

Funkční vyšetření při diagnostice a monitorování CHOPN

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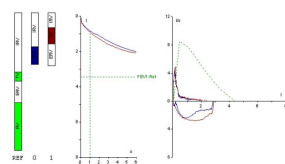


Funkční vyšetření - diagnostika

1. Spirometrie
2. Statické (nepřímo měřitelné) parametry
3. TLco
4. Detekce flow limitace
5. Spiroergometrie

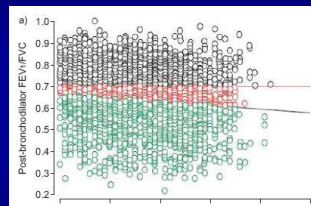
Křivka F/V

Spirometrie, křivka průtok / objem, urovňování Pre / Post



Statistika plicní objemu					
Parametr	Jednotka	Ničetání	Pre %Ničetání	Post %Ničetání	Post/Pre
CEw			1437	1513	
CEw (ml)					
ERV	l	4.85	2.81	2.86	02
%L		1.17	1.85	1.18	101
TV	l		0.96	0.89	-7
IC	l	3.70	2.85	1.70	46
Dynamický plicní objem					
FEV1	l	4.45	2.27	2.38	10
FEV1	l	3.45	0.85	0.91	27
FEV1/FVC	%	76	39	40	4
FEV1/FVC	%	76	39	39	52
PEF	l/s	8.53	4.23	4.96	18
MEF75	l/s	7.58	0.48	0.61	9
MEF50	l/s	4.51	0.23	0.37	6
MEF25	l/s	1.71	0.20	0.22	11
MEF25-75	l/s	3.44	0.52	0.57	17
PEF	l/s	2.38	2.83		19
MEF50	l/s	1.96	2.74		40
Rrs	Hz	1.56	1.81		19
Rrs	kPa (Hz)	0.30	0.33	0.27	89
PEF	ml	106	53		56
FEV1/FVC	%	1	1		7
EV	l	8.9	8.7		1

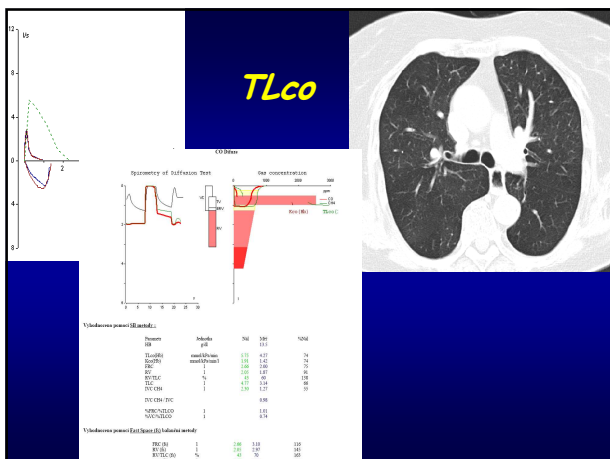
GOLD kriteria ?



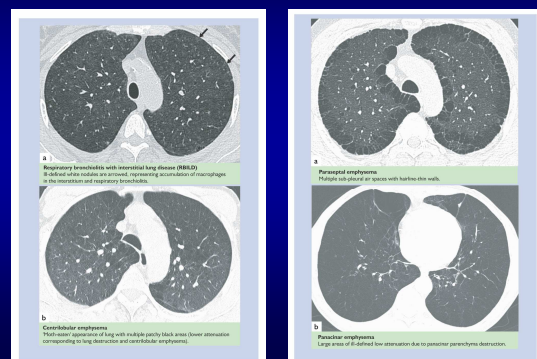
Ve věku > 60 let
33% falešně pozitivních
LLN !!!

