DDOT
a co s ní (dál)?

jan chlumský

První plicní ambulance, s.r.o. Praha

Pneumologická klinika 1.LF UK

Thomayerova nemocnice Praha

Sekce patofyziologie dýchání

Registr DDOT

Organizovaný ČPFS (samozřejmě sponzorovaný)
Vznikl z lékařské potřeby – potřebujeme mít informace o pacientech na DDOT

Nepřidělává práci
Přesto je v něm JEN cca 75% indikovaných pacientů

zůstává do značné míry nepochopený
Podpora výboru ČPFS je malá

Situace je komplikována nepochopením doporučeného postupu a zmatenými kompetencemi

Historie indikace DDOT

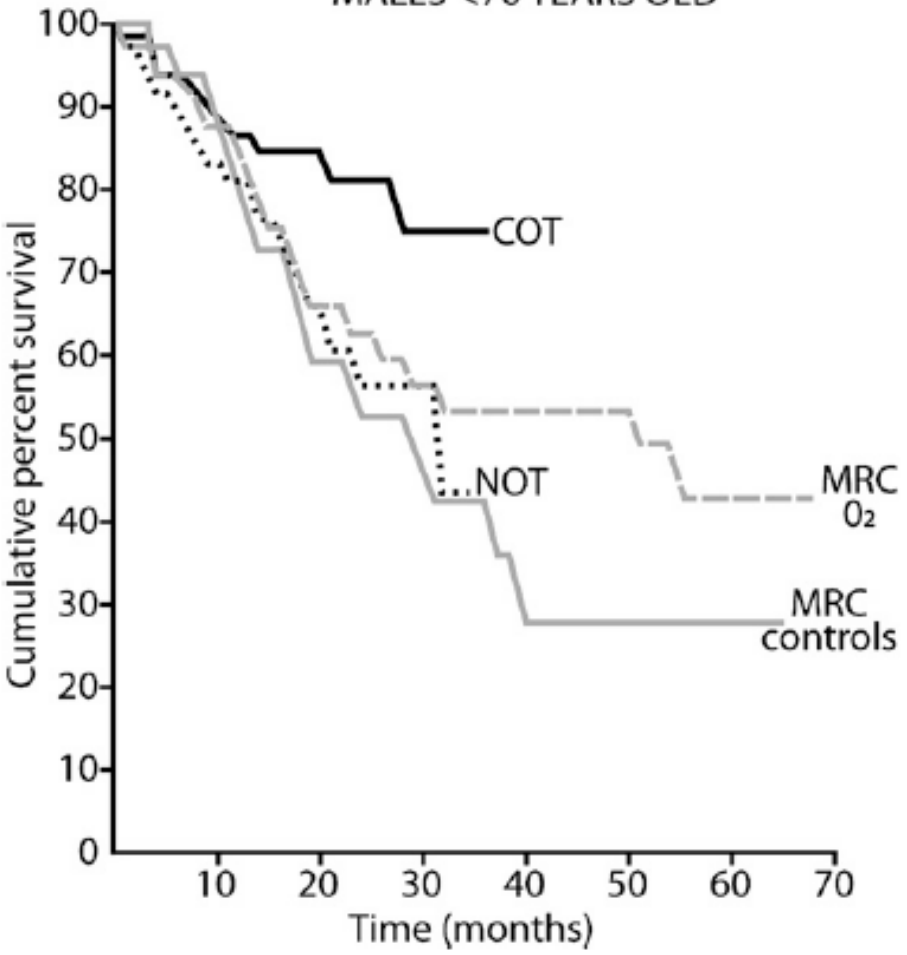
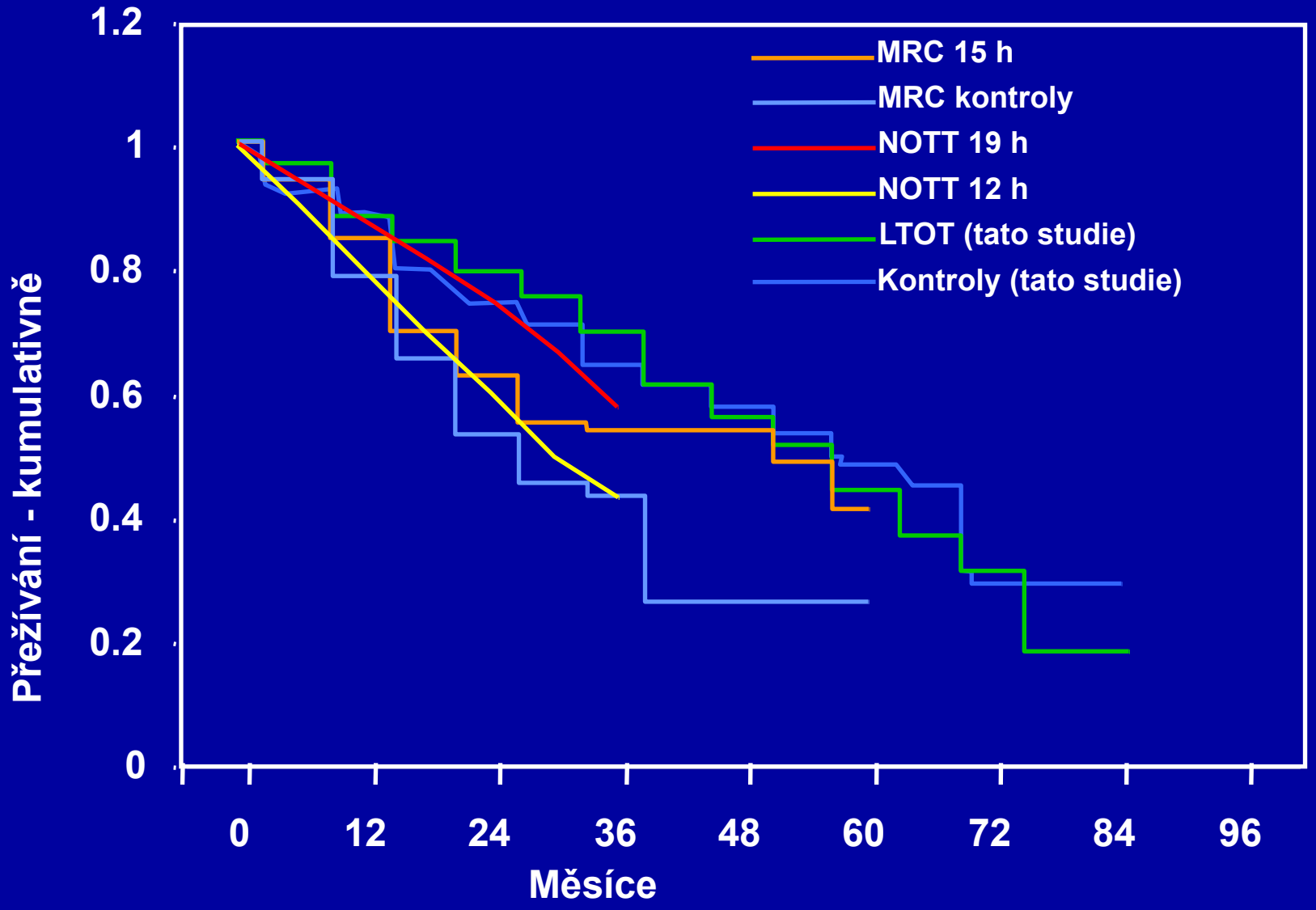


FIGURE 1. Long-term oxygen therapy in Medical Research Council and National Institutes of Health controlled trials in men aged <70 years, examining the fraction of subjects surviving compared to the time from randomization or duration of treatment. COT = continuous oxygen therapy[3]; MRC = Medical Research Council[4]; NOT = nocturnal oxygen therapy.[3]

DDOT



Gorecka D et al, Thorax, 1997

Mobilní DDOT – ano nebo ne?

