

# *Nemocniční fenotypy CHOPN*

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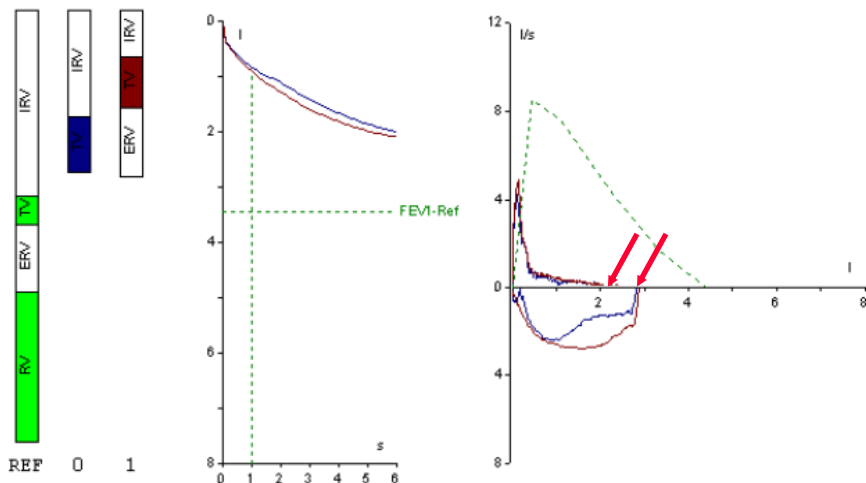


*Tato prezentace vznikla za podpory NFA*

# Definice

Irr-OVP  
Expozice  
Symptomy

## Spirometrie, křivka průtok / objem, srovnání Pre / Post



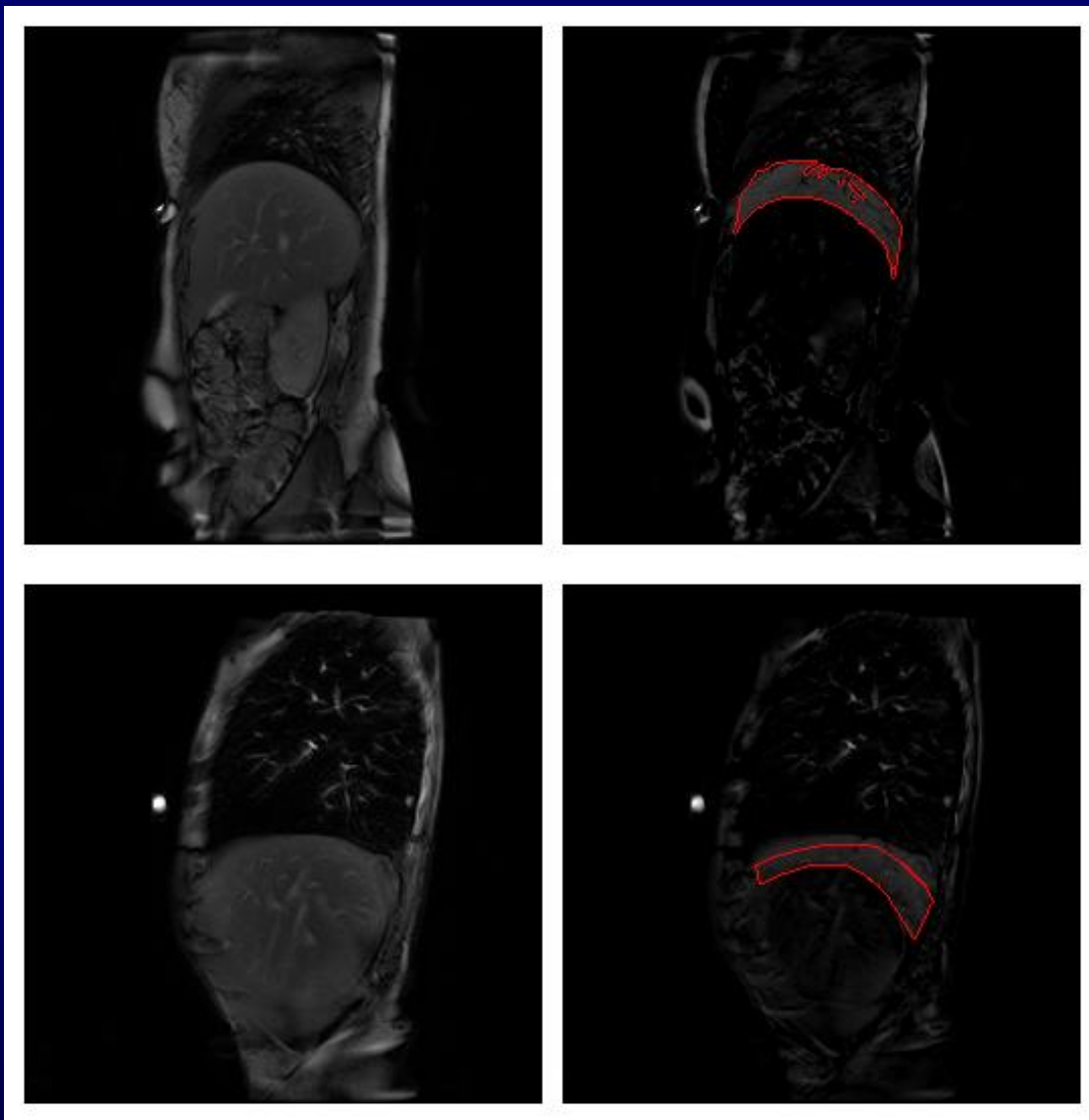
### Statické plicní objemy

Parametr	Jednotka	Nálezitá	Pre 14:57 %Nálezitě		Post 15:13 %Nálezitě		Post%Pre
VC	l	4.63	2.81	61	2.88	62	2
ERV	l	1.17			1.18	101	
IRV	l		1.85		0.80		-57
TV	l		0.96		0.89		-7
IC	l	3.70	2.81	76	1.70	46	-40

### Dynamické plicní objemy

FVCex	l	4.45	2.27	51	2.38	53	5
FEV1	l	3.45	0.85	25	0.93	27	9
FEV1/VC	%	76	30	40	32	43	6
FEV1/FVC	%	76	38	50	39	52	4
PEF	l/s	8.53	4.25	50	4.90	57	15
MEF75	l/s	7.58	0.48	6	0.65	9	35
MEF50	l/s	4.53	0.25	5	0.37	8	49
MEF25	l/s	1.72	0.20	12	0.22	13	10
MEF25-75	l/s	3.44	0.32	9	0.37	11	17
PIF	l/s		2.38		2.83		19
MIF50	l/s		1.96		2.74		40
Aex	l*/l/s		1.56		1.85		19
Rocc	kPa/(l/s)	0.30	0.33	110	0.27	89	-19
tPEF	ms		106		53		-50
EV/FVC	%		1		1		7
EV	l		0.03		0.03		12
tex	s		8.8		8.7		-1

# *V čem je problém?*

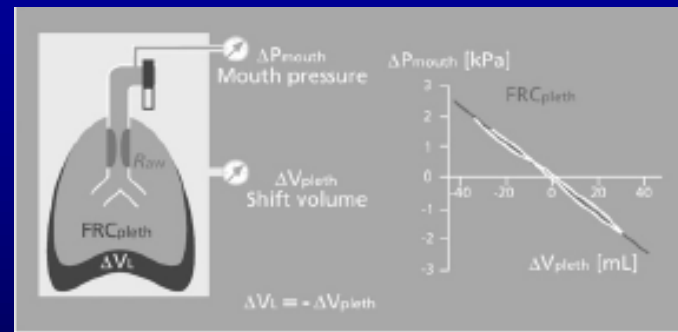
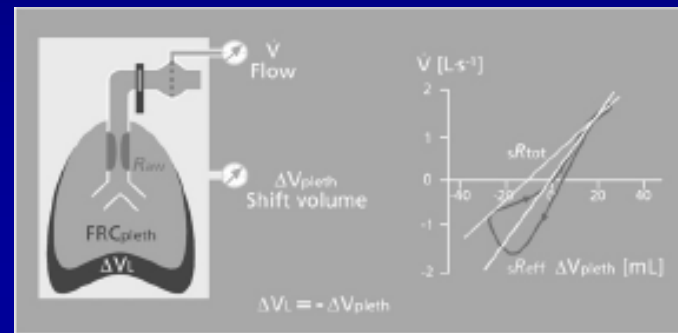


