

# The role of surgery in the treatment of lymphoedema

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## Aims

- Quality of Life
- Surgical management of lymphoedema
- QoL before & after liposuction

## Quality of Life

- Subjective & multidimensional, encompassing positive & negative features of life
- The general well-being of a person or society, defined in terms of health & happiness

## Quality of life with lymphoedema

- Multiple authors have demonstrated adverse impact of lymphoedema on QoL
- Huggenberger (2015) suggested QoL for primary legs was normal
- Various treatments have demonstrated improvement in patient's QoL

## QoL Questionnaires

- General health questionnaires
  - Short Form 36
  - Disabilities of Arm Shoulder Hand
  - Hospital Anxiety Depression Score
  - Measure Yourself Medical Outcome Profile
  - Positive & Negative Affect Schedule
- Cancer Specific
  - EORTC QLQ C-30
  - EORTC QLQ Br-23
  - FACT-B

Cornelissen et al 2018 Lymph Res Biol

## Lymphoedema Specific QoL

- LYMQOL - Keeley
- LyQLI - Klernas
- Lymph-ICF – Devoogdt
- LSIDS-A – Ridner
- ULL-27 – Launois
- PBI-L – Blome
  
- Lymph-ICF & LyQLI most complete & accurate to assess QoL

Cornelissen et al 2018 Lymph Res Biol

# Lymph-ICF-LL

- Lymphoedema Functioning, Disability & Health Questionnaire
- 5 domains, analogue score, 29 questions
  - Physical function, mental function, general activities, mobility, social
- Score 0-290

# LyQLI

Qual Life Res (2012) 34:477–489  
DOI 10.1007/s11136-012-0134-4

**Lymphoedema Quality of Life Inventory (LyQLI)-Development and investigation of validity and reliability**

Ph Klerlein · Aida Johnson · Vibeke Hartmann · Linda J. Kristjansson · Karla Johansson

- Validated
- 41 items
- 3 domains
  - Physical
  - Psychosocial
  - Practical
- Score 0-3 each item
- 0-123

Physical concerns due to lymphoedema	How much do these concerns affect your quality of life?
1 Pain/aches due to my lymphoedema	None A Little bit Somewhat A lot
2 Discomfort due to my lymphoedema	None A Little bit Somewhat A lot
3 A feeling of heaviness due to my lymphoedema	None A Little bit Somewhat A lot
4 Pins and needles/numbness due to my lymphoedema	None A Little bit Somewhat A lot
5 Burning sensation/heat due to my lymphoedema	None A Little bit Somewhat A lot
6 Swelling/tightness due to my lymphoedema	None A Little bit Somewhat A lot
7 Skin problems due to my lymphoedema	None A Little bit Somewhat A lot
8 Difficulty sleeping due to my lymphoedema	None A Little bit Somewhat A lot
9 Movement difficulties due to my lymphoedema	None A Little bit Somewhat A lot
10 Feeling physically aware of my lymphoedema all the time	None A Little bit Somewhat A lot
11 Feeling a loss of strength in the swollen part of my body	None A Little bit Somewhat A lot
12 Infection (e.g. cellulitis, erysipelas)	None A Little bit Somewhat A lot

Psychosocial concerns due to lymphoedema	How much do these concerns affect your quality of life?
13 Feelings of frustration/feeling annoyed	None A Little bit Somewhat A lot
14 Feeling anxious about whether or not the lymphoedema will get worse	None A Little bit Somewhat A lot
15 Embarrassed by lymphoedema/compression garments	None A Little bit Somewhat A lot
16 Negative changes in how I see myself	None A Little bit Somewhat A lot
17 Feeling discouraged	None A Little bit Somewhat A lot
18 Not being able to do the things I used to enjoy	None A Little bit Somewhat A lot
19 Concerns about when to seek medical attention	None A Little bit Somewhat A lot
20 Finding constant attention to my condition affects my existing relationships	None A Little bit Somewhat A lot
21 Concerns about how my lymphoedema could affect new relationships	None A Little bit Somewhat A lot
22 Negative changes in my feelings about doing sports and hobbies	None A Little bit Somewhat A lot
23 Feeling uncomfortable/embarrassed when attending social activities with friends and family	None A Little bit Somewhat A lot
24 Feeling uncomfortable/embarrassed when attending social activities with friends and family	None A Little bit Somewhat A lot
25 Feeling uncomfortable/embarrassed when attending social activities with friends and family	None A Little bit Somewhat A lot
26 Having to ask for help in different situations	None A Little bit Somewhat A lot
27 Concerns about negative changes in my appearance	None A Little bit Somewhat A lot
28 Having to answer questions about my lymphoedema	None A Little bit Somewhat A lot

