Delayed versus immediate exercises following surgery for breast cancer: a systematic review

Shamley D R, Barker K, Simonite V, Beardshaw A

CRD summary
This review compared the effects of delayed and early exercise after breast cancer surgery. The authors concluded that delayed exercise reduces the risk of seroma formation, but differences between studies made it impossible to adequately assess the effects on other outcomes. This was a well-conducted review and the authors' conclusions are likely to be reliable.

Authors' objectives
To compare the effects of delayed versus early exercise after surgery for breast cancer in terms of risk of seroma formation, fluid loss, hospital stay and loss of arm movement.

Searching
The Cochrane Controlled Trials Register, MEDLINE, EMBASE, CINAHL, AMED, PEDro, REHABDATA and ProQuest Medical Library were searched from 1960 to June 2002 without any language restrictions; the search terms were reported. The reference lists of relevant reports were checked.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies that compared early versus delayed shoulder mobilisation or exercise were eligible for inclusion. In the included studies, delayed exercise started 3 to 14 days after early exercise, where stated.

Participants included in the review
Studies of women who had had surgery for primary breast cancer were eligible for inclusion. The included studies differed in the extent of surgery the women had received (from lumpectomy with axillary dissection to radical mastectomy). One study included women who had received pre-operative chemotherapy and radiotherapy.

Outcomes assessed in the review
Studies that assessed range of motion of the shoulder, wound complications, volume of fluid drained, or incidence of seroma formation were eligible for inclusion. The review also assessed length of hospital stay.

How were decisions on the relevance of primary studies made?
Three independent reviewers, blinded to authors and publications, selected studies. Any disagreements were resolved by consensus.

Assessment of study quality
Studies were assessed for many aspects of validity: power calculations, sample size, randomisation methods, allocation concealment, blinding, validity of the methods used to assess the outcomes, statistical analysis, baseline comparability of the treatment groups, description of the interventions, and losses to follow-up reported with reasons. Two independent reviewers assessed validity using a standardised form, and any disagreements were resolved by consensus.

Data extraction
Two independent reviewers extracted the data using a standardised form, and any disagreements were resolved by consensus. Where necessary, authors were contacted for further information about missing data. The number of
patients with each outcome of interest was extracted for each treatment.

Methods of synthesis
How were the studies combined?
Pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for dichotomous data using fixed-effect and random-effects meta-analyses. Pooled weighted mean differences (WMDs) with 95% CIs were calculated for continuous data. Funnel plots were used to examine the potential for publication bias.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test and potential sources of differences among the studies were discussed.

Results of the review
Twelve RCTs (n=1,127) were included in the review, of which six (n=540) were included in the meta-analyses.

In terms of study quality, most of the studies did not report power calculations, allocation concealment, validity of the outcome measures, blinding of the outcome assessment, or randomisation methods. Other methodological flaws included insufficient information justifying the use of parametric statistical tests, inadequate reporting of exclusion criteria, a and lack of reporting baseline comparability of the treatment groups.

Seroma formation (5 studies).
Seroma formation was significantly reduced with delayed compared with early exercises, 27% versus 46%; the OR when using a fixed-effect model was 0.41 (95% CI: 0.20, 0.95, P=0.00001; the upper limit of the 95% CI was reported as 0.5 in the review abstract). No significant statistical heterogeneity was found (P=0.15). The results were similar when using the random-effects model (OR 0.40, 95% CI: 0.22, 0.73, P=0.003).

Drainage volume (6 studies).
There was no significant difference between treatments for drainage volume (WMD 175 mL, 95% CI: -397, 47, P=0.12). Significant statistical heterogeneity was found (P<0.00001).

Hospital stay (5 studies).
There was no significant difference between treatments in length of hospital stay (WMD 0.63 days, 95% CI: -1.91, 0.66, P=0.3). Significant statistical heterogeneity was found (P=0.0015).

It was not possible to conduct a meta-analysis for treatment effects on range of shoulder motion because there was too much variability among studies in the methods used to measure this outcome.

Owing to the small number of studies, it was not possible to draw firm conclusions about publication bias from the funnel plots.

Authors' conclusions
There was evidence that delayed exercises reduce the risk of seroma formation, but differences between the studies made it impossible to draw conclusions about the effects of delayed exercise on fluid drainage, hospital stay or arm movement.

CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant databases were searched without language restriction and attempts were made to locate unpublished studies, thus minimising the potential for language and publication bias. At least two reviewers
independently selected studies, assessed validity and extracted the data, thus reducing the potential for reviewer bias and errors. Validity was comprehensively assessed using specified criteria, the results of the assessment were reported, and adequate information about the primary studies was given.

Sources of clinical heterogeneity among the studies were discussed and statistical heterogeneity was assessed. The use of a meta-analysis to pool studies assessing seroma appeared appropriate, although studies differed in the extent of surgical treatment. The finding of significant heterogeneity for meta-analyses of outcomes other than seroma suggests, as the authors correctly stated, that meta-analysis was not an appropriate method for summarising the effect size of treatment for these outcomes. This was a well-conducted review and the authors' conclusions are likely to be reliable.

**Implications of the review for practice and research**

Practice: The authors did not state any implications for practice.

Research: The authors stated that future studies should clearly define distinctive protocols for each treatment, take prognostic factors into account in study design, use an adequate sample size, and adhere to the Consolidated Standards of Reporting Trials (CONSORT) recommendations for methods and reporting.

**Bibliographic details**


**PubMedID**

15830140

**DOI**

10.1007/s10549-004-4727-9

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Arm; Breast Neoplasms /surgery; Exercise Therapy; Female; Humans; Length of Stay; Mastectomy /rehabilitation; Movement; Postoperative Complications /prevention & control; Randomized Controlled Trials as Topic; Range of Motion, Articular; Seroma /etiology /prevention & control; Time Factors; Treatment Outcome; Wound Healing

**AccessionNumber**

12005003856

**Date bibliographic record published**

30/09/2006

**Date abstract record published**

30/09/2006

**Record Status**

This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.