



Comparisons of Variable Treatments for Extremity Lymphedema

		Compression Garments	Liposuction	Side-to-End Lymphovenous Anastomosis	Vascularized Lymph Nodes Transfer
Indications	Cheng's Lymphedema Grading System with Lymphoscintigraphy	<ul style="list-style-type: none"> Grade 1- 4 	<ul style="list-style-type: none"> Grade 1- 4 Without pitting edema 	<ul style="list-style-type: none"> Grade 1- 2 Patent lymphatic vessels on indocyanine green lymphography 	<ul style="list-style-type: none"> Grade 2- 4 Partial obstruction with no patent lymphatic vessels or total obstruction on Lymphoscintigraphy
	Indocyanine Green Lymphography (ICG)	<ul style="list-style-type: none"> Not required 	<ul style="list-style-type: none"> Not required 	<ul style="list-style-type: none"> Linear pattern, patent lymphatic vessels on indocyanine green lymphography 	<ul style="list-style-type: none"> Dermal backflow patterns
Time	Garments Wearing	<ul style="list-style-type: none"> 24/7 	<ul style="list-style-type: none"> 24/7 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
	Procedures / Postoperative Care	<ul style="list-style-type: none"> Complex decongestive therapy (CDT) typically lasts 2 to 12 weeks One hour per section, 2 to 3 sessions per week Continue to wear compression garments during the day Self-manual lymphatic drainage about 20 minutes per day 	<ul style="list-style-type: none"> Continue to wear bandage and compression garments for 4 weeks Self-manual lymphatic drainage 2- 4 hours each time May need blood transfusion for larger amount liposuction Ecchymosis of the limb for 1- 2 weeks 	<ul style="list-style-type: none"> 2- 4 hours for surgery 7 post-operation recovery days to return to regular activity 	<ul style="list-style-type: none"> 4- 6 hours for vascularized submental lymph node transfer Hospitalization for 7 days for upper limb and 14 days for lower limb 7 recovery days after hospitalization to resume regular activity

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Outcomes	Clinical and Objective Results	<p>At a 26-month follow-up</p> <ul style="list-style-type: none"> • The circumference increased by 2%.¹ • Episodes of cellulitis increased from 2.1/year to 2.9/year¹ <p>At an 8.5-months follow up</p> <ul style="list-style-type: none"> • The circumferential reduction rate reached 10%.² • Episodes of cellulitis decreased from 2.3/year to 1.2/year² 	<ul style="list-style-type: none"> • Up to 100% reduction rate in non-pitting edema cases 	<p>At a 10-month follow-up</p> <ul style="list-style-type: none"> • The circumferential reduction rate reached 17.3%.² • Episodes of cellulitis decreased from 4.4/year to 1.4/year² 	<p>At a 58-month follow-up</p> <ul style="list-style-type: none"> • The circumferential reduction rate reached 34%.² • Episodes of cellulitis decreased from 7.4/year to 2.6/year²
	Quality of Life (Lymphedema Quality of Life (LYMQoL) or Lymphedema Quality of Life Inventory (LyQLI)	<ul style="list-style-type: none"> • Higher quality of life (QOL) for the patients treated with complete decongestive therapy (CDT) than the ones without CDT⁴ 	<ul style="list-style-type: none"> • Significant higher QOL in physical, psychosocial, and practical domains⁵ 	<p>After a 8.5-month follow-up</p> <ul style="list-style-type: none"> • Significant improvements in function, appearance, symptom, mood, and overall quality of life domains⁶ 	<p>After a 12-month follow-up</p> <ul style="list-style-type: none"> • Significant improvements in function, appearance, symptom, mood, and overall quality of life domains³

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Pros	<ul style="list-style-type: none"> • Non-surgical • Less costly (first year) 	<ul style="list-style-type: none"> • Less costly (first year) • Immediate volume decreases 	<ul style="list-style-type: none"> • No more compression garments - lifelong • Lighter and softer extremity • Decreased episodes of cellulitis • Moderate decreases in circumference and volume of lesion limb 	<ul style="list-style-type: none"> • No more compression garments – lifelong • Lighter and softer extremity • Decreased episodes of cellulitis • Significant decreases in circumference and volume of lesion limb
Cons	<ul style="list-style-type: none"> • Life-long cost • Side effect of contact dermatitis • Higher risk of cellulitis • Limited physical activities • Cosmesis and physical discomfort 	<ul style="list-style-type: none"> • Life-long cost • Side effect of contact dermatitis • Higher risk of cellulitis • Limited physical activities • Cosmesis and physical discomfort 	<ul style="list-style-type: none"> • Limited application • LVA is only indicated in the lesioned limb with linear patent lymphatic vessels on indocyanine lymphography 	<ul style="list-style-type: none"> • Temporary unsighted scar on the distal recipient sites (wrist or ankle) • One or a few follow-up revision surgeries (1 hour) for cosmetic improvement

- 1.Cheng MH, et. al., Validity in the Application of the Novel Lymphoscintigraphy Staging for Unilateral Extremity Lymphedema. *Annals of Surgery*. 2018;268: 513.
- 2.Engel H, Cheng MH, et al., Outcome of Lymphedema Microsurgery for Breast Cancer Related Lymphedema with or without Microvascular Breast Reconstruction. *Annals of Surgery*. 2018; 268:1076.
- 3.Patel KM, Cheng MH, et al., A Prospective Evaluation of Lymphedema-Specific Quality-of-Life Outcomes Following Vascularized Lymph Node Transfer. *Ann Surg Oncol*. 2015, 22: 2424.
- 4.Luchi T, et al., Associations between the treatments and outcomes of patients with upper and lower lymphedema in Japan: a cross-sectional observational study. *Int J Nurs Stud*. 2015; 52: 913.
- 5.Klernäs P, et al., Test of Responsiveness and Sensitivity of the Questionnaire "Lymphedema Quality of LifeInventory". *Lymphat Res Biol*. 2018, 16:300.
- 6.Marzia Salgarello, et al., A Prospective Evaluation of Health-Related Quality of Life following Lymphaticovenular Anastomosis for Upper and Lower Extremities Lymphedema. *J Reconstr Microsurg*. 2018; 34:701.

Side-to-end fashion is the preferred technique by Dr. Cheng for lymphovenous anastomosis for Cheng's Lymphedema Grade 1- early Grade 2 patients. Other end-to-end anastomosis technique is not compared in this table.