

Systematic Review

Incidence of Long-Term Complications in Breast Implant “Prosthesis”: A Systematic Review

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Abstract: Objectives: The term ‘prosthesis’ in reference to breast implants is used to clarify its distinction from the general term ‘breast implant’, which is widely adopted by plastic surgeons. This terminology highlights the role of the implant as a functional tissue substitute, particularly in post-mastectomy reconstruction, rather than solely as a cosmetic enhancement. This distinction is relevant for understanding the long-term implications of implant-based reconstruction and the associated complications. The aim of this systematic review was to compile and analyze the current evidence on the long-term complications associated with breast implants. We explored how these complications vary depending on implant type, surgical techniques, patient-specific factors, and the indication for implantation (cosmetic vs. reconstructive). These indications were analyzed separately to avoid assumptions regarding their correlation with surgical techniques. **Methods:** A systematic search was conducted across PubMed, Web of Science, and Scopus for studies published up to December 2024, following PRISMA 2020 guidelines and the Cochrane Handbook for Systematic Reviews of Interventions. An initial search identified 1480 studies. After screening and applying inclusion criteria, 11 studies were selected for the final analysis. Studies included in this review reported long-term complications in human subjects, were published in English, and evaluated breast implants. The quality of the included studies was assessed using the ROBINS-E tool. Additionally, subgroup analyses examined differences based on implant type (silicone vs. saline), surgical techniques, and patient characteristics, such as age, comorbidities, and the duration of follow-up. **Results:** This review study was performed between September 2024 and December 2024. A total of 11 studies were included in the review. The included studies were published between 1997 and 2021, providing a long-term perspective on breast implant complications. The most frequently reported complications were capsular contracture, implant rupture, seroma, and infection, with capsular contracture being the most prevalent. Silicone implants were associated with a higher risk of rupture compared to saline implants. Techniques using textured implants and dual-plane placements were found to reduce the incidence of capsular contracture. Patient-related factors, such as age and smoking status, were identified as significant risk factors for complications, while longer follow-up periods revealed more late-onset complications. **Conclusions:** This review underscores the importance of understanding the long-term risks of breast implants and highlights the need for personalized surgical planning and thorough follow-up care. Future studies should focus on standardizing outcomes reporting and further evaluating the safety and effectiveness of new implant materials and surgical approaches.



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1. Introduction

Breast implants have become a widely chosen option for both reconstructive and cosmetic procedures, offering many women an opportunity to enhance their confidence, body image, and overall quality of life.

Since their introduction in the 1960s, advancements in implant materials, surgical techniques, and postoperative care have significantly improved the safety and effectiveness of these procedures. Nevertheless, long-term complications remain a concern for both patients and surgeons.

The introduction of the two-stage breast reconstruction method, pioneered by Radovan in 1982, marked a major milestone in reconstructive surgery. This approach, which utilizes tissue expanders followed by implants, has provided a dependable solution for women undergoing mastectomies. In more recent years, the development of skin-sparing and nipple-sparing mastectomies has further improved aesthetic outcomes, making these procedures even more appealing. However, challenges persist, as long-term complications such as capsular contracture, implant rupture, and infections continue to pose difficulties for patients and healthcare providers alike [1–11].

Several previous studies have analyzed different aspects of breast implant characteristics and outcomes, comparing round vs. shaped implants, smooth vs. textured surfaces, and different implant brands, with their findings providing additional insights into the topic [12–27].

Breast implants mainly come in two types: silicone and saline-filled. Each has its own benefits and considerations. Silicone implants, especially the latest cohesive gel versions, feel more natural and have a lower risk of rupture. However, they carry a slightly higher chance of capsular contracture. Saline implants, on the other hand, are often seen as safer in case of rupture, as the body can easily absorb the saline solution. However, they may feel less natural and have a higher likelihood of deflating over time.

Beyond the type of filler, the implant's outer shell also affects the long-term results. Textured implants were designed to lower the risk of capsular contracture by helping the surrounding tissue adhere better. Meanwhile, newer sixth-generation smooth implants have been showing promising results, forming thinner capsules and causing less inflammation.

There is no one-size-fits-all solution when it comes to breast implants. The right choice depends on many factors, including a patient's body type, lifestyle, and personal goals. A careful, individualized approach helps ensure the best results while reducing potential risks over time.

Capsular contracture is among the most frequent complications associated with breast implants. It occurs when scar tissue forms tightly around the implant, causing the breast to feel firm or appear misshapen. In more severe cases, it can become painful and may require corrective surgery. Studies suggest that up to 10% of patients experience this condition, with factors such as radiation therapy and the type of implant used significantly influencing its likelihood [2,28].

