GANGGUAN PADA SISTEM MUSCULOSKELETAL

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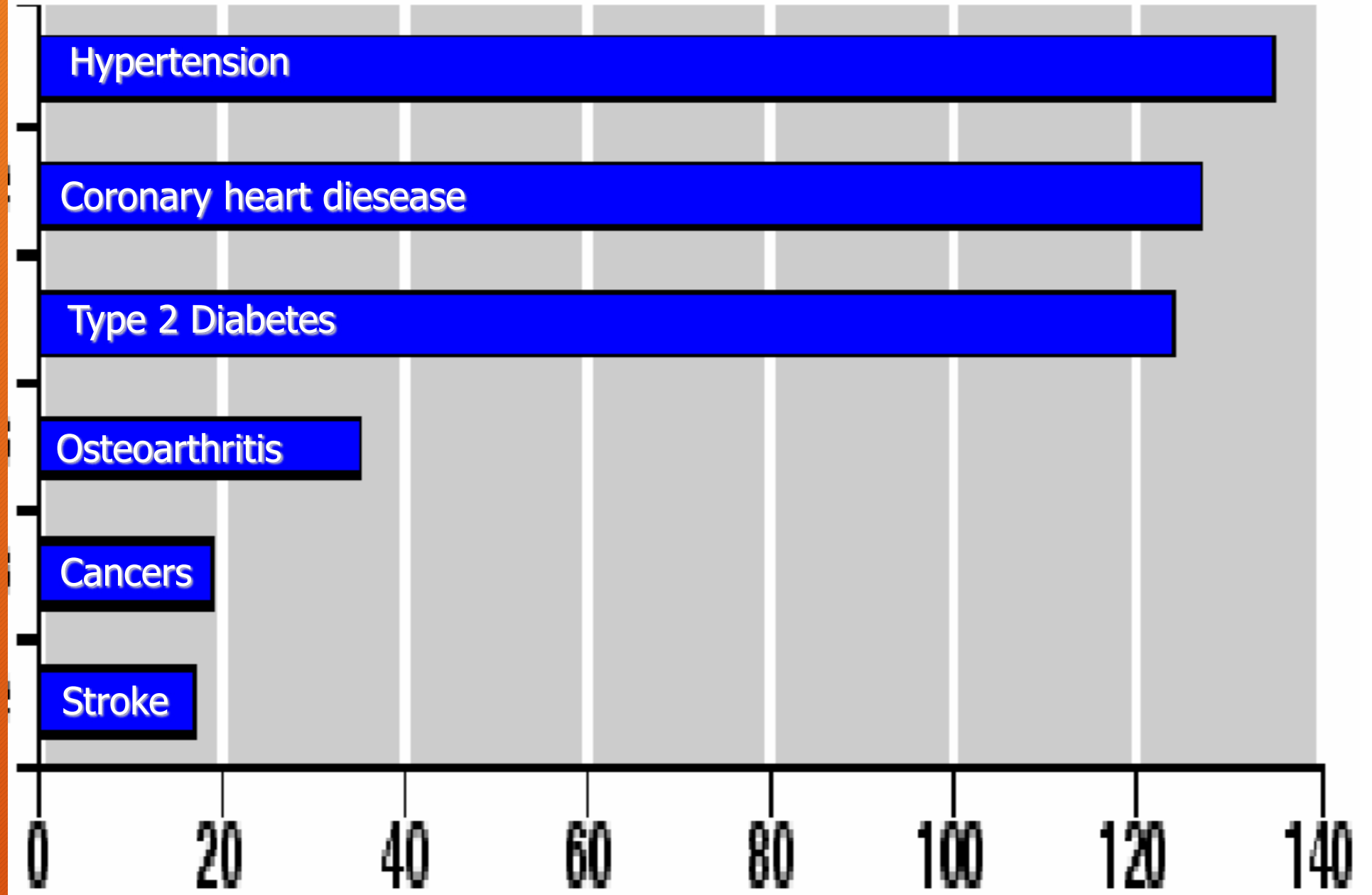
- Depatemen Fisiologi FKKMK UGM

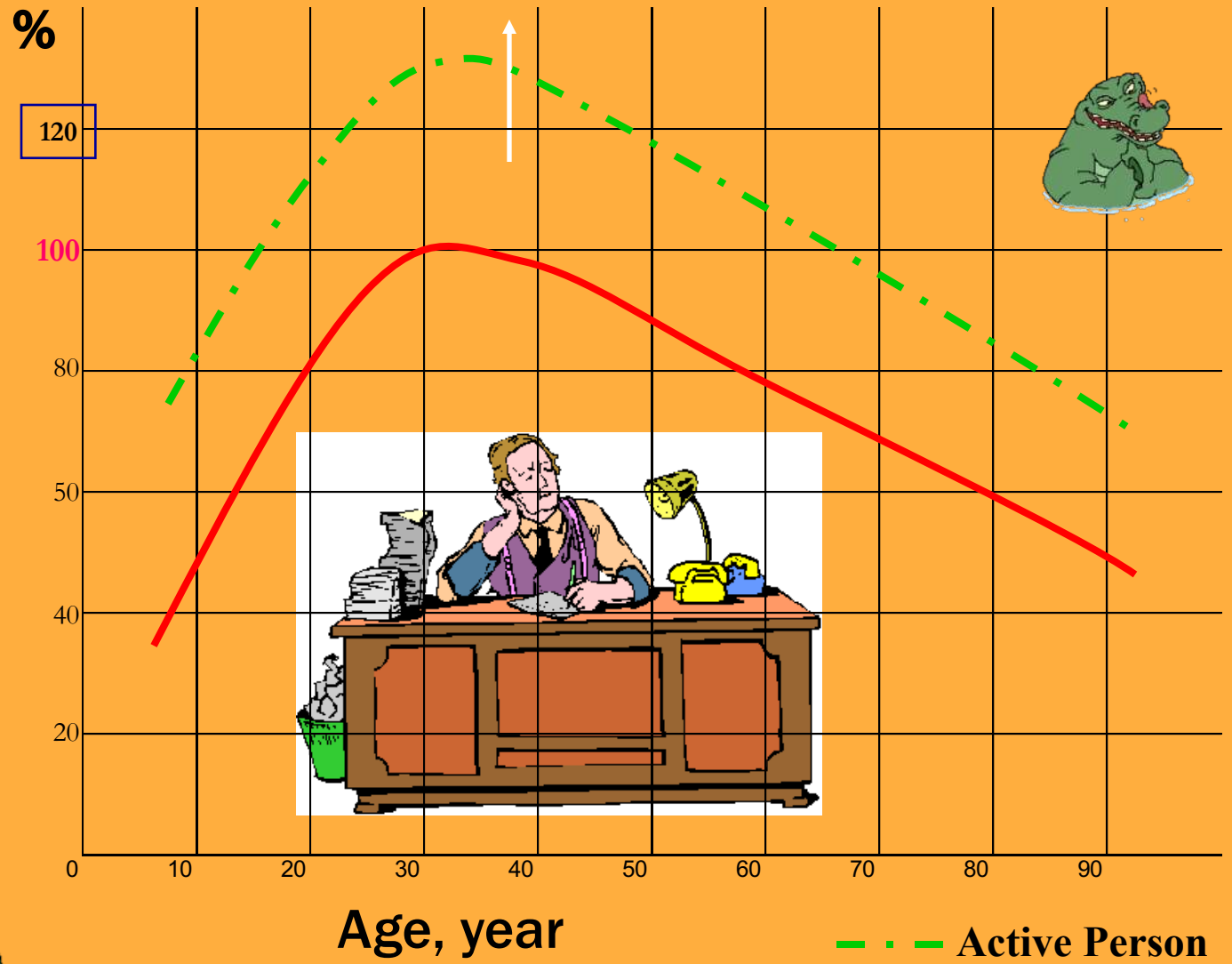
Man is not destroyed by suffering; he is destroyed by suffering without meaning.

