NICE National Institute for Health and Care Excellence

Professional Expert Questionnaire

Technology/Procedure name & indication: **P409/3 Liposuction for chronic lymphoedema**

Your information

Name:	Anne Dancey
Job title:	Consultant Plastic and Reconstructive surgery
Organisation:	BAPRAS
Email address:	anne@annedancey.co.uk
Professional organisation or society membership/affiliation:	BAPRAS
Nominated/ratified by (if applicable):	Click here to enter text.
Registration number (e.g. GMC, NMC, HCPC)	GMC 4615482

How NICE will use this information: the advice and views given in this questionnaire will form part of the information used by NICE and its advisory committees to develop guidance or a medtech innovation briefing on this procedure/technology. Information may be disclosed to third parties in accordance with the Freedom of Information Act 2000 and the Data Protection Act 2018, complying with data sharing guidance issued by the Information CommissioGMC 4615482ner's Office. Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Your name, job title, organisation and your responses, along with your declared interests will also be published online on the NICE website as part of the process of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

For more information about how we process your data please see our privacy notice.

☐ I give my consent for the information in this questionnaire to be used and may be published on the NICE website as outlined above. If consent is NOT given, please state reasons below:

Click here to enter text.

Please answer the following questions as fully as possible to provide further information about the procedure/technology and/or your experience.

Please note that questions 10 and 11 are applicable to the Medical Technologies Evaluation Programme (MTEP). We are requesting you to complete these sections as future guidance may also be produced under their work programme.

1	Please describe your level of experience with the procedure/technology, for example: Are you familiar with the procedure/technology?	I commonly perform liposuction for both lipoedema and lymphoedema and I have been doing this for over 5 years on the NHS and then 14 years in the private sector, as the NHS trust was not willing to continue this service due to lack of funding. There is significant regional variation in the services offered by the NHS. I am aware that there are surgeons performing liposuction in lymphoedema, but I am not sure how common this is or how many cases they operate on per year.
	Have you used it or are you currently using it? – Do you know how widely this procedure/technology is used in the NHS or what is the likely speed of uptake? – Is this procedure/technology performed/used by clinicians in specialities other than your own? – If your specialty is involved in patient selection or referral to another specialty for this procedure/technology, please	Liposuction for lymphoedema is only performed by plastic surgeons in the UK. However, abroad it is performed by the dermatologists and occasionally general surgeons. As plastic surgeons are performing the liposuction in the UK, then we do not refer on to another speciality to perform this procedure.

	indicate your experience with it.	
2	– Please indicate your research experience relating to this procedure (please choose one or more if relevant):	**I have done bibliographic research on this procedure.** **I have had no involvement in research on this procedure**. I am collecting quality-of-life data from patients having liposuction for lymphoedema to audit the psychological benefit as well as the functional benefits.
3	How innovative is this procedure/technology, compared to the current standard of care? Is it a minor variation or a novel approach/concept/design? Which of the following best describes the procedure (please choose one):	Liposuction for lymphoedema was popularised by Brorston in 1998 and has been part of standard practice for lymphoedema management ever since. Liposuction is a commonly used technique in plastic surgery to contour the body and reduce diet resistant fat deposits. It is also performed as a standard part of many plastic surgical procedures, such as abdominoplasty and thigh lift **Established practice and no longer new.**
4	Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care?	Liposuction should be used as in addition to existing conservative management. Along with ALT (autologous lymph node transfers) and LVA (lymphovenous anastomoses).

Current management

5	Please describe the current standard of care that is used in the NHS.	Unfortunately, NHS lymphoedema care is inconsistent. Lymphoedema nurses provide the main stay of treatment with conservative management, using manual lymphatic drainage and compression garments. However, the condition is progressive and conservative management will not halt its progression or change the course of the disease. Sadly, many

		patients never get referred to the lymphoedema nurses and they are under- funded at best, making their presence inconsistent throughout the country. This leaves large geographical areas with no lymphoedema nurse support and patients are forced to fend for themselves.
6	Are you aware of any other competing or alternative procedure/technology available to the NHS which have a similar function/mode of action to this? If so, how do these differ from the procedure/technology described in the briefing?	ALT (autologous lymph node transfers) and LVAs (lymphovenous anastomoses) are offered by some surgeons, where supported by the CCG. Again, this is inconsistent. They are physiological techniques which are designed to restore lymphatic function and reduce infections. In some patients, it will be possible to stop wearing lymphoedema compression garments. In contrast, liposuction is not physiological and will not improve the progression of lymphoedema. It will symmetrise legs and reduce the heaviness of the lymphoedema limb. It will need repeating in the future if the results are to be maintained. Compression garments must be worn constantly day and night.

