Co-funded by the European Union

SCALPEL project

LNT in Lymphedema surgery – Vascular Anatomy and Preoperative Diagnostic

06/30/2023,
Rome

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UCSC

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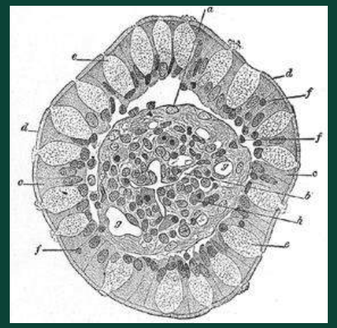
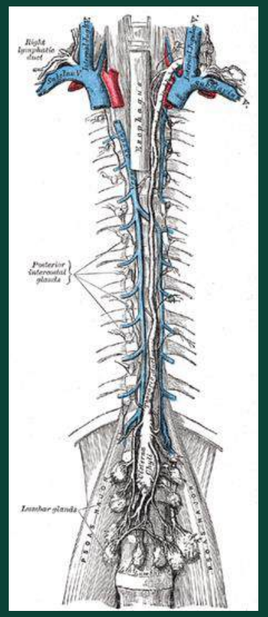
Lymphatic system in the history

Lymphaticus (/lymˈpʰaː.ti.kus/, [lʲʏmˈpʰäːtɪ̪kʊs̪]) : "connected to water"

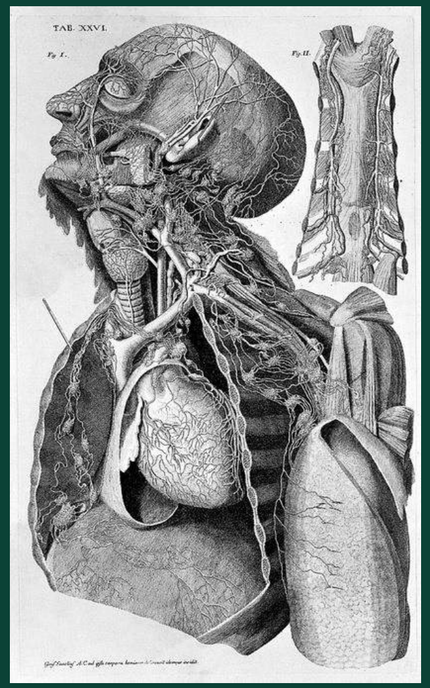
- Hippocrates, 5 century BC, mention lymphnodes
- Herophilos, 3 century BC, first mention of lymphatic vessels as "absorptive veins of the lymphatics" (lacteals)





- Rufus of Ephesus, 1 century BC, identified the axillary, inguinal and mesenteric lymph nodes
- Bartolomeo Eustachi, 1563, described the thoracic duct (vena alba thoracis)
- Jean Pecquet, 1651, connection between lacteals and thoracic duct

- Thomas Bartholin, 1654, the one to have named them "lymphatic vessels", described the Human Lymphatic System



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Lymphatic system Anatomy

Components:

- Lymph
- Lymphatic cells
- Lymphatic vessels and plexuses
- Lymph nodes
- Lymphoid organs

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Lymphedema

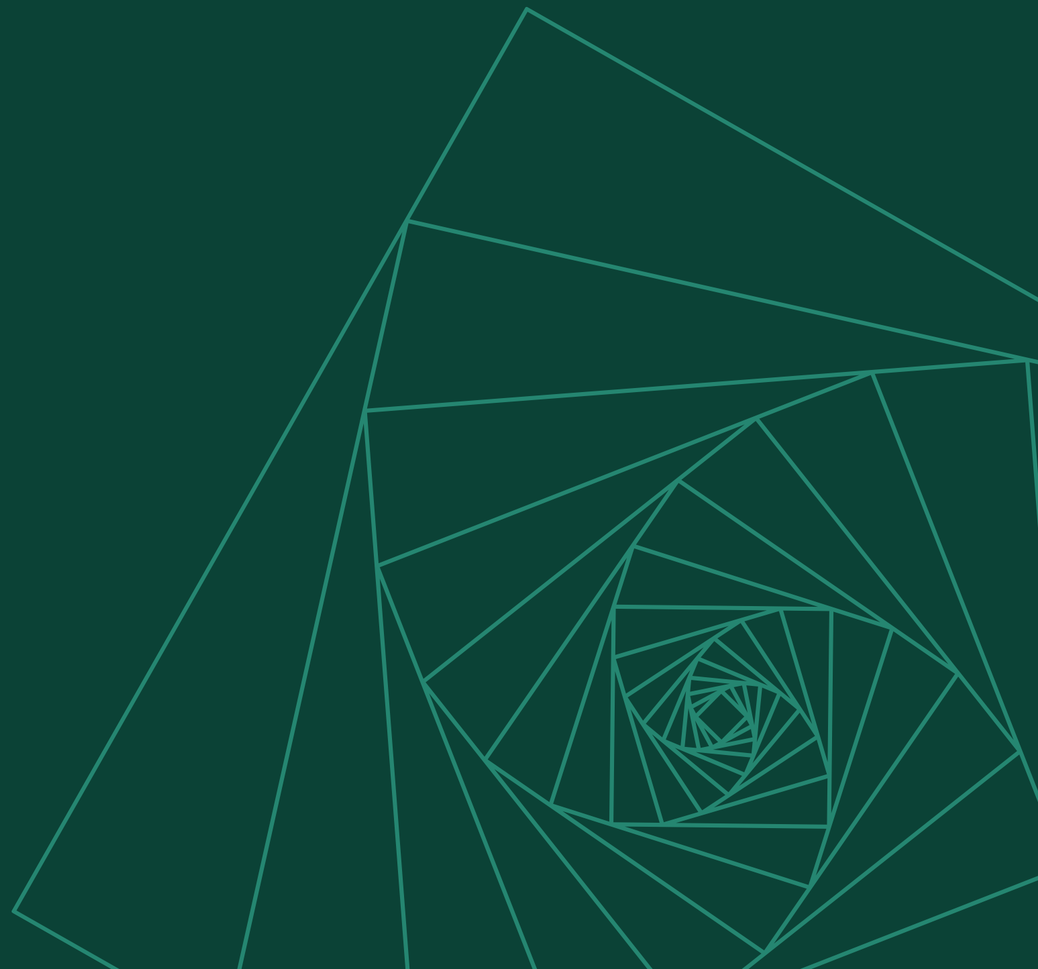
"Condition of localized swelling caused by a compromised lymphatic system."

- Primary: abnormal development of the lymphatic system
- Secondary acquired damage to the lymphatic system

> 250 million people worldwide

Chronic complications:

- Fibrosis
- Fat hypertrophy
- Destruction of lymphatic vessels



Lymphedema Treatment

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Goals

- Weight reduction of the affected region
- Reduced frequency of infections
- Prevention of disease progression
- Improvement in limb function and cosmesis
- **Overall improvement in patient's quality of life**

Lymphedema Treatment

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Decongestive lymphatic therapy

- Compression garments
- Physiotherapy

Surgical Procedures

Physiologic treatments

- Flap interposition
- Lymphatic-lymphatic bypass
- VLNT (Vascularized LymphNode Transfer)
- LVA (LymphoVenous Anastomosis)

Excisional treatments

- Direct excision
- Liposuction

Lymphedema Treatment

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VLNT
When and Why?

- In established lymphedema the lymphatic vessels become sclerosed
- Scars from traumatic soft-tissues injury

- Lymphangiogenesis with new lymphatic collateral pathways connecting with adjacent lymph nodes to restore outflow (Bridging)
- Neo-lymphangiogenesis establishing new lymphatico-venous drainage within the transplanted lymph nodes, mechanism driven by perfusion gradients between arterial inflow and venous outflow (Pumping)

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VLNT: Vascularized limphNode Transfer

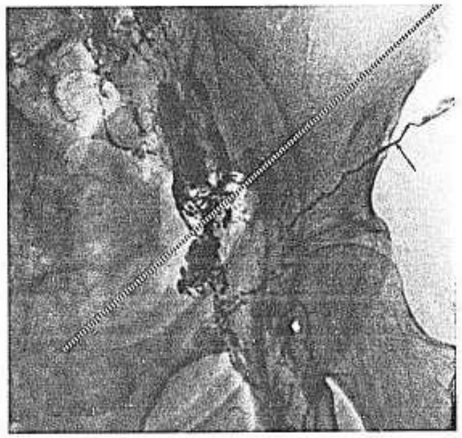

Fig 2. Axial lymphatic in a left-sided groin flap, demonstrated by suprailiac lymphography, filling phase. Cross-hatching indicates inguinal ligament.

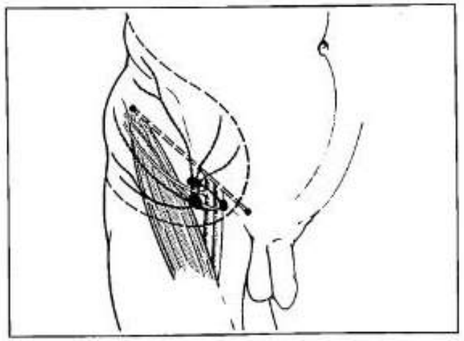

Fig 4. The blood and lymphatic vessel system (along with three lymph nodes) of a right-sided groin flap. The inguinal ligament is again shown by cross-hatching.

Suprailiac Limphography, Bruna J. 1972

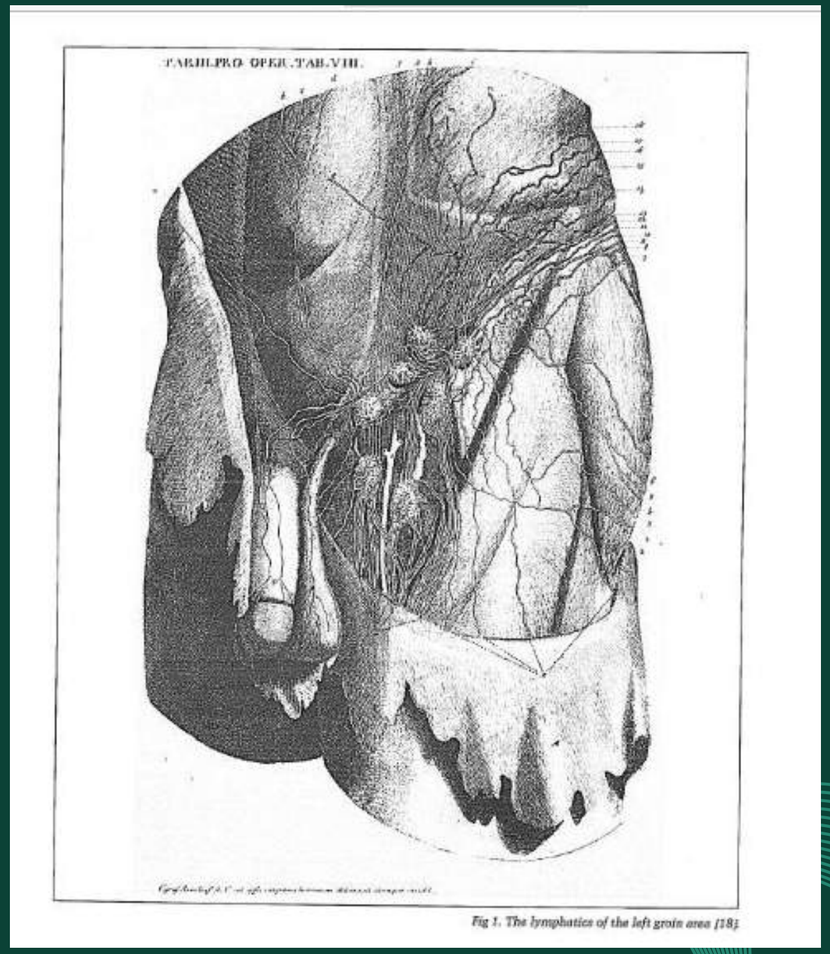

Fig 1. The lymphatics of the left groin area [18].

Clodius L. et al. 1982

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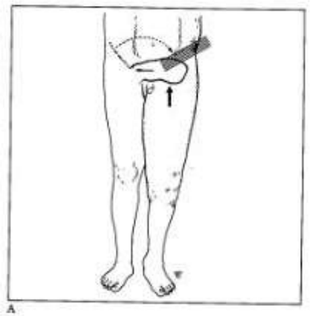
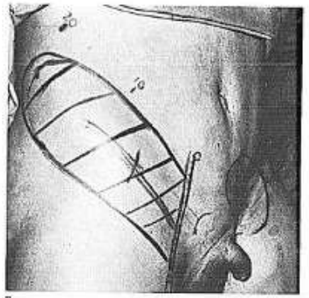
VLNT: Vascularized limphNode Transfer

Fig 5. Patient with secondary lymphedema of the left leg and lower abdominal wall following removal of a seminoma with inguinal metastasis and extensive postoperative irradiation. The patient also has psoriasis.



A

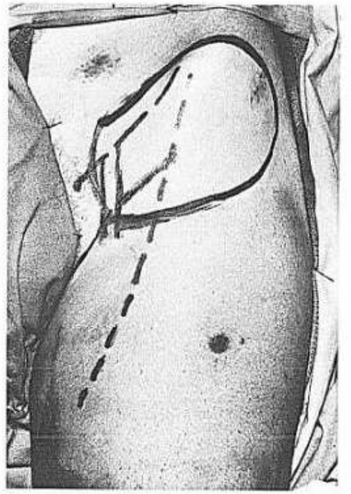


B

Fig 6. Transfer of a right-sided groin flap across the midline to the left inguinal area. (A) Parallel lines in the left groin represent the lymph block. Arrows indicate lymph flow following spontaneous lympholymphatic anastomoses between the flap lymphatics and those of the thigh. (B) Right groin flap is outlined; on the left, scarred area to be resected is visible. (C) The flap is elevated. (D) Suturing of the left inguinal defect.

Pedicled

A



B

Fig 10. (A) Medial aspect of the right popliteal region. The skin area to be resected and the recipient vessels for the free vascular systems of the free groin flap are outlined. (B) The lymph-bearing groin flap to be used for covering the defect. The medial aspect of the flap is placed superiorly in the defect (as seen in Figure 11). At three sites—anterior midthigh, lateral end of flap, and medial lower abdomen—patent blue is injected to visualize the lymph collectors of the groin flap.

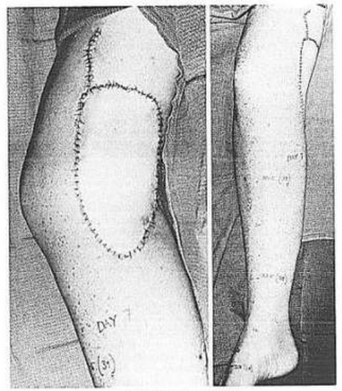


Fig 11. One week postoperatively. There is complete absence of the swelling of the flap and the differences in circumference of the lower leg and ankle have decreased. The leg had gone down to within 1 cm of the circumference of the normal leg on the left.

Microsurgical

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Submental

Supraclavicular

Lateral Toracic

VLNT

Omental

Groin

Jejunal Mesenteric

COMPREHENSIVE REVIEW OF VASCULARIZED LYMPH NODE TRANSFERS FOR LYMPHEDEMA: OUTCOMES AND COMPLICATIONS

MARIO F. SCAGLIONI, M.D.,[1,3] MICHAEL ARVANITAKIS, M.D.,[3] YEN-CHOU CHEN, M.D.,[1] PIETRO GIOVANOLI, M.D.,[3] JOHNSON CHIA-SHEN YANG, M.D.,[1] and EDWARD I. CHANG, M.D.,[2*]

Donor Lymph Nodes

The inguinal nodes were used in the vast majority of studies with 72% of all cases followed by the lateral thoracic lymph nodes in 14.8%. Supraclavicular, omental, and submental nodes were taken in 6.5, 3.7 and 3%, respectively. There were 129 free inguinal node flaps, 67 abdominal based free flaps including inguinal lymph nodes, 40 lateral thoracic lymph node flaps (33 free flaps, six pedicle flaps, and one pedicle latissimus dorsi myocu-

Microsurgery DOI 10.1002/micr

Table 3. Overall Complications Rates Based on Donor Site

	Total number	Total complication rate	Donor site complication	Donor site lymphedema	Lymphocele or seroma	Donor site pain	Testicular hydrocele
Inguinal	185 (71.2%)	21 (13.5%)	17 (10.9%)	3 (1.6%)	14 (7.6%)	3 (1.6%)	1 (0.5%)
Lateral thoracic	38 (14.6%)	7 (18.4%)	6 (15.8%)	5 (13.2%)	1 (2.6%)	1 (2.6%)	0
Supraclavicular	24 (9.2%)	1 (4.2%)	1 (1.2%)	0	1	0	0
Submental	7 (2.7%)	0	0	0	0	0	0
Omentum	6 (2.3%)	0	0	0	0	0	0

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Key steps

- Identification of the nodes that are safe to harvest
- Identification of the blood supply of these nodes
- Preservation of nodes that drain important structures or that could cause iatrogenic lymphoedema
- Dissectionand preservation or division and repair of nerves
- Inclusion for addition soft tissues as needed

Diagnostic and Planning

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Lymphoscintigraphy
(pre-op)

Using Tc-99 to confirm the diagnoses of lymphedema and provides a baseline assesment of the recipient lymphatic function of donor site. Gamma-probe (intra-op) to show draining nodes.

