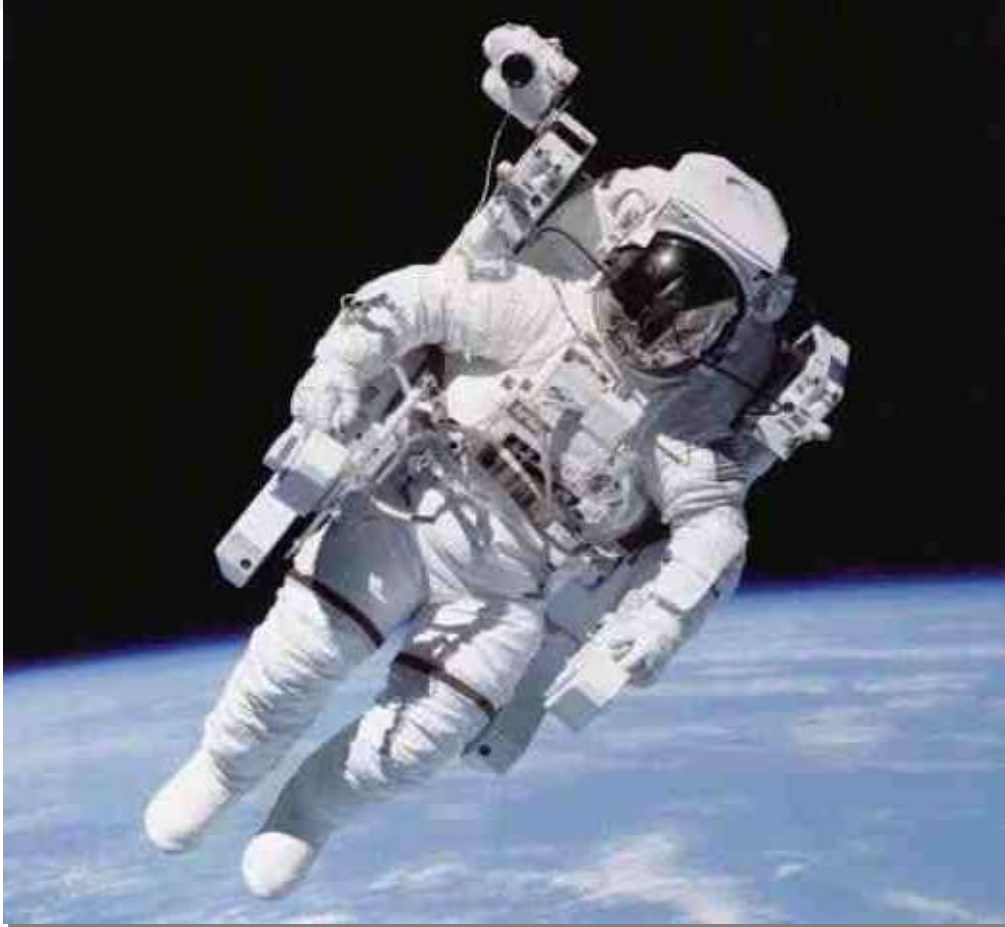


The Use of IVT on Lymph- and Lipoedema

Space Technology for Vascular Medicine

The Intermittent Vacuum Therapy – IVT –

WHY SPACE TECHNOLOGY?



>> No gravity – no flow ! <<

Absence of gravity leads to orthostatic complications and complications of the baroreceptor reflex.

WHY SPACE TECHNOLOGY?



>> No gravity – no flow ! <<

The solution: a Lower Body Negative Pressure Device (LBNPD). Developed by DLR and NASA

THE PROJECT

started in 1962.