# V čem je problém?

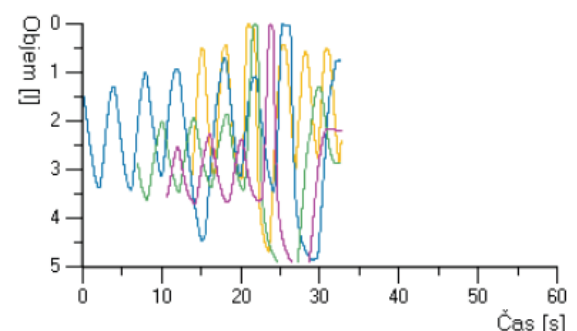
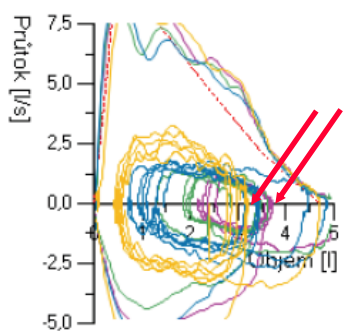
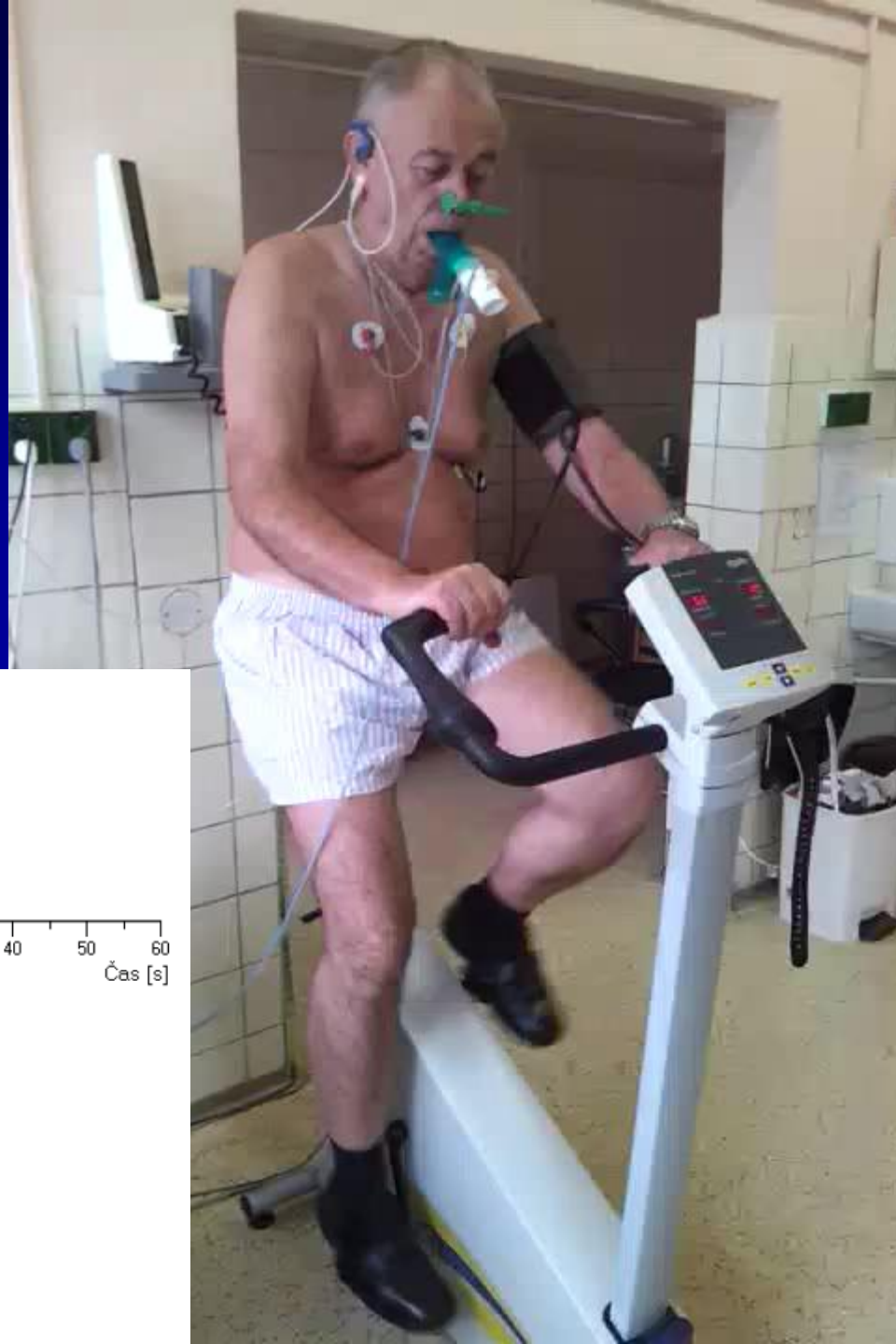
Zvýšená rezistance d.c.

a/nebo

Zvýšená compliance plic

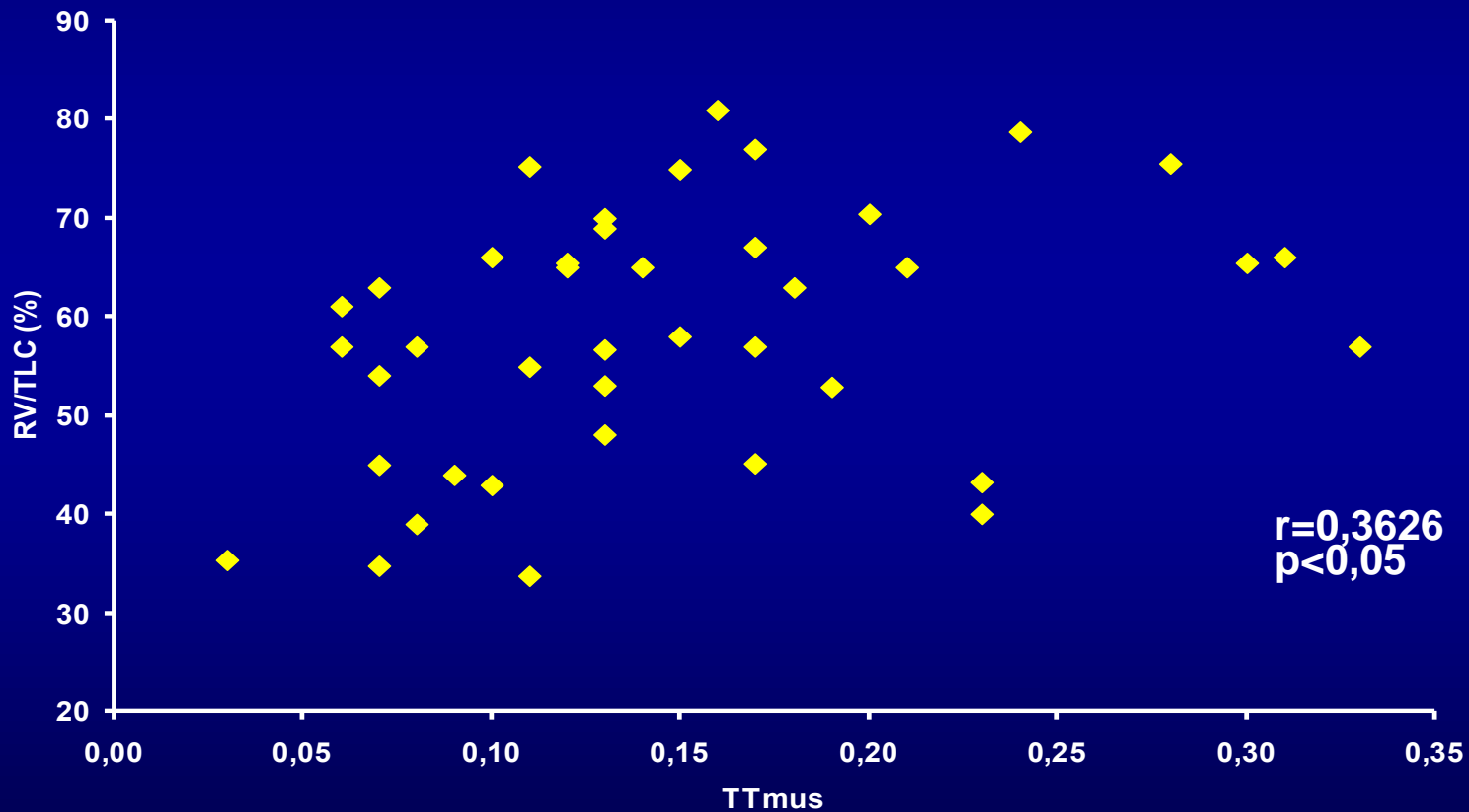


# Dynamická hyperinflace



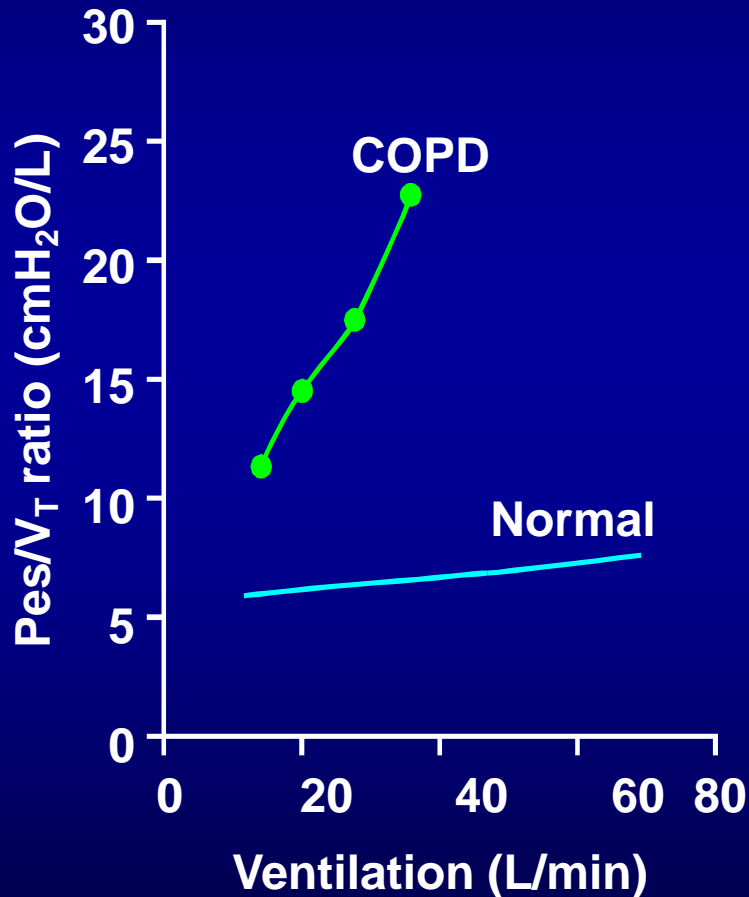
	Jednotka	Nál.	0	1	2	3
Čas	min:sec		0:40	4:45	8:50	10:31
Zátěž	W		0	50	100	150
TV	l		1,27	1,42	2,24	2,53
IC	l		3,67	3,44	3,44	3,20
TV/IC	%		35	41	65	79