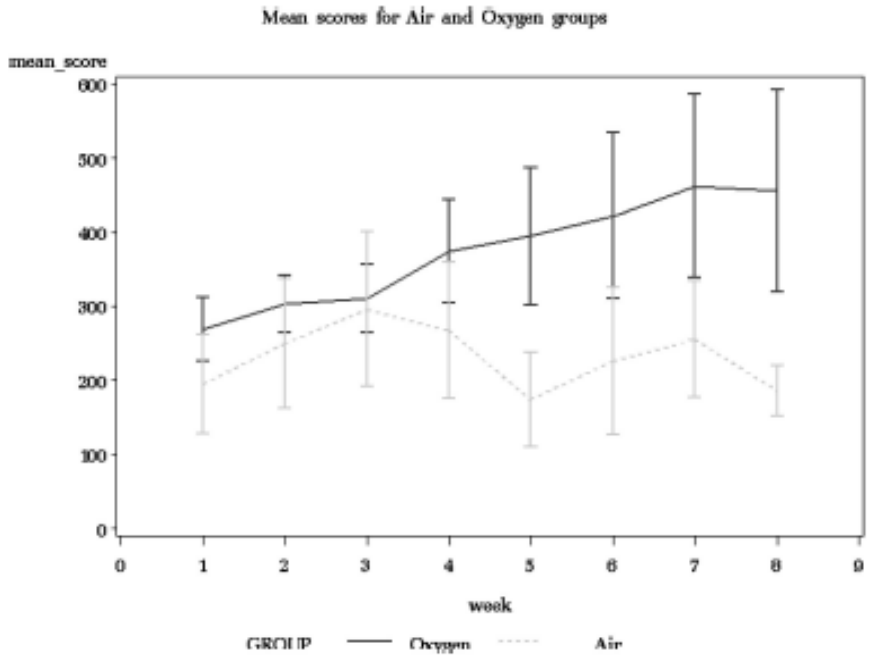


FIGURE 2. Cylinder duration (minutes per week).

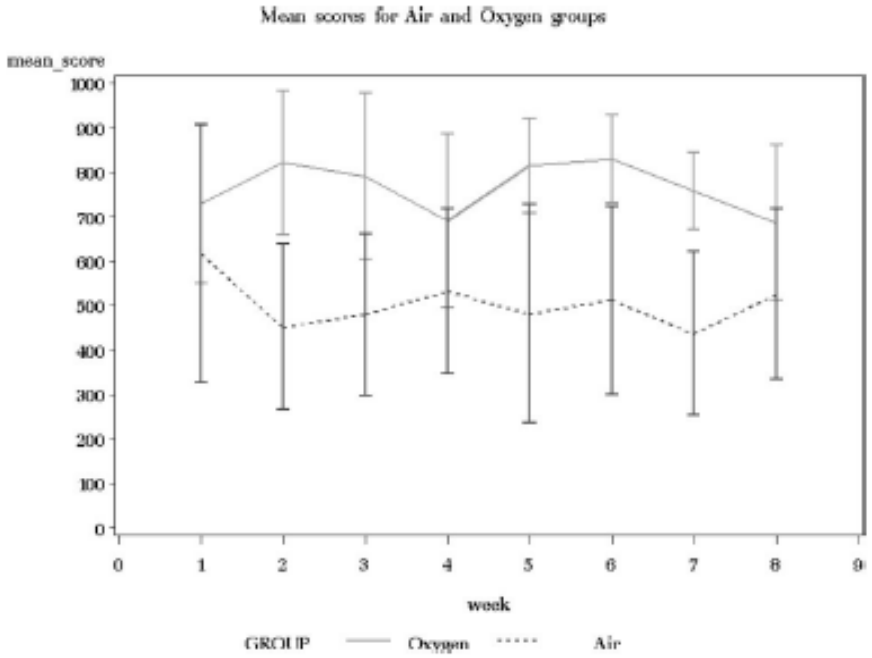


FIGURE 3. Time spent away from home (minutes per week).

Sandland CJ, et al., Chest 2008

Mobilní DDOT – ano nebo ne?