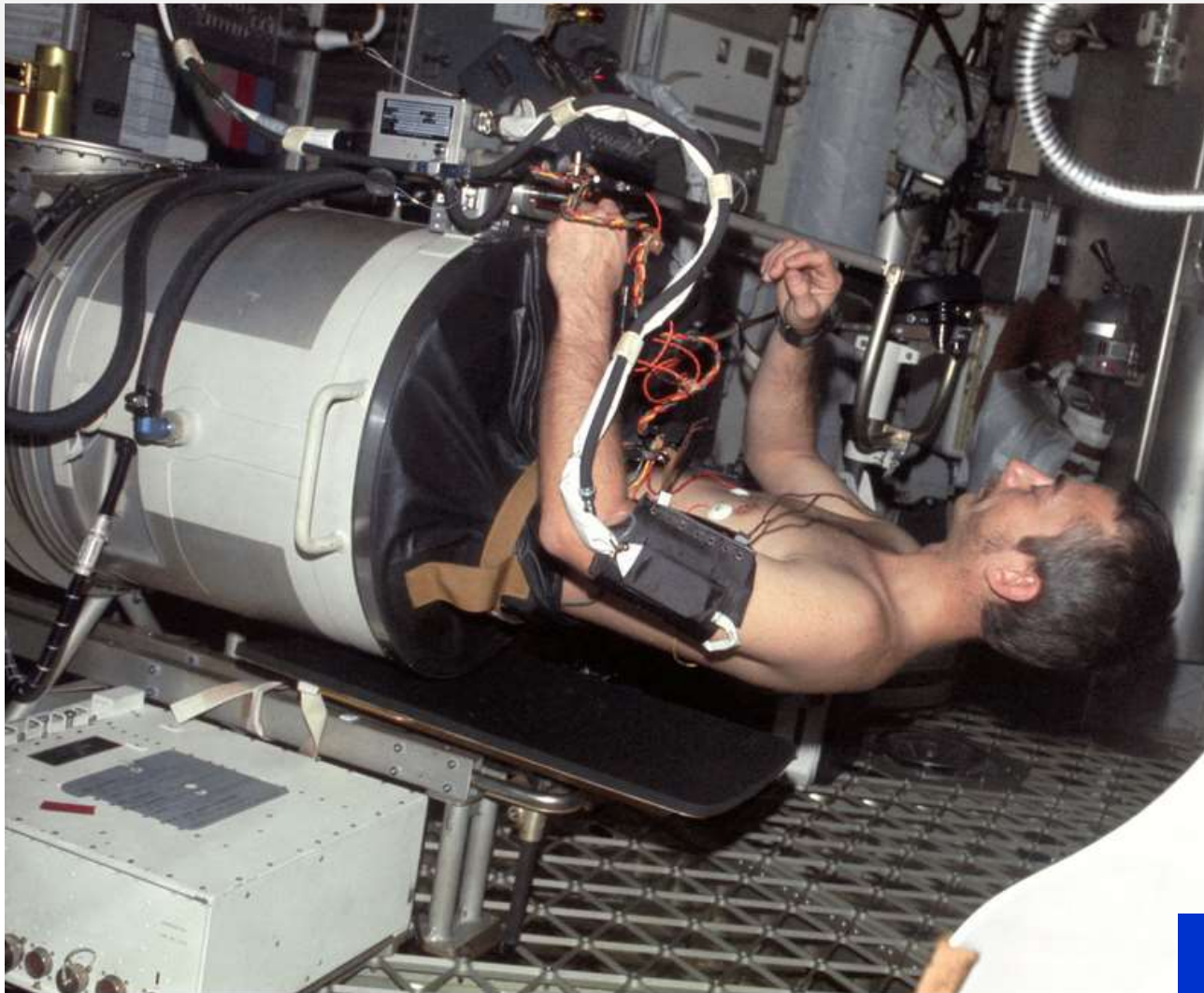
The physical principle:

