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Systematic review

Oncoplastic versus Conventional Breast-Conserving Surgery: Re-Excision Rates, Local Recurrence, and Patient-Reported Outcomes: A Systematic Review

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Abstract

Background: Oncoplastic breast-conserving surgery integrates cancer excision with immediate breast reshaping. Its comparative value involves repeat surgery, local disease control, and patient experience. Our review examined the outcomes against conventional breast conservation. **Methods:** Comparative original reports published through 31 May 2026 were included. Study characteristics, surgical outcomes, follow-up, and validated patient-reported measures were extracted from accessible publications. Findings were synthesized narratively, with re-excision distinguished from broader reoperation and local recurrence distinguished from composite survival endpoints. **Results:** Thirteen comparative reports included one randomized trial and twelve observational investigations. Several cohorts reported fewer repeat operations after oncoplastic surgery, including a Danish nationwide analysis reporting re-excision in 14.1% versus 15.6%. Saudi cohort reported re-excision in 26.3% versus 13.0%. Comparative recurrence analyses did not establish a consistent difference in local control. The randomized trial show improved five-year body image following simple defect closure without a significant re-excision difference. Patient-reported findings varied: selected studies favored psychosocial well-being or satisfaction, whereas a prospective multicenter cohort reported less favorable body image. Differences in surgical selection, instruments, and assessment timing limited direct comparisons. **Conclusion:** Oncoplastic surgery expands breast-conserving options and is associated with fewer repeat excisions in several settings. The available comparisons do not establish superior local control or universally better patient-reported outcomes. Treatment selection requires individualized discussion of oncological requirements, reconstructive extent, and patient priorities.

Keywords: Breast cancer; oncoplastic surgery; breast-conserving surgery; re-excision; local recurrence.

Introduction

Breast-conserving surgery (BCS) with radiotherapy is a new treatment for appropriately selected patients with early breast cancer, supported by randomized comparisons with mastectomy and prolonged postoperative observation. Fisher et al. reported no significant differences in survival between total mastectomy, lumpectomy alone, and lumpectomy with irradiation after twenty years, while irradiation reduced ipsilateral breast recurrence following lumpectomy (1). Veronesi et al. documented comparable long-term survival after breast conservation and radical mastectomy, establishing breast preservation as an oncologically valid treatment objective despite differences in local recurrence (2).

Margin adequacy is important to evaluate breast conservation because additional surgery reflects residual disease and the pathological criteria used to define an acceptable excision (3). The invasive-cancer consensus guideline identifies no ink on tumor as an adequate negative margin during treatment incorporating whole-breast irradiation (3). For ductal carcinoma in situ (DCIS) treated with whole-breast irradiation, the corresponding consensus identifies a two-millimeter standard and recommends clinical judgment when considering further excision for narrower negative margins (4). These distinctions require attention when comparing studies conducted during different treatment periods or involving different proportions of invasive disease and DCIS (3,4).

Oncoplastic breast-conserving surgery (OBCS) integrates tumor removal with reconstructive techniques selected according to tumor location, breast characteristics, and the extent of anticipated tissue loss (5). Clough et al. described a classification and anatomical atlas that distinguish procedures by operative complexity and guide technique selection, showing the relationship between resection requirements and cosmetic preservation.

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This diversity means that limited glandular rearrangement and extensive therapeutic mammoplasty represent substantially different interventions within the same surgical category, with different implications for interpretation of outcomes (5). Patient experience requires direct measurement, and development of the BREAST-Q breast-conserving therapy module established validated scales addressing breast satisfaction and relevant quality-of-life domains (6). The scope of reconstruction therefore adds another dimension to evaluating treatment success after breast conservation (5,6).

A Cochrane review identified predominantly nonrandomized comparative data and substantial uncertainty arising from confounding and inconsistent outcome measurement. Its findings associated oncoplastic surgery with fewer re-excisions while leaving comparative local recurrence and patient-reported benefits uncertain (7). This review synthesized comparative original research available through 31 May 2026, focusing on re-excision rates, local recurrence, and validated patient-reported outcomes while preserving differences in surgical technique and outcome definition.

Methods

Review framework and eligibility period

This review addressed comparative outcomes of immediate oncoplastic and conventional breast-conserving surgery in adult women with invasive breast carcinoma or DCIS. Reporting followed the PRISMA 2020 framework (Fig . The publication eligibility cutoff was 31 May 2026; online-first reports available by that date were eligible regardless of issue assignment.