# $TT_{mus}$ versus $RV/TLC$

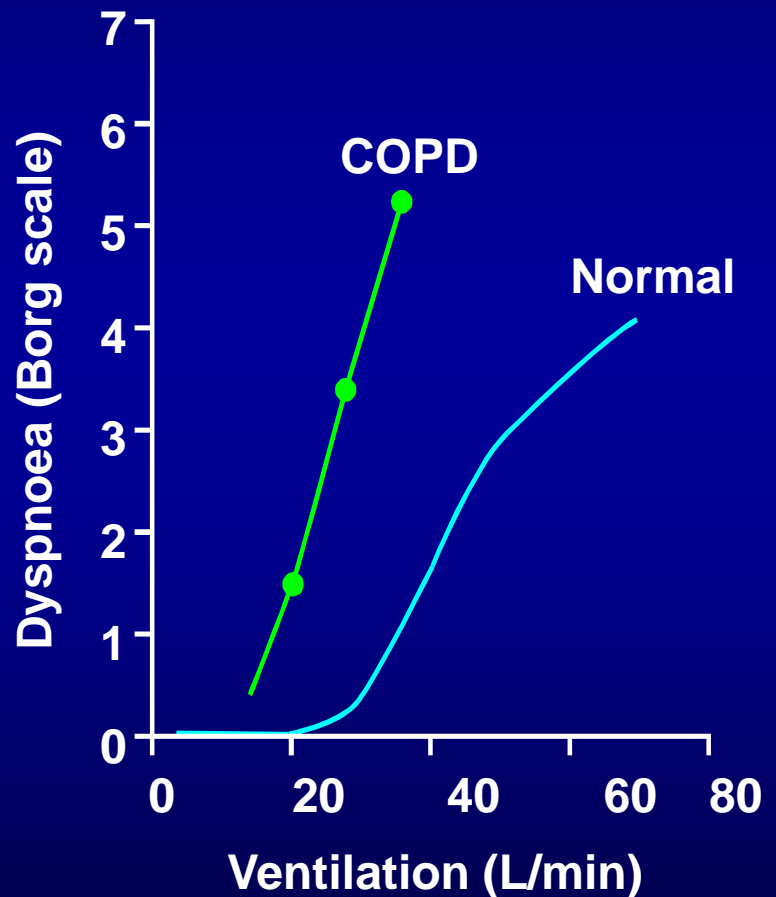


# Neuromechanická disociace a dušnost

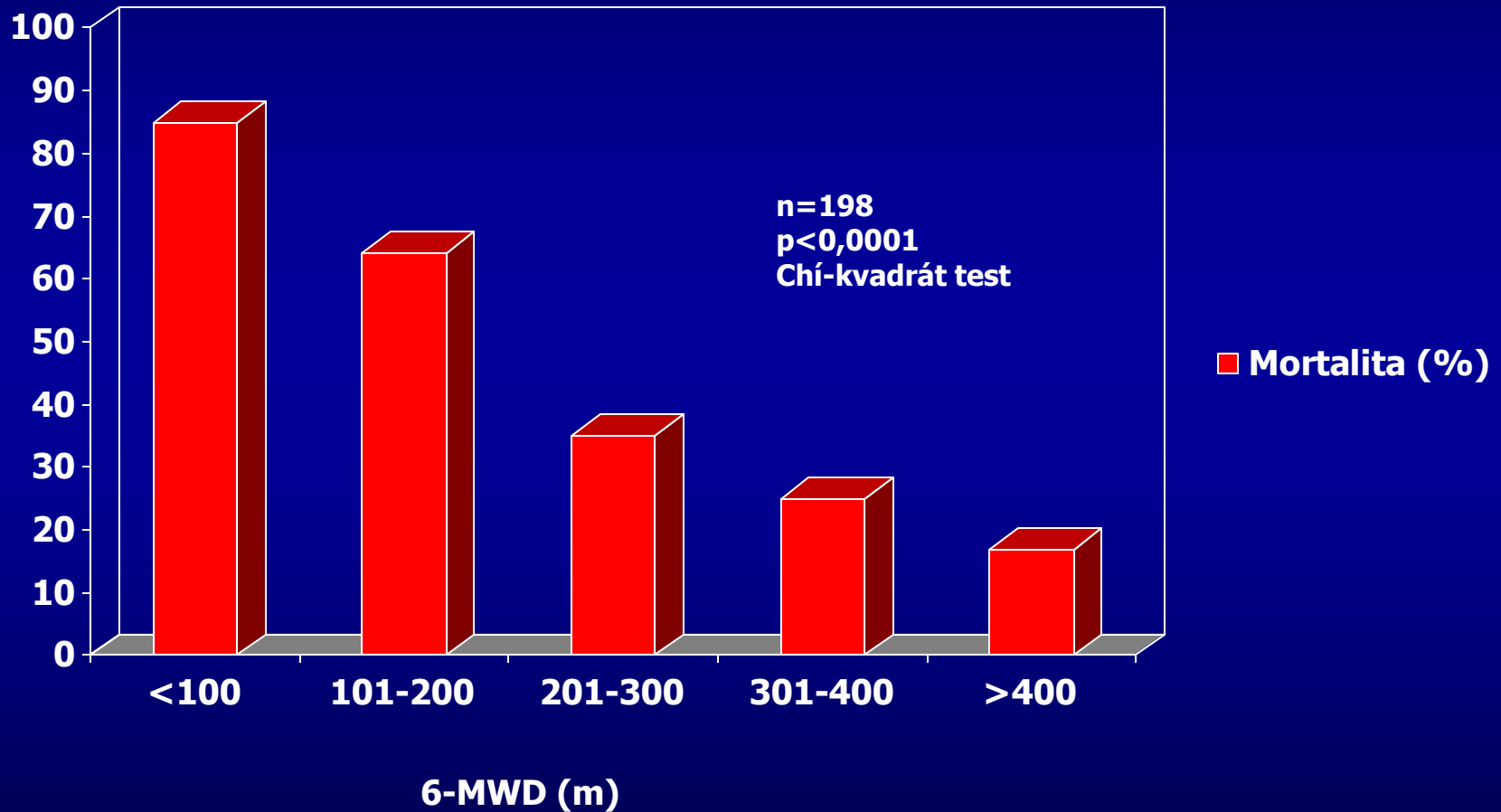
Neuromechanical dissociation



Exertional dyspnoea



# 6-MWD - vyjadřuje prognózu





# První pokus o fenotypizaci - 1956

## Type A: 'Pink puffer'

- Good respiratory drive
  - Intense dyspnea with pursed-lip breathing
  - Alert
  - Leaning forward using accessory muscles of respiration
  - Hyperinflation with increased total lung capacity
  - Small sputum volume
  - Severe airway obstruction on spirometry
  - Emphysema on CT scan
- Thin body build – cachexia and muscle wasting
- Late onset of respiratory and heart failure
  - Well-perfused with near-normal blood gases



## Type B: 'Blue bloater'

- Poor respiratory drive
  - Relatively mild dyspnea
  - Drowsy
  - Central cyanosis at rest or on mild exertion – bluish lips, oral mucosa and finger tips
  - Large sputum volume
  - Moderate airway obstruction on spirometry
  - Emphysema not detected on CT scan
- Often obese
- *Cor pulmonale* with right-sided heart failure – ankle edema, raised jugular venous pressure, hepatomegaly
  - Respiratory failure: hypoxia and hypercapnia
  - Nocturnal hypoxia during sleep
  - Polycythemia



# Český standard - fenotypy

Bronchitický

Non-bronchitický

Plicní kachexie  
BMI <21/FFM <16, <15

Rychlý pokles FEV1  
(>60ml/rok)