Victor Frankl

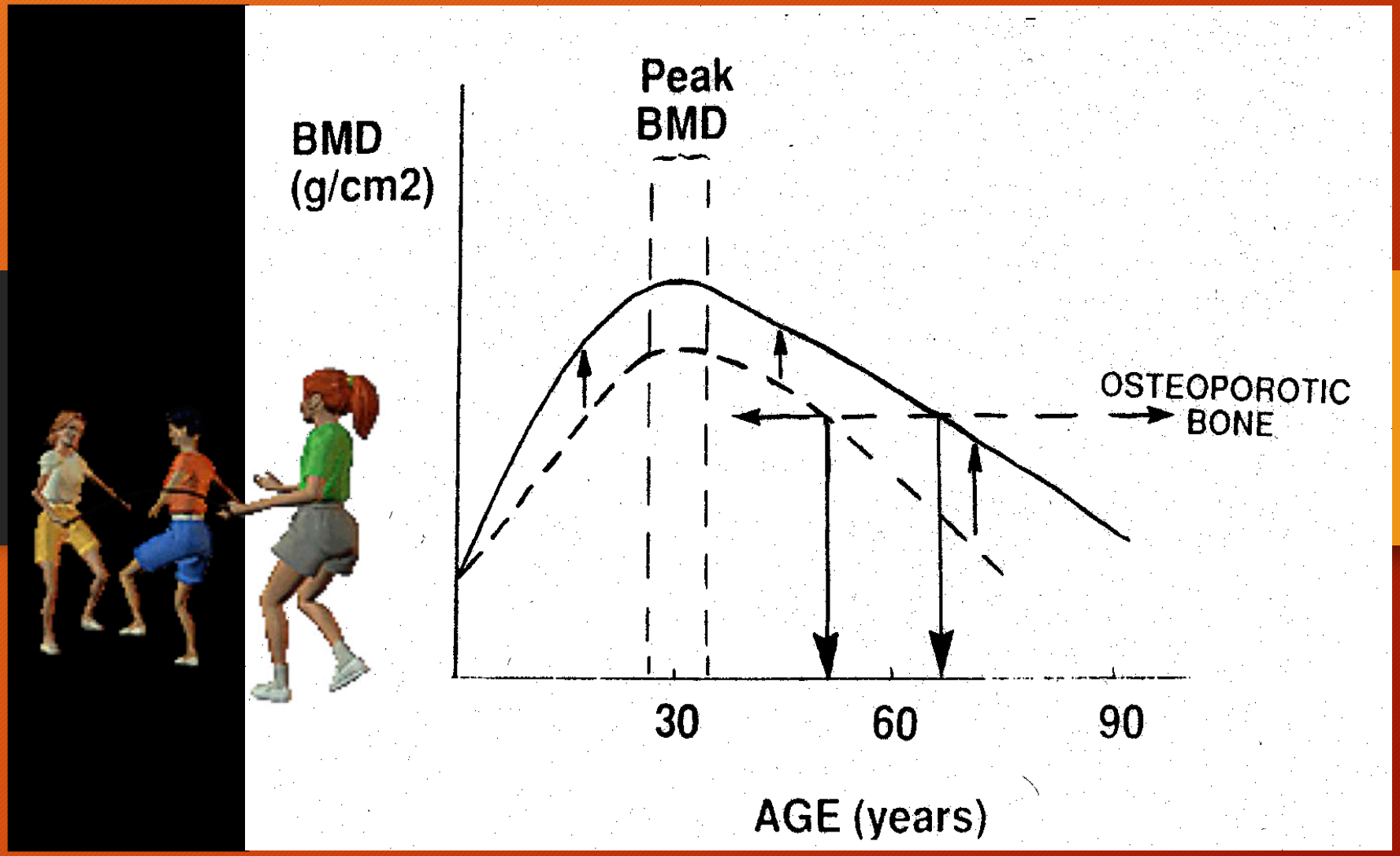


Rp. million healthy cost of companies **(WHO Survey, 2000)**

General Level of Physiologic Function



Natural History of Bone



From: Kemper, Pediatric Exercise Science 2000;12:198-216.

ERGOMETRY TEST

ERGOMETRI 1

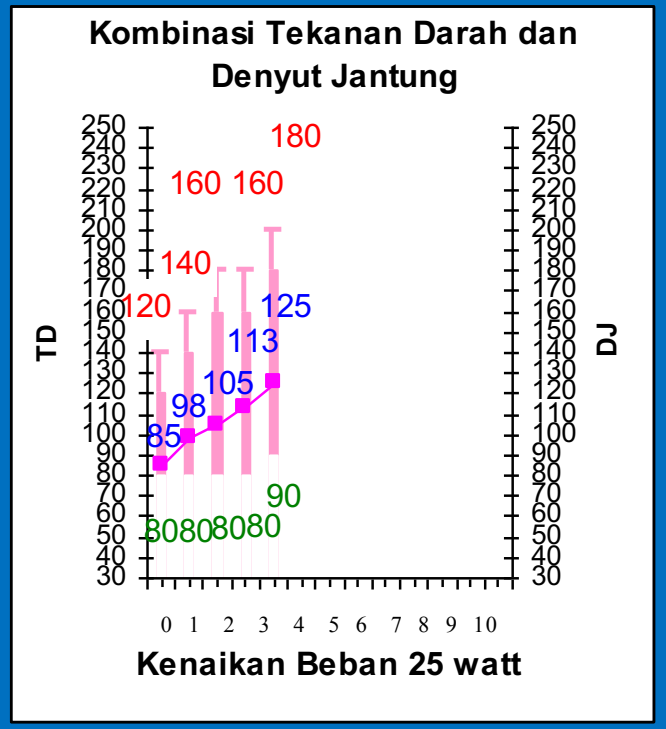
abadan LifeSupport

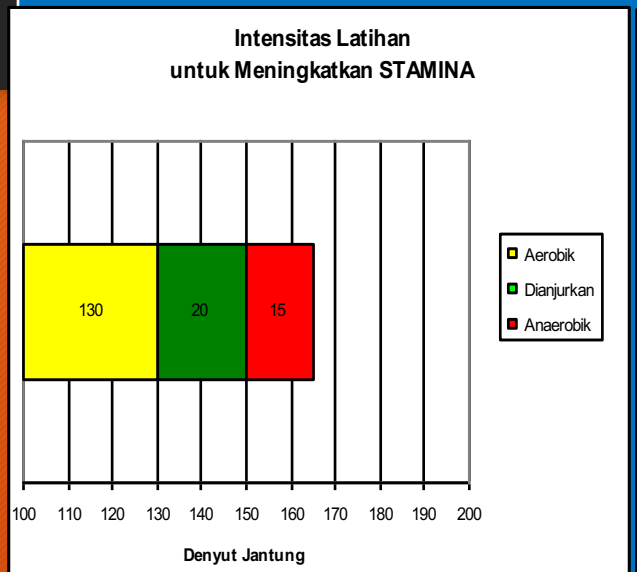
No. Induk	: -
Instansi	: PT. XXX
Periksa Ke	: SATU
Tgl. Periksa	: Maret 2004
Nama	: Tn. AA
Keluhan	: -
Pakai obat	: -
Umur	: 65 Tahun
Berat Badan	: 63 Kg
Tinggi Badan	: 171 Cm
L.P.B.	: 1.75 m²
DJ. Max pred.	: 155 x per menit
% DJP	: 0.77

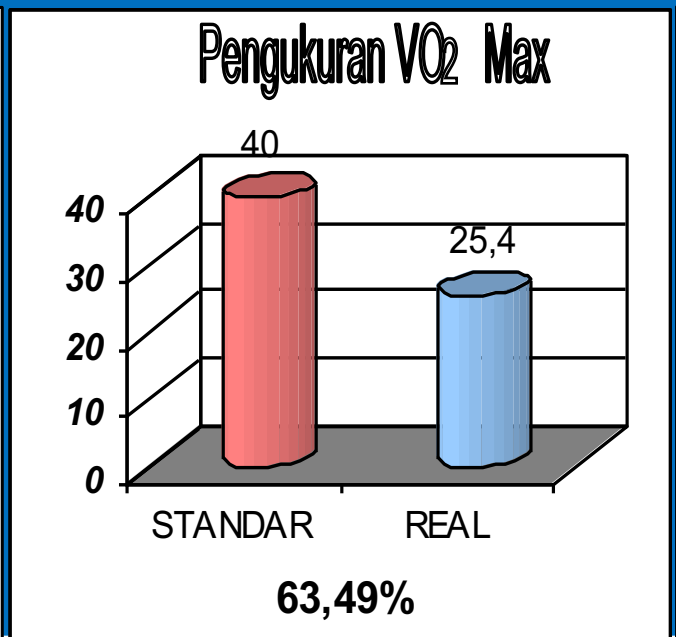
PWC Pred	149 watt
PWC Real	67,11 %
85 % DJ Max	131,8

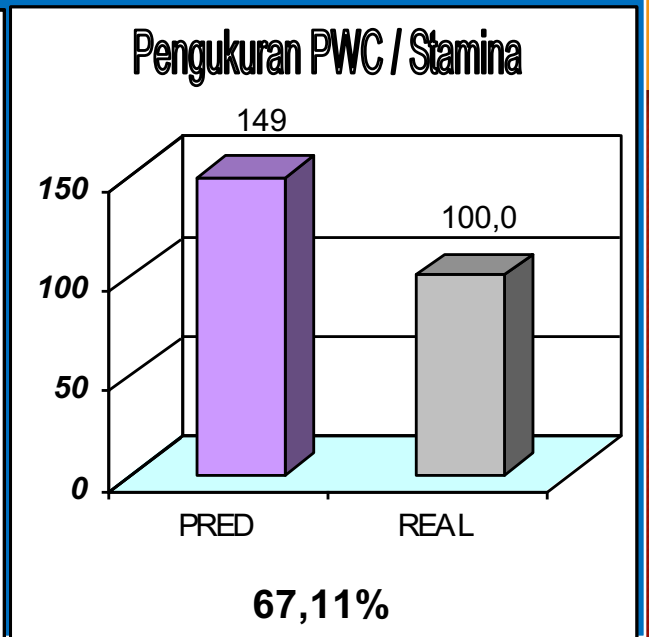
Kondisi	DJ	Sistolik	Diastolik
Istirahat	85	120	80
Beban Akhir	125	180	90
Pemulihan	115	150	70
E.K.G.	Sinus Normal		

VO2 Max	25,3 cc/kg/menit
MET	7,26 MET
IMT	21,55
KET.	Ideal
	0 Kg









ERGOMETRI 1

abadan Life Support

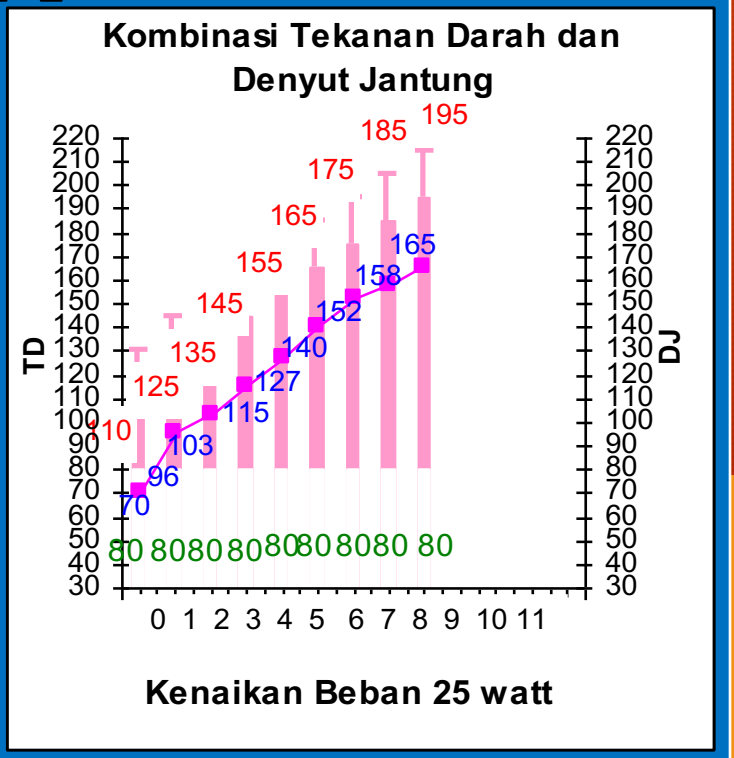
No. Induk	: (02635)
Instansi	: Atlet Sepak Bola
Periksa Ke	: SATU
Tgl. Periksa	: 13 Desember 2003
Nama	: Atlet 1
Keluhan	: -
Pakai obat	: -
Umur	: 22 Tahun
Berat Badan	: 57 Kg
Tinggi Badan	: 165,5 Cm
L.P.B.	: 1,63 m²
DJ. Max pred.	: 198 x per menit
% DJP	: 76,77