The NEW ENGLAND JOURNAL of MEDICINE

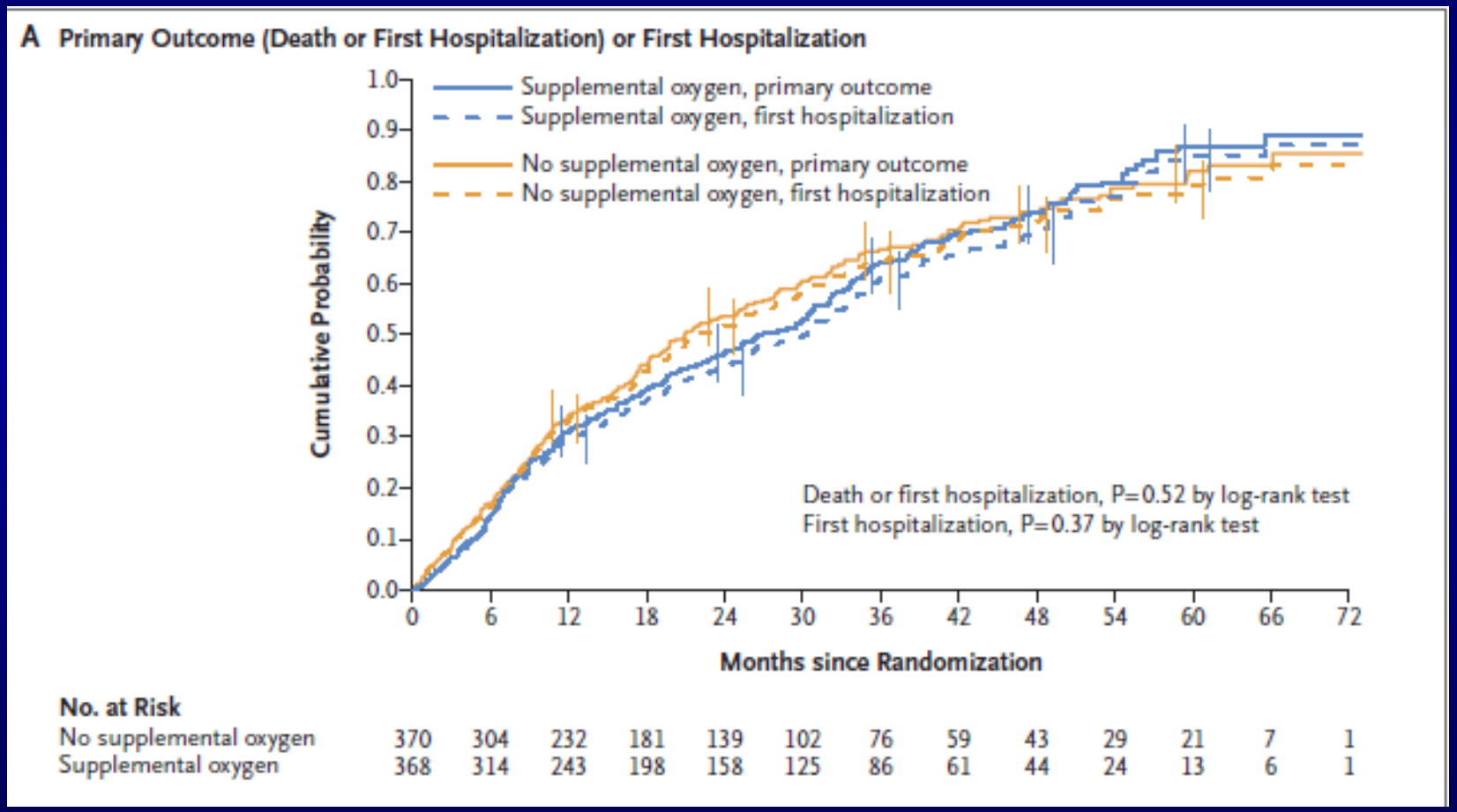
ESTABLISHED IN 1812 OCTOBER 27, 2016 VOL. 375 NO. 17

A Randomized Trial of Long-Term Oxygen for COPD with Moderate Desaturation

The Long-Term Oxygen Treatment Trial Research Group*

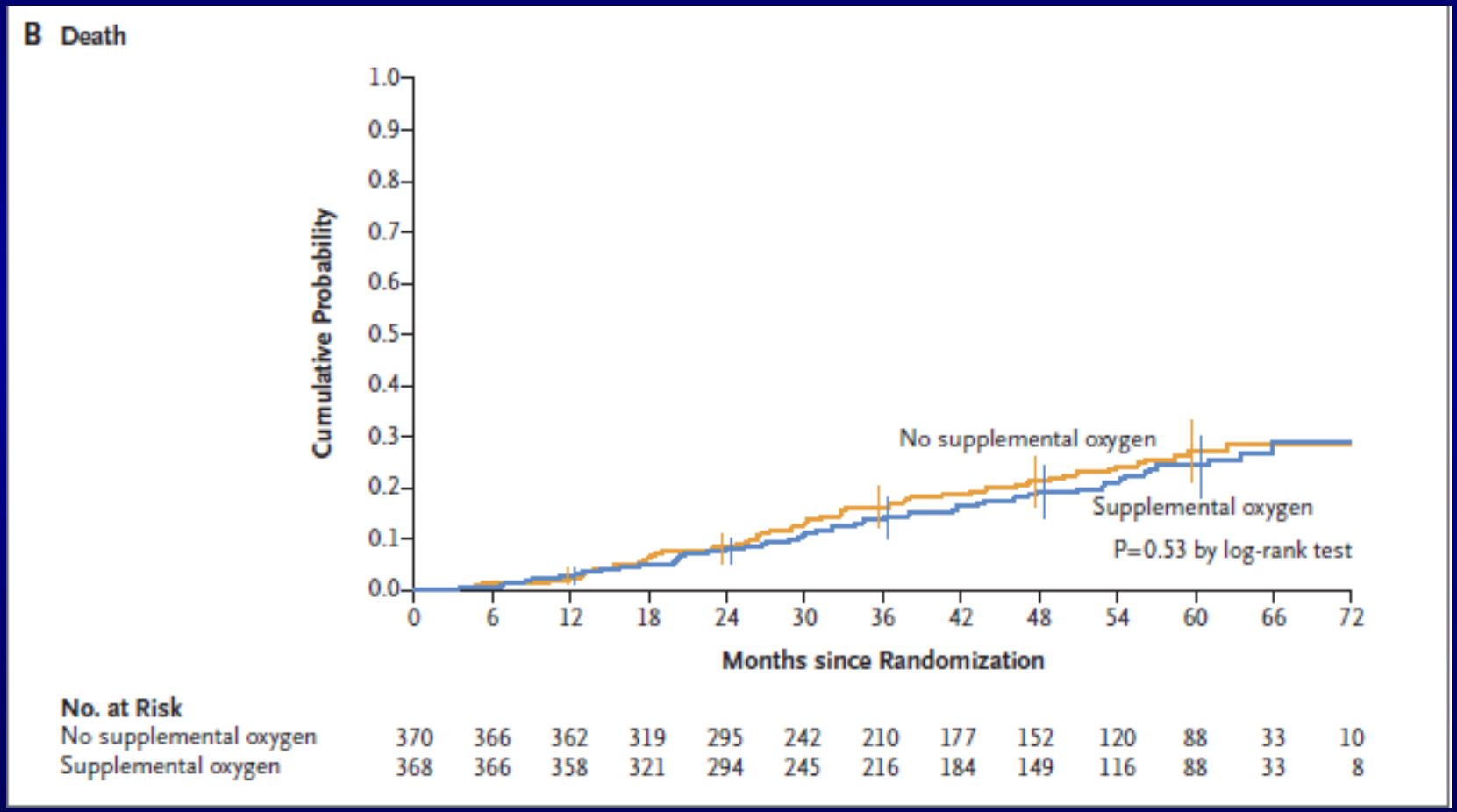
LTOT research group. NEJM 2016

Mobilní DDOT – ano nebo ne?