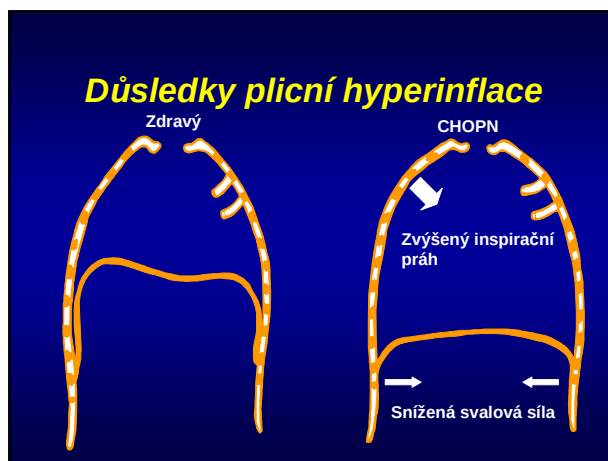
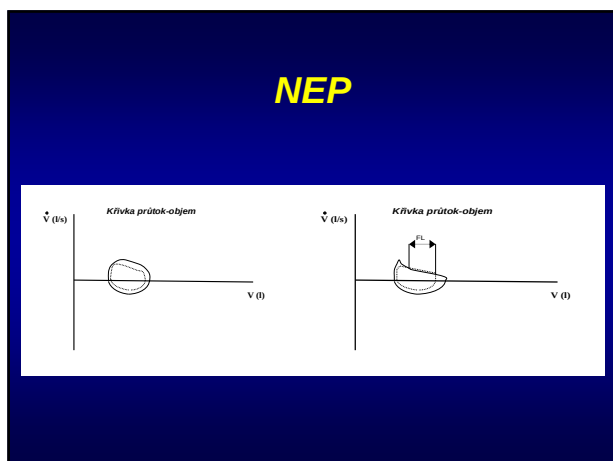
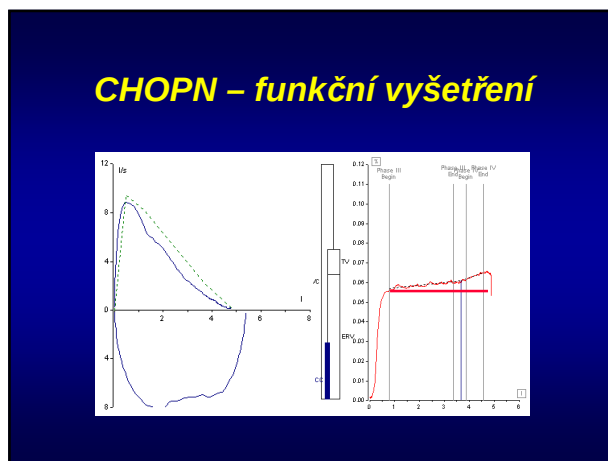
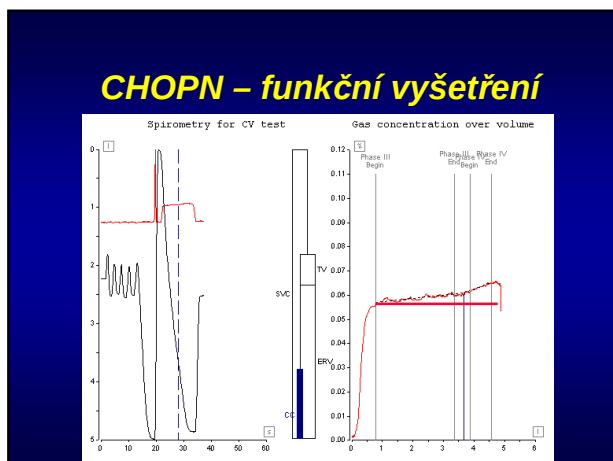
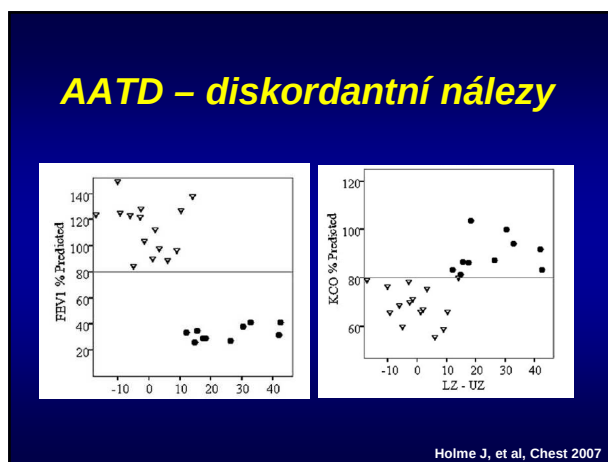
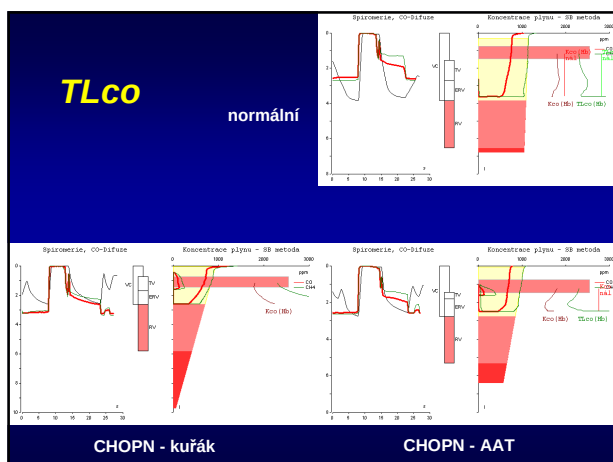
Schermer TR, et al, ERJ 2008