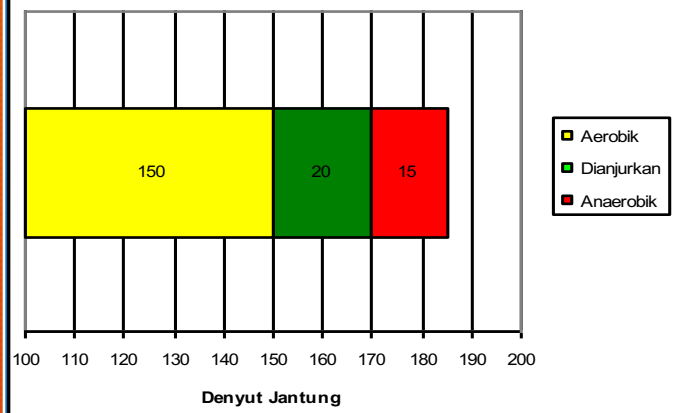
PWC Pred	194 watt
PWC Real	103,09 %
DJ Latiuhan	150 – 170 /menit

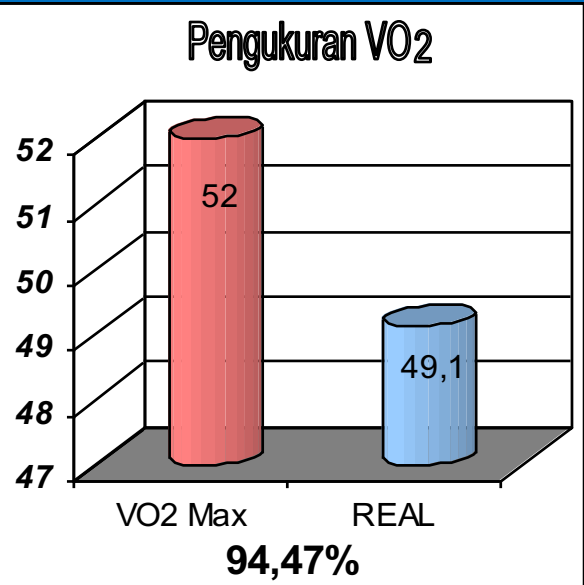
Kondisi	DJ	Sistolik	Diastolik
Istirahat	70	110	80
Beban Akhir	152	175	80
Pemulihan	107	145	80