Information sources and search strategy

PubMed, Scopus, Web of Science Core Collection, and the Cochrane Library were searched from inception to the eligibility cutoff. Searches combined controlled vocabulary and free-text terms for breast malignancy with oncoplastic surgery, therapeutic mammaplasty, therapeutic mammoplasty, volume displacement, and volume replacement. The core Boolean structure was: (breast cancer OR breast neoplasm* OR breast carcinoma OR DCIS) AND (oncoplastic* OR therapeutic mammaplast* OR therapeutic mammoplast* OR volume displacement OR volume replacement). Outcome restrictions were omitted to preserve sensitivity. Reference lists of eligible reports and relevant reviews were examined for additional comparative publications.

Study selection

Randomized trials and prospective or retrospective comparative observational studies were eligible when they reported re-excision, local recurrence, validated patient-reported outcomes, or relevant secondary surgical outcomes. Secondary outcomes comprised margin involvement, completion mastectomy, complications, and intervals to adjuvant treatment. Single-arm series, mastectomy-only comparisons, technical descriptions, reviews, and reports without separable comparative data were excluded. Following duplicate removal, two authors independently screened titles and abstracts, assessed retrieved reports, and extracted data;

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disagreements were resolved through discussion and consensus.

Data extraction

Extraction covered country, design, recruitment period, eligibility, operative technique, group denominators, tumor characteristics, outcome definitions, follow-up, assessment instruments, and adjusted estimates with confidence intervals. Re-excision was separated from completion mastectomy and broader reoperation, while ipsilateral local recurrence was separated from regional recurrence and composite recurrence-free survival. Patient-reported measures were retained by instrument, module, domain, and assessment time. Potential overlap was evaluated using centers, recruitment dates, and population descriptions.

Methodological appraisal and synthesis

Two authors independently appraised methodological limitations, considering allocation, confounding, participant selection, missing observations, outcome ascertainment, and selective reporting. Particular attention was given to tumor burden, breast characteristics, adjuvant treatment, baseline patient-reported scores, and survey response. Findings were synthesized narratively by outcome and design because intervention definitions, clinical selection, follow-up, and measurement instruments differed. Published denominators and reported estimates were preserved without imputing missing events. Both crude and adjusted findings were retained separately. Cohort totals were not combined when participants or analytical units overlapped. Statistical nonsignificance was interpreted as absence of a detected difference rather than proof of equivalence. The review used published aggregate information without participant recruitment or access to identifiable individual records.

Results

Thirteen comparative reports, comprising one randomized trial and twelve observational investigations, informed the synthesis of surgical and patient-reported outcomes. Clinical comparisons and patient-reported assessments are summarized in Tables 1 and 2, respectively, with the original analytical units retained. Recruitment periods overlapped among Danish publications, while other datasets counted operations or breast cancers rather than unique individuals, precluding an aggregate patient total (10,12-15). Nonrandomized comparisons frequently involved larger tumors or more complex disease in the oncoplastic groups, and adjustment strategies included multivariable analysis and propensity matching (10,11,13,15,17).

Re-excision and broader reoperation findings differed between settings, with Chakravorty et al. reporting re-excision in 4/150 oncoplastic procedures versus 59/440 conventional procedures, equivalent to 2.7% versus 13.4% (8). Down et al. reported further surgery in 5.4% versus 28.9%, accompanied by larger specimens and wider clear margins following oncoplastic surgery (9). In the Danish nationwide cohort, re-excision occurred in 14.1% versus 15.6%, with an adjusted odds ratio of 0.80 and 95% confidence interval of 0.72-0.88 (13). Niinikoski et al. found similar margin-related reoperation rates, 9.2% versus 8.1%, despite less favorable tumor characteristics in the oncoplastic group (11). Almojel et al. reported the opposite

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association, with re-excision in 26.3% versus 13.0% and significantly higher margin positivity following oncoplastic surgery (20).

Margin-related findings included fewer positive or close margins in Carter et al., 5.8% versus 8.3%, and lower adjusted odds of nonradical primary excision in Rose et al., 0.50, with a confidence interval of 0.29-0.84 (10,12). Local recurrence in Chakravorty et al. was 2.7% versus 2.2% after a median 28 months, while Niinikoski et al. found no significant difference in local recurrence-free survival after a median 75 months (8,11). André et al. recorded local recurrence in 57/3720 standard cases, 1/243 simple oncoplastic cases, and 3/215 complex cases (15).