Angio-TC
(pre-op)

Used for the study of blood vessels

ICG Lymphoangiography
(pre-op / intra-op)

Demonstrate abnormal lymphatic flow or used in Reverse Lymph Node Mapping, we can see the lymphatic function in real time

Doppler Ultrasounds
(pre-op)

Identification of pedicles and vessels,
Identification of nodes

Magnetic resonance angiography (MRA)

(pre-op)

Using Gadofosveset Trisodium (not allowed in Italy).
Information on vascular anatomy, quantity and location of lymphonodes

Pocket doppler
(intra-op)

Blu Patent
(intra-op)

Diagnostic and Planning

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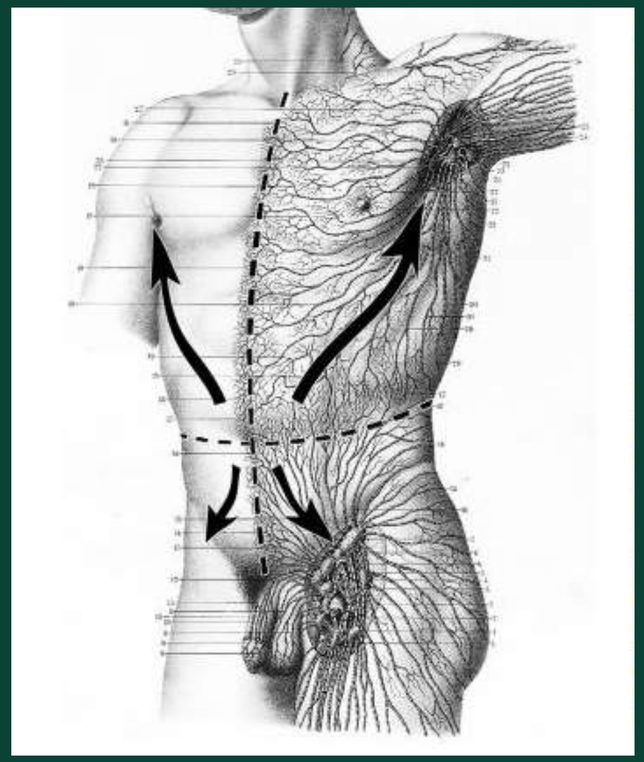
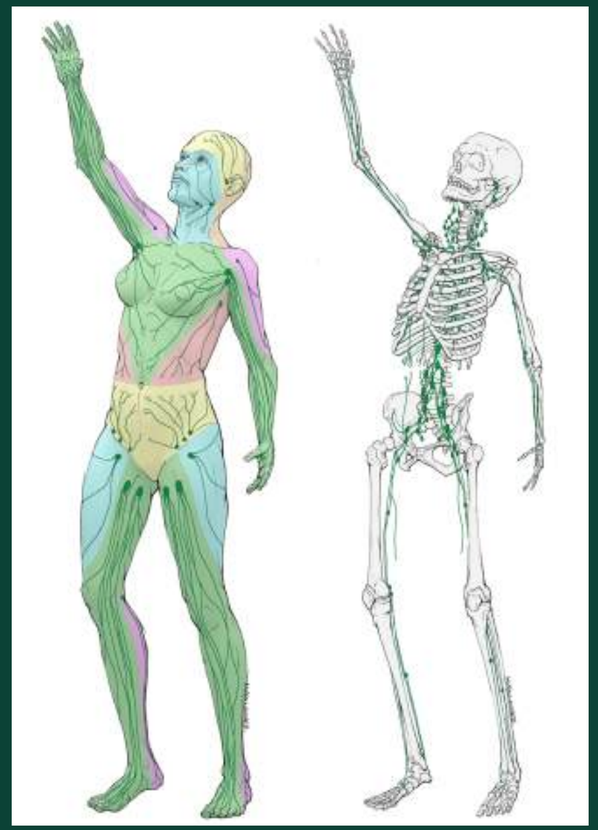
Lymphosome Concept: Anatomical Study of the Lymphatic System

HIROO SUAMI, MD, PhD*
Faculty of Medicine and Health Sciences, Macquarie University, Sydney, New South Wales, Australia





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Groin Flap

Groin Flap *Anatomy*

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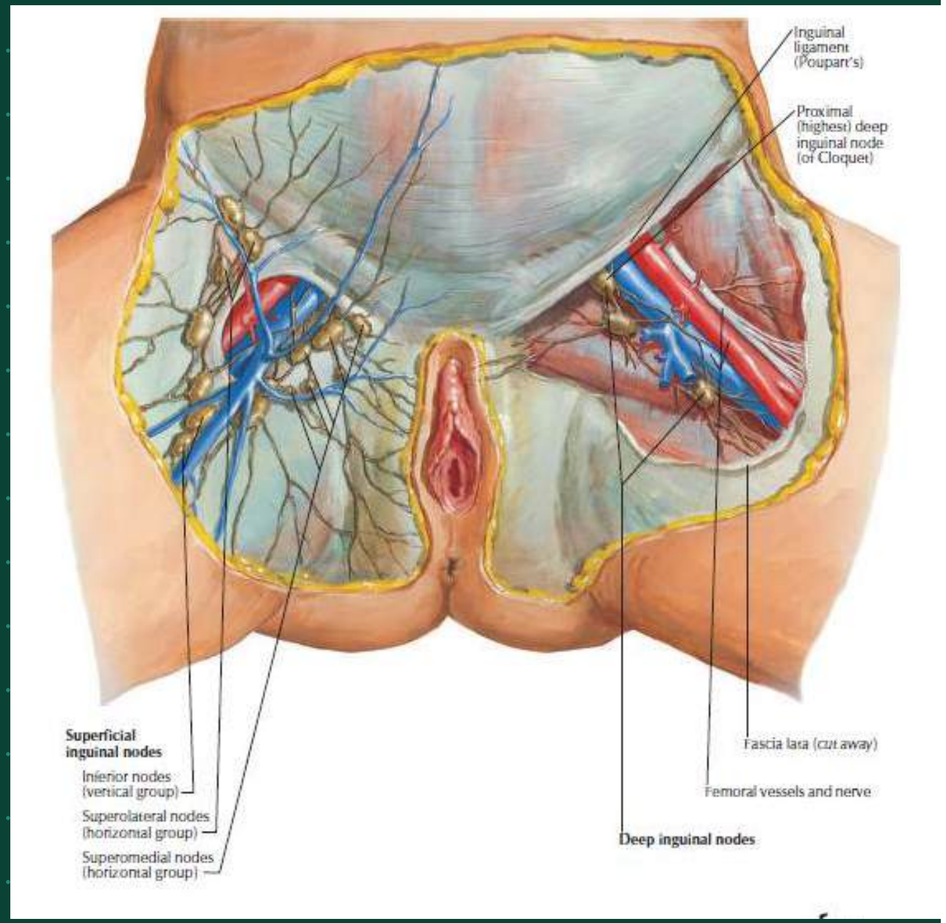

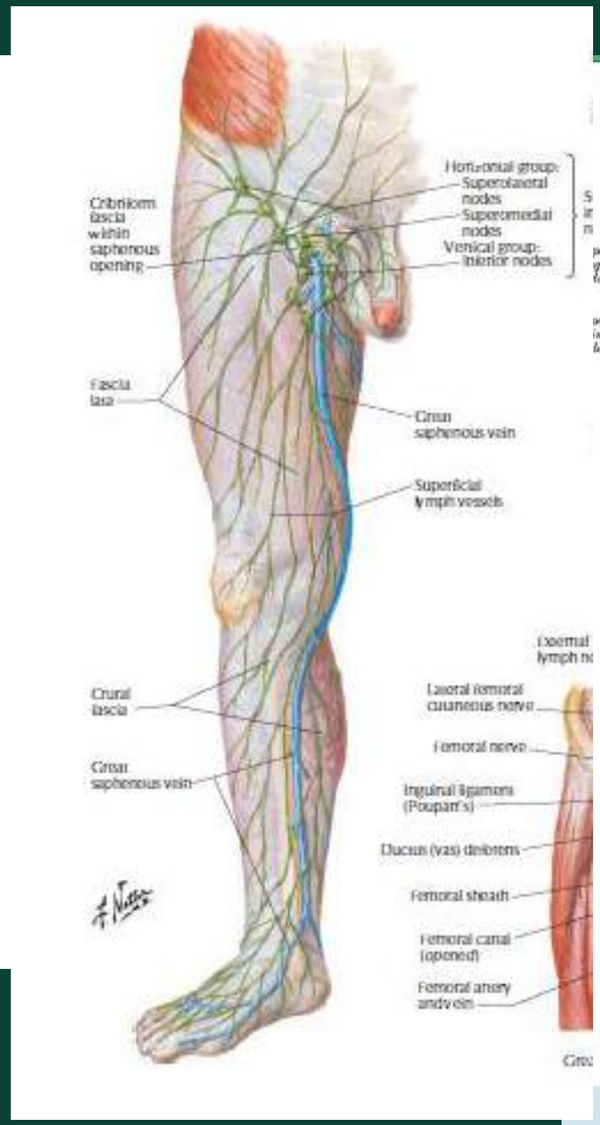

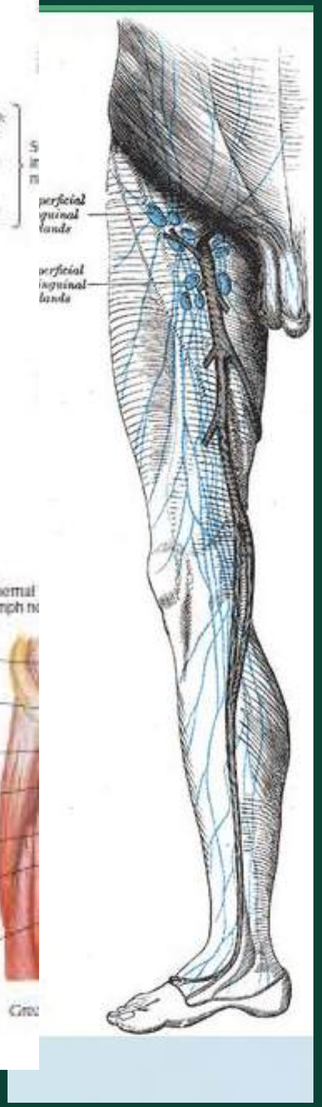

Groin Flap *Anatomy*

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Lymphatic anatomy of the inguinal region in aid of vascularized lymph node flap harvesting☆

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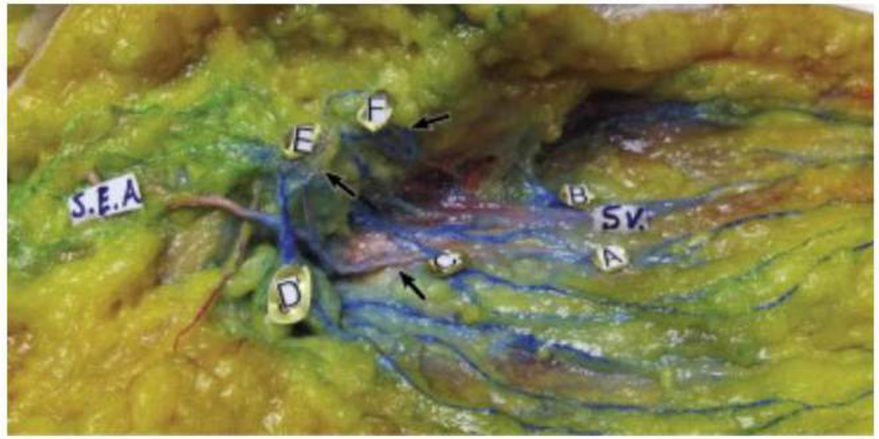
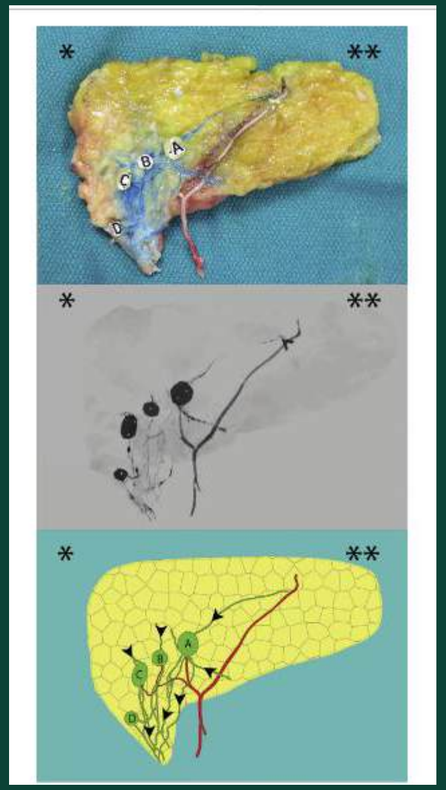
Received 27 June 2014; accepted 31 October 2014



- The two most distal lymph nodes (A and B) were considered to be the dominant lymph nodes draining the lower leg, and they were consistently located on both sides of the great saphenous vein



- Lymphatic vessels in the medial thigh (blue) and in the abdomen (green); lymph nodes (A to F); the superficial inferior epigastric artery (SEA); and the great saphenous vein (SV)

- The circumflex artery near the upper groin lymph node chain

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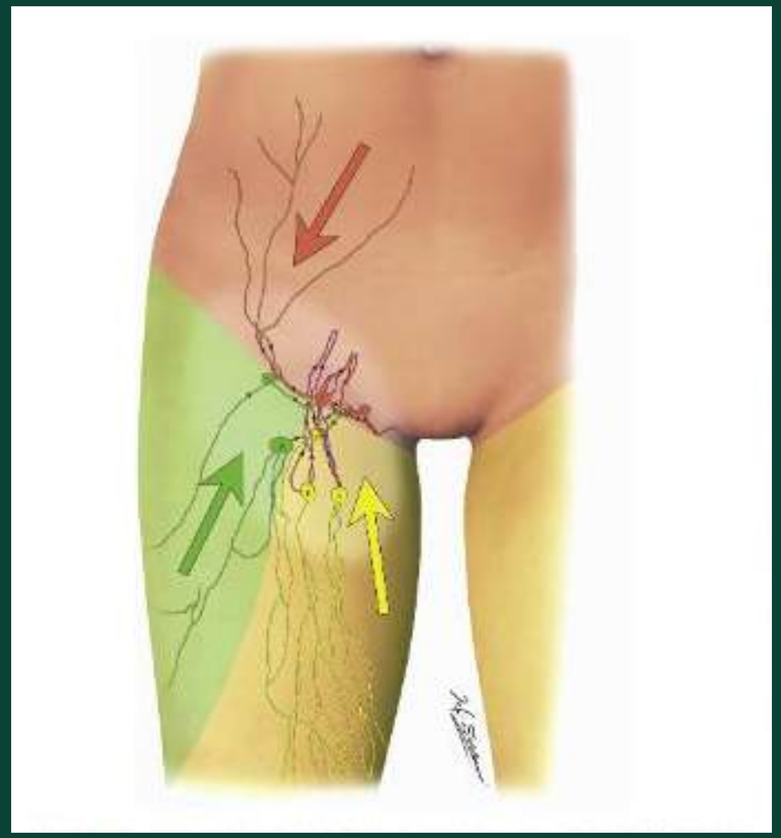
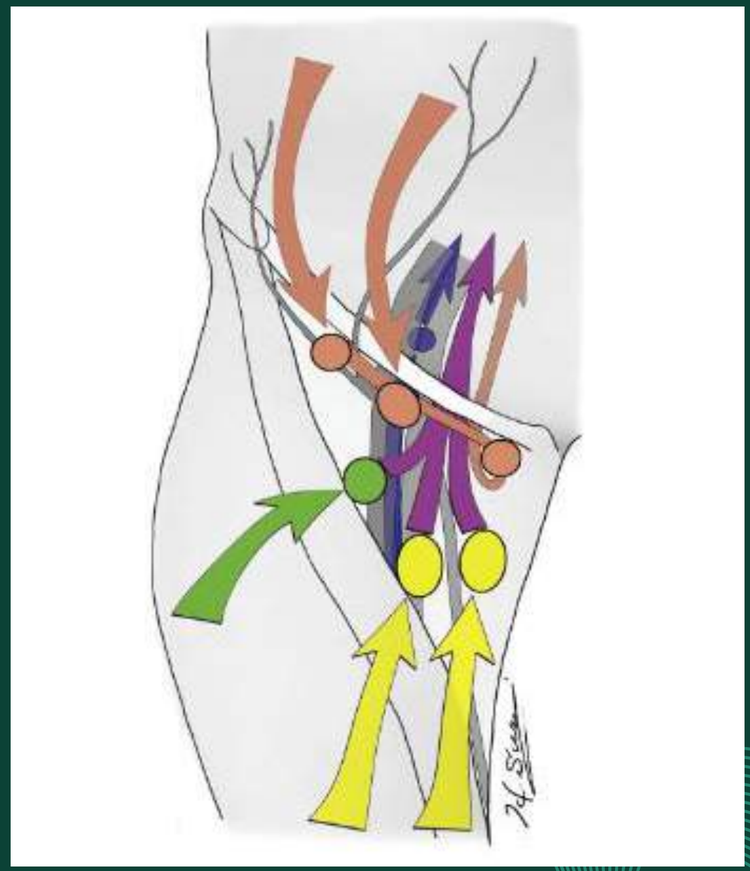


Lymphosomes in the inguinal region: the abdominal (orange), lateral thigh (green), and medial thigh (yellow)



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Journal of *Personalized Medicine*

