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Complication Rates Following Breast Implant Explantation Without Reimplantation: Role of Capsulectomy Extent and Concomitant Mastopexy — A Systematic Meta-Analysis

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 March 2026 and was last updated on 30 March 2026.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aimed to (1) determine pooled minor and major postoperative complication rates following breast implant explantation without reimplantation, (2) evaluate whether the extent of capsulectomy (total, partial, or none) influences complication rates, and (3) assess the impact of concomitant aesthetic procedures (mastopexy) on complication rates. Population: Patients undergoing breast implant explantation without reimplantation. Intervention: Breast implant explantation with total, partial, or no capsulectomy, with or without concomitant mastopexy. Comparator: Subgroup comparisons between capsulectomy types and between concomitant mastopexy versus no aesthetic procedure. Outcome: Pooled minor and major postoperative complication rates. Study design: Observational studies (retrospective and prospective).

Rationale Breast implant explantation procedures have increased substantially in recent years, driven by Breast Implant Illness (BII), Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL), capsular contracture, and aesthetic dissatisfaction. Despite the growing clinical significance of explantation, the optimal extent of capsulectomy and the safety of concomitant aesthetic procedures remain debated. While total en-bloc capsulectomy is the standard of care for confirmed breast implant-associated malignancies, the optimal capsule management for other indications such as BII, capsular contracture, or asymptomatic patients lacks consensus. Furthermore, no dedicated meta-analysis has previously quantified pooled complication rates across capsulectomy approaches for explantation without reimplantation. This systematic review and meta-analysis addresses this evidence gap.

Condition being studied Postoperative complications following breast implant

explantation without reimplantation. Breast implant explantation is performed for various indications including capsular contracture, implant rupture, Breast Implant Illness, BIA-ALCL risk, pain, and aesthetic dissatisfaction. The surgical management encompasses varying extents of capsulectomy (total, partial, or none) and may include concomitant aesthetic procedures such as mastopexy.

METHODS

Search strategy A systematic search was performed across PubMed, Scopus, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL). The search combined MeSH terms and free-text keywords: ("Breast Implants"[MeSH] OR "breast implants"[tiab] OR "breast augmentation"[tiab] OR "silicone implants"[tiab] OR "mammary implants"[tiab] OR "breast prosthesis"[tiab]) AND ("implant removal"[tiab] OR "explantation"[tiab] OR "capsulectomy"[tiab] OR "total capsulectomy"[tiab] OR "partial capsulectomy"[tiab] OR "en bloc capsulectomy"[tiab] OR "en bloc resection"[tiab] OR "implant exchange"[tiab] OR "implant replacement"[tiab] OR "breast implant revision"[tiab] OR "implant revision"[tiab]). Publication type filters were applied to restrict results to clinical studies, observational studies, reviews and case reports. The search was restricted to publications from January 1995 to April 2025. Supplementary searches included citation searching and targeted website screening.

Participant or population Patients undergoing breast implant explantation without reimplantation, with a documented capsulectomy type and reported minor and/or major postoperative complication rates with extractable absolute event counts.

Intervention Breast implant explantation with total capsulectomy, partial capsulectomy, or no capsulectomy, with or without concomitant mastopexy, and/or lipofilling.

Comparator Subgroup comparisons: (1) Total capsulectomy vs. partial capsulectomy vs. no capsulectomy; (2) Concomitant mastopexy (with/without lipofilling) vs. no aesthetic procedure (or lipofilling only).

Study designs to be included Retrospective and prospective observational studies, including case series (minimum 5 patients), cohort studies, and database analyses. Randomized controlled trials were eligible but none were identified.

Eligibility criteria Inclusion: Studies enrolling patients undergoing breast implant explantation with documented capsulectomy type, reporting minor and/or major postoperative complication rates with extractable absolute event counts, published in peer-reviewed journals from January 1995 onwards, in English or German language. Exclusion: Case series with fewer than five patients, purely histological or imaging studies without clinical outcome data, studies focusing on breast implant reimplantation, studies employing regional or free flap procedures for breast reconstruction after explantation (e.g., latissimus dorsi flap, DIEP flap), studies involving non-silicone/saline or non-mammary implants, Poly Implant Prothese (PIP) implants, animal studies, and studies with mixed capsulectomy types that could not be disaggregated.