Patient-reported benefits varied by domain and assessment time, with Rose et al. finding higher odds of above-median psychosocial well-being after oncoplastic surgery without significant breast-satisfaction, physical, or sexual well-being differences (14). The randomized defect-closure trial reported the highest body-image score in 66.9% versus 35.8% at five years, alongside nine margin re-excisions in each group (16). Pak et al. found similar long-term breast satisfaction and sexual well-being after propensity matching, with a psychosocial difference at four years that was absent at five years (17).

The prospective multicenter study by Bargon et al. reported less favorable body image after oncoplastic surgery, including mean scores of 87.8 versus 92.2 at twenty-four months they also reported a median intervals to radiotherapy of forty-one days after oncoplastic versus thirty-six after conventional surgery (18). Hekimoğlu et al. reported higher BREAST-Q scores, 80 versus 71, and lower Arizona Sexual Experiences Scale scores, 14 versus 17, in matched oncoplastic patients (19).

Patient-reported assessments used different instruments and postoperative schedules, limiting direct comparison of scores between reports (14,16-19). In Pak's study, preoperative BREAST-Q measurements were available for only three conventional-surgery patients, restricting interpretation of baseline differences despite propensity matching of the clinical cohorts (17).

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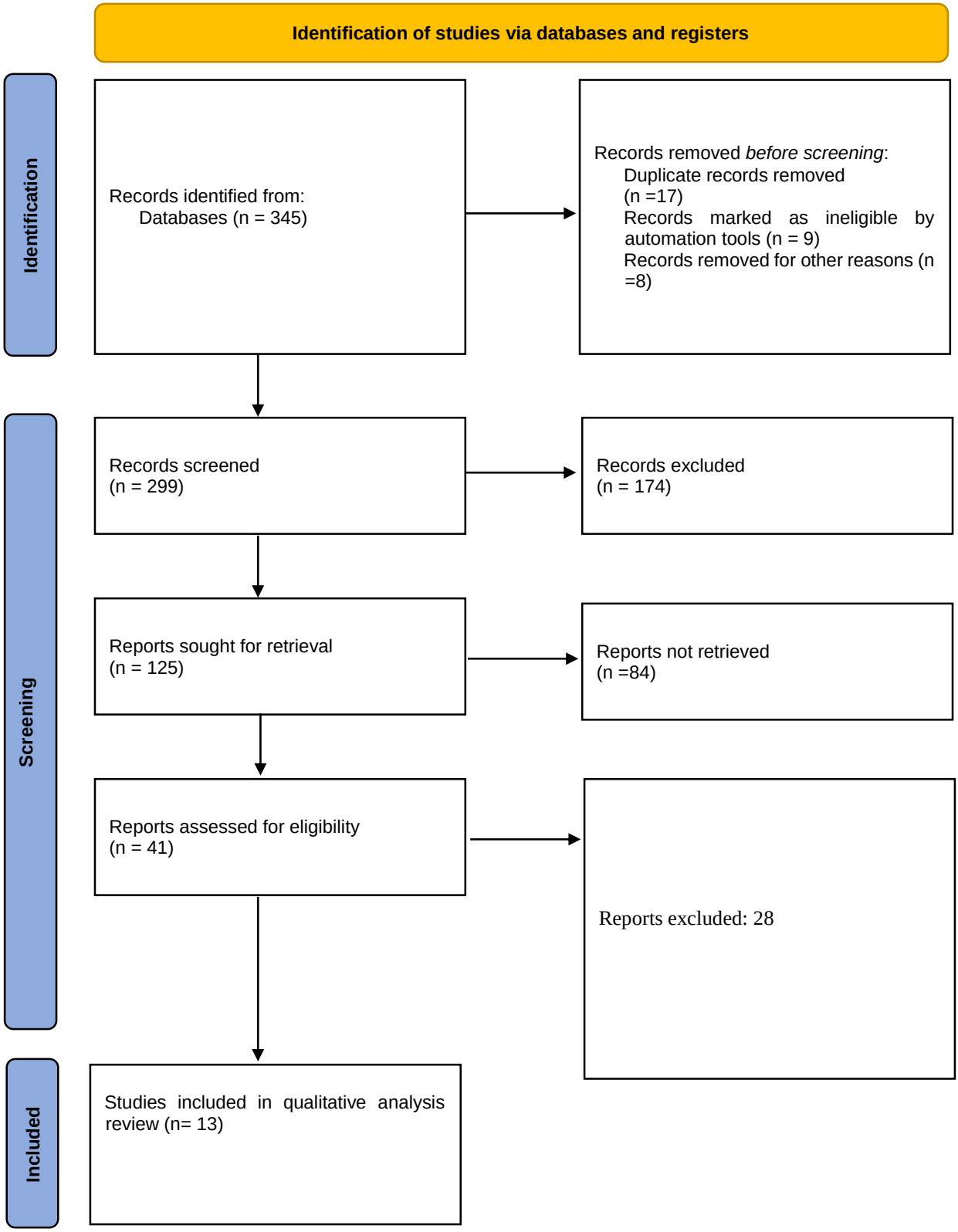