Similarly, implant rupture remains a concern, whether caused by material degradation over time or external trauma. While modern silicone implants are engineered to reduce these risks, rupture rates and their potential long-term consequences continue to be important considerations for both patients and surgeons [3,29,30].

In recent years, innovative surgical techniques have been introduced to address these challenges. Methods such as prepectoral implant placement and the use of acellular dermal matrices (ADMs) aim to reduce complications and improve outcomes. ADMs, for example, provide added support and coverage around the implant, which may lower the risk of capsular contracture while enhancing aesthetic results. However, these advancements often come with higher costs and added complexity, requiring careful consideration by both patients and surgeons [3].

The emotional impact of long-term complications is equally significant and cannot be underestimated. For many women, undergoing these procedures is deeply emotional, symbolizing a personal journey [31]. While studies suggest that most women eventually recover from the psychological stress caused by complications, some may continue to experience lasting dissatisfaction or distress. This underscores the importance of providing emotional support and fostering clear communication between patients and healthcare providers throughout the reconstructive process [29].

Interestingly, not all patients decide to remove or replace their implants due to complications. Some make this choice because of concerns about aging implants or potential health risks associated with long-term use. A recent study conducted among Chinese patients revealed that worries about implant longevity and overall health were common reasons for opting for implant removal, even when there were no physical problems present [4]. These findings underline the importance of tailoring care to individual patient needs and expectations.

Conducting a systematic review is essential to provide more reliable, evidence-based insights into the risks and management strategies for long-term implant complications. This systematic review aimed to assess the incidence of long-term complications with breast implants.

2. Materials and Methods

2.1. Eligibility Criteria

All documents were assessed for eligibility based on the Population, Exposure, Comparator, and Outcomes (PECO) model [32].

(P) Participants consisted of human subjects.

(E) The Exposure consisted of the exposure to breast implant surgery.

(C) The Comparison was performed between different types of breast implants, specifically silicone vs. saline implants and textured vs. smooth implants. We did not include studies comparing breast implant vs. no implant. Additionally, we analyzed variations based on different surgical techniques (e.g., submuscular vs. subglandular placement).

(O) The Outcome consisted of evaluating the incidence of long-term complications with breast implants.

Only papers providing data at the end of the intervention were included. The exclusion criteria were as follows: (1) cross-over study design; (2) studies written in a language other than English; (3) full-text unavailability (i.e., posters and conference abstracts); (4) studies involving animals; (5) review (topical or systematic) articles; and (6) case reports/series.

2.2. Search Strategy

We carried out an extensive search across Web of Science, PubMed, and Scopus for articles published up to December 2024, following the strategy detailed in Table 1. To make sure no relevant studies were missed, we also reviewed the references from included articles and previous systematic reviews on related topics. This review was conducted in accordance with the Cochrane Handbook for Systematic Reviews of Interventions and the PRISMA 2020 guidelines.

Table 1. Search strategy.

PubMed
Search: (long term complications) AND (breast implant)—Spellcheck off
“long”[All Fields] AND (“term birth”[MeSH Terms] OR (“term”[All Fields] AND “birth”[All Fields]) OR “term birth”[All Fields] OR “term”[All Fields]) AND (“complicances”[All Fields] OR “complicate”[All Fields] OR “complicated”[All Fields] OR “complicates”[All Fields] OR “complicating”[All Fields] OR “complication”[All Fields] OR “complication s”[All Fields] OR “complications”[MeSH Subheading] OR “complications”[All Fields]) AND (“breast”[All Fields] AND (“drug implants”[MeSH Terms] OR (“drug”[All Fields] AND “implants”[All Fields]) OR “drug implants”[All Fields] OR “implant”[All Fields] OR “embryo implantation”[MeSH Terms] OR (“embryo”[All Fields] AND “implantation”[All Fields]) OR “embryo implantation”[All Fields] OR “implantation”[All Fields] OR “implant s”[All Fields] OR “implantability”[All Fields] OR “implantable”[All Fields] OR “implantables”[All Fields] OR “implantate”[All Fields] OR “implantated”[All Fields] OR “implantates”[All Fields] OR “implantations”[All Fields] OR “implanted”[All Fields] OR “implanter”[All Fields] OR “implanters”[All Fields] OR “implanting”[All Fields] OR “implantion”[All Fields] OR “implantitis”[All Fields] OR “implants”[All Fields]))
Scopus
TITLE (long AND term AND complications AND breast AND implant)
Web of Science
(ALL = (breast implant)) AND ALL = (long term complications)

The systematic review protocol has been registered on the International Prospective Register of Systematic Reviews (PROSPERO) with the provisional number 483272.

