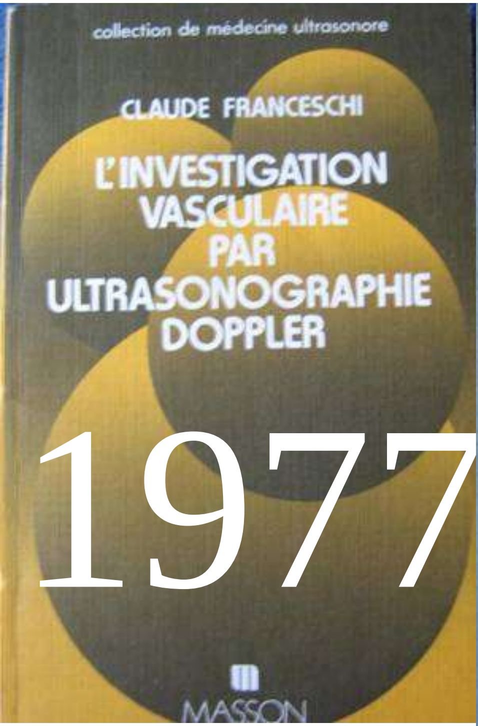
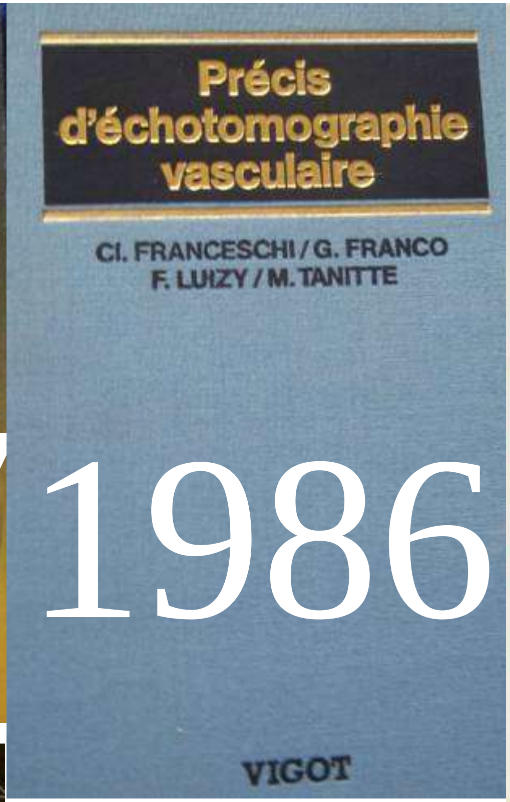
CORSO TEORICO-PRATICO DI FLEBOLOGIA CLINICA.

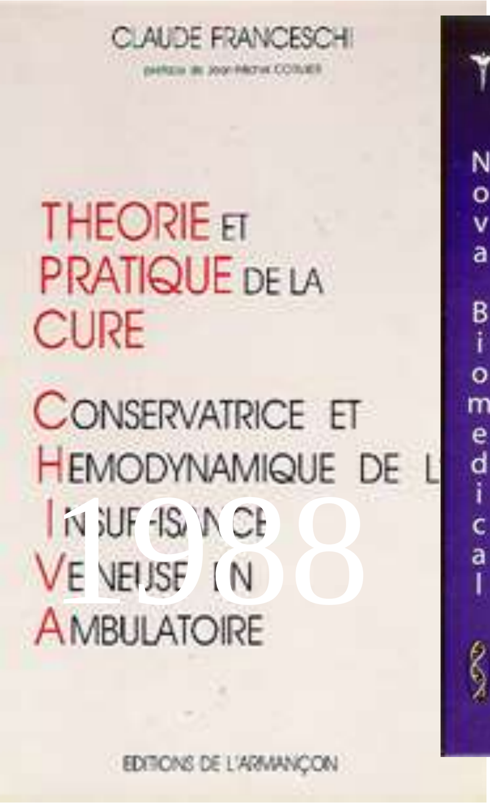
L'insufficienza Venosa degli Arti Inferiori

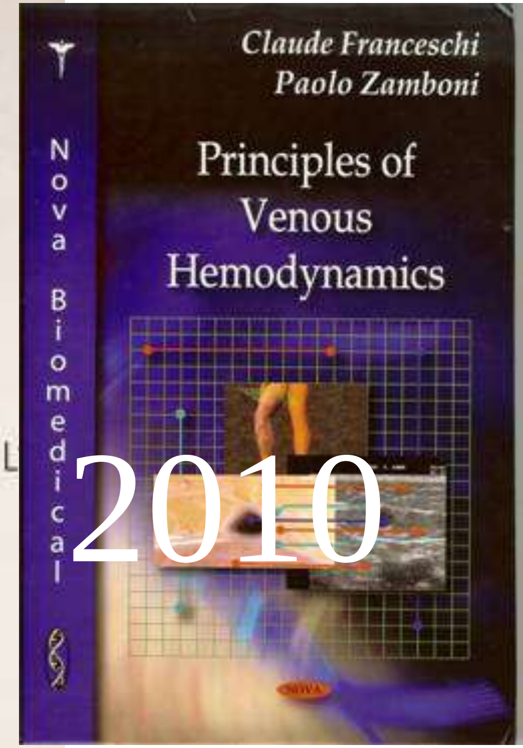
FIRENZE 24-25-26 Marzo 2011

Claude Franceschi Paris Cremona









Doppler ed ecografia hanno consentito a indagare in un modo complessivo il sistema venoso ed applicarli le leggi della mecanica dei fluidi tale da concepire un modello fisiopatologico coerente che ha rivoluzionato intrambi diagnosi e terapia.

Che cosa è l'Insufficienza Venosa?

Tutte le manifestazioni cliniche o pre-cliniche dell'incapacità del sistema venoso a assùmere le sue funzioni.

Manifestazioni cliniche

Dolori

Edemi

Danni trofici

Ulcere

Varici

Che sono le cause dell'Insufficienza Venosa?

Le varie alterazioni del sistema venoso, tranne quelle che non alterano la funzione.

Che sono varie alterazioni del sistema venoso che alterano la funzione venosa?

Quelle che non consentono più corrette:

-Alimentazione del cuore destro

-Termoregolazione

-Drenàggio dei tessuti

Che sono cosa è l'alimentazione del cuore destro?

Grazie a la sua compliance, il sistema venoso consente delle importanti variazioni di volume con pocche modoficazioni di pressione (effetto réservoir) in grado di fornire il cuore secondo le richieste del cuore

Esempio di disinescamento della pompa cardiaca

Che cosa è la Termoregolazione?

Omeostasi termica grazie allo scambio di calorie vene superficiale-aria ambiente (effetto radiatore).

Calore:Dilatazione venosa ed edema per Aumento di Pressione Residua dovuto alla riduzione delle Resistenze Microcircolatorie

Freddo : fenomeno inverso

Che cosa è il Drenàggio dei tessuti?

Lo scarico dei liquidi, elletrodi, molecole, CO^2, catabolici tossici dei tessuti

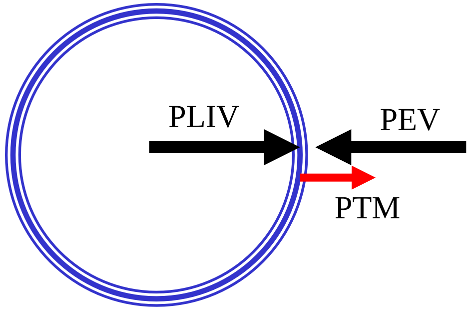
Mal Drenaggio : Edema, infiammazione, necrosi, infezione

Che sono sono gli effetti fisiopatologici delle alterazioni del sistema venoso che alterano la funzione venosa?

L’eccesso di pressione venosa che dilata le vene (saturazione dell’effeto reservoir,  ralentamento dell’effetto radiatore,  sfiancamento varicoso o no delle vene.  bloccaggio del drenàggio. 

Ma, che cosa è la pressione venosa?

Le varie forze di pressione che risultano in una pressione CAPITALE, la Pressione Trans-murale PTM



PTM

=

Pressione Laterale Intra-Venosa (PLIV)

–

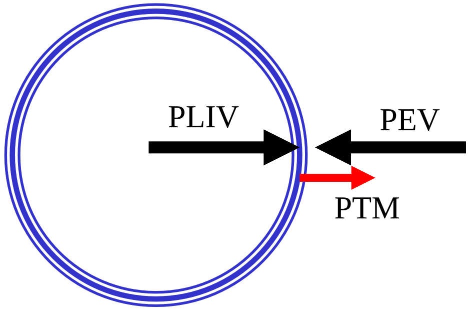
Pressione Extra-Venosa (PEV)

Al nivello delle vene e del versante venoso delle micro-circolazione

Dalla PTM dipende

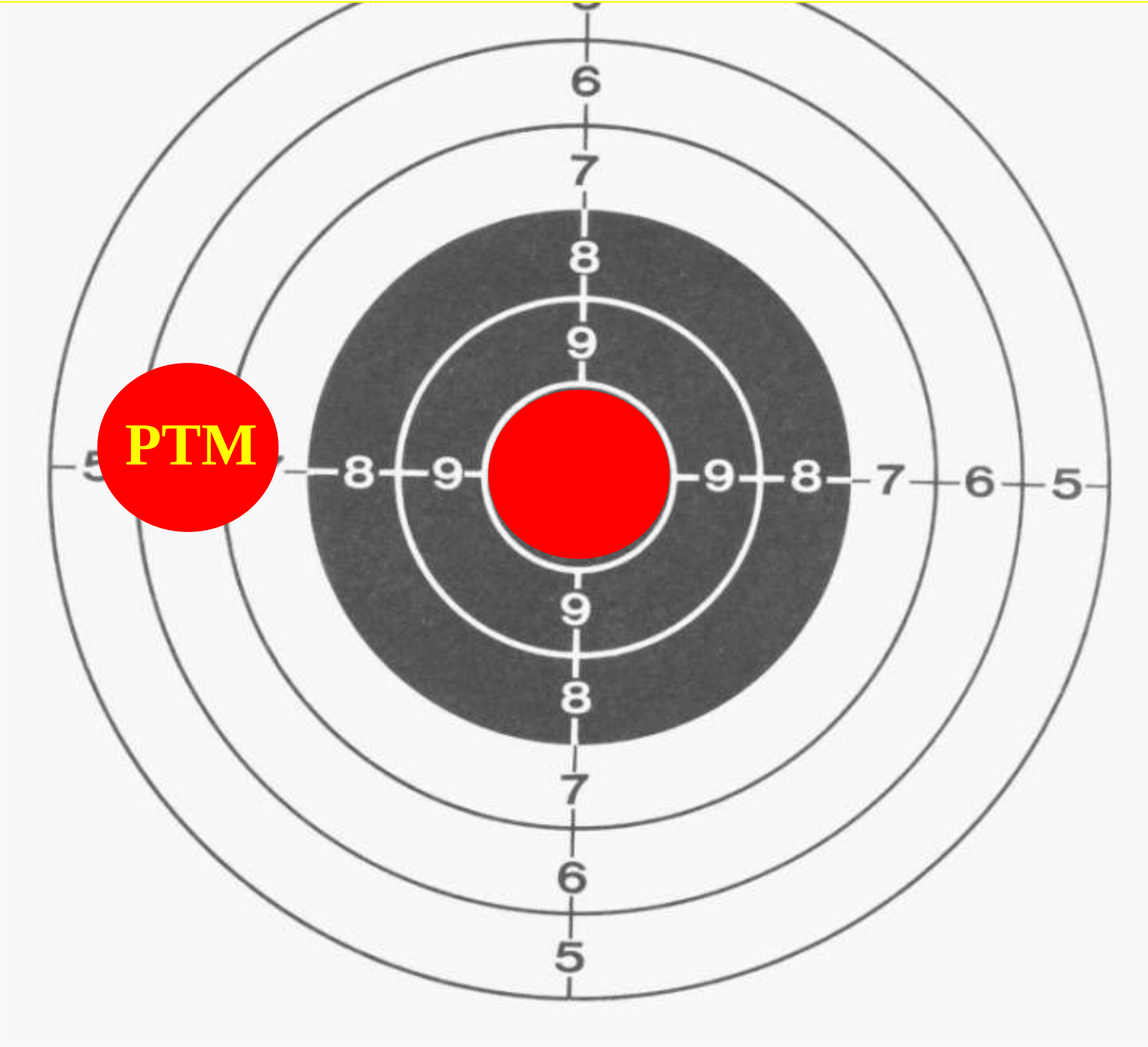
il calibro e volume venoso

il drenaggio dei tessuti

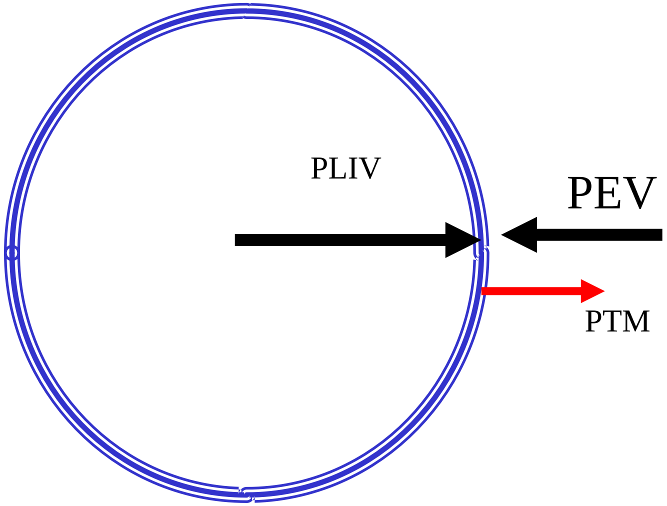


VENE E CAPILLARI

Il Sistema Venoso deve mantenere una PTM ideale



Cosi, dobbiamo conoscere da dove vengono la PEV e la PLIV



PEV

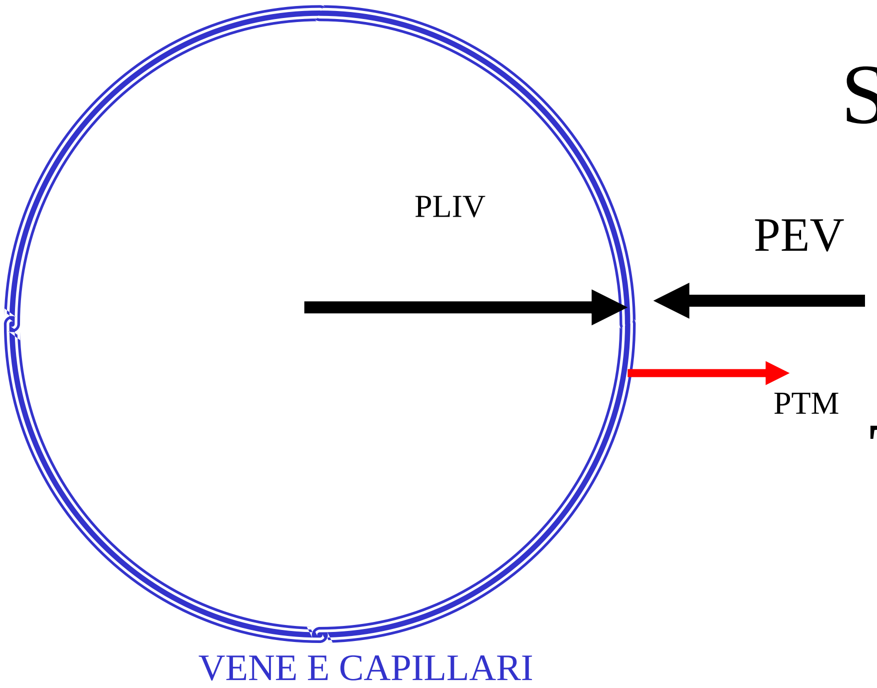
=

Pressione Tessutale PT

+

Pressione Atmosferica PAt

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

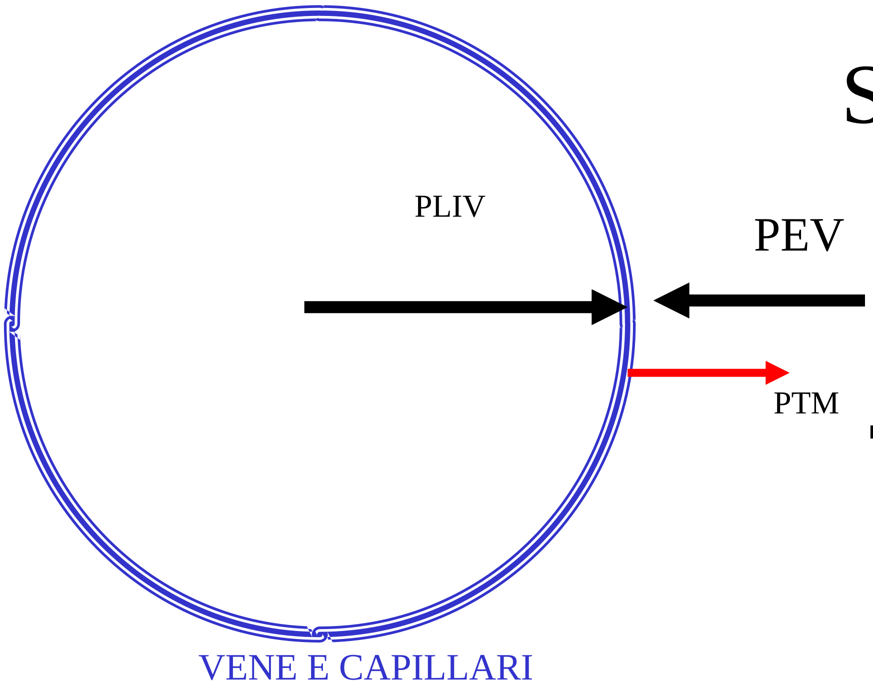


PEV

Si riduce la PTM quando aumenta la PEV: COMPRESSIONE

Terapia emodinamica di base

Cosi, dobbiamo conoscere da dove vengono la PEV e la PLIV

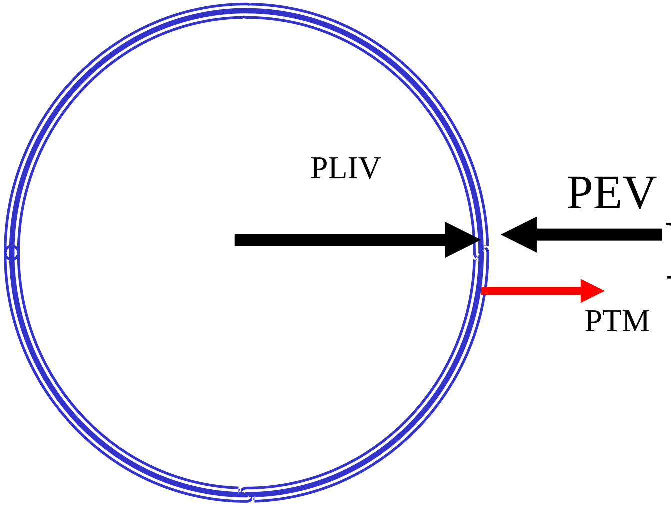


PLIV

Si riduce la PTM quando aumenta la PEV: COMPRESSIONE

Terapia emodinamica di base

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV



PLIV

=

Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

=

Pressione Idrostatica PI

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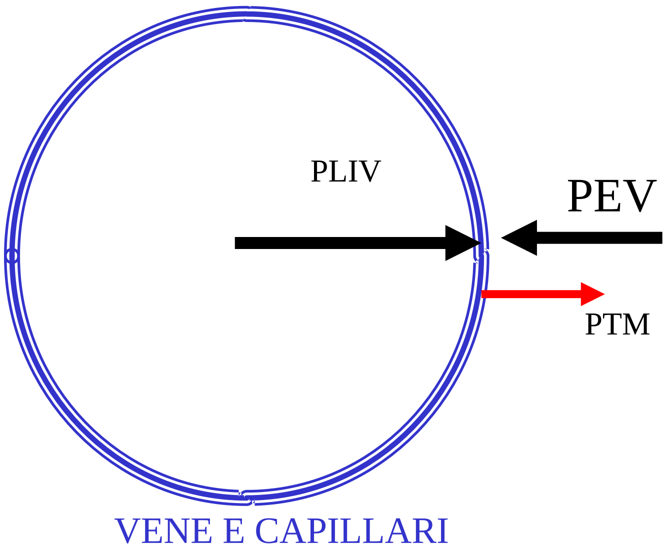
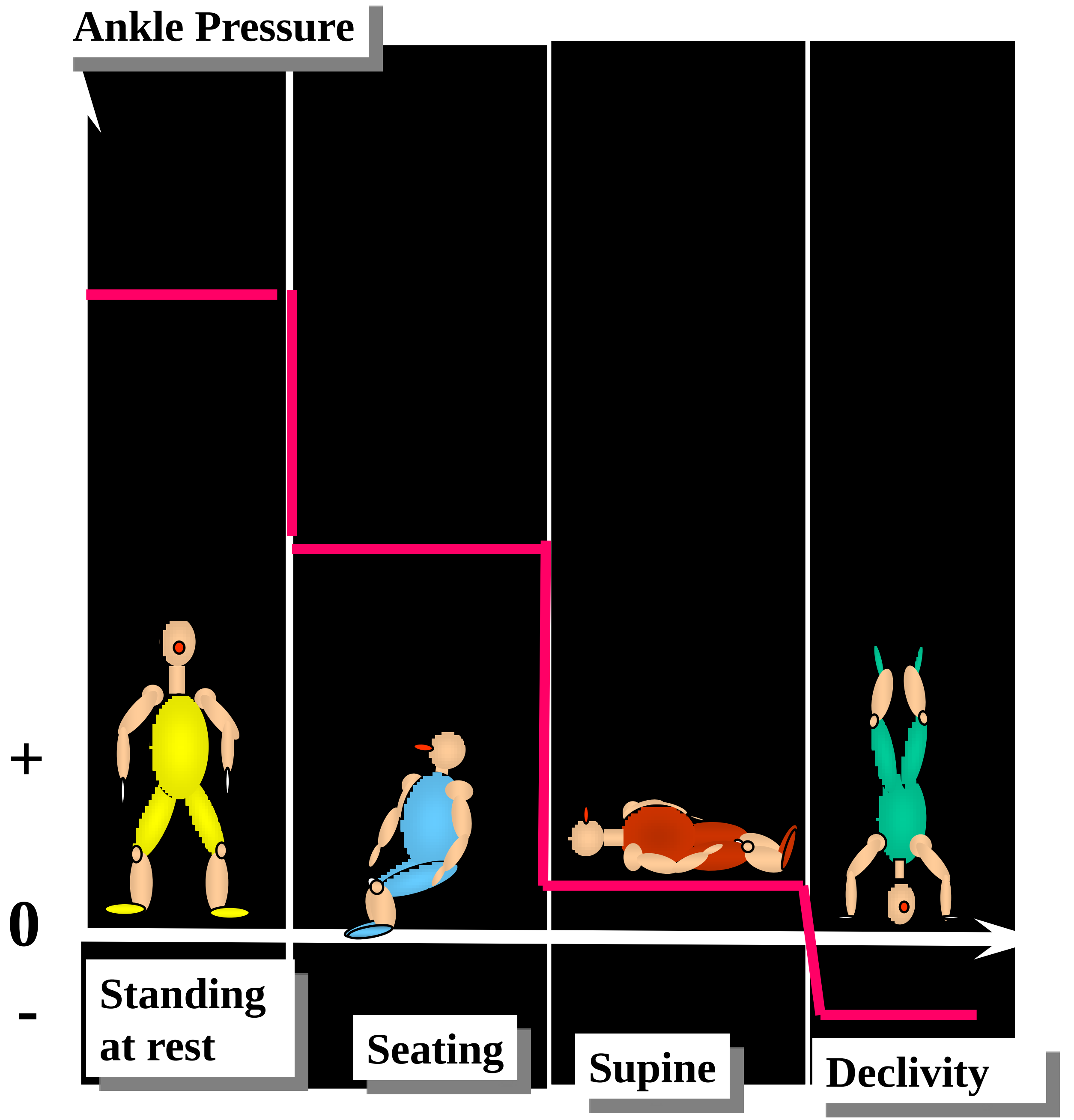
Pressione di Pompa Valvulo-Muscolare PPVM



Pressione Idrostatica PI varia con la postura perche dipende dall'altezza della colonna di pressione



Ankle Pressure
+
0
-
Standing at rest
Seating
Supine
Declivity

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

=

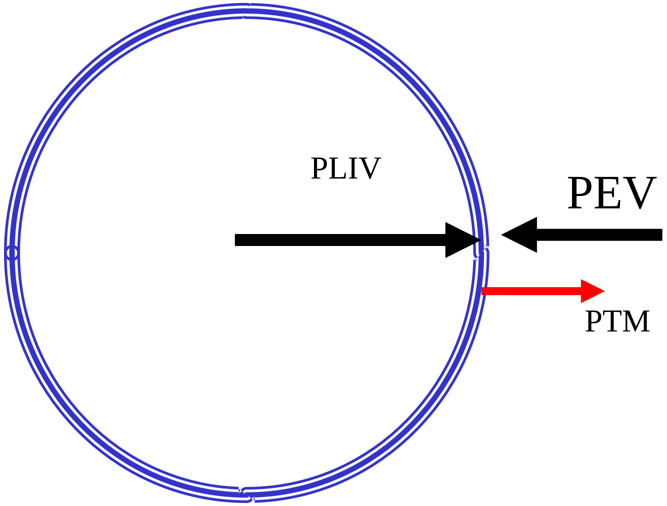
Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM



VENE E CAPILLARI

Pressione Idrostatica PI

In piedi immobile le valvole sono aperte e la PI rimane alta e mantene una PTM troppo alta portando all'insufficienza venosa

Effetto patologgico per chi, non ostante un sistema venoso normale, sta sempre fermo in piedi: Ribilanciamo la PTM con una compressione.