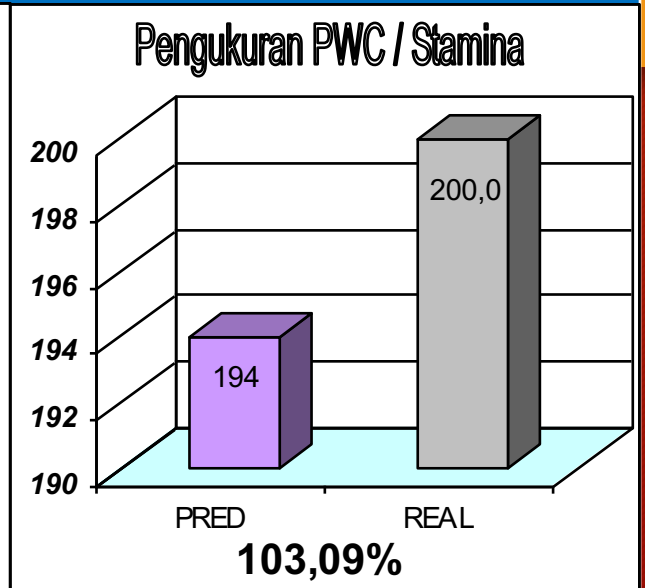
E.K.G.	Sinus Normal

VO2 Max	49.1 cc/kg/menit
MET	14.0 MET
IMT	20,81
KET.	Ideal
	0Kg

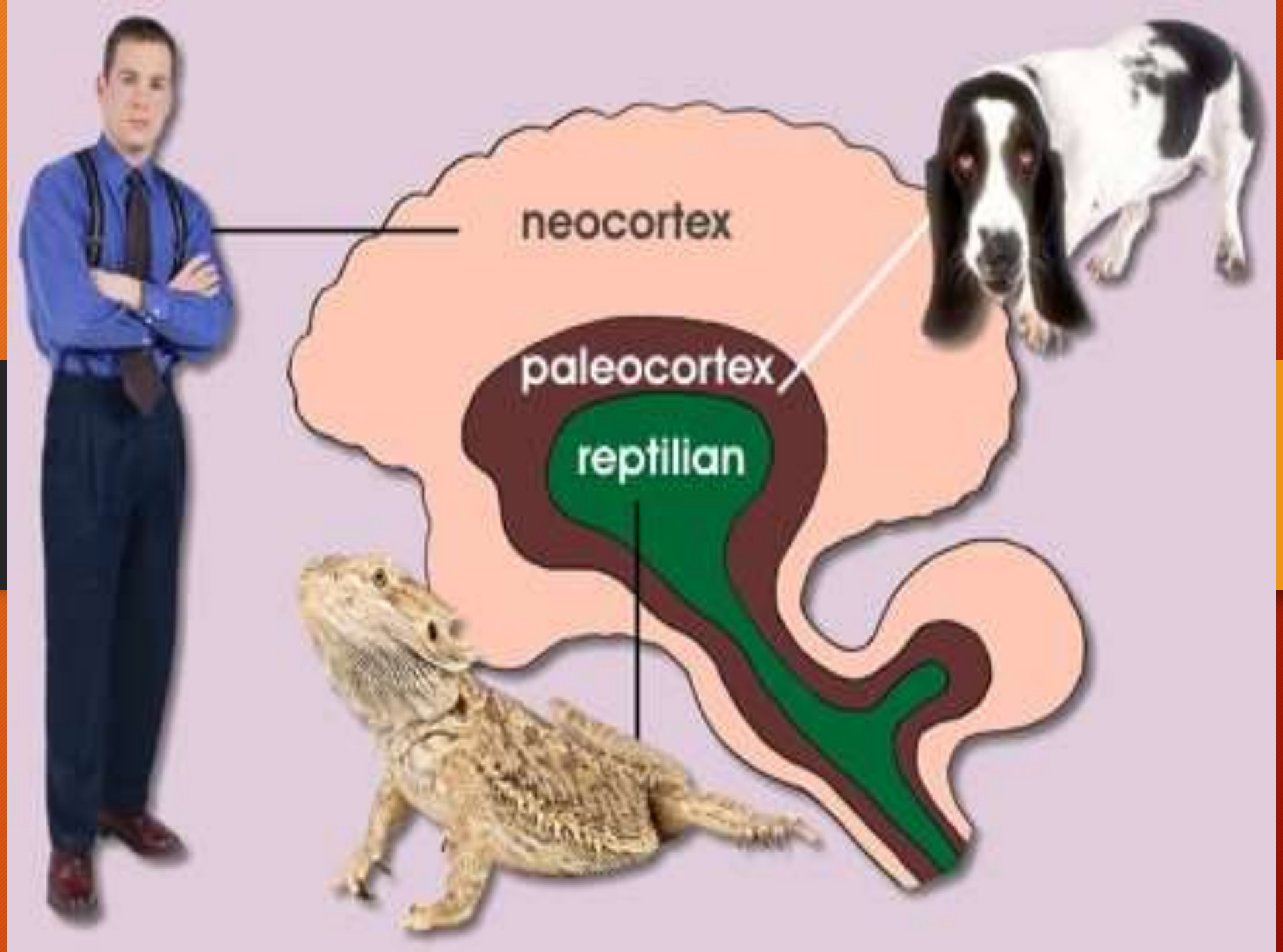


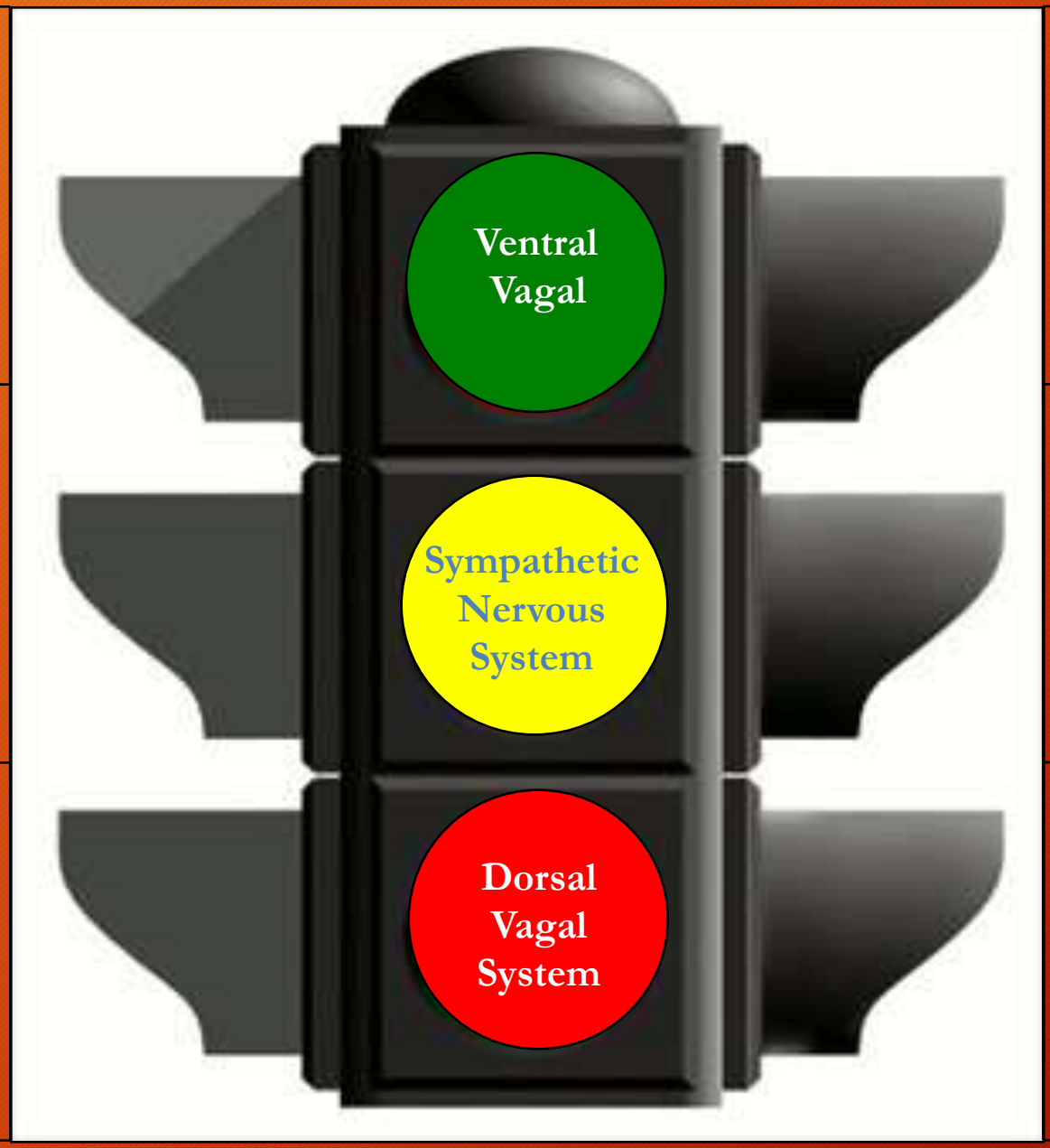




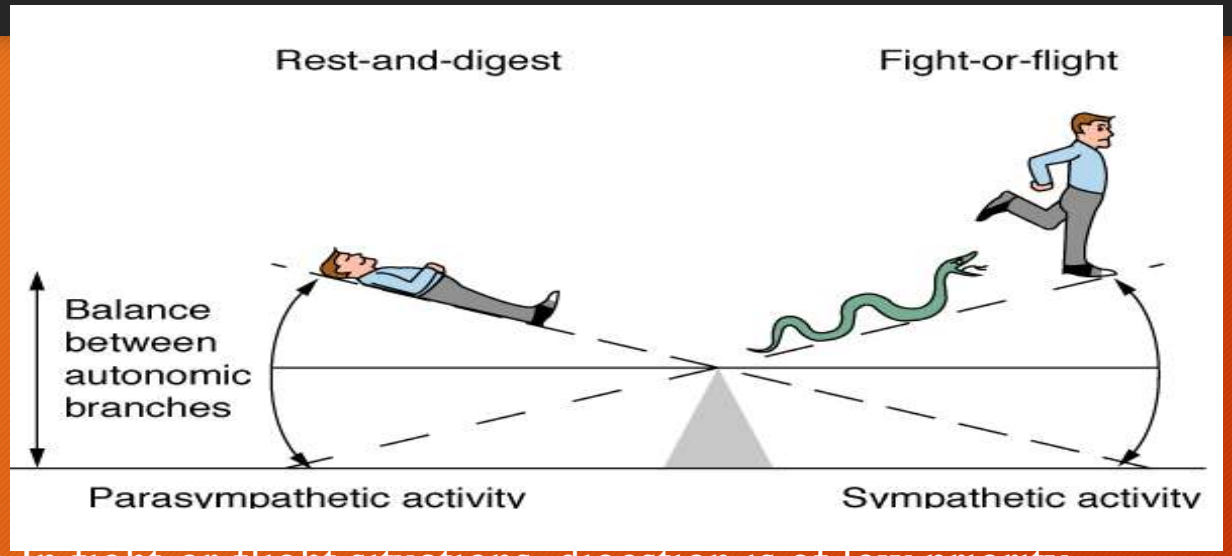


What does “environment” mean?


neocortex
paleocortex
reptilian

Social Engagement		Safe
Fight, Flight, Freeze		Danger
Immobility		Life Threatening

KONSEP LAMA DAN BARU



- In fight-or-flight situations, digestion is of low priority.

  Heart and skeletal muscle prepare for high level of activity.
- The maintenance of homeostasis in the body involves balancing sympathetic and parasympathetic activity.

Hierarchycal Model

Polyvagal State

Myelinated (supra-diaphragmatic) Vagus

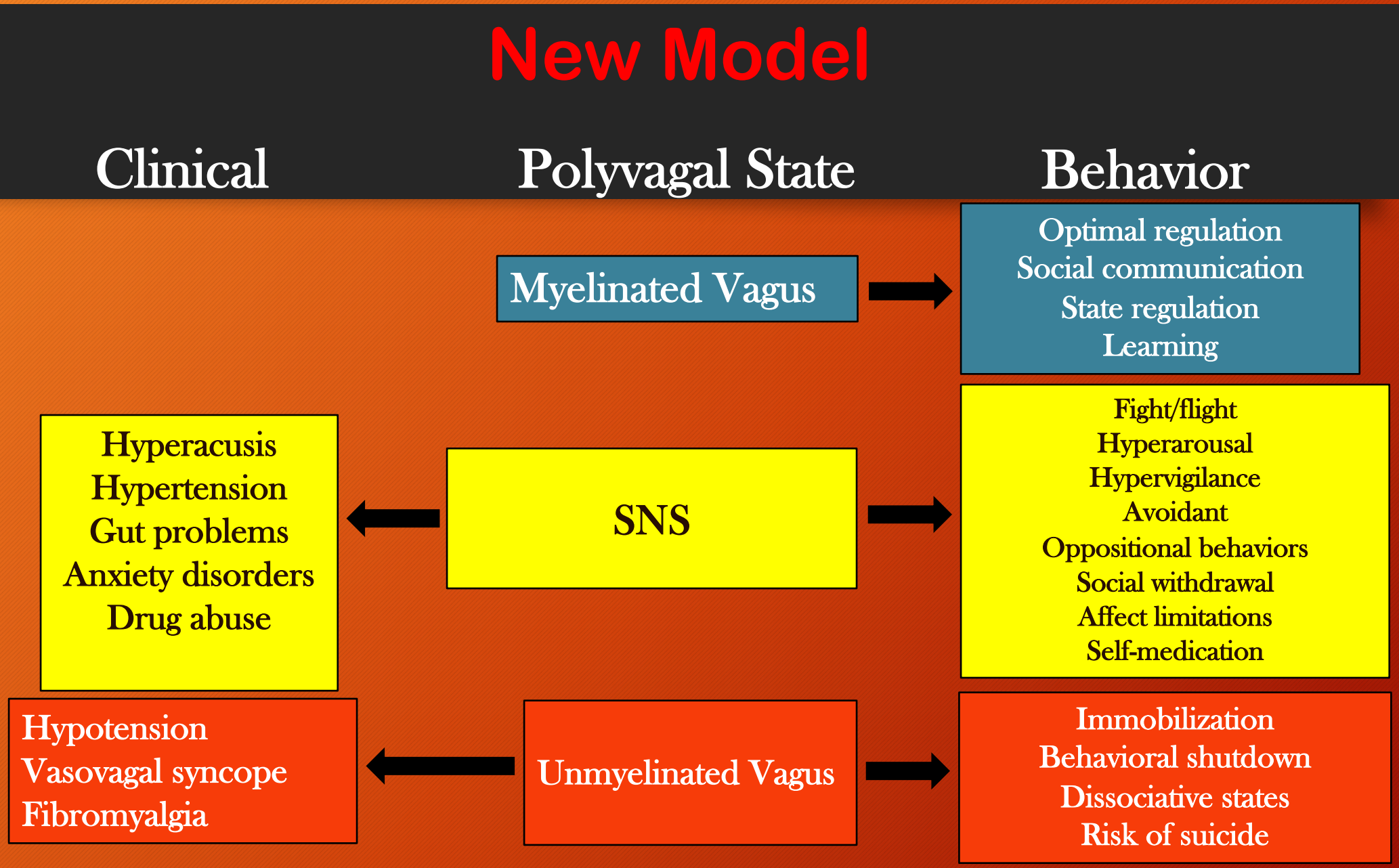
↓

Sympathetic Nervous System

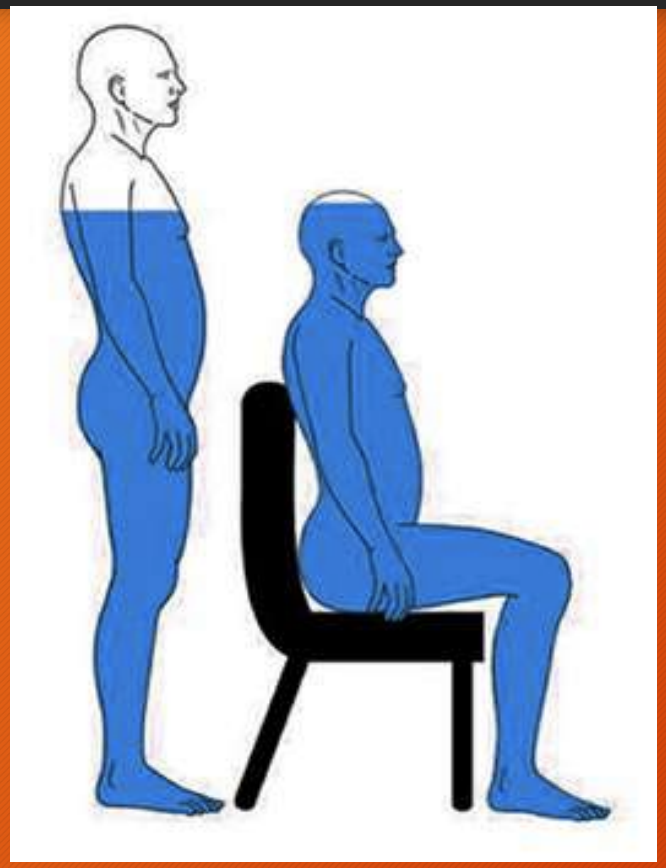
↓

Unmyelinated (sub-diaprhragmatic) Vagus

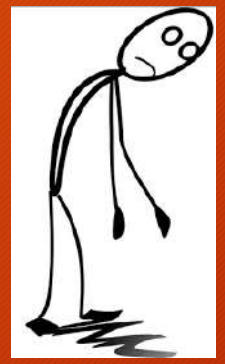
New Model


Clinical
Polyvagal State
Behavior
Myelinated Vagus
Optimal regulation
Social communication
State regulation
Learning
Hyperacusis
Hypertension
Gut problems
Anxiety disorders
Drug abuse
SNS
Fight/flight
Hyperarousal
Hypervigilance
Avoidant
Oppositional behaviors
Social withdrawal
Affect limitations
Self-medication
Hypotension
Vasovagal syncope
Fibromyalgia
Unmyelinated Vagus
Immobilization
Behavioral shutdown
Dissociative states
Risk of suicide