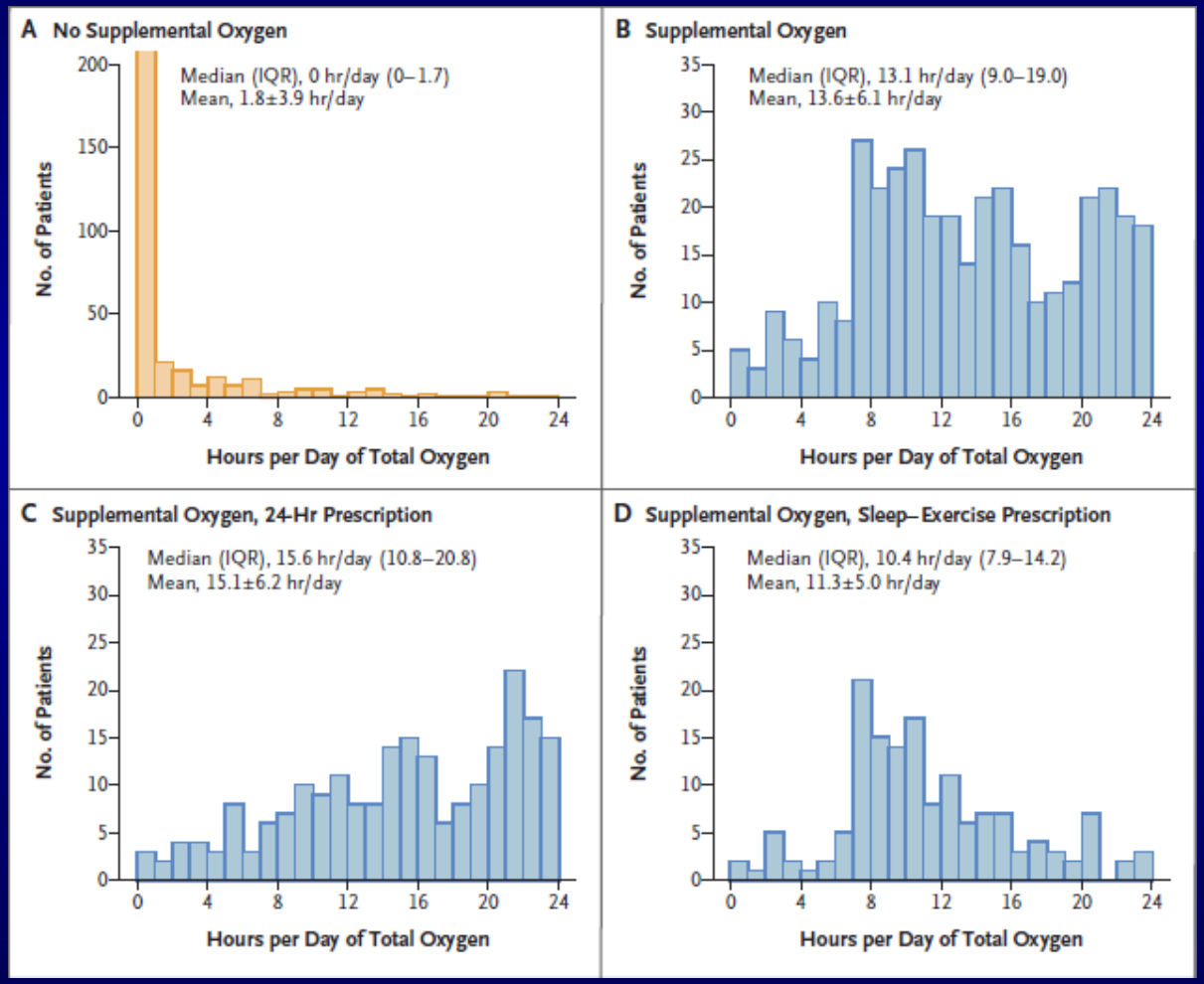
LTOT research group. NEJM 2016

Mobilní DDOT – ano nebo ne?



LTOT research group. NEJM 2016

Mobilní DDOT – ano nebo ne?



LTOT research group. NEJM 2016

Mobilní DDOT – ano nebo ne?

Žádný rozdíl mezi skupinami pro pO2 > 7,3 kPa

Přežití
Exacerbacích
Hospitalizacích
HRQL
6-MWD

LTOT research group. NEJM 2016

IPF – predikce přežití

Table 2 Exercise parameters that predict survival in IIP

Variable	Threshold	Hazard ratio (95% CI)	Patient group	Author(s)
PaO_2	• Each 5 mm Hg increase	0.74 (0.67–0.82), $P < 0.0001$	IPF	King[65]
Peak VO_2	• <8.3 mL/min/kg	3.24 (1.10–9.56; $P = 0.03$)	IPF	Fell[67]
V_E/VCO_2@AT	• >45	4.58, $P = 0.001$	IPF	Van der Plas[66]
6MWT SpO_2	• Desaturation ≤88%	2.92 (1.04–8.22; $P = 0.04$)	fIIP	Eaton[54]
	• Desaturation amplitude	1.14 (1.04–1.24; $P < 0.005$)	fIIP	Eaton[54]
	• Desaturation ≤88%	4.47 (1.58–12.64), $P = 0.005$	IPF, NSIP	Lama[22]
	• 10-point increase in DA	1.33 (1.08–1.63), $P = 0.007$	IPF	Flaherty[21]
6MW distance	• Each 100m decrement	2.1 (1.4–3.0, $P < 0.001$)	IPF	Hook[68]
	• Distance <207m	4.7 (2.5–8.9, $P < 0.0001$)	IPF	Lederer[69]
	• Change at 24 wks<–50m	4.27 (2.57–7.10, $P < 0.001$)	IPF	Du Bois[55]
6MWT heart rate	• HRR† ≤ 13 beats per min	5.2 (1.8–15.2), $P = 0.002$	IPF	Swigris[70]
	• Peak HR < 80% HR reserve	10.71 (2.67–42.94), $P = 0.001$	ILD	Holland[71]

Chronotropic incompetence occurs when an individual does not achieve 80% of heart rate reserve, calculated as the change in HR from rest to peak exercise on a maximum symptom-limited exercise test.†HRR1, heart rate recovery at 1 min, defined as the difference between heart rate at the 6th min of the 6MWT and at 1 min after completion.CI, confidence interval; CO_2, carbon dioxide; DA, desaturation area, defined as the sum of % points below 100% at each minute over 6 min; fIIP, fibrotic idiopathic interstitial pneumonia; IIP, idiopathic interstitial pneumonia; ILD, interstitial lung disease; IPF, idiopathic pulmonary fibrosis; NSIP, non-specific interstitial pneumonia; PaO_2, partial pressure of arterial oxygen; SPO_2, oxyhaemoglobin saturation; V_E/VCO_2@AT, ventilatory equivalent for CO_2 at anaerobic threshold; VO_2, .oxygen consumption.

Troy LK, et al., Respirology 2015

Mobilní DDOT – IIP?

Study or subgroup	Mean difference±SE	Oxygen total	Air total	Weight %	Mean difference IV, fixed, 95% CI
Harris-Eze [11]	0±0.1028	20	20	86.1	0.00 (−0.20–0.20)
Nishiyama [15]	−0.4±0.2555	7	7	13.9	−0.40 (−0.90–0.10)
Total (95% CI)		27	27	100.0	−0.06 (−0.24–0.13)

Heterogeneity: Chi-squared=2.11, df=1 (p=0.15); I^2=53%
Test for overall effect: Z=0.58 (p=0.56)

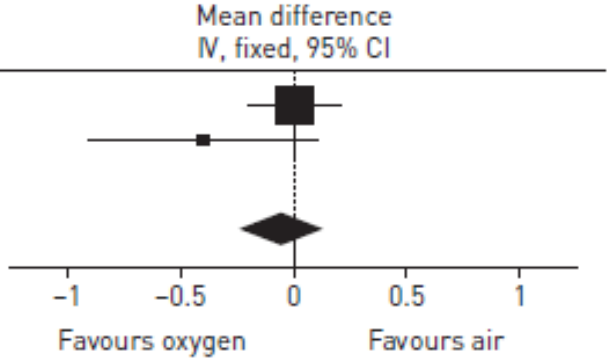


FIGURE 3 Effect of oxygen compared to air on modified Borg scale in randomised crossover trials.