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

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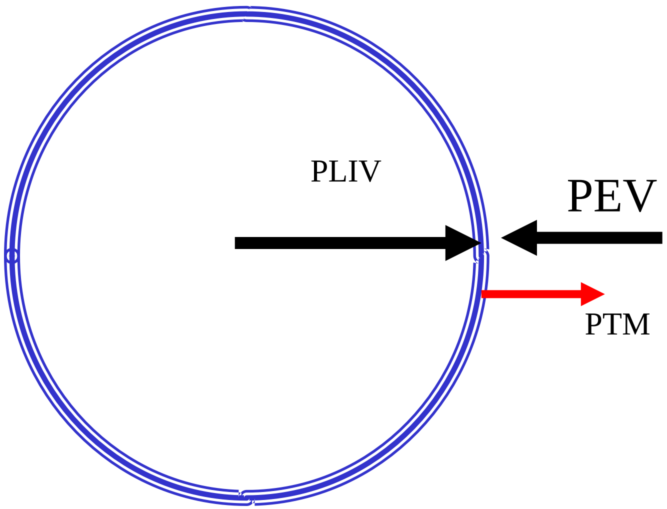
Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

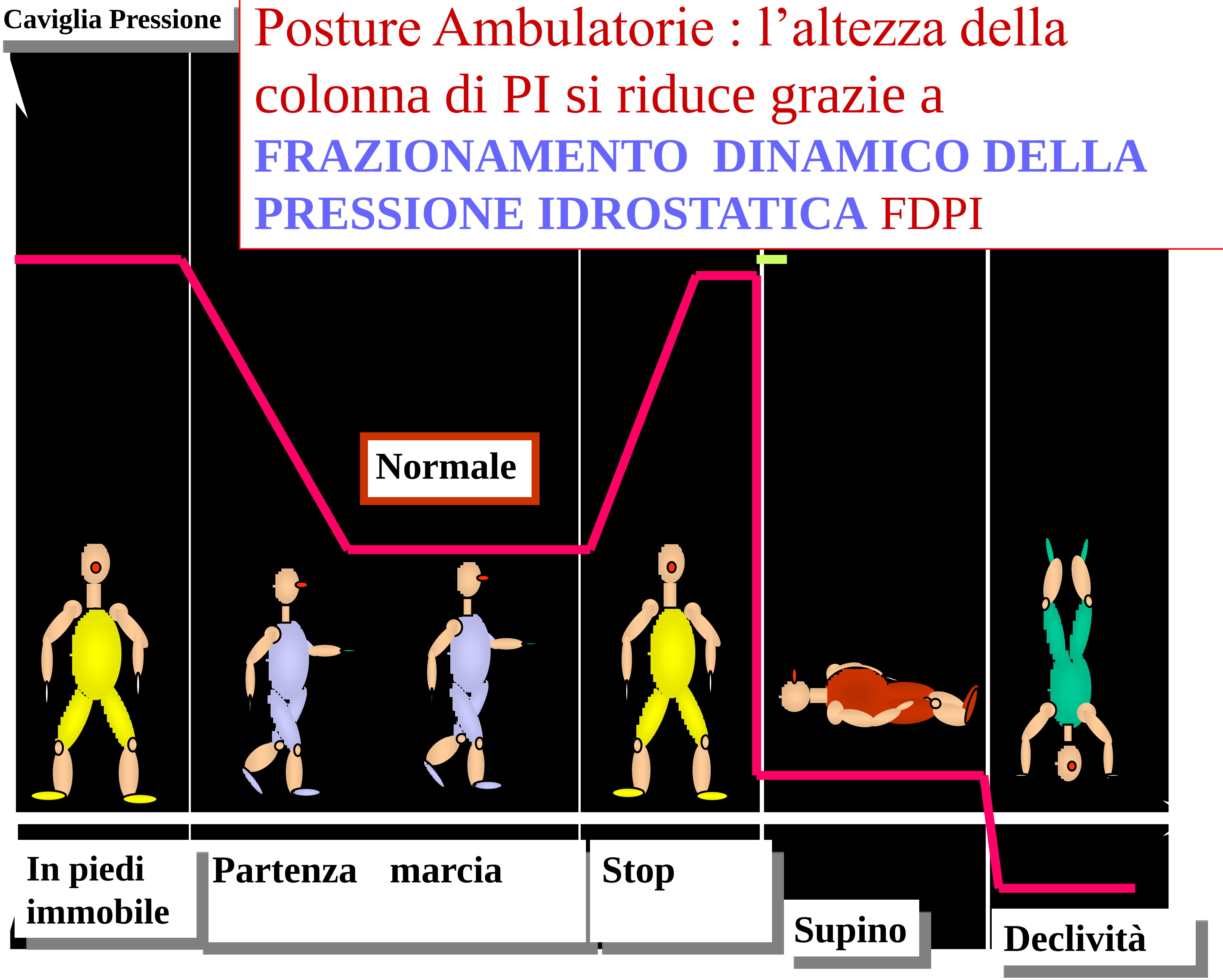
Pressione di Pompa Valvulo-Muscolare PPVM

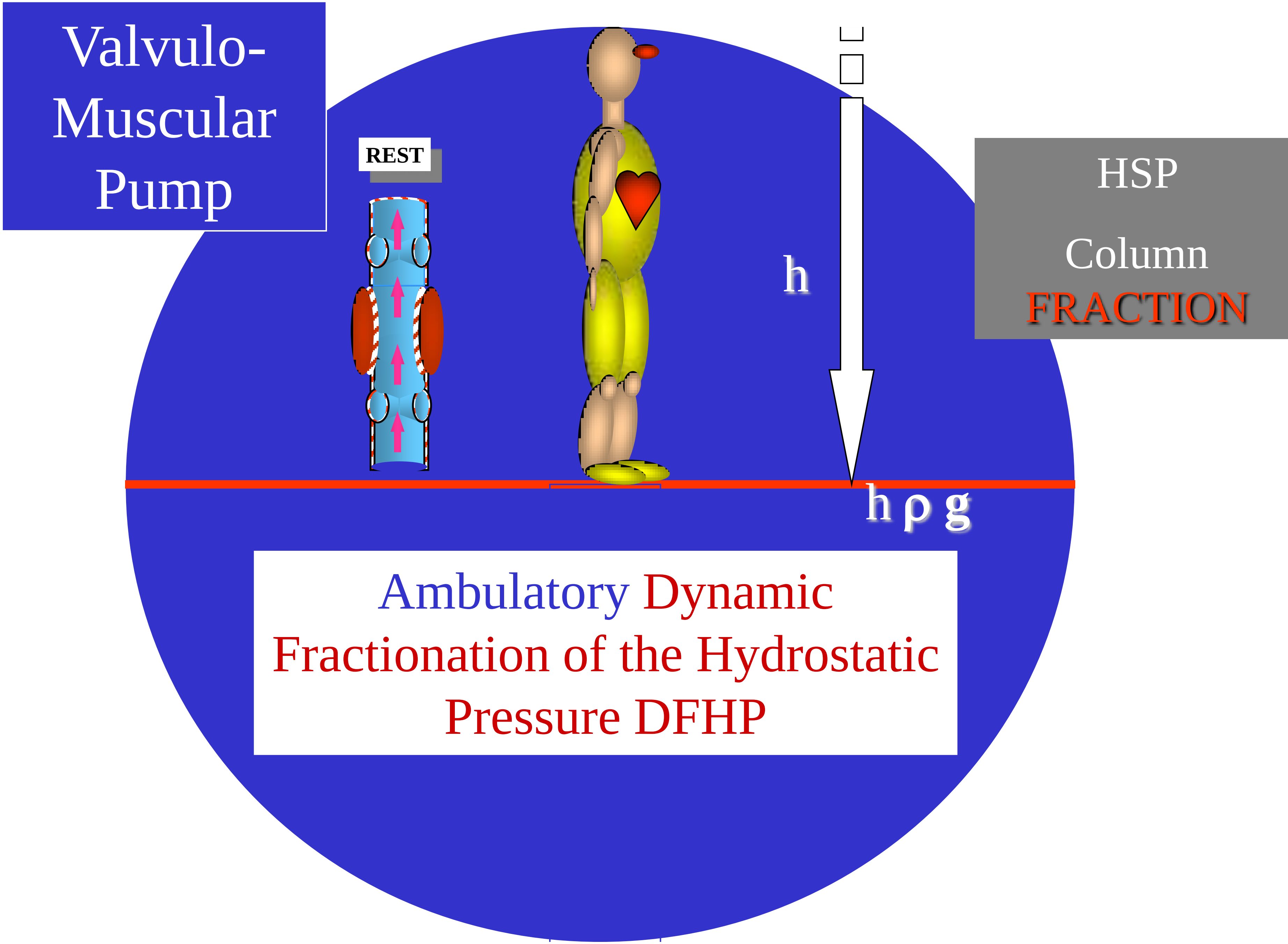


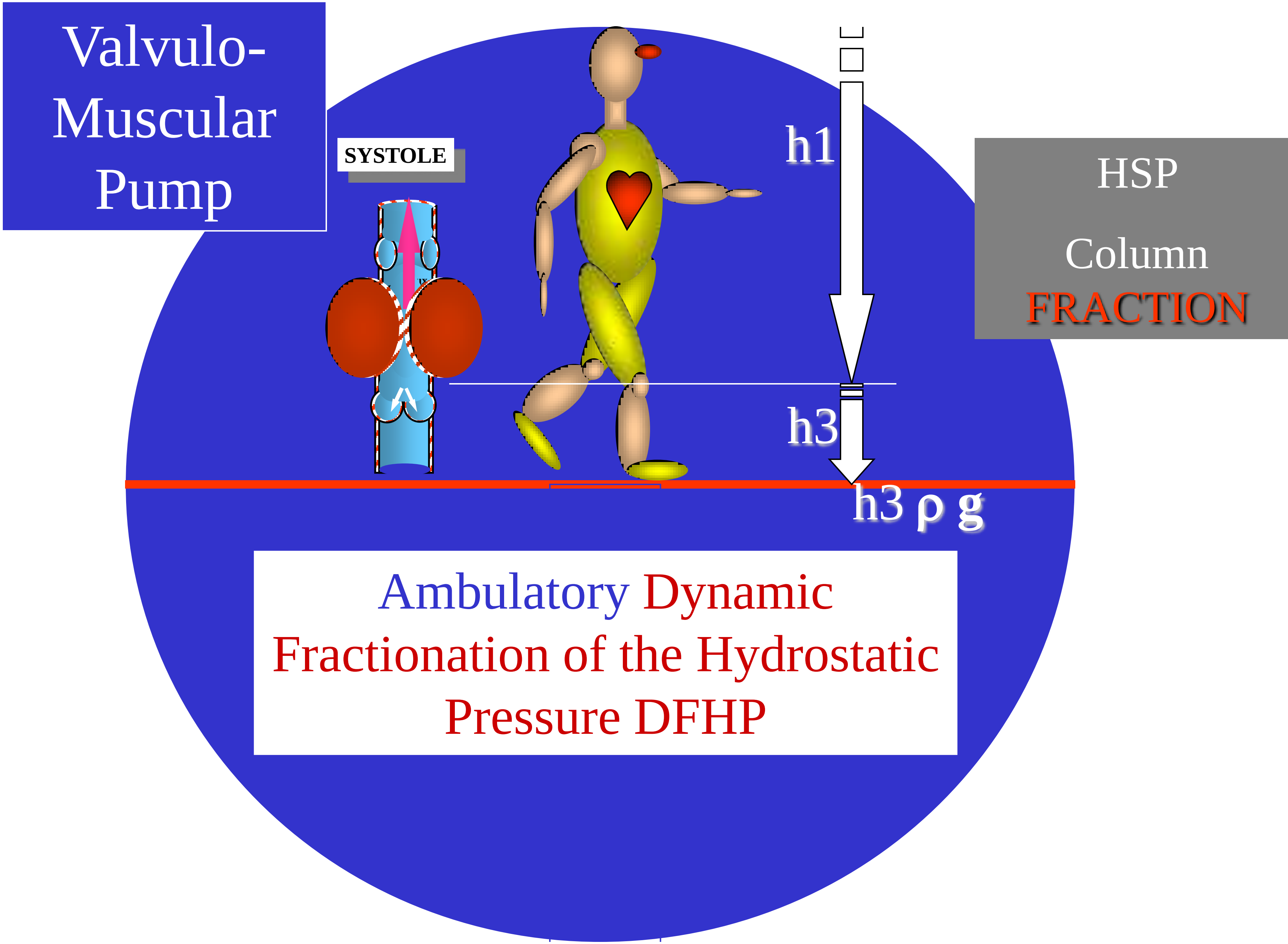
O facciamolo caminare perche,

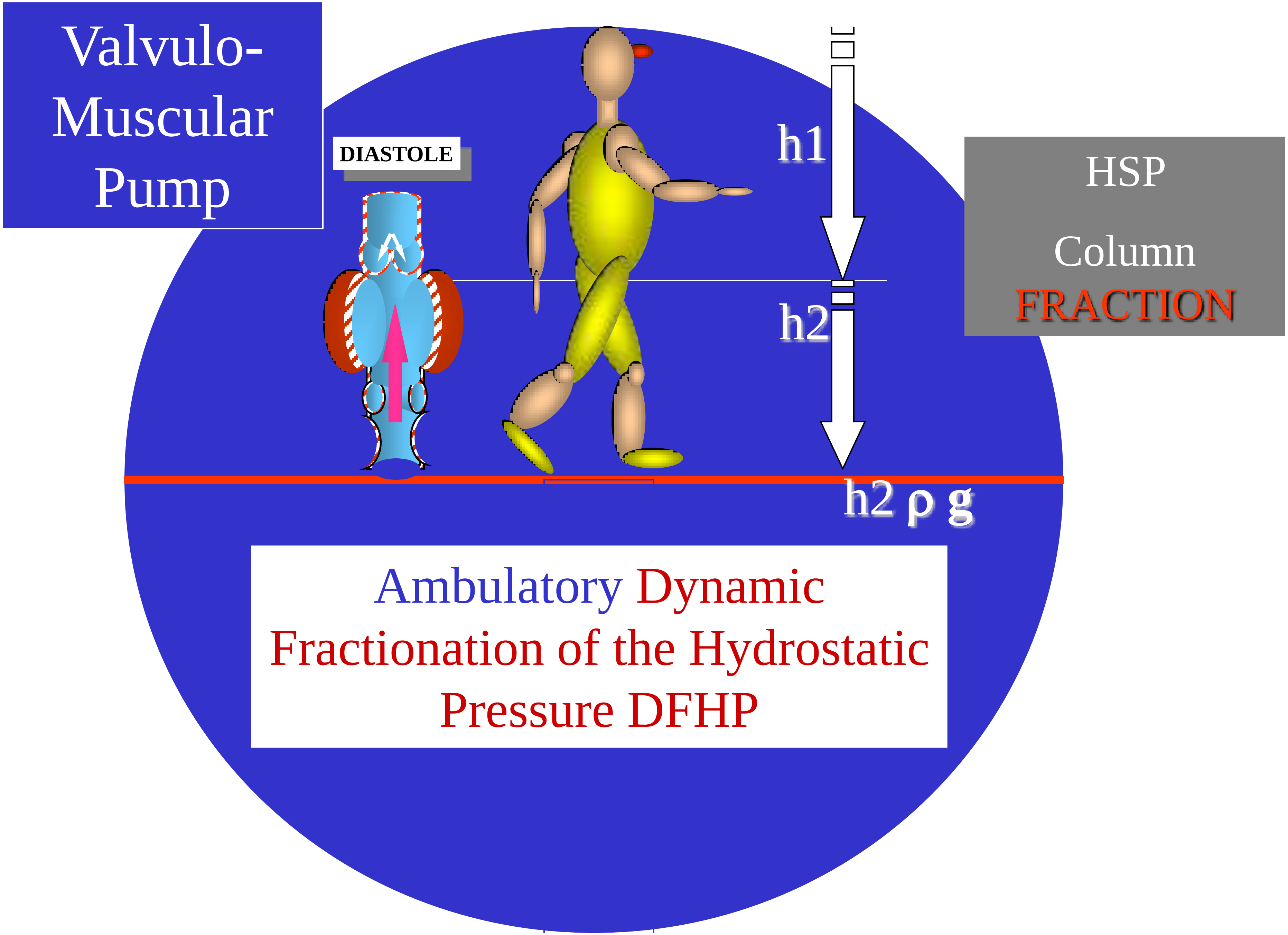
Grazie alla marcia, si attiva la Pompa Valvulo-Muscolare che Fraziona dinamicamente la PI

Posture Ambulatorie : l’altezza della colonna di PI si riduce grazie a **FRAZIONAMENTO DINAMICO DELLA PRESSIONE IDROSTATICA** FDPI

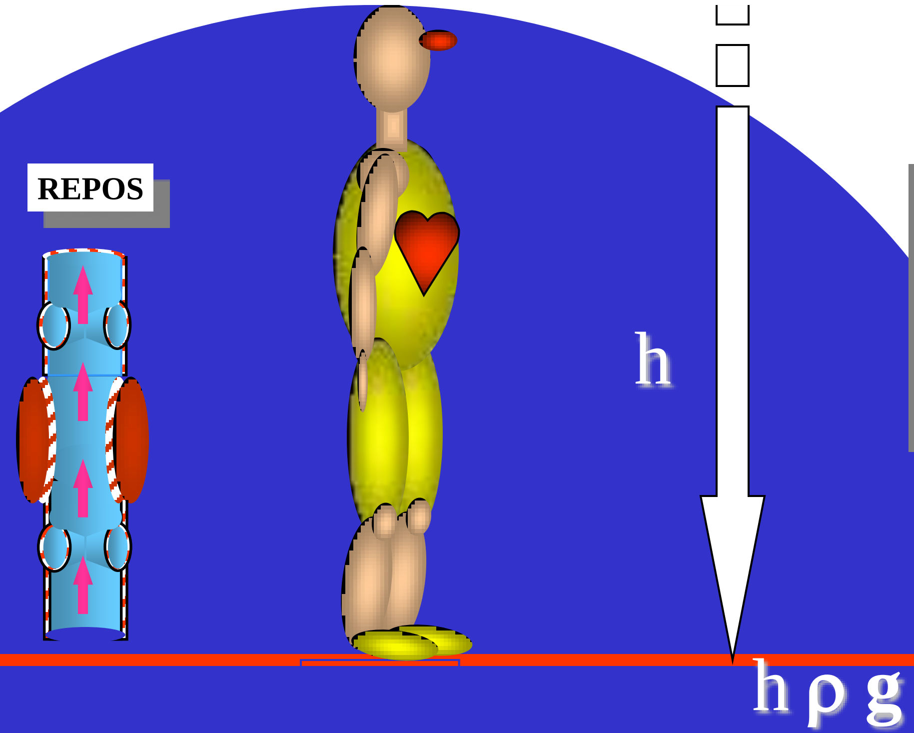



Valvulo-Muscular Pump
REST
h
HSP
Column
FRACTION
h ρ g
Ambulatory Dynamic Fractionation of the Hydrostatic Pressure DFHP


Valvulo-
Muscular
Pump
SYSTOLE
h1
h3
h3 ρ g
HSP
Column
FRACTION
Ambulatory Dynamic
Fractionation of the Hydrostatic
Pressure DFHP