Potential patient benefits and impact on the health system

7	What do you consider to be the potential benefits to patients from using this procedure/technology?	Liposuction can improve quality-of-life for patients suffering from lymphoedema.
8	Are there any groups of patients who would particularly benefit from using this procedure/technology?	All patients who are suitable for surgery would benefit. However, some would benefit more from a physiological technique.
9	Does this procedure/technology have the potential to change the current pathway or clinical outcomes to benefit the healthcare system? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?	At the moment, liposuction is rarely available on the NHS and making it more accessible for patients is likely to improve quality-of-life and make the standard part of every lymphoedema service. Without making liposuction a standard part of lymphoedema management, it is unlikely to be performed consistently.
10 - MTEP	Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the procedure/technology likely to cost more or less than current standard care, or about the same? (in terms of staff, equipment, care setting etc)	More expensive.
11 - MTEP	What do you consider to be the resource impact from adopting this procedure/technology (is it likely to cost more or less than standard care, or about same-in terms of staff, equipment, and care setting)?	This is likely to cost more than standard care as lymphoedema nurse input will still be required in addition to the surgery. A physiological technique would potentially reduce costs as the nurses will no longer be needed, should the technique be successful and the frequency of admissions for cellulitis would reduce significantly.
12	What clinical facilities (or changes to existing facilities) are needed to do this procedure/technology safely?	More plastic surgeons trained to do liposuction for lymphoedema and more lymphoedema nurses.
13	Is any specific training needed in order to	Yes. This is a specialist technique and although it is consistent with normal liposuction, there

	use the procedure/technology with respect to efficacy or safety?	are nuances of lymphatic surgery which need to be understood and respected.

Safety and efficacy of the procedure/technology

14	What are the potential harms of the procedure/technology? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence: Adverse events reported in the literature (if possible, please cite literature) Anecdotal adverse events (known from experience) Theoretical adverse events	Liposuction is considered one of the safest procedures in plastic surgery but there are always risks and complications associated with any surgery. The main stay of data comes from analysis of liposuction in cosmetic plastic surgery and lipoedema. There have been very few direct analysis of lymphoedema itself but given the technique is the same despite the pathology being different, the same risks and complications should apply. The following complications have been reported with liposuction: □ Bleeding (0.15%) Infection (0.1-0.3%) □ Aesthetic complications (uneven fat extraction resulting in contour irregularities) □ Seroma (fluid build up) □ VTE (0.06%) – blood clots such as DVTs and PEs □ Pulmonary (lung) complications (0.1%) Other rare, but reported complications include: □ Fat embolism □ Necrotising fasciitis **References** Grazer FM, de Jong RH. Fatal outcomes from liposuction: Census survey of cosmetic surgeons. Plast Reconstr Surg.2000;105:436–446; discussion 447. Housman TS, Lawrence N, Mellen BG, et al. The safety of liposuction: Results of a national survey. Dermatol Surg.2002;28:971–978. Lehnhardt M, Homann HH, Daigeler A, Hauser J, Palka P, Steinau HU. Major and lethal complications of liposuction: A review of 72 cases in Germany between 1998 and 2002. Plast