Bell EC, et al., ERR 2017

Mobilní DDOT – IIP?

TABLE 1 Summary of the effects of short-term oxygen compared to air in randomised trials

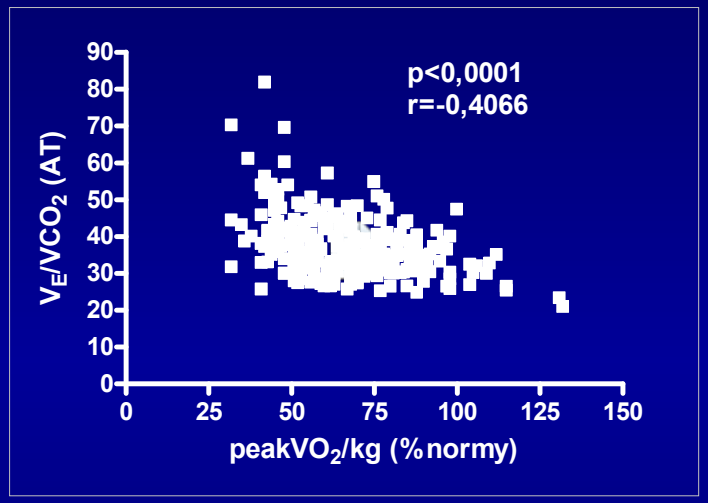
	Outcome	Studies	Participants	Estimate	Study design
During exercise	Borg dyspnoea score	2	27	−0.06 (−0.24–0.13) units lower with oxygen	Randomised, placebo-controlled, crossover
	Peak work on CPET	1	7	17 (10.60–23.40) W higher with oxygen	Randomised, placebo-controlled, crossover
	V'_{O_2peak} on CPET	1	7	Mean 1.58 L·min^{-1} on oxygen *versus* 1.32 L·min^{-1} on air, p<0.05	Randomised, placebo-controlled, crossover
	Cycle endurance time	1	16	6 (3.64–8.26) min longer with oxygen	Randomised, placebo-controlled, crossover
	6MWD	1	20	13 (−24–50) m further with oxygen	Randomised, placebo-controlled, crossover
At rest	100 mm VAS	1	10	Mean 30.2 mm on oxygen *versus* 48.1 mm on air, p<0.05	Randomised, placebo-controlled, crossover

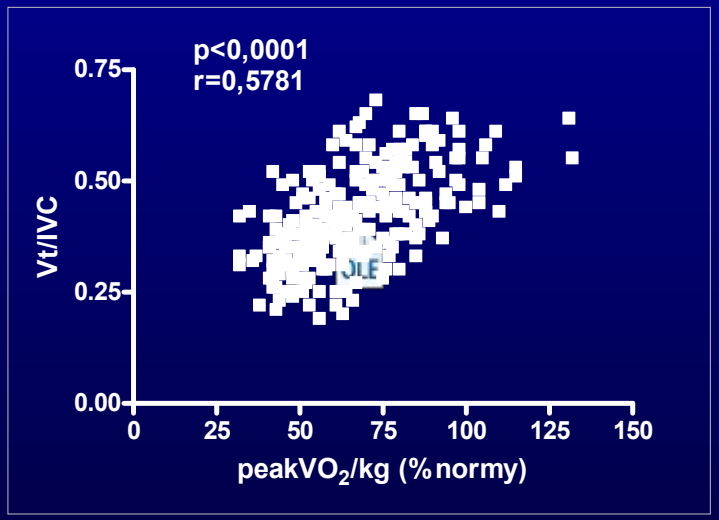
Data are presented as n or mean (95% CI), unless otherwise stated. CPET: cardiopulmonary exercise test; V'_{O_2peak}: peak oxygen uptake; 6MWD: 6 min walk distance; VAS: visual analogue scale.

