

CADTH Reference List

# Liposuction for Lymphedema

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## Key Messages

- One randomized controlled trial was identified regarding the clinical effectiveness of liposuction compared to no treatment for the management of lymphedema.
- Two systematic reviews and 1 non-randomized study were identified regarding the clinical effectiveness of liposuction compared to alternative treatments for the management of lymphedema.
- Two evidence-based guidelines were identified regarding the use of liposuction for the management of lymphedema.

## Research Questions

1. What is the clinical effectiveness of liposuction compared to no treatment for the management of lymphedema?
2. What is the clinical effectiveness of liposuction compared to alternative treatments for the management of lymphedema?
3. What are the evidence-based guidelines regarding the use of liposuction for the management of lymphedema?

## Methods

### Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, Embase, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were lymphedema and liposuction. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was completed on June 23, 2022 and limited to English-language documents published since January 1, 2017. Internet links were provided, where available.

### Selection Criteria and Summary Methods

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in [Table 1](#). Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications. Open-access, full-text versions of evidence-based guidelines were reviewed when available, and relevant recommendations were summarized.

**Table 1: Selection Criteria**

Criteria	Description
Population	Individuals with lymphedema
Intervention	Liposuction (any type)
Comparator	Q1: No treatment Q2: Alternative treatments (e.g., wrapping/compression, drainage, combined decongestive therapy [e.g., manual lymphatic drainage and wearing compression garments]) Q3: Not applicable
Outcomes	Q1 and Q2: Clinical effectiveness (e.g., reduced swelling, pain, bruising or discomfort; easier ambulation; improved quality of life) and safety Q3: Recommendations regarding best practices (e.g., appropriate populations or clinical settings, strategies to minimize adverse events)
Study designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

## Results

Six relevant references were identified for this report.<sup>1-6</sup> Two systematic reviews,<sup>1,2</sup> 1 randomized controlled trial,<sup>3</sup> 1 non-randomized study,<sup>4</sup> and 2 evidence-based guidelines<sup>5,6</sup> were identified regarding the use of liposuction for the treatment of lymphedema. No relevant health technology assessments were identified.

Additional references of potential interest that did not meet the inclusion criteria are provided in [Appendix 1](#).

## Overall Summary of Findings

A systematic review (SR) that examined the use of liposuction for lower limb lymphedema found that patients had a greater than 50% reduction in lymphedema immediately following the procedure and had complete volume reduction after 4 to 5 years of follow-up.<sup>1</sup> There was a greater reduction in volume for patients with secondary versus primary lymphedema.<sup>1</sup> Another SR evaluated treatments for head and neck lymphedema following head and neck cancer therapy.<sup>2</sup> A small number of studies of liposuction treatment for this patient group were identified in the review, but the authors concluded that the treatment has been effective for a limited number of these patients.<sup>2</sup>

One randomized controlled trial was identified that compared liposuction to no treatment for the management of lymphedema following treatment for head and neck cancer.<sup>3</sup> The authors found a statistically significant improvement in both patients' self-perception and scoring of appearance following liposuction treatment.<sup>3</sup> In a non-randomized study, patients with chronic upper extremity lymphedema who were treated with simultaneous lymph node transfer and liposuction had an average decrease in arm volume of 87.7%.<sup>4</sup> The majority of participants (17 out of 21) were able to reduce the use of compression garments and did not experience an increase in edema volume when compression was not applied.<sup>4</sup>

Treatment guidelines from the National Institute for Health and Care Excellence (NICE) recommend the use of liposuction for the treatment of chronic lymphedema.<sup>5</sup> A multidisciplinary team with expertise in treating lymphedema should be used to select patients who are eligible for the procedure, which should only be performed by clinicians with training and expertise in the procedure.<sup>5</sup> Chang et al.<sup>6</sup> recommend liposuction for addressing non-fluid components of lymphedema. There is no specific recommended timing for each procedure when liposuction is combined with physiologic procedures.

## References

### Health Technology Assessments

No literature identified.