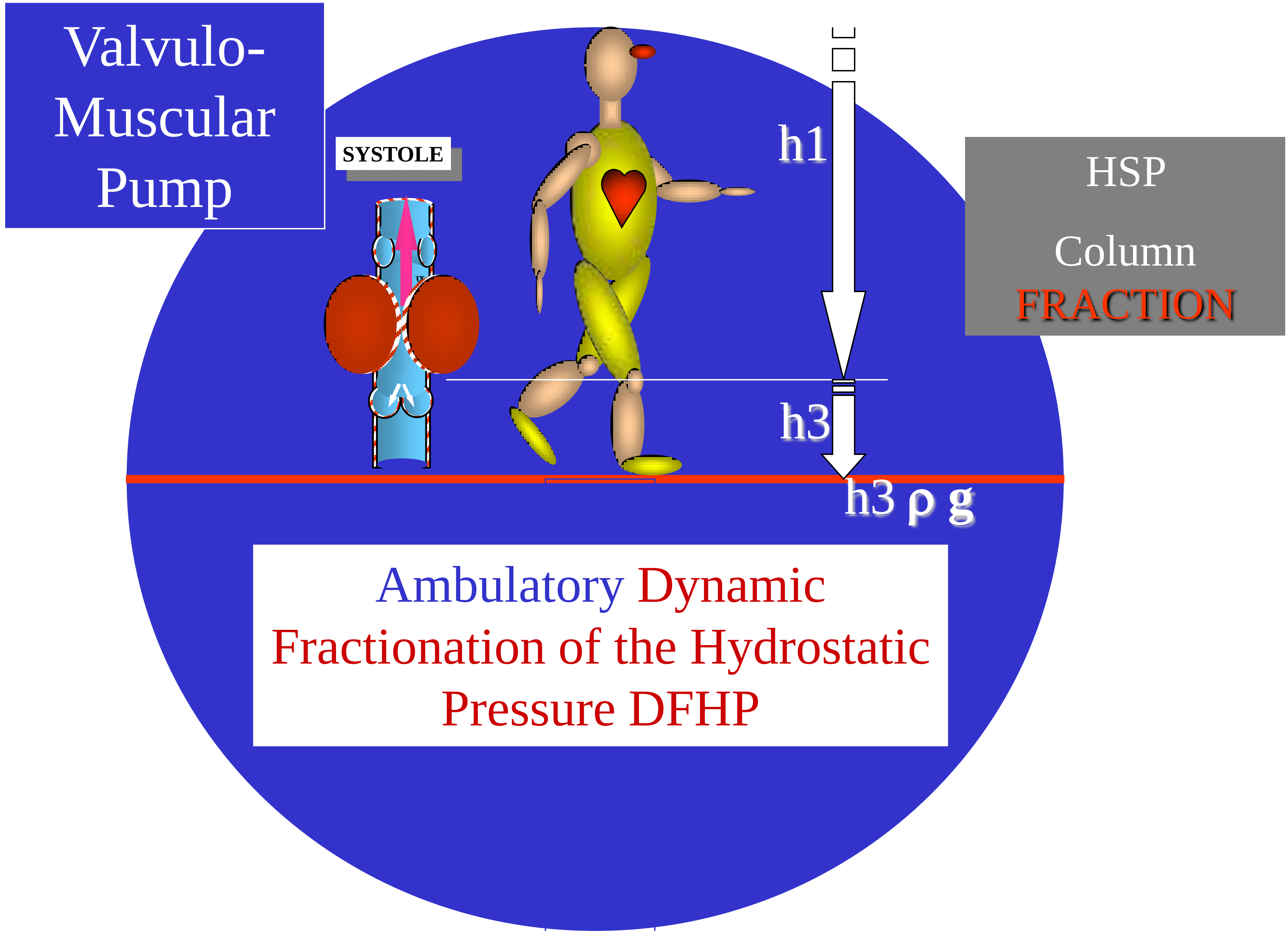

Valvulo-
Muscular
Pump
DIASTOLE
h1
h2
h2 ρ g
HSP
Column
FRACTION
Ambulatory Dynamic
Fractionation of the Hydrostatic
Pressure DFHP

Valvulo-Muscular Pump



HSP
Column
FRACTION

Ambulatory Dynamic Fractionation of the Hydrostatic Pressure DFHP


Valvulo-
Muscular
Pump
SYSTOLE
h1
h3
h3 ρ g
HSP
Column
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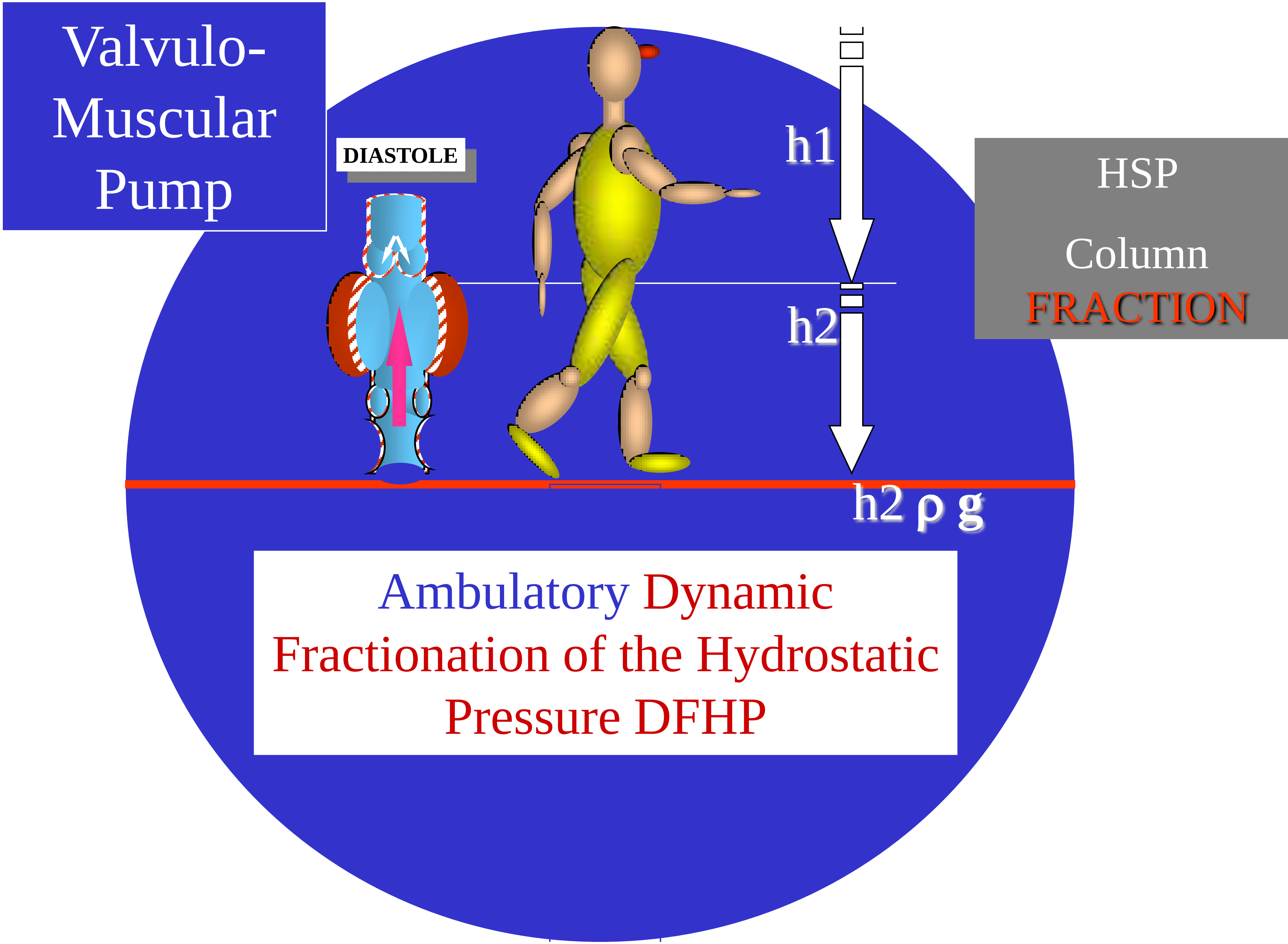
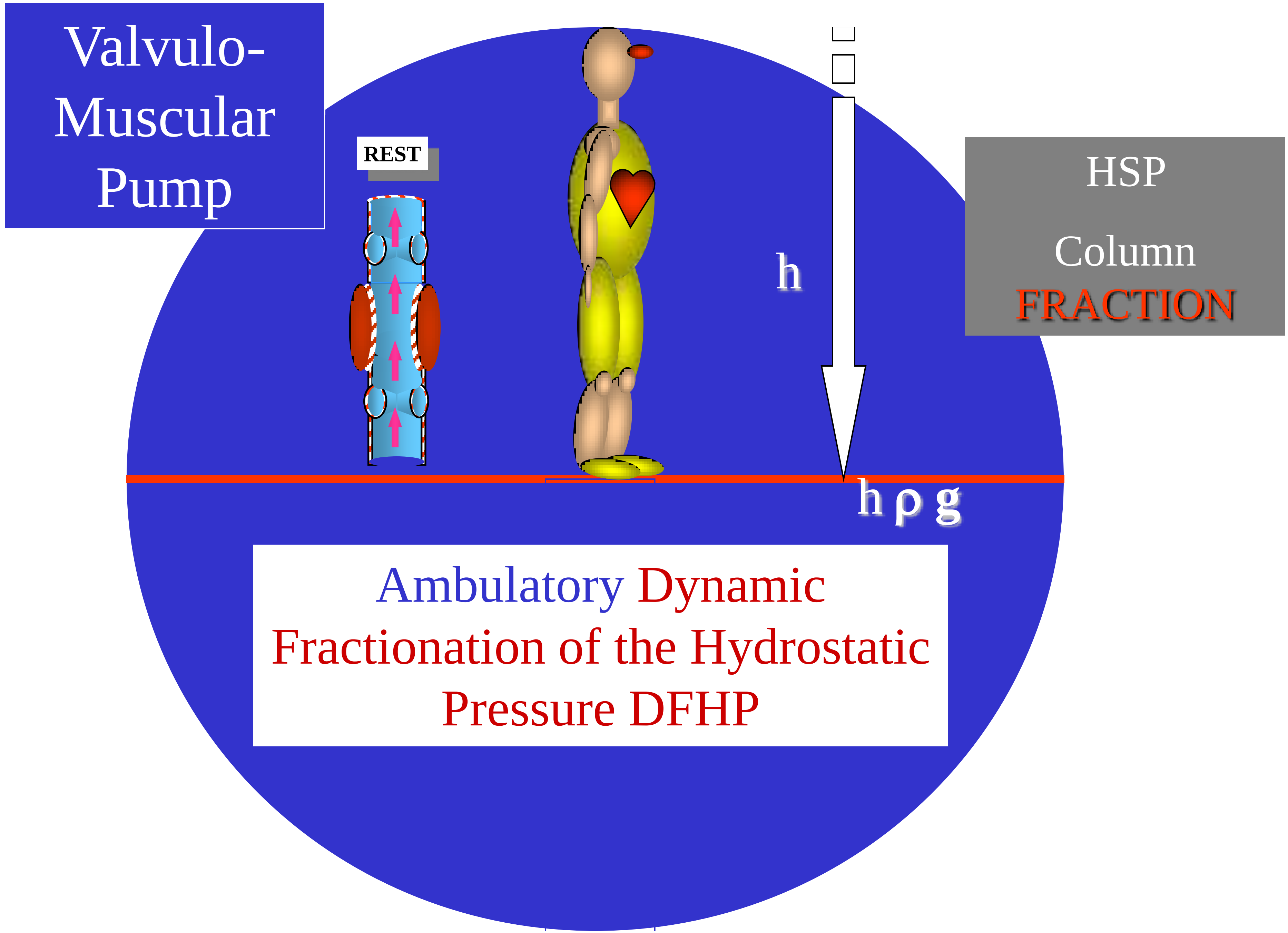
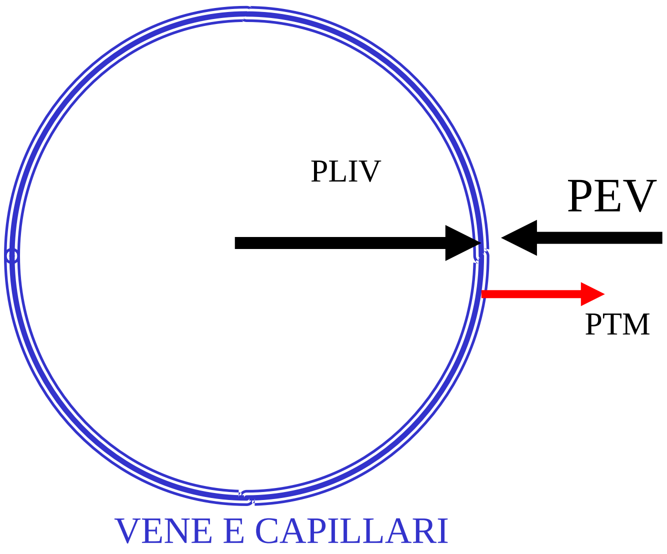


Valvulo-Muscular Pump
DIASTOLE
h1
h2
h2 ρ g
HSP
Column
FRACTION
Ambulatory Dynamic Fractionation of the Hydrostatic Pressure DFHP


Valvulo-
Muscular
Pump
REST
h
HSP
Column
FRACTION
h ρ g
Ambulatory Dynamic
Fractionation of the Hydrostatic
Pressure DFHP

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

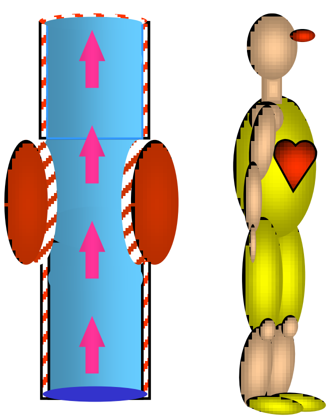
OK, ma se la PVM non funziona per esempio per incontinenza avlvolare?

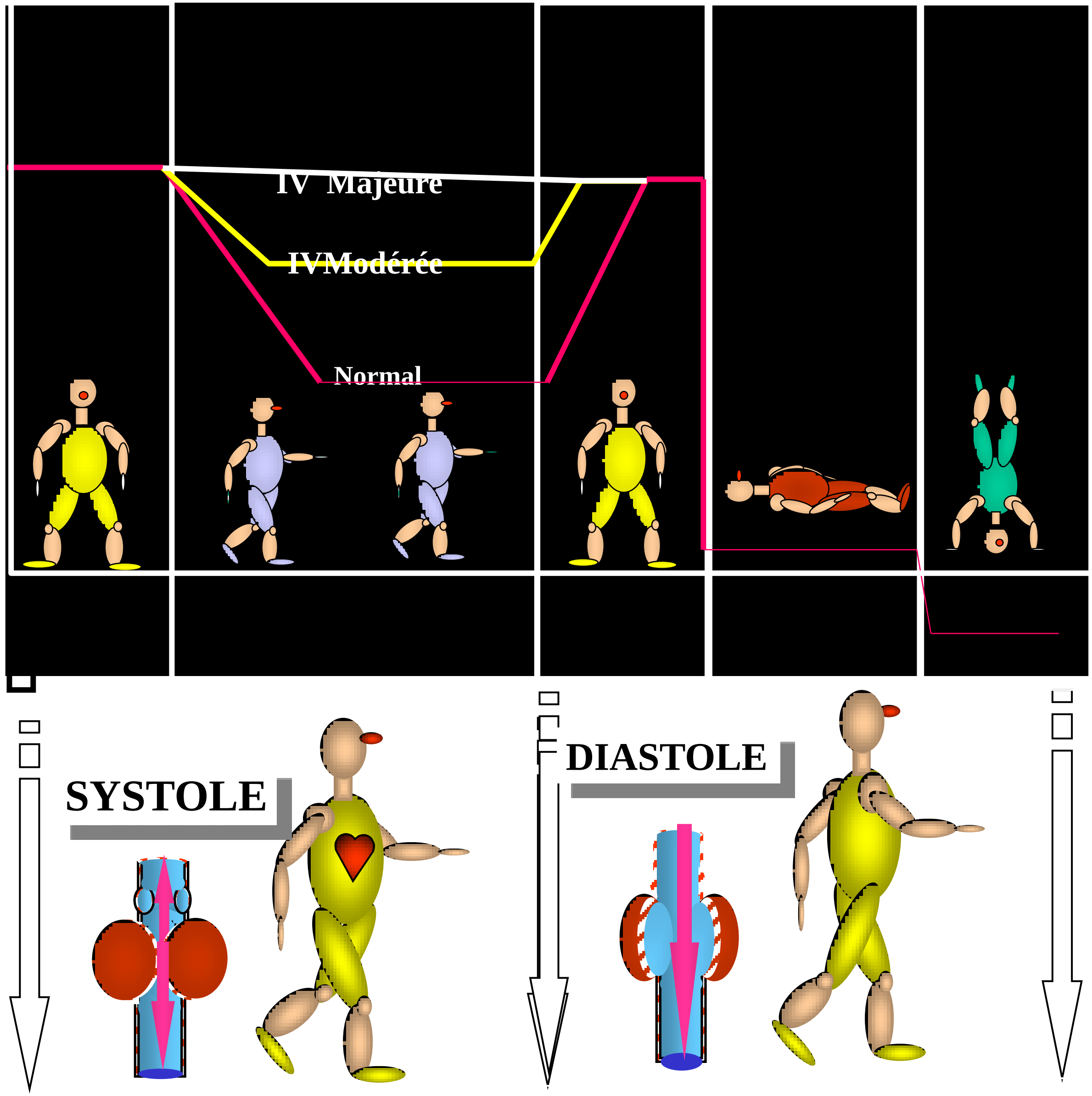


Il FDPI non puo più fare il suo lavoro in proporzione dell’importanza dell’incontineza valvolare