2.3. Data Extraction

Two authors (M.C. and G.M.) extracted the data from the included studies using customized data extraction on a Microsoft Excel sheet. In case of disagreement, a consensus was reached through a third author (R.P.). The following data were extracted: (1) first author; (2) year of publication; (3) nationality; (4) number of study participants (5) diagnostic tool; and (6) clinical relevance.

2.4. Quality Assessment

In this review, we used the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-E) tool to evaluate the risk of bias in the included studies. This tool provides a clear and systematic way to assess potential biases in non-randomized research. Each study was reviewed independently by at least two trained reviewers who carefully examined seven key areas: confounding factors, how participants were selected, how interventions were classified, deviations from intended interventions, missing data, how outcomes were measured, and how results were reported.

To ensure fairness and accuracy, any disagreements between the reviewers were resolved through discussion. If they could not reach an agreement, a third reviewer stepped in to make the final decision. This process ensured that the assessment was as objective and consistent as possible. By identifying the strengths and weaknesses of the studies, this bias evaluation provided valuable insights into the quality and reliability of the evidence. Ultimately, this helped us interpret the findings with greater confidence and draw more informed conclusions.

3. Results

3.1. Study Characteristics

We began with a total of 1480 studies identified through our search. As detailed in the PRISMA 2020 flowchart in Figure 1, only 11 studies were ultimately included in this systematic review. During the initial screening, we excluded 343 articles for the following

reasons: 189 were reviews, 68 were case reports, 46 were conference papers, and 40 were not written in English.

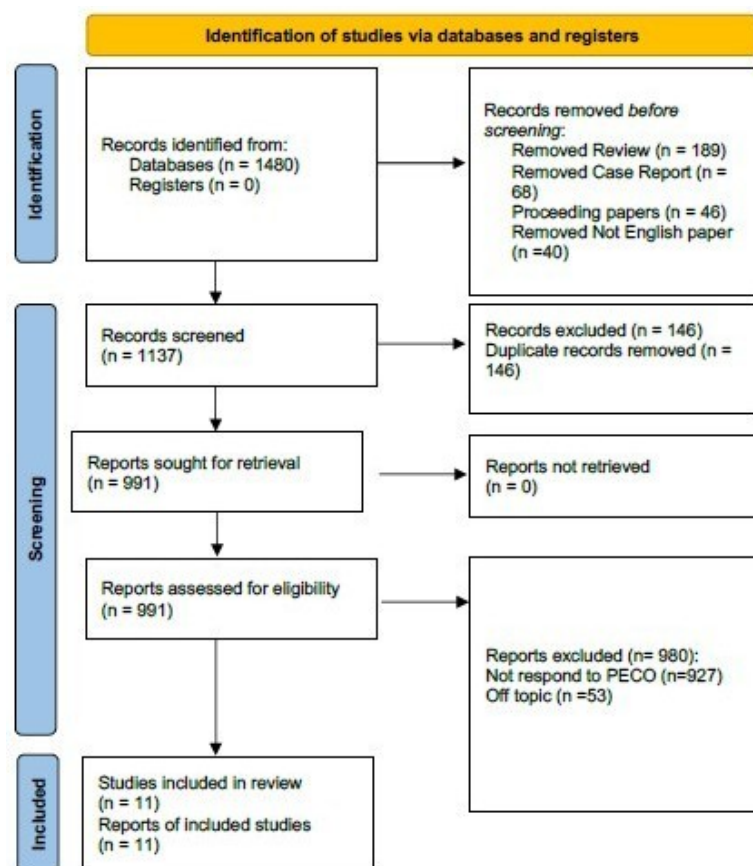


Figure 1. Prisma flowchart.

After this step, 1137 articles remained and were screened by title and abstract to assess their alignment with the PECO criteria. Among these, 146 duplicates were removed, leaving 991 articles for eligibility review. Of these, 980 were excluded—927 did not meet the PECO criteria, and 53 were unrelated to the topic.

The final selection included 11 studies, published between 1997 and 2021. A summary of the main characteristics of these studies can be found in Table 2, as described in the data extraction section.

Table 2. Principal elements of the studies that formed part of the present systematic analysis.