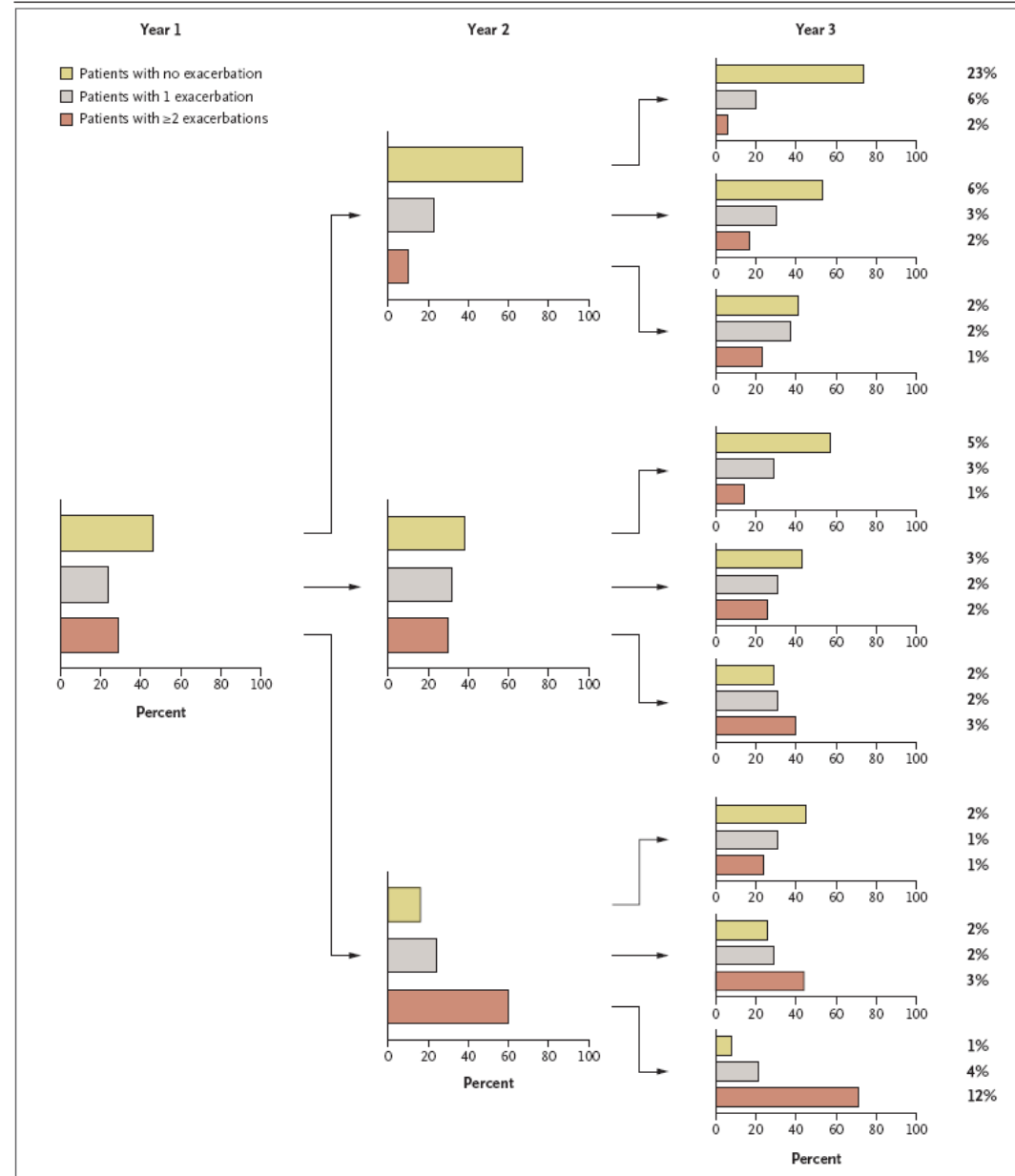
OVERLAP  
CHOPN + AB

Časté AE  
(≥2/rok)





# Exacerbace



**Figure 2.** Stability of the Frequent-Exacerbation Phenotype in the 1679 Patients with Chronic Obstructive Pulmonary Disease Who Completed the Study.

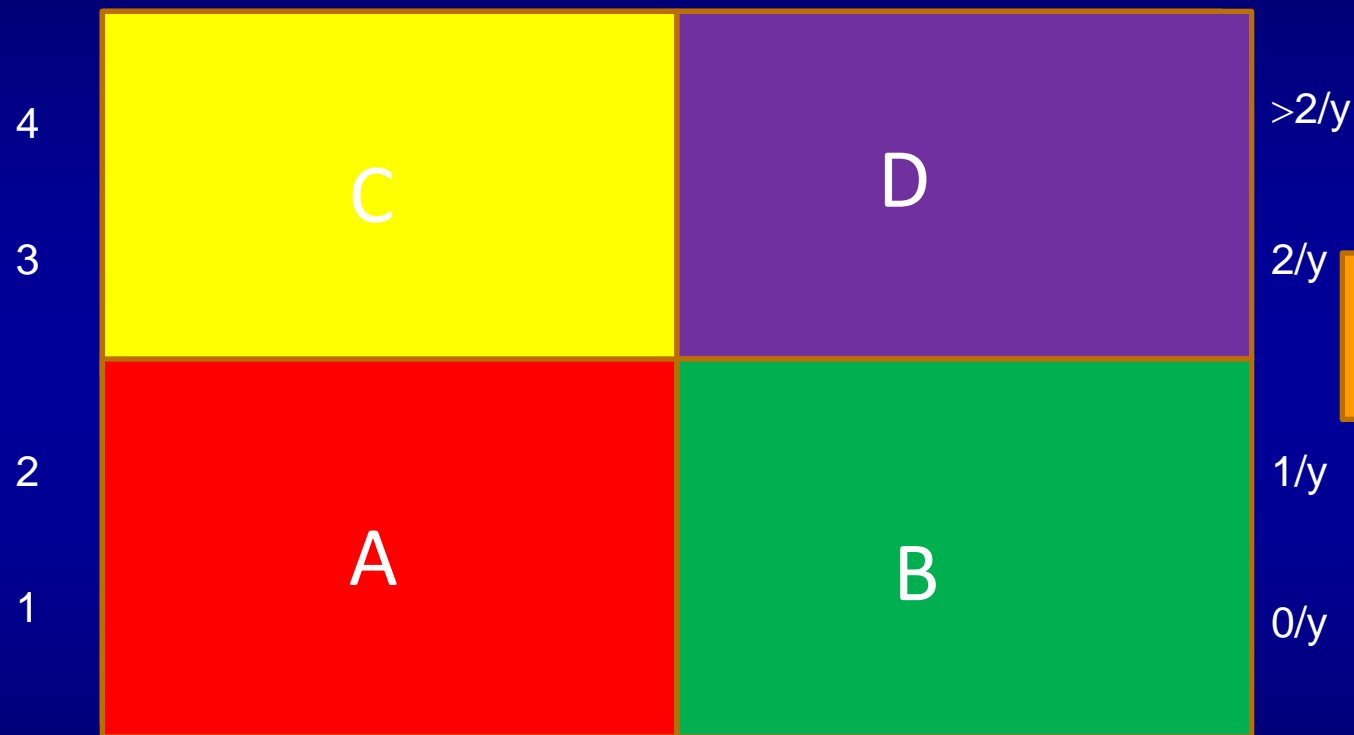
The bars at the left show the proportions of patients with no exacerbations, one exacerbation, or two or more exacerbations in year 1. The bars in the middle show the respective incidence of exacerbations for these patients in year 2; the bars at the right show the respective incidence in year 3. The percentages at right denote the proportions of all patients with no exacerbations, one exacerbation, or two or more exacerbations. Numbers do not sum to 100 because of rounding.

# Exacerbace

**Table 3.** Factors Associated with Increased Exacerbation Frequency in the Stepwise Multivariate Model.\*

Factor	Number of Exacerbations						P Value for Overall Model
	≥2 vs. 0		1 vs. 0		≥2 vs. 1		
	odds ratio (95% CI)	P value	odds ratio (95% CI)	P value	odds ratio (95% CI)	P value	
Exacerbation during previous yr — any vs. none	5.72 (4.47–7.31)	<0.001	2.24 (1.77–2.84)	<0.001	2.55 (1.96–3.31)	<0.001	<0.001
FEV <sub>1</sub> — per 100-ml decrease	1.11 (1.08–1.14)	<0.001	1.06 (1.03–1.08)	<0.001	1.05 (1.02–1.09)	<0.001	<0.001
SGRQ score for COPD — per increase of 4 points	1.07 (1.04–1.10)	<0.001	1.01 (0.99–1.04)	0.38	1.06 (1.03–1.09)	<0.001	<0.001
History of reflux or heartburn — yes vs. no	2.07 (1.58–2.72)	<0.001	1.61 (1.23–2.10)	<0.001	1.29 (0.97–1.70)	<0.005	<0.001
White-cell count — per increase of 1×10 <sup>3</sup> /mm <sup>3</sup>	1.08 (1.03–1.14)	0.002	1.02 (0.97–1.08)	0.45	1.06 (1.01–1.12)	<0.001	0.007