Difetto di FDPI

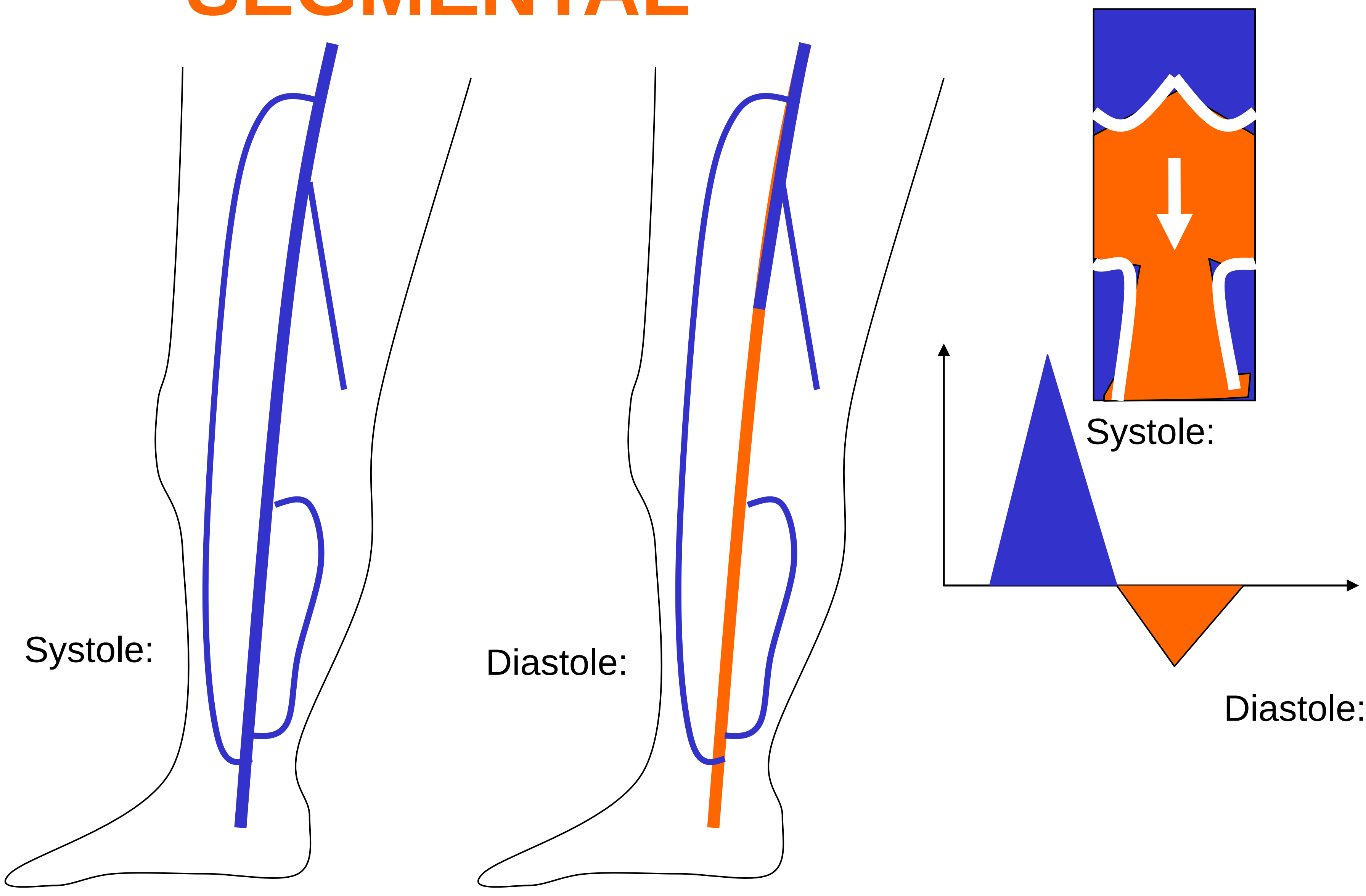
REFLUSSO PROFONDO DIRETTO





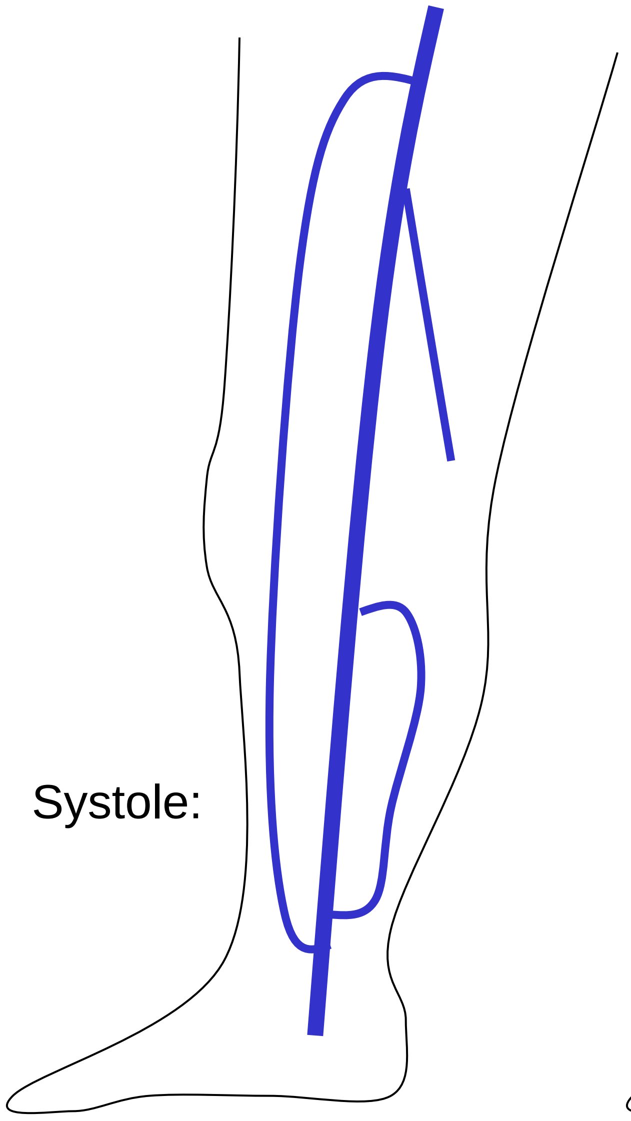
INCOMPETENCE WITHOUT CLOSED SHUNT

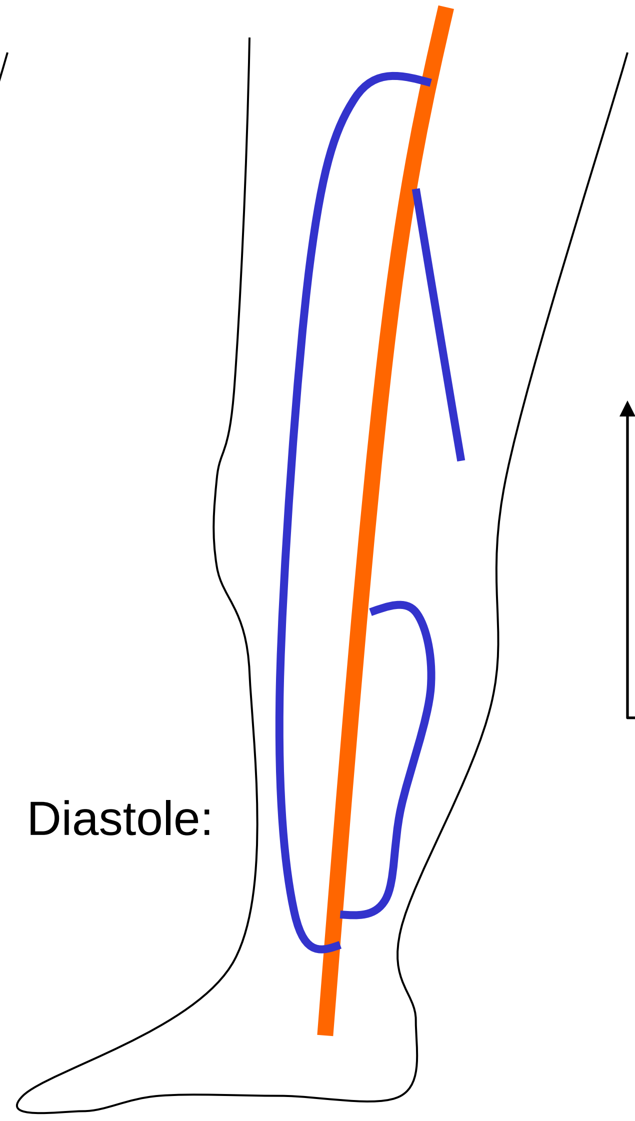
SEGMENTAL

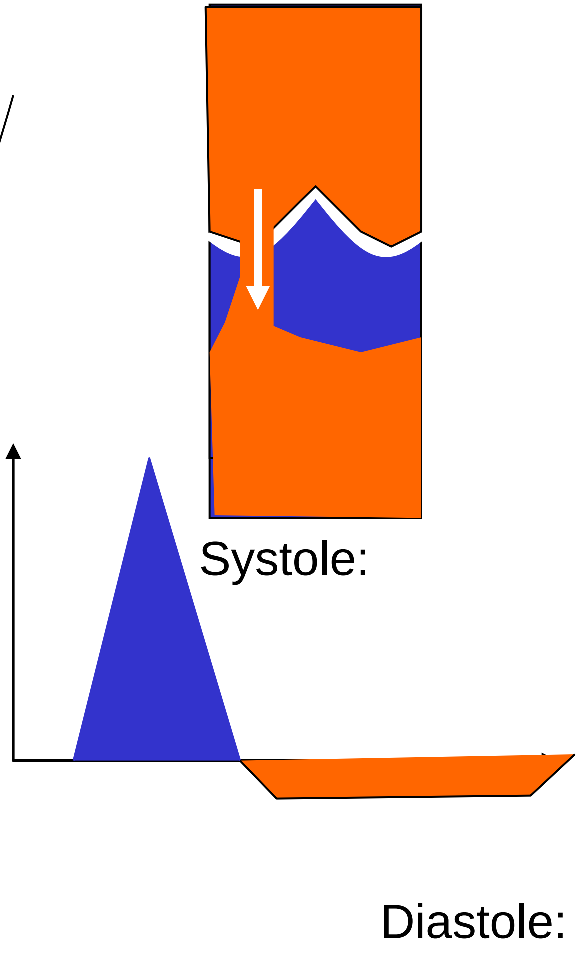


INCOMPETENCE WITHOUT CLOSED SHUNT

PARTIAL







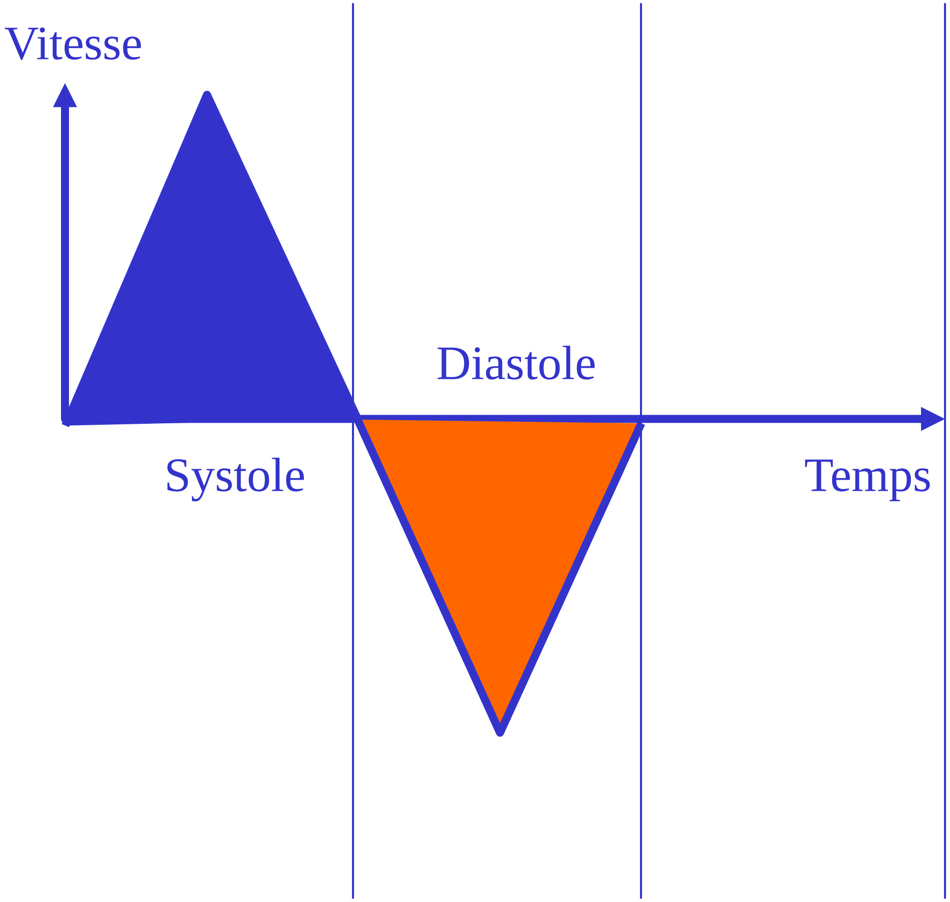
INCOMPETENCE WITHOUT CLOSED SHUNT

Diastolic Reflux Volume = Systolique Volume Flow

RT: Reflux Time = $\frac{VmR \times tR}{}$

IP: Psatakis Index $P\ I = \frac{VmR \times tR}{VmS \times tS}$

RDI: Reflux Dynamic Index $IDR = \frac{VmR^2 \times tR}{VmS^2 \times tS}$



INCOMPETENCE WITHOUT CLOSED SHUNT

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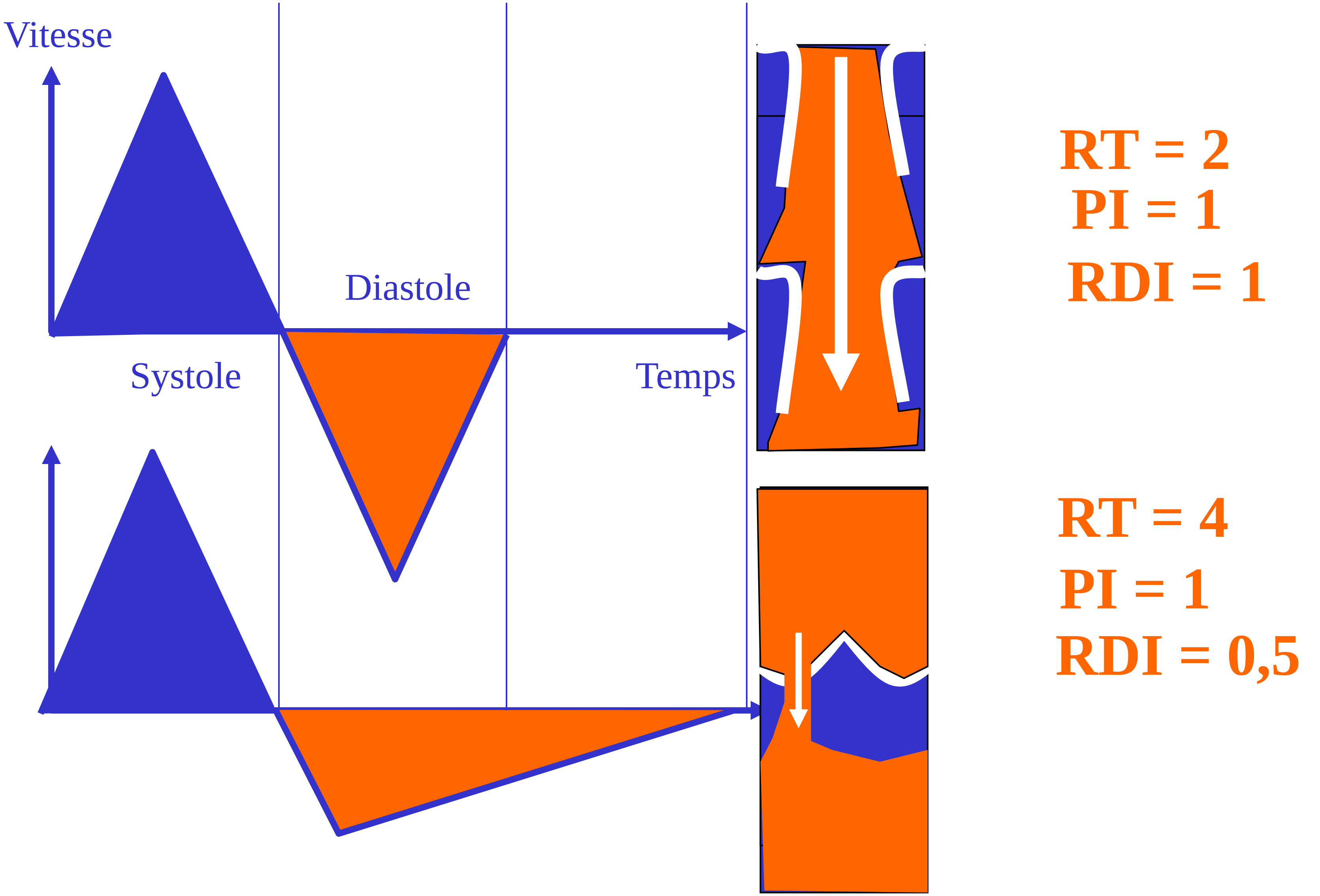
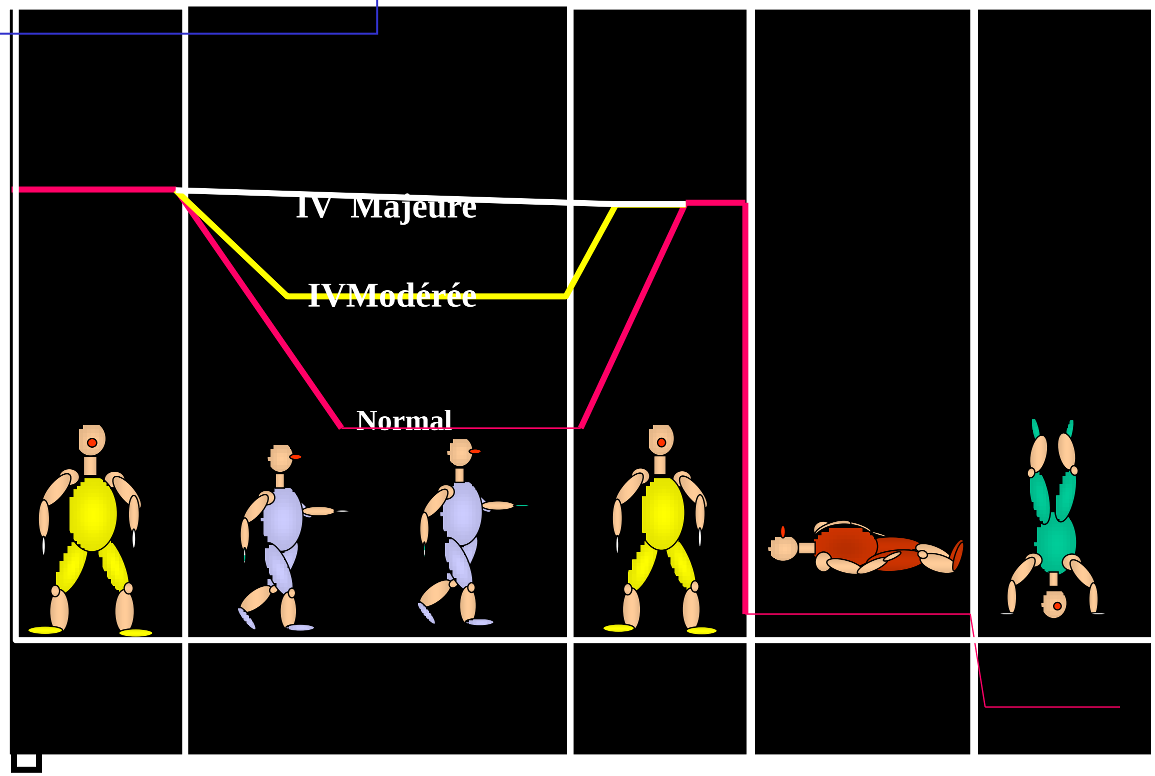
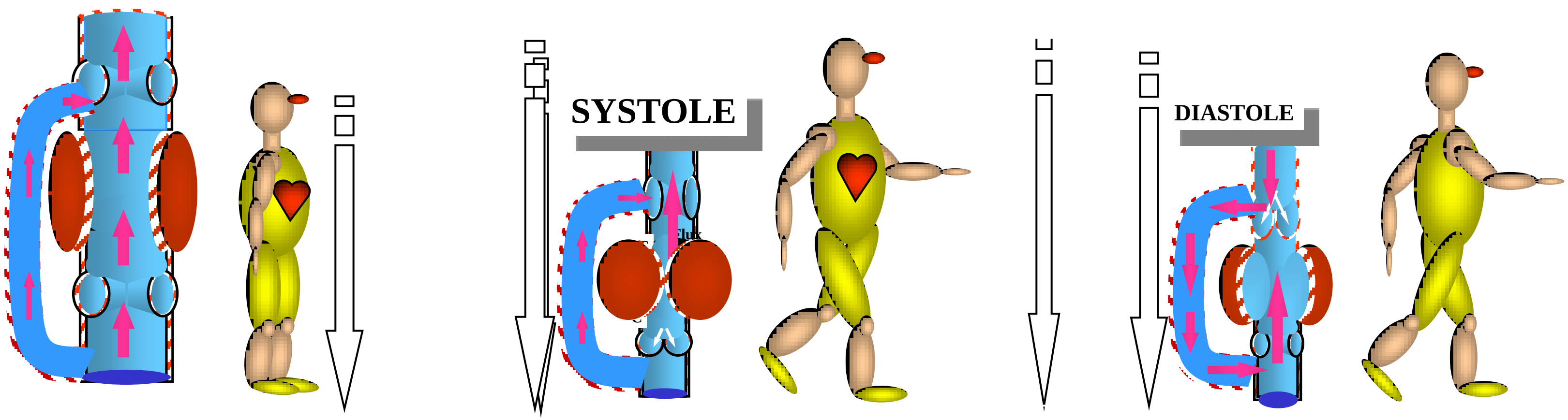


Difetto di FDPI

REFLUSSO
SUPERCIAL
O
PROFONDO
CON SHUNT
CHIUSO





Che cosa possiamo fare per trattare questo eccesso di PTM?

Per primo, vediamo che quell’eccesso di PTM avviene solo quando si stà in piedi e non va risolto con la marcia.

Basta che il paziente viva sempre sdraiatto e la malattia scompare.

Che cosa possiamo fare per trattare questo eccesso di PTM?

Basta che il paziente viva sempre sdraiatto e la malattia scompare o allora va ribilanciata la PTM quando camina:

-Aumentando la PEVcon la Compresssione

-Riduccendo la PLEV con Valuloplastia o CHIVA: disconnexione degli shunts chiusi

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

=

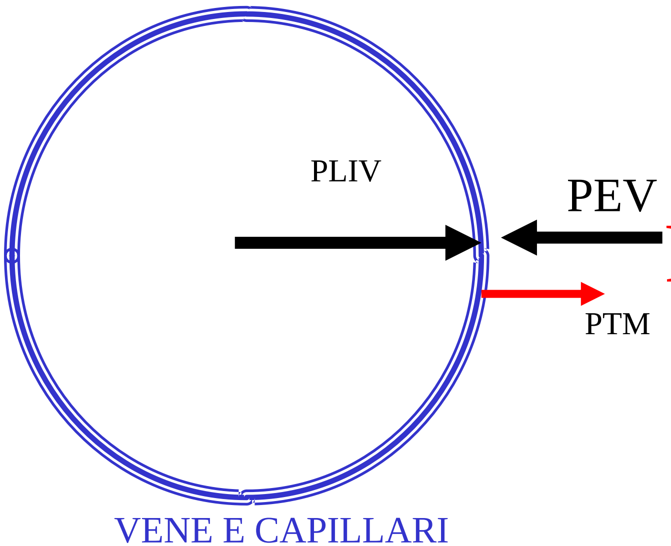
Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM



PLIV

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Pressione Idrostatica PI

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Pressione Residuale Statica PRS

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Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

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Pressione Idrostatica PI

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Pressione Residuale Statica PRS

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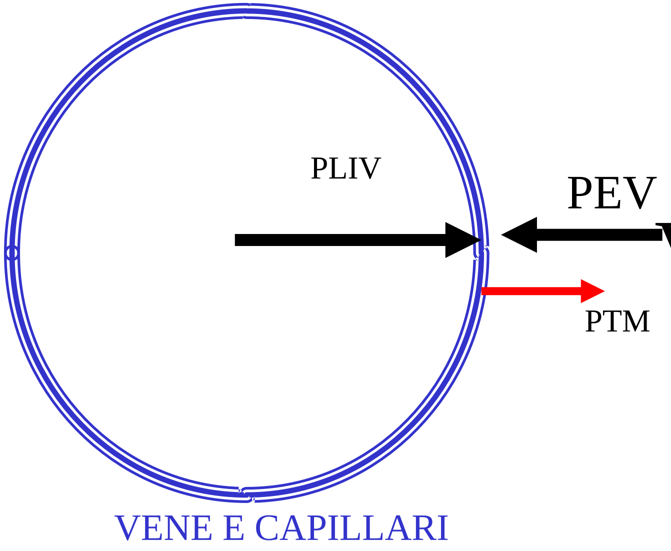
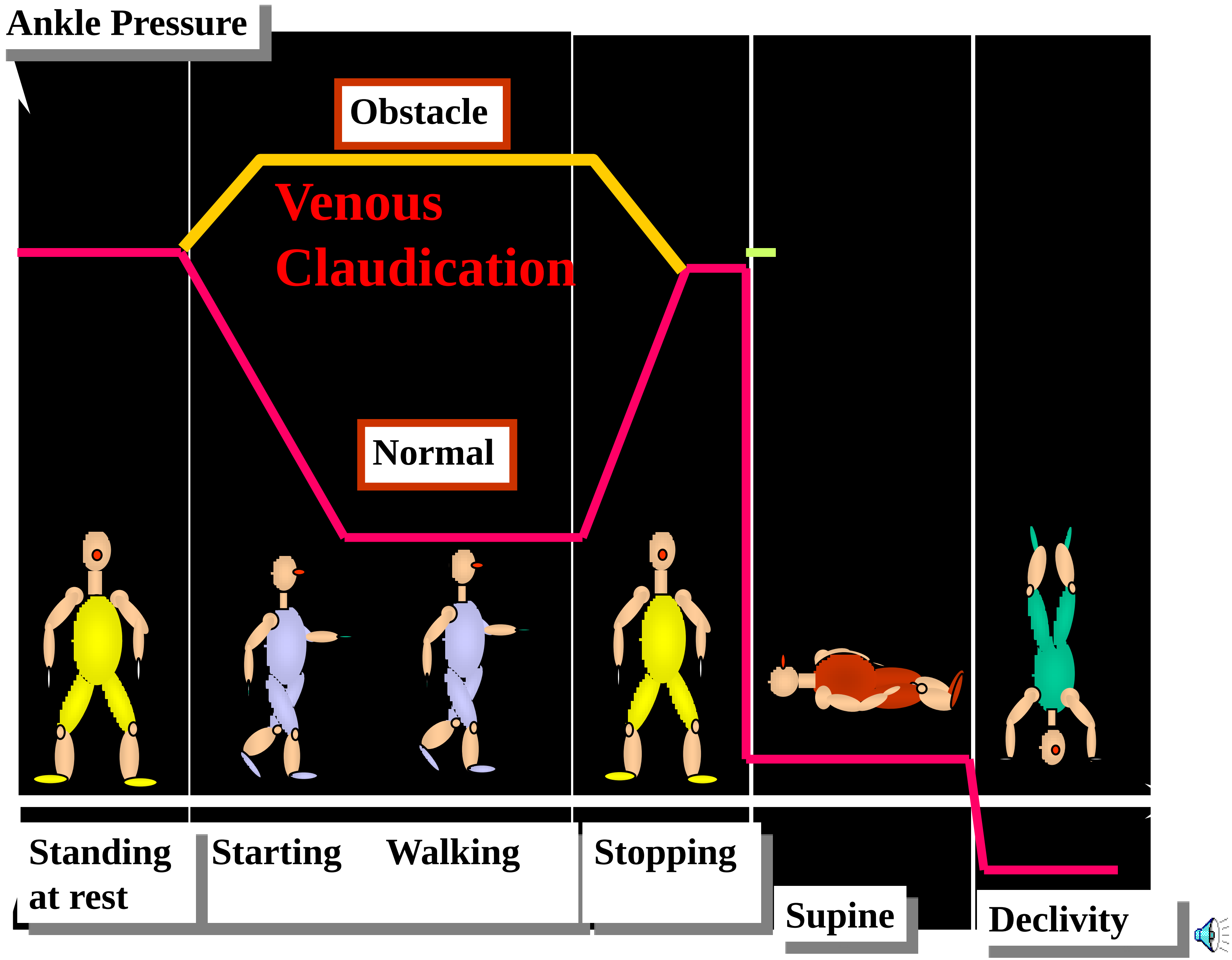
Pressione di Pompa Valvulo-Muscolare PPVM