permanent negative pressure
in a range till -70 mbar





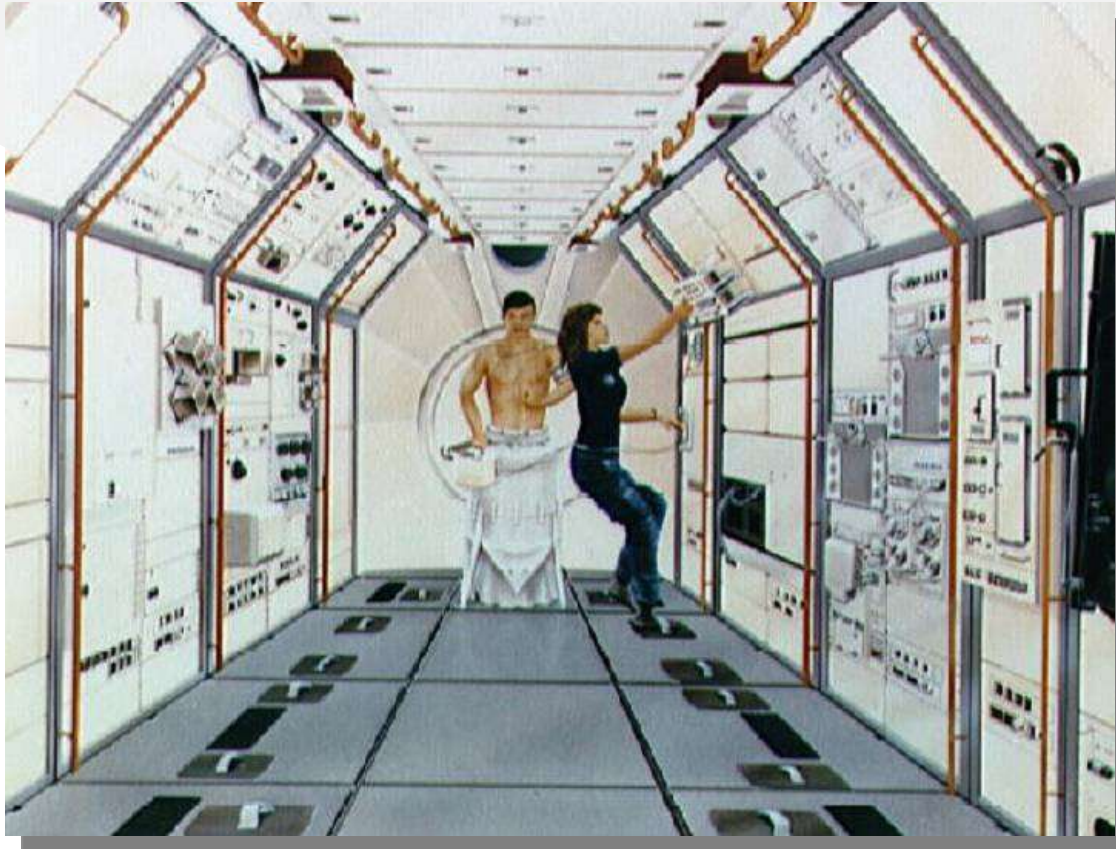
Astronaut Jack R. Lousma, Skylab 3 pilot, in the Lower Body Negative Pressure Device (LBNPD).



Scientist -
astronaut Owen
K. Garriott in a
LBNPD.