Study Reference	Patient Cohort and Implant Type	Complication Rates (Capsular Contracture, Rupture, etc.)	Additional Findings (Satisfaction, Quality of Life, etc.)
Ménez et al., 2018 [33]	Autologous reconstructions (Latissimus dorsi flap vs. prosthetic implants)	Lower capsular contracture rates with autologous reconstructions.	Immediate reconstructions showed the highest satisfaction and quality-of-life scores.
Coroneos et al., 2019 [34]	99,993 patients with silicone and saline implants	Capsular contracture: 7.2% in primary augmentation, 12.7% in reconstructions (higher for silicone). Rupture: 0.5% silicone, 2.5% saline.	Silicone implants linked to rare systemic complications such as Sjögren's syndrome (SIR 8.14).
Caplin et al., 2014 [35]	Round vs. shaped silicone gel implants	Capsular contracture: 3.4% (shaped) vs. 11.3% (round) in augmentations. Rupture: 3.1% (shaped) vs. 10.3% (round).	High patient satisfaction (>94%) for both implant types.
Collis et al., 2000 [36]	Textured vs. smooth silicone implants	Capsular contracture: 11% (textured) vs. 65% (smooth).	Subpectoral placement further reduced contracture rates.

Table 2. Cont.

Study Reference	Patient Cohort and Implant Type	Complication Rates (Capsular Contracture, Rupture, etc.)	Additional Findings (Satisfaction, Quality of Life, etc.)
Duteille et al., 2018 [16]	995 Eurosilicone textured implants (augmentation and reconstruction)	Capsular contracture: 8.5%. Rupture: 0.9%. Explantation: 6% (augmentation), 13.8% (reconstruction).	Demonstrated excellent safety with low local complication rates.
Hallberg et al., 2019 [37]	Surgisis vs. muscle-covered implants, 116 vs. 132 reconstructions	Early complication: 37% (Surgisis) vs. 27% (control). Capsular contracture: 4.2% (Surgisis) vs. 2.5% (control).	Patient satisfaction and quality of life were similar across groups.
Malata et al., 1997 [38]	Textured vs. smooth silicone implants, subglandular augmentation	Capsular contracture: 11% (textured) vs. 59% (smooth).	Textured implants maintained reduced capsular contracture over three years.
Marchac et al., 2021 [39]	Smooth, semi-smooth, microtextured, macrotextured implants, 908 patients	Capsular contracture (Baker III/IV): 1.5% (Group 1). No contractures for semi-smooth implants.	Semi-smooth implants showed favorable outcomes in reconstruction and augmentation.
Maxwell et al., 2015 [40]	Natrelle 410 anatomical form-stable silicone implants, 941 subjects	Capsular contracture (Baker III/IV): 9.2% (augmentation), 26.8% (reconstruction revision). Rupture: 5.7%.	High patient satisfaction; low complication rates over 10 years.
Niechajev et al., 2007 [41]	Cohesive gel-filled implants (McGhan 410 vs. Eurosilicone Vertex), 80 patients	Capsular contracture: 23% (moderately firm breasts).	98.6% of patients were satisfied; implants were firmer than natural breasts.
Hedén et al., 2009 [42]	Style 410 shaped gel implants, 163 patients	Capsular contracture: 5.3%. Rupture: 1.7% (median 8 years).	High satisfaction; effective in reducing capsular contracture.

3.2. Main Findings

Ménez et al., 2018 [33]: This study provided a comprehensive evaluation of long-term outcomes associated with various breast reconstruction techniques, with a particular focus on patient satisfaction and complication rates. The findings revealed that autologous reconstructions, such as those using the Latissimus dorsi flap, were associated with higher levels of patient satisfaction and fewer complications when compared to prosthetic implants. Notably, major complications such as capsular contracture were observed less frequently in autologous reconstructions. Furthermore, the study underscored the advantages of immediate reconstruction, which resulted in the best quality-of-life outcomes. While delayed procedures or revisions following previous failures also yielded satisfactory results, the satisfaction scores were somewhat lower than those seen with immediate reconstructions [33].

Coroneos et al., 2019 [34]: This FDA post-approval study analyzed long-term safety data for both silicone and saline breast implants, encompassing a vast cohort of 99,993 patients. The study highlighted some key differences between the two implant types. Silicone implants were associated with higher rates of capsular contracture—7.2% in primary augmentations and 12.7% in reconstructions—compared to saline implants. Interestingly, silicone implants were also linked to rare systemic complications, including Sjögren’s syndrome, scleroderma, and rheumatoid arthritis, with standardized incidence ratios (SIRs) of 8.14, 7.00, and 5.96, respectively. On the other hand, implant rupture was more common in saline implants (2.5%) compared to silicone (0.5%). These findings emphasize the importance of regular follow-ups to monitor long-term complications in implant recipients [34].