La

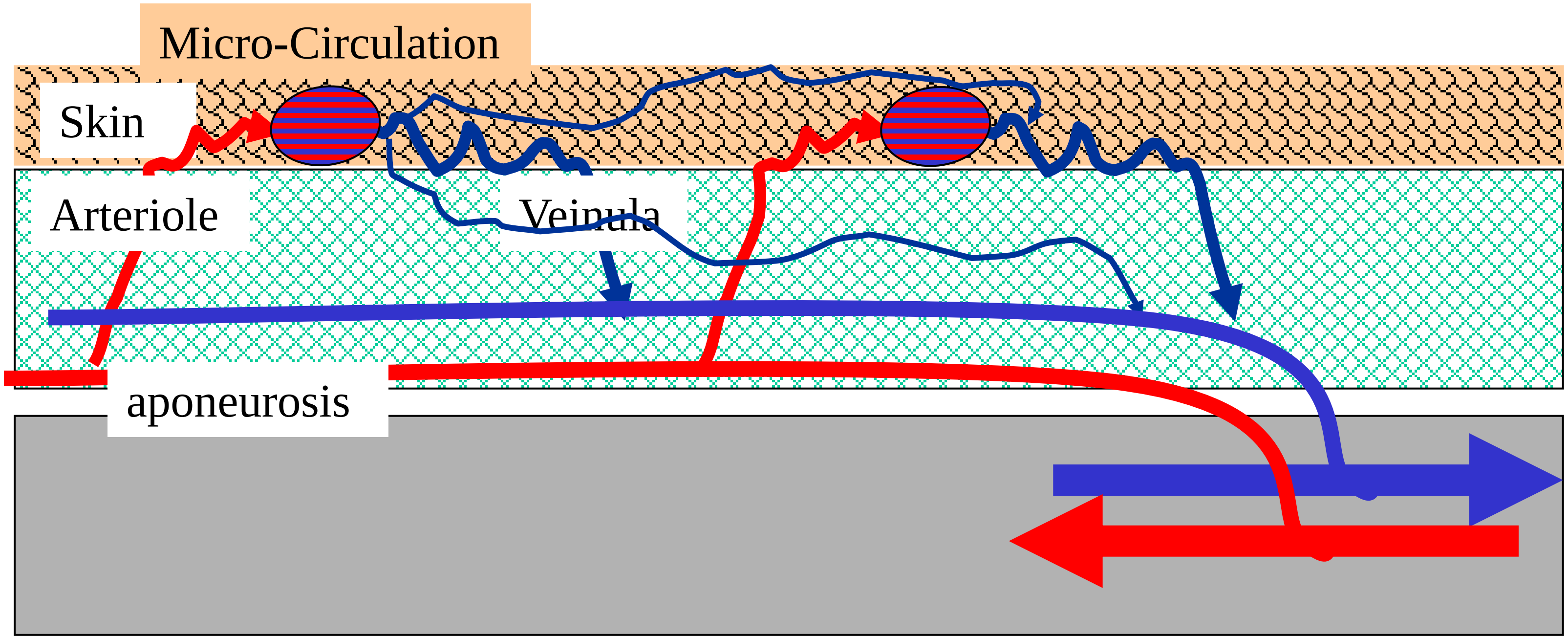
Pressione Residuale Statica PRS

Aumenta con l'Abbassamento delle Resistenze Micro-Circolatorie , le Fistole Artero-Venose e gli Ostacoli al Deflusso Drenante


Ankle Pressure
Obstacle
Venous
Claudication
Normal
Standing
at rest
Starting
Walking
Stopping
Supine
Declivity