		Reconstr Surg. 2008;121:396e–403e. Kanapathy, M et. Al. Safety of Large-volume Liposuction in Aesthetic Surgery: A Systematic Review and Meta-analysis. Submitted for publication to the Aesthetic Surgery Journal. 2020 Kaoutzanis C. et al. Cosmetic Liposuction: Preoperative Risk Factors, Major Complication Rates, and Safety of Combined Procedures Aesthetic Surgery Journal, Volume 37, Issue 6, 1 June 2017, Pages 680–694,21 Kenkel JM et al. Hemodynamic Physiology and Thermoregulation in Liposuction Plast Reconstr Surg, 114 (2), 503-13; discussion 514-5 Aug 2004 Hetter GP. The effect of low-dose epinephrine on the hematocrit drop following lipolysis Aesthetic Plastic Surgery volume 8, pages19–21(1984) Lipschitz AH, Kenkel JM, Luby M, Sorokin E, Rohrich RJ, Brown SA. Electrolyte and plasma enzyme analyses during large-volume liposuction. Plast Reconstr Surg. 2004;114:766– 775; discussion 776–777. Lohrmann C1, Foeldi E, Langer M. MR imaging of the lymphatic system in patients with lipedema and lipo-lymphedema.Microvasc Res. 2009 May;77(3):335-9. McKee DE, Lalonde DH, Thoma A, Glennie DL, Hayward JE. Optimal time delay between epinephrine injection and incision to minimize bleeding. Plast Reconstr Surg. 2013;131(4):811-814. "Liposuction for Advanced Lymphedema: A Multidisciplinary ...." 30 Jun. 2015, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4686553/. Damstra RJ, Voesten HG, Klinkert P, Brorson H. Circumferential suction-assisted l ipectomy for lymphoedema after surgery for breast cancer. Br J Surg. 2009;96(8):859–864. doi: 10.1002/bjs.6658.
15	Please list the key efficacy outcomes for this procedure/technology?	There are several key efficacy outcomes reducing the size of limb symmetry mobility Effectiveness of MLD and compression

		It does require lifelong compression but given patients are wearing compression most of the time they do not find this particularly difficult to comply with. Quality-of-life improvements are statistically significant and make a huge difference to these patients.
16	Please list any uncertainties or concerns about the efficacy and safety of this procedure/?	I have no concerns about the use of liposuction in lymphoedema bar the recognised complications.
17	Is there controversy, or important uncertainty, about any aspect of the procedure/technology?	No.
18	If it is safe and efficacious, in your opinion, will this procedure be carried out in (please choose one):	A minority of hospitals, but at least 10 in the UK.

Abstracts and ongoing studies

19	Please list any abstracts or conference proceedings that you are aware of that have been recently presented / published on this procedure/technology (this can include your own work). Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important.	None.
20	Are there any major trials or registries of this procedure/technology currently in progress? If so, please list.	Not sure.

Other considerations

21	Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?	50% of the target population.
22	Are there any issues with the usability or practical aspects of the procedure/technology?	No.
23	Are you aware of any issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS?	Funding. Lack of Surgeon experience/training. Inconsistent lymphoedema service.
24	Is there any research that you feel would be needed to address uncertainties in the evidence base?	
25	Please suggest potential audit criteria for this procedure/technology. If known, please describe: − Beneficial outcome measures. These should include short- and long-term clinical outcomes, quality-of-life measures and patient-related outcomes. Please suggest the most appropriate method of measurement for each and the timescales over which these should be measured. − Adverse outcome measures. These should include early and late	Beneficial outcome measures: The, measured selected should assess both the physical and psychological impact of the disease pre- and post-surgery. • The Lymphoedema Quality of Life Tool (LYMQOL-Leg) (Keeley et al. 2010) • Lower Extremity Functional Scale (LEFS) (Binkley et al.) • Hospital Anxiety and Depression Scale (HADS) (Bjelland et al.) • Derriford Appearance Scale (DAS) (Harris and Carr) Proposed measurement frequency and time points would be baseline (pre-operatively), and following all planned tumescent liposuction procedures to the legs at 6 months, 12 months, 24 months, 36 months and 60 months. Adverse outcome measures should be recorded throughout the duration of the study and at the

	complications. Please state the post procedure timescales over which these should be measured:	intervals suggested above. Adverse outcome measures: Death Infection Worsening lymphoedema DVT/PE Wound healing problems Fat embolus

Further comments

26	Please add any further comments on your particular experiences or knowledge of the procedure/technology,	I am co-author of the BAPRAS and BAAPS UK liposuction guidelines which cover aesthetic liposuction, liposuction in lipoedema. Lymphoedema is not named specifically in the title, but the lipoedema guidelines equally apply.