TLco



HRCT plic





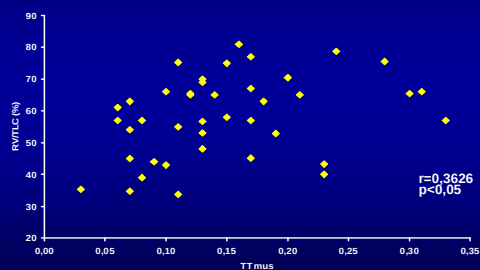
Funkce dýchacích svalů

- Statická síla inspiračních svalů: **PI_{max}**
- Index dechové práce:
 $nTTi = P_{0,1}/PI_{max} * TI/T_{tot}$
 $TT_{mus} = PI/PI_{max} * TI/T_{tot}$, kde $PI = 5 P_{0,1} * TI$



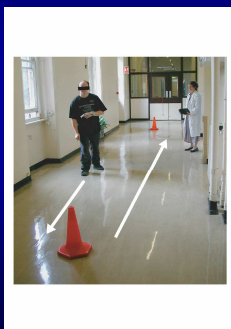
M.Ramonatxo et al, JAP 1995,
M.Hayott, et al., AJRCCM, 2000

TT_{mus} vs RV/TLC

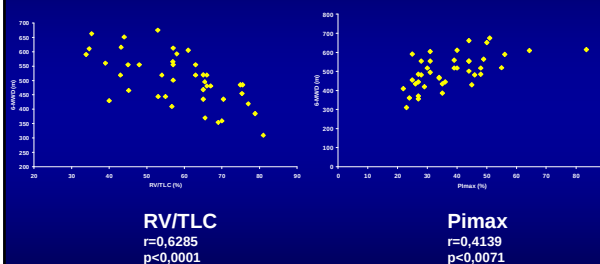


Chlumsky J, et.al, JIMR 2006

Testování fyzické zátěže – testy chůzí

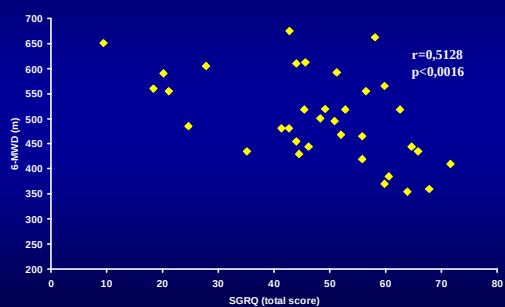


6 MWD

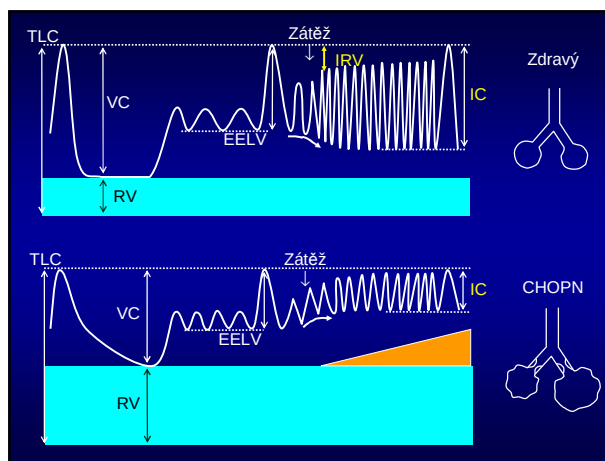


Chlumsky J, et.al, JIMR 2006

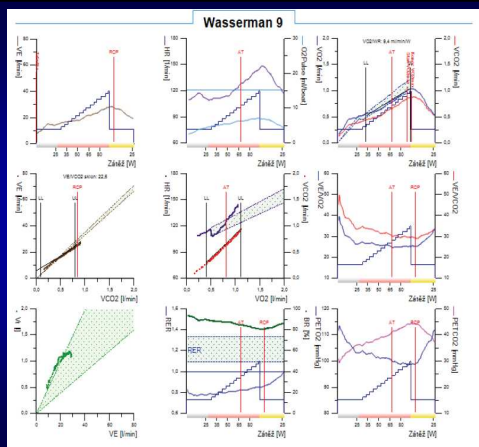
6 MWT vs quality of life



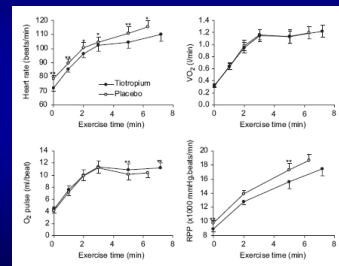
Chlumsky J, et.al, ACCP 2003