# Nová klasifikace GOLD



Tíže obstrukce

Frekvence AE/rok

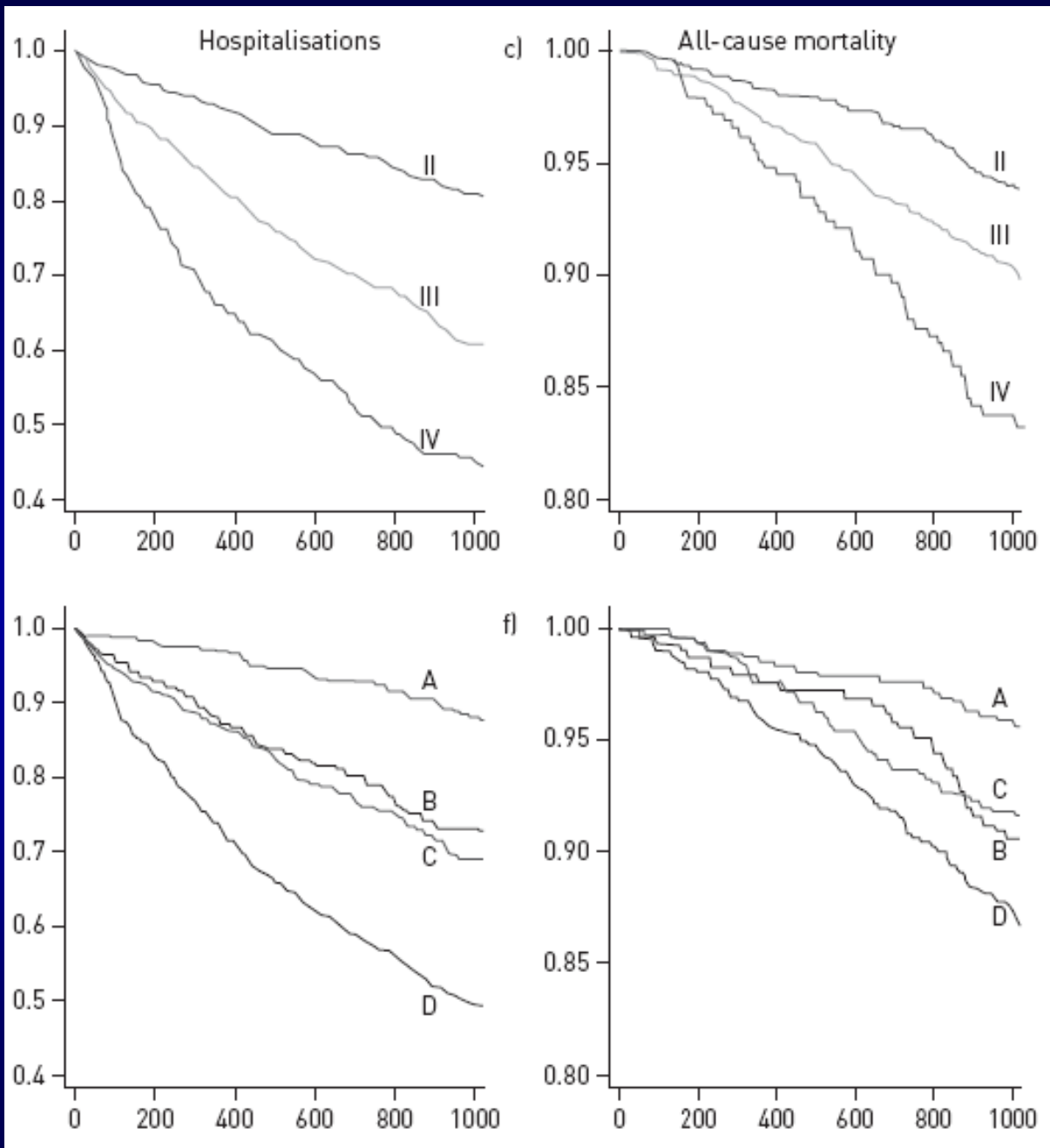
Málo symptomů

Hodně symptomů

mMRC < 1  
CAT < 10  
SGRQ < 25

mMRC ≥ 1  
CAT ≥ 10  
SGRQ ≥ 25

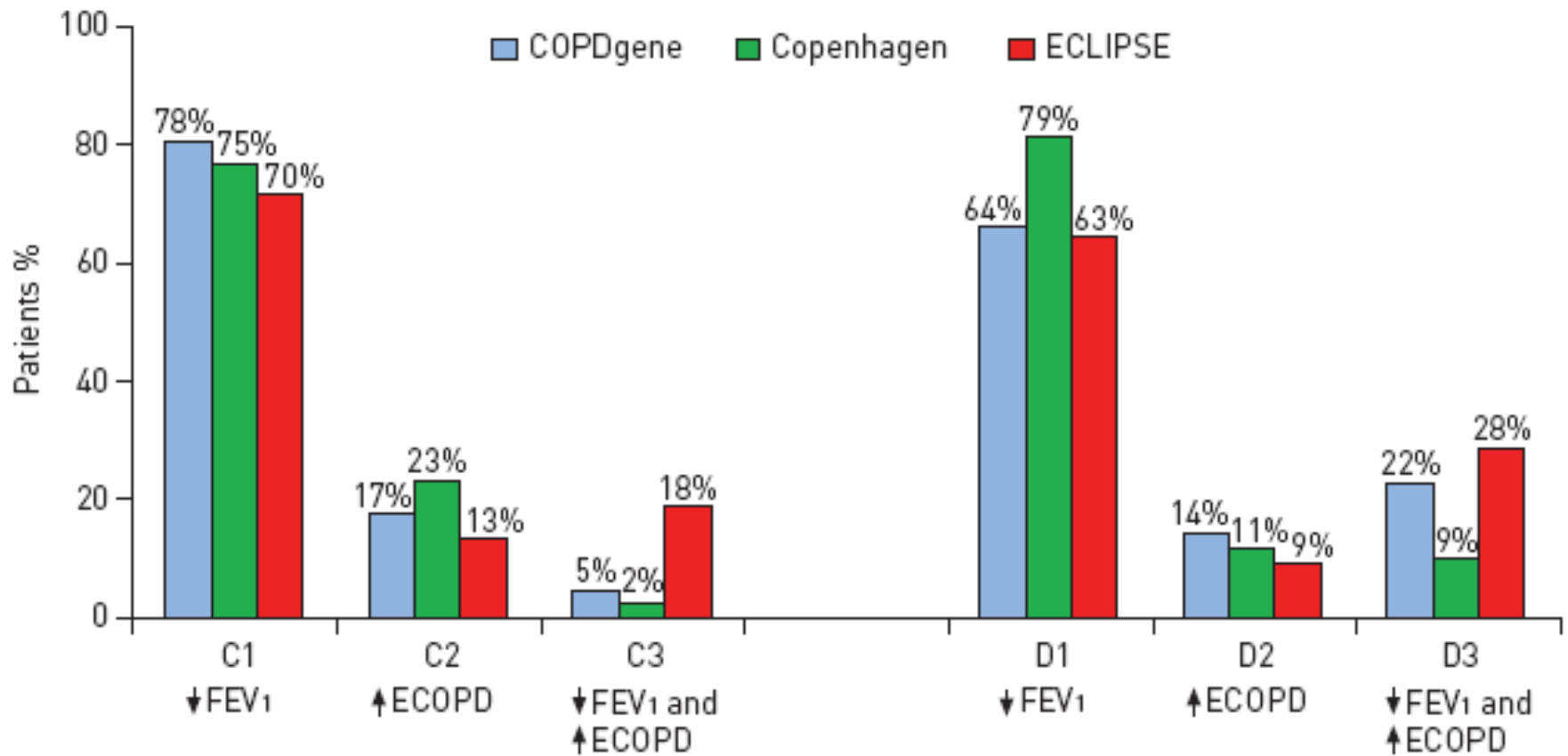
# ALE



Agusti A et al, ERJ 2013

Leivseth L et al, Thorax 2013

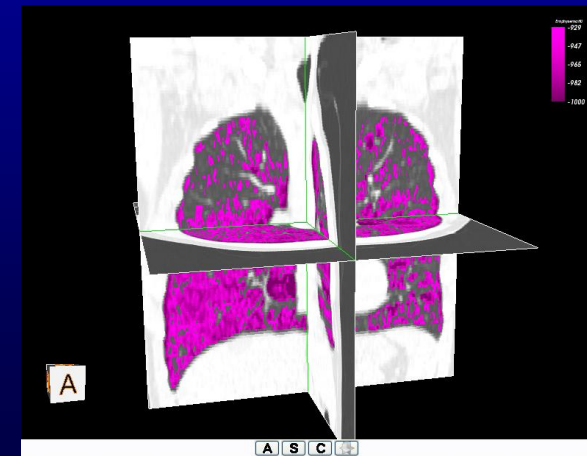
# ALE





# Fenotypy - jaké vlastně jsou?

n	58
m/f	42/16
věk	57,4±9,9
BMI	25,1±4,8
mMRC	1,9±0,8
FEV <sub>1</sub>	49,3±20,8
TL <sub>CO</sub>	53,2±18,3
RV (BODY)	227,6±75,6
VO <sub>2</sub> /kg	59,1±18,6
RA950	22,3±13,3
mBODE	4,1±2,6

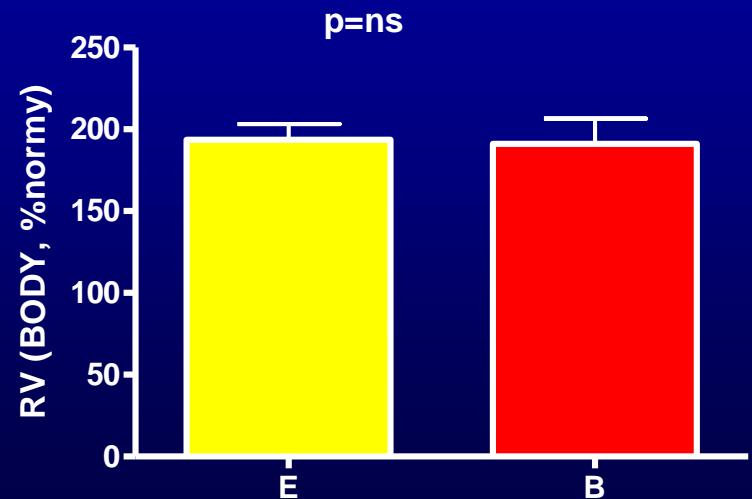
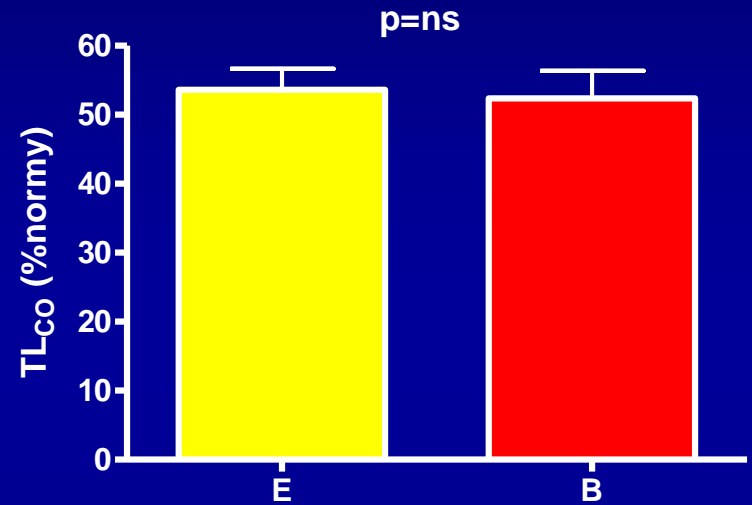
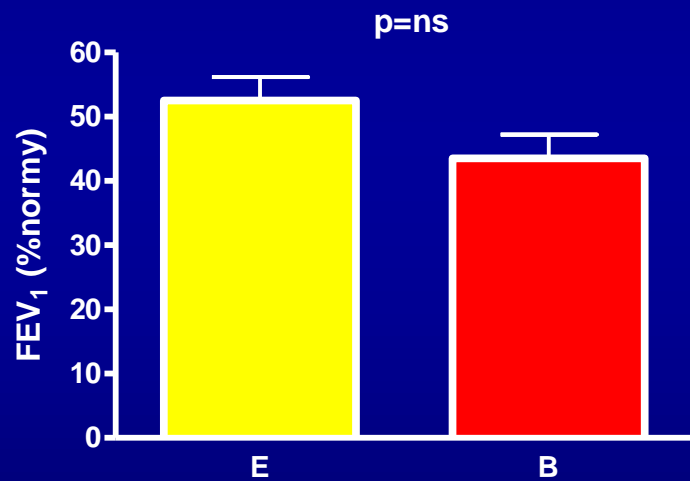