July – September
1973

developed for Space



Also in the Int'l Space Station (ISS) and MIR

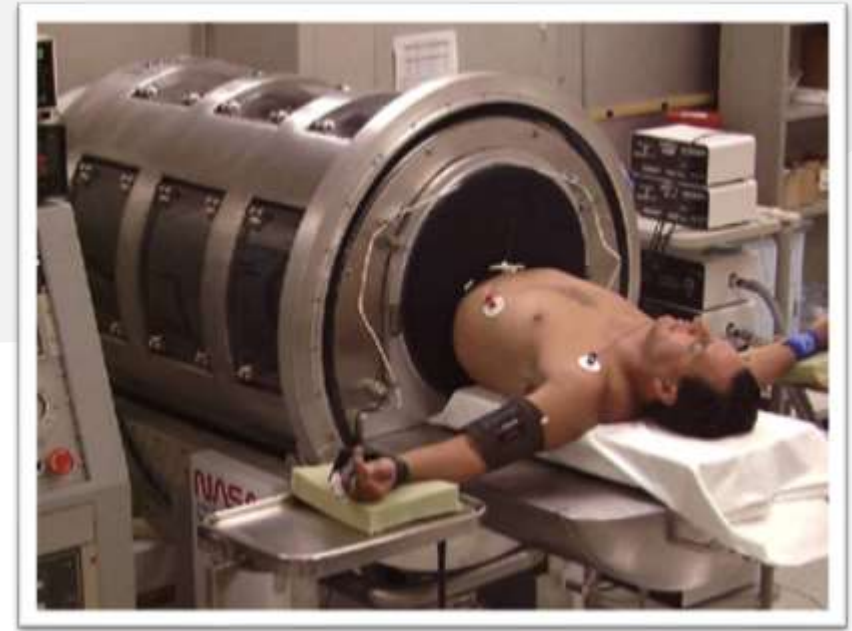


DLR



Plenty of medical research by Deutsches Zentrum für Luft- und Raumfahrt (DLR) and NASA

DLR



Permanent negative pressure (till -70 mbar) leads to a capillary dilation and prevents orthostatic complication.

(<http://nssdc.gsfc.nasa.gov/nmc/experimentDisplay.do?id=1973-027A-51>; Esch, B.T. et al., 2007).

Approved by NASA

FROM SPACE TO EARTH

The challenge: applying permanent and intermittent negative pressure



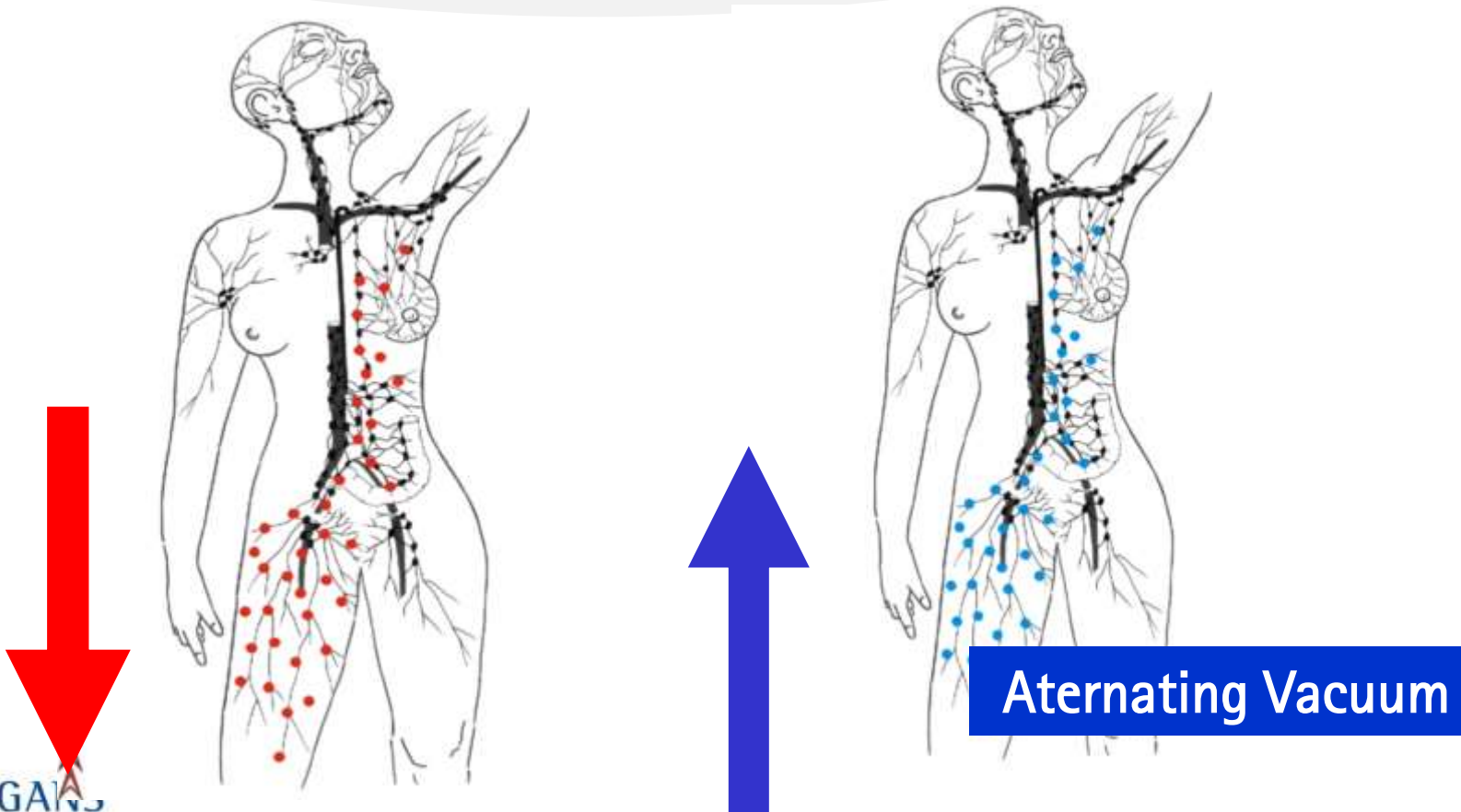
The physical principle is alternating negative pressure.
The nomenclature of the application is:

