvant radiotherapy leads to a higher rate of reconstruction failure, an increased prevalence of complications, and more frequent occurrences of fat necrosis [34]. According to expert consensus, autologous breast reconstruction is preferred for patients who have undergone radiotherapy, especially when considering the risk of capsular contracture associated with radiotherapy [17]. Patients undergoing immediate autologous breast reconstruction followed by Post Mastectomy Radiotherapy (PMRT) are found to experience fewer complications, a lower failure rate, and improved quality of life, compared to those who have implant-based reconstruction [35]. To mitigate the long-term effects of radiotherapy, performing immediate implant/expander space reconstruction followed by a switch to autologous tissue is necessary to maintain the skin envelope [32]. However, research from one database has indicated that the optimal approach following postmastectomy radiotherapy is a combination of prosthetic and autologous breast reconstruction [36]. One official breast unit recommends that Post Mastectomy Radiotherapy (PMRT) should be performed during stage I of breast reconstruction, specifically during tissue expansion. Regarding the timing of fat grafting, it is dependent on the modified LENT-MONA score post-expansion. Typically, this occurs three months prior to expander substitution and at least five months after PMRT [37]. In addition to the timing of PMRT, another contentious issue is whether to administer radiotherapy to the implant/expander. Nava et al. reported in their study that delivering PMRT to expanding tissues may adversely affect the outcomes of reconstruction [38]. Nevertheless, administering radiation to autologous implant tissue is associated with a lower rate of local recurrence and improved overall survival [31]. The importance of grafting a flap with a good blood supply cannot be overstated, as it is essential to prevent flap necrosis, wound infection, and delays in radiotherapy [39].

Outcome

General characteristics of the included literature

After the screening process, a total of 10 articles were ultimately included, comprising 3 guidelines, 2 systematic reviews, and 5 expert consensus documents. The specific details of the screening results are presented in Table 1.

Quality evaluation results of the included literature

The quality evaluation results of the included literature-comprising 3 guidelines, 2 systematic reviews, and 5 expert consensus documents-indicate that they are of high quality and recommended for use. For more details, see Table 2 through 4.

Evidence synthesis and description

The highest quality evidence included in this study consists of 3 guidelines, 2 systematic reviews, and 5 expert consensus documents. The selection of evidence was conducted in accordance with established criteria, ensuring that there were no objections to the translation and synthesis of the evidence. For more details, refer to Table 5.

The predominant method of breast reconstruction following mastectomy is the use of a Deep Inferior Epigastric Perforator (DIEP) flap [40]. For patients with insufficient abdominal tissue, alternative non-abdominal flaps from the thighs, buttocks, or flanks can be utilized. The Profunda Artery Perforator (PAP) flap has increasingly become the secondary choice for autologous breast reconstruction after the Deep Inferior Epigastric Perforator (DIEP) flap [41]. During the immediate ischemia period following the harvesting of all the aforementioned flaps, meticulous care is required. This includes irrigation with heparin saline to prevent thrombosis and wrapping the flaps with moistened gauze. Additionally, maintaining a comfortable ambient temperature, ideally between 22-24 degrees Celsius, is crucial to prevent vasoconstriction caused by hypothermia. The blood supply indicators of the flap should be closely monitored for the first 24-48 hours after tissue transfer surgery. This monitoring includes checking the temperature and color of the skin, observing for swelling and bleeding around the flap, and assessing the local capillary refill time. Furthermore, to prepare for any potential emergency surgery due to venous congestion, patients are advised to refrain from oral intake of fluids or food for the first 24 hours postoperatively [40,42]. The absence of specialized perioperative nursing and intra-operative assistance is a major factor in why some hospitals do not offer autologous reconstruction [43]. From the patients' perspective, the most common concerning issues include nutrition, as well as back and neck pain, among others [44]. Careful nursing, focusing on a balanced diet and appropriate pain management, is essential. This care should be based on the preoperative selection of suitable patients, which includes excluding those with tobacco intake and controlling conditions such as diabetes and blood pressure. Emphasizing these factors is crucial for patient outcomes [45].

Conclusion

This systematic literature review presents clinical advice supported by strong-level evidence, outlining optional surgical techniques, potential adjustments in management, and key nursing considerations during the perioperative period. However, given the inherent risk of bias in our research and the diverse characteristics of patients, a clear consensus on surgical options remains elusive, despite our efforts to list available choices for various situations. Future studies should continue to focus on the perioperative management of patients undergoing breast reconstruction surgery, with particular emphasis on postoperative nursing and neoadjuvant therapy.