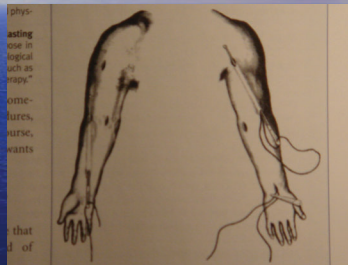
Practical concerns due to lymphoedema	How much do these concerns affect your quality of life?
29 Personal activities of daily living (e.g. dressing, combing hair, foot care)	None A Little bit Somewhat A lot
30 Normal daily activities (e.g. doing housework, sports and hobby activities)	None A Little bit Somewhat A lot
31 Employment activities	None A Little bit Somewhat A lot
32 Learning to do things differently	None A Little bit Somewhat A lot
33 Having less energy to do activities (e.g. personal, normal daily or employment)	None A Little bit Somewhat A lot
34 Financial costs of managing my lymphoedema (e.g. clothes, shoes, treatments, garments)	None A Little bit Somewhat A lot
35 Finding well-functioning compression garments (e.g. stockings, sleeves, gloves)	None A Little bit Somewhat A lot
36 Travelling long distances by car, train, plane etc.	None A Little bit Somewhat A lot
37 Finding clothes and shoes that are comfortable and attractive, the right size and type of material	None A Little bit Somewhat A lot
38 Limitations in hot weather/sun	None A Little bit Somewhat A lot
39 The comfort of care I need to do to stop my lymphoedema from getting worse	None A Little bit Somewhat A lot
40 Obtaining information about how to manage my lymphoedema	None A Little bit Somewhat A lot
41 Being prepared for emergencies (e.g. always having a script for antibiotics)	None A Little bit Somewhat A lot

# Management of Lymphoedema

- Non-surgical
  - Education
  - Prevention
  - Lymphatic drainage
  - Compression
  - Laser
  - Exercise
  - diet
- Surgical
  - Debulking
    - Resection procedures
    - Liposuction
  - Restorative
    - Lymphaticovenous
    - Lymphatic graft
    - Lymph node

# Surgical History

- 1908 – Handley – silk threads
- 1912 – Charles – excision & skin graft
- 1918 – Sistrunk – Kondoleon's excision
- 1935 – Dick – omental transfer
- 1935 – Gillies & Fraser – pedicled flap transfer
- 1936 – Homans – multiple stage excision with local flaps
- 1954 – Gibson & Tough – excision & FTSG
- 1958 – Martorell – strips of fascia lata
- 1962 – Thompson – buried dermal flaps
- 1966 – Olszewski & Nielubowicz – lymphonodovenous anastomosis
- 1970s – O'Brien et al - lymphaticovenous anastomosis
- 1989 – O'Brien – liposuction
- 2006 – Becker – node transplant
- 2015 – Olszewski – silicone tubes



# Surgical debulking

- Charles procedure
  - Excision of all tissue to deep fascia
  - Cover with split skin grafts
  - Poor cosmetic result on limb
  - Useful for genital lymphoedema





- Surgical treatment of lymphedema of the penis and scrotum. Modolin *et al*/Clinics 2006; 61: 289-294.
- Used modified Charles procedure in 17 patients
- Improvement in physical appearance, ambulation, hygiene, micturition & sexual function



6 months

## Surgical debulking

- Reconstruction of massive localized lymphedema of the scrotum: Results, complications & QoL improvements
  - Wisenbaugh E, et al. Urology 2016
  - QoL scores improved across all domains
  - Own 13 point questionnaire



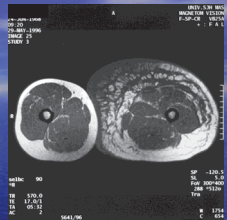
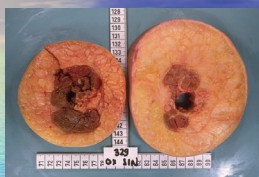
## Homan's procedure