### Systematic Reviews

1. Forte AJ, Huayllani MT, Boczar D, Ciudad P, McLaughlin SA. Lipoaspiration for the Treatment of Lower Limb Lymphedema: A Comprehensive Systematic Review. *Cureus*. 2019;11(10):e5913. [PubMed](#)
2. Tyker A, Franco J, Massa ST, Desai SC, Walen SG. Treatment for lymphedema following head and neck cancer therapy: A systematic review. *Am J Otolaryngol*. 2019;40(5):761-769. [PubMed](#)

### Randomized Controlled Trials

3. Alamoudi U, Taylor B, MacKay C, et al. Submental liposuction for the management of lymphedema following head and neck cancer treatment: a randomized controlled trial. *J Otolaryngol Head Neck Surg*. 2018;47(1):22. [PubMed](#)

### Non-Randomized Studies

4. Leppapuska IM, Suominen E, Viitanen T, et al. Combined Surgical Treatment for Chronic Upper Extremity Lymphedema Patients: Simultaneous Lymph Node Transfer and Liposuction. *Ann Plast Surg*. 2019;83(3):308-317. [PubMed](#)

### Guidelines and Recommendations

5. Liposuction for chronic lymphoedema. Interventional procedures guidance [IPG723]. London (UK): National Institute for Health and Care Excellence. 2022. <https://www.nice.org.uk/guidance/ipg723>
6. Chang DW, Dayan J, Greene AK, et al. Surgical Treatment of Lymphedema: A Systematic Review and Meta-Analysis of Controlled Trials. Results of a Consensus Conference. *Plast Reconstr Surg*. 2021;147(4):975-993. [PubMed](#)

## Appendix 1: References of Potential Interest

### Previous CADTH Reports

- Intermittent Pneumatic Compression Devices for the Management of Lymphedema: A Review of Clinical Effectiveness and Guidelines. Ottawa (ON): CADTH. 2017. <https://www.cadth.ca/intermittent-pneumatic-compression-devices-management-lymphedema-review-clinical-effectiveness-and>

### Systematic Reviews

#### Comparing Order of Treatments

- Forte AJ, Huayllani MT, Boczar D, Ciudad P, Manrique O. Lipoaspiration and Lymph Node Transfer for Treatment of Breast Cancer-related Lymphedema: A Systematic Review. *Cureus*. 2019;11(11):e6096. [PubMed](#)

#### Type of Surgical Intervention Not Specified

- Tang NSJ, Ramakrishnan A, Shayan R. Quality-of-life outcomes after operative management of primary and secondary lymphoedema: a systematic review. *ANZ J Surg*. 2021;91(12):2624-2636. [PubMed](#)

#### Quality Appraisal

- Carl HM, Walia G, Bello R, et al. Systematic Review of the Surgical Treatment of Extremity Lymphedema. *J Reconstr Microsurg*. 2017;33(6):412-425. [PubMed](#)

### Non-Randomized Studies

#### Single Arm Studies

- Bolletta A, di Taranto G, Losco L, et al. Combined lymph node transfer and suction-assisted lipectomy in lymphedema treatment: A prospective study. *Microsurgery*. 2022;42(5):433-440. [PubMed](#)
- Xin J, Sun Y, Xia S, et al. Liposuction in cancer-related lower extremity lymphedema: an investigative study on clinical applications. *World J Surg Oncol*. 2022;20(1):6. [PubMed](#)
- Granoff MD, Pardo J, Singhal D. Power-Assisted Liposuction: An Important Tool in the Surgical Management of Lymphedema Patients. *Lymphat Res Biol*. 2021;19(1):20-22. [PubMed](#)
- Baumeister RGH, Wallmichrath J, Weiss M, Baumeister SHC, Frick A. Microsurgical lymphatic vascular grafting and secondary liposuction: Results of combination treatment in secondary lymphedema. *Lymphology*. 2020;53(1):38-47. [PubMed](#)
- Ciudad P, Manrique OJ, Bustos SS, et al. Single-stage VASER-assisted liposuction and lymphatico-venous anastomoses for the treatment of extremity lymphedema: a case series and systematic review of the literature. *Gland Surg*. 2020;9(2):545-557. [PubMed](#)
- Granoff MD, Johnson AR, Shillue K, et al. A Single Institution Multi-Disciplinary Approach to Power-Assisted Liposuction for the Management of Lymphedema. *Ann Surg*. 2020 Nov 4. [PubMed](#)
- Hoffner M, Ohlin K, Svensson B, et al. Liposuction Gives Complete Reduction of Arm Lymphedema following Breast Cancer Treatment-A 5-year Prospective Study in 105 Patients without Recurrence. *Plast Reconstr Surg Glob Open*. 2018;6(8):e1912. [PubMed](#)