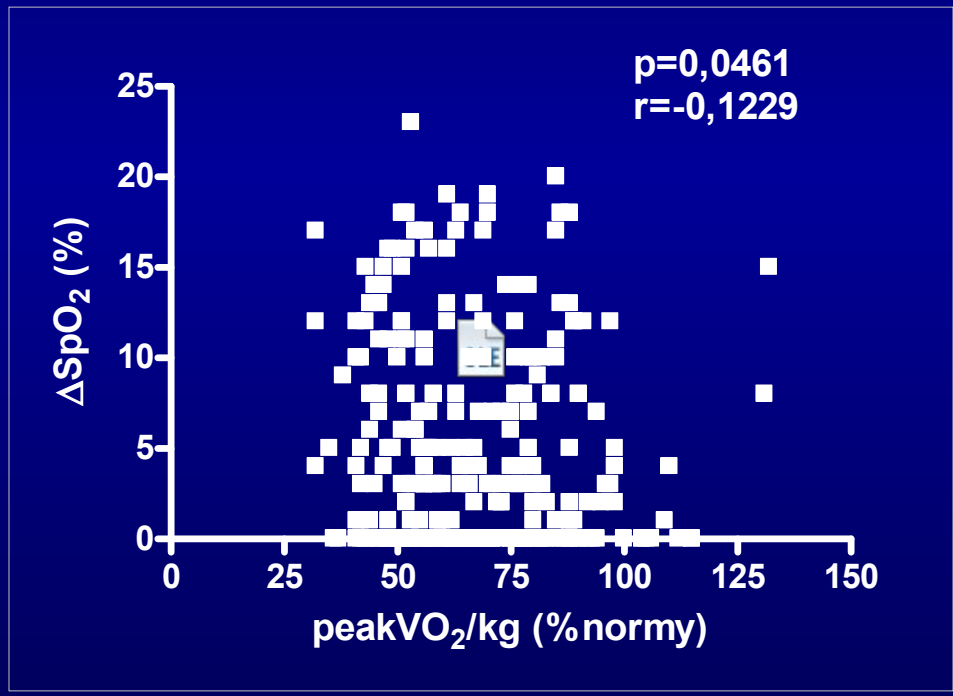
Bell EC, et al., ERR 2017

Tolerance zátěže (CPET) u IPP

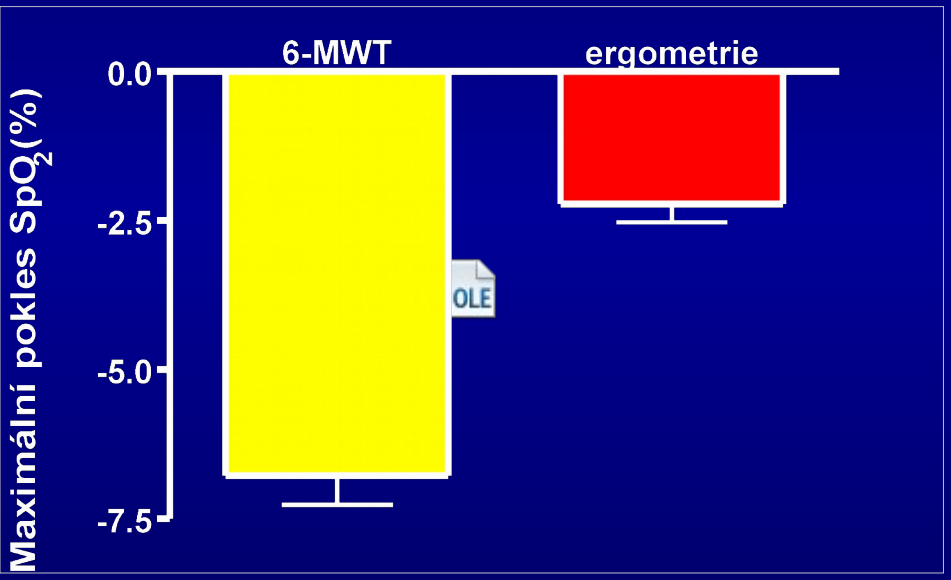
n=205



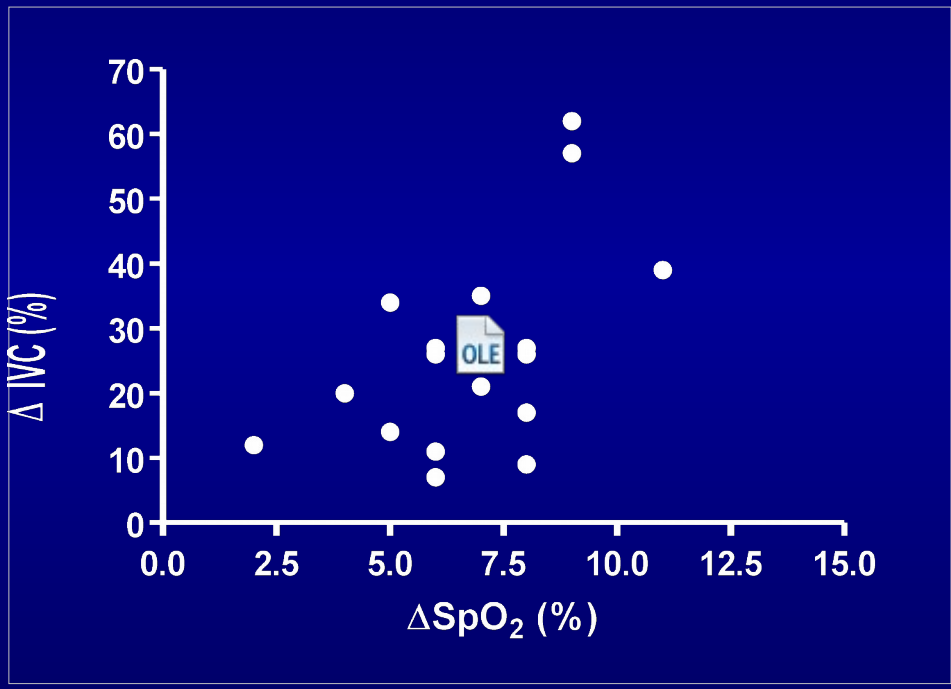




Srovnání oxygenace



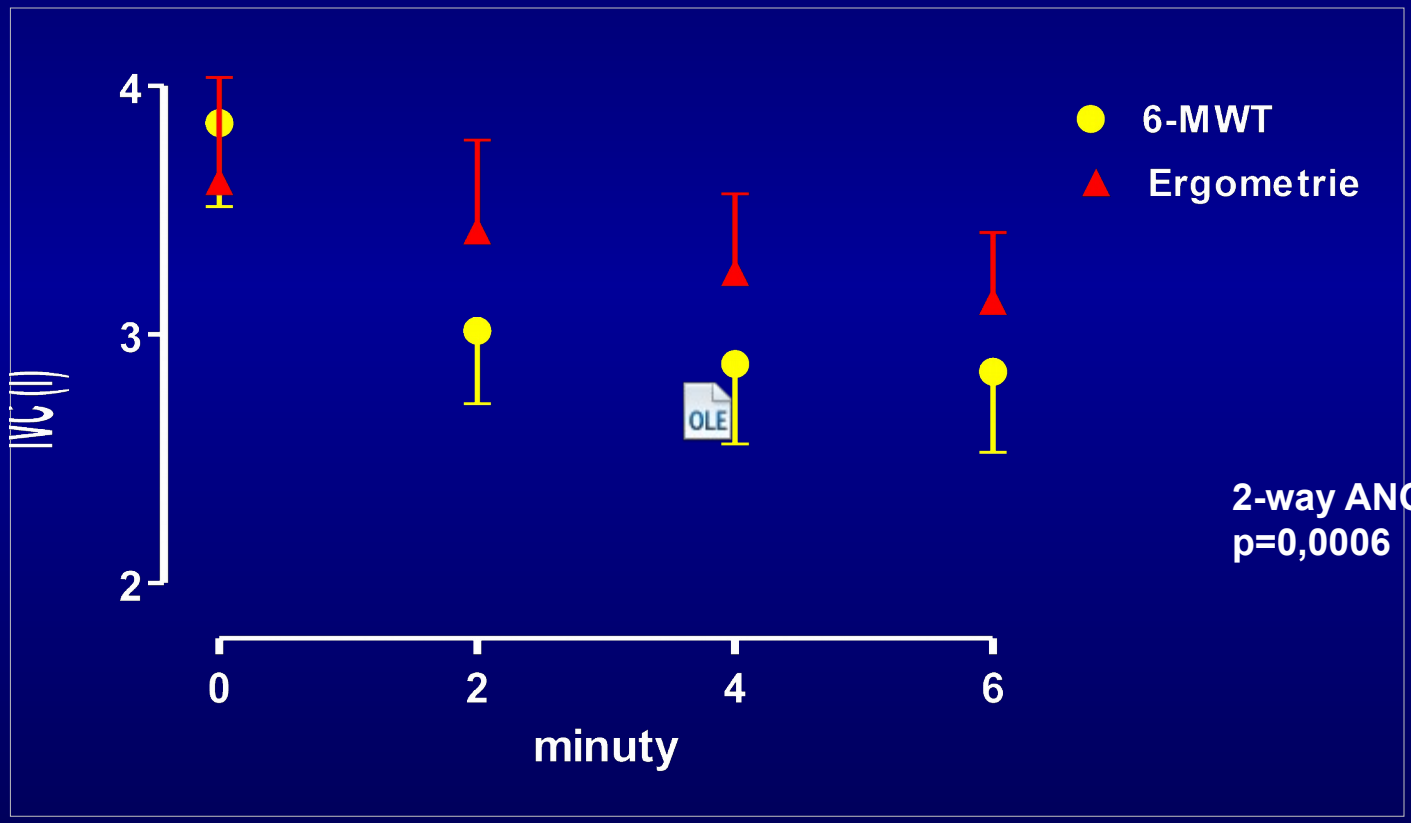
95%CI: -5,378 až -3,734
p<0,0001



r=0,5405
p=0,0206

Chlumsky J, et.al, ERS 2006

Srovnání dynamiky IVC



Chlumsky J, et.al, ERS 2006

Mobilní DDOT – jak indikovat?

