

Immediate Lymphatic Reconstruction in the Prevention of Breast Cancer Related Lymphedema: A Systematic Review and Meta-Analysis

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Background

- In breast cancer survivors, the development of breast-cancer related lymphedema (BCRL) is a common postoperative complication following Axillary Lymph Node Dissection (ALND)
 - Reported incidence of **19.9%**¹
- Immediate Lymphatic Reconstruction (ILR)** is a novel technique where lymphovenous bypass is done **at the time of breast cancer surgery** to **prevent** the development of BCRL
 - Boccardo et al. (2009)²: Lymphatic Microsurgical Preventive Healing Approach (LYMPHA)
- While this technique is gaining traction and early results are promising, there has yet to be a wide-scale meta-analysis done that quantifies the treatment effect of ILR during ALND for the development of lymphedema

Objective

Conduct a systematic review and meta-analysis to examine the efficacy of ILR in preventing BCRL compared to those undergoing ALND without ILR.

Methods

- A review of Pubmed, Embase, and Scopus was performed for studies where ILR was performed at the time of breast cancer surgery
- Search terms: ((lymphedema) AND (prevention) AND (surgery) AND ((breast cancer))
- Exclusion criteria: non-ILR interventions, papers not in English, nonhuman subjects, purely descriptive papers, sample size of <20 patients, and literature reviews, letters, commentaries, case studies, and abstracts. Studies containing overlapping patients were also excluded
- Both double and single-armed studies were included
- Treatment effects were calculated using risk ratios (for single-arm studies, the incidence of BCRL following ALND was taken from the literature¹)
- A meta-analysis was performed using the inverse variance method and a random-effects model, and treatment effects were reported as log risk ratios with 95% confidence intervals