Figure 1: PRISMA flow chart

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Table 1. Comparative surgical and oncological findings

Study	Design and setting	OBCS/CBCS denominator	Clinical findings
Chakravorty, 2012 (8)	Retrospective; United Kingdom	150/440 procedures	Re-excision: 2.7% versus 13.4%; local recurrence: 2.7% versus 2.2%; median follow-up 28 months.
Down, 2013 (9)	Retrospective; United Kingdom	37/121 patients	Further surgery: 5.4% versus 28.9%; mean clear margin: 14.3 versus 6.1 mm.
Carter, 2016 (10)	Retrospective; United States	Overall cohort: 9,861 patients in four surgical categories	Positive or close margins: 5.8% versus 8.3%; similar recurrence-free survival; median follow-up 3.4 years.
Niinikoski, 2019 (11)	Retrospective; Finland	611/1,189 patients	Margin-related reoperation: 9.2% versus 8.1%; no significant local recurrence-free survival difference at median 75 months.
Rose, 2019 (12)	Registry-based comparative cohort; Denmark	197/1,399 patients	Nonradical primary excision: adjusted OR 0.50, 95% CI 0.29-0.84; no significant disease-free survival difference.
Heeg, 2020 (13)	Nationwide cohort; Denmark	5,003/13,185 patients	Re-excision: 14.1% versus 15.6%; adjusted OR 0.80, 95% CI 0.72-0.88.
André, 2021 (15)	Multicenter cohort; Sweden	458/3,720 breast cancers	Local recurrence: 0.4% after simple OBCS, 1.4% after complex OBCS, and 1.5% after CBCS; median follow-up 64 months.
Bargon, 2025 (18)	Prospective multicenter cohort; Netherlands	290/1,628 patients	Margin re-excision within three months: 4.8% versus 5.3%.
Almojel, 2026 (20)	Retrospective; Saudi Arabia	137/100 patients	Re-excision: 26.3% versus 13.0%; P = 0.013; margin positivity: 17.5% versus 5.0%.

Table 2. Comparative patient-reported outcomes

Study	Design and comparison	Instrument and timing	Patient-reported findings
Rose, 2020 (14)	Registry-linked survey; 96 OBCS/631 CBCS evaluable respondents	BREAST-Q breast-conserving therapy module; postoperative survey	Above-median psychosocial well-being: OR 2.15, 95% CI 1.25-3.69; no significant breast-satisfaction, physical, or sexual well-being differences.
Hadjittofi, 2022 (16)	Randomized trial; 124/109 patients	Body Image Questionnaire; five years	Highest body-image score: 66.9% versus 35.8%; P = 0.0001.
Pak, 2023 (17)	Propensity-matched cohort; 99/198 patients	BREAST-Q; three to five years	Similar breast satisfaction and sexual well-being; lower psychosocial scores at four years, without a difference at five years.
Bargon, 2025 (18)	Prospective multicenter cohort; 290/1,628 patients	EORTC QLQ-C30/BR23; through twenty-four months	Mean body-image score at twenty-four months: 87.8 versus 92.2; less favorable after OBCS.
Hekimoğlu, 2026 (19)	Retrospective matched cohort; 132/132 patients	BREAST-Q Reduction/Mastopexy module and ASEX	Reported median BREAST-Q score: 80 versus 71; ASEX: 14 versus 17; both P < 0.001.