Intermittent Vacuum Therapy (-IVT-)

PRINCIPAL OF INTERMITTENT VACUUM THERAPY

Negative pressure phase

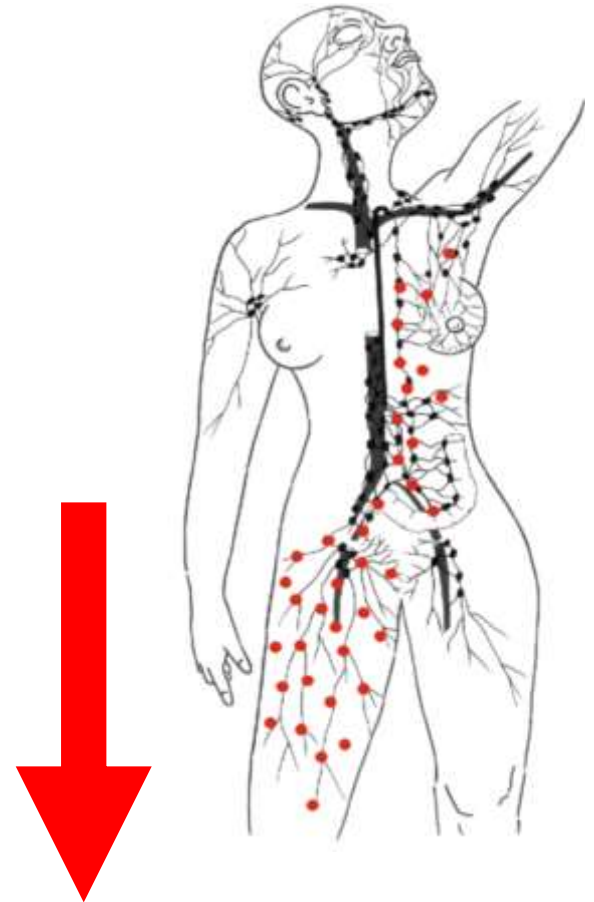
Atmospheric / positive pressure phase



PHYSIOLOGICAL RESPONSE

Negative pressure phase

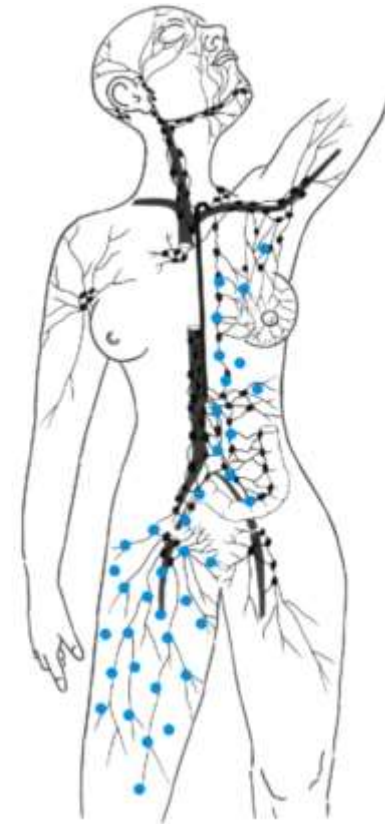
- Capillary dilation
- Capillarization
- Improvement of blood circulation in the periphery and musculature (micro perfusion)
- Infiltration of venous blood and lymphatic liquid