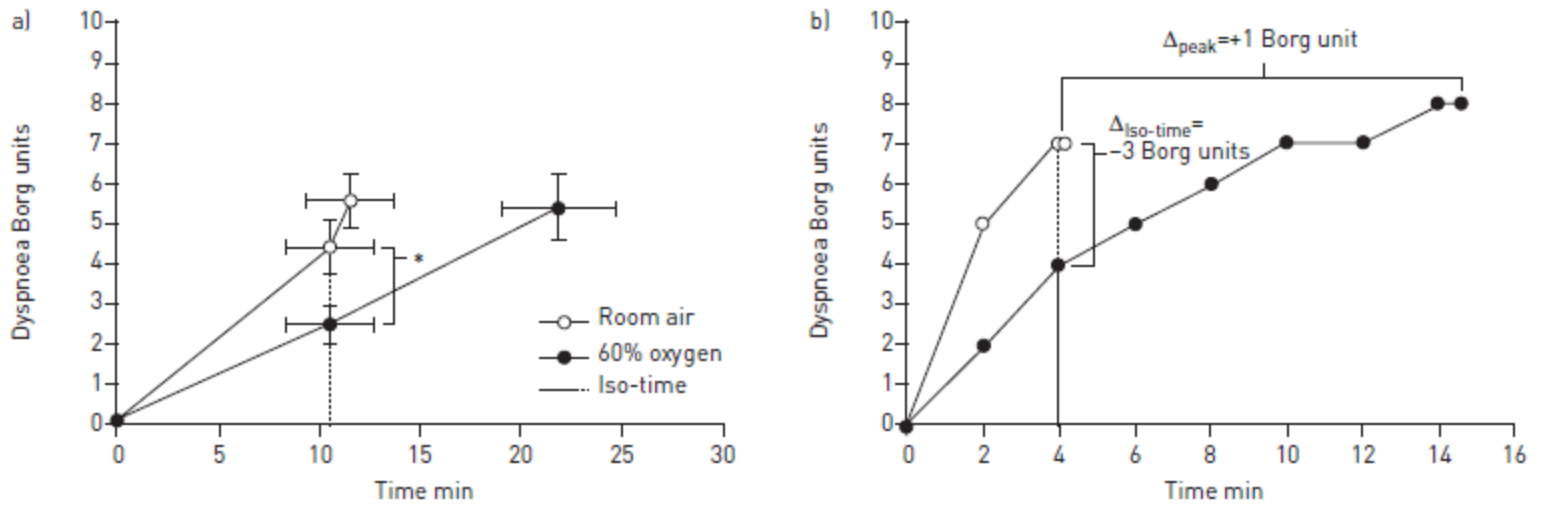


FIGURE 1 a) Dyspnoea response at rest, iso-time, and peak exercise in 20 patients with fibrotic interstitial lung disease during constant work-rate cycle exercise testing while breathing 60% oxygen or room air. There was a statistically significant improvement in dyspnoea at iso-time but no change at peak exercise. Data are presented as mean±SEM. *: $p<0.05$. b) Dyspnoea ratings every 2 min during constant load cycling in an individual patient while breathing 60% oxygen or room air. Dyspnoea ratings were reduced at all submaximal exercise times but the rating was increased at peak exercise. The Borg dyspnoea scale ranges from 0 to 10. Data from [13].

Scheaffer MR, ERJ 2017

DDOT – a co Špaňalé?

Table 4
Indications for Oxygen Therapy in Patients With Chronic Obstructive Pulmonary Disease.

	Strength of recommendation	Quality of evidence
Continuous oxygen therapy (>15 h/day)		
Indicated to improve survival and quality of life when:		
Resting PaO_2 ≤55 mmHg (7.3 kPa), or	Consistent	High
Resting PaO_2 between 56 and 59 mmHg (7.4–7.8 kPa) with evidence of organ damage by hypoxia (including right heart failure, pulmonary hypertension or polycythaemia)	Consistent	Moderate
Not recommended in patients with COPD and moderate hypoxaemia	Consistent	Poor
Oxygen flow should be sufficient to maintain PaO_2>60 mmHg (8.0 kPa) or SpO_2 >90%	Consistent	High
Oxygen therapy during exercise		
May improve the quality of life of patients with exercise desaturation (SpO_2 ≤88%)	Weak	Poor
Demonstration of the correction of hypoxaemia during exercise by administering oxygen (SpO_2 ≥90%) accompanied by an improvement of dyspnoea or exercise tolerance is required for prescription	Weak	Poor
May be useful during exercise in patients in rehabilitation programmes, to increase the duration and intensity of training	Weak	Moderate
Nocturnal oxygen therapy		
May be considered in patients with demonstrated nocturnal oxyhaemoglobin desaturation (SpO_2 <90% for at least 30% of total recording time) and hypoxia-related sequelae (polycythaemia or signs of right heart failure)	Weak	Poor
CPAP or mechanical ventilation should be considered for replacing or supplementing oxygen	Consistent	Moderate
Oxygen during air travel		
Requires specifically titrated oxygen flow during sleep, exercise and air travel	Consistent	Poor

Ortega Ruiz 7, et al., Arch.Bronconeumol 2014

Možnosti indikace mobilních DDOT

1.Varianta – tak by to mělo být, pokud ctíme EBM
paO2 < 7,3 kPa, případně
paO2 < 8,0 kPa + PAH, polyglobulie ???
průkaz mobility při pO2 < 7,3 kPa
Aktigrafie k měření denních aktivit měsíc před indikací a dále po přidělení DDOT (alespoň 30min/den a zlepšení o 50%)