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Declarations of interests

Please state any potential conflicts of interest relevant to the procedure/technology (or competitor technologies) on which you are providing advice, or any involvements in disputes or complaints, in the previous **12 months** or likely to exist in the future. Please use the NICE policy on declaring and managing interests as a guide when declaring any interests. Further advice can be obtained from the NICE team.

Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Choose an item.			
Choose an item.			
Choose an item.			

☐ I confirm that the information provided above is complete and correct. I acknowledge that any changes in these declarations during the course of my work with NICE, must be notified to NICE as soon as practicable and no later than 28 days after the interest arises. I am aware that if I do not make full, accurate and timely declarations then my advice may be excluded from being considered by the NICE committee.

Please note, all declarations of interest will be made publicly available on the NICE website.

Print name:	**Anne Dancey**
Dated:	**23.8.21**

NICE National Institute for Health and Care Excellence

Professional Expert Questionnaire

Technology/Procedure name & indication: P409/3 Liposuction for chronic lymphoedema

Your information

Name:	Mr Alex Munnoch
Job title:	Consultant Plastic Surgeon
Organisation:	NHS Tayside, Ninewells Hospital, Dundee
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Professional organisation or society membership/affiliation:	Fellow Royal College of Surgeons of Edinburgh; Medical advisor for Lymphoedema Support Network; Patron MLD-UK
Nominated/ratified by (if applicable):	Click here to enter text.
Registration number (e.g. GMC, NMC, HCPC)	GMC 3303005

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Please note that questions 10 and 11 are applicable to the Medical Technologies Evaluation Programme (MTEP). We are requesting you to complete these sections as future guidance may also be produced under their work programme.

1	Please describe your level of experience with the procedure/technology, for example: Are you familiar with the procedure/technology?	I have been undertaking this procedure since 2005, having undergone appropriate training with Dr Brorson in Malmo, Sweden. In that time have treated 28 arms & 79 legs from across the UK & Eire I am aware of several other plastic surgeons around the UK who perform this, either on NHS or privately, Some were trained by Brorson, others have adapted general skills. I am aware that within the private sector there are non-plastic surgeons offering forms of liposuction for lymphoedema.
	Have you used it or are you currently using it? − Do you know how widely this procedure/technology is used in the NHS or what is the likely speed of uptake? − Is this procedure/technology performed/used by clinicians in specialities other than your own? − If your specialty is involved in patient selection or referral to another specialty for this procedure/technology, please	Patients are referred to me for consideration of surgery by GP, Hospital Consultant & Lymphoedema Practitioner. Not all health authorities approve funding – many deem liposuction to be cosmetic.

	indicate your experience with it.	
2	− Please indicate your research experience relating to this procedure (please choose one or more if relevant):	I have done bibliographic research on this procedure. I have done clinical research on this procedure involving patients or healthy volunteers. I have published this research. Other (please comment)
3	How innovative is this procedure/technology, compared to the current standard of care? Is it a minor variation or a novel approach/concept/design? Which of the following best describes the procedure (please choose one):	When first developed, liposuction & controlled compression were seen as a novel approach. Its role has expanded internationally, with many centres now offering it. Needs to be carried out in a multi-disciplinary environment, surgery alone will not maintain the outcome. Has replaced the previous commonly performed excisional procedures (Charles, Sistrunk, Thompson) Established practice and no longer new. A minor variation on an existing procedure, which is unlikely to alter the procedure's safety and efficacy. Definitely novel and of uncertain safety and efficacy. The first in a new class of procedure.
4	Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care?	Used as an additional standard – not all patients are suitable. Other surgical techniques (LVA & Node transfer) are also being carried out, but have never been reviewed by NICE