# *Klinické fenotypy - co s nimi?*

Klinické fenotypy:

a) emfyzematický	37
b) bronchitický	21
c) exacerbátor	7
d) plicní kachexie	9
e) overlap CHOPN+AB	0
f) overlap CHOPN+BE	0

# *Klinické fenotypy - co s nimi?*



# Klinické fenotypy - co s nimi?

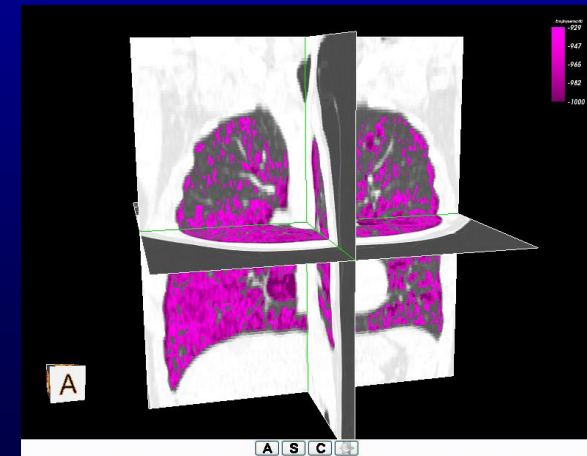
## 1. Klinické fenotypy:

a) emfyzematický	37
b) bronchitický	21
c) exacerbatör	7

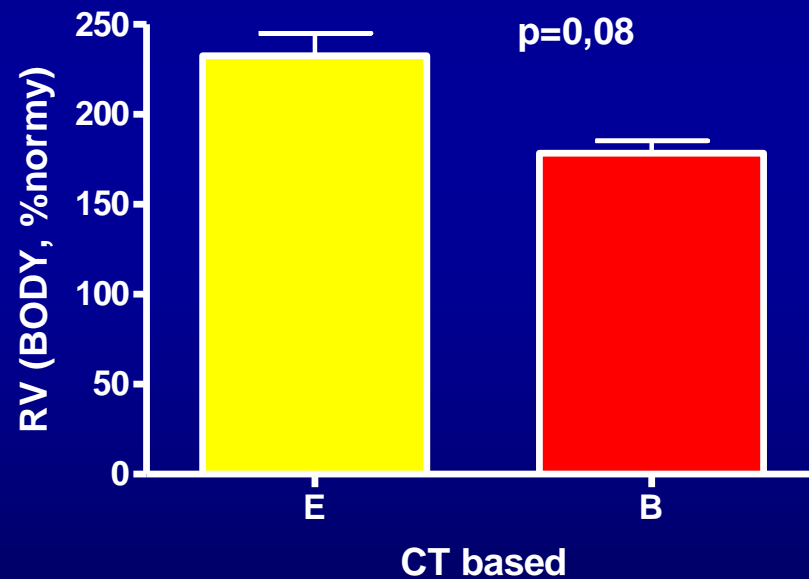
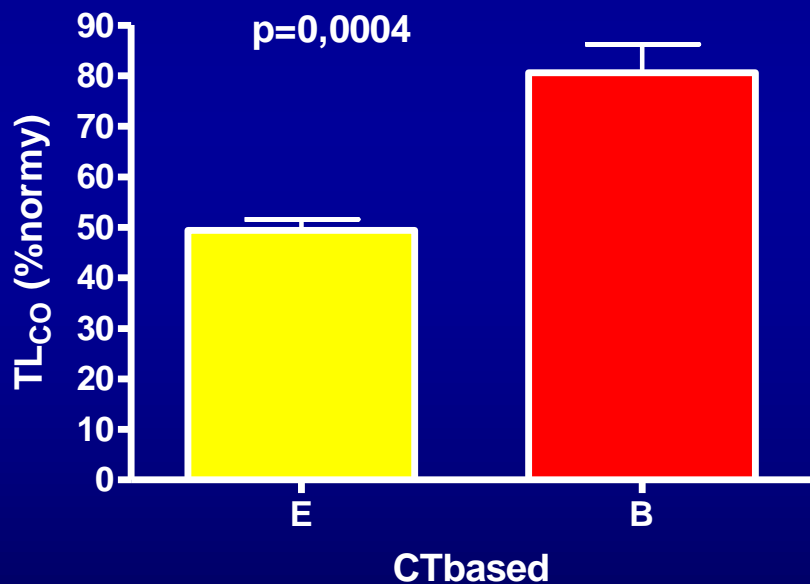
## 2. Fenotypy podle CT denzitometrie (RA950, %)

a) emfyzém	51
b) bronchitik	7
c) bronchiektazie	13

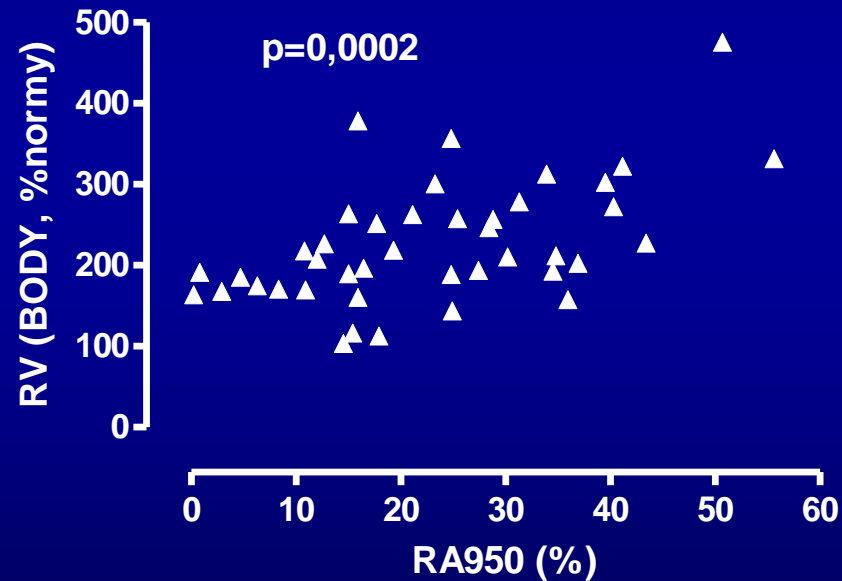
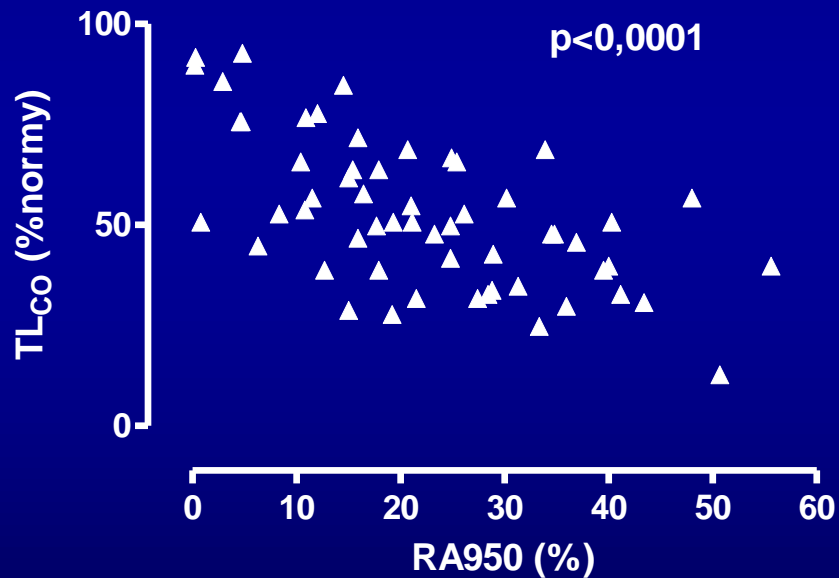
## 3. Dynamická hyperinflace při CPET 55