CPET obstrukce

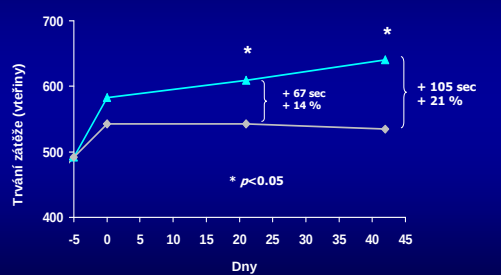


Dynamická hyperinflace - efekt BD

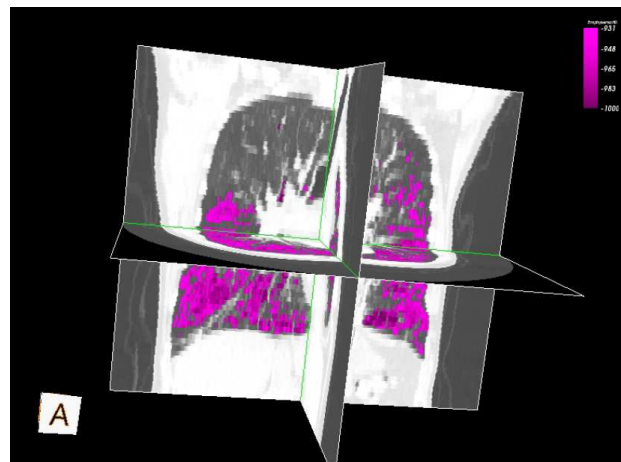


J Travers et al, Resp Med 2007

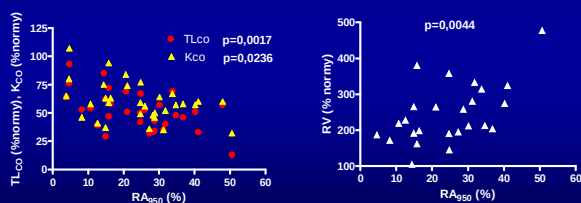
Vytrvalostní čas



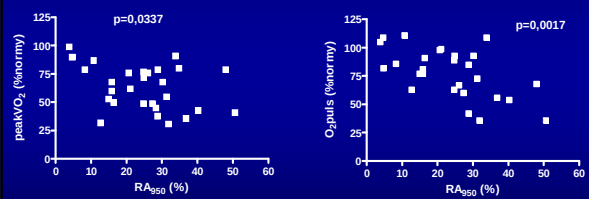
O'Donnell D. et al, ERJ 2004



Denzita a plicní funkce



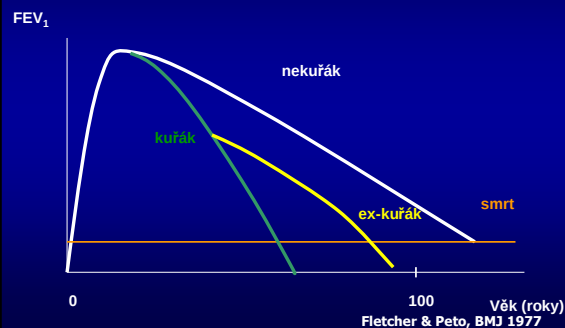
Denzita a tolerance zátěže



Funkční vyšetření - prognóza

1. Spirometrie
2. Statické (nepřímo měřitelné) parametry
3. Zátěžové testy
4. Hemodynamika

CHOPN - pokles ventilace s lety trvání onemocnění

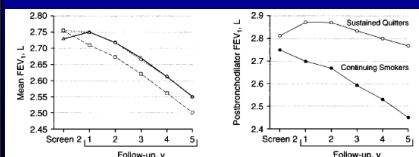


FEV1 k určení prognózy

Effects of Smoking Intervention and the Use of an Inhaled Anticholinergic Bronchodilator on the Rate of Decline of FEV₁