MDPI

Article

Lymphatic Tissue Transfer: Ultrasound-Guided Description and Preoperative Planning of Vascularised Lymph Nodes, Lymphatic Units, and Lymphatic Vessels Transfers †

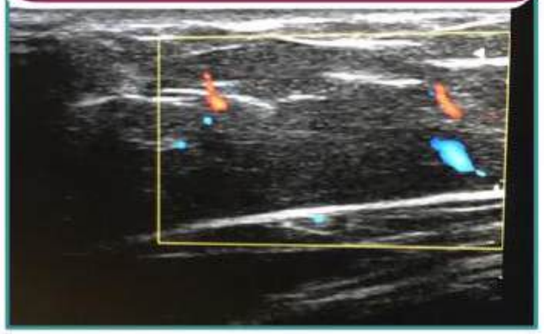
Giuseppe Visconti [1,*], Alessandro Bianchi [1], Marzia Salgarello [1], Alba Di Leone [2], Akitatsu Hayashi [3], Riccardo Masetti [2] and Gianluca Franceschini [2]

Pre-Op Diagnostic

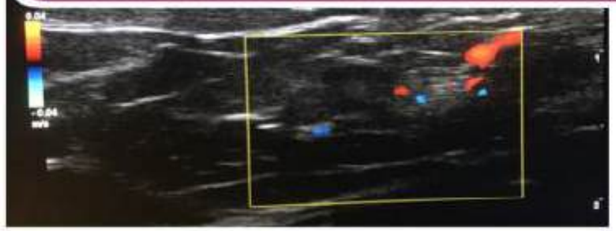
1- SCIA and SCIV identification at the origin

2- Follow SCIA to indentify the superficial and deep branch

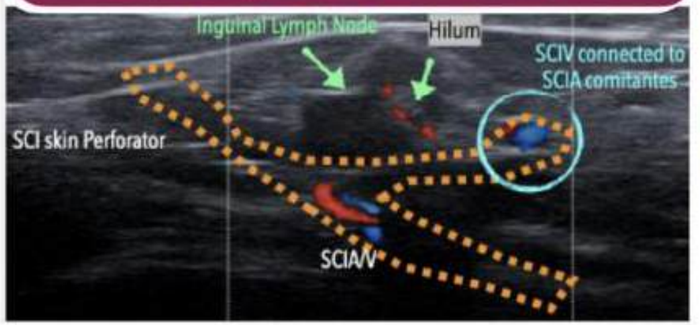
3- Locate reliable cutaneous perforators if the skin wants to be included (LYST)



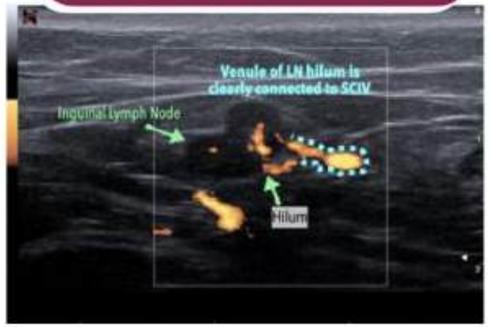
4- Locate lymph node along the vessel course



5-Evaluate microvascular Lymph Node anatomy with CDS



6-and with Power Doppler Mode



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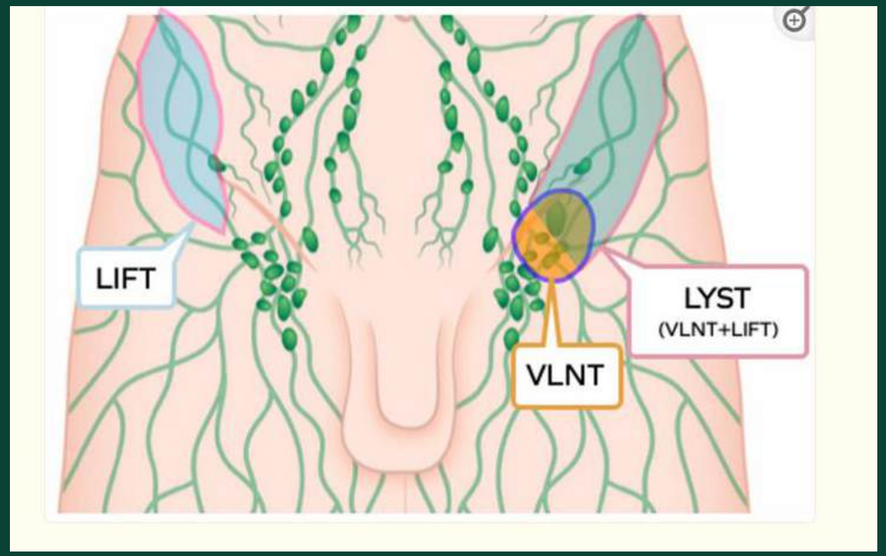
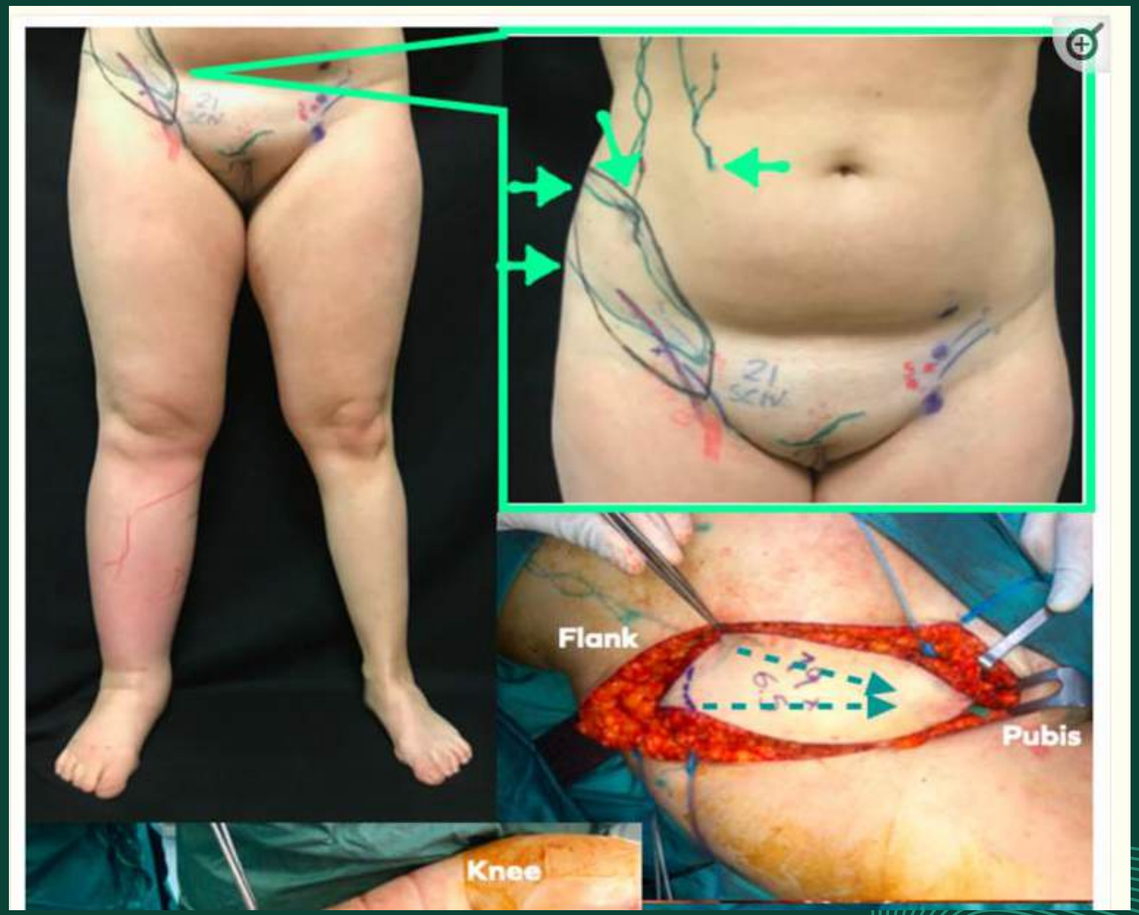


Graphic illustration of the three subtypes of lymphatic tissue transfer: LIFT, lymphatic interposition flap transfer; VLNT, vascularised lymph node transfer; LYST, lymphatic system transfer.

- The preoperative ICG-L was employed to map the lymph collecting vessels draining the lower hemiabdomen and the flank up to the inguinal nodes.
- The HF-US, using the 18-MHz probe, was used to evaluate the superficial circumflex iliac artery (SCIA) and superficial vein (SCIV)
- The UHF-US allowed clarification of the characteristics of the lymph nodes and their afferent lymphatics identified by ICG-L



- LYST flaps are usually used used as free flaps for upper extremity lymphedema, both in the proximal and distal region

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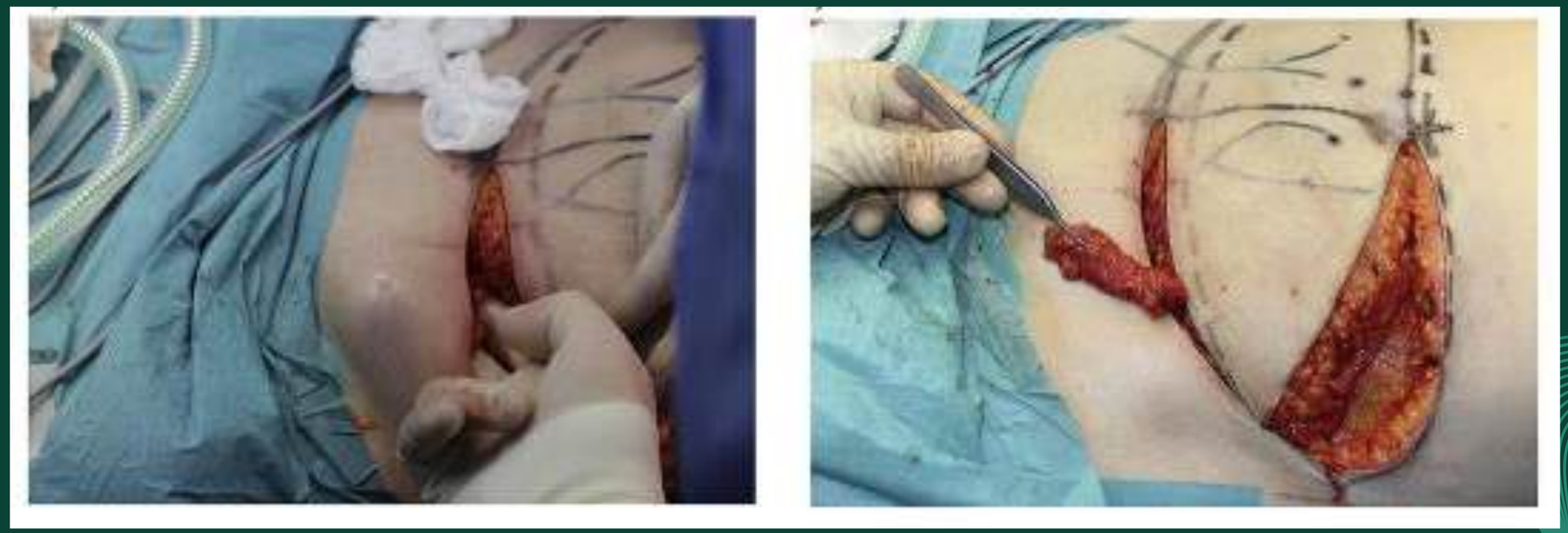
Linfo Diep

- Breast reconstruction with DIEP flap
- Breast cancer related Upper limb lymphedema treatment with Groin VLNT



Supraclavicular Flap

Diagnostic and Planning

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Pre-op

- Angio TC-scan
- Doppler Ultrasound

Intra-op

- Indocyanine green fluorescent dye can be used to confirm the vascularity of the lymph nodes.
- Reverse Lymph Node Mapping

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Reverse Lymph Node Mapping Using Indocyanine Green Lymphography

0. In-room Tc-99 injection in foot web space

1. Intra-Op IndoCyanine Green injection in the flank and visualization of the afferent lymphatic vessels and the lymph nodes thereafter using an infrared camera system

2. Tag using a marker pen the lymph nodes localized by ICG

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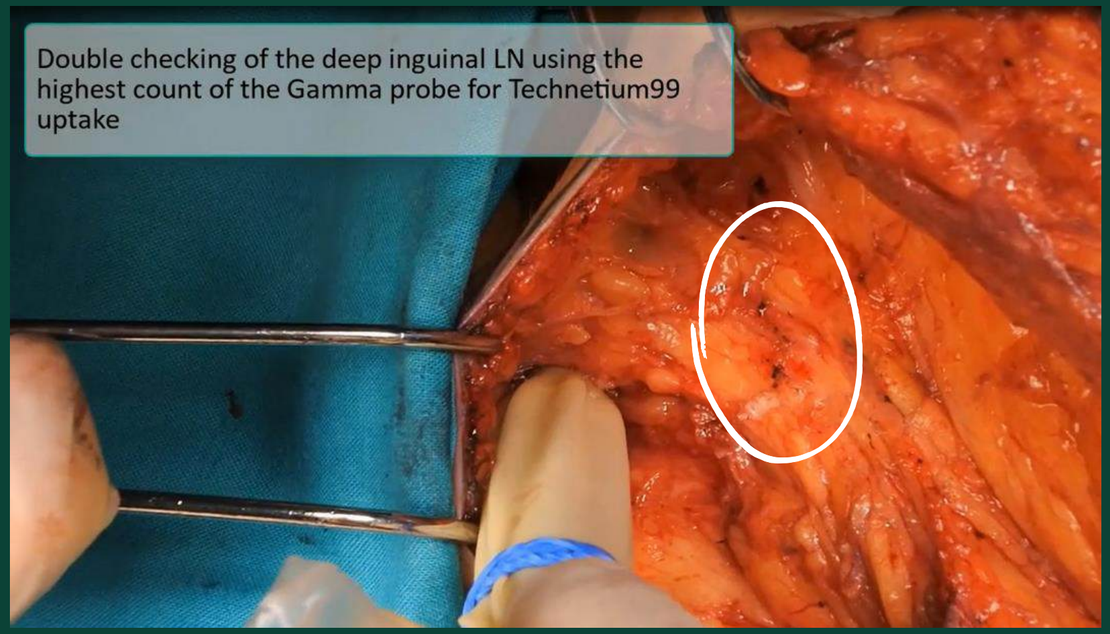
Reverse Lymph Node Mapping Using Indocyanine Green Lymphography



3. Check of deep inguinal LN using gamma probe to identify the lymph nodes to be spared

White circle: lymph nodes previously identified by ICG

4. Check low signal in the lymph nodes included in the flap

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Groin Flap

The lymph nodes in the groin have been described as being spread over **5** regions

- Central (saphenofemoral junction)
- Superomedial
- Superolateral
- Inferomedial
- inferolateral

Drainage

- Lower limb: central and medial based nodes
- Suprailiac region: lateral based nodes

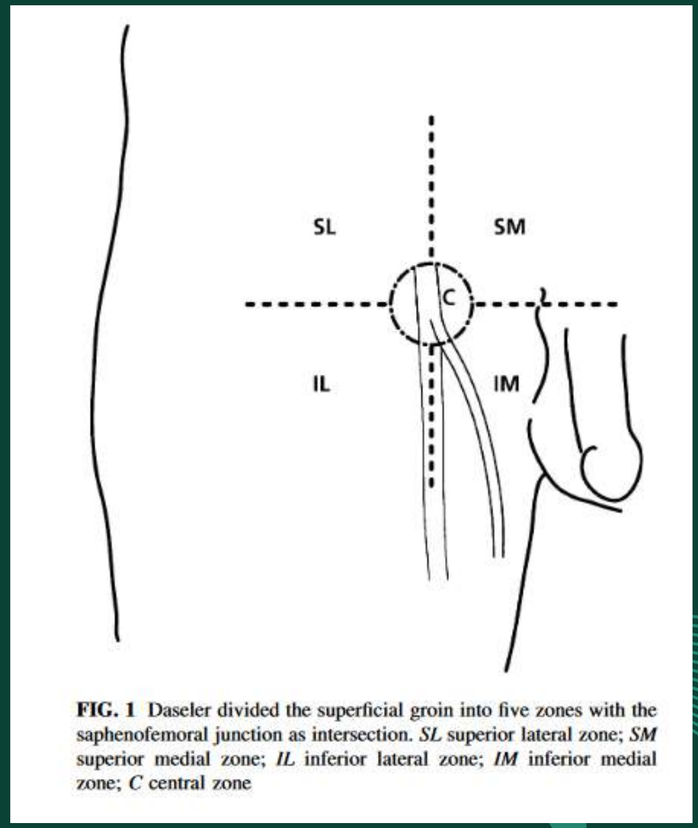

FIG. 1 Daseler divided the superficial groin into five zones with the saphenofemoral junction as intersection. *SL* superior lateral zone; *SM* superior medial zone; *IL* inferior lateral zone; *IM* inferior medial zone; *C* central zone

Iris M. C. et Al., 2009

Groin Flap

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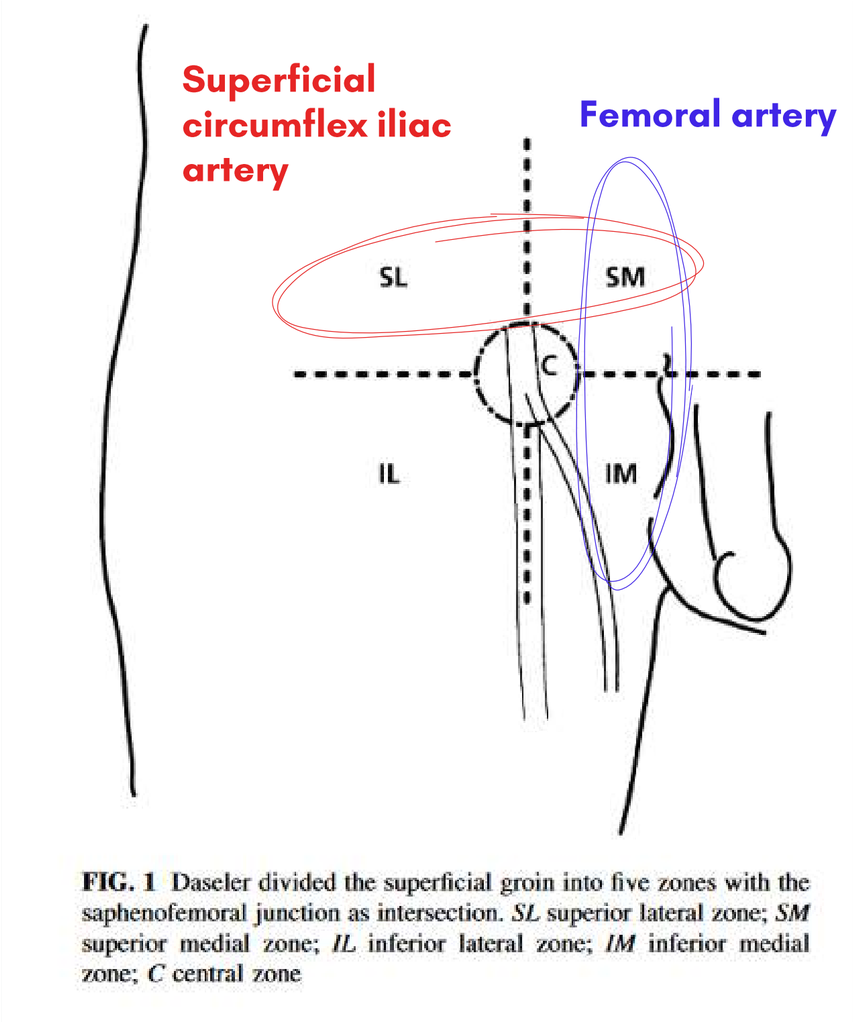

FIG. 1 Daseler divided the superficial groin into five zones with the saphenofemoral junction as intersection. *SL* superior lateral zone; *SM* superior medial zone; *IL* inferior lateral zone; *IM* inferior medial zone; *C* central zone

Could we cause secondary donor site lymphedema?