Relevance to clinical practice

The evidence synthesized from the included literature-comprising guidelines, systematic reviews, and expert consensus documents-provides a crucial foundation for improving postoperative management in breast reconstruction patients. This comprehensive collection of high-quality evidence directly impacts clinical practice in several key ways:

Evidence-based recommendations: The integration of these recommendations into clinical practice ensures that patient care is grounded in the most current, rigorously analyzed, and proven effective strategies. This approach minimizes variability in care and helps standardize treatment protocols, leading to more predictable and optimized patient outcomes.

Patient-centered care: The document emphasizes the importance of considering patient preferences, lifestyle factors, and comorbid conditions in the planning and execution of breast reconstruction and postoperative management. By adopting a patient-centered approach, healthcare providers can ensure that care plans are not only evidence-based but also tailored to the individual needs and circumstances of each patient, thereby enhancing patient satisfaction and overall outcomes.

Multidisciplinary collaboration: The findings highlight the necessity for a collaborative approach among various specialists involved in breast reconstruction, including surgeons, oncologists, nursing staff, and rehabilitation therapists. This multidisciplinary effort is crucial for addressing the complex and multifaceted needs of breast reconstruction patients, ensuring comprehensive care that spans from preoperative preparation to long-term follow-up and rehabilitation.

Informed decision-making: Providing patients with information on the benefits and risks associated with different surgical options, and postoperative care strategies, empowers them to make informed decisions about their care. The evidence serves as a resource for healthcare professionals to facilitate discussions with patients about their treatment options, expected outcomes, and potential complications, fostering an environment of shared decision-making.

Quality improvement and benchmarking: The aggregated evidence can serve as a benchmark for quality improvement initiatives within healthcare institutions. By comparing current practices to evidence-based recommendations, institutions can identify gaps in care, develop interventions to address these gaps, and monitor progress over time. This continuous quality improvement cycle can lead to enhanced care delivery and patient outcomes.

Professional education and training: The detailed analysis and synthesis of the best available evidence can also inform educational programs and professional development activities for healthcare providers. By incorporating these findings into training modules, workshops, and continuing education programs, institutions can ensure that their staff is knowledgeable about the latest evidence-based practices in breast reconstruction postoperative care.

In conclusion, the relevance of this evidence to clinical practice cannot be overstated. By guiding clinical decision-making,

promoting patient-centered care, fostering multidisciplinary collaboration, and supporting quality improvement initiatives, this evidence plays a pivotal role in advancing the field of breast reconstruction and improving the care and outcomes of patients undergoing these procedures.

Declarations

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Author contributions: Na Liu and Jintian Hu provided the methodology for the study, Chang Qu and Qingqian Wei analysed the data and drafted the article. The remaining authors contributed to refining the ideas, discussing the results and revising the manuscript.All the authors approved the version to be submitted.