Current management

5	Please describe the current standard of care that is used in the NHS.	Manual Lymphatic Drainage & Compression controls oedema, but will not treat fat hypertrophy which is a recognised long-term sequelae
6	Are you aware of any other competing or alternative procedure/technology available to the NHS which have a similar function/mode of action to this? If so, how do these differ from the procedure/technology described in the briefing?	Only alternative to reduce hypertrophied fat is surgical excision (Charles, Sistrunk, etc) which have significant morbidity & poor long-term outcomes

Potential patient benefits and impact on the health system

7	What do you consider to be the potential benefits to patients from using this procedure/technology?	Reduction in limb bulk, improved mobility & function (unpublished work from University of Dundee gait lab supports this), improved quality of life (published evidence), reduction in incidence of cellulitis (published evidence)
8	Are there any groups of patients who would particularly benefit from using this procedure/technology?	Patients with chronic lymphoedema who are compliant with conservative therapies including compression, have no pitting oedema, excess limb volume >1000ml
9	Does this procedure/technology have the potential to change the current pathway or clinical outcomes to benefit the healthcare system? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?	Yes – reducing bulk in lower limb improves gait, reduces stresses across joints, reducing risk of arthritis. In patients with recurrent cellulitis published data shows>80% reduction in incidence, reducing hospital admissions
10 - MTEP	Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the procedure/technology likely to cost more or less than current standard care, or about the same? (in terms of staff, equipment, care setting etc)	Likely to result in reduced costs longterm across the population when reduction in cellulitis & improved QoL is considered
11 - MTEP	What do you consider to be the resource impact from adopting this procedure/technology (is it likely to cost more or less than standard care, or about same-in terms of staff, equipment, and care setting)?	
12	What clinical facilities (or changes to existing facilities) are needed to do this procedure/technology safely?	None
13	Is any specific training needed in order to	Surgical teams (surgeon & therapists) should be trained in assessment, surgery &

	use the procedure/technology with respect to efficacy or safety?	postoperative care, to ensure optimum outcomes

Safety and efficacy of the procedure/technology

14	What are the potential harms of the procedure/technology? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence: Adverse events reported in the literature (if possible, please cite literature) Anecdotal adverse events (known from experience) Theoretical adverse events	Bleeding, infection, necrosis, scarring, nerve injury, embolism Personally have had a few patients with minor skin necrosis on the leg, 2 patients with peroneal nerve compression due to tight postop garments (resolved over 6 months) Recurrent falls – patients over-compensating for their no-longer bulky limb
15	Please list the key efficacy outcomes for this procedure/technology?	Limb volume reduction, Improved QoL, Reduction in cellulitis
16	Please list any uncertainties or concerns about the efficacy and safety of this procedure/?	
17	Is there controversy, or important uncertainty, about any aspect of the procedure/technology?	
18	If it is safe and efficacious, in your opinion, will this procedure be carried out in (please choose one):	Fewer than 10 specialist centres in the UK.

Abstracts and ongoing studies

19	Please list any abstracts or conference proceedings that you are aware of that have been recently presented / published on this procedure/technology (this can include your own work). Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important.	H Brorson has published extensively. Dutch team (Damstra R) have also published, as have the Australian team (Boyages J). Own publications: 1. Quality of life improvements in patients with lymphedema after surgical or non-surgical interventions with 1-year follow-up. Klernäs P, Johnsson A, Boyages J, Brorson H, **Munnoch D,** Johansson K. Lymph Res Biol 2020; 18(4): 340-50. 2. Treatment of gynaecological cancer related lower limb lymphoedema with liposuction. McGee P, **Munnoch DA.** Gynecol Oncol 2018; 151(3): 460-5. 3. Liposuction treatment of lymphoedema. Schaverien MV, **Munnoch DA,** Brorson H. Seminars in Plastic Surgery 2018; 32: 42-7. 4. Test of responsiveness and sensitivity of the questionnaire "Lymphedema Quality of Life Inventory" (LyQLI). Klernäs P, Johnsson A, Boyages J, Brorson H, **Munnoch DA,** Johansson K. Lymph Res Biol 2018; 16(3): 300-308. 5. Liposuction for advanced lymphedema: a multidisciplinary approach for complete reduction of arm and leg swelling. Boyages J, Kastanias K, Koelmeyer LA, Winch CJ, Lam TC, Sherman KA, **Munnoch DA,** Brorson H, Ngo QD, Heydon-White A, Magnussen JS, Mackie H. Ann Surg Oncol 2015; 22: 1263-70. 6. 5 year experience of liposuction for chronic lymphoedema of the upper limb in Dundee, Scotland. Kandamany N, Munro K, **Munnoch DA.** Progress in Lymphology XXIII. Lymphology 2012; 45(Suppl): 275-277. Presentation 1. Patient Reported Outcome Measures after Liposuction for Upper and Lower Limb Lymphoedema. Kim VY, Couves A, **Munnoch A.** PRS Korea November 2020.
20	Are there any major trials or registries of this procedure/technology currently in progress? If so, please list.	No