PHYSIOLOGICAL RESPONSE

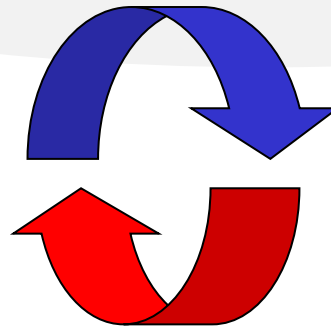
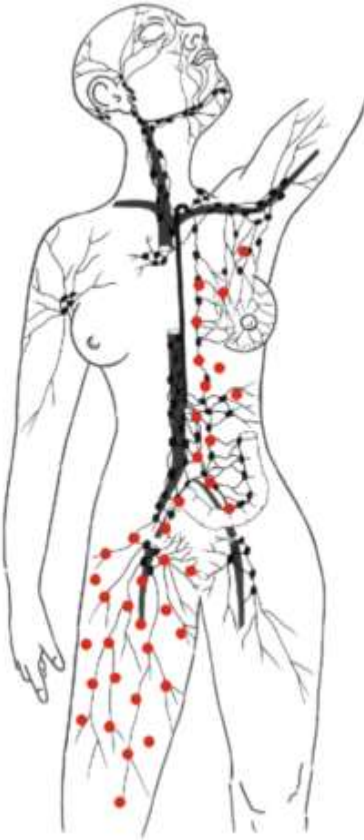
Atmospheric / positive pressure phase

- Promotion of venous back flow
- improved lymph flow / LD



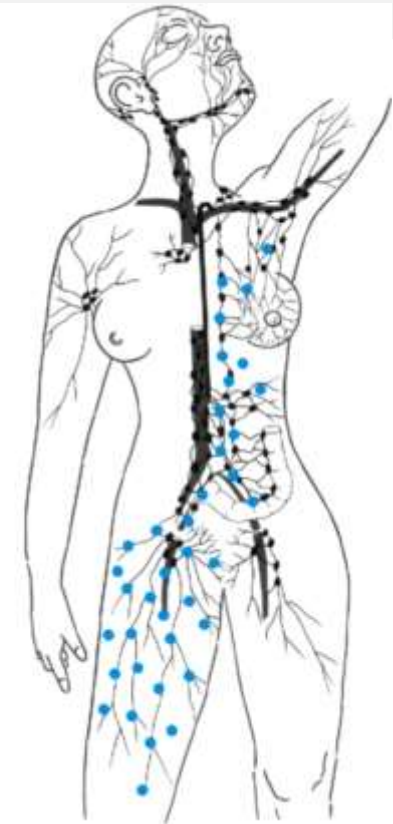
Negative pressure phase

Atmospheric / positive pressure phase



Exchange Effect:

