



Topic Exploration Report

Topic explorations are designed to provide a high-level briefing on new topics submitted for Determine the quantity of evidence available for a technology of interest.

- Identify any gaps in the evidence.
- Inform decisions on topics that warrant fuller assessment by Health Technology Wales (HTW).

Topic exploration report number:	TER427
Topic:	Liposuction for chronic lymphoedema
Summary of findings:	<p>Chronic lymphoedema refers to the accumulation of subcutaneous fluid and fat in body tissues as a result of either a condition affecting the lymphatic system, or damage to the lymphatic system by surgery, radiation, infection or injury. Currently, lymphoedema is treated using decongestive therapy, which involves the use of compression bandages and exercise to manage excess volume in the extremities. Liposuction has recently emerged as a potentially promising alternative to decongestive therapy for the treatment and management of lymphoedema.</p> <p>This topic exploration report (TER) is informed by NICE Interventional procedures guidance (IPG) 723. Further to this IPG, we identified one health technology assessment, two systematic reviews and five individual. Results show that liposuction may be an effective intervention for chronic lymphoedema, but there is a paucity of evidence concerning its clinical and cost effectiveness compared to standard practice.</p>

Introduction and aims

Lymphoedema is the abnormal accumulation of subcutaneous fluid and fat in body tissues, primarily in arms and legs. It leads to chronic swelling that can result in disability, pain and cosmetic issues. Primary lymphoedema results from a range of conditions affecting the lymphatic system, and secondary lymphoedema arises from damage to this system by surgery, radiation, infection or injury.

Current standard practice for lymphoedema is decongestive lymphatic therapy, this involves compression bandaging, skin care and exercise and necessitates that the person wear a compression garment every day for life. Liposuction for chronic lymphoedema involves removal of the oedematous adipose tissue by vacuum aspiration. Following treatment, a compression garment is made and will be revised multiple times until the oedema volume reaches a steady state, but this garment must be worn for life. The use of liposuction may be particularly effective for those with primary and cancer-related lymphoedema.

Health Technology Wales researchers searched for evidence on the clinical and cost effectiveness of liposuction for chronic lymphoedema.

Evidence overview

One piece of relevant guidance, one health technology assessment, two systematic reviews and five individual studies were identified. Economic evidence was searched for, but none was identified.

Guidance

This TER is informed by NICE IPG723 'Liposuction for chronic lymphoedema'. This IPG supports that the evidence on the safety and efficacy of liposuction for chronic lymphoedema is adequate to support the use of this procedure. This TER aims to assess the evidence available for the clinical and cost effectiveness of the technology.

The rapid review that informed IPG723 identified seven key sources of evidence published up to November 2021: one systematic review, one systematic review with a meta-analysis, and five before-and-after studies. These are discussed in more detail below. A further search was carried out to identify any relevant information published following IPG723, but none was identified.

Health technology assessments

The Norwegian Institute of Public Health (2021) assessed the efficacy, safety and health economic consequences of liposuction for the treatment of chronic lymphoedema. The assessment found no comparative studies, however, only evidence up to May 2017 was included, which was limited to a NICE IPG that has since been superseded by IPG723. The health economic model considered in this assessment was based on uncertain parameters, but does suggest that patients may benefit from liposuction. The incremental effectiveness was estimated at 0.29 QALYs. Cost per QALY gain was estimated between NOK 129,000 and NOK 315,000 (approximately between £11,704.89 and £28,581.71). Overall relevance of these findings may vary due to the HTA and economic model being primarily based in a Norwegian context.

Systematic reviews

Two systematic reviews were included in IPG723. The Chang et al. (2021) systematic review and meta-analysis investigated the safety and efficacy of surgical interventions for upper and lower

extremity lymphoedema in adults. The review identified nine studies on liposuction and compressive therapy, with a total population of 371. The review identified that liposuction and compression therapy significantly reduced excess limb volume, but the % per ml amount varied between studies. The review concludes that liposuction is effective in addressing nonfluid components of lymphoedema but further research is necessary.

Tang et al. (2021) performed a systematic review of 21 studies, with a total population of 736. The study included 7 individual studies which assessed the effectiveness of liposuction in treating lymphoedema, of which 2 were comparative. However,, the review did not report outcomes specific to this intervention, only concluding that all treatment modalities see significant health-related quality of life improvements across a range of health domains.

It should be noted that there is the potential for overlap in the evidence base between the two systematic reviews included in this TER.