Other considerations

21	Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?	Unknown, as true extent & severity of lymphoedema is unknown 110 operations in 16 years would not suggest a large number
22	Are there any issues with the usability or practical aspects of the procedure/technology?	Ensuring appropriate postoperative compression garments
23	Are you aware of any issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS?	Funding issues when liposuction is considered as cosmetic
24	Is there any research that you feel would be needed to address uncertainties in the evidence base?	
25	Please suggest potential audit criteria for this procedure/technology. If known, please describe: − Beneficial outcome measures. These should include short- and long-term clinical outcomes, quality-of-life measures and patient-related outcomes. Please suggest the most appropriate method of measurement for each and the timescales over which these should be measured. − Adverse outcome measures. These should include early and late	Beneficial outcome measures: Adverse outcome measures:

	complications. Please state the post procedure timescales over which these should be measured:	

Further comments

26	Please add any further comments on your particular experiences or knowledge of the procedure/technology,	

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Print name:	**Alex Munnoch**
Dated:	**1/9/21**

NICE National Institute for Health and Care Excellence

Professional Expert Questionnaire

Technology/Procedure name & indication: P409/3 Liposuction for chronic lymphoedema

Your information

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Email address:	vaughan.keeley@nhs.net
Professional organisation or society membership/affiliation:	Click here to enter text.
Nominated/ratified by (if applicable):	Click here to enter text.
Registration number (e.g. GMC, NMC, HCPC)	GMC 2386199

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Please note that questions 10 and 11 are applicable to the Medical Technologies Evaluation Programme (MTEP). We are requesting you to complete these sections as future guidance may also be produced under their work programme.

1	Please describe your level of experience with the procedure/technology, for example: Are you familiar with the procedure/technology? Have you used it or are you currently using it? − Do you know how widely this procedure/technology is used in the NHS or what is the likely speed of uptake? − Is this procedure/technology performed/used by clinicians in specialities other than your own? − If your specialty is involved in patient selection or referral to another specialty for this	I lead a Specialist Lymphoedema service based in Derby and providing clinics in Nottingham and Mansfield. About 7 years ago we established a service to provide liposuction for people with advanced lymphedema together with Plastic Surgeons based in Nottingham, following the NICE guidance originally published in 2008 and the 2017 update. All patients were assessed / selected by the lymphoedema service and if they met the appropriate criteria – i.e. advanced lymphedema where adipose tissue and fibrosis predominate which causes significant problems and which cannot be improved further by conventional compression treatment and where the patient is prepared to wear compression garments 24hr per day, 7days per week post-operatively indefinitely. Compression to be applied at the time of surgery was provided by our service and following an initial post-operative surgical assessment all further follow-up was carried out by our lymphedema team. In the first year this was more frequent as there is a need to review and provide appropriate compression garments to manage the postoperative swelling. An audit was carried out involving each patient with pre- and post-op. limb volume measurements, incidence of cellulitis, complications, compression garment use and LYMQOL quality of life scores (LYMQOL is a published, validated condition specific quality of life tool, developed by our service). The audit has not been published. 16 patients were treated with liposuction for advanced primary and secondary lymphoedema over an approximately 5 year period. In summary: all patients were pleased that they had had the procedure carried out; there was a significant sustained limb volume reduction following liposuction in all patients; some patients had pitting oedema despite layered hosiery and 24 hr per day wear, especially in the first year; quality of life improvement was experienced by most patients; one patient developed a post-operative foot drop. (More details can be provided if required).