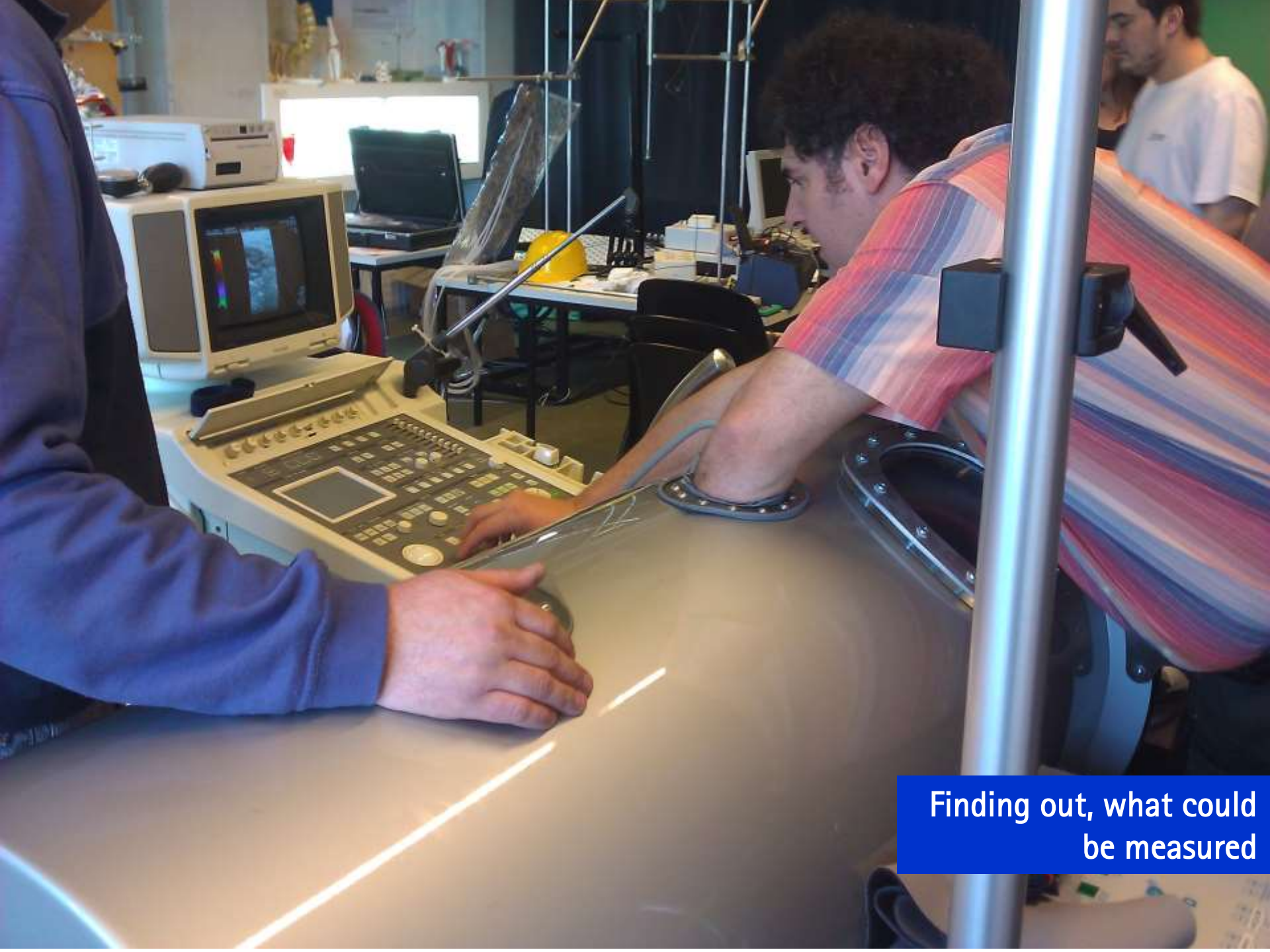
- Vascular training
- Total flow increase
- more Oxygen, $> pO_2$
- Neuronal stimulation
- Increases & protects Capillarization



Total Flow Increase



University of Brussels, Belgium. Insitute Research Lymphologique. Prof. J.P. Belgrado . Finding out, what could be measured



Finding out, what could
be measured

ENGINEERING DESIGN





Modern Design



Modern Design

REPORT OF EFFECTIVENESS ON PATIENTS WITH LYMPHATIC CONGESTION

Campisi, Corradino (President int'l Association of Lymphology), - Genova, Italy,

Total number of patients treated with IVT – Vacumed®: approx. 2.000

Treatment parameter: 21 sec. neg. pressure -35 till -40 mbar ./ 7 sec. atmosphere

Average treatment time: 20 min.

