Physical therapist management of lymphedema following treatment for breast cancer: a critical review of its effectiveness

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Authors' objectives
To critically analyse the recent research involving physical therapist management of lymphedema secondary to breast cancer treatments.

Searching
The authors searched the CINAHL, Index Medicus, and HEALTHSTAR electronic databases (1966 to 1997) using the search terms 'lymphedema', 'physical therapy', 'occupational therapy', and special modality names such as 'compression garments', 'pneumatic pump', 'elevation', and 'ultrasound' for English language publications. Reference lists from previously identified articles were also scanned for additional relevant references.

Study selection
Study designs of evaluations included in the review
Randomised, controlled trial (RCT) (1 study); one group pre-test- post-test (7 studies); pre-test-post-test with comparison groups (non-randomised allocation (4 studies); and non-random cross-over study (1 study). Length of follow-up ranged from 5 hours to 13 months.

Specific interventions included in the review
Conservative or noninvasive treatment of lymphedema using uniform or differentiated pressure pneumatic pumps (with or without compression garments); compression garments; complex physical therapy (CPT) (combining exercise, Foldi massage, use of compression garments, and skin hygiene); modified CPT; electrical stimulation device (with or without compression garments; microwave heating; Wright linear pump; supine arm elevation; manual massage (with or without compression garments); lymph pulsator; ultrasound; control.

Participants included in the review
Patients who had been treated for breast cancer and who had secondary lymphedema in at least one upper extremity.

Outcomes assessed in the review
Change in size of the upper extremity measured by various methods (e.g. circumference measurement at various sites or intervals, water volumetry with or without subjective report, water displacement volume, arm volume, or volume measurement by truncated cone method).

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
Studies were evaluated according to a modified version of Sackett's rules of evidence (5 hierarchical levels of evidence) (see Other Publications of Related Interest, Boyd, Piper, and Sackett references) and also evaluated for scientific rigour using 6 criteria:

1. Inclusion and exclusion criteria were listed for the subjects and included an operational definition of lymphedema.

2. The treatment protocol was adequately described to be replicable.

3. The reliability of data obtained with outcome measures was investigated.
4. The validity of the outcome measures has been assessed.

5. The assessors were blinded to the treatment groups.

6. All subjects enrolled in the study were accounted for.

The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
The authors do not state who, or how many of the authors, extracted the data. However, to assess the reliability of different rater's judgements in classifying the studies into Sackett's classifications, the authors independently reviewed and classified the studies. Interrater agreement on level of evidence was attained for 15 of the 19 studies (78.9%). Consensus for the remaining 4 studies was achieved through discussion.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative review.

How were differences between studies investigated?
No statistical test for homogeneity was conducted.

Results of the review
Thirteen studies met the inclusion criteria (920 participants). One study (74 participants) was Level II (small randomised controlled trial with high false-positive or false-negative errors). Five studies (393 participants) were Level III (nonrandomised, pre-test/post-test with comparison group or cross-over design). Seven studies (453 participants) were Level V (one-group pre-test/post-test).

Based on the levels of evidence extracted from the included studies, 1 Grade B (single-level II study) and 6 Grade C (level of evidence grade III to V) recommendations were generated by the results of the individual studies.

The Grade B recommendation was that compression garments appear to reduce limb size after 6 months of use, and the addition of electrical stimulation does not improve the results.

The Grade C recommendations were:

1. Elevation alone is not effective in controlling lymphedema.

2. Microwave treatment, in combination with compression garment use, can reduce limb size.

3. Compression garments alone reduce limb size. Pneumatic pumps or electrical stimulation devices, in combination with compression garments, do not improve the results.

4. Complex physical therapy (CPT) was supported by 2 level V studies, but modified CPT was found to be just as effective as regular CPT in one of the studies.

5. Combinations of treatments including massage, pneumatic pump, and compression garments show positive results in the treatment of people with lymphedema (2 studies).

6. The Wright linear pump and the uniform pressure pump are effective in reducing limb size when followed by the use of compression garments.
Authors' conclusions
The authors state that caution must be exercised when considering these recommendations because none of them are supported by numerous, definitive studies.

CRD commentary
The authors have stated their research question and inclusion/exclusion criteria and have performed a reasonable search of the literature. It is not clear whether additional relevant data may have been missed since unpublished literature and non-English publications were not included in the review. There is no statistical combination of the data but the narrative discusses the combination of individual study details and reports groups of results in the form of graded recommendations. These are then summarised in clinical recommendations for use in the future treatment of lymphedema.

There may be bias in the review because there is no information reported about the selection or data extraction processes for the included studies. The authors also do not report the statistical results of the quality assessment of the included individual studies. The authors recognise that the methodological quality of the selected studies is poor and therefore their results should be viewed with caution.

Implications of the review for practice and research
Practice: The authors' recommendations for clinical practice are: to encourage the use of compression garments and the combination of techniques (massage, sequential pneumatic compression, compression garments or compression bandaging), but not including electrical stimulation which is not any more effective than compression garments alone.

Research: The authors recommend that more rigorous research incorporating blind assessment of outcomes and random assignment of subject groups are required. Consensus as an outcome measure that yields valid and reliable data for the evaluation of limb size is critical to allow comparison of results across studies.

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Bibliographic details

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Other publications of related interest

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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.