	procedure/technology, please indicate your experience with it.	This was felt by patients and staff to be a valuable innovation with good results. Initially it was funded by a local arrangement but in recent years we have not carried out any further procedures as the funding stream was changed to Individual Funding Requests to each CCG and none of our applications was funded. This was on the basis on "lack of exceptionality" rather than lack of effectiveness. The same issues have been experienced by other providers around the country. The procedure seems to fall between IFR and Specialised commissioning and didn't fit either. I am aware of only one area (in the North East) where a local arrangement has been developed. There is, therefore, a postcode problem of availability. We have recognised this problem at a national forum for lymphoedema (the National Lymphoedema Partnership) and agreed that there is a need for a consistent funding arrangement to be developed.
2	– Please indicate your research experience relating to this procedure (please choose one or more if relevant):	I have done bibliographic research on this procedure. I have done research on this procedure in laboratory settings (e.g. device-related research). I have done clinical research on this procedure involving patients or healthy volunteers. I have published this research. ***I have had no involvement in research on this procedure***. ***X*** Other (please comment)- ***We have carried out an audit of our results.***
3	How innovative is this procedure/technology, compared to the current standard of care? Is	It is a valuable addition to conventional treatment in carefully selected patients. As metioned above the problem is funding it.

	it a minor variation or a novel approach/concept/design? Which of the following best describes the procedure (please choose one):	***Established practice and no longer new***. A minor variation on an existing procedure, which is unlikely to alter the procedure's safety and efficacy. Definitely novel and of uncertain safety and efficacy. The first in a new class of procedure.
4	Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care?	Additional as described above. It is not intended to replace the use of compression treatments which are still required long term.

Current management

5	Please describe the current standard of care that is used in the NHS.	The current care is mainly focussed on compression treatments, which as described above are not particularly effective in the advanced lymphedema which could be improved with liposuction.
6	Are you aware of any other competing or alternative procedure/technology available to the NHS which have a similar function/mode of action to this?	None for this specific indication.

	If so, how do these differ from the procedure/technology described in the briefing?	

Potential patient benefits and impact on the health system

7	What do you consider to be the potential benefits to patients from using this procedure/technology?	Reduced size of limb resulting in reduced pain, improved function and reduced incidence of cellulitis (see evidence from NICE guidance 2017).
8	Are there any groups of patients who would particularly benefit from using this procedure/technology?	Yes. Those with advanced lymphoedema of upper or lower limb.
9	Does this procedure/technology have the potential to change the current pathway or clinical outcomes to benefit the healthcare system? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?	Improved outcomes as described in 7 and reduced incidence of cellulitis, which can result in hospital admission.
10 - MTEP	Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the procedure/technology likely to cost more or less than current standard care, or about the same? (in terms of staff, equipment, care setting etc)	The procedure itself represents a cost. Patients with advanced lymphoedema often have to wear compression garments day and night anyway, so the only additional cost of garments is in the post operative 6-12 months when more frequent changes are required to manage the post-operative oedema.
11 - MTEP	What do you consider to be the resource impact from adopting this procedure/technology (is it likely to cost more or less than standard care, or about same-in terms of staff, equipment, and care setting)?	See 10
12	What clinical facilities (or changes to existing facilities) are needed to do this procedure/technology safely?	Surgical facilities for liposuction – already exist. Local lymphoedema service with appropriate expertise working together with surgical team Ideally a number of specialist centres around the UK, as this is not a commonly required procedure.

13	Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?	The methods developed by Brorson and colleagues covering the pre-op, operative and post-op assessment and care are well established and evaluated. Dr Brorson's centre in Sweden is happy to support the training and development of new centres - not just in the surgical technique but in the provision of pre and post-op care. The liposuction technique aims to minimise further damage to remaining functional lymphatics. It is essential that surgical centres and lymphoedema services are integrated to provide a successful service.