References

1. DellaCroce FJ, Wolfe ET. Breast reconstruction. Surg Clin North Am. 2013; 93(2): 445-54. doi: 10.1016/j.suc.2012.12.004
2. Gerber B, Marx M, Untch M, Faridi A. Breast Reconstruction Following Cancer Treatment. Dtsch Arztebl Int. 2015; 112(35-36): 593-600. doi: 10.3238/arztebl.2015.0593
3. Bargon CA, Young-Afat DA, Ikinci M, et al. Breast cancer recurrence after immediate and delayed postmastectomy breast reconstruction-A systematic review and meta-analysis. Cancer. 2022; 128(19): 3449-3469. doi: 10.1002/cncr.34393
4. IJ S, W C, JM B, et al. Breast Reconstruction after Mastectomy: A Systematic Review and Meta-Analysis. Agency of Healthcare Research and Quality. 2021; 2021. doi: https: //doi.org/10.23970/AHRQEPCCER245
5. Evidence-based Practice Center Systematic Review Protocol Project Title: Breast Reconstruction after Mastectomy. Agency of Healthcare Research and Quality. 2020;
6. Nava MB, Benson JR, Audretsch W, et al. International multidisciplinary expert panel consensus on breast reconstruction and radiotherapy. Br J Surg. 2019; 106(10): 1327-1340. doi: 10.1002/bjs.11256
7. Colwell AS, Taylor EM. Recent Advances in Implant-Based Breast Reconstruction. Plast Reconstr Surg. 2020; 145(2): 421e-432e. doi: 10.1097/prs.0000000000006510
8. Alessandri Bonetti M, Carbonaro R, Borelli F, et al. Outcomes in Hybrid Breast Reconstruction: A Systematic Review. Medicina (Kaunas). 2022; 58(9). doi: 10.3390/medicina58091232
9. Ter Louw RP, Nahabedian MY. Prepectoral Breast Reconstruction. Plast Reconstr Surg. 2017; 140(5S Advances in Breast Reconstruction): 51s-59s. doi: 10.1097/prs.0000000000003942
10. Friedrich M, Krämer S, Friedrich D, Kraft C, Maass N, et al. Difficulties of Breast Reconstruction - Problems That No One Likes to Face. Anticancer Res. 2021; 41(11): 5365-5375. doi: 10.21873/anticanres.15349
11. Evidence-based Practice Center Systematic Review Protocol Project Title: Breast Reconstruction After Mastectomy. Agency of Healthcare Research and Quality. 2020;
12. Li YS DJ, Jiang HC, Zhu W. Chinese Society of Breast Surgery. Clinical practice guidelines for post-mastectomy breast reconstruction: Chinese Society of Breast Surgery (CSBrS) practice guidelines. 2021. 2021;
13. Perdikis G DC, Boukovalas S, et al. American Society of Plastic Surgeons Evidence-Based Clinical Practice Guideline Revision: Reduction Mammaplasty. Plast Reconstr Surg. 2022. doi: 10.1097/PRS.0000000000008860
14. Breast Reconstruction: National guidelines for best practice. Wellington: Ministry of Health. 2021.
15. IJ S WC, JM B, et al. Breast Reconstruction after Mastectomy: A Systematic Review and Meta-Analysis. Agency of Healthcare Research and Quality. 2021
16. Breast Cancer Professional Committee of Chinese Anti-Cancer Association, Breast Surgeons Committee of Surgeons Branch of Chinese Medical Doctor Association, Breast Cancer Professional Committee of Shanghai Anti-Cancer Association. Expert Consensus on Breast Cancer Plastic Surgery and Breast Reconstruction (2022 edition). Chinese journal of Cancer. 2022. doi: 10.19401/j.cnki.1007-3639.2022.09.011.
17. Yin Jian WG-n, Qiang Wan-Min, et al. Chinese Expert Consensus on Accelerated Rehabilitation Surgery for Breast Reconstruction (2022 edition). Chinese oncology clinic.
18. Liu Yin-hua ZW. Chinese expert consensus on breast reconstruction after breast cancer surgery. Chinese Journal of Practical Surgery. doi: 10.19538/j.cjps.issn1005-2208.2019.11.05.
19. B M N RJB, W A, et al. International multidisciplinary expert panel consensus on breast reconstruction and radiotherapy. The British journal of surgery. 2019.
20. Claire T AMS, Mark T, et al. Consensus Review of Optimal Perioperative Care in Breast Reconstruction: Enhanced Recovery after Surgery (ERAS) Society Recommendations. Plastic and reconstructive surgery. 2017.
21. Santosa KB, Qi J, Kim HM, Hamill JB, Wilkins EG, Pusic AL. Long-term Patient-Reported Outcomes in Postmastectomy Breast Reconstruction. JAMA Surg. 2018; 153(10): 891-899. doi: 10.1001/jamasurg.2018.1677
22. Hernandez-Boussard T, Zeidler K, Barzin A, Lee G, Curtin C. Breast reconstruction national trends and healthcare implications. Breast J. 2013; 19(5): 463-9. doi: 10.1111/tbj.12148
23. Sando IC, Chung KC, Kidwell KM, Kozlow JH, Malay S, et al. Comprehensive breast reconstruction in an academic surgical practice: an evaluation of the financial impact. Plast Reconstr Surg. 2014; 134(6): 1131-1139. doi: 10.1097/prs.0000000000000757
24. Stefura T, Rusinek J, Wątor J, et al. Implant vs. autologous tissue-based breast reconstruction: A systematic review and meta-analysis of the studies comparing surgical approaches in 55,455 patients. J Plast Reconstr Aesthet Surg. 2023; 77: 346-358. doi: 10.1016/j.bjps.2022.11.044
25. Chao LF, Patel KM, Chen SC, et al. Monitoring patient-centered outcomes through the progression of breast reconstruction: A multicentered prospective longitudinal evaluation. Breast Cancer Res Treat. 2014; 146(2): 299-308. doi: 10.1007/s10549-014-3022-7
26. Bertozzi N, Pesce M, Santi P, Raposio E. One-Stage Immediate Breast Reconstruction: A Concise Review. Biomed Res Int. 2017; 2017: 6486859. doi: 10.1155/2017/6486859
27. de Kerckhove M, Matsunaga N, Tomita S, Fujii M, Terao Y. Tertiary Autologous Breast Reconstruction After Implant-Based Reconstruction: Safety and Patient-Related Outcomes. J Plast Reconstr Aesthet Surg. 2023; 79: 47-54. doi: 10.1016/j.bjps.2023.01.016
28. Bonomi S, Sala L, Cortinovis U. Prepectoral Breast Reconstruction. Plast Reconstr Surg. 2018; 142(2): 232e-233e. doi: 10.1097/prs.0000000000004560
29. Nahabedian MY. Implant-based breast reconstruction: Strate-

gies to achieve optimal outcomes and minimize complications. J Surg Oncol. 2016; 113(8): 895-905. doi: 10.1002/jso.24210