The Lung Health Study

Nicholas R. Anthonisen, MD, John E. Connett, PhD, James P. Kiley, PhD, Murray D. Altose, MD, William C. Bailey, MD, A. Sonia Burst, MD, William A. Conway, Jr, MD, Paul L. Enright, MD, Richard E. Kanner, MD, Peggy O'Hara, PhD, Gregory R. Owens, MD, Paul D. Scanlon, MD, Donald P. Tashkin, MD, Robert A. Wise, MD, for the Lung Health Study Research Group



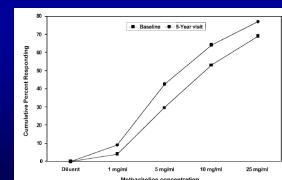
Anthonisen NR, et al. JAMA 1994

FEV1 k určení prognózy

The Effect of Smoking Intervention and an Inhaled Bronchodilator on Airways Reactivity in COPD*

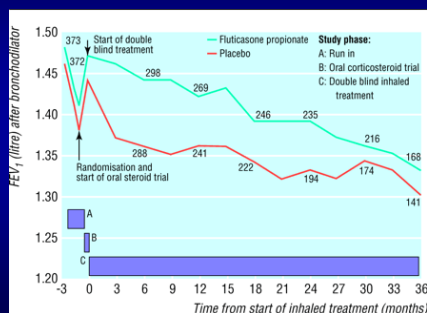
The Lung Health Study

Characteristic	Value
Mean age at baseline, yr	48.1 ± 6.75
Female gender	26.5
Physician-confirmed asthma	3.6
Chronic bronchitis	30.9
FEV ₁ , % predicted	76.2 ± 8.8
FEV ₁ /FVC ratio, %	40.7 ± 5.5
Cigarettes smoked per day	30.5 ± 12.8
Non-smoker	3.9
LAM-R	0.432 ± 0.392
Where (highest reported level)	
None	23.9
With colds	18.5
Apart from mild	27.2
Most days, slight	30.4
Shortness of breath (highest reported level)	
None	59.5
Hurrying uphill	25.9
Walking with peers	9.5
Walking at own pace	1.9
Walking 100 yards	2.9
Dressing undressing	0.6
Day from	19.1
Days or more exposure	47.6