Postural orthostatic tachycardia syndrome



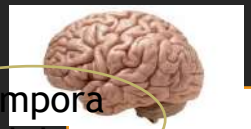
Dizziness



Fatigue

Sweating

Chest Pain,
Shortness of breath
Heart palpitation



Tempora
l lobe

NEUROCEPTION

SAFE

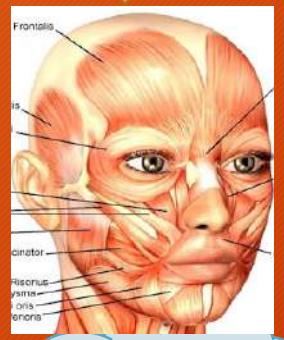
DANGER

Life Threatening

Corticobulbar pathway

HOMEOSTASIS

FITT



SMART

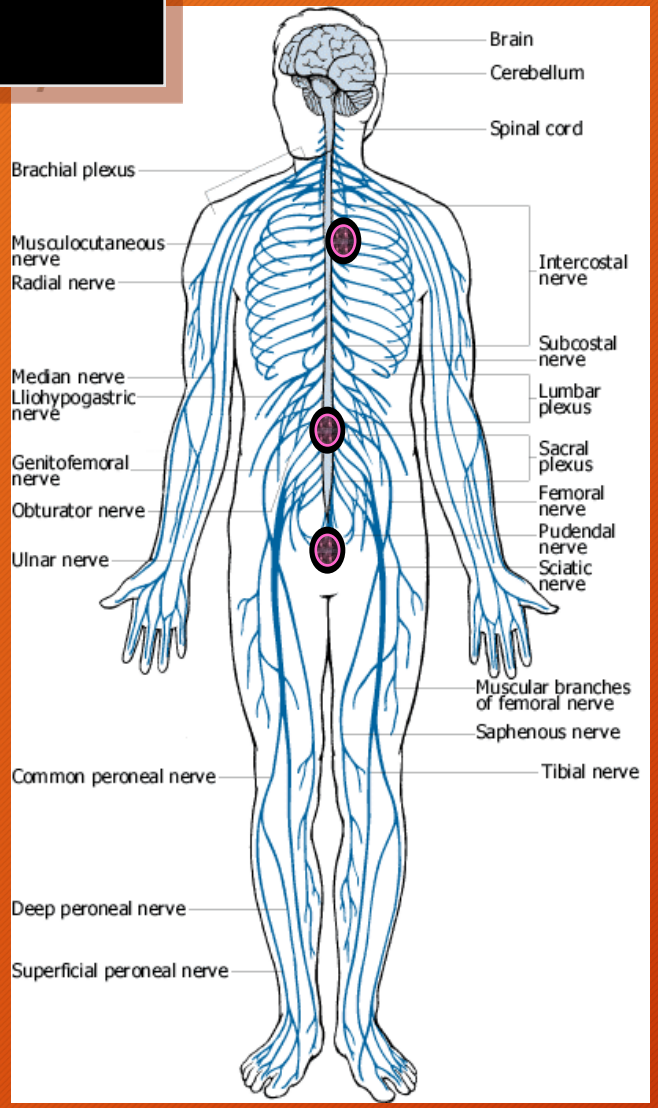
- HRV
- Schellong

New Vagus

Fight or Flight

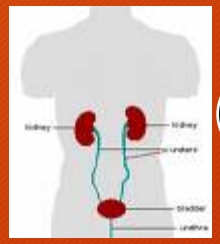
Shut Down (Parasimpatis)