OBSTACLES

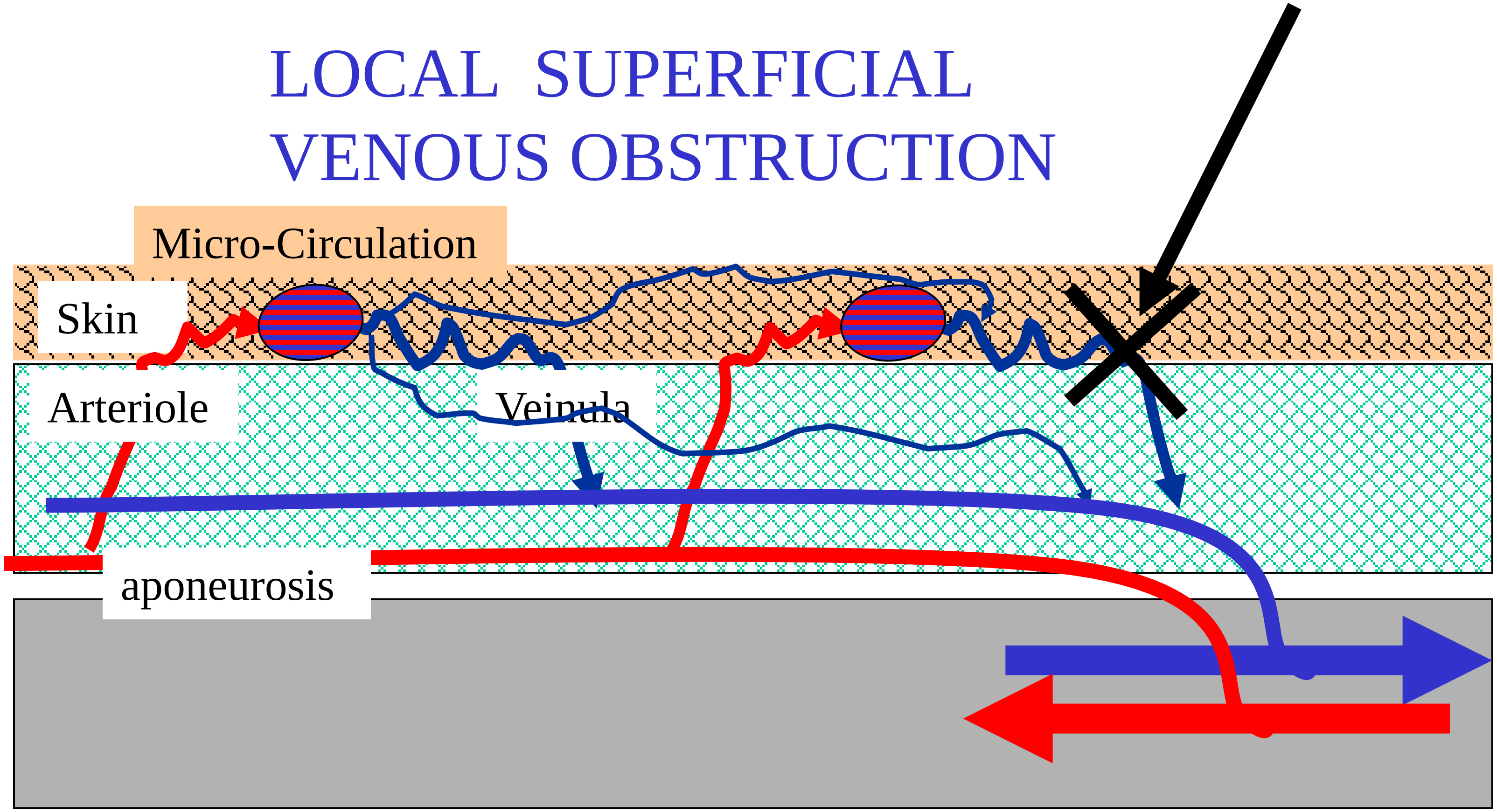
LOCAL IMPAIRED DRAINAGE



OBSTACLES

LOCAL IMPAIRED DRAINAGE

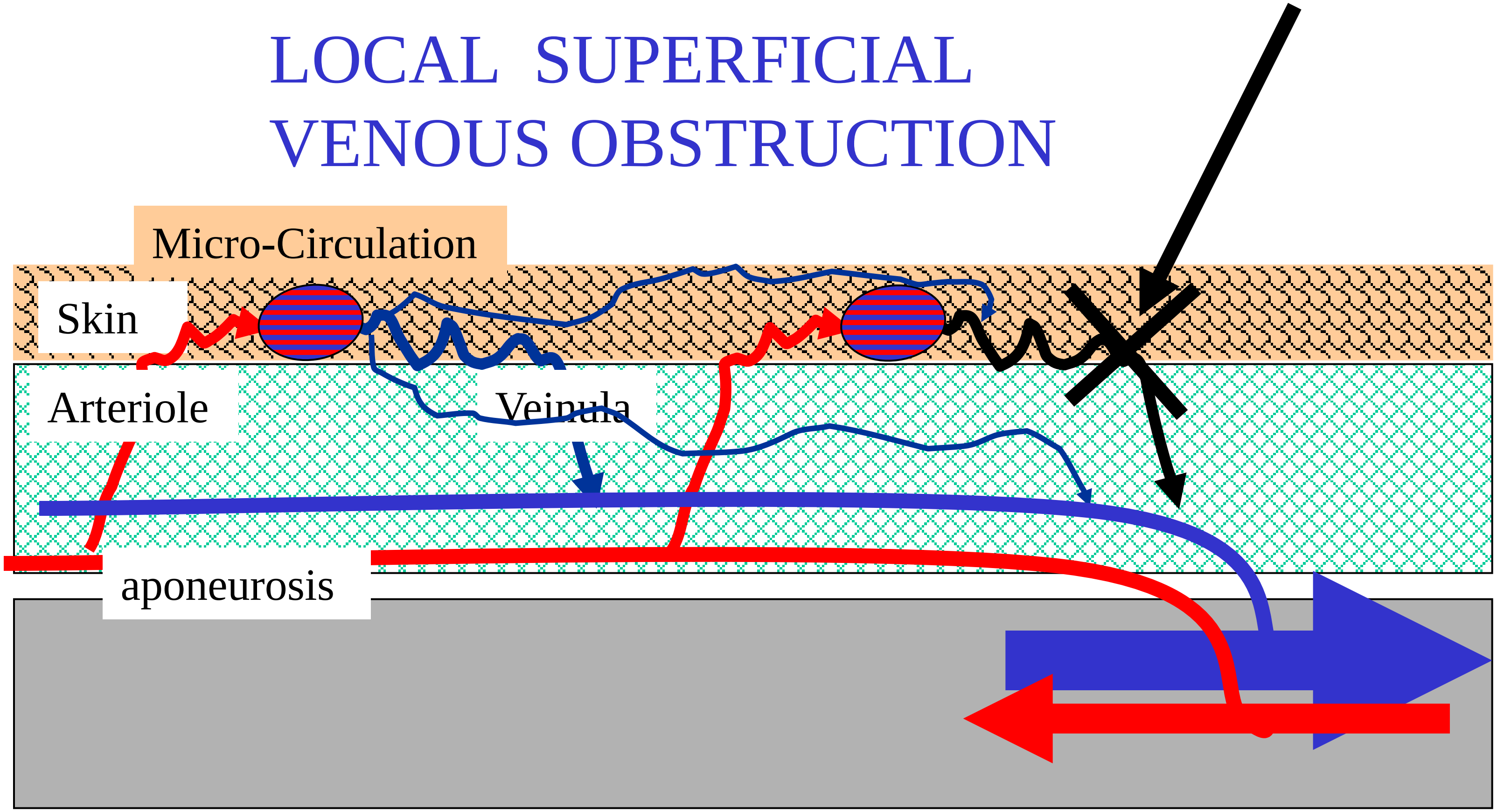
LOCAL SUPERFICIAL
VENOUS OBSTRUCTION



OBSTACLES

LOCAL IMPAIRED DRAINAGE TMP

LOCAL SUPERFICIAL VENOUS OBSTRUCTION

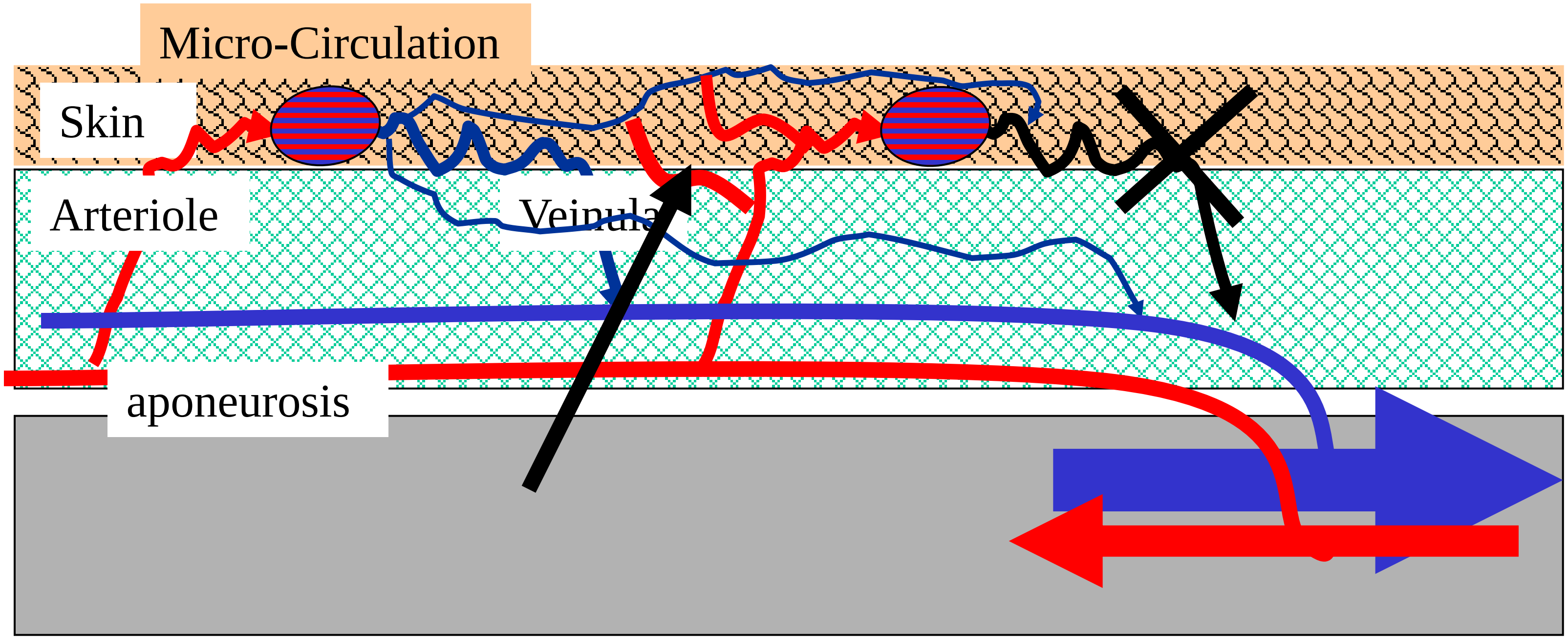


LOCAL TMP ↗

OBSTACLES

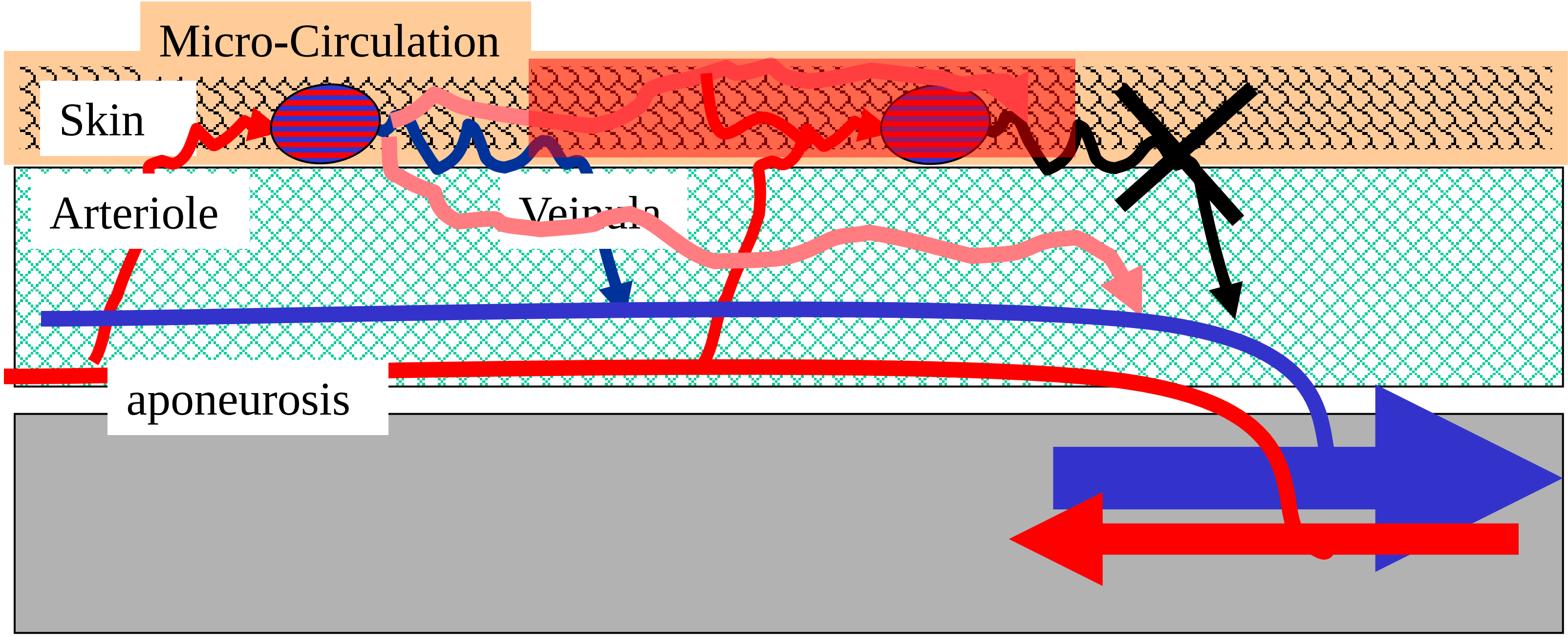
LOCAL IMPAIRED DRAINAGE

LOCAL SUPERFICIAL VENOUS OBSTRUCTION



MICRO-SHUNTS OPEN

LOCAL IMPAIRED DRAINAGE

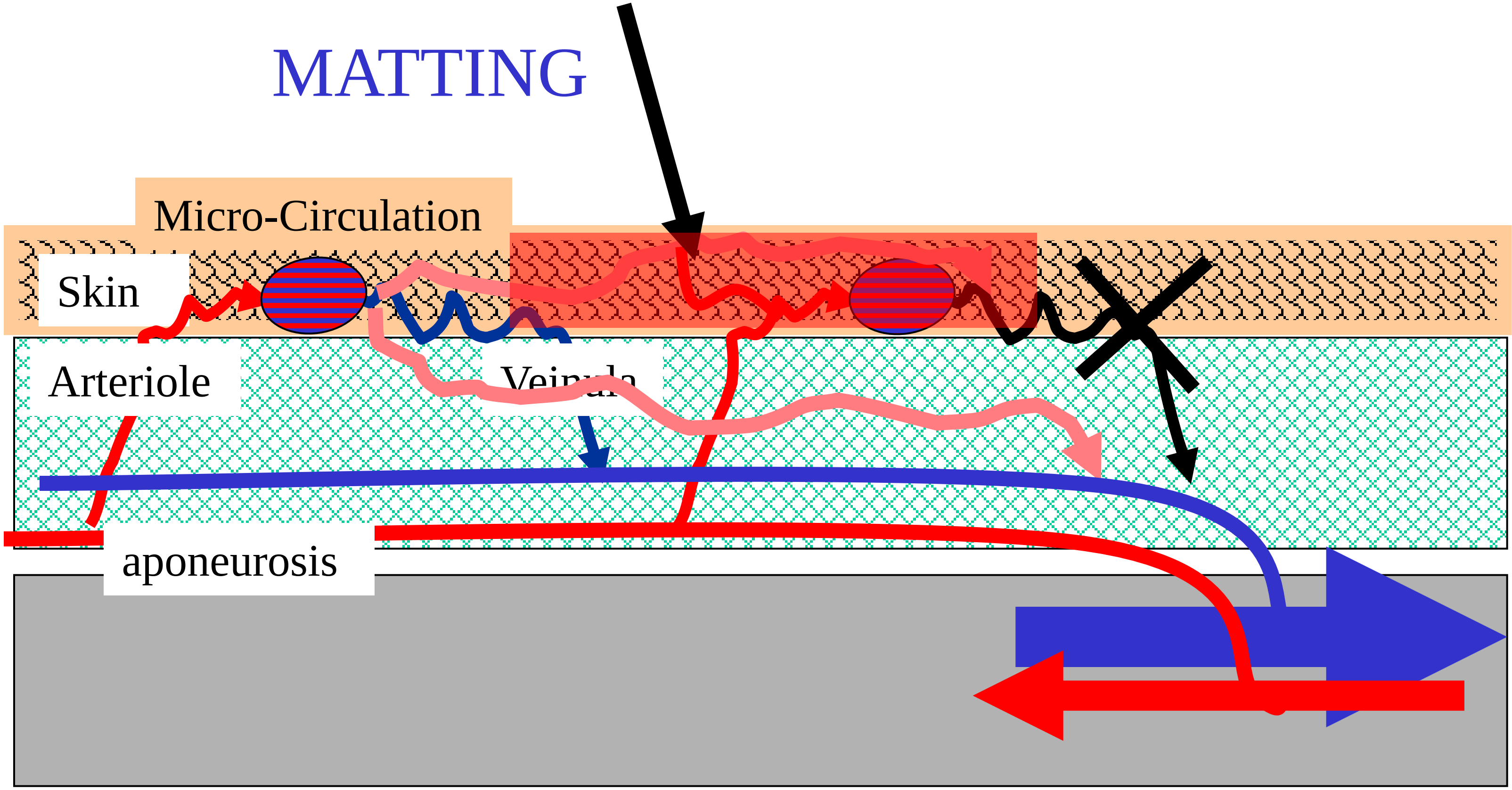


Collateral Venulas are overloaded by Red Blood

OBSTACLES

LOCAL IMPAIRED DRAINAGE

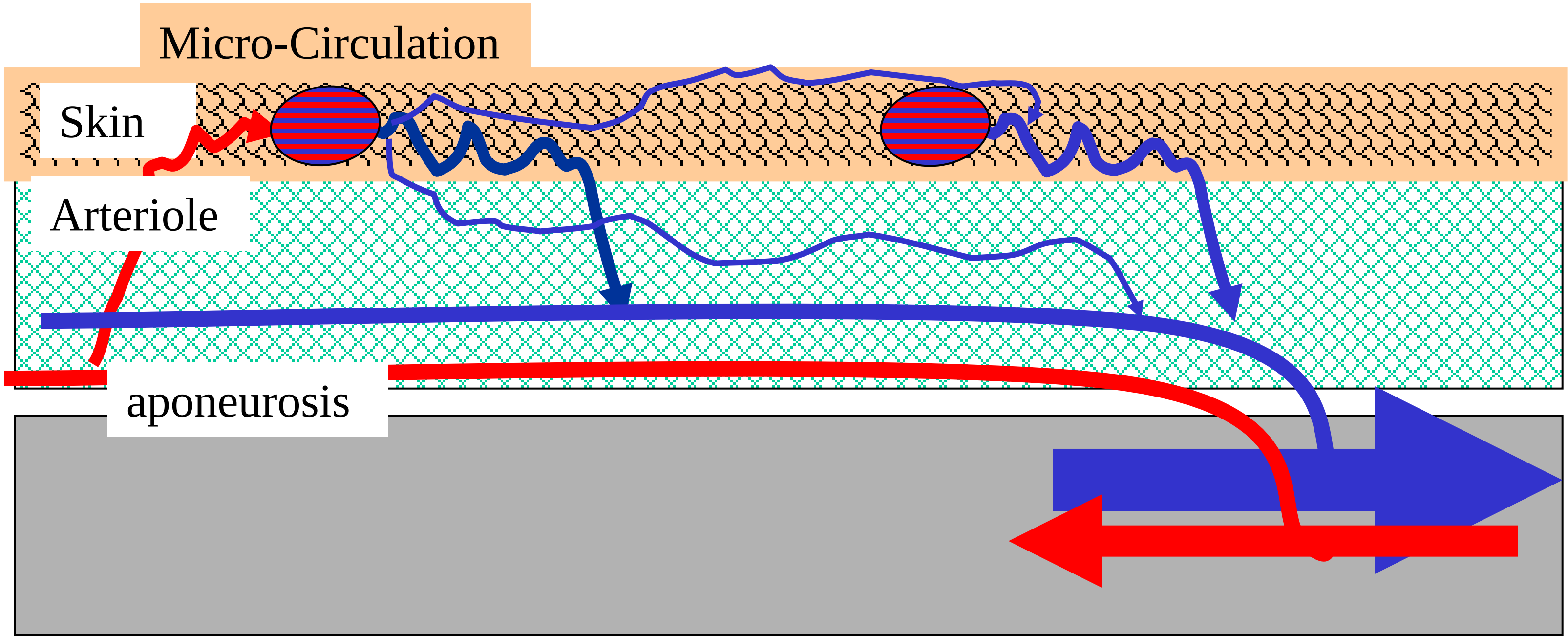
MATTING



MATTING

OBSTACLES

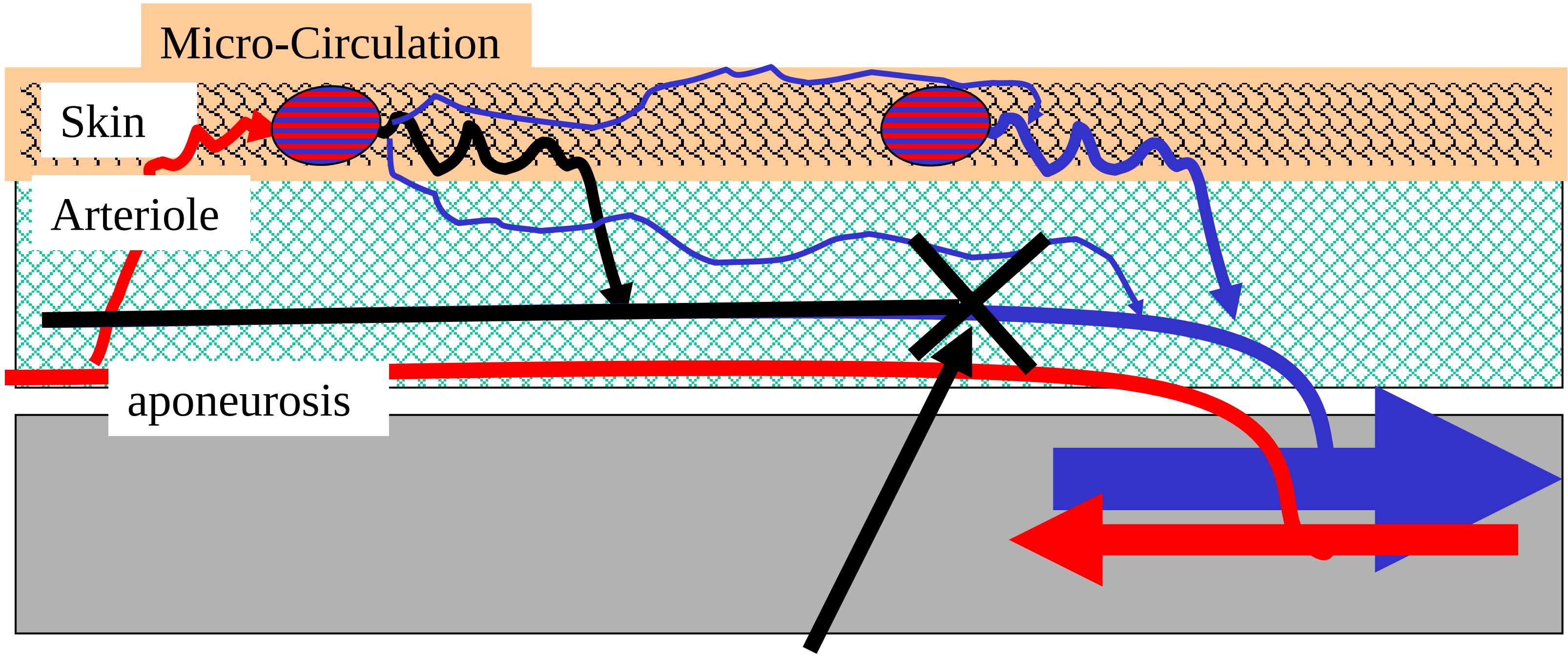
REGIONAL IMPAIRED DRAINAGE



OBSTACLES

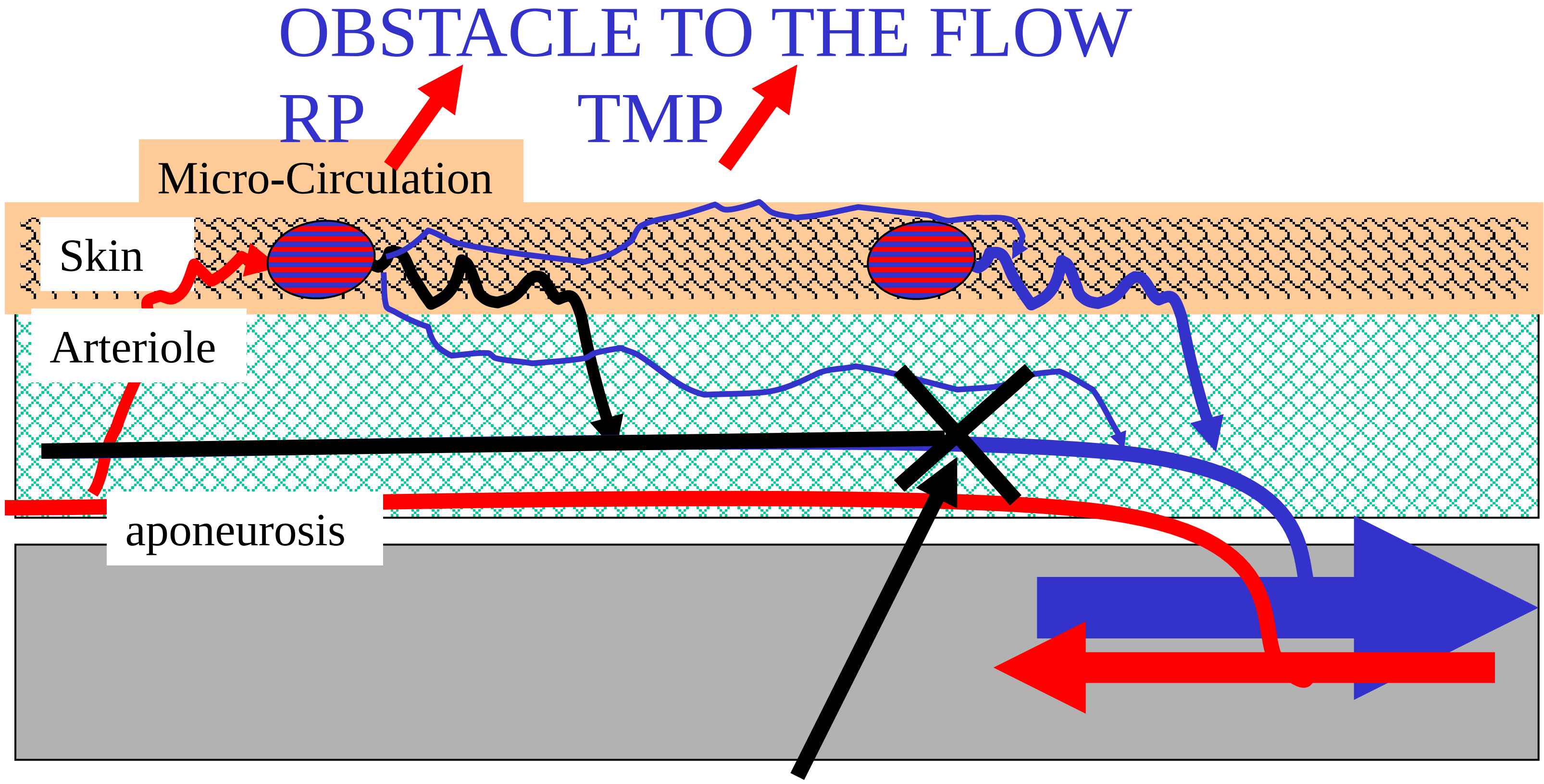
REGIONAL IMPAIRED DRAINAGE

OBSTACLE TO THE FLOW



OBSTACLES

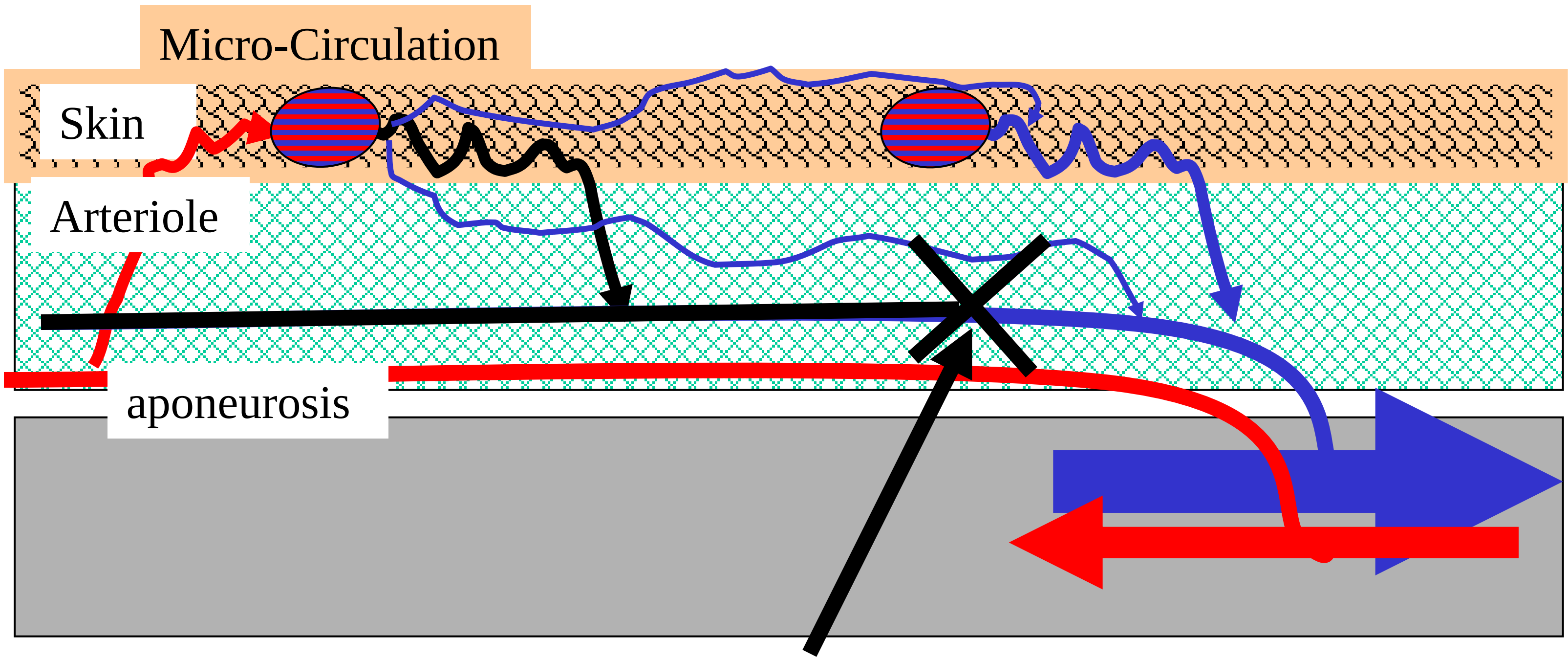
REGIONAL IMPAIRED DRAINAGE



OBSTACLES

REGIONAL IMPAIRED DRAINAGE

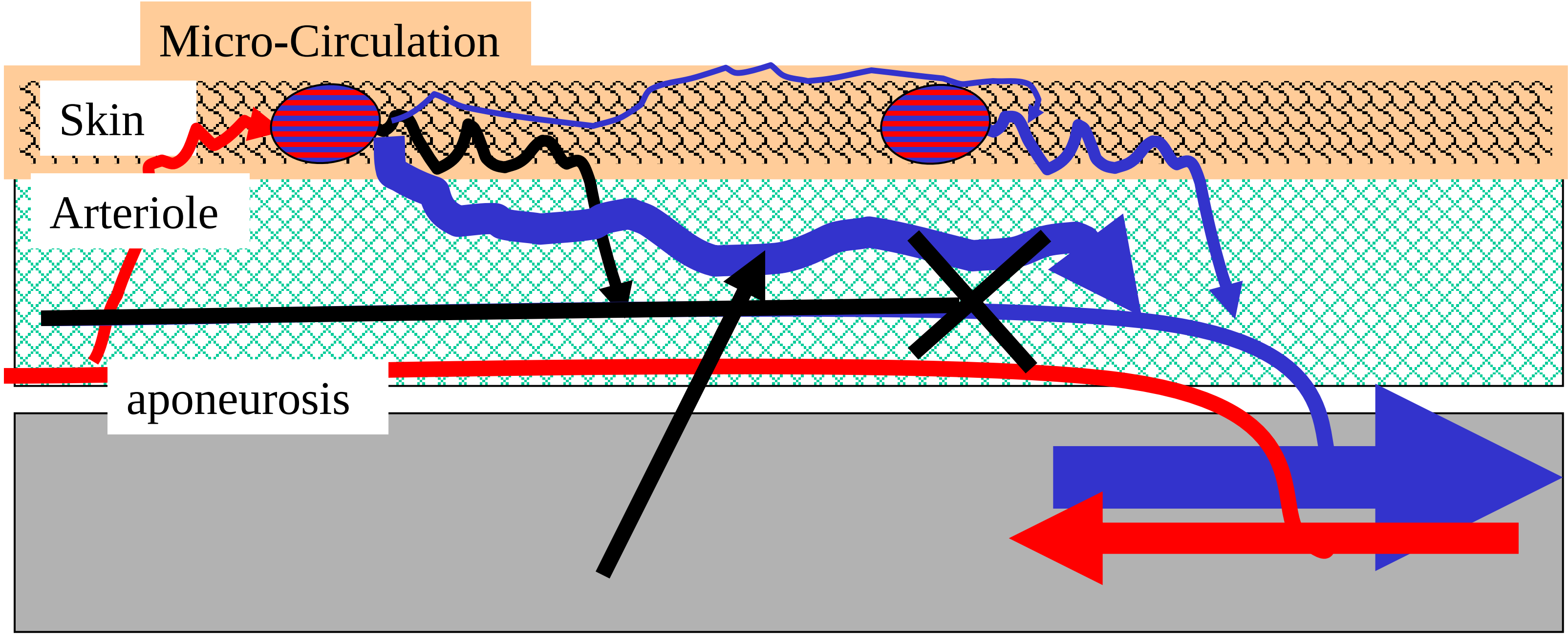
TMP ↗ COLLATERALS DILATE



OBSTACLES

REGIONAL IMPAIRED DRAINAGE

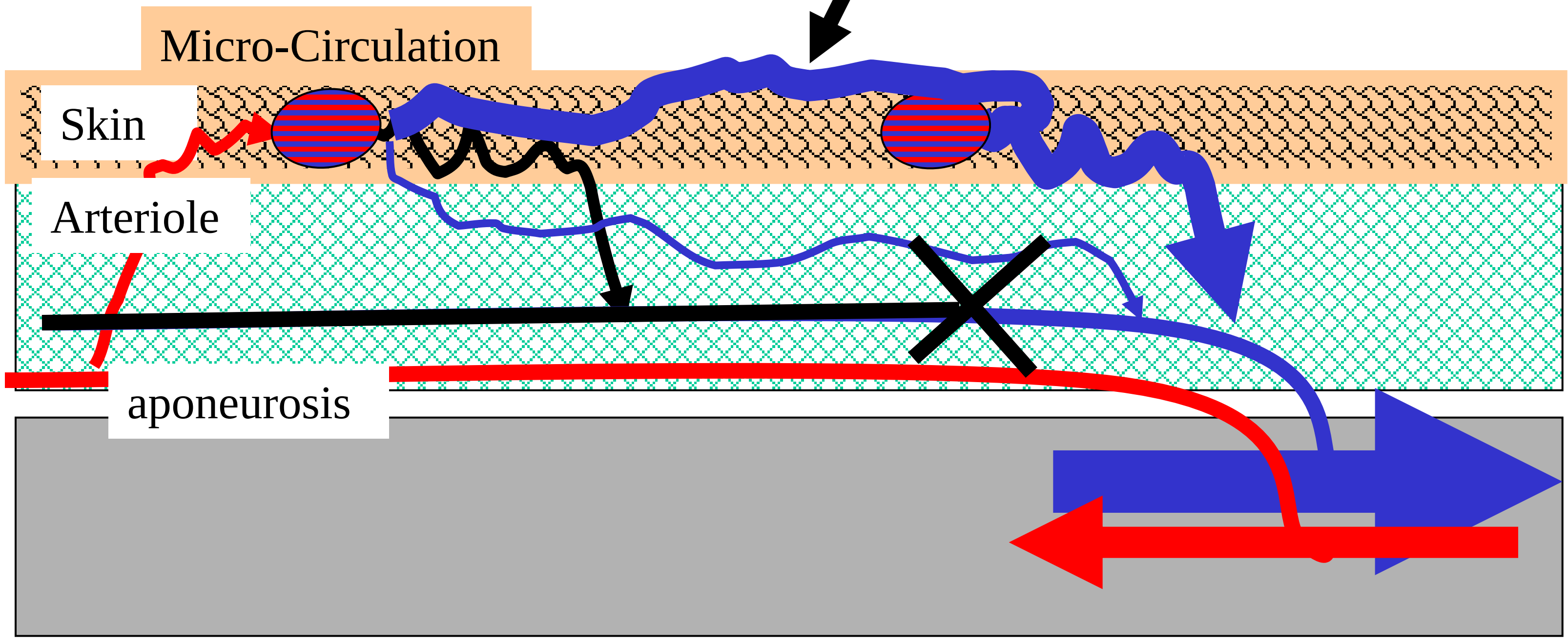
TMP ↗ INVISIBLE SUB-CUT. VARICES



OBSTACLES

REGIONAL IMPAIRED DRAINAGE

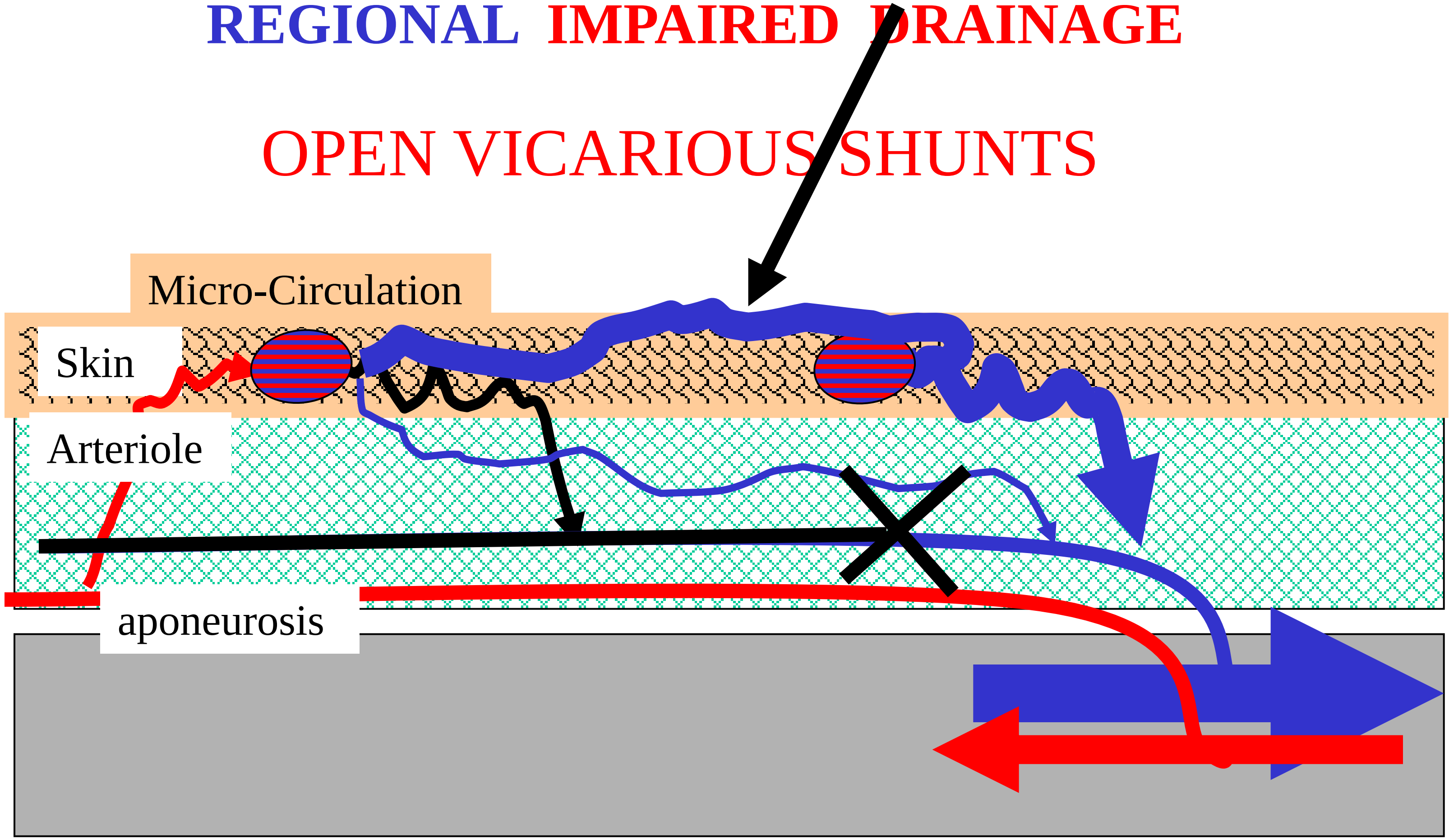
TMP ↗ VISIBLE. VARICES



OBSTACLES

REGIONAL IMPAIRED DRAINAGE

OPEN VICARIOUS SHUNTS



Come trattare?