Caplin et al., 2014 [35]: Over the course of a nine-year investigation into the performance of round versus shaped silicone gel implants, this study reported favorable outcomes for shaped implants. Capsular contracture rates were significantly lower for shaped implants compared to round ones—3.4% versus 11.3% in primary augmentations and 15.6%

versus 24.4% in primary reconstructions. Additionally, shaped implants showed lower rupture rates, with 3.1% compared to 10.3% for round implants. Overall, both implant types achieved patient satisfaction rates exceeding 94%, but the safety profile of shaped implants was particularly noteworthy [35].

Collis et al., 2000 [36]: This 10-year prospective study provided valuable insights into the long-term performance of textured versus smooth silicone gel implants. The results demonstrated a substantial reduction in capsular contracture rates with textured implants—11% compared to 65% with smooth implants. The study also highlighted the role of subpectoral placement in further minimizing the risk of capsular contracture, reinforcing the importance of surgical technique in achieving optimal outcomes [36].

Duteille et al., 2018 [16]: An eight-year follow-up study on Eurosilicone textured implants offered additional evidence supporting their safety and efficacy. The study reported a capsular contracture rate of 8.5%, though this figure was higher in primary reconstruction cases (18%) than in primary augmentations (8.4%). Implant rupture rates were remarkably low at just 0.9%, and explantation rates were 6% for augmentations and 13.8% for reconstructions. Overall, the study affirmed the low local complication rates associated with textured implants, underscoring their long-term safety profile [43].

The incidence of long-term complications in breast implants has been extensively studied, with findings varying depending on the type of implant and follow-up duration. A six-year follow-up study by Hallberg et al. (2019) compared two types of breast reconstruction techniques: Surgisis® (a porcine-derived matrix) and traditional muscle-covered implants. The results showed comparable rates of long-term complications, with capsular contracture occurring slightly more frequently in the Surgisis® group (4.2% compared to 2.5% in the control group). Despite these differences, the need for corrections and overall patient satisfaction remained similar between the groups [37].

The impact of implant surface texture on complications was investigated by Malata et al. (1997) in a three-year randomized controlled trial. Their findings underscored the significant influence of surface texturing on reducing capsular contracture. Patients with textured implants experienced a markedly lower rate of adverse capsular contracture (11%) compared to those with smooth implants (59%). Additionally, the need for revisional surgeries was substantially lower in the textured group, emphasizing the potential of texturing to mitigate long-term complications [38].

More recent research by Marchac et al. (2021) examined different surface types—smooth, semi-smooth, microtextured, and macrotextured—in a large-scale, three-year multicenter study. Capsular contracture rates were notably low across all groups, with semi-smooth implants showing no instances of severe contracture (Baker grade III/IV). Rupture rates were similarly minimal, reinforcing the overall safety of these newer implant technologies [39].

Studies with longer follow-ups naturally reported more late-onset complications. However, this is not due to the follow-up itself, but rather, to the fact that implants that stay in place for many years are more likely to develop issues over time. Maxwell et al. [40] found that capsular contracture rates increased by about 1% per year, reaching 9.2% in augmentation patients and 26.8% in those undergoing reconstruction revisions. This pattern highlights a simple reality: the longer an implant remains in the body, the higher the chances of complications arising.

Implant ruptures were observed in 5.7% of cases, with the majority detected through magnetic resonance imaging (MRI). Despite these complications, patient satisfaction remained high throughout the decade [40].

Niechajev et al. [41] (2007) conducted a five-year prospective study comparing two brands of cohesive gel implants. While patient satisfaction was overwhelmingly positive, with 98.6% expressing satisfaction with their outcomes, capsular contracture was observed

in approximately 23% of cases. Additionally, 5% of patients experienced implant rotation, and changes in skin or nipple sensitivity were reported by 25% [41].

Hedén et al. (2009) [42] presented findings from a multicenter study that followed patients with Style 410 cohesive silicone implants for 5 to 11 years. This study highlighted a low rupture rate of 1.7% and capsular contracture in 5.3% of cases. Importantly, no Grade IV contractures were noted, and 91% of patients considered the surgery beneficial, demonstrating high long-term satisfaction.

Overall, capsular contracture remains one of the most common complications associated with breast implants, with incidence rates influenced by factors such as implant type, surface texture, and surgical technique. Rupture rates, while relatively low, underscore the importance of long-term monitoring [42]. Despite these risks, patient satisfaction generally remains high, reflecting the advancements in implant design and surgical approaches over the years. These studies collectively provide valuable insights into optimizing implant choice and management strategies to minimize complications while maintaining favorable outcomes.