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Discussion

The comparative data supports an association between oncoplastic surgery and fewer margin-related repeat operations in several settings, alongside variation between centers and study populations. Larger resections and immediate defect reconstruction provide a plausible explanation for improved margin clearance, although the Saudi findings demonstrate that this association is not universal (5,9,20). Margin management also depends on practices beyond reconstruction, in a randomized trial, cavity shaving reduced positive margins from 34% to 19% and second surgery for clearance from 21% to 10% (21). Separating repeat lumpectomy from completion mastectomy improves clinical interpretation, since both procedures contribute to broader reoperation endpoints while carrying different implications for individual patients and breast preservation (9,11,13).

Available recurrence findings are broadly reassuring, with the comparative cohorts showing no consistent disadvantage for oncoplastic surgery (8,11,15). These observations do not establish oncological equivalence, particularly when recurrence events are sparse and treatment allocation is nonrandomized (7,15). Radiotherapy is an important determinant of breast-conservation outcomes, as the individual-patient meta-analysis of seventeen randomized trials demonstrated reductions in recurrence and breast cancer mortality following irradiation (22). Recurrence comparisons require interpretation alongside adjuvant treatment and follow-up duration, especially when contrasting early postoperative series with cohorts observed for more than five years (8,11,15,22).

Patient-reported outcomes resist a single conclusion because satisfaction, body image, psychosocial well-being, and sexual functioning represent distinct treatment consequences (6,14,17-19). The randomized defect-closure study strengthens the data for long-term cosmetic and body-image benefits of a specific, relatively limited reconstructive intervention (16). Comparable breast satisfaction in Pak et al. and less favorable body image in Bargon et al. demonstrate that broader claims of uniformly improved patient experience exceed the observed data (17,18). Hekimoğlu et al. reported favorable satisfaction and sexual-function findings, although their use of the Reduction/Mastopexy BREAST-Q module also limits direct comparison with studies using the breast-conserving therapy module (6,19).

Selection bias remains a central interpretive concern because oncoplastic patients frequently differ in age, tumor burden, and surgical complexity from conventional-surgery patients (10,11,15). Multivariable adjustment and propensity matching address measured characteristics, leaving uncertainty about unmeasured selection factors (7,13). Patient-reported comparisons face additional limitations from postoperative-only assessment, incomplete survey participation, and limited baseline measurements, illustrated by Rose's survey response and Pak's sparse preoperative control data (14,17). The distinction between photographic panel ratings and patient-reported body image also prevents interpreting every cosmetic improvement as an equivalent improvement in lived experience (16).

Our synthesis supports individualized surgical counseling that discusses margin control, reconstruction extent, recovery, and patient

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priorities without promising superior outcomes in every domain (7,14,16-20). Cochrane data linked oncoplastic surgery with more complications, with very low certainty supporting careful balancing of re-excision benefits against morbidity (7). Comparisons also require consistent application and reporting of invasive-cancer and DCIS margin definitions to separate technical effects from differences in treatment thresholds (3,4). Future comparative research requires clearly classified operations, baseline and repeated validated questionnaires, explicit reporting of reasons for repeat surgery, and sufficiently prolonged recurrence surveillance (5-7). These priorities follow directly from the inconsistent surgical effects and differing patient-reported trajectories documented in the comparative studies (11,13,17-20).

Conclusion

Oncoplastic breast-conserving surgery offers a reconstructive approach that supports breast preservation while accommodating more extensive excision. Comparative data associates it with fewer repeat excisions in several settings, alongside contradictory findings from contemporary cohorts. Local recurrence data provide reassurance without establishing superior disease control or formal equivalence. Patient-reported benefits vary by technique, measurement instrument, domain, and assessment interval. Surgical decisions therefore require individualized evaluation of tumor extent, margin requirements, breast characteristics, reconstructive burden, and patient preferences.

Abbreviations

Abbreviation	Definition
ASEX	Arizona Sexual Experiences Scale
BCS	Breast-conserving surgery
CBCS	Conventional breast-conserving surgery
CI	Confidence interval
DCIS	Ductal carcinoma in situ
EORTC	European Organisation for Research and Treatment of Cancer
OBCS	Oncoplastic breast-conserving surgery
OR	Odds ratio
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QLQ-C30	30-item core quality-of-life questionnaire
QLQ-BR23	23-item breast cancer questionnaire module

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