#### Before and After Studies

- Karlsson T, Hoffner M, Brorson H. Liposuction and Controlled Compression Therapy Reduce the Erysipelas Incidence in Primary and Secondary Lymphedema. *Plast Reconstr Surg Glob Open*. 2022;10(5):e4314. [PubMed](#)
- Karlsson T, Karlsson M, Ohlin K, Olsson G, Brorson H. Liposuction of Breast Cancer-Related Arm Lymphedema Reduces Fat and Muscle Hypertrophy. *Lymphat Res Biol*. 2022;20(1):53-63. [PubMed](#)
- Hoffner M, Bagheri S, Hansson E, Manjer J, Troeng T, Brorson H. SF-36 Shows Increased Quality of Life Following Complete Reduction of Postmastectomy Lymphedema with Liposuction. *Lymphat Res Biol*. 2017;15(1):87-98. [PubMed](#)

### Review Articles

- Marchica P, D'Arpa S, Magno S, et al. Integrated Treatment of Breast Cancer-related Lymphedema: A Descriptive Review of the State of the Art. *Anticancer Res*. 2021;41(7):3233-3246. [PubMed](#)
- Park KE, Allam O, Chandler L, et al. Surgical management of lymphedema: a review of current literature. *Gland Surg*. 2020;9(2):503-511. [PubMed](#)
- Al Afif A, Uys HK, Taylor SM. Improving aesthetic outcomes after head and neck reconstruction. *Curr Opin Otolaryngol Head Neck Surg*. 2018;26(4):227-233. [PubMed](#)
- Smile TD, Tendulkar R, Schwarz G, et al. A Review of Treatment for Breast Cancer-Related Lymphedema: Paradigms for Clinical Practice. *Am J Clin Oncol*. 2018;41(2):178-190. [PubMed](#)
- Garza R, 3rd, Skoracki R, Hock K, Povoski SP. A comprehensive overview on the surgical management of secondary lymphedema of the upper and lower extremities related to prior oncologic therapies. *BMC Cancer*. 2017;17(1):468. [PubMed](#)

## Additional References

26. Viviano SL, Neligan PC. Updates on Excisional Procedures for Lymphedema. *Adv Wound Care (New Rochelle)*. 2022;11(8):419-427. [PubMed](#)
27. Boyages J, Koelmeyer LA, Suami H, et al. The ALERT model of care for the assessment and personalized management of patients with lymphoedema. *Br J Surg*. 2020;107(3):238-247. [PubMed](#)

## Treatment Algorithms

28. Deptula P, Zhou A, Posternak V, He H, Nguyen D. Multimodality Approach to Lymphedema Surgery Achieves and Maintains Normal Limb Volumes: A Treatment Algorithm to Optimize Outcomes. *J Clin Med*. 2022;11(3):25. [PubMed](#)
29. Brazio PS, Nguyen DH. Combined Liposuction and Physiologic Treatment Achieves Durable Limb Volume Normalization in Class II-III Lymphedema: A Treatment Algorithm to Optimize Outcomes. *Ann Plast Surg*. 2021;86(5S Suppl 3):S384-S389. [PubMed](#)