30. Weber WP, Shaw J, Pusic A, et al. Oncoplastic breast consortium recommendations for mastectomy and whole breast reconstruction in the setting of post-mastectomy radiation therapy. Breast. 2022; 63: 123-139. doi: 10.1016/j.breast.2022.03.008

31. Frasier LL, Holden S, Holden T, et al. Temporal Trends in Postmastectomy Radiation Therapy and Breast Reconstruction Associated With Changes in National Comprehensive Cancer Network Guidelines. JAMA Oncol. 2016; 2(1): 95-101. doi: 10.1001/jamaoncol.2015.3717

32. Gilmour A, Cutress R, Gandhi A, et al. Oncoplastic breast surgery: A guide to good practice. Eur J Surg Oncol. 2021; 47(9): 2272-2285. doi: 10.1016/j.ejso.2021.05.006

33. Schaverien MV, Macmillan RD, McCulley SJ. Is immediate autologous breast reconstruction with postoperative radiotherapy good practice?: A systematic review of the literature. J Plast Reconstr Aesthet Surg. 2013; 66(12): 1637-51. doi: 10.1016/j.bjps.2013.06.059

34. Lam TC, Hsieh F, Boyages J. The effects of postmastectomy adjuvant radiotherapy on immediate two-stage prosthetic breast reconstruction: a systematic review. Plast Reconstr Surg. 2013; 132(3): 511-518. doi: 10.1097/PRS.0b013e31829acc41

35. Chetta MD, Aliu O, Zhong L, et al. Reconstruction of the Irradiated Breast: A National Claims-Based Assessment of Postoperative Morbidity. Plast Reconstr Surg. 2017; 139(4): 783-792. doi: 10.1097/prs.0000000000003168

36. Kronowitz SJ, Robb GL. Radiation therapy and breast reconstruction: a critical review of the literature. Plast Reconstr Surg. 2009; 124(2): 395-408. doi: 10.1097/PRS.0b013e3181aee987

37. Maione L, Murolo M, Lisa A, Caviggioli F, Klinger F, et al. What Is the Optimum Timing of Postmastectomy Radiotherapy in Two-Stage Prosthetic Reconstruction: Radiation to the Tissue Expander or Permanent Implant? Plast Reconstr Surg. 2016; 138(1): 150e-151e. doi: 10.1097/prs.0000000000002276

38. Nava MB, Pennati AE, Lozza L, Spano A, Zambetti M, et al. Outcome of different timings of radiotherapy in implant-based breast reconstructions. Plast Reconstr Surg. 2011; 128(2): 353-359. doi: 10.1097/PRS.0b013e31821e6c10

39. Terao Y, Taniguchi K, Fujii M, Moriyama S. Postmastectomy radiation therapy and breast reconstruction with autologous tissue. Breast Cancer. 2017; 24(4): 505-510. doi: 10.1007/s12282-017-0760-5

40. Tan S, Pan L, Zhao H, Hu J, Chen H. Perioperative nursing for immediate breast reconstruction with deep inferior epigastric perforator flap after breast cancer resection. J Thorac Dis. 2018; 10(7): 4017-4022. doi: 10.21037/jtd.2018.07.58

41. Seth AK, Allen RJ, Jr. Modern techniques and alternative flaps in microsurgical breast reconstruction. J Surg Oncol. 2018; 118(5): 768-779. doi: 10.1002/jso.25198

42. Lamp S, Lester JL. Reconstruction of the breast following mastectomy. Semin Oncol Nurs. 2015; 31(2): 134-45. doi: 10.1016/j.soncn.2015.02.009

43. Panchal H, Matros E. Current Trends in Postmastectomy Breast Reconstruction. Plast Reconstr Surg. 2017; 140(5S Advances in Breast Reconstruction): 7s-13s. doi: 10.1097/prs.0000000000003941

44. Holtzmann J, Timm H. The experiences of and the nursing care for breast cancer patients undergoing immediate breast reconstruction. Eur J Cancer Care (Engl). 2005; 14(4): 310-8. doi: 10.1111/j.1365-2354.2005.00578.x

45. Cheah MA, Sarmiento S, Lesko RP, et al. Association of preoperative opioid use and postoperative complications following breast reconstruction. J Plast Reconstr Aesthet Surg. 2023; 83: 258-265. doi: 10.1016/j.bjps.2023.05.007.