The Human Nervous System



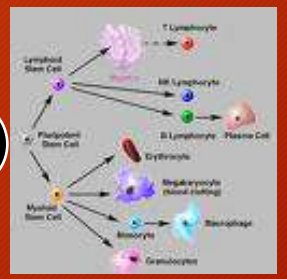
Cardiovascular system

Urogenital tract



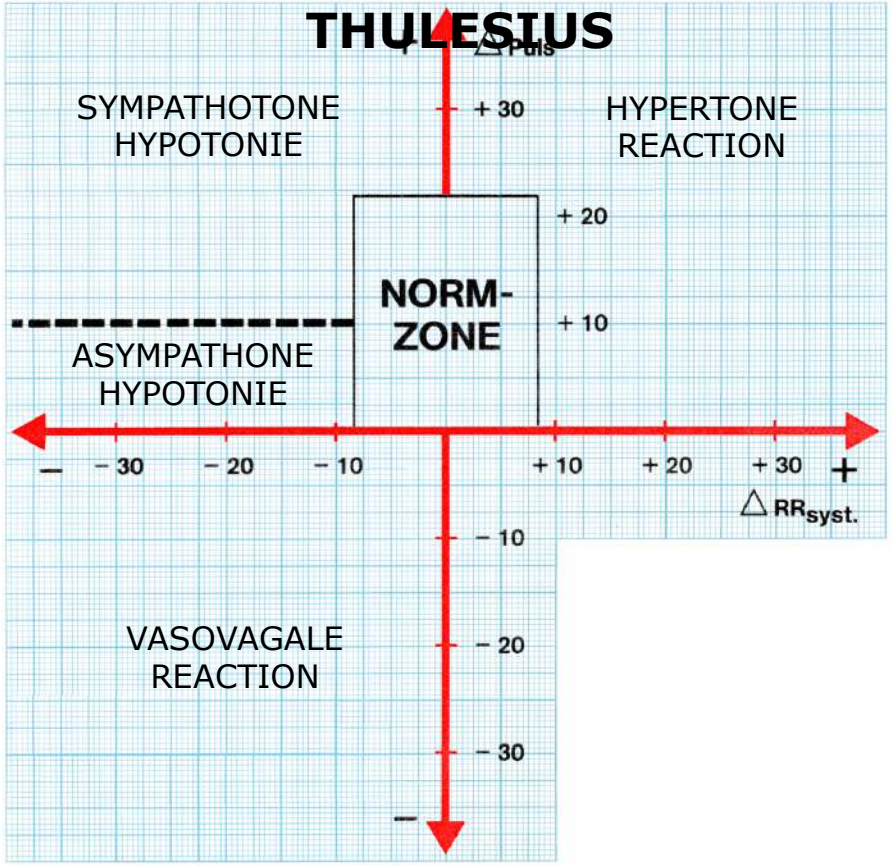
Homeostasis

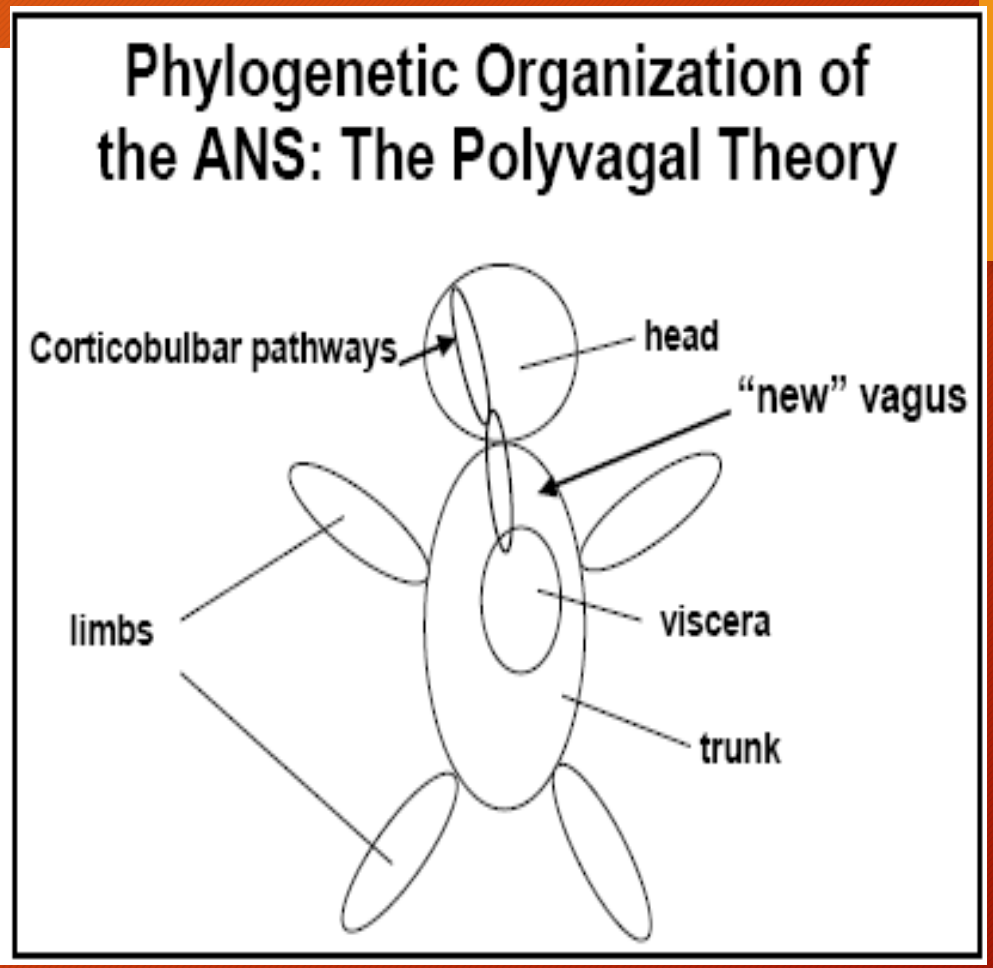
Immune system



Gastrointestinal tract

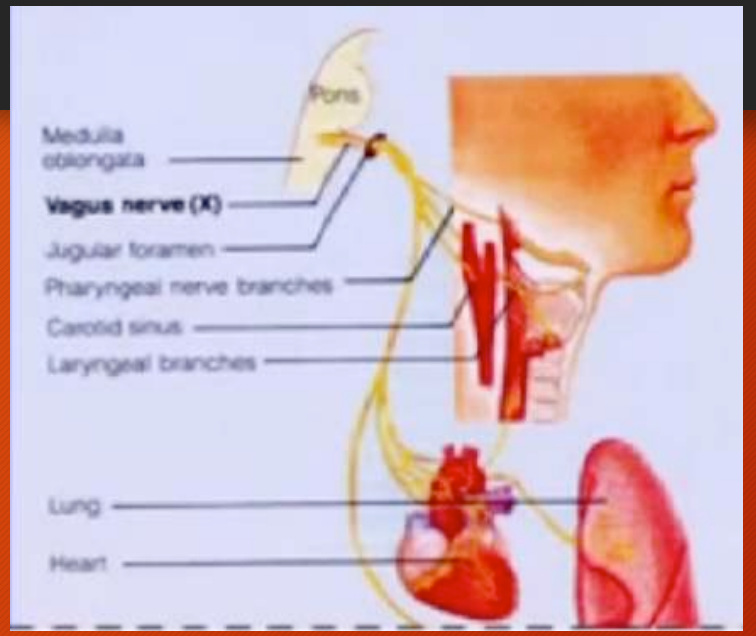
DIAGNOSE SCHEMA NACH THULESIUS





Supra-diaphragmatic vagus

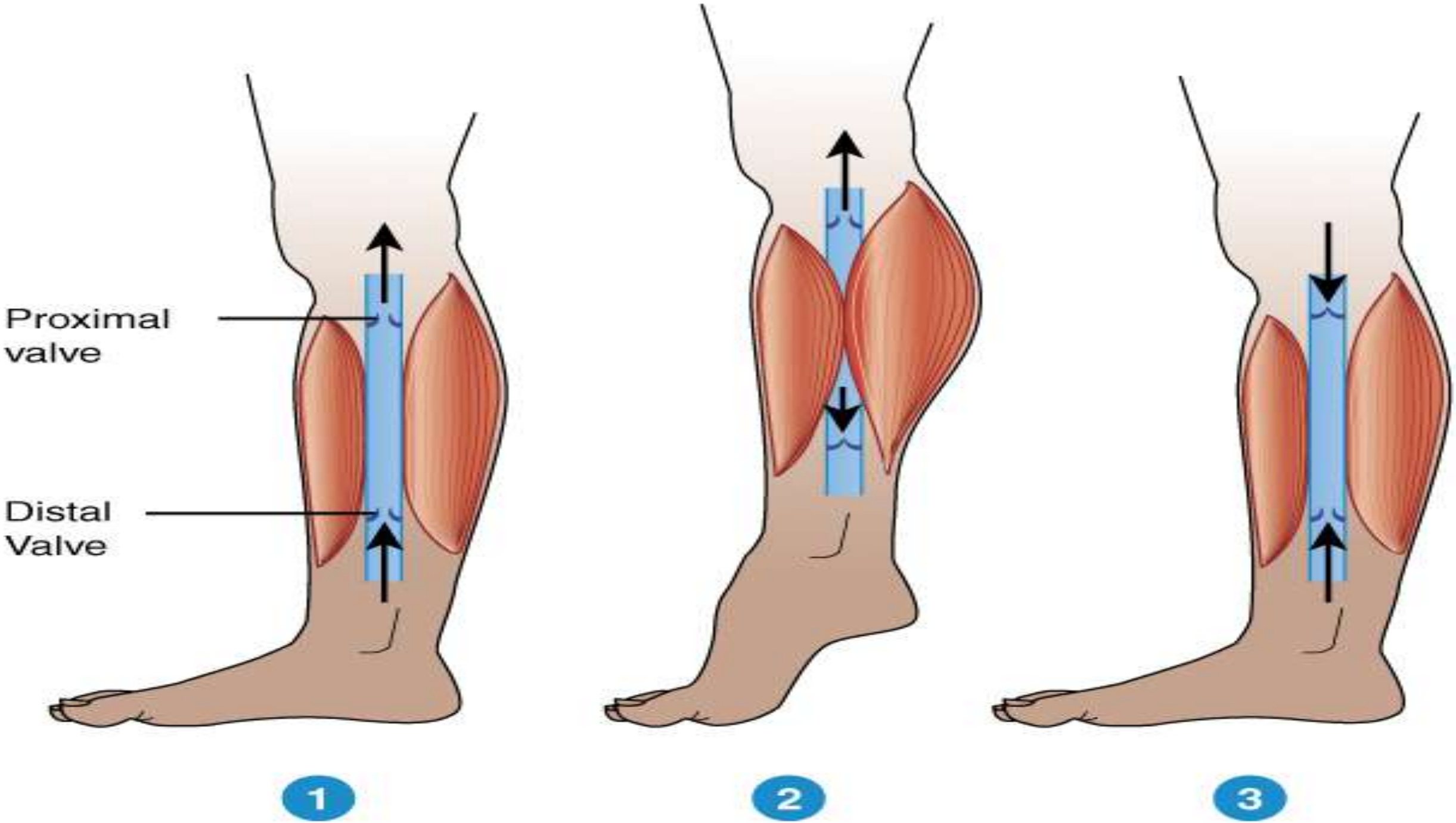
SNS, HPA (stress) Axis



Sympathetic | **Parasympathetic**

Sub-diaphragmatic vagus

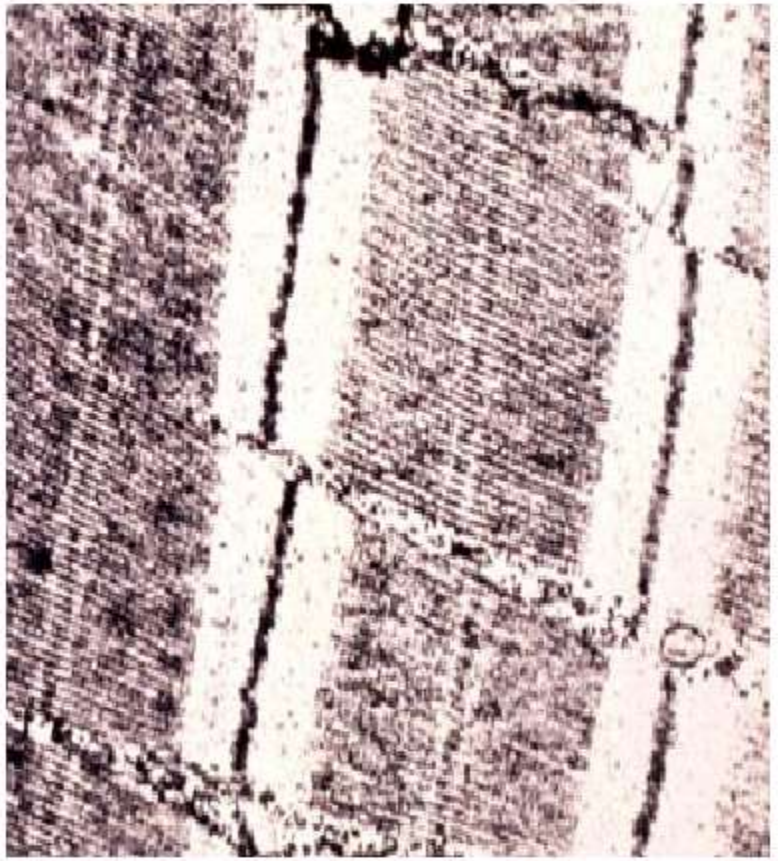
Vasovagal Syncope


Proximal