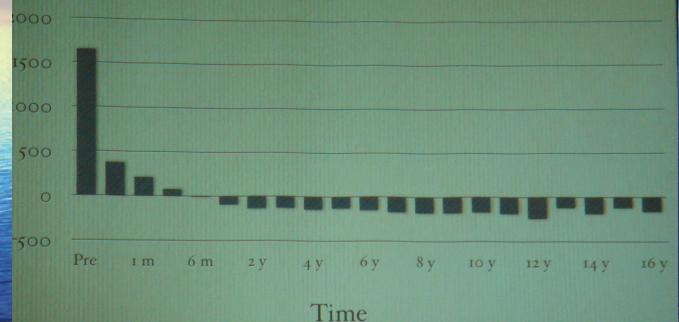
## Liposuction - Brorson

- Complete reduction of lymphoedema of the arm by liposuction after breast cancer. Scand J Plast Reconstr Surg hand Surg 1997; 31: 137-143.
- Liposuction combined with controlled compression therapy reduces arm lymphoedema more effectively than controlled compression alone. Plast Reconstr Surg 1998; 102: 1058-1068.
- Liposuction gives complete reduction of chronic large arm lymphoedema after breast cancer. Acta Oncol 2000; 39: 407-420.
- Quality of life following liposuction and conservative treatment of arm lymphoedema. Lymphology 2006; 39: 8-25.

## Fat not lymph



## Excess volume reduction (ml)





# Results



Preop. 2 100 ml



9 years postop.

# Liposuction

- SF-36 shows increased quality of life following complete reduction of postmastectomy lymphoedema with liposuction
  - Hoffner M, et al. Lymphatic Research & Biology 2017
  - Improvement in physical, pain, vitality, social functioning, emotional & mental health

# Lymphaticovenous anastomosis



- Olszewski 1966
- O'Brien 1977
- End-end or end-side
- Single point on limb or multiple
- Large vessels proximally or multiple small vessels
- Mixed results reported

# Campisi *et al*

- Microsurgery 2006; 26: 65-69
  - >1000 patients over 25 years
  - 843 followed 5-15yrs
  - 75% reduction in 73%, 50% reduction in 24%
  - 85% have discontinued conservative therapy
- Microsurgery 2007; 27: 333-338
  - >1500 patients over 30 years
  - Better results in early stages
  - >75% excess reduction in 83% pts >10years
  - 87% reduction in cellulitis

Pre-op

Post-op

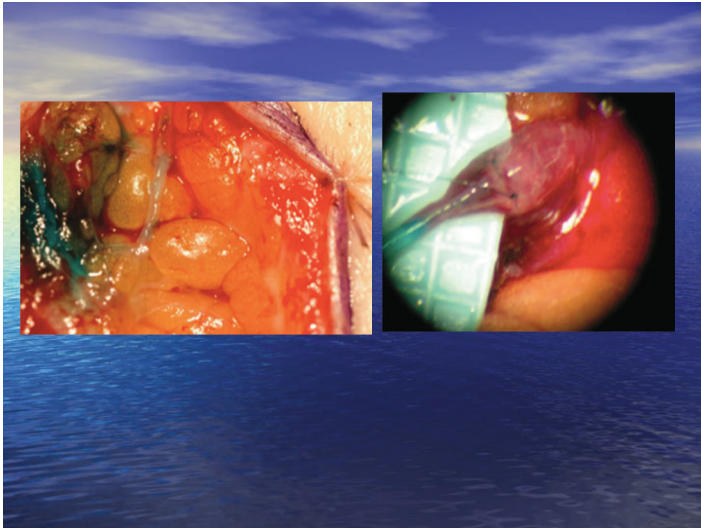
Follow up 24 months  
10/49 patients with lymphoedema  
8% in LYMPHA group  
33% in control group

Patient who underwent axillary lymphodal dissection and primary surgical procedure of secondary lymphedema by LYMPHA technique

# Supermicrosurgery - Koshima

- J Reconstr Microsurg 2000; 16: 437-442
  - Supermicrosurgical lymphaticovenous anastomoses & compression for arm lymphoedema in 12 patients
  - 47% reduction after 2 years
- J Reconstr Microsurg 2003; 19: 209-215
  - 55% reduction in 13 legs after 3 years
- Ann Plast Surg 2004; 53: 261-266
  - Effective in 82.5% of 52 patients?
  - 17patients >4cm reduction in calf