Reverse sentinel node mapping technique could be used to preserve the deeper lymphatics and nodes inferior to the inguinal ligament.

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Supraclavicular Flap

Supraclavicular Flap *Anatomy*

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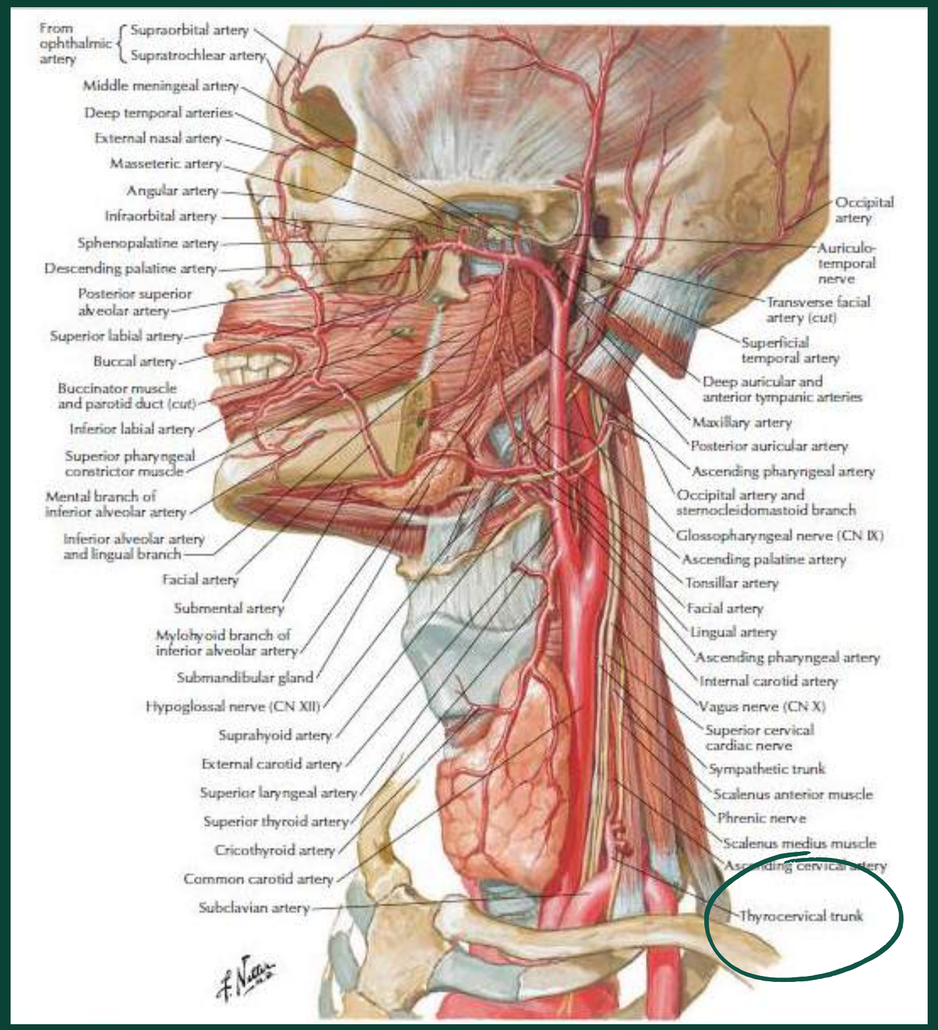

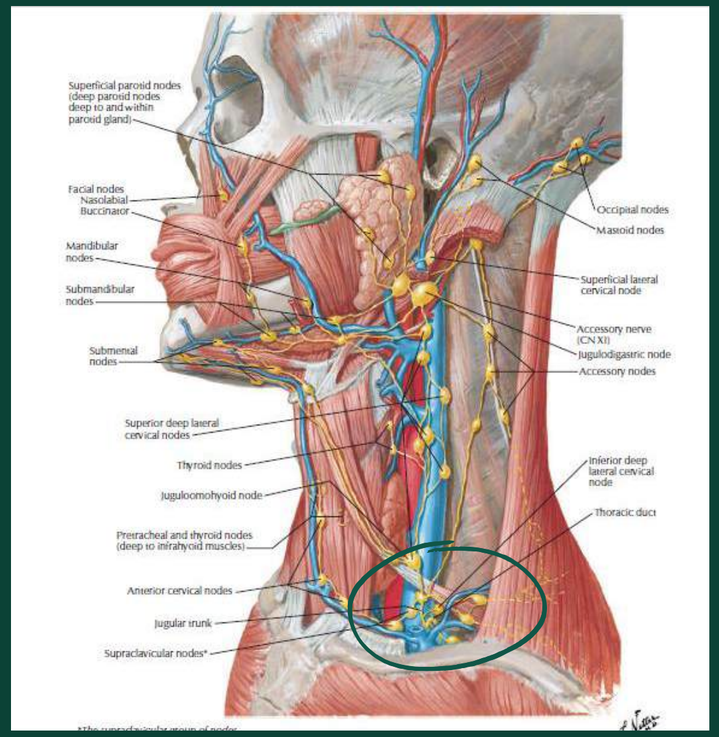

Transverse cervical artery arises from:

- Thyrocervical trunk in 80 %
- Directly from subclavia artery 17 %
- As a branch of internal mammary artery 3%

Transverse cervical vein arises from external jugular vein

Supraclavicular Flap *Anatomy*

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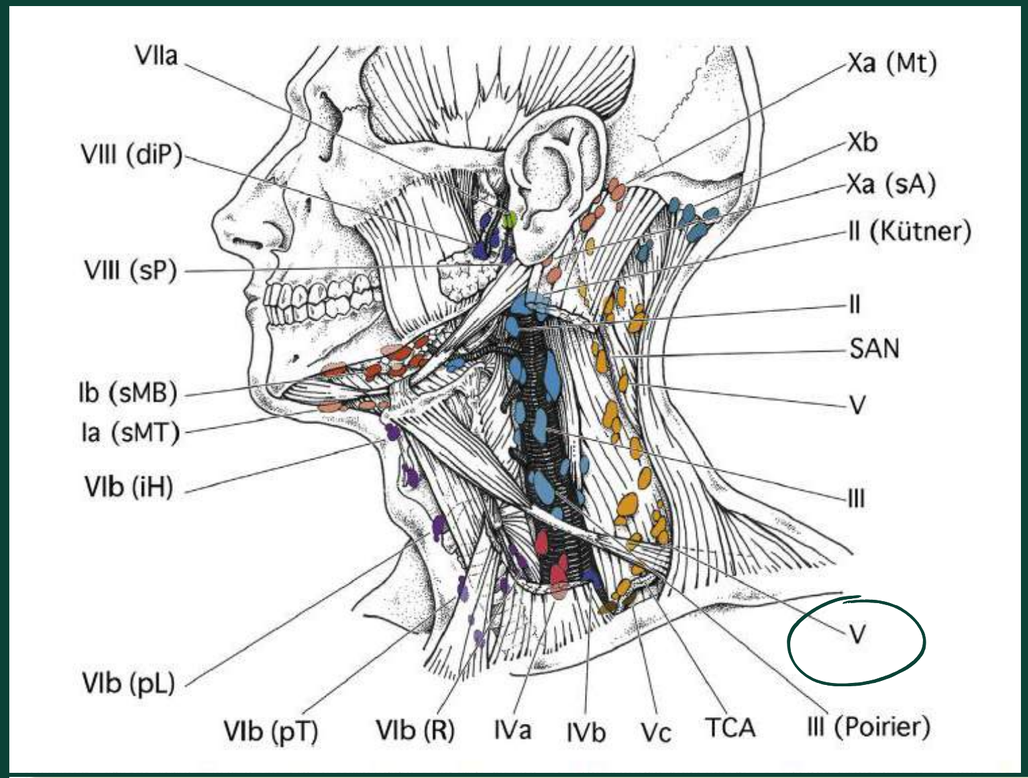
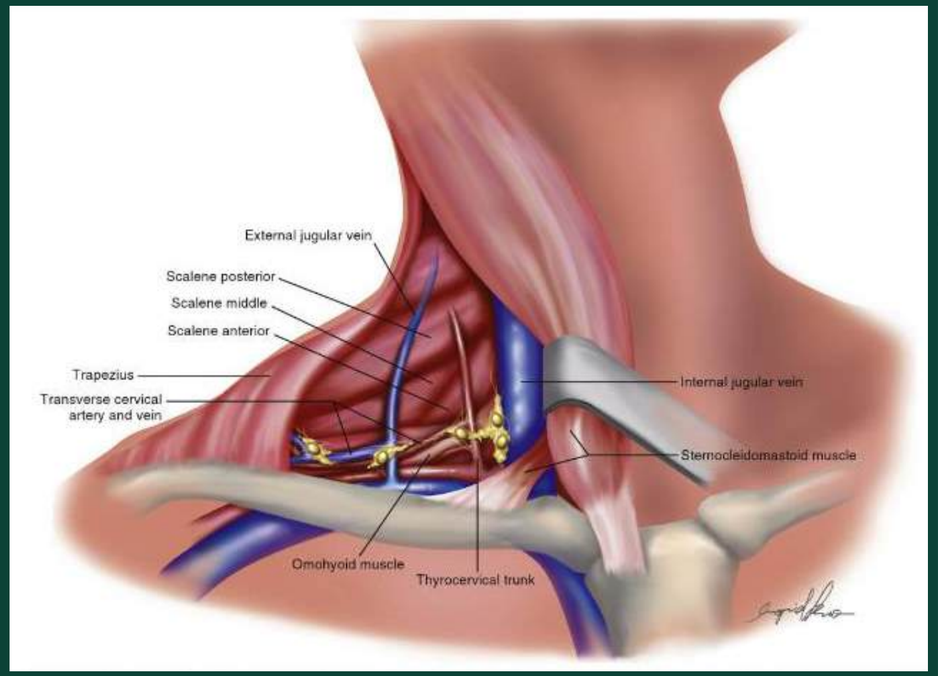
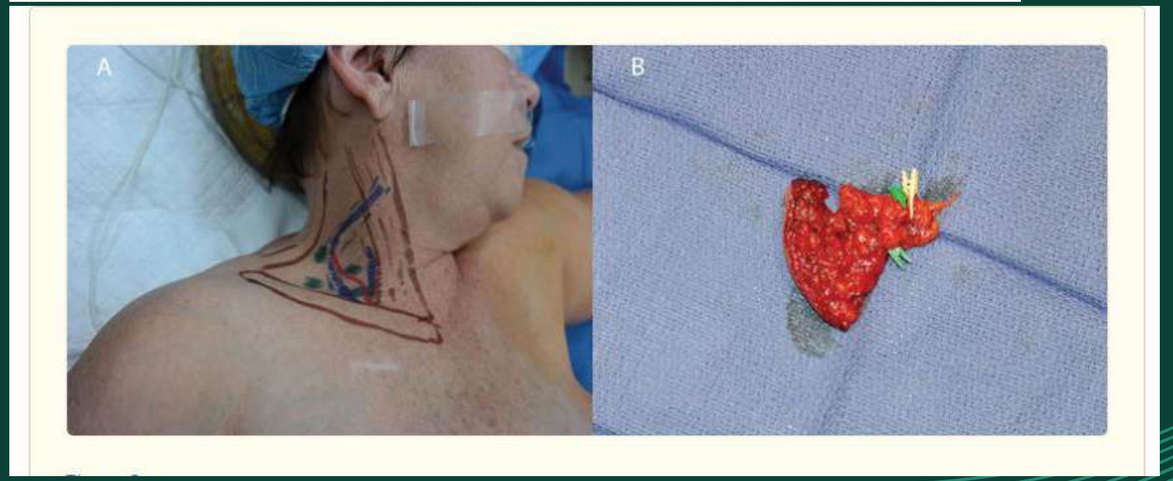
Lymphonodes "Transverse chain"

Located along TCA (transverse cervical artery) that arises from Thyrocervical trunk







Supraclavicular Flap *Anatomy*

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The Tunneled Supraclavicular Island Flap: An Optimized Technique for Head and Neck Reconstruction

Norbert Pallua, M.D., Ph.D., and Ernst Magnus Noah, M.D.
Aachen, Germany

Supraclavicular Artery

In all specimens, the subclavian artery was exposed, and the transverse cervical artery was subsequently dissected. In 100 percent, we found the supraclavicular artery arising 3 to 4 cm from the origin of the transverse cervical artery. In all cases, the artery was found in the triangle between the dorsal edge of the sternocleidomastoid muscle, the external jugular vein, and the medial part of the clavicle (Fig. 1). Examination of the skin landmarks revealed that the artery exited 3.0 ± 0.7 cm above the clavicle at a distance of 8.2 ± 1.7 cm from the sternoclavicular joint and approximately 2.1 ± 0.9 cm dorsal to the sternocleidomastoid muscle. The mean diameter of the artery was 0.15 ± 0.034 cm (Fig. 2).

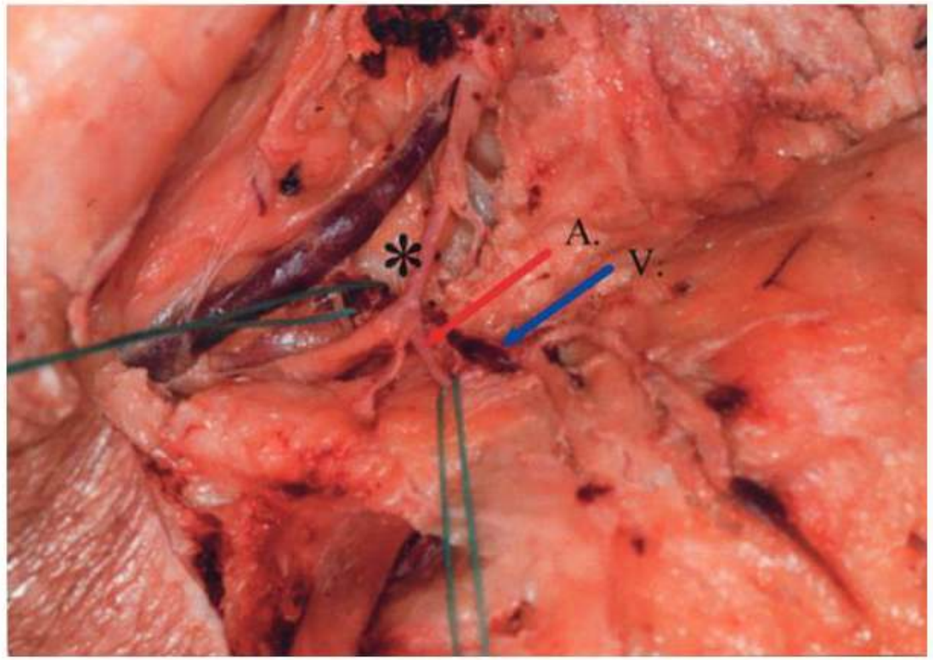


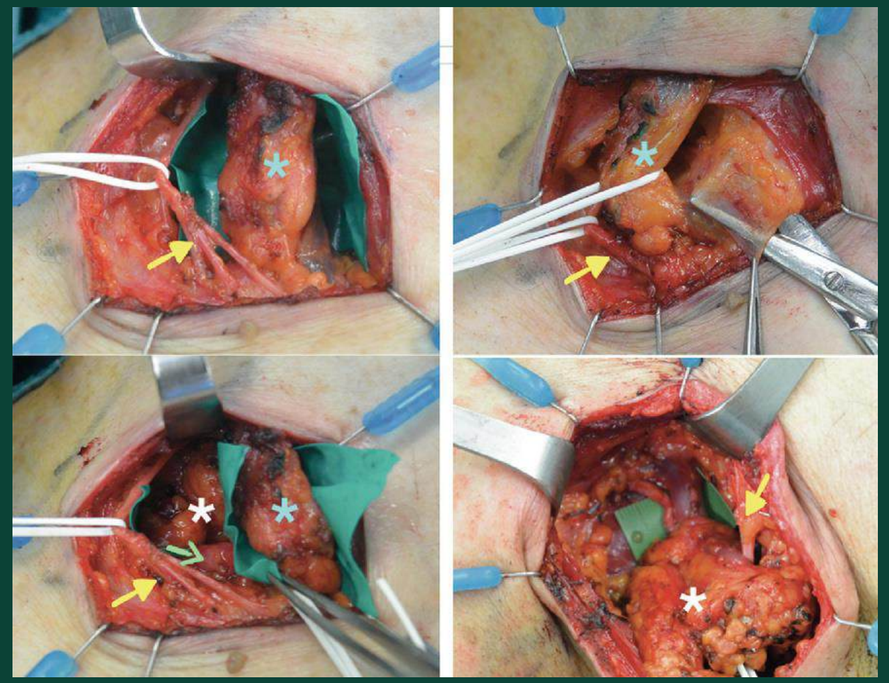
FIG. 2. Cadaver dissection of the supraclavicular artery (*A*) and the accompanying vein (*V*) exiting from the transverse cervical vessels (*).