Average treatments of therapy: 12 within 2 weeks

Success rate: 90 %

Results: increase of lymph from periphery to center,
increase of capacity of lymph flow
reduction of circumference

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Lymphology 48(4) 161-215, December 2015



PATIENTS WITH LYMPHATIC CONGESTION

SECONDARY LYMPH OEDEMA

3 sessions , 45 min., with
VACUMED®



PATIENTS WITH LYMPHATIC CONGESTION

SECONDARY LYMPH OEDEMA (TRAUMATIC CONDITION. ANCLE SPRAIN)



1st day (after injury)



2nd day

2 sessions , 30 min., with VACUMED®

PATIENTS WITH LYMPHATIC CONGESTION

SECONDARY LYMPH OEDEMA, 50 YEARS , MALE
(POST THROMBOTIC SYNDROME)



Manual lymphatic drainage, compression
+ VACUMED®

PATIENTS WITH LYMPHATIC CONGESTION

PRIMARY LYMPH OEDEMA , 19 YEARS OLD FEMALE



Manual lymphatic drainage
+ VACUMED®

PATIENTS WITH LYMPHATIC CONGESTION

PRIMARY LYMPH OEDEMA , 25 YEARS OLD FEMALE

Manual lymphatic drainage
+ VACUMED®



PATIENTS WITH LYMPHATIC CONGESTION

PRIMARY LYMPH OEDEMA (CUTIS DEFORMIDATIS)



6 sessions , 30 min., withVACUMED®

PATIENTS WITH LYMPHATIC CONGESTION

PRIMARY LYMPH OEDEMA (CUTIS DEFORMIDATIS)

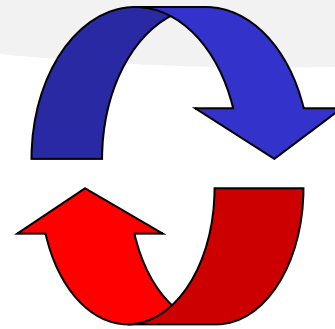
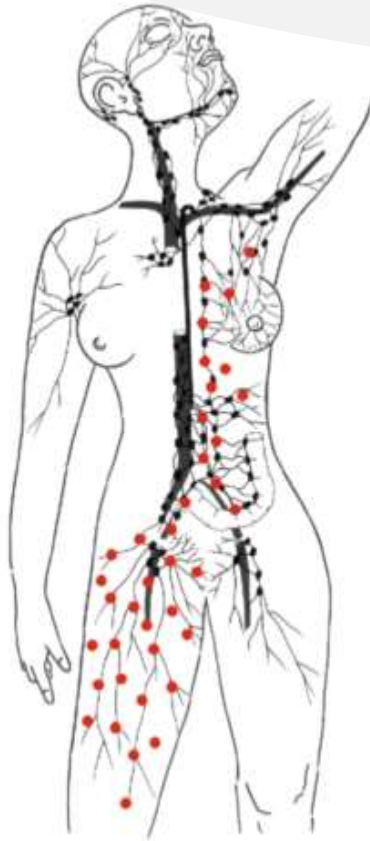
70% reduction of volume in
13 days. 6 sessions , 45 min.,
With VACUMED®



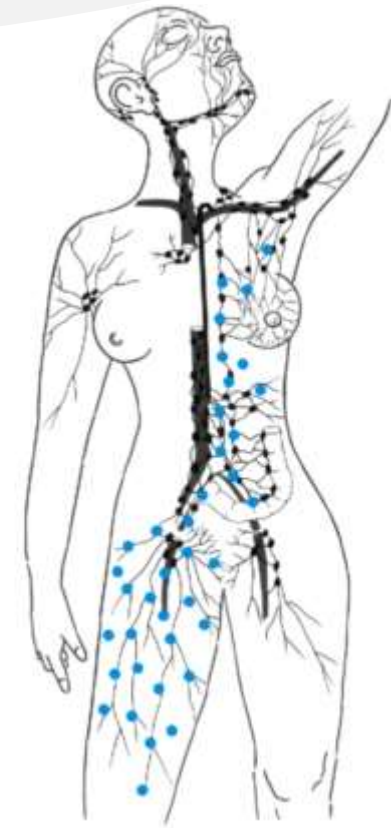
INNOVATION: INTERMITTENT VACUUM THERAPY -IVT-

Negative Pressure

Positive Pressure



Biophysical
Exchange Effect



INNOVATION: INTERMITTENT VACUUM THERAPY -IVT-

... because >Flow is the Name of the Game <!

Thank you