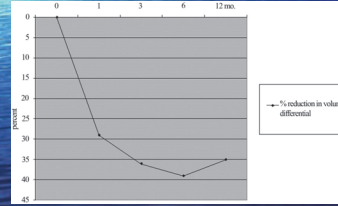




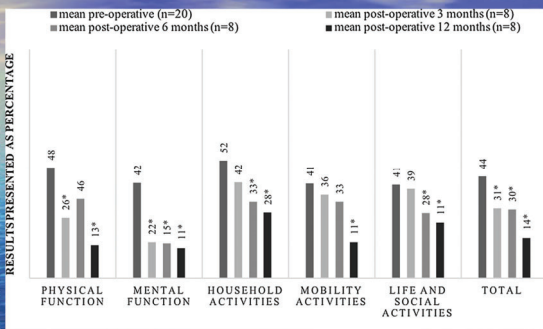
Lymphaticovenular bypass for lymphedema management in breast cancer patients: a prospective study. Chang PRS 2010; 126: 752



- 20 patients, minimum 12 month f/u
- 34% volume excess (5-69)
- 19 symptomatic improvement
- 13 quantitative improvement



## LVA & QoL



- Cornelissen AJM *et al.* Br Can Res Treat 2017
- No volume change, 85% discontinued garments

## Microsurgical lymph node transplantation

- Becker, Annals of Surgery 2006; 243: 313-315
- Transfer of vascularised lymph nodes from groin to axilla, vascular microanastomoses, NO lymphatic anastomosis
- 10 patients "cured", 12 improved (6>50%), 2 unchanged – minimum 5 year follow up
- Physiotherapy discontinued in 15 patients
- Lymphoscintigraphy demonstrated effectiveness in 31%

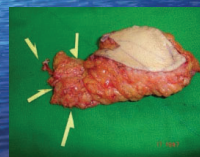
## Vascularised lymph node transfer (VLNT)

- Multiple surgeons
- Multiple donor sites – groin, axilla, cervical, submental, omentum, mesenteric, gastro-epiploic
- Vascular repair +/- LVA
- Skin paddle?
- Proximal or distal
- Outcomes variable

## Lin et al PRS 2009



13 patients  
Reduction 50% +/-19  
Single measurement  
upper arm



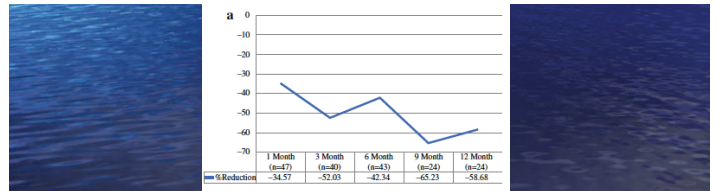
## Lymph node transfer

- A prospective evaluation of lymphedema-specific QoL outcomes following vascularized lymph node transfer
  - Patel KM, et al. Annals of Surgical Oncology 2015
  - Distal insertion
  - Arm volume reduced 25%, leg 35%
  - Reduction in cellulitis
  - LYMQOL – improvements in all domains

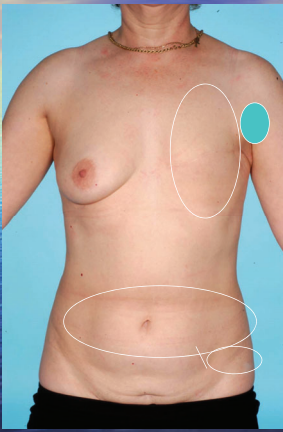
## Clinical and Psychosocial Outcomes of Vascularized Lymph Node Transfer for the Treatment of Upper Extremity Lymphedema After Breast Cancer Therapy

Andrew Gratton, MD<sup>1</sup>, Jerette Schultz, BS<sup>2</sup>, Kristine Secrest, OTR/L, CLT-LANA<sup>1</sup>, Kenneth Lee, MD, FACS<sup>1</sup>, Jeffrey Feiner, MD<sup>1</sup>, and Richard D. Klein, MD, MPH, FACS<sup>1,3</sup>