3.3. Quality Assessment and Risk of Bias

The risk of bias was assessed using the ROBINS-I tool, and the findings are summarized in Figures 2 and 3. Bias due to confounding is moderate across most studies, with none showing a low risk in this domain. Bias in participant selection was a significant concern in the studies by Coroneos et al. [34] and Collis et al. [36], indicating a serious risk. In contrast, the studies by Malata et al. [38], Maxwell et al. [40], and Niechajev et al. (2007) [41] achieved a low risk in participant selection due to rigorous inclusion and follow-up strategies. Classification of interventions was robust across all studies, including those by Ménez et al. [33], Duteille et al. [16], Hallberg et al. [37], Marchac et al. [39], and Hedén et al. [42], reflecting consistently applied methods and clear definitions.

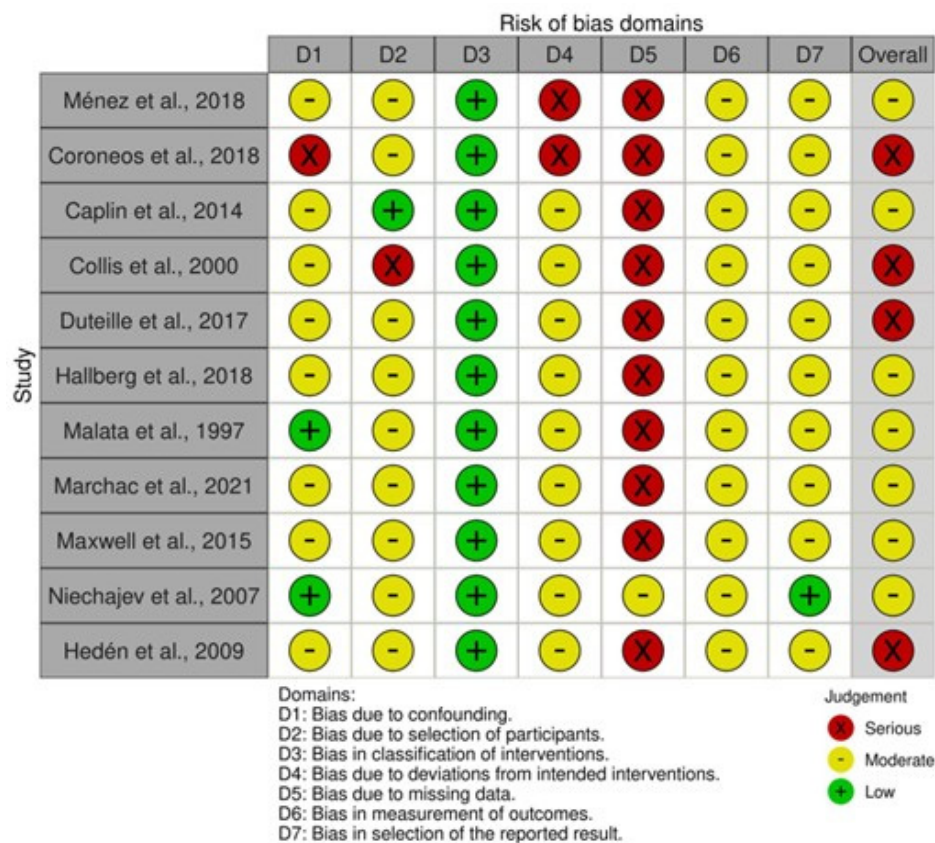


Figure 2. Traffic light plot for risk of bias assessment across studies [16,33–35,37–42].

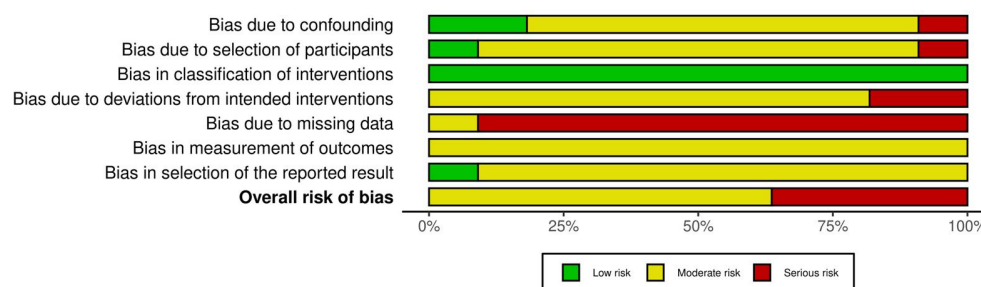


Figure 3. Risk of bias assessment across studies using the ROBINS-I tool.