- -Favorendo la collateralità
- -By-pass
- -Compressione

Come prevenire?

Non distruggendo le vene anche varicose: CHIVA

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

=

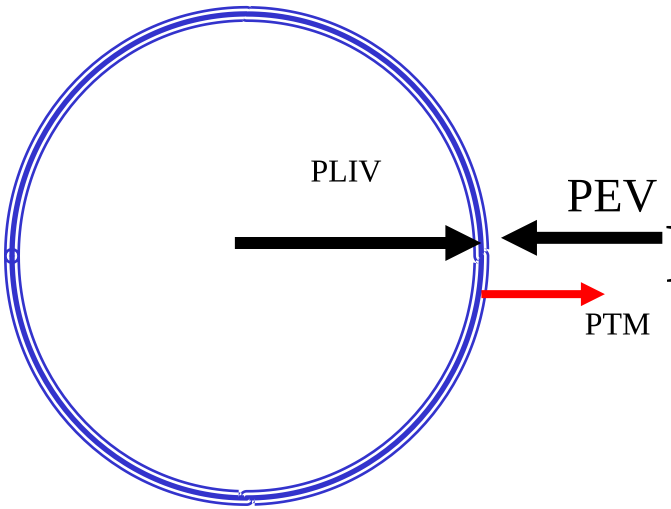
Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM



VENE E CAPILLARI

PLIV

=

Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

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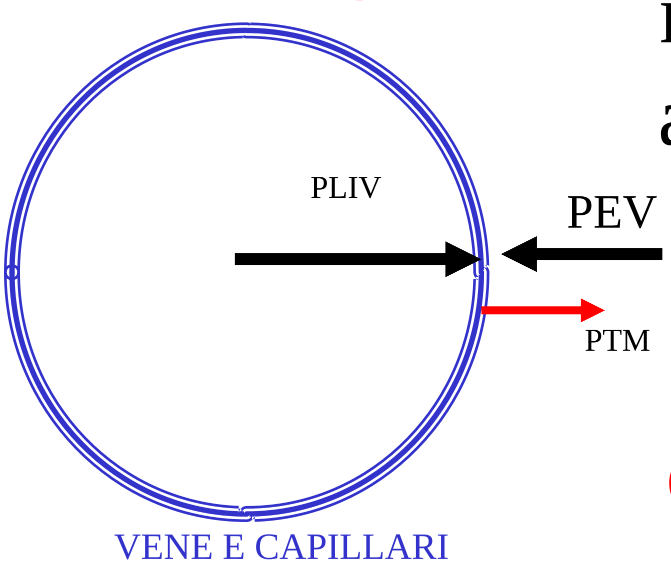
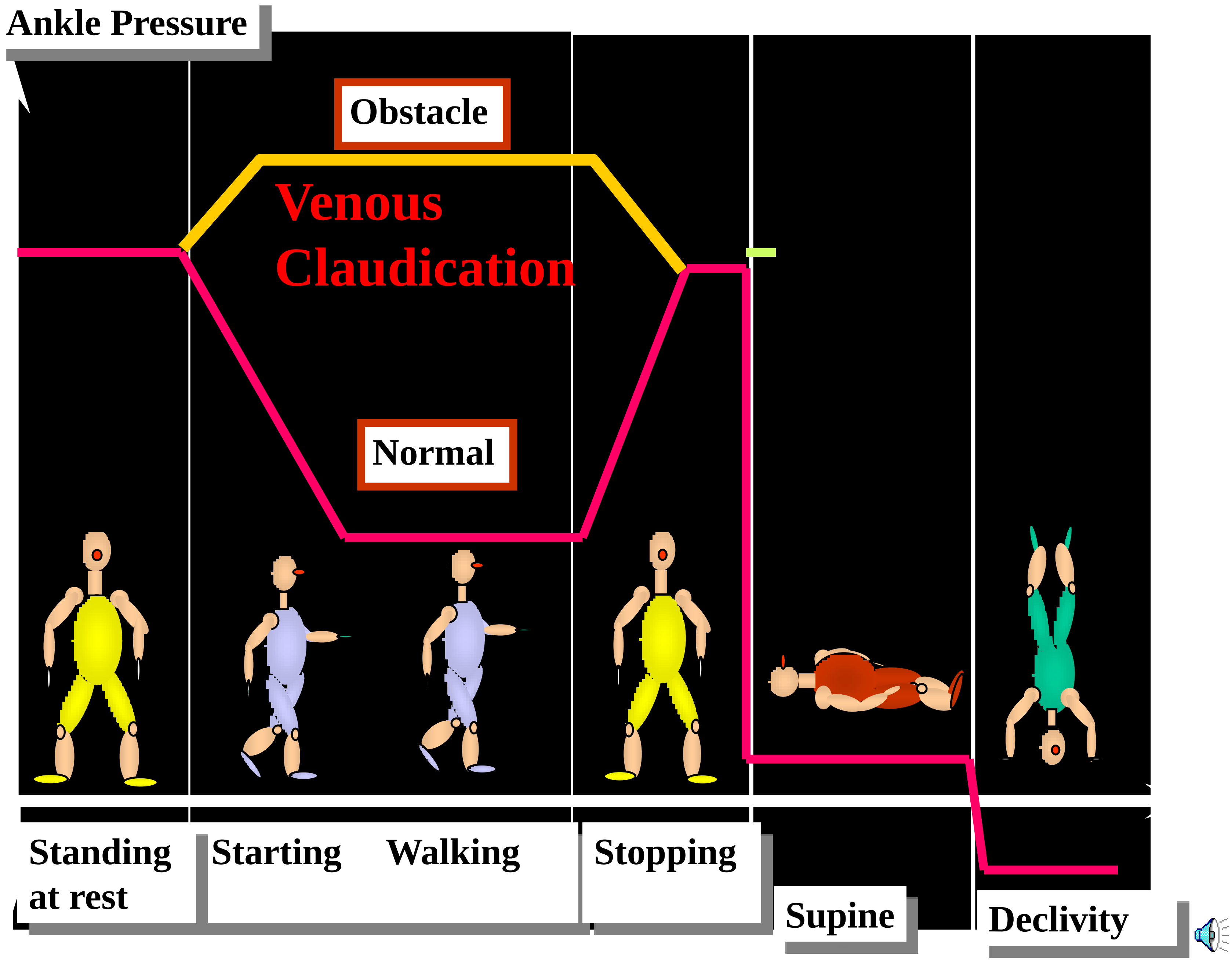


Pressione di Pompa Valvulo-Muscolare PPVM

Energia dalla contrazione dei muscoli della gamba comunicata al sangue che è espeditto verso il cuore.

In caso di Ostruzzione, questa energia va transmessa alle pareti aumentando la PTM


Ankle Pressure
Obstacle
Venous
Claudication
Normal
Standing
at rest
Starting
Walking
Stopping
Supine
Declivity

Cosi, dobbiamo conoscere da dove vengono la PV e la PLIV

PLIV

=

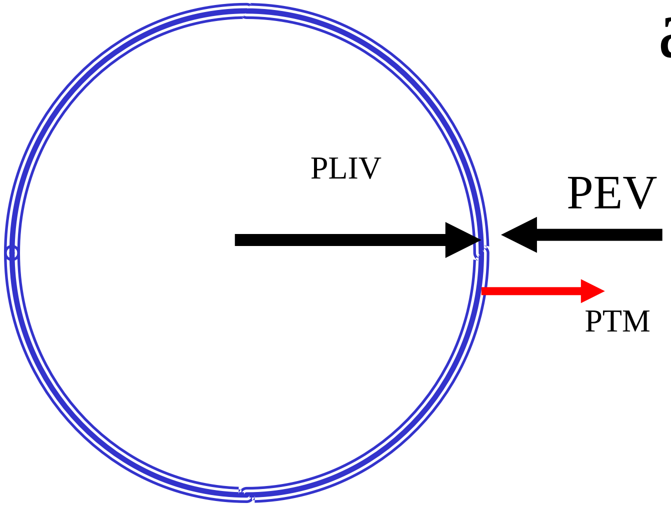
Pressione Idrostatica PI

+

Pressione Residuale Statica PRS

+

Pressione di Pompa Valvulo-Muscolare PPVM

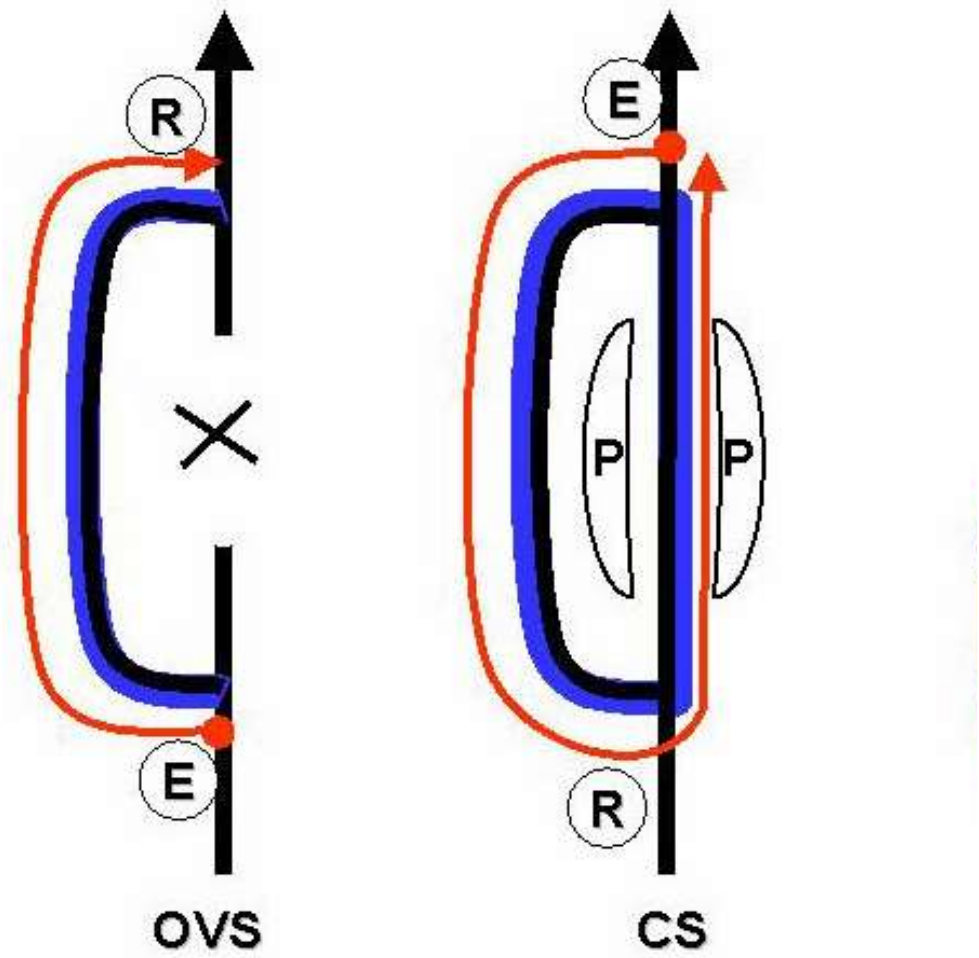


Pressione di Pompa Valvulo-Muscolare PPVM

Energia da la contrazione dei muscoli della gamba comunicata al sangue che è espeditto verso il cuore.

In caso di incompetenza con o senza shunt questa energia torna indietro durante la diastole e si tramette alle pareti aumentando la PTM

OBSTACLES AND OPEN VICARIOUS SHUNTS

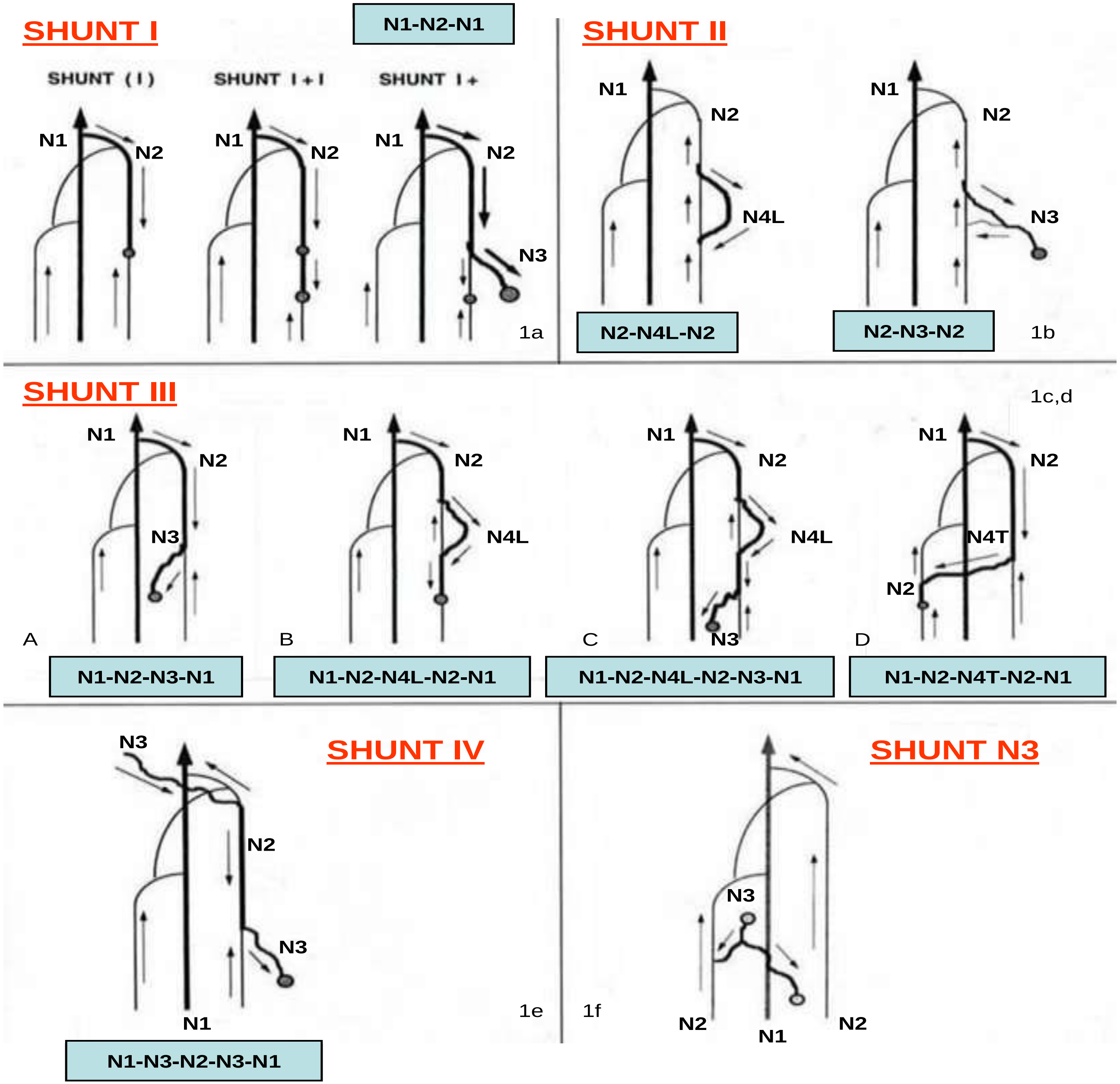


Open Circuit

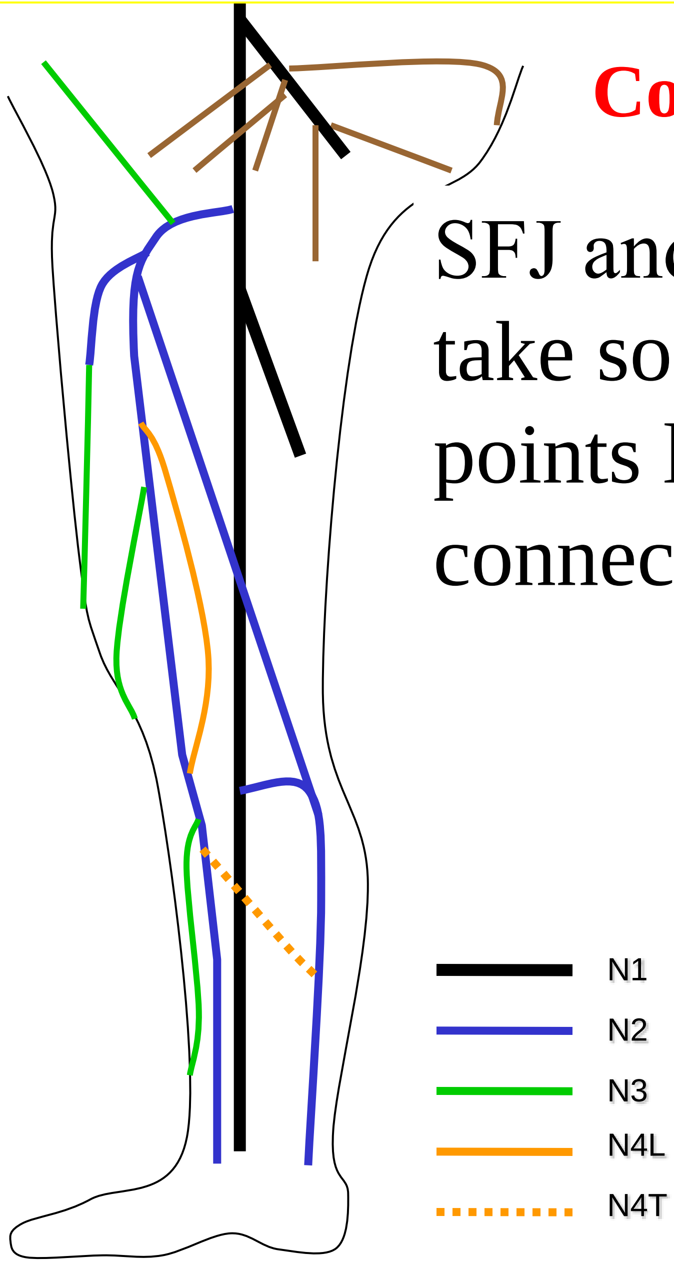
Open Vicarious Shunt (systole)

Closed Circuit

Closed Shunt (diastole)


SHUNT I
N1-N2-N1
SHUNT (I)
SHUNT I+I
SHUNT I+
N1
N2
N3
1a
SHUNT II
N1
N2
N4L
N3
N2-N4L-N2
N2-N3-N2
1b
SHUNT III
1c,d
N1
N2
N3
N4L
N4T
A
B
C
D
N1-N2-N3-N1
N1-N2-N4L-N2-N1
N1-N2-N4L-N2-N3-N1
N1-N2-N4T-N2-N1
SHUNT IV
N3
N2
N3
N1
N1-N3-N2-N3-N1
1e
1f
SHUNT N3
N3
N2
N1
N2

ESCAPE POINTS



Connections

SFJ and SPJ are well known. Let's take some time to show the escape points located at the pelvic connections

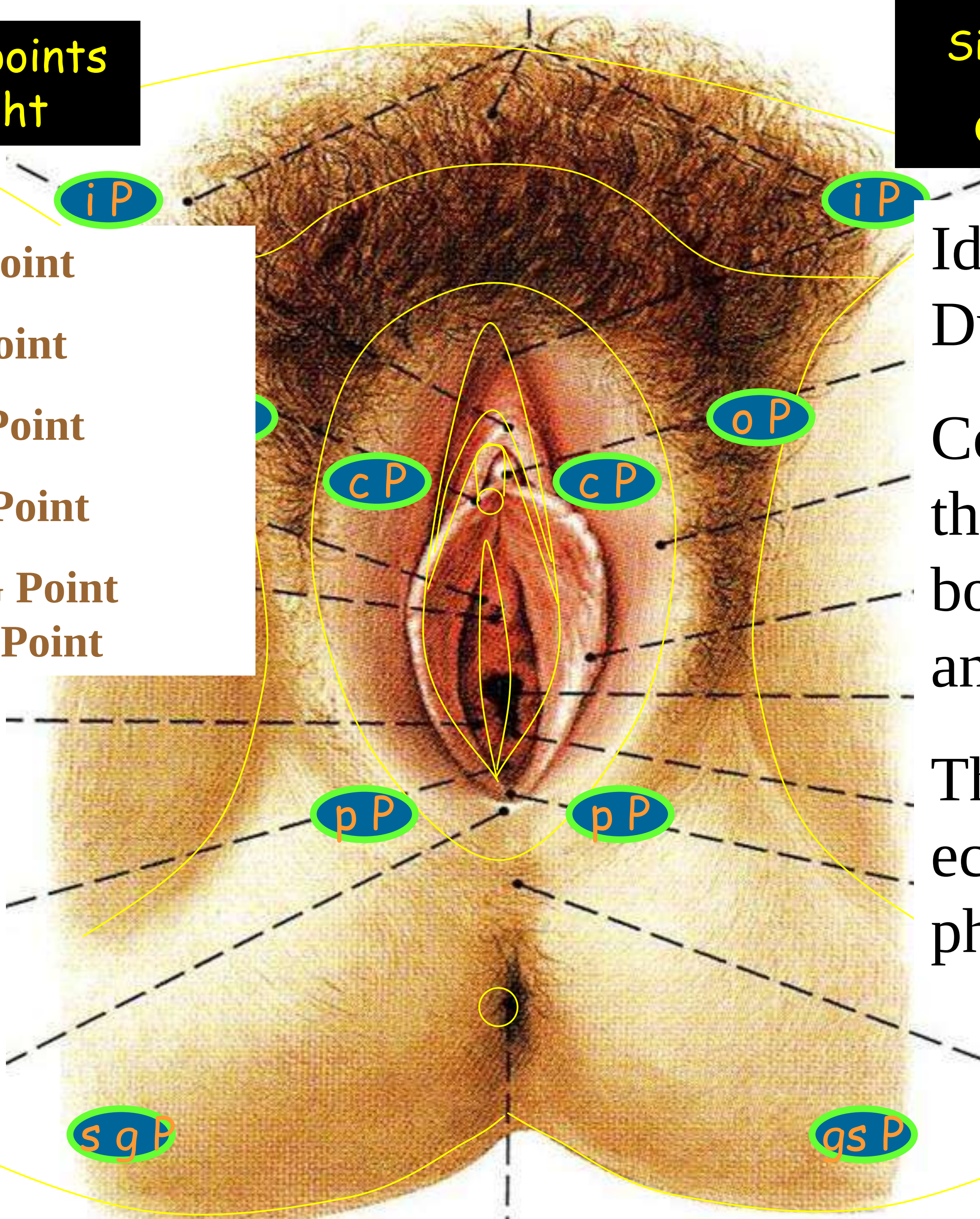
N3 -N1:

Collectors:

Perineal V	**P Point**
Rd Ligt V	**I Point**
Clit. V	**C Point**
Obt. V	**O Point**
S Glut. V	**SG Point**
I Glut. V	**IG Point**

Six Escape points on the right

Six Escape points on the left



Perineal V	**P Point**
Rd Ligt V	**I Point**
Clit. V	**C Point**
Obt. V	**O Point**
S Glut. V	**SG Point**
I Glut. V	**IG Point**

Identified with Duplex scan

Confirmed by the classical books of anatomy

Then by echoguided phlebography

Come trattare?