Supraclavicular Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project

Compartimental harvesting of dual lymph node flap from the right supraclavicular area for the treatment of lower extremity lymphedema: A case series

Giuseppe Visconti[a,*], Girolamo Tartaglione[b], Roberto Bartoletti[c], Marzia Salgarello[a]



- Expose all the anatomical landmarks of the posterior neck triangle to avoid damages to the spinal accessory nerve
- The external jugular vein (EJV) was deroofed up to its confluence into the subclavian vein and the superficial compartment, and a lymphatic flap of 3 × 5 cm was drawn, centered on the EJV.
- Robbins level VB deep compartiment nodes were harvested based on the TCA and TCV in a medial to lateral direction, staying just above the deep cervical fascia
- Avoid damages to the phrenic nerve, which lies just below the vascular pedicle and to the brachial plexus.
- The anatomical plane between the two compartments was defined by the supraclavicular nerves laterally and the middle cervical fascia medially.

Supraclavicular Flap

Diagnostic and Planning

Dr. M. Barbera
SCaLPEL project

Pre-op

- Angio TC
- Doppler Ultrasound

Intra-op

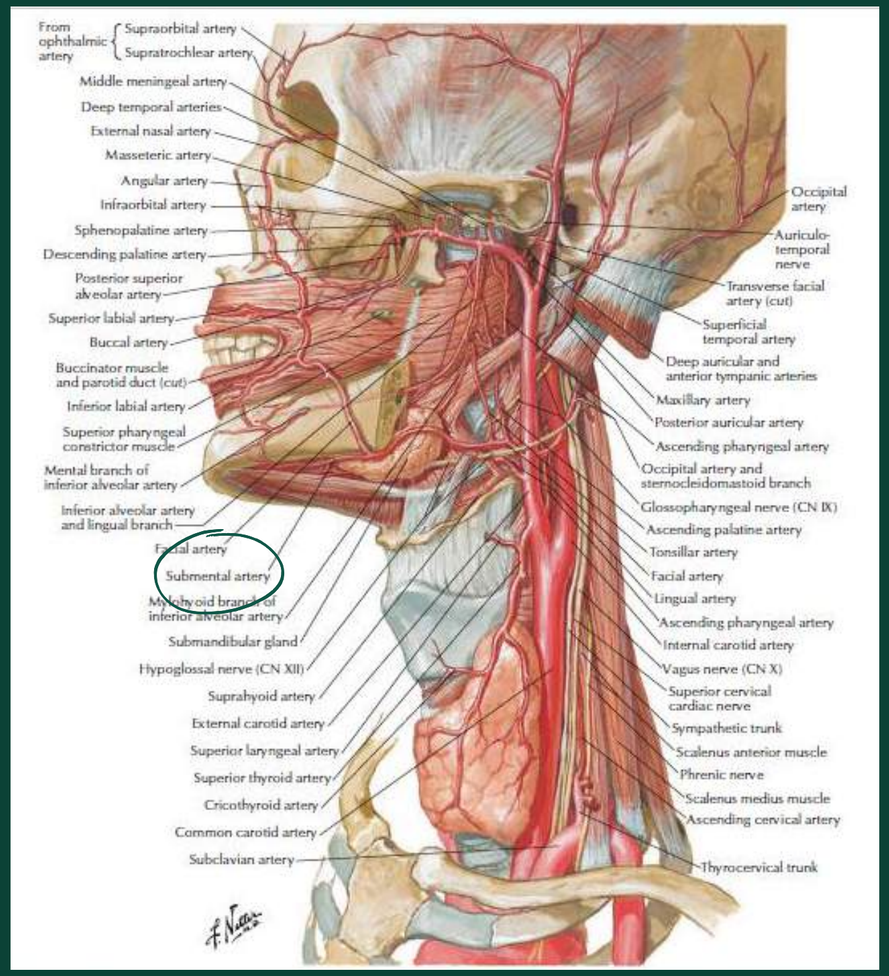
- Indocyanine green fluorescent dye can be used to confirm the vascularity of the lymph nodes.
- Reverse Lymph Node Mapping

Dr. M. Barbera
SCaLPEL project

Submental Flap

Submental Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



- *Submental artery arise from Facial artery*
- *Submental vein provides the venous drainage into the facial vein*
- *The main perforator is typically found 3 cm in front of the facial artery*

- *The length of the submental artery including the facial artery is approximately 5 cm.*
- *1 to 6 submental lymph nodes*

Submental Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project

The submental island flap: a new donor site. Anatomy and clinical applications as a free or pedicled flap

D Martin [1], J F Pascal, J Baudet, J M Mondie, J B Farhat, A Athoum, P Le Gaillard, G Peri

Affiliations + expand

PMID: 8415968

1993, adipocutaneous flap

2012, VLNT

A novel approach to the treatment of lower extremity lymphedema by transferring a vascularized submental lymph node flap to the ankle ☆

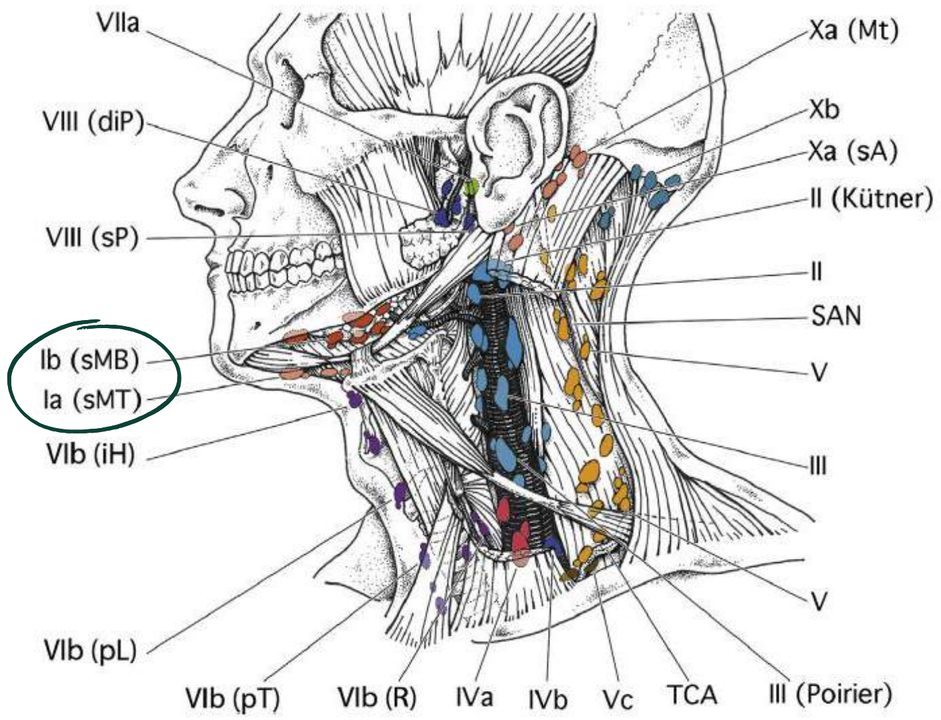
Ming-Huei Cheng [a,*], Ju-Jung Huang [a], Dung H. Nguyen [a], Michel Saint-Cyr [b], Michael R. Zenn [c], Bien Keem Tan [d], Chyi-Long Lee [e]

[a] Division of Reconstructive Microsurgery, Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, College of Medicine, Chang Gung University, Taoyuan, Taiwan
[b] Department of Plastic Surgery, University of Texas Southwestern Medical Center at Dallas, TX, USA
[c] Division Plastic Surgery, Duke University Medical Center, Durham, NC, USA
[d] Division of Plastic Surgery, Singapore General Hospital, Singapore
[e] Division of Gynecologic Endoscopy, Department of Obstetrics and Gynecology, Chang Gung Memorial Hospital, College of Medicine, Chang Gung University, Taoyuan, Taiwan

- *Lymph nodes found in the histological sections in the dissected submental flap*
- *Submental lymph node flap supplied by the submental artery with two visible lymph nodes dissected*

Submental Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



- *1A group*
- *1 to 6 submental lymph nodes*

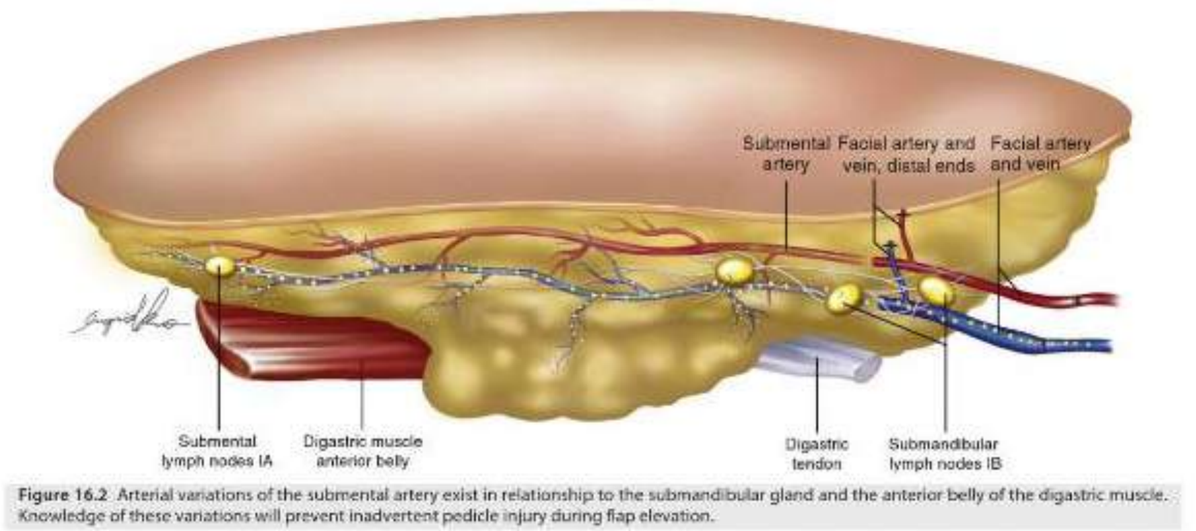


Figure 16.2 Arterial variations of the submental artery exist in relationship to the submandibular gland and the anterior belly of the digastric muscle. Knowledge of these variations will prevent inadvertent pedicle injury during flap elevation.

- *Asterisks: lymph nodes larger than 1 cm in areas Ib (black asterisk) and IIa (yellow asterisk).*
- *White arrow: submental pedicle.*

Submental Flap *Diagnostic and Planning*

Dr. M. Barbera
SCaLPEL project

Pre-op

- Angio TC
- Doppler Ultrasound

Intra-op

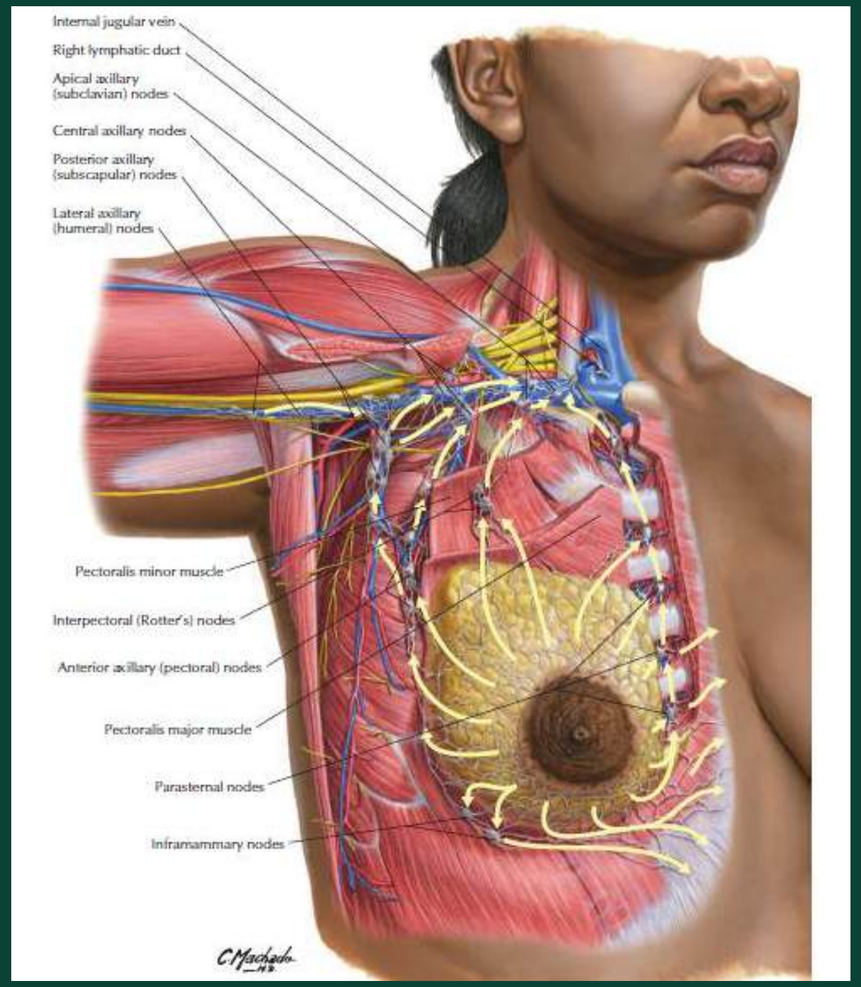
- Facial nerve monitoring using electrodes
- Indocyanine green fluorescent dye can be used to confirm the vascularity of the lymph nodes.
- Pencil Doppler

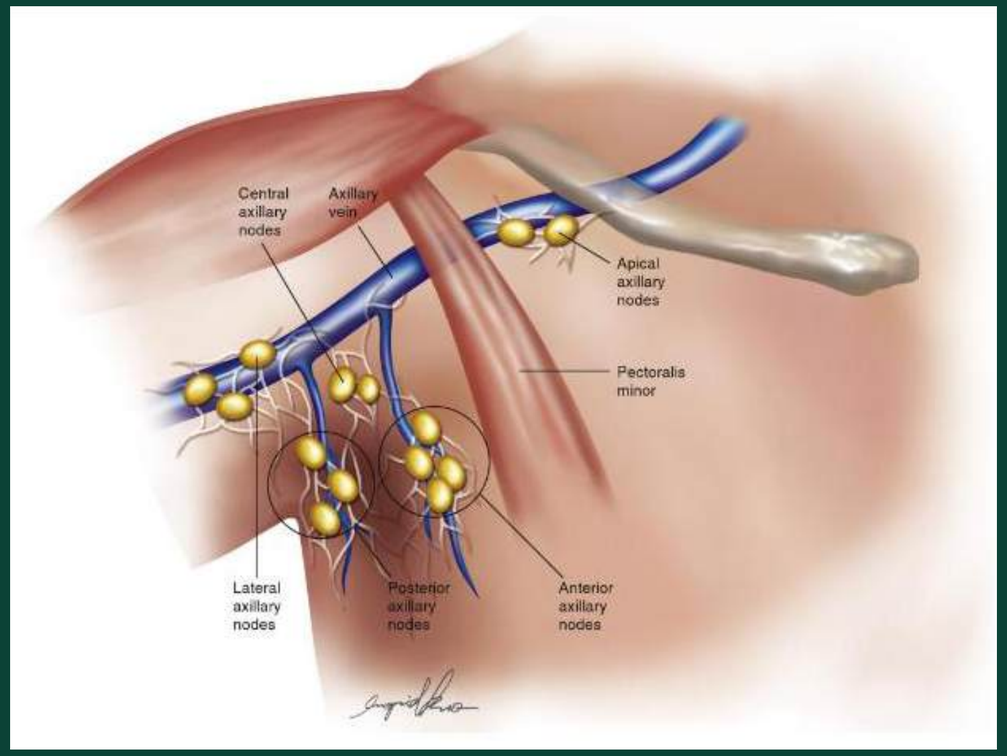
Dr. M. Barbera
SCaLPEL project

Lateral Thoracic Flap

Lateral thoracic *Anatomy*

Dr. M. Barbera
SCaLPEL project





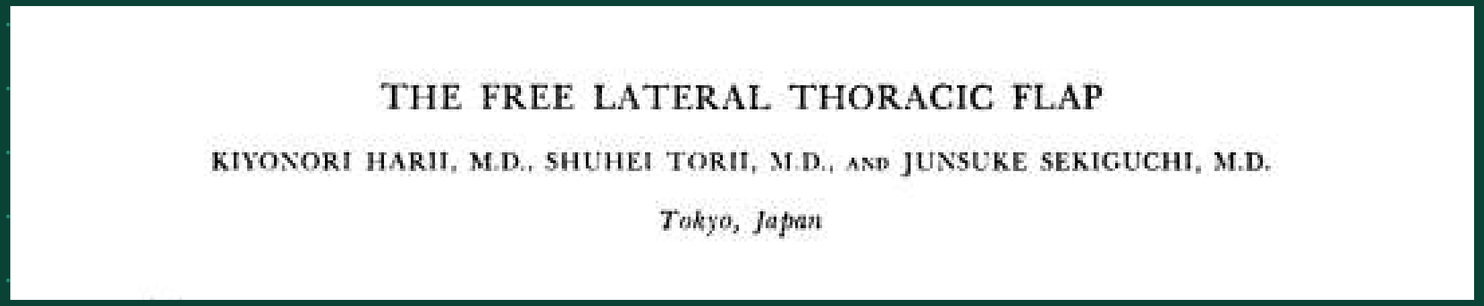
Lateral thoracic artery arises from:

- Thoracdorsal artery 71%
- Subscapular artery 29%

- The anterior and posterior lymphnode groups are targeted for arvest in axillary vlnt

Lateral thoracic flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



THE FREE LATERAL THORACIC FLAP

KIYONORI HARII, M.D., SHUHEI TORII, M.D., AND JUNSUKE SEKIGUCHI, M.D.