However, deviations from the intended interventions and missing data presented substantial challenges, with serious bias identified in the studies by Coroneos et al. [34], Collis et al. [36], and Duteille et al. [16]. Measurement bias was moderate in most studies but low in those by Malata et al. [38] and Maxwell et al. [40], which used objective tools such as MRIs. Bias in the selection of reported results was generally low across all studies, suggesting the comprehensive reporting of findings. The overall risk of bias varied significantly. The studies by Malata et al. [38] and Maxwell et al. [40] were rated as low risk, while those by Coroneos et al. [34] and Collis et al. [36] were rated as serious. This highlights the variability in study quality and underscores the need for improved methodological rigor, particularly in addressing missing data and controlling for confounders (Figures 2 and 3) [33–43].

4. Discussion

This systematic review provides a comprehensive look at the long-term complications associated with breast implant prostheses, highlighting issues such as capsular contracture, implant rupture, seromas, infections, and their psychosocial effects on patients. The variation in complication rates reported across studies reflects the complexity of managing long-term outcomes in patients undergoing breast augmentation or reconstruction. The following discussion integrates these findings to offer a deeper understanding of the complications and their relevance to clinical practice.

Capsular contracture emerged as one of the most frequent complications, affecting up to 10.4% of patients in some studies. This condition, marked by fibrosis and hardening of the capsule around the implant, often leads to pain and aesthetic concerns that may require surgical intervention. Notably, capsular contracture was more common in patients who had undergone radiation therapy, aligning with findings in breast cancer patients who received implant-based reconstruction following radiation treatment [1,2]. Most of the studies in this review comparing capsular contracture rates between textured and smooth implants focused on older-generation smooth implants. These earlier models had some design limitations, such as increased gel leakage and lower manufacturing standards, which may have contributed to the higher rates of contracture. However, newer research suggests that today's smooth implants, designed with improved materials and advanced surface technology, may not carry the same risks as their predecessors. In fact, some recent studies show that modern smooth implants may have contracture rates similar to or even lower than textured implants. This ongoing discussion highlights how much our understanding of implant surfaces and complications is evolving. While older studies suggested that textured implants had an advantage, newer evidence shows that the choice between smooth and textured implants is not as simple as it once seemed. More research is needed to truly understand which type offers the best long-term outcomes for patients [44–50].

Notably, techniques such as the use of acellular dermal matrices (ADMs) and prepectoral implant placements have demonstrated some success in mitigating this complication. However, these approaches also increase the procedural complexity and cost [2,4].

Implant rupture is another notable long-term complication, particularly prevalent among silicone implants. While advancements in implant technology have significantly reduced the risk of rupture, it has not been entirely eliminated. This complication carries implications not only for patient safety but also for aesthetic outcomes, often requiring revision surgeries to address the issue. Interestingly, studies indicate that textured implants, despite their benefits in lowering the risk of capsular contracture, may have a slightly higher likelihood of rupture. This underscores the inherent trade-offs in implant design and the need for individualized patient care [1,4].

Choosing between saline and silicone implants requires a thoughtful evaluation of the associated risks, balanced with the patient's individual preferences and priorities.

Although less common than capsular contracture and implant rupture, seromas and infections are still significant complications. Seromas, which involve fluid buildup around the implant, can extend the recovery time and elevate the risk of secondary infections. Infections, on the other hand, can occur shortly after surgery or even years later, requiring vigilant monitoring and timely treatment. Despite advancements in surgical techniques and postoperative care, which have helped to lower infection rates, they remain a considerable source of concern and morbidity for patients with implants [2,3].

The psychological effects of these complications are profound and should not be underestimated. Many patients face emotional challenges such as anxiety and depression when dealing with implant-related issues. However, research suggests that most individuals eventually recover emotionally, even after significant setbacks such as total implant failure. Despite these challenges, patient satisfaction with aesthetic outcomes often remains high. That said, dissatisfaction tends to increase in cases requiring multiple revision surgeries, highlighting the need for ongoing emotional support and clear communication throughout the treatment process [29].

This demonstrates the remarkable resilience of patients but also emphasizes the need for thorough preoperative counseling to establish realistic expectations.