	Avg preop	Avg 12-mo postop	Month where significance first noted	p value
Function (1–4)	2.41	1.5	3 months	<0.01
Appearance (1–4)	2.99	1.95	3 months	<0.01
Symptoms (1–4)	2.69	1.6	1 month	<0.01
Mood (1–4)	2.23	1.4	3 months	<0.01
Overall QoL (1–10)	5.72	7.79	3 months	<0.01
Pain (1–10)	3.97	0.38	1 month	<0.01
Heaviness (1–10)	5.52	1.67	1 month	<0.01



## Breast & lymph reconstruction



	Before	After	Wilcoxon Test p-Value
Appearance	3.0 (2.2 – 3.3)	1.3 (1.2 – 1.8)	0.004*
Function	1.7 (1.6 – 2.4)	1.4 (1.1 – 1.5)	0.009*
Symptoms	2.8 (2.2 – 3.3)	1.7 (1.2 – 1.8)	0.004*
Mood	2.3 (1.7 – 3.2)	1.3 (1.0 – 2.0)	0.004*
QOL	5.0 (4.0 – 6.0)	8.5 (7.0 – 9.3)	0.008*

Data Displayed as: "Median (Quartiles)"  
\*Significant at p<0.05

- Dancy A *et al.* J Plast Reconstr Surg 2013
- 11/18 patients responded
- LYMQOL
- Pain & heaviness improved
- No data on lymphoedema volumes

## Liposuction in Dundee

- Following Brorson's technique
- Wrap garments postoperatively, then into compression stocking from 2 weeks
- Limb circumferences every 4cm, conal volumes calculated



## Criteria for Treatment

- No active cancer
- No wounds or infection
- Limb swelling minimum 1000 ml
- Compliant use of compression garments
- No further effect of conservative therapy
- No pitting

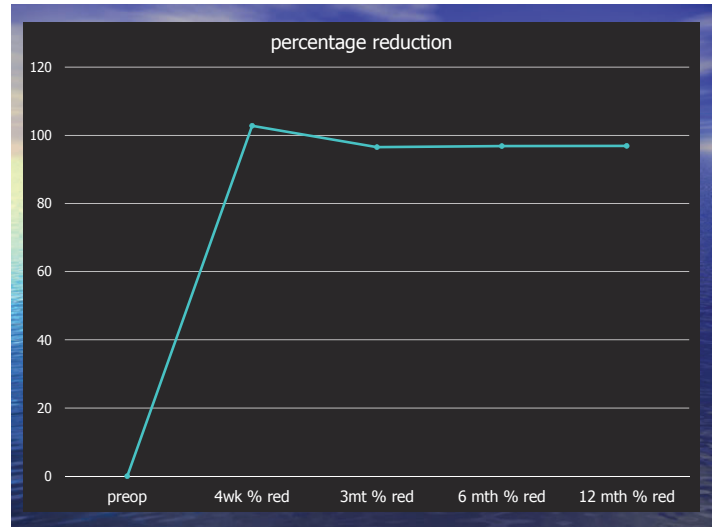
## Methods

- All patients undergoing liposuction for lymphoedema since October 2013
- LyQLI, ICF-LL & HADS questionnaires
  - Preop, 1, 3, 6, 12 months post



## Demographics

- 39 patients (3M; 36F)
- Age 43 (21-67)
- 24 primary, 17 secondary
- Length of time 19yrs (5-38)
- Excess volume 4110mls (229-15166)
- 97% reduction 1 year (50-170)



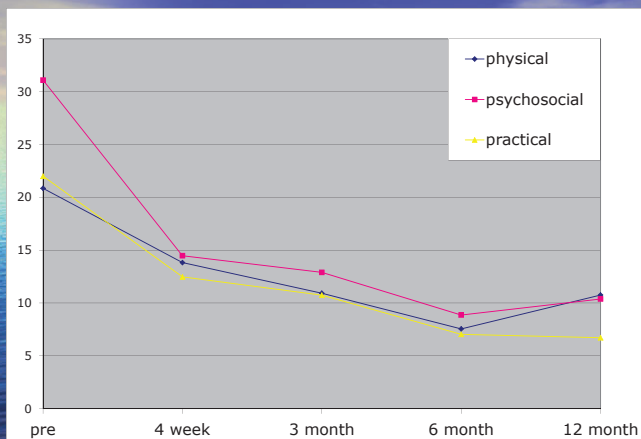
## Results - Preop

	Physical (36)	Psychosocial (48)	Practical (39)	Total (123)
Mean	20.85	31.1	22	73.95
Range	7-33	9-48	8-37	33-115
%	57.9	64.8	56.4	60.1