Tokyo, Japan

1978,
The free lateral thoracic flap

- The anterior and posterior lymphnode groups are targeted for arvest in axillary vlnt

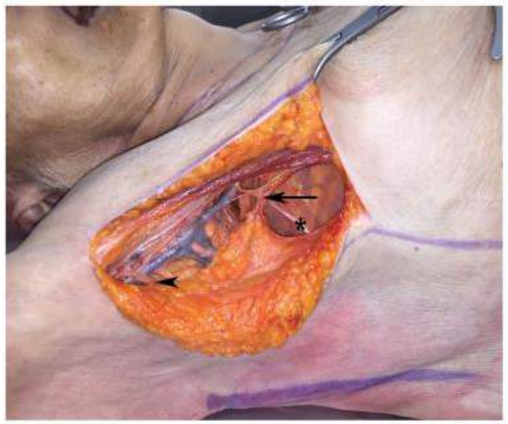
Lateral thoracic flap *Anatomy*

Dr. M. Barbera
SCaLPEL project

The surgical anatomy of the vascularized lateral thoracic artery lymph node flap—A cadaver study

Ines E. Tinhofer MD[1] | Stefan Meng MD, PhD[1,2] | Johannes Steinbacher MD[1] | Julia Roka-Palkovits MD[3] | Eva Györi MD, PhD[3] | Lukas F. Reissig MD[1] | Ming-Huei Cheng MD, MBA, FACS, PhD[4] | Wolfgang J. Weninger MD, PhD[1] | Chieh-Han J. Tzou MD, MBA, PhD[3]

- The anatomical landmarks to determine the flap's cranial position were chosen to be on the projection of the anterior axillary line, exactly 2 cm below the point where the axillary neurovascular bundle traverse the pectoralis major muscle.



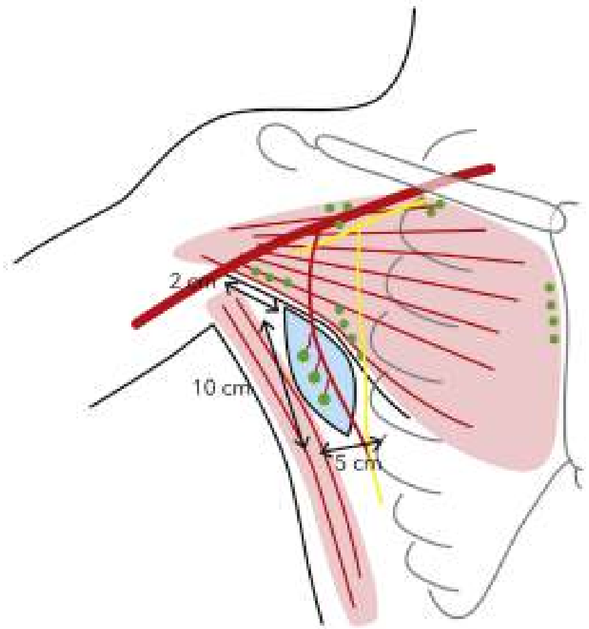


FIGURE 1 Schematic drawing of the lateral thoracic artery-based flap design

- The lateral thoracic artery originated at a mean distance of -0.28 ± 1.17 cm (range 3–1 cm) to the minor pectoral muscle.
- Flap thickness 2 cm

Lateral thoracic flap *Anatomy*

Dr. M. Barbera
SCaLPEL project

Lymph Fasciocutaneous Lateral Thoracic Artery Flap: Anatomical Study and Clinical Use

Guilherme Cardinali Barreiro, MD[1] Rachel Rossine Baptista, MD[1] Kiril Endo Kasai, MD[1]
Daniel Marchi dos Anjos, MD[1] Fabio de Freitas Busnardo, MD[1] Miguel Modolin, MD[1]
Marcus Castro Ferreira, PhD[1]

[1]Division of Plastic Surgery, University of São Paulo, Medical School Address for correspondence Guilherme Cardinali Barreiro, MD

- The artery is absent in around 12.5% of sides, in which case the thoracodorsal artery provides the vascular supply to those lymph nodes.
- Perforators to the overlying skin were present in 87.5% of anatomical dissections, allowing for transfer of a skin paddle

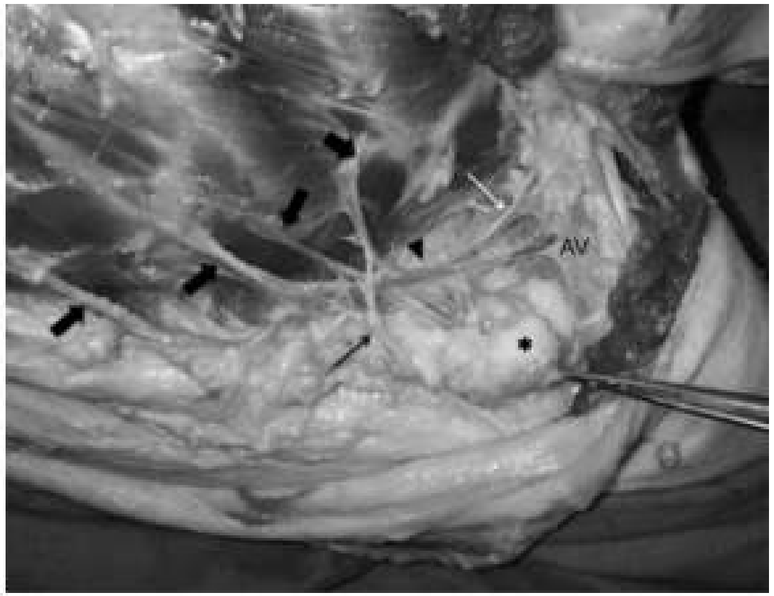


Fig. 2 The lateral thoracic pedicle (arrowhead) arises from the axillary vessels and sends branches to the surrounding lymph nodes and muscles, the LICAP (bold arrows). The forceps is holding the LTLN (asterisk) and lower left, the intercostobrachial nerve crosses the pedicle toward the arm (thin arrow). On the right, the lateral thoracic artery (white arrow) goes behind the axillary vein (AV). LICAP, lateral intercostal artery perforator; LTLN, lateral thoracic axillary lymph nodes.

Lateral thoracic Flap *Diagnostic and Planning*

Dr. M. Barbera
SCaLPEL project

Pre-op

- Angio TC-scan
- Doppler Ultrasound
- MRA (Magnetic resonance angiography)

Intra-op

- Indocyanine green fluorescent dye can be used to confirm the vascularity of the lymph nodes.
- Reverse Lymph Node Mapping

Dr. M. Barbera
SCaLPEL project

MRA (Magnetic Resonance Angiography)

Gadofosveset Trisodium
(Ablavar

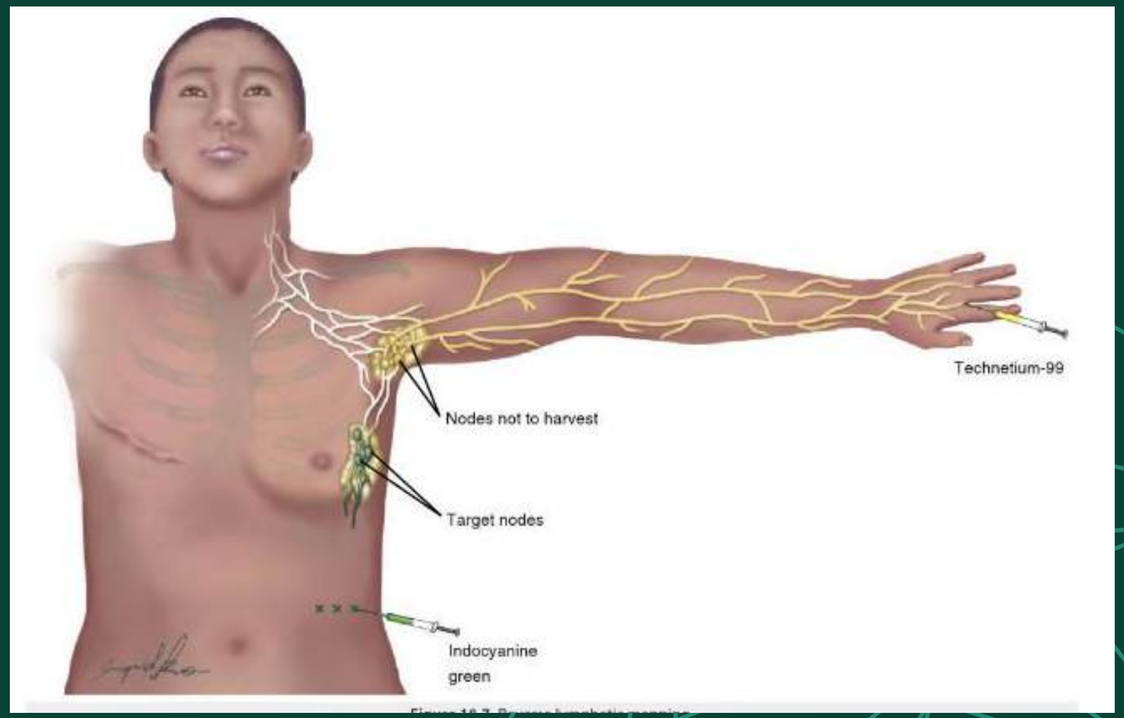
Lateral thoracic *Diagnostic and Planning*

Dr. M. Barbera
SCaLPEL project

Reverse lymphatic Mapping

A tecnique used to separatly identify lymphnode draining the arm and the chest

- On the morning of surgery, the patient is injected with 0,2cc of Tc-99 in the first and second webspace of the donor extremity
- Identification of draining nodes with a gamma probe during surgery
    - Once in the operating room 4 or 5 ICG injection are performed along the lateral chest and back (0.1 cc per inj.)
    - The injection site are massaged
    - The drain nodes is visualized using near-infrared fluorescence (depth of 5-20 mm) when the axilla is exposed
    - Ensure that the nodesdo not have uptake Tc-99



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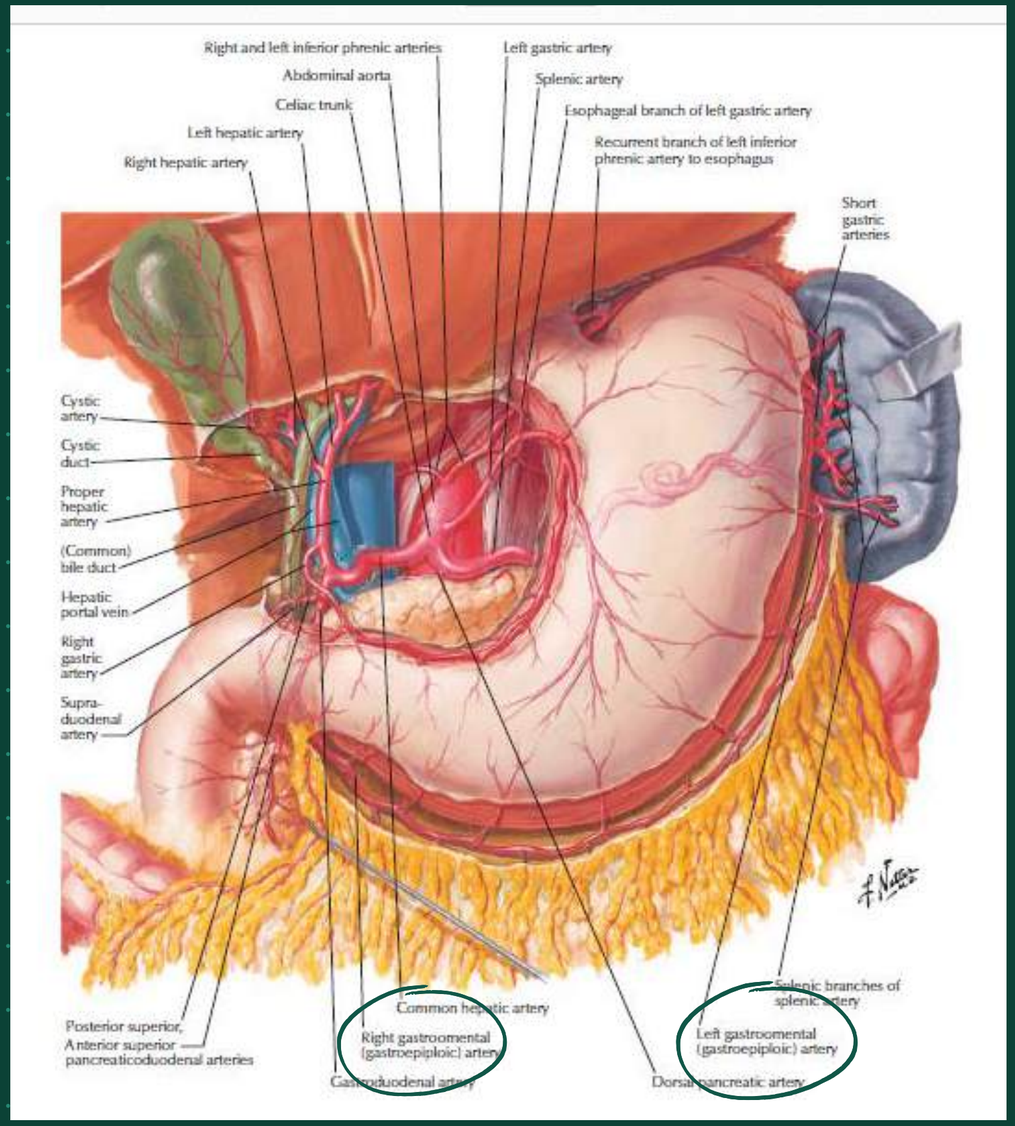
Omenthal Flap

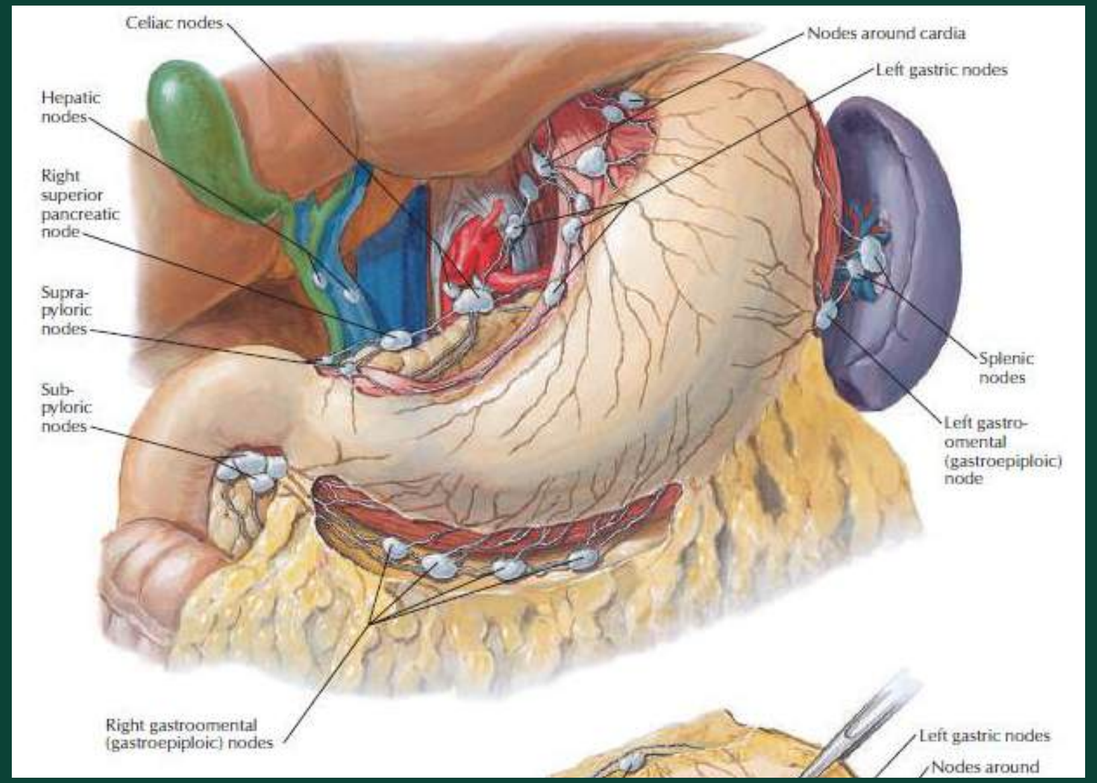
Omenthal flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