The topic of implant removal, even in cases without complications, is also worth exploring. Many patients choose to remove their implants out of concern for aging prostheses or perceived long-term health risks. A study focusing on Chinese patients found these concerns to be the most common reasons for implant removal. Factors such as older age and the presence of comorbidities were also shown to significantly influence this decision [4,28]. This highlights the importance of ongoing patient education about implant safety and longevity to enable informed decision-making.

Recent advancements, such as direct-to-implant reconstruction performed after skin- or nipple-sparing mastectomies, have added new layers of complexity to managing long-term outcomes. While these approaches simplify the process by reducing the number of surgical stages, they are often associated with higher rates of immediate complications. However, the majority of these complications are manageable, and most patients continue to report high levels of satisfaction with their results [4]. These findings indicate that while direct-to-implant techniques may not be suitable for every patient, they present a valuable alternative for those who are carefully selected and deemed appropriate candidates.

Looking ahead, this review underscores several key areas that require further research. First, to better understand the natural evolution of problems and assess the efficacy of different therapies, there is an urgent need for high-quality randomized controlled trials (RCTs) with long follow-up periods. It is important to acknowledge relevant studies that, despite not being included, address similar issues. For instance, Han et al. (2019) and

Oh et al. (2020) compared round and shaped implants, while Spear et al. (2007) and McGuire et al. (2017) examined different surface textures and indications for placement. Furthermore, studies such as those by Kolasiński et al. (2023) and Stevens et al. (2012, 2016) provide additional perspectives on implant performance and patient outcomes. These works contribute to the broader understanding of breast implant safety and efficacy and highlight the complexity of long-term outcomes [6–9,12–27].

The current reliance on retrospective studies and case series limits the generalizability and robustness of the findings. Second, the development and implementation of standardized outcome measures are urgently needed to enable better comparisons across studies and to enhance the overall quality of evidence. Finally, emerging concerns such as breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) and its link to textured implants highlight the importance of continued monitoring and investigation to ensure patient safety and improve clinical outcomes [3,4,28].

Despite the abundance of studies available, there remains a notable gap in high-quality randomized controlled trials (RCTs) specifically addressing the long-term complications of breast implants. Much of the existing data are derived from retrospective studies and case series, which, while valuable, come with inherent limitations.

This review highlights the critical importance of tailoring patient care to the individual. Decisions about implant type, placement, and surgical technique should take into account not only the patient's anatomy and medical history but also their lifestyle, personal preferences, and expectations. Comprehensive preoperative counseling plays a vital role in this process, ensuring patients are aware of potential complications and the necessity for lifelong monitoring. By fostering an informed and collaborative approach, patients can feel more prepared and supported throughout their reconstructive journey.

Breast implant complications do not just affect a patient's health—they can also have legal and ethical consequences. Problems such as capsular contracture, implant rupture, seromas, and infections are among the most common, sometimes leading to legal disputes over medical responsibility, product safety, or whether a patient was properly informed before surgery. The need for additional surgeries and the risk of unsatisfactory results make open and honest preoperative discussions, along with thorough documentation, absolutely essential. In recent years, growing concerns—especially regarding conditions such as BIA-ALCL have led to stricter regulations on breast implants in many countries. Surgeons now play a crucial role in ensuring that patients fully understand both the benefits and the potential risks. When communication is unclear or incomplete, misunderstandings can arise, sometimes escalating into legal issues. This highlights the need for greater transparency and ethical awareness in medical practice. Looking ahead, discussions around breast implants will likely focus on improving long-term safety, creating standardized follow-up plans, and ensuring clearer guidelines for product recalls and reporting complications. Addressing these issues is key not just for protecting patients but also for supporting healthcare providers in delivering the best possible care with confidence and clarity.

5. Conclusions

This review highlights the ongoing challenges of managing long-term complications in breast implant patients. Despite advancements in materials and surgical techniques, issues such as capsular contracture, implant rupture, seromas, and infections remain concerns, sometimes requiring multiple revisions and impacting both physical and emotional well-being.

Our analysis provides an overview of these complications but has limitations. The variability in study designs, patient selection, and evaluation methods made a meta-analysis unfeasible, and our findings should be interpreted with caution.

Many patients show remarkable resilience, but dissatisfaction with aesthetic outcomes underscores the need for honest preoperative counseling and emotional support. Emerging techniques, such as direct-to-implant reconstruction and acellular dermal matrices, offer promise but must be carefully tailored to each patient.

Moving forward, more standardized, long-term studies are needed to refine clinical guidelines and improve patient outcomes. While breast implants provide important reconstructive and cosmetic benefits, they require lifelong monitoring and personalized care to ensure the best possible results.

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