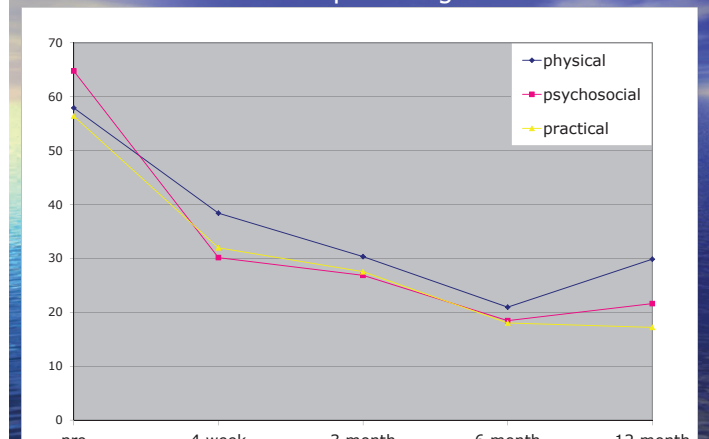
## Postop

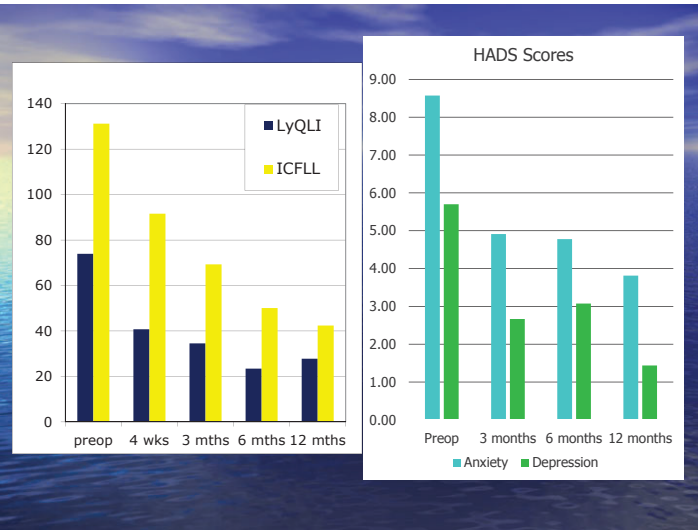
	Physical (36)	Psychosocial (48)	Practical (39)	Total (123)
Preop	20.85	31.1	22	73.95 (n=41)
4 weeks	13.82	14.47	12.47	40.75 (n=34)
3 months	10.92	12.9	10.74	34.55 (n=38)
6 months	7.54	8.86	7.03	23.43 (n=35)
12 months	10.75	10.375	6.71	27.80 (n=24)

## Domain scores



## Domains as percentage





## Summary

- Results are comparable between 4 international centres – Sweden, Scotland, The Netherlands, Australia
- Requires dedicated team and enthusiastic patients
- Liposuction is an effective treatment for the secondary fat accumulation in lymphoedema

## Surgical techniques

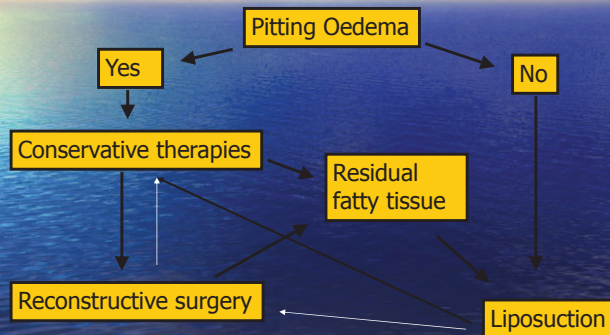
- Reduce cellulitis
- Improve quality of life
- Variable reduction in excess volume (0-160%)
- May reduce need for compression garments

## Conclusion

- Lymphoedema adversely affects QoL
- QoL issues often multifactorial
- All surgical techniques appear to further improve QoL



## Treatment algorithm



## Thank you