Figure 1. PRISMA Flow Diagram²²

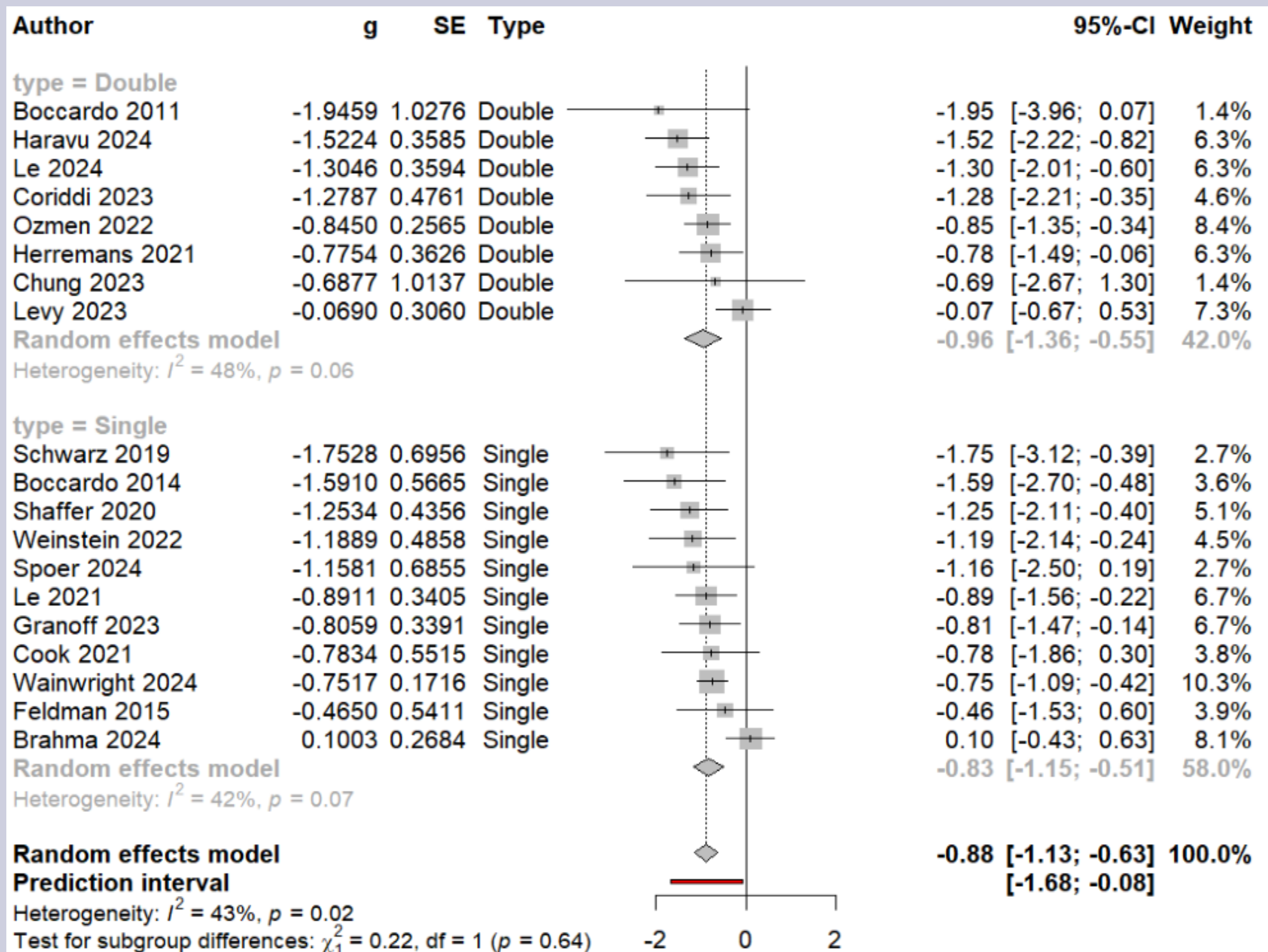
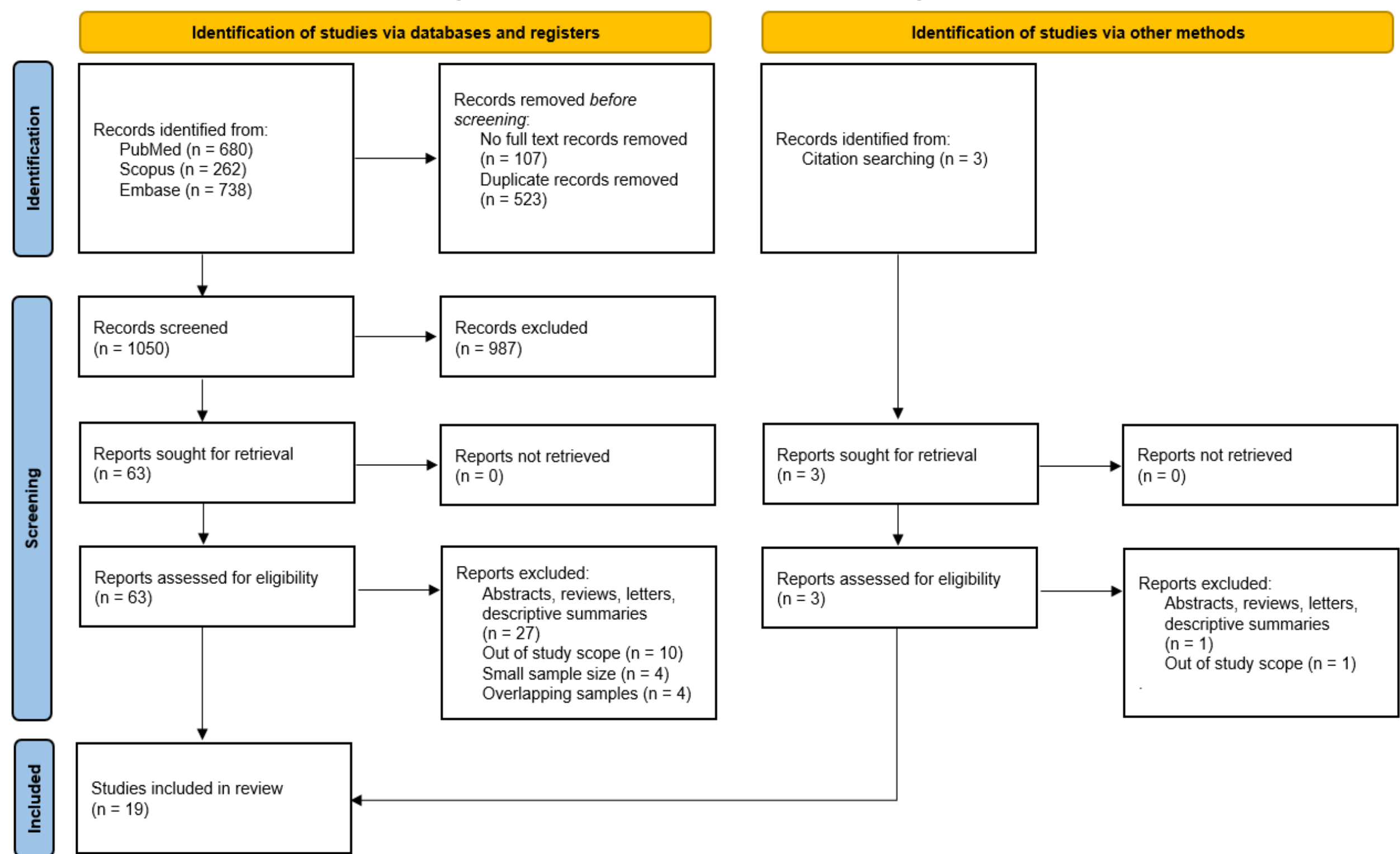


Figure 2. Forest plot broken down by double and single-arm studies showing the treatment effect (expressed as log risk ratio) of ILR vs. ALND without ILR