"Gastroepiploic flap"

- Gastroepiploic vascular arcade



Omenthal flap *Anatomy*

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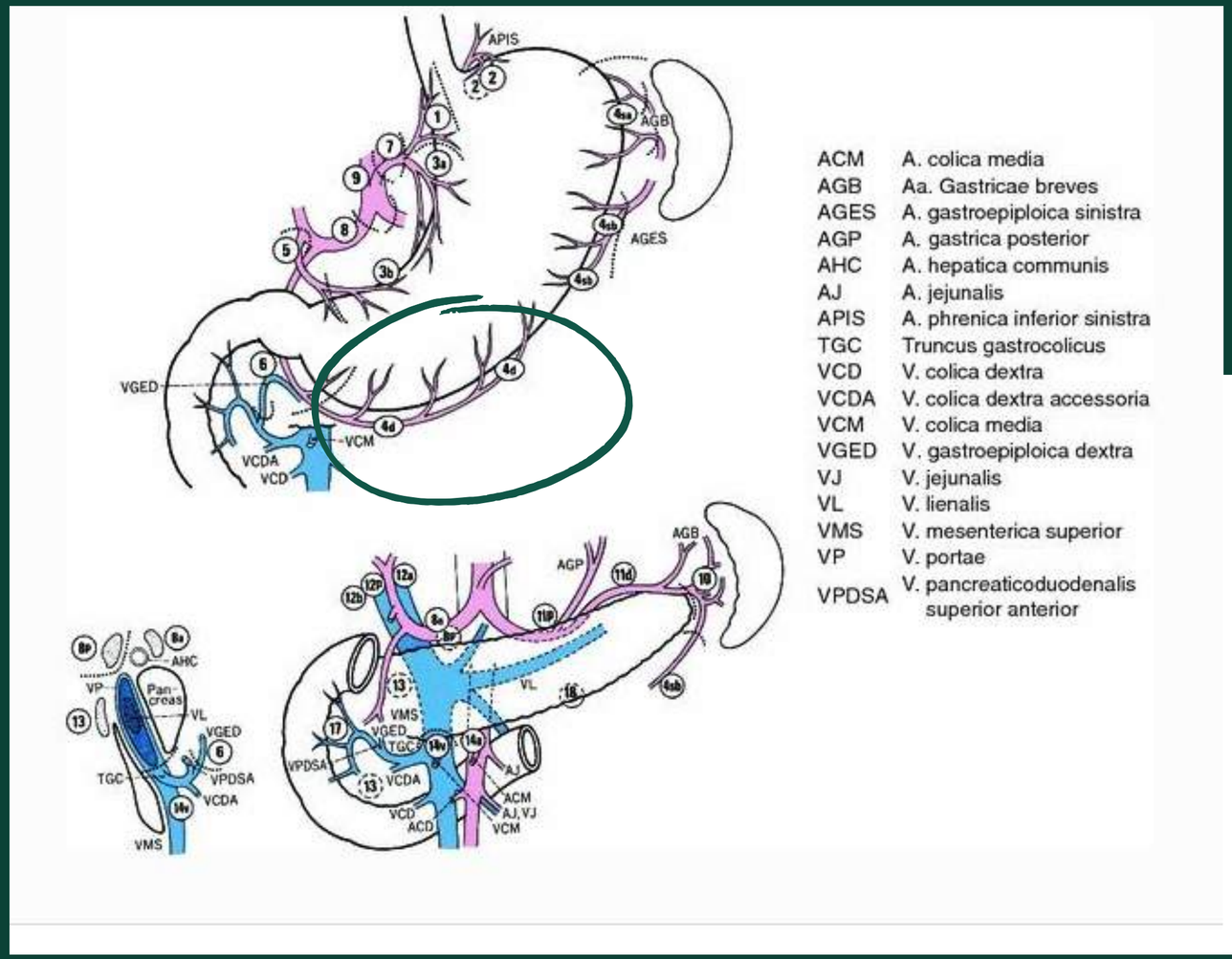
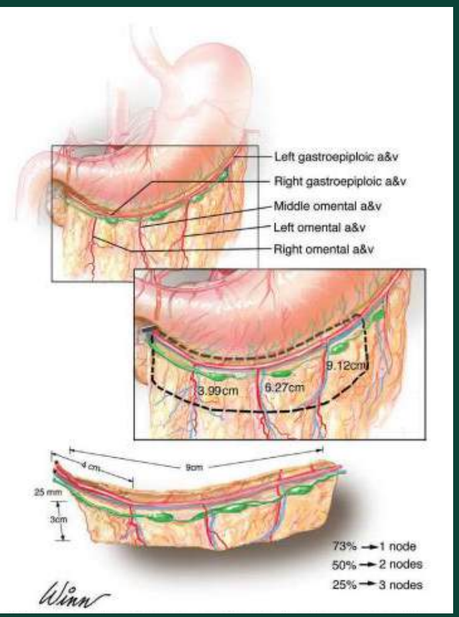


ACM	A. colica media
AGB	Aa. Gastricae breves
AGES	A. gastroepiploica sinistra
AGP	A. gastrica posterior
AHC	A. hepatica communis
AJ	A. jejunalis
APIS	A. phrenica inferior sinistra
TGC	Truncus gastrocolicus
VCD	V. colica dextra
VCDA	V. colica dextra accessoria
VCM	V. colica media
VGED	V. gastroepiploica dextra
VJ	V. jejunalis
VL	V. lienalis
VMS	V. mesenterica superior
VP	V. portae
VPDSA	V. pancreaticoduodenalis superior anterior

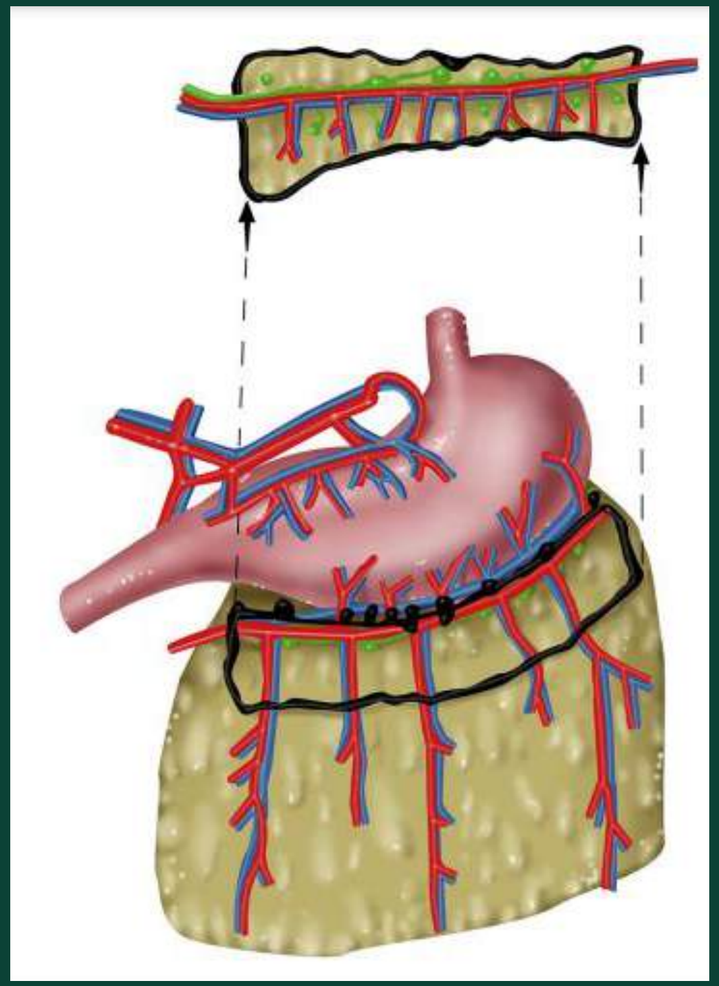
Japanese classification of gastric carcinoma

- the nodal tissue around the gastroepiploic arcade is defined as nodal station no. 4.
- Mainly we use 4d (dextri) nodes

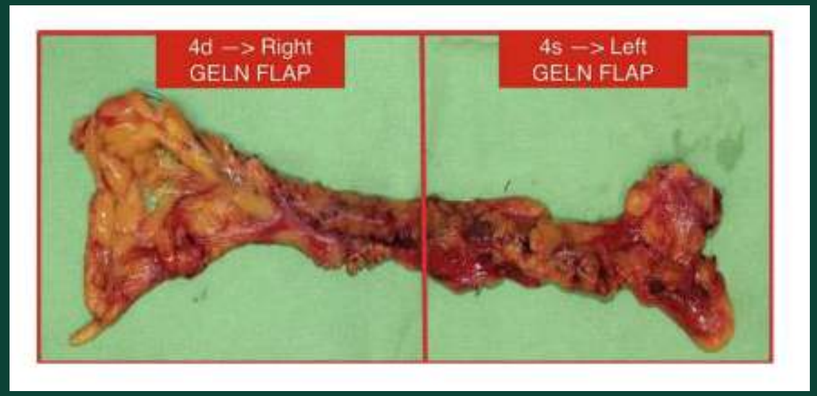


Omenthal flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



- The dissection of the right gastroepiploic flap is more comfortable
- Possible to use it as a double flap if taken entirely, both right and left
- No donor site injury, small scar



Omenthal flap

Diagnostic and Planning

Dr. M. Barbera
SCaLPEL project

Pre-op

- Angio TC-scan

Intra-op

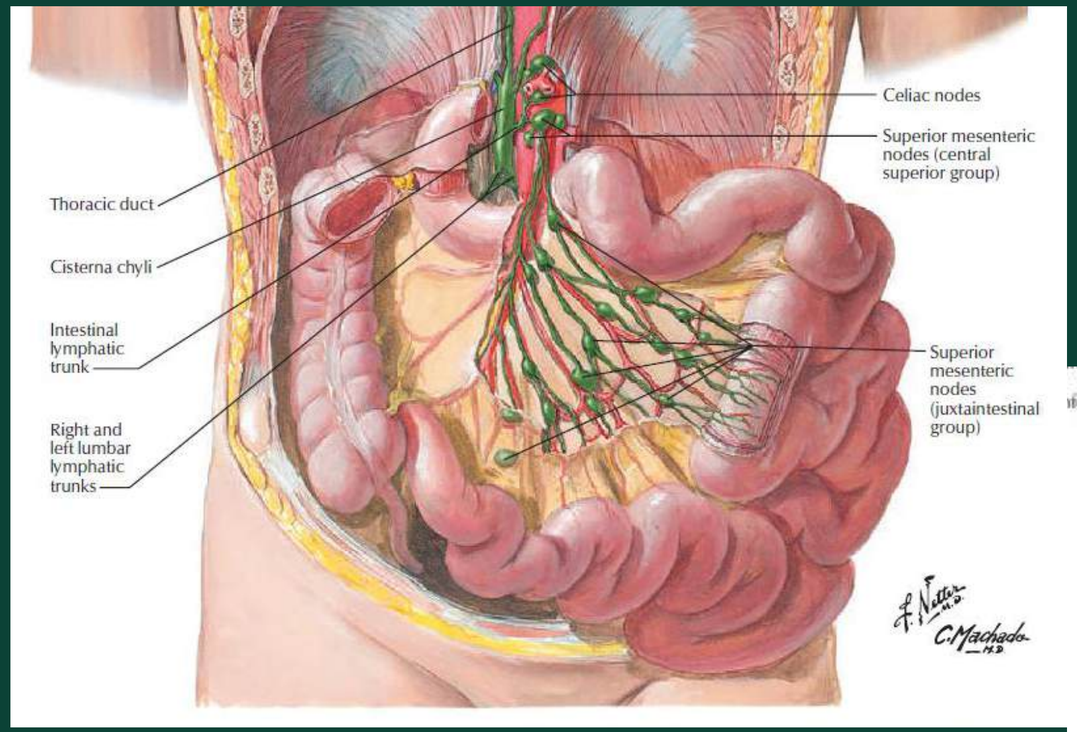
- Trans-illumination.

Dr. M. Barbera
SCaLPEL project

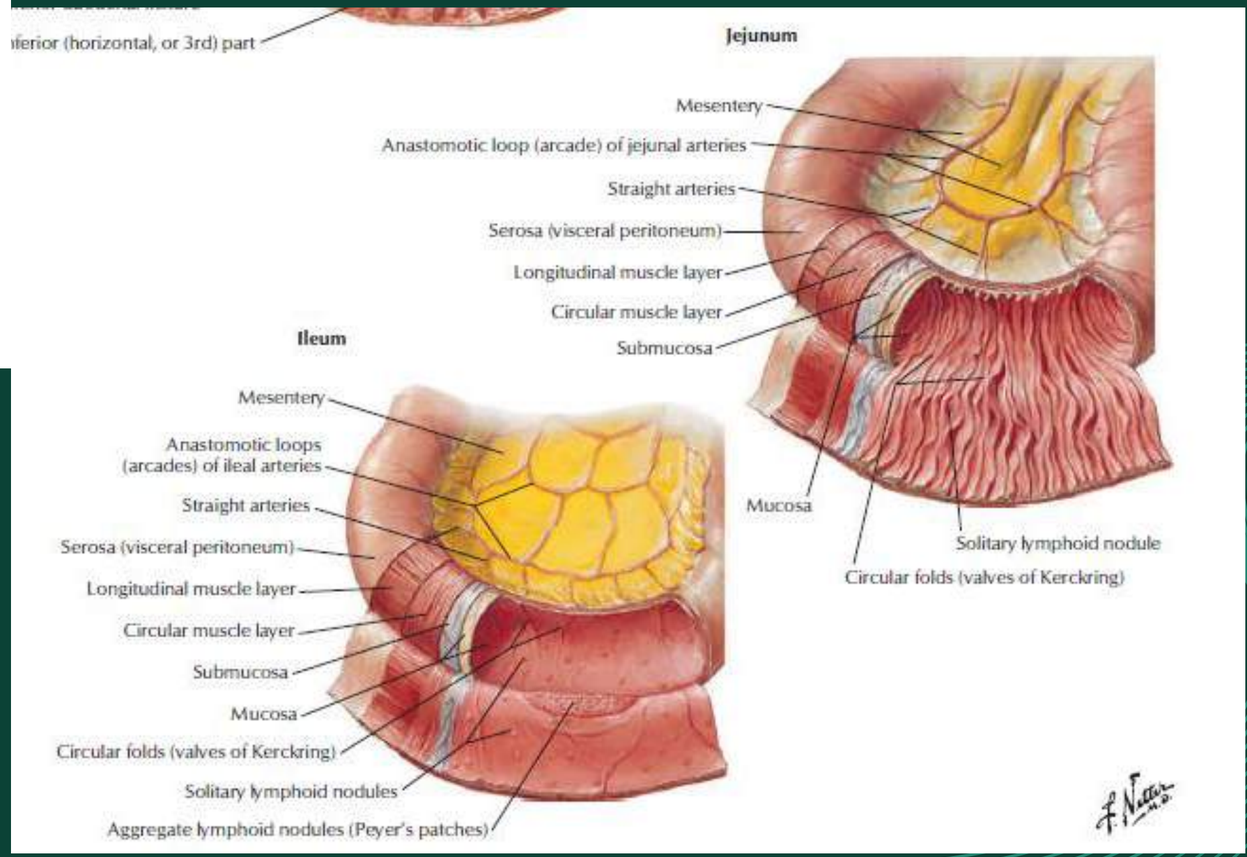
Jejunal Mesenteric Flap

Jejunal Mesenteric Lymph Node Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project



- Mesenteric lymph nodes flow along the jejunal mesenteric arteries.