Safety and efficacy of the procedure/technology

14	What are the potential harms of the procedure/technology? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence: Adverse events reported in the literature (if possible, please cite literature) Anecdotal adverse events (known from experience) Theoretical adverse events	As mentioned above, we had one patient who developed a foot drop post-operatively. Generally, if patients do not wear compression post-operatively, oedema recurs.
15	Please list the key efficacy outcomes for this procedure/technology?	Reduced limb volume; improved limb function; reduced pain / heaviness / discomfort; improved quality of life; reduced incidence of cellulitis
16	Please list any uncertainties or concerns about the efficacy and safety of this procedure/?	None if carried out correctly in appropriate patients
17	Is there controversy, or important uncertainty, about any aspect of the procedure/technology?	No

18	If it is safe and efficacious, in your opinion, will this procedure be carried out in (please choose one):	Most or all district general hospitals. A minority of hospitals, but at least 10 in the UK. ***Fewer than 10 specialist centres in the UK.*** Cannot predict at present.

Abstracts and ongoing studies

19	Please list any abstracts or conference proceedings that you are aware of that have been recently presented / published on this procedure/technology (this can include your own work). Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important.	Reports of longer term follow-up by Brorson's group e.g. International Society of Lymphology conference, Buenos Aires, 2019, confirm long term benefits persist over 20years (if compression garments are worn indefinitely).
20	Are there any major trials or registries of this procedure/technology currently in progress? If so, please list.	Not to my knowledge.

Other considerations

21	Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an	In our centre maybe 2-4 per year. We see about 1450 new patients with lymphoedema per year. As we are a specialist centre, patients come from out of our immediate area for consideration of this procedure.

	estimated number, or a proportion of the target population)?	
22	Are there any issues with the usability or practical aspects of the procedure/technology?	As mentioned above, this requires a combined approach between plastic surgical service and lymphoedema service for safe and effective outcomes. Patient selection and appropriate follow-up especially in the first 6-12 months are particularly important.
23	Are you aware of any issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS?	Funding is the biggest barrier, as described above in section1.
24	Is there any research that you feel would be needed to address uncertainties in the evidence base?	No.
25	Please suggest potential audit criteria for this procedure/technology. If known, please describe: − Beneficial outcome measures. These should include short- and long-term clinical outcomes, quality-of-life measures and patient-related outcomes. Please suggest the most appropriate method of measurement for each and the timescales over which these should be measured. − Adverse outcome measures. These should include early and late complications. Please state the post procedure timescales over which these should be measured:	Beneficial outcome measures: Limb volume reduction – by tape measure of circumferences or Perometer Quality of life – LYMQOL – includes pain, function, appearance, mood, overall QoL. Cellulitis incidence – cellulitis is particularly common in advanced lymphoedema and liposuction reduces its incidence. – measured as episodes per year Measurements pre-operatively and 6 monthly post-operatively We can share the protocol for our audit if you wish. Adverse outcome measures: ***Early***: Fat embolism Wound infections Skin trauma

		Haematomas Neurological e.g.foot drop ***Late:*** Recurrence of lymphoedema (by volume measurements and clinical assessment as above)

Further comments

26	Please add any further comments on your particular experiences or knowledge of the procedure/technology,	As mentioned previously, robust funding / commissioning arrangements are required.

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Declarations of interests

Please state any potential conflicts of interest relevant to the procedure/technology (or competitor technologies) on which you are providing advice, or any involvements in disputes or complaints, in the previous **12 months** or likely to exist in the future. Please use the NICE policy on declaring and managing interests as a guide when declaring any interests. Further advice can be obtained from the NICE team.

Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Choose an item.	Nil		
Choose an item.			
Choose an item.			

X☐ I confirm that the information provided above is complete and correct. I acknowledge that any changes in these declarations during the course of my work with NICE, must be notified to NICE as soon as practicable and no later than 28 days after the interest arises. I am aware that if I do not make full, accurate and timely declarations then my advice may be excluded from being considered by the NICE committee.

Please note, all declarations of interest will be made publicly available on the NICE website.

Print name:	**Vaughan Keeley**
Dated:	**31.8.2021**