# *Denzitometrie předurčuje plicní funkce*



# *Denzitometrie předurčuje plicní funkce*



# Fenotypy - co s nimi?

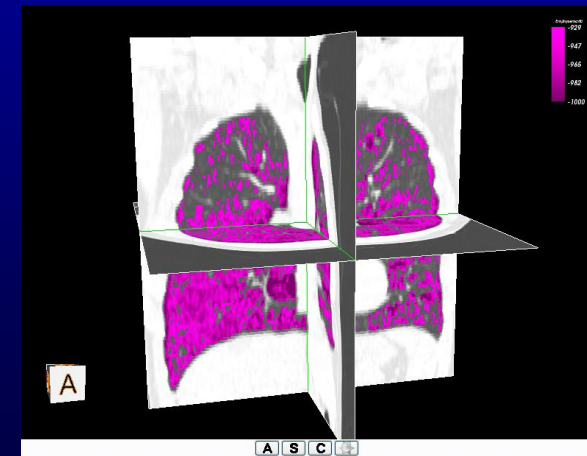
Klinické fenotypy:

a) 14 emfyzematiků má současně chronický kašel

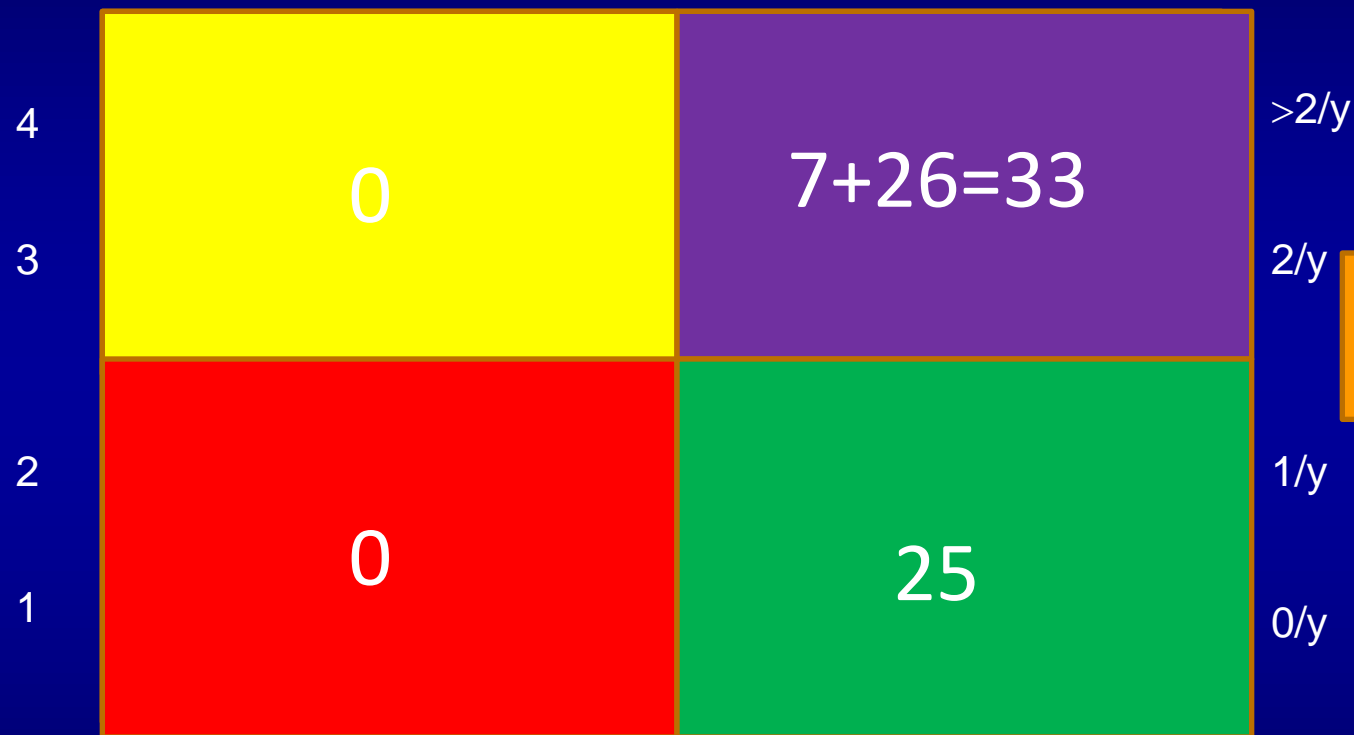
b) 14 emfyzematikům bychom odepřeli možnost fenotypové léčby (např. LVRS)

c) BE byly u 11 emfyzematiků  
2 bronchitiků

Senzitivita pro detekci emfyzému 68%  
Specificita pro detekci emfyzému 25%



# Nová klasifikace GOLD



Tíže obstrukce

Frekvence AE/rok

Málo symptomů

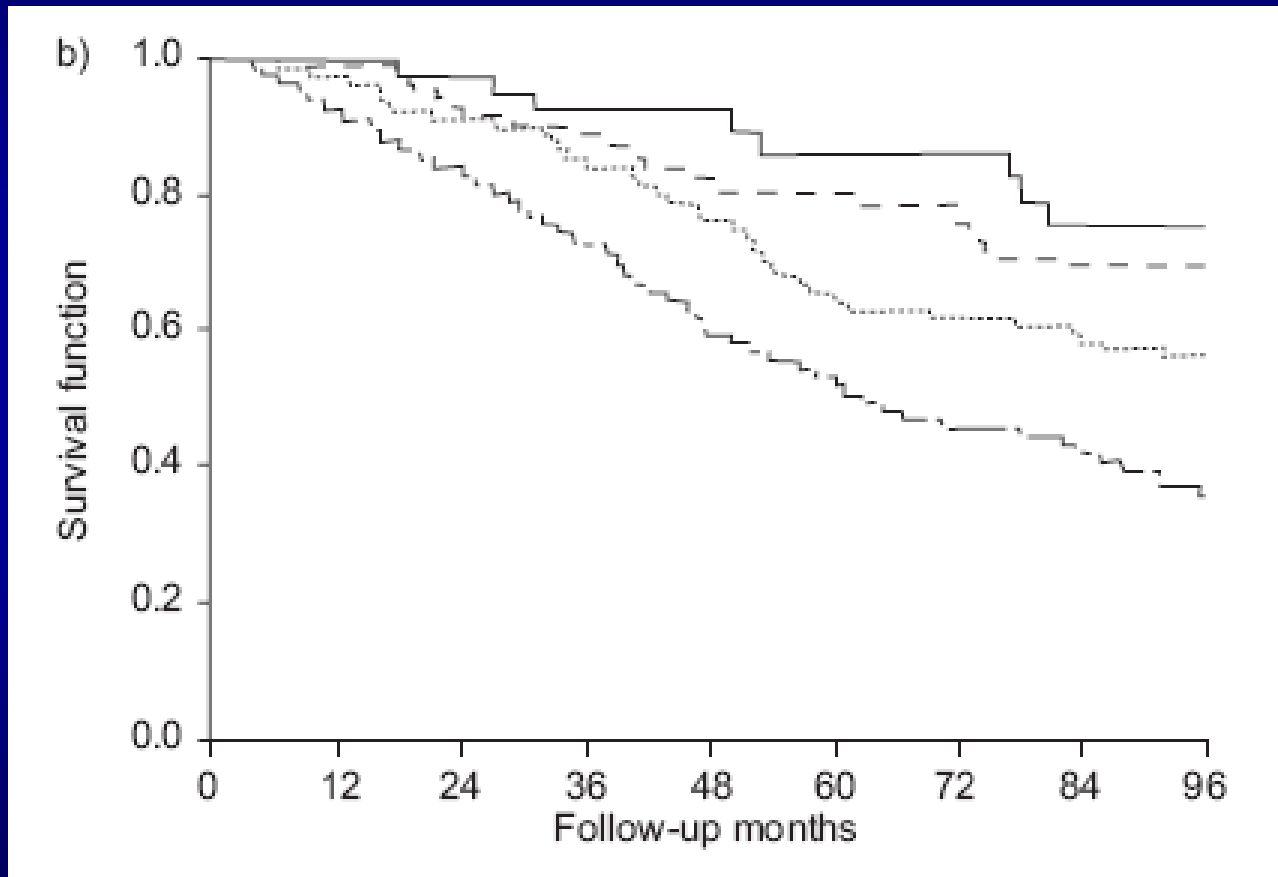
Hodně symptomů

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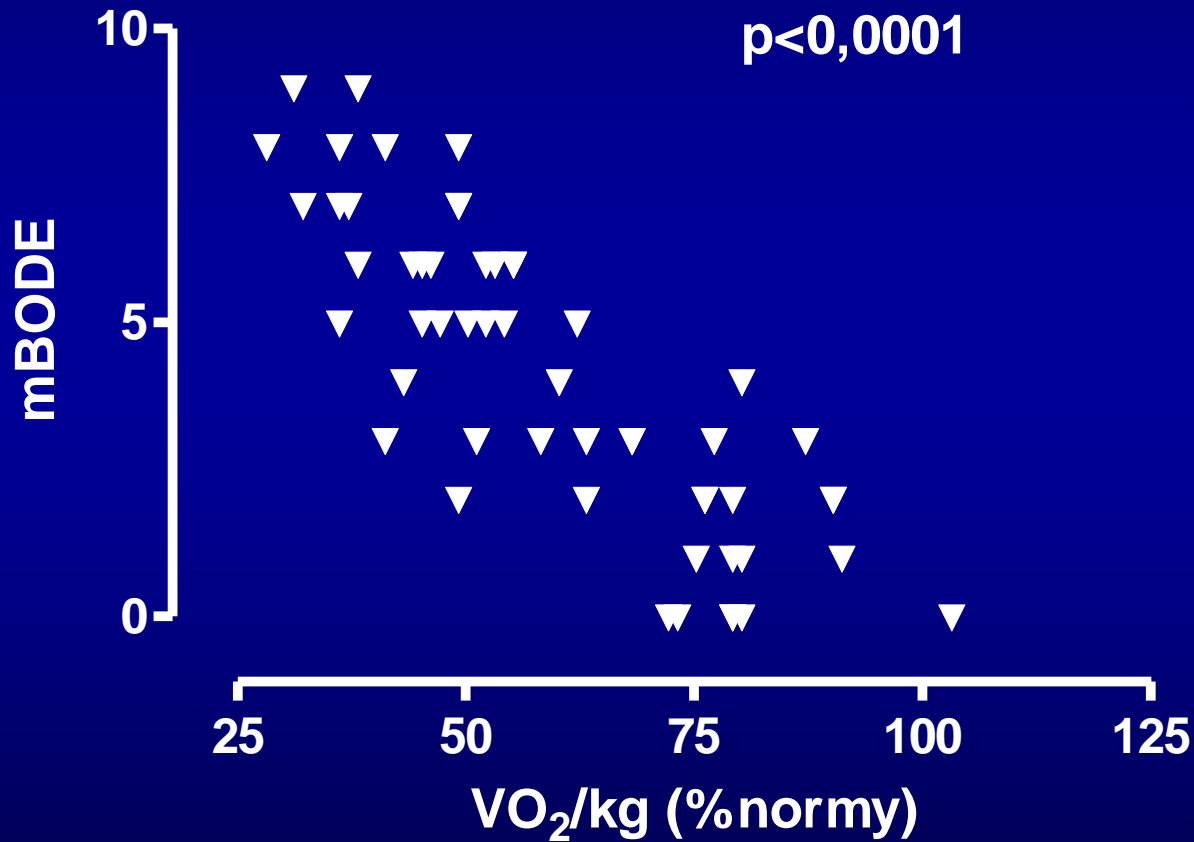
mMRC ≥ 1  
CAT ≥ 10  
SGRQ ≥ 25