-Valvuloplastia

-Compressione

-Disconnessione degli shunt

Demolitiva con rischio di recidiva per eccesso di PR

Conservativa evitando le recidive per eccesso di PR : CHIVA

CHIVA:

1/ Frammentazione della colona di pressione idrostica

2/ Disconnessione degli shunts

3/ Conservazione delle vene anche varicose

In Mini Chirurgia Ambulatoriale (anestesia locale)

TERAPIE CONSERVATIVE EMODINAMICHE:
Bilanciamento della PTM

-Compressione

-Posture

-CHIVA

Cochrane Library

The **Cochrane Library** is a collection of database in medecine and other healthcare specialties provided by the cochrane collaboration and other organisations. At its core is the collection of **Cochrane Reviews**, a database of systematic reviews and meta-analyses which summarize and interpret the results of medical research. The Cochrane Library aims to make the results of well-conducted controlled readily available and is a key resource in evidence –based-medicine

Varicose Vein Surgery Stripping versus the CHIVA method:
a Randomized Controlled Trial
Josep oriol Pares and al
Annals of Surgery * Volume 251, Number 4, April 2010
[ISRCTN52861672]. (international standard randomised controlled trial number)www.controlled-trials.com

1-Varicose Vein Surgery Stripping versus the CHIVA method:
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Annals of Surgery * Volume 251, Number 4, April 2010 **[ISRCTN52861672].**
(international standard randomised controlled trial number)www.controlled-trials.com

2-Minimally Invasive Surgical management of primary venous Ulcer vs.
Compression Treatment: a randomized Clinical Trial
P.Zamboni and all
Eur J vasc Endovasc Surg 00,1 6 (2003)

3-Clinical and random study comparing two, surgical techniques for varicose vein treatment : immediate results
Iborra and all
Angiologia 2000:6, 253-258

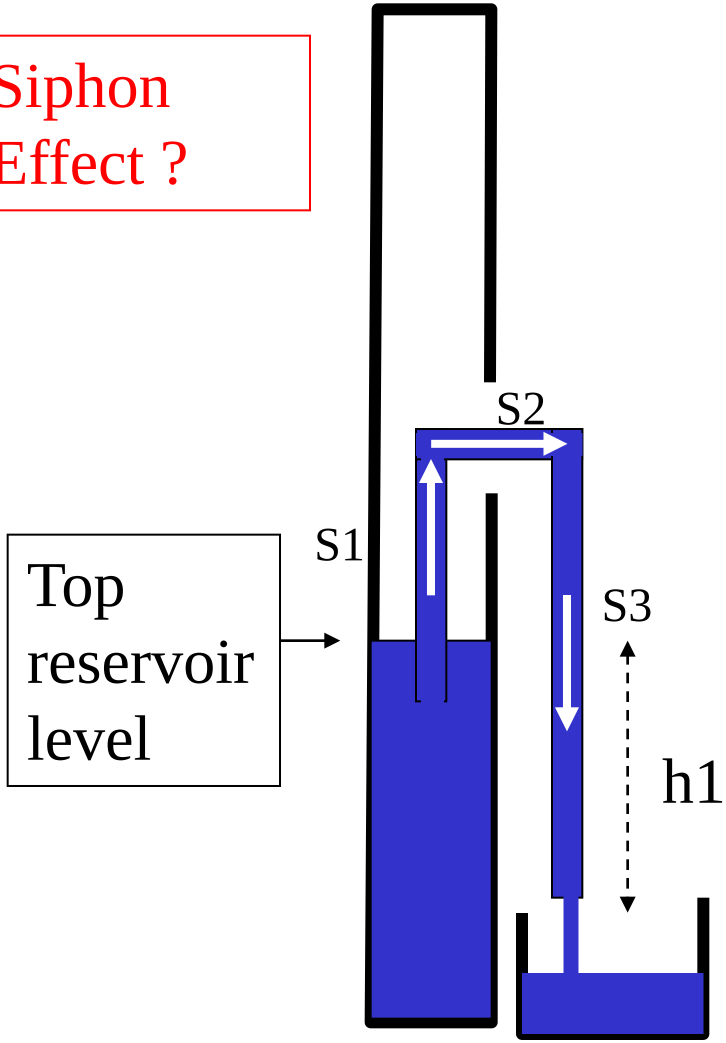
4-Varicose Vein Stripping vs Haemodynamic Correction (CHIVA):
a Long Term Randomised Trial.
Carandina, C. and al.
Eur J Vasc Endovasc Surg xx, 1e8 (2007)
doi:10.1016/j.ejvs.2007.09.011

Siphon effect, Reservoir effect, aspirating varices

Are these concepts applicable to the varices?

C.Franceschi

Siphon Effect ?



Siphon

S2 above the reservoir level

Open circuit

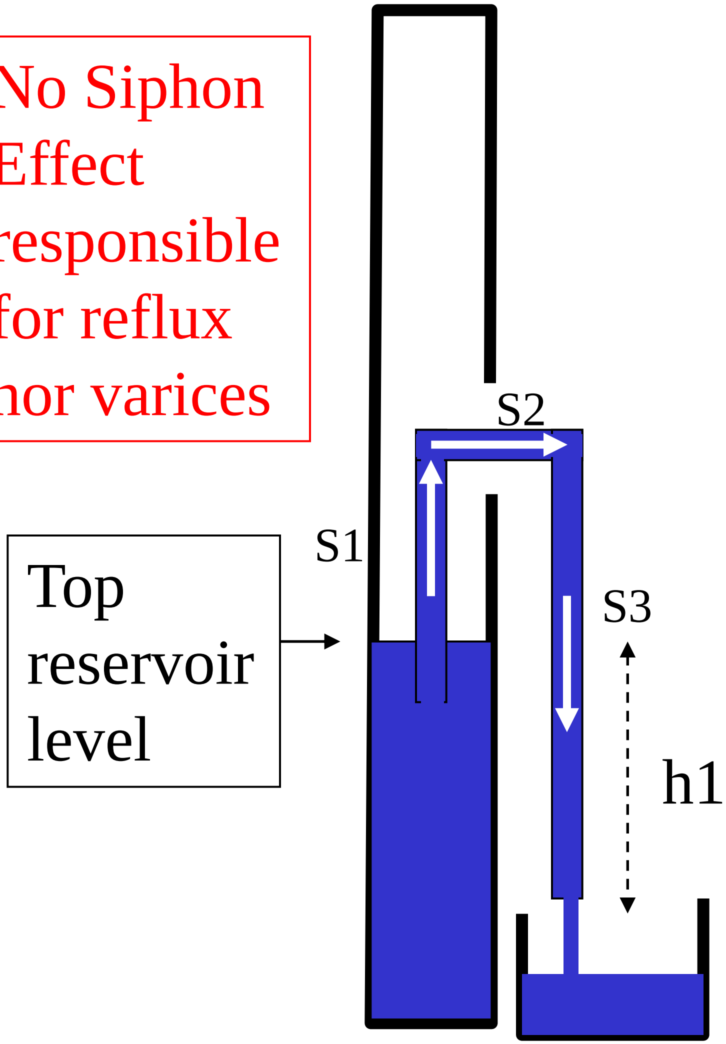
No aspiration

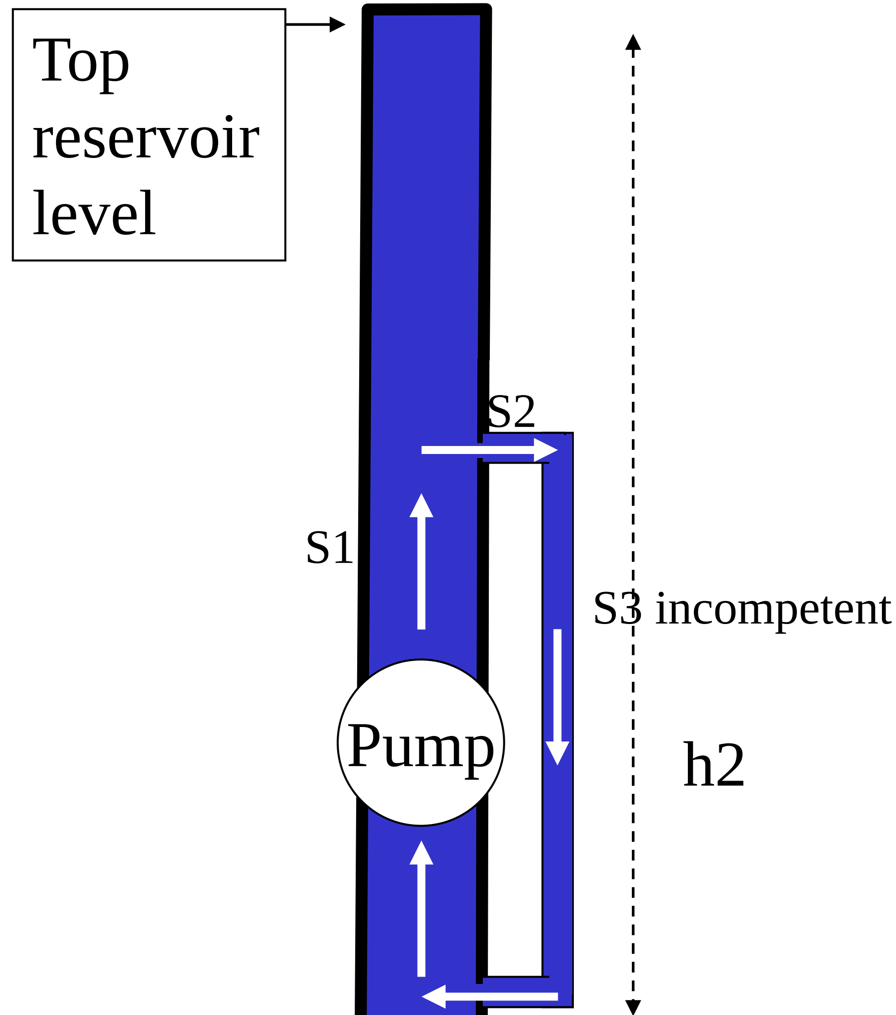
Pump Not necessary for flowing

Siphon Physics definition:

A siphon (also spelled syphon) is a open continuous tube that allows liquid to drain from a reservoir through an intermediate point S2 that is higher, than the reservoir S1, the flow being driven only by gravity h1 without any need for pumping. The atmospheric pressure is necessary to get the liquid to flow uphill S1 to begin with. In a siphon, the "downhill" side of the tube S3 is longer than the "uphill" side. Gravity pulls downward on the liquid on both sides, but the overall gravitational force on the downhill side is greater than the overall gravitational force on the uphill side, just because there is more liquid to pull. It needs to have some pressure behind it, which is provided by the atmospheric pressure.

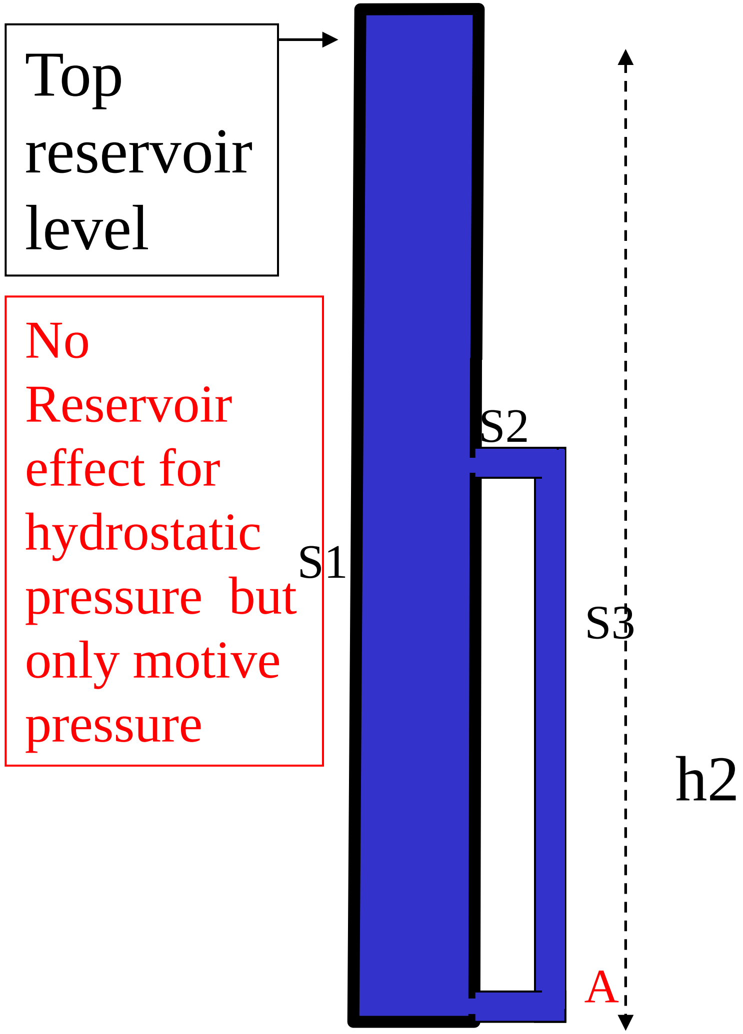
No Siphon Effect responsible for reflux nor varices

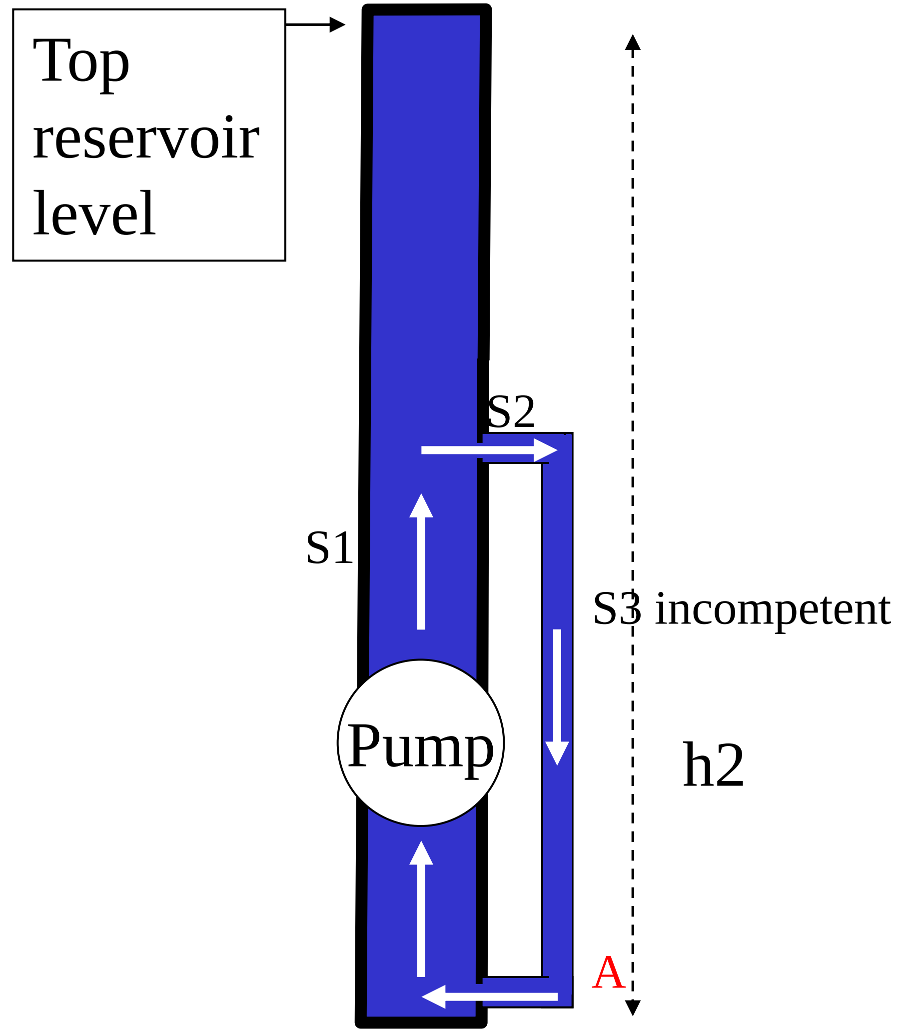




Siphon	Venous network is not a siphon
S2 above the reservoir level	S2 below reservoir level
Open circuit	Closed circuit
No aspiration	Aspiration
Pump Not necessary for flowing	Pump necessary for flowing

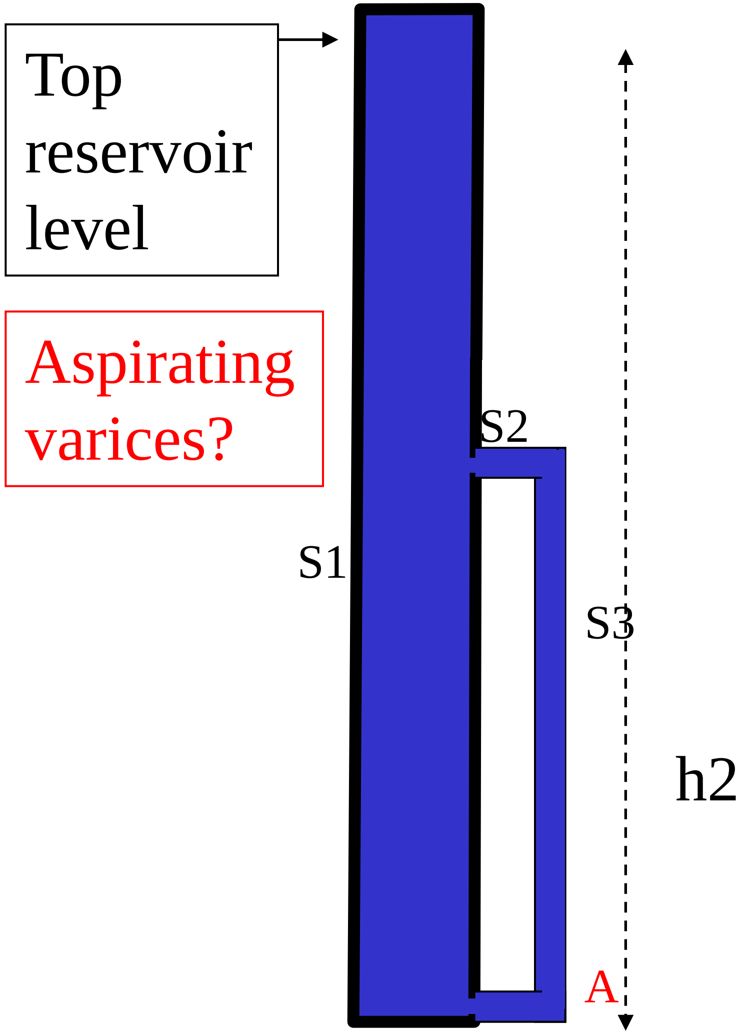
Reservoir effect is the capability for the venous compartment to absorb the variations of motive pressure thanks to the variation of volume due to the compliance, though it doesn't modify the hydrostatic pressure that varies exclusively with the height of the liquid column and doesn't depend on the compliance

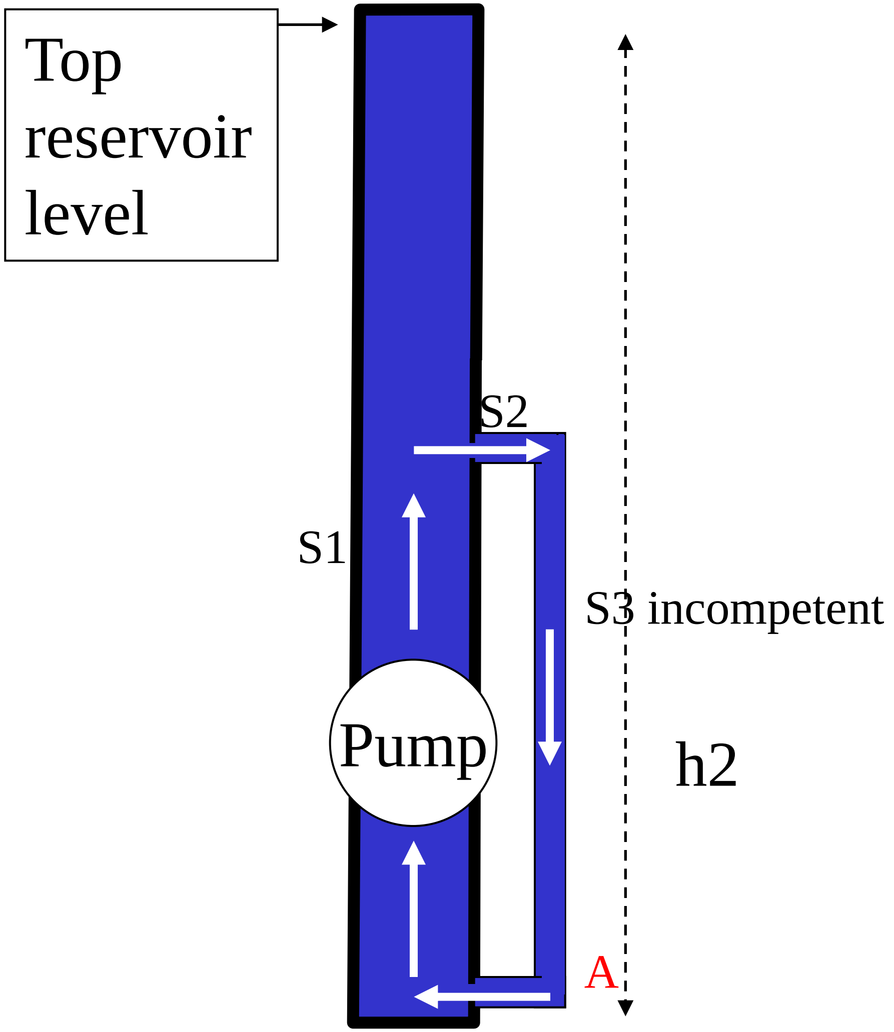




Hydrostatic pressure in A is proportional to h2 and varies only with h2 and is not changed by compliance in A, so no reservoir effect in A.

Deep Pumping is necessary to to vary the flow and motive pressure in A and implement the reservoir effect (shunts)





No aspiration effect possible due to S3 volume or compliance (varices) . S3 is passive and fills up only in proportion to its volume and compliance and hydrostatic pressure (h2)

Deep Pumping is necessary to aspirate fluid in S1 and to vary the flow and pressure in A (shunts)

Cure CHIVA : La pratique prouve la théorie

Exemple: Shunts I + II de la grande Saphène.