valve
Distal
Valve
1
2
3

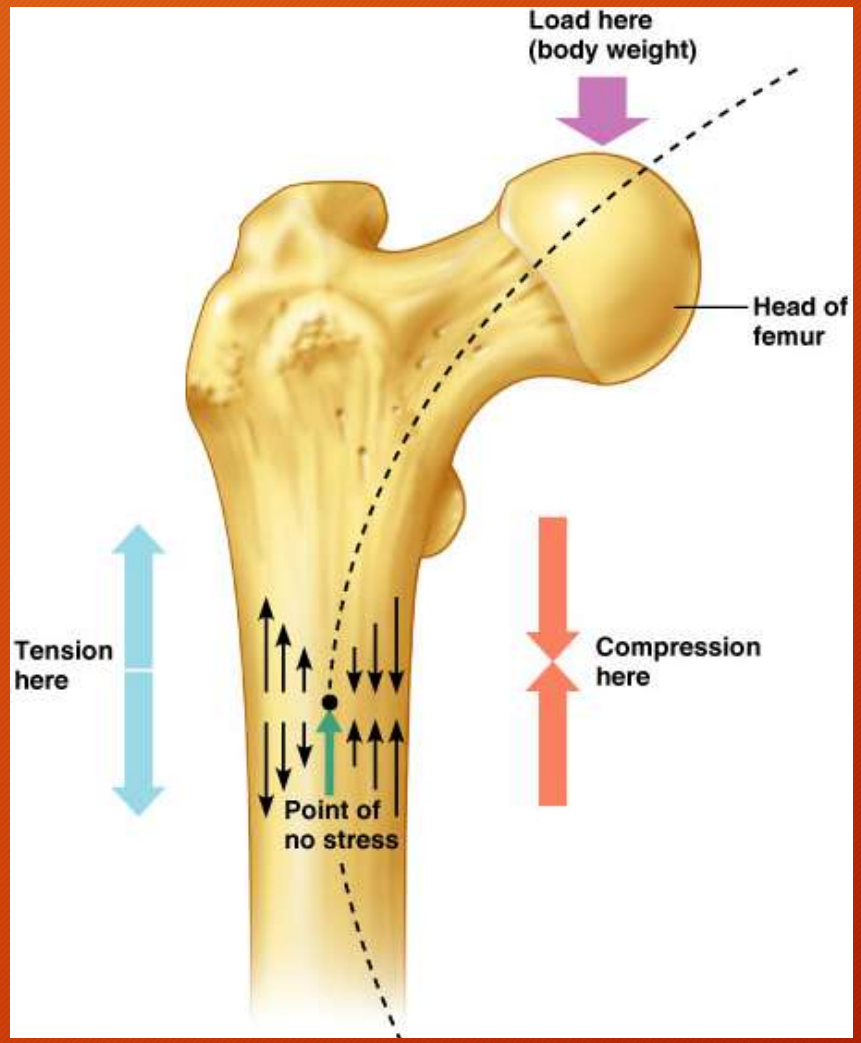

CYBEX
6000

Structural Damage in Muscle Fibers

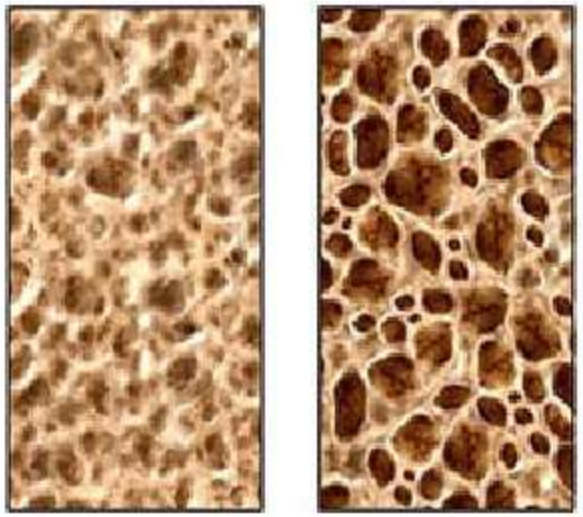
- The vertical lines are the "z - lines" that define the boundaries of the muscle sarcomere
- Microscopic damage can lead to disruption of the z-lines and contribute to soreness



Response to Mechanical Stress



Bone section through hip



Spinal osteoporosis

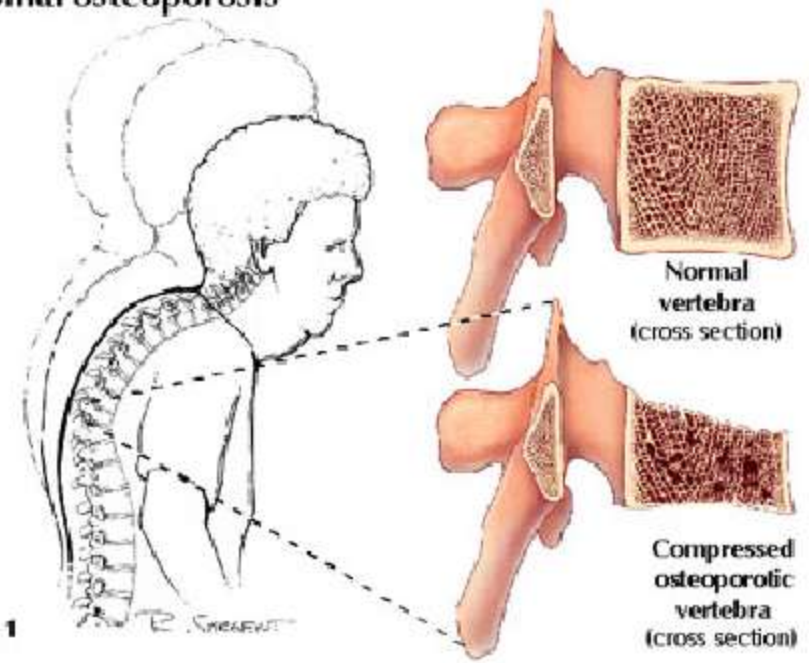
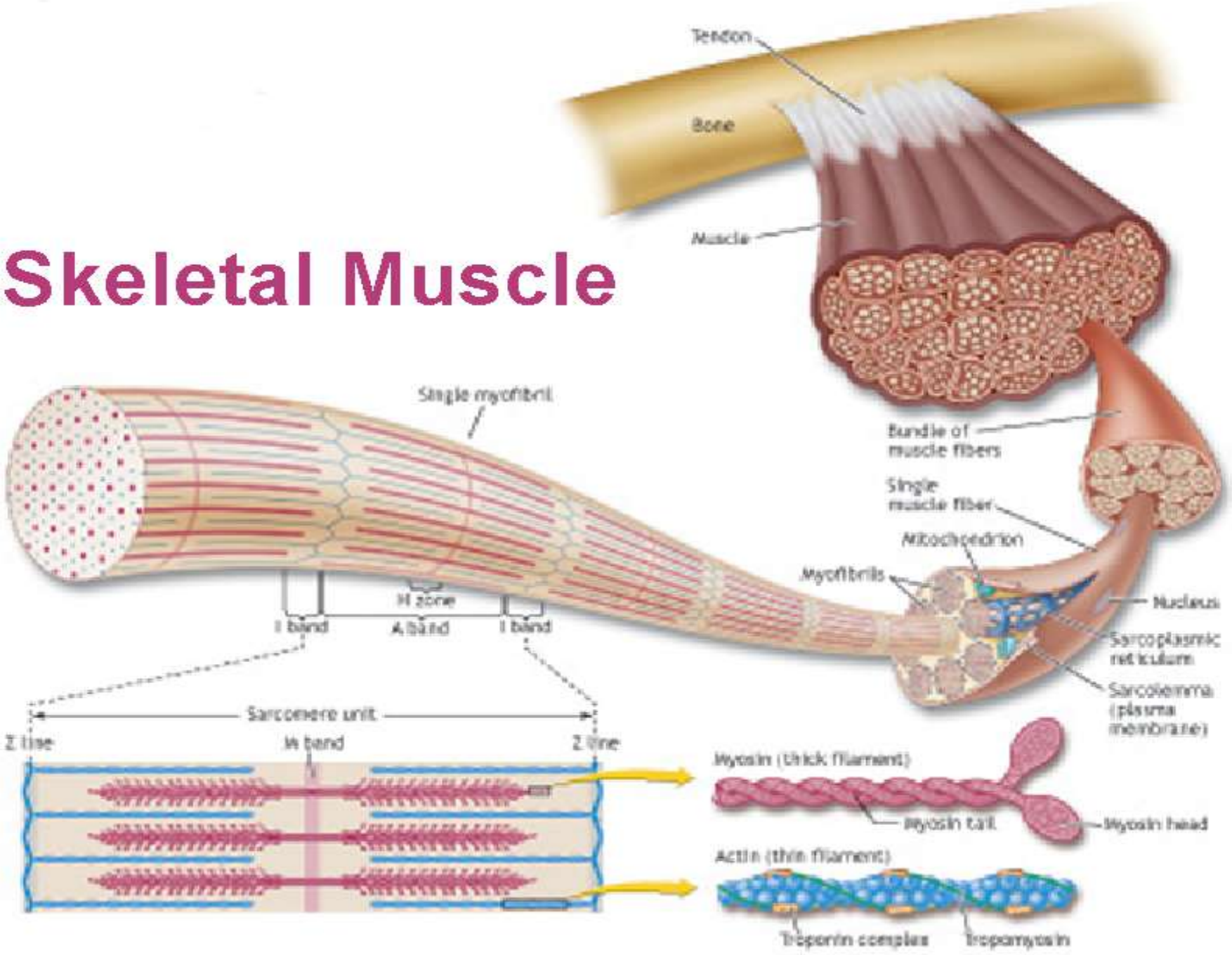
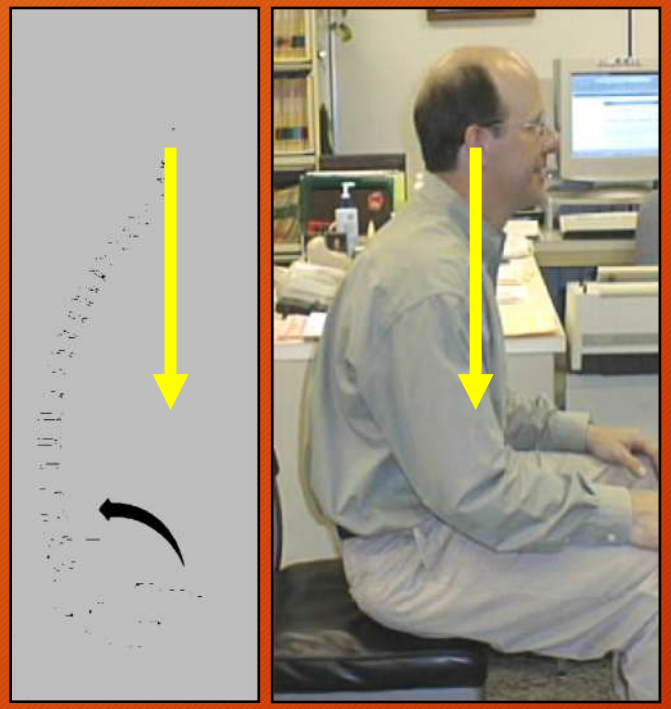