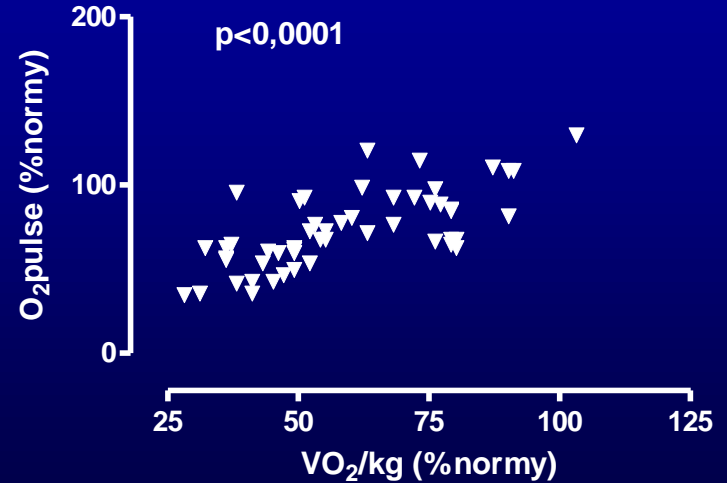
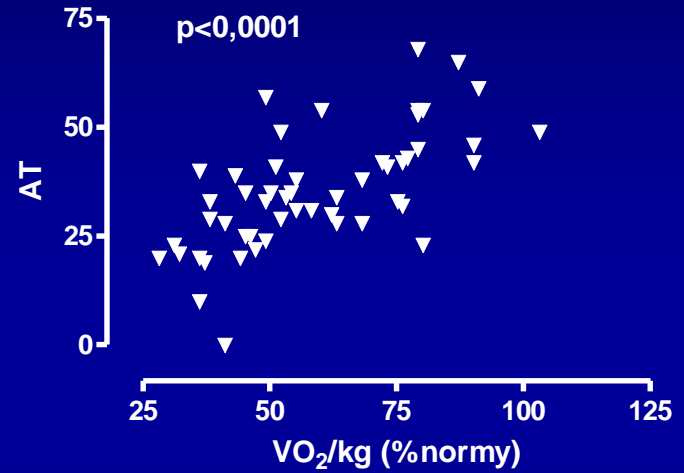
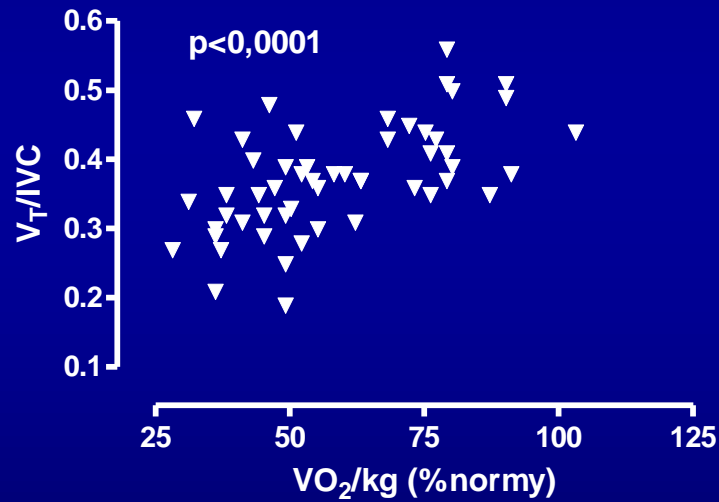
# Modified BODE



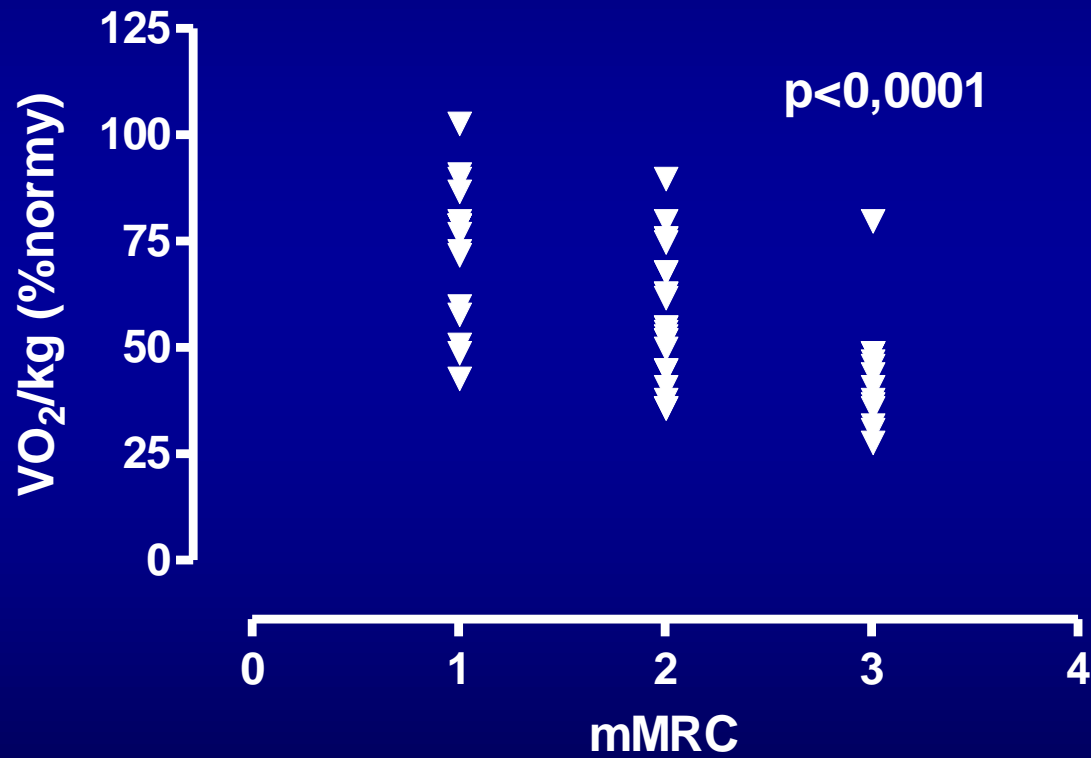
# *Modified BODE*



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# *Modified BODE*



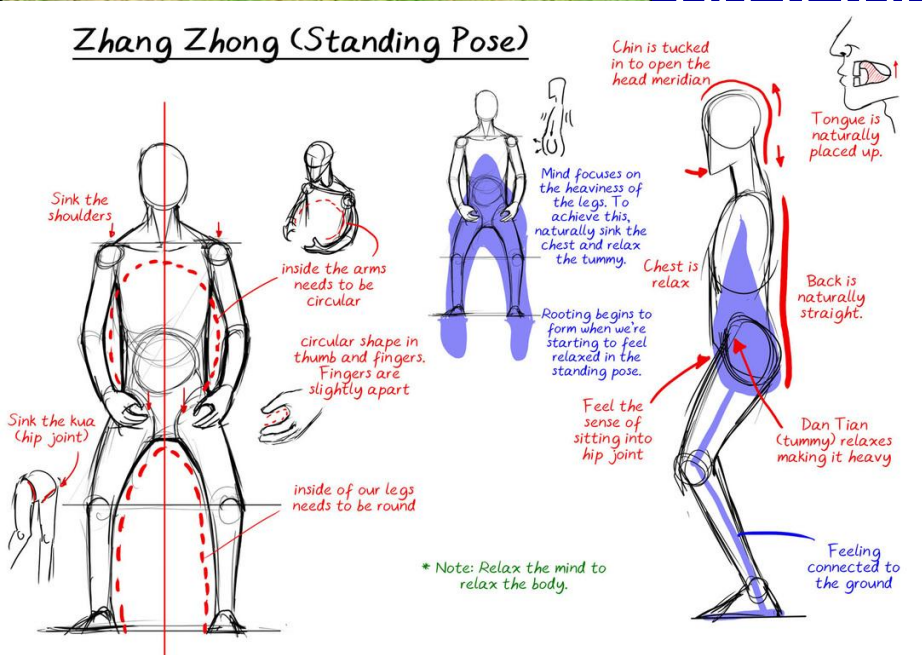


# Závěr

užitečné z mr  
jmě omezený



Zhang Zhong (Standing Pose)



ou y terénní p  
DDE, A

cvičení