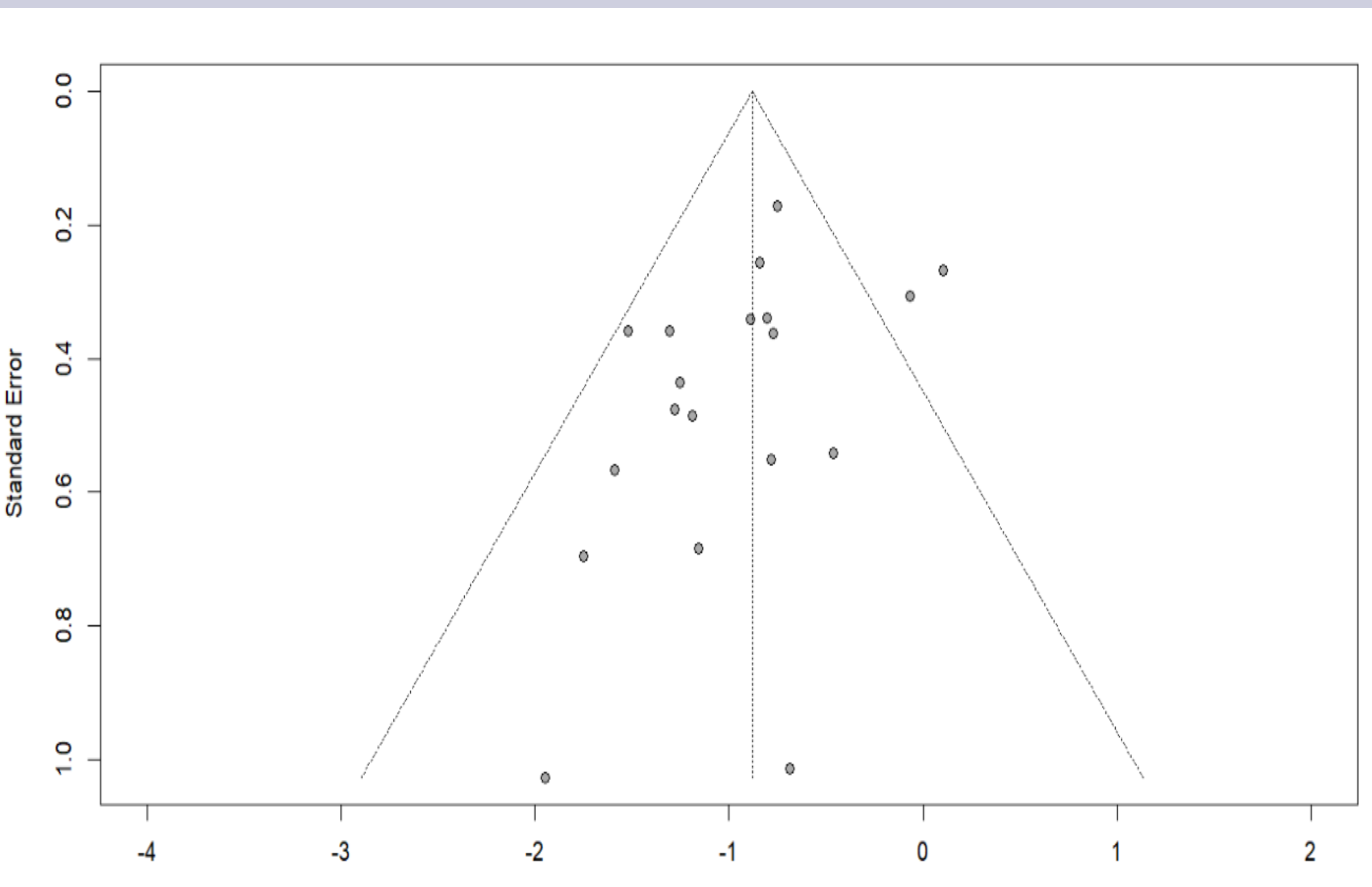


Figure 3. Funnel plot to assess for publication bias in our meta-analysis

Results

- 19 total studies (n=2682) were included in the meta-analysis³⁻²¹
 - 8 double-arm studies that compared patients undergoing ILR (n=442) to patients that did not receive ILR (n=1286)
 - 11 single-arm studies that only included ILR patients (n=954)
- Treatment effects** were expressed as the log risk ratio (95% CI):
 - Double-arm: -0.96 (-1.36, -0.55)
 - Single-arm: -0.83 (-1.15, -0.51)
 - The test for subgroup differences revealed no significant difference between double- and single-arm studies ($p=0.64$).
 - Overall pooled treatment effect: -0.88 (-1.13, -0.63)
- This corresponded to a risk ratio of 0.41 (0.32, 0.53)
- Patients who received ILR were 0.41 times as likely to develop lymphedema compared to those who did not receive ILR at the time of breast cancer surgery.**

Conclusion

Patients who received ILR were significantly less likely to develop BCRL compared to those who did not. ILR is an effective and promising procedure to prevent the development of lymphedema in breast cancer survivors undergoing ALND.

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