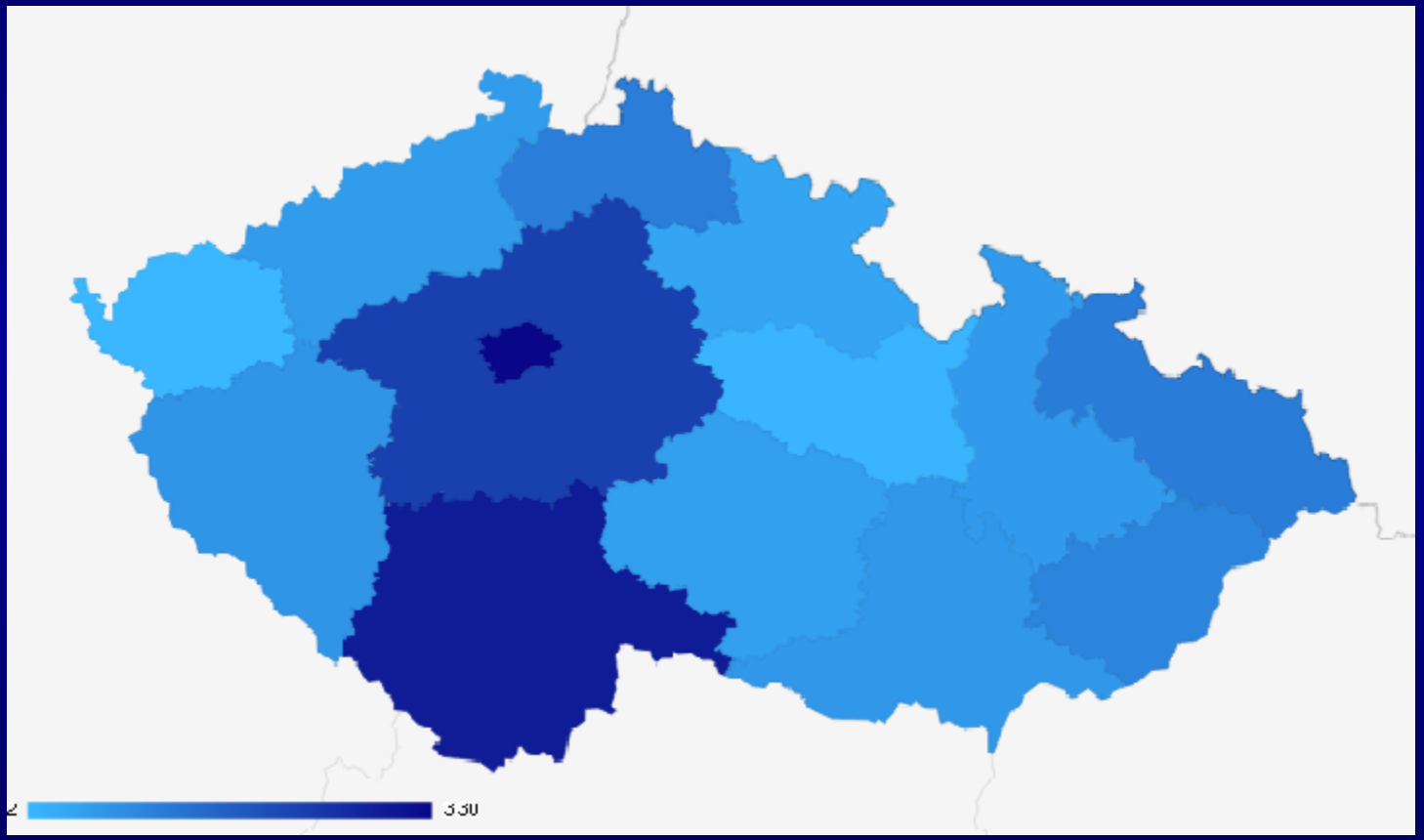
Spánková desaturace – NE (sleep lab)
Zátěžová desaturace – NE (viz výše)

Možnosti indikace mobilních DDOT

2.Varianta – uděláme to po česku, tedy necháme vše při starém
paO2 < 7,3 kPa, případně
paO2 < 8,0 kPa + PAH, polyglobulie
průkaz mobility nadiktovaný VZP:

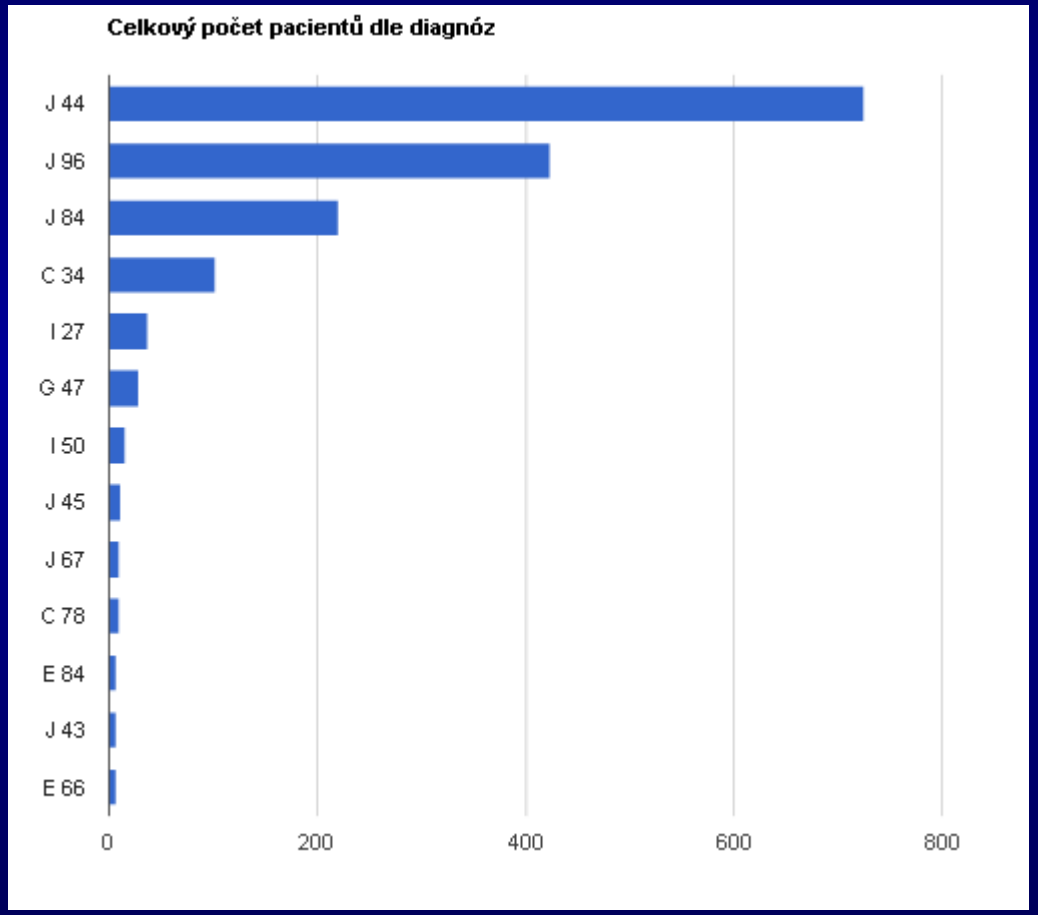
Spánková desaturace – ANO
Zátěžová desaturace – ANO

Registr DDOT - kraje



www.ddot.cz

Registr DDOT



www.ddot.cz

Registr s doporučení DDOT

www.ddot.cz – by se mohlo stát zdrojem informací

Bylo by prima mít vlastní data o efektivitě mobilních zařízení
Multicentrická studie s monitorováním pohybových aktivit

Otázky, připomínky, nápady, prosím pište na: jan.chlumsky@ftn.cz