Jejunal Mesenteric Lymph Node Flap *Anatomy*

Dr. M. Barbera
SCaLPEL project

Br. J. Surg. Vol. 65 (1978) 829–833

Relief of lymph obstruction by use of a bridge of mesentery and ileum*

J. B. KINMONTH, P. A. HURST, J. M. EDWARDS AND D. L. RUTT†

- Pedicled mesenteric lymph node flap
  - Harvested with intestinal loop segment
  - Mucosa removed by dissection
  - Flap placed in the iliac fossa

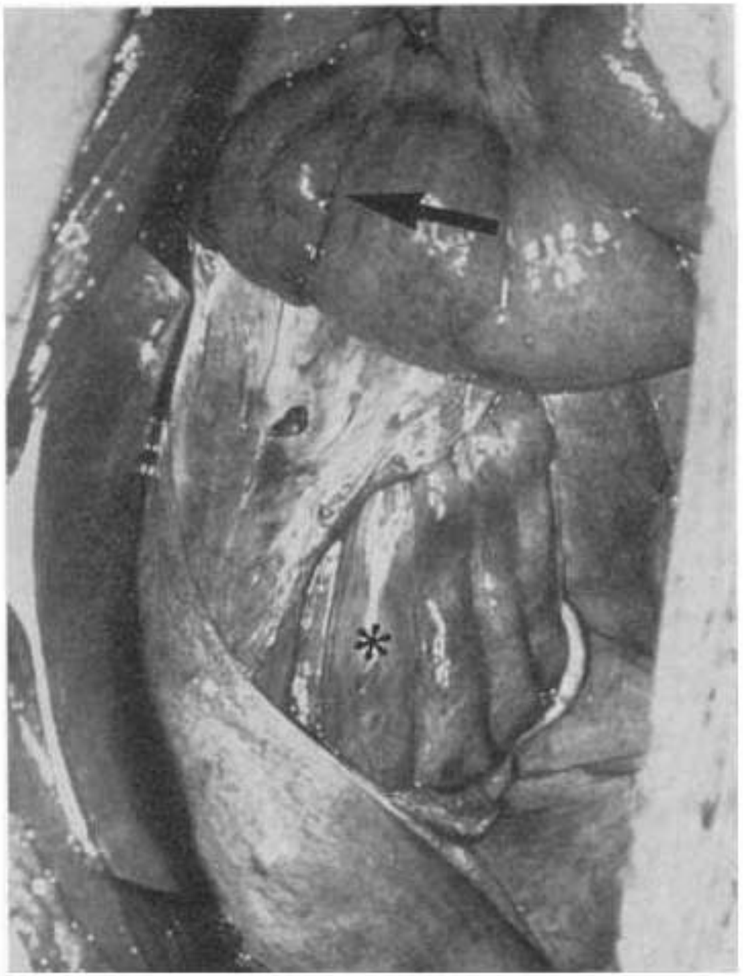
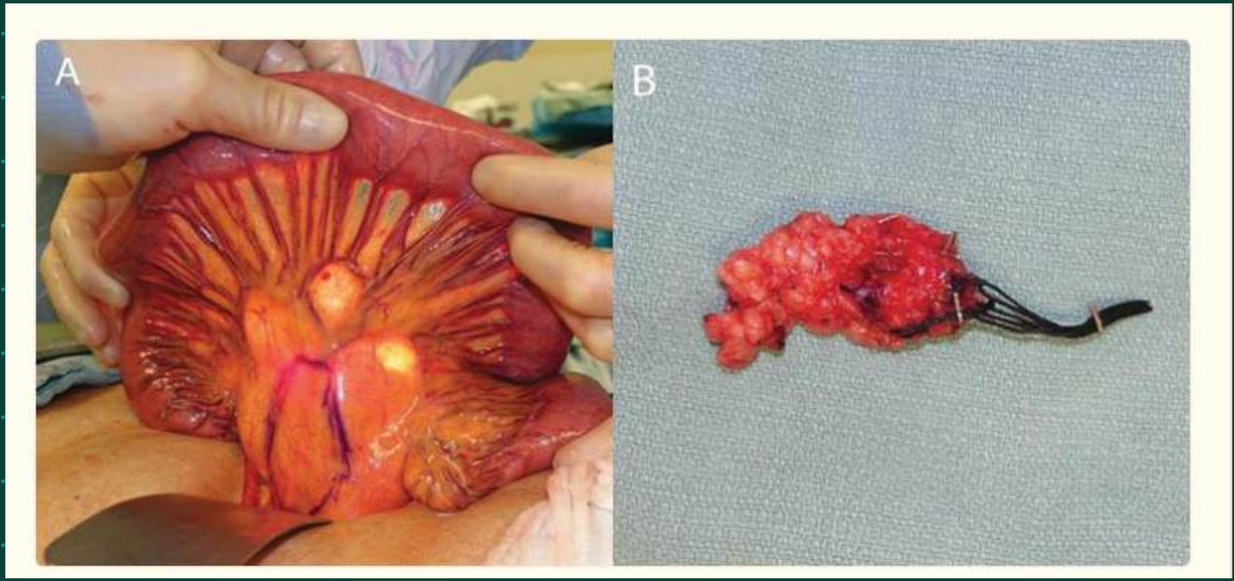


Fig. 5. The bridge of mesentery with its foot or pedicle of prepared gut has been placed in the right iliac fossa (star). The peritoneal flaps have been replaced to cover its edges. Note gut continuity restored by anastomosis (arrow).

Jejunal Mesenteric *Anatomy*

Dr. M. Barbera
SCaLPEL project



- Flap harvested from the periphery of the mesentery to incorporate a vascular arcade adjacent to the jejunum, potentially risking ischemic bowel complications
- Flap harvested from closer to the root of the mesentery, that avoids disruption to the vascular supply to the adjacent bowel segment.

- The longest loop of the third part of the jejunum is identified, and a flap based on either the second, third, or fourth mesenteric branch is designed where a concentration of lymph nodes can be palpated.
- This segment has significantly more lymph nodes than the other segments.

Figure 1. Jejunal mesenteric vascularized lymph node flap.

Supraclavicular Flap *Diagnostic and Planning*

Dr. M. Barbera
SCaLPEL project

Pre-op

- Angio TC-scan

Intra-op

- Trans-illumination.

Dr. M. Barbera
SCaLPEL project

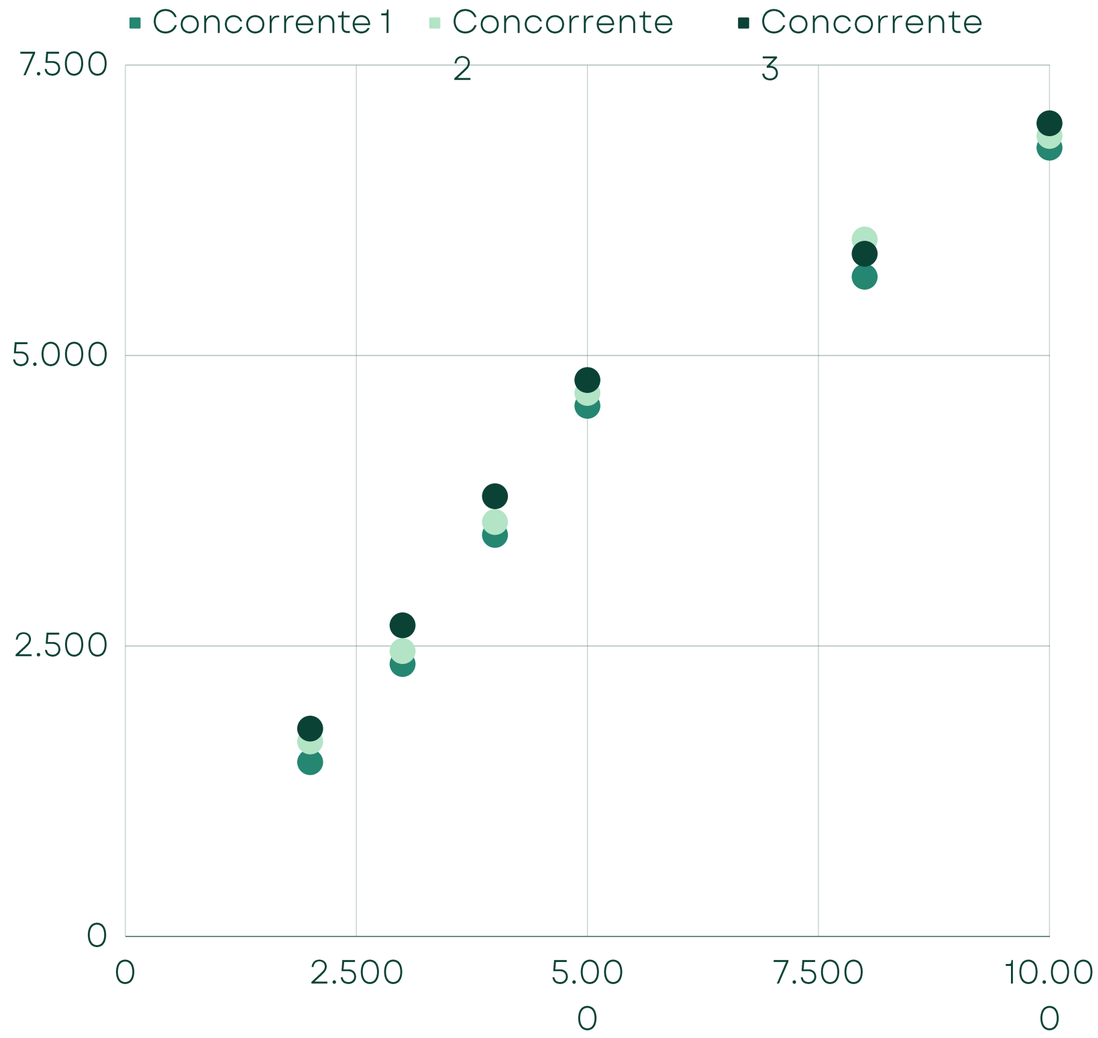
Thank You

Torna al programma

Analisi della concorrenza

Descrivi come si posiziona la tua azienda rispetto alla concorrenza.

Elabora brevemente il concetto.



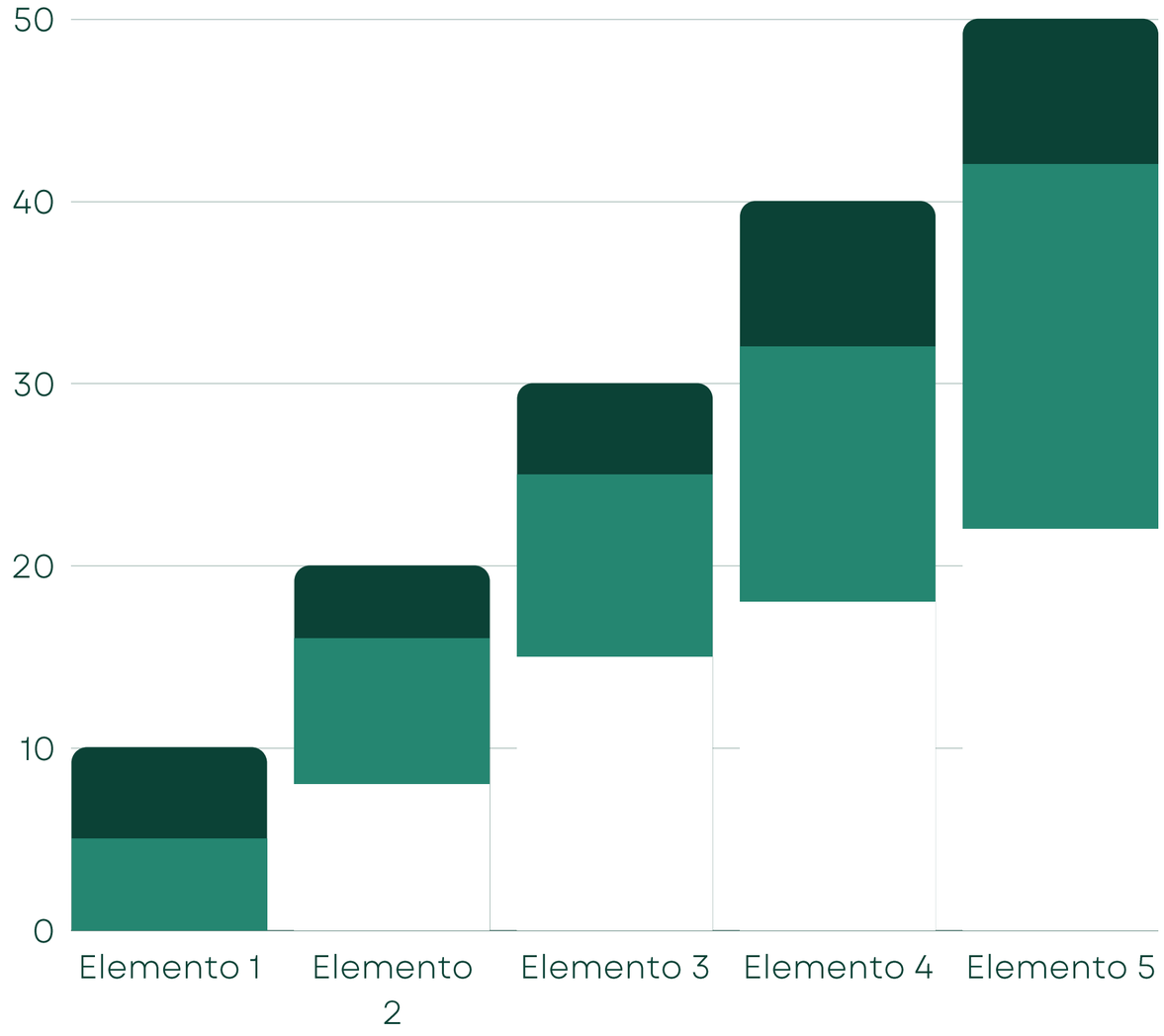
Fonte: cita la provenienza delle informazioni.

Torna al programma

Analisi del settore

Descrivi le più recenti e importanti tendenze del settore.

Elabora brevemente il concetto.



Fonte: cita la provenienza delle informazioni.

Torna al programma

Definizione dei problemi

01

Descrivi un problema dell'azienda

Illustra brevemente questo problema.

02

Descrivi un problema dell'azienda

Illustra brevemente questo problema.

03

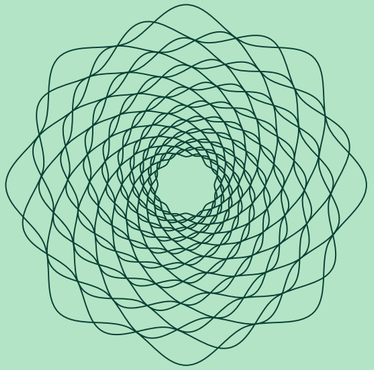
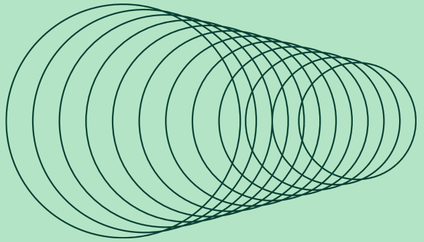
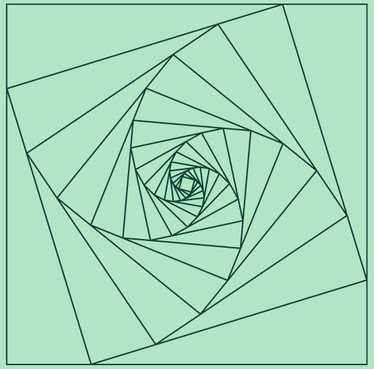
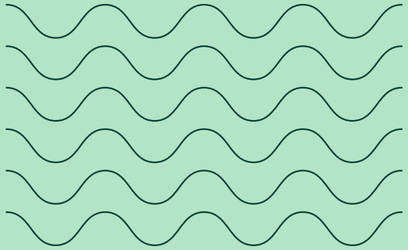
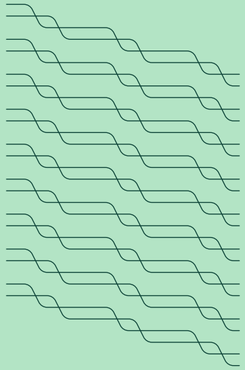
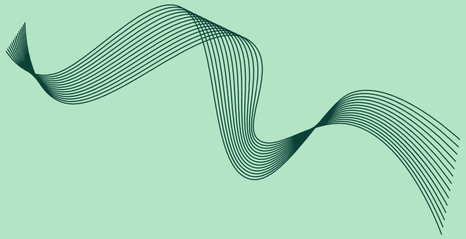
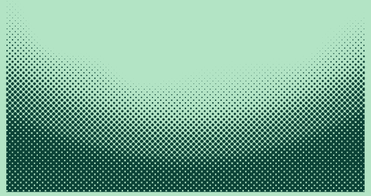
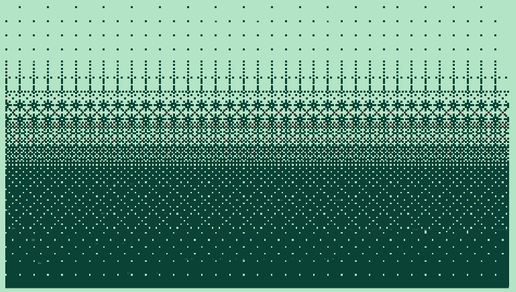
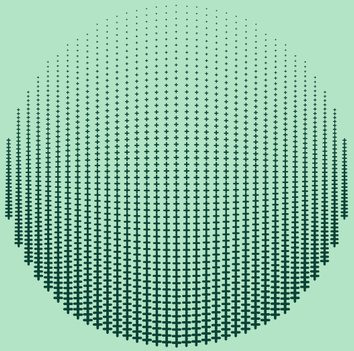
Descrivi un problema dell'azienda

Illustra brevemente questo problema.

Pagina di risorse

Usa queste risorse nella tua presentazione Canva. Buon lavoro!

Elimina questa pagina prima della presentazione.

Pagina di risorse

Usa queste risorse nella tua presentazione Canva. Buon lavoro!

Elimina questa pagina prima della presentazione.