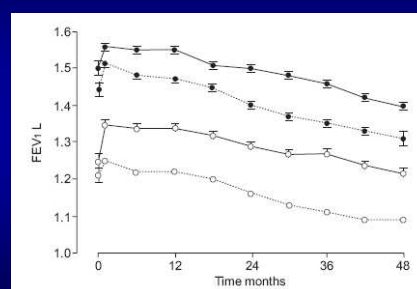
Wise RA, et al. Chest 2003

Efekt léčby



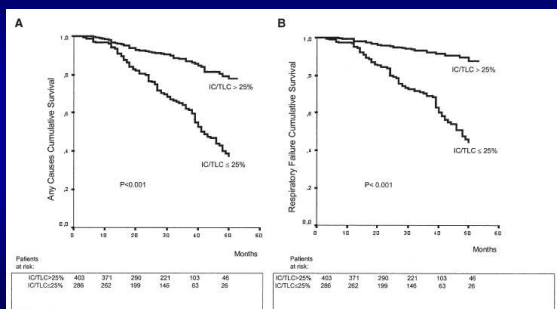
Burge, PS et al, BMJ 2000

Efekt léčby



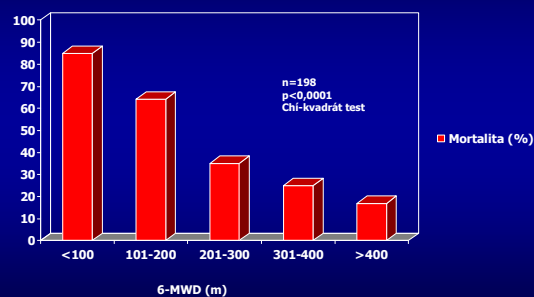
Troosters J et al, ERJ 2010

Statické objemy



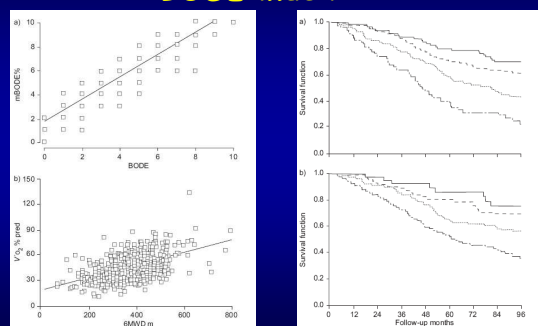
Casanova C et al, AJRCCM 2005

6-MWT – vyjadřuje prognózu



Pinto-Plata VM. et al. ERJ 2004

BODE index



Cote CG et al, ERJ 2008

BODE index

	0 points	1 point	2 points	3 points	4 points	7 points	9 points
BMI (kg/m ²)	>21	≤21	..	..	..	..	..
FEV ₁ (% predicted)	≥65%	≥36-64%	≤35%	..	..	..	..
Dyspnoea (MRC scale)	0-1	2	3	4	..	..	..
6-min walk distance (m)	≥350	..	..	..	≥250-349	≥150-249	<150

BMI=body-mass index. FEV₁=forced expiratory volume in 1 s. MRC=Medical Research Council.

Table 3: Assignment of points for the updated BODE index

Puhan MA et al, Lancet 2009

ADO index

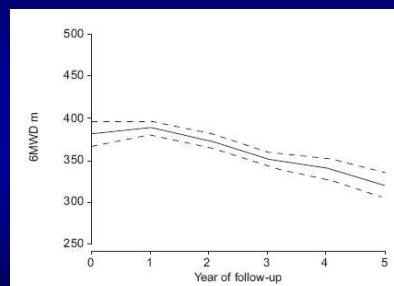
	0 points	1 point	2 points	3 points	4 points	5 points
FEV ₁ (% predicted)	≥65%	≥36-64%	≤35%	..	..	..
Dyspnoea (MRC scale)	0-1	2	3	4	..	..
Age (years)	40-49	50-59	60-69	70-79	80-89	≥90

FEV₁=forced expiratory volume in 1 s. MRC=Medical Research Council.

Table 6: Assignment of points for the ADO index

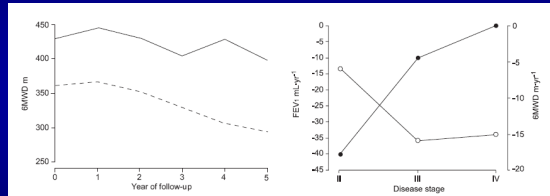
Puhan MA et al, Lancet 2009

Dynamika tolerance zátěže



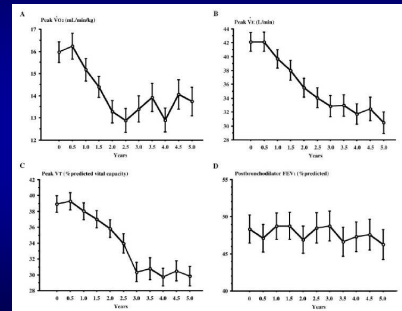
Casanova C et al, ERJ 2007

Dynamika tolerance zátěže



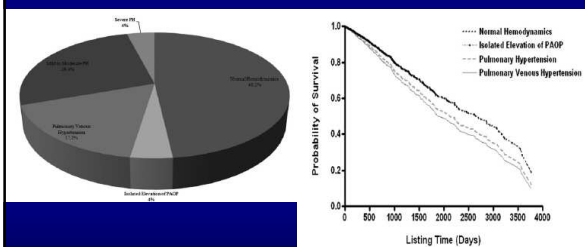
Casanova C et al, ERJ 2007

Dynamika tolerance zátěže



Oga T et al, Chest 2005

Plicní hemodynamika



Cuttica MJ et al, Respiratory Medicine 2010

- Spirometry is used for diagnosis of LLN and for monitoring of prognosis (VO₂).
- Prognosis is used for prognosis of survival and quality of life.