Individual studies

Five before-and-after studies were included in IPG723. Hoffner (2018) performed a single arm, single centre non-randomised before-and-after study between 1993 and 2012 in individuals receiving liposuction for arm lymphoedema secondary to breast cancer. The study concluded that liposuction is an effective method for the treatment of chronic lymphoedema in the arm, and the volume reduction remains complete at the 5 year mark. There is, however, a likely 100% patient overlap between this study and Lee (2016).

Lee (2016) performed a single arm, single centre non-randomised before-and-after study between 1993 and 2012 in individuals receiving liposuction for lymphoedema secondary to breast cancer. The study evaluated the incidence of erysipelas and arm excess volume before-and-after liposuction. The study concluded that liposuction can significantly reduce incidence of erysipelas in patients with post mastectomy arm lymphoedema who suffered one or more attacks prior to the intervention.

Stewart (2018) performed a single arm, single centre non-randomised before-and-after study between 2007 and 2016 in individuals receiving liposuction treatment for leg lymphoedema with a total population of 69. The study lost 17 individuals to follow up at a mean of 17 months (range between 6 and 48). The study concluded that liposuction did reduce the mean leg excess volume, but no test of statistical significance was reported and no statistical analysis was performed overall.

Granoff (2020) performed a single arm, single centre non-randomised before-and-after study between 2017 and 2020 in individuals with chronic lymphoedema receiving liposuction, with a total population of 39. The study concluded that mean overall QoL increases following surgery and the reduction in excess volume is statistically significant for both arm and leg lymphoedema.

Greene (2016) performed a single arm, single centre, non-randomised before-and-after study between 2007 and 2015 in individuals with primary and secondary lymphoedema, with a total population of 15. At follow up (mean of 3.1 years) the mean reduction in excess extremity volume was 73% (48-94%). No statistical analysis was performed.

Areas of uncertainty

Further comparative studies on the use of liposuction for the management and treatment of lymphoedema are necessary, as are economic evaluations of the intervention.

Further information is required in the following areas:

- What is the precise population for this intervention, and are there different treatment requirements for patients with primary and secondary lymphoedema?
- Is liposuction or lipectomy an alternative to standard practice, or would it be used in tandem with decongestive therapy?
- Economic modelling and analysis, as we did not identify any economic evidence in our searches
- Whether liposuction or lipectomy is currently used in Wales and how it would integrate with current NHS systems.

Literature search results

Health technology assessments and guidance

Norwegian Institute of Public Health. (2021). Liposuction (lipectomy) for the treatment of fat accumulation caused by chronic lymphoedema. Available at: <https://www.fhi.no/en/publ/2021/Liposuction-treatment-fat-accumulation-caused-chronic-lymphoedema/> [accessed 24/01/23]

NICE. (2022). [IPG723] Liposuction for chronic lymphoedema. Available at: <https://www.nice.org.uk/guidance/ipg723> [accessed 24/01/23]

Evidence reviews and economic evaluations

Chang DW, Dayan J, Greene AK, et al. (2021). Surgical Treatment of Lymphedema: A Systematic Review and Meta-Analysis of Controlled Trials. Results of a Consensus Conference. *Plastic and Reconstructive Surgery*. 147(4): 975-93. doi: 10.1097/PRS.00000000000007783

Tang NSJ, Ramakrishnan A, Shayan R. (2021). Quality-of-life outcomes after operative management of primary and secondary lymphoedema: a systematic review. *ANZ Journal of Surgery*. 91(12): 2624-36. doi: 10.1111/ans.16764

Individual studies

Hoffner M, Ohlin K, Svensson B, et al. (2018). 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*. 6(8): e1912. doi: 10.1097/GOX.0000000000001912

Lee D, Piller, N., Hoffner, M., Manjer, J., & Brorson, H., . (2016). Liposuction of Postmastectomy Arm Lymphedema Decreases the Incidence of Erysipelas. *Lymphology*., 49(2): 85-92.

Stewart CJ, Munnoch DA. (2018). Liposuction as an effective treatment for lower extremity lymphoedema: A single surgeon's experience over nine years. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 71(2): 239-45. doi: 10.1016/j.bjps.2017.11.003

Granoff MD, Johnson AR, Shillue K, et al. (2022). A Single Institution Multi-disciplinary Approach to Power-assisted Liposuction for the Management of Lymphedema. *Annals of Surgery*. 276(5): e613-e21. doi: 10.1097/SLA.00000000000004588

Greene AK, Maclellan RA. (2016). Operative Treatment of Lymphedema Using Suction-Assisted Lipectomy. *Annals of Plastic Surgery*. 77(3): 337-40. doi: 10.1097/SAP.0000000000000597

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Concepts used:

liposuction OR lipectomy AND chronic / lymphoedema OR chronic / lymphedema