Information sources Electronic databases: PubMed, Scopus, Web of Science, Cochrane Central Register of Controlled Trials (CENTRAL). Supplementary searches: citation searching of included studies and relevant reviews, and targeted website screening.

Main outcome(s) Primary outcomes: (1) Pooled minor complication rate — defined as adverse events not requiring operative re-intervention, including wound dehiscence, seroma, non-evacuated hematoma, superficial wound infection, and transient sensory disturbances . (2) Pooled major complication rate — defined as events requiring surgical re-intervention, unplanned hospital readmission, or resulting in significant long-term morbidity. Surgical aesthetic revision procedures were not classified as minor or major complications. Effect measure: pooled proportions with 95% confidence intervals.

Additional outcome(s) Subgroup complication rates stratified by capsulectomy type (total, partial, none) and by concomitant aesthetic procedure (mastopexy vs. no aesthetic procedure). Pairwise comparisons between subgroups.

Data management Two reviewers independently screened titles and abstracts using Rayyan systematic review software (Rayyan Systems Inc., Cambridge, MA, USA). Data was extracted using a standardized form. Variables collected included first author, year, study design, sample size, mean patient age, indications for explantation, capsulectomy type, concomitant aesthetic procedure, absolute event counts for minor and major complications, patient satisfaction data, and follow-up duration. Discrepancies were resolved by consensus or consultation with a third reviewer.

Quality assessment / Risk of bias analysis Risk of bias was assessed by two reviewers using the Newcastle-Ottawa Scale (NOS) adapted for non-comparative observational studies. Each study was evaluated across three domains: selection of the study groups (max 4 stars), comparability of the groups (max 2 stars), and ascertainment of the outcome (max 3 stars). Based on the total star count, study quality was classified as good (7-9 stars), fair (5-6 stars), or poor (≤4 stars). The certainty of evidence for each pooled outcome was assessed using the GRADE framework, adapted for prevalence estimates from observational studies, evaluating risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Strategy of data synthesis Random-effects meta-analysis using the Freeman-Tukey double arcsine transformation (PFT) was conducted. For the overall pooled analysis, the restricted maximum-likelihood (REML) estimator was used for between-study variance (tau-squared), with 95% confidence intervals derived using the Q-Profile method. For subgroup analyses, the DerSimonian-Laird estimator was used with confidence intervals based on the Jackson method. Both common-effect and random-effects models were computed. Statistical heterogeneity was quantified using the I-squared statistic (25%, 50%, 75% thresholds for low, moderate, high). Pairwise comparisons between subgroups were performed using meta-regression with linear contrasts, with Holm and Bonferroni corrections for multiple testing. Statistical analysis was performed using R (version 4.5.2) with the meta (version 8.2-1) and metafor (version 4.8-0) packages.

Subgroup analysis Predefined subgroup analyses were performed by: (1) Capsulectomy type: total capsulectomy vs. partial capsulectomy vs. no capsulectomy; (2) Concomitant aesthetic procedure: mastopexy (including mastopexy with lipofilling) vs. no aesthetic procedure (including lipofilling only). Tests for subgroup differences were conducted using both common-effect and random-effects approaches.

Sensitivity analysis Leave-one-out sensitivity analysis was performed by sequentially omitting each cohort and recalculating the pooled estimate to assess the influence of individual studies on the overall result. Publication bias was assessed visually using funnel plots and formally using Begg's rank correlation test and Egger's linear regression test.

Language restriction English and German.

Country(ies) involved Germany, Switzerland.

Keywords breast implant explantation; capsulectomy; mastopexy; complication rate; meta-analysis; systematic review; breast implant illness.

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