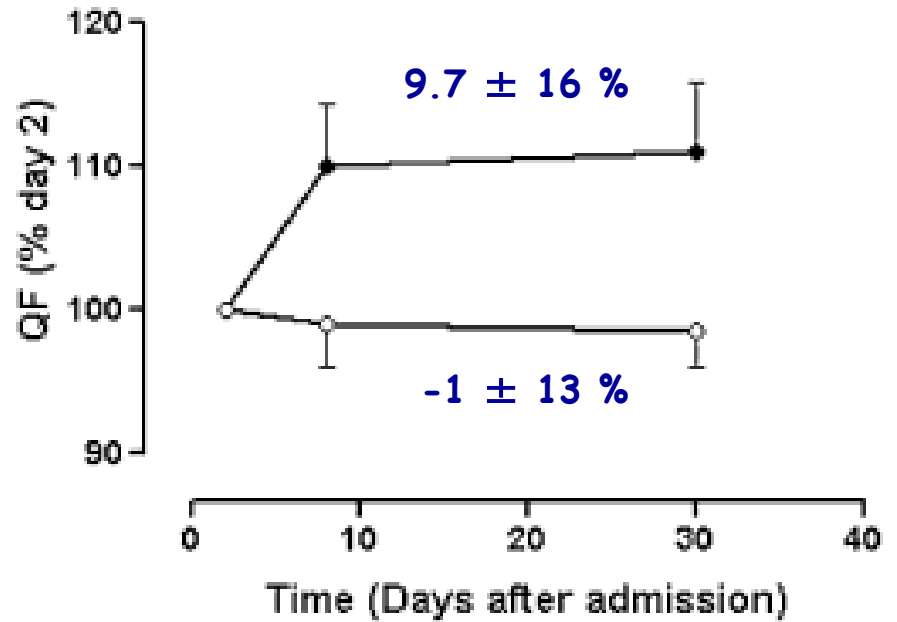
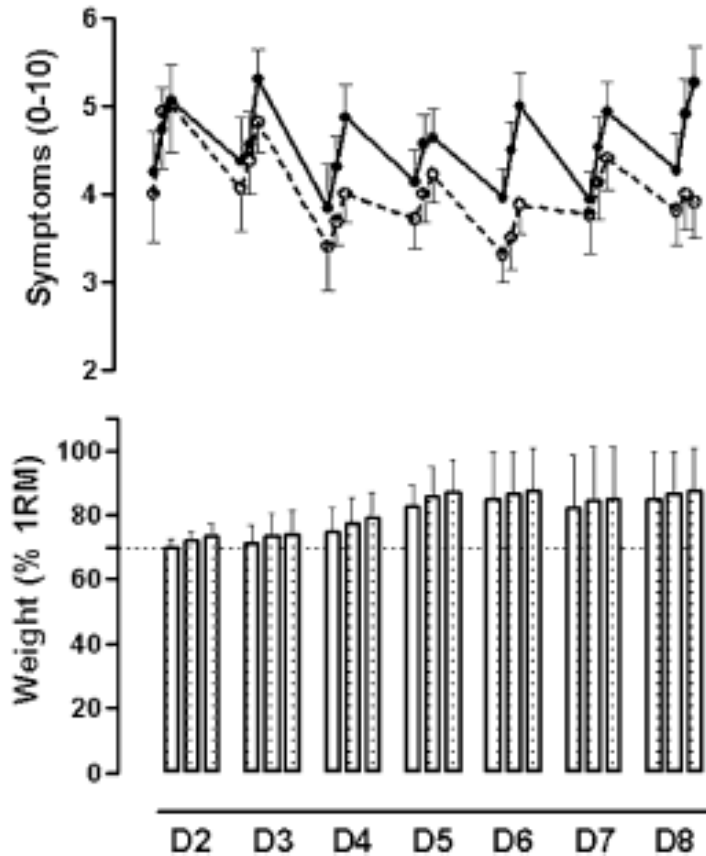


BPCO sévère en exacerbation



Durée et Fréquence /séances recommandée

- Durée de l'effort continu : 30 à 45 min
Durée séance : 45 à 90 min
- Fréquence : 3 x/sem

Rehabilitation of patients with COPD.

Exercise twice a week is not sufficient !

38 patients BPCO VEMS 47%vp et TM6 413 ± 75 m (SGRQ (T) 44 ± 21)

Rehabilitation (n = 17) 2x/sem pd 8 sem: 1h exercise + 45' éducation vs
Contrôle (n 21)

Résultats: TM6 : + 29m (NS) - SGRQ (NS)

Ringbaek Respir Med 2000



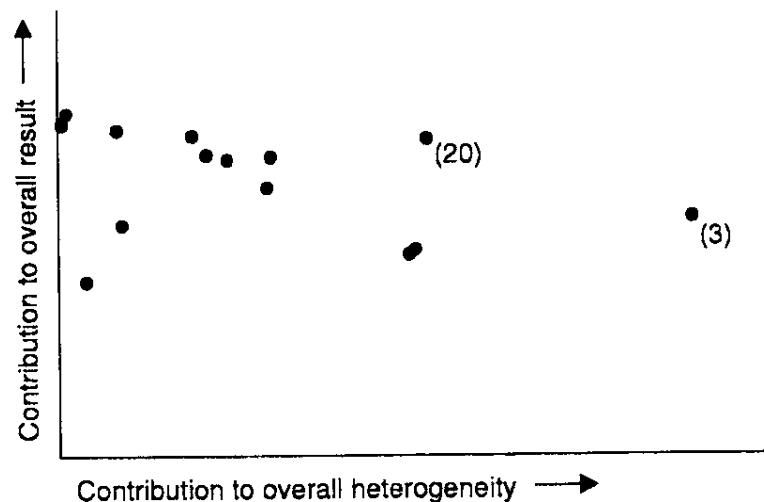
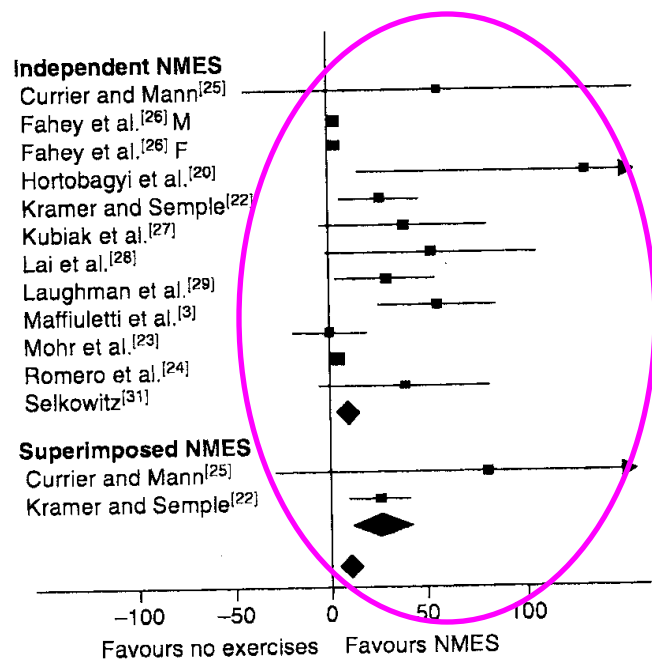
Electrostimulation neuromusculaire

The metabolic response during resistance training and neuromuscular electrical stimulation (NMES) in patients with COPD, a pilot study

Maurice J.H. Sillen^a, Paul P. Janssen^b, Marco A. Akkermans^b,
Emiel F.M. Wouters^{c,1}, Martijn A. Spruit^{b,*}

	RT	NMES	p-Value
Resting VO ₂ (ml/min)	273 (229-311)	241 (208-283)	0.099
Peak VO ₂ (ml/min)	497 (443-592)	311 (238-359)	0.001
Peak VO ₂ (% peak VO ₂ CPET)	57 (45-84)	34 (30-42)	0.001
Resting VE (l)	14 (12-18.5)	13 (11.5-15)	0.023
Peak VE (l)	28 (22.0-32.5)	14 (12.5-19.5)	0.001
Peak VE (% MVV)	58 (43-78)	31 (25-37)	0.001
Borg dyspnoea (points)	3 (2-4)	1 (1-3)	0.005
Borg fatigue (points)	3 (2.5-5)	2 (0.8-3.5)	0.031

ES versus absence d'exercice



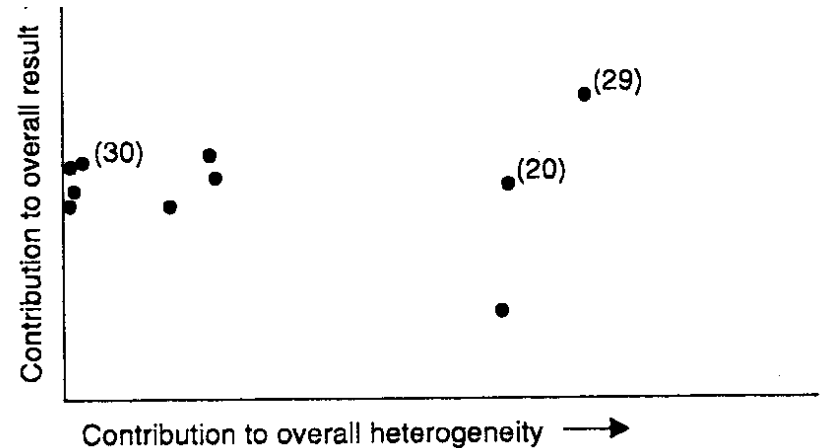
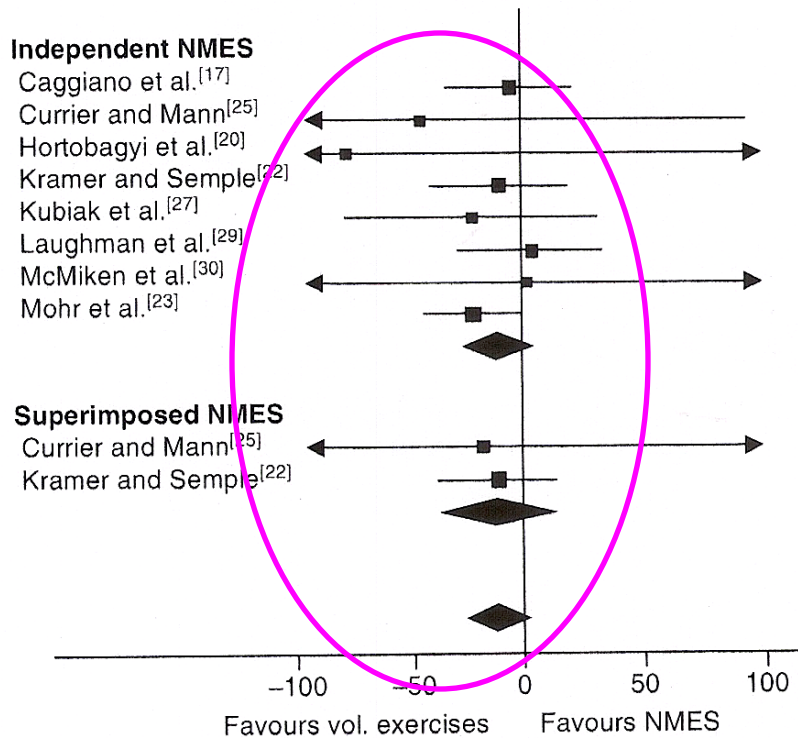
ES > Aucun Exercice : 12 études – 235 patients.... Mais grande variabilité des résultats

Does neuromuscular electrical stimulation strengthen the quadriceps femoris?

A systematic review of randomised controlled trials. [Bax L](#), [Staes F](#), [Verhagen A](#). [Sports Med](#). 2005;35(3):191-212

Effacité gain de force sur le muscle sain ?

ESNM versus exercice



Exercice > ESNM : 8 études

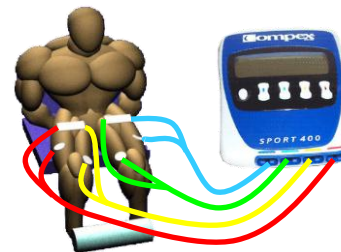
REVIEW

Electrical stimulation and peripheral muscle function in COPD: A systematic review

Marc Roig ^{a,b,*}, W. Darlene Reid ^{a,b}

Bénéfices physiologiques de l'ESNM

	Fonction musculaire périphérique				Tolérance à l'effort							
	FQ		EQ		TM6		Shuttle T		Endurance (80%VO ₂ pic)		VO ₂ pic	
	GC	GE	GC	GE	GC	GE	GC	GE	GC	GE	GC	GE
Neder (n=15) Thorax 2002	9%	42%*	1.6%	34%*					-12%	+ 87%*	11.3%	20%*
Bourjeily (n=18) Thorax 2002	9%	39%*					1.6%	36.1%*			-1.6%	+ 6.1%
Vivotdzev (n=17) Chest 2006	14%	35%*			6% vt	11%* vt						
Dalcorso (n=17) Respir Med 2007	1.2%	10%			0%	2.7%						





REVIEW

Electrical stimulation and peripheral muscle function in COPD: A systematic review

Marc Roig^{a,b,*}, W. Darlene Reid^{a,b}

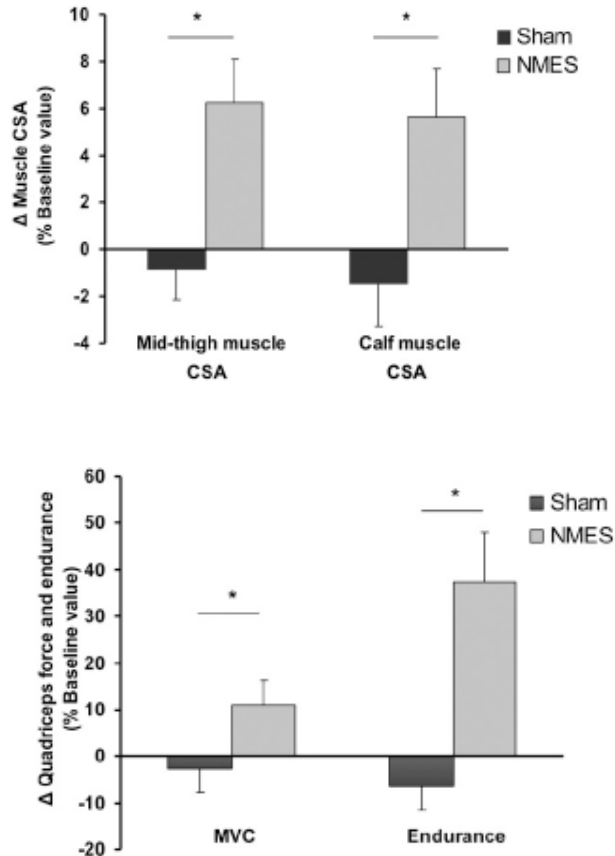
modalités de l'ESNM

Revue systématique	Clinique VEMS%	Nature des programmes ES					
		Freq Hz	Impulsion µs	Intensité mA	Interventions	Sessions nbr/h	Cycle c/r (sec)
Neder (n=15) Thorax 2002	Stable VEMS 38%	50	300-400	10-100	6sem ss ES 1sem (5x15') + 5sem (5x30')	30 13h45	2/18 (sem1) 5/25 (sem2) 10/30 (sem3-6)
Bourjeily (n=18) Thorax 2002	Stable VEMS 38%	50	200	55-100	Fausse ES idem GE 3 x20 min/sem/6sem	18 6h	2/15
Vivotdzev (n=17) Chest 2006	Stable -30% BMI	35	400	15-70	MAP/6sem MAP + 4x30'/6sem	16 8h	7/8
Dalcorso (n=17) Respir Med 2007	Stable VEMS 50%	50	400	24-50	Fausse ES idem GE 1sem(5x15') + 5sem (5x 30-60')	30 23h45	2/10 (sem1) 5-25 (sem2) 10-30 (sem3-4) 10/20 (sem 5-6)

Functional and Muscular Effects of Neuromuscular Electrical Stimulation in Patients With Severe COPD : A Randomized Clinical Trial

Isabelle Vivodtzev, Richard Debigaré, Philippe Gagnon, Vincent Mainguy, Didier Saey, Annie Dubé, Marie-Eve Paré, Marthe Bélanger and François Maltais

Chest 2012;141:716-725; Prepublished online November 23, 2011; DOI 10.1378/chest.11-0839



Respiratory Medicine (2012) 106, 1429–1434



Available online at www.sciencedirect.com

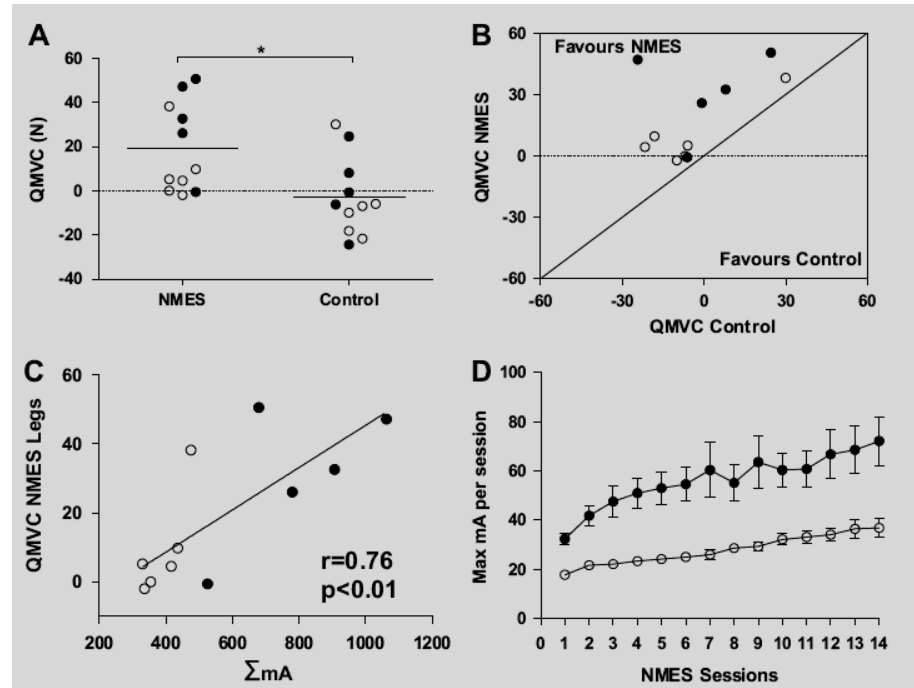
SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/rmed



Neuromuscular electrical stimulation prevents muscle function deterioration in exacerbated COPD: A pilot study

Santiago Giavedoni^a, Andrew Deans^{a,b}, Paul McCaughey^b, Ellen Drost^a, William MacNee^a, Roberto A. Rabinovich^{a,*}



Entraînement des muscles inspiratoires



Condition:

Faiblesse des muscles inspiratoires
 $P_{I_{max}} < 60 \text{ cmH}_2\text{O}$ (50 à 60% vp)

Intensité d'entraînement (en fct des études):

basse 30% $P_{I_{max}}$ ou haute 50-80% $P_{I_{max}}$

Durée : 15 à 20 min/ J

Résultats : amélioration de la force, de l'endurance des muscles respiratoires et de la performance à l'exercice avec diminution de la dyspnée (GOLD III-IV)

Impact de la durée de la réhabilitation

3, 4, 7, 12 ou 24 semaines ?

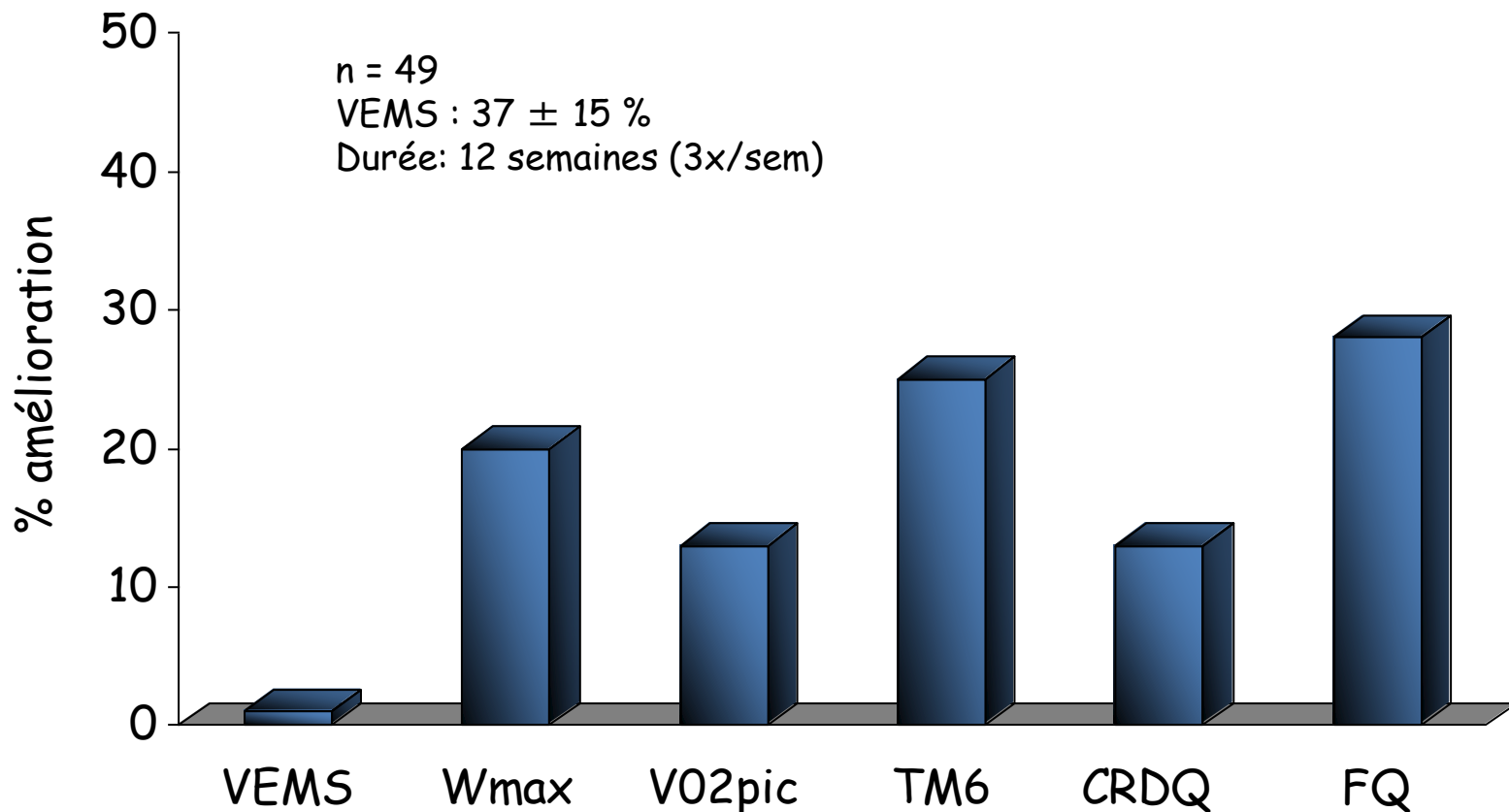
Paramètres	T10		T20		p
	répondeur n (%)	non-répondeur	répondeur	non répondeur	
Wmax	12 (48)	13 (52)	17 (68)	8 (32)	0,025
TM6	5 (20)	20 (80)	19 (76)	6 (24)	0,001
Dyspnée	11 (44)	14 (56)	17 (68)	8 (32)	0,134
Fatigue jambes	16 (64)	9 (36)	16 (64)	8 (32)	0,739
SGRQ (Total)	9 (36)	16 (64)	16 (64)	9 (36)	0,008

Rossi Chest 2005

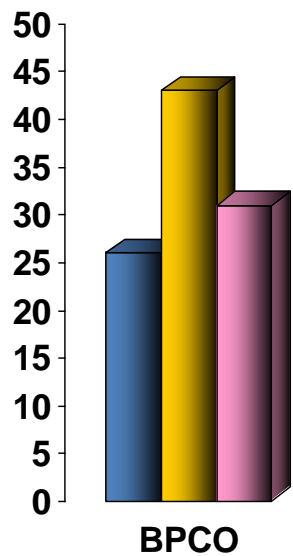
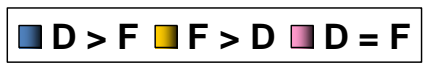
	Avant	3 mois	6 mois
Temps de marche (min)	52 ± 23	59 ± 29	64 ± 28*
Temps assis	362 ± 106	395 ± 123	365 ± 104
Temps couché (min)	91 ± 106	71 ± 75	57 ± 79*
Vitesse de marche (m/s ²)	1,80 ± 0,2	1,88 ± 0,3	1,92 ± 0,3*

Pitta Chest 2008

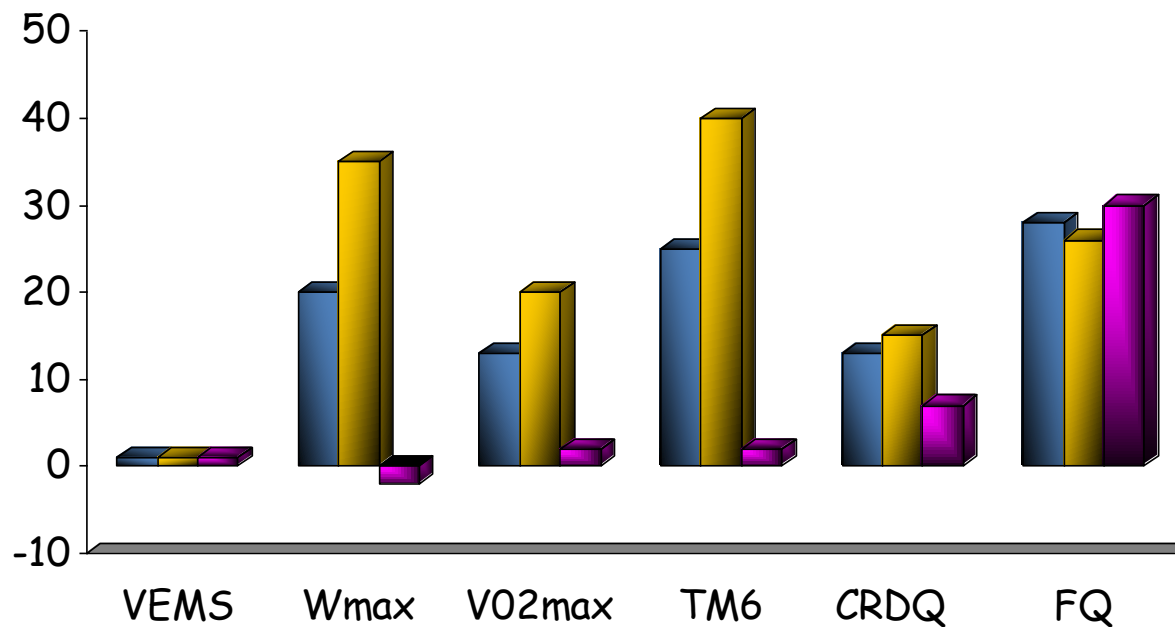
Bénéfices physiologiques de la réhabilitation



Répondeur - non-répondeur



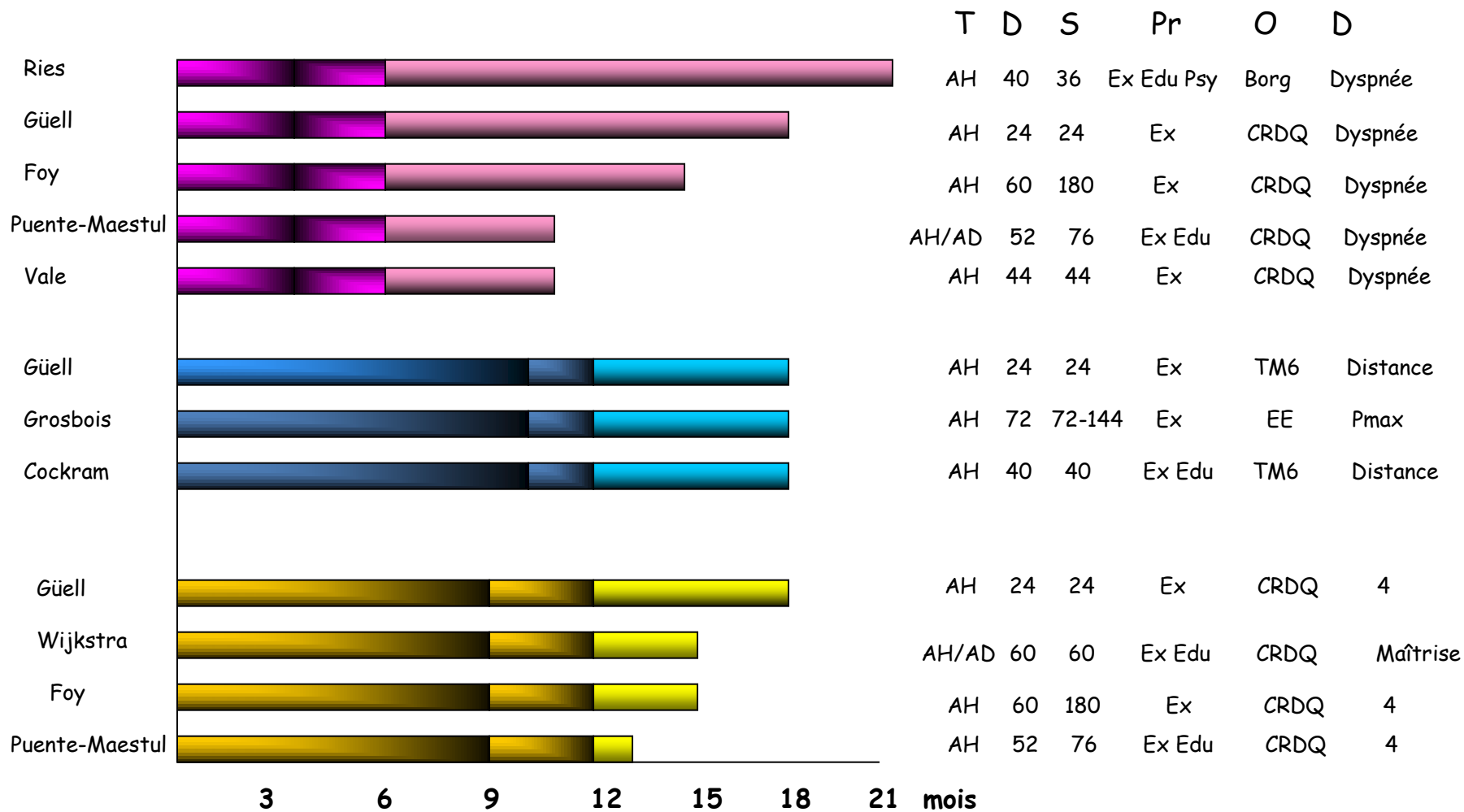
EEmax (n=97)

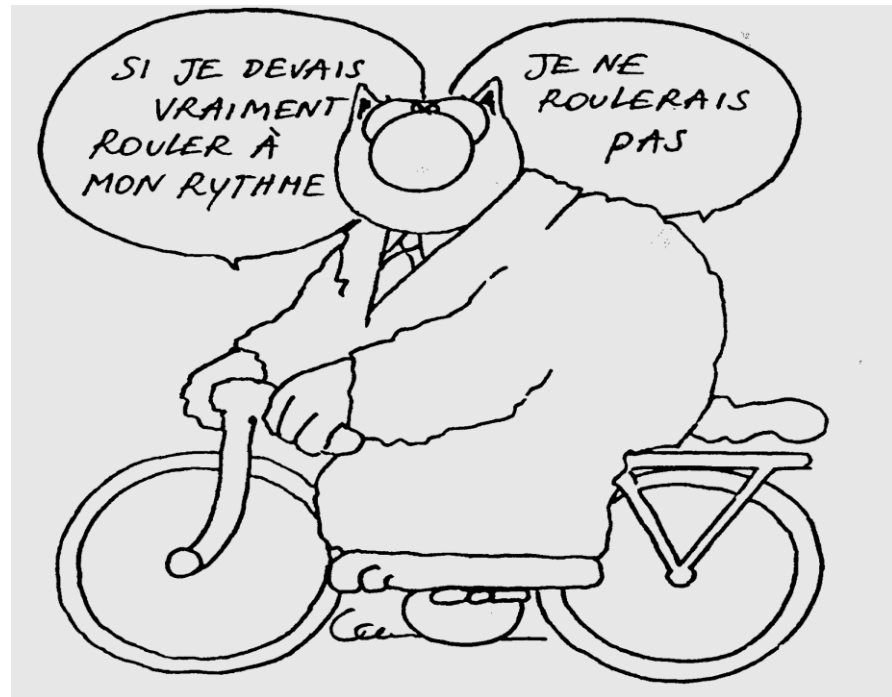


Critères répondeurs : > 15% Wmax et/ou > 25% TM6 et +10 points CRDQ

VEMS: 46.6 ± 14.2
 Wpic : 86 ± 39.5 W ($60 \pm 23\%$)
 VEpic : $72 \pm 19.3\%$
 Fcpic : $76 \pm 13.5\%$

Programmes de maintenance BPCO





Merci de votre attention

Hôpital
Erasme



ULB



L'équipe de réadaptation pulmonaire
CHU Erasme Bruxelles