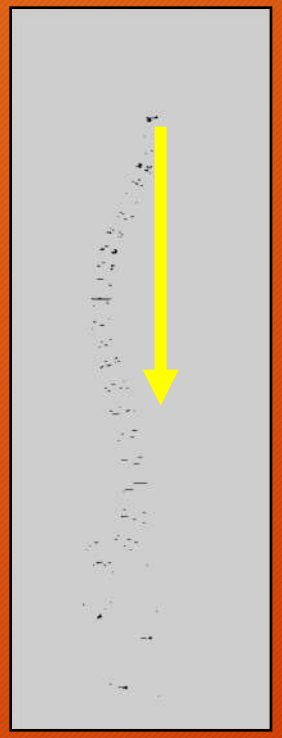
Fig. 1

Skeletal Muscle

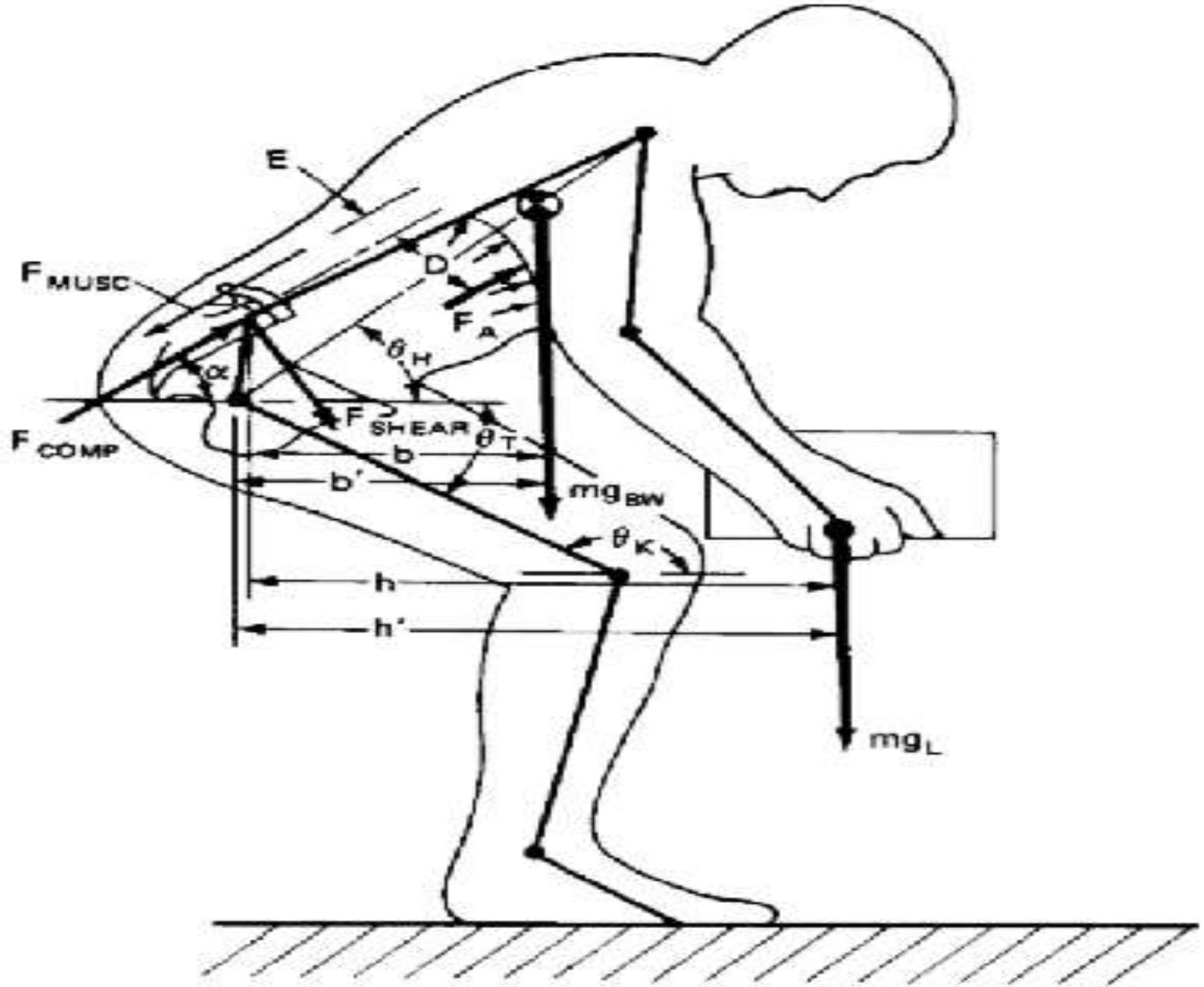




- When we lose the support of the lumbar spine, the head moves into a forward head posture
- Places significant stress across the posterior muscles of the neck and shoulders



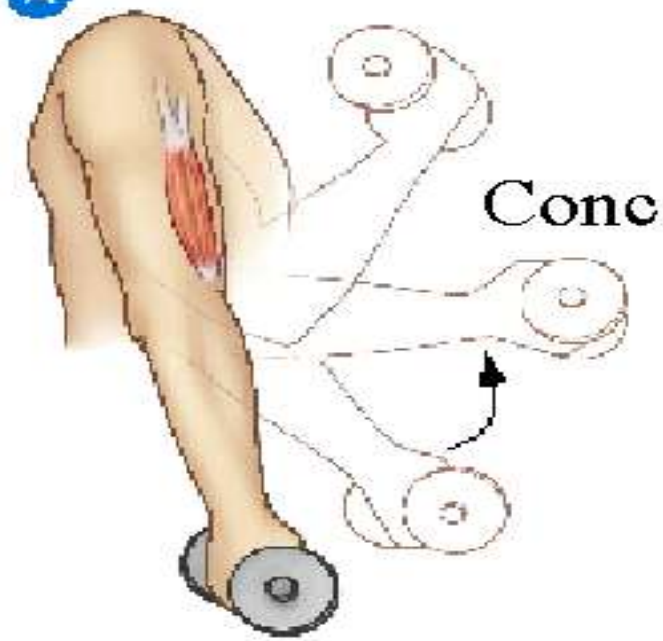
- The lumbar spine is the foundation of the entire spine
- An upright posture provides an optimal position for the head and neck


E
F MUSC
D
F A
θ H
α
F SHEAR
θ T
F COMP
b
b'
mg BW
θ K
h
h'
mg L

Muscle Actions

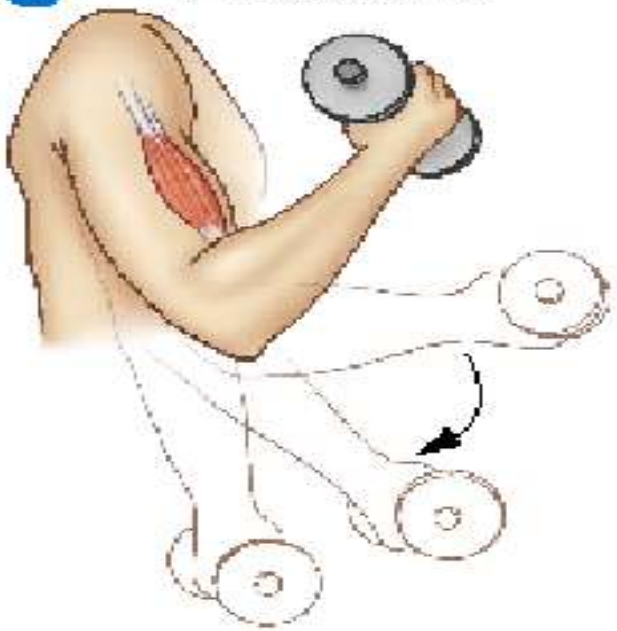
A

Concentric



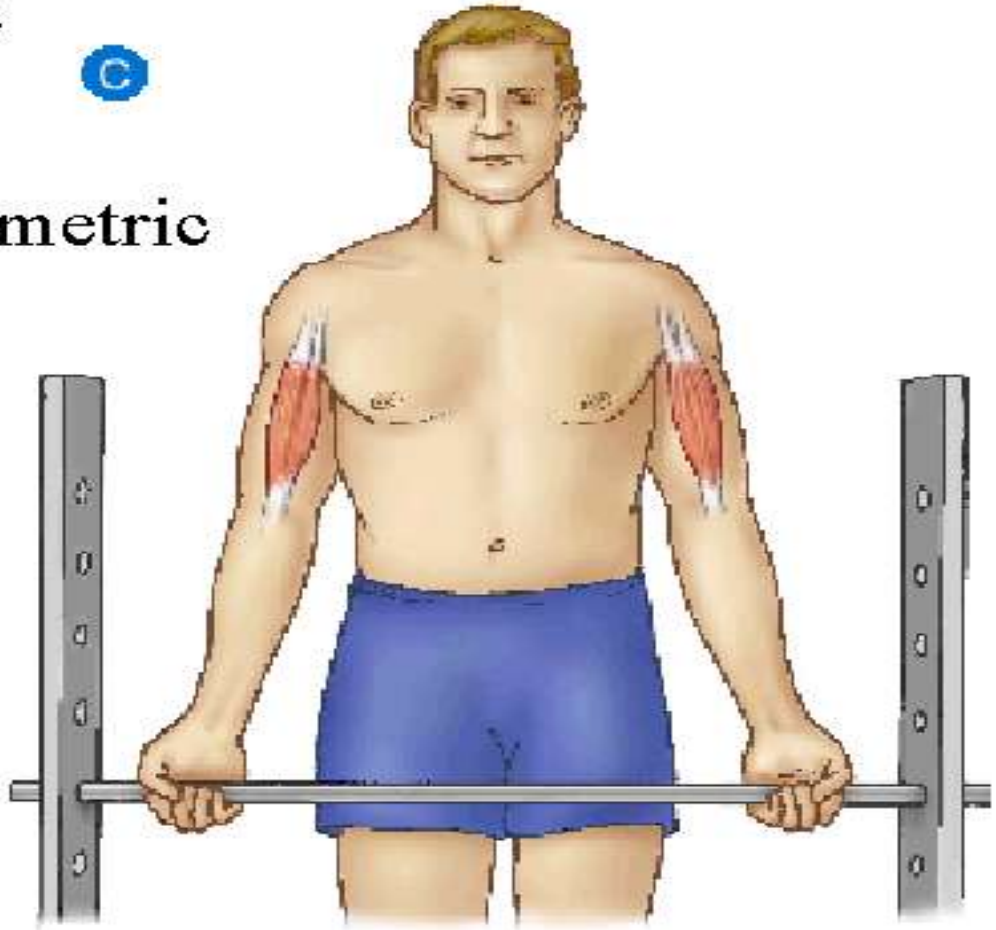
B

Eccentric